FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
PROJECT NO. C915-00-258
CSJ: 0915-00-258

VARIOUS COUNTIES
VARIOUS LOCATIONS

LIMITS FROM: VARIOUS LOCATIONS DISTRICTWIDE

NET LENGTH OF ROADWAY = VARIOUS
NET LENGTH OF BRIDGE = VARIOUS
NET LENGTH OF PROJECT = VARIOUS

FOR WORK CONSISTING OF ADDRESS VARIOUS BRIDGE REPAIR INCLUDING SCOUR

DESIGN SPEED = VARIOUS

AREA OF DISTURBED SOIL = < 1 ACRE

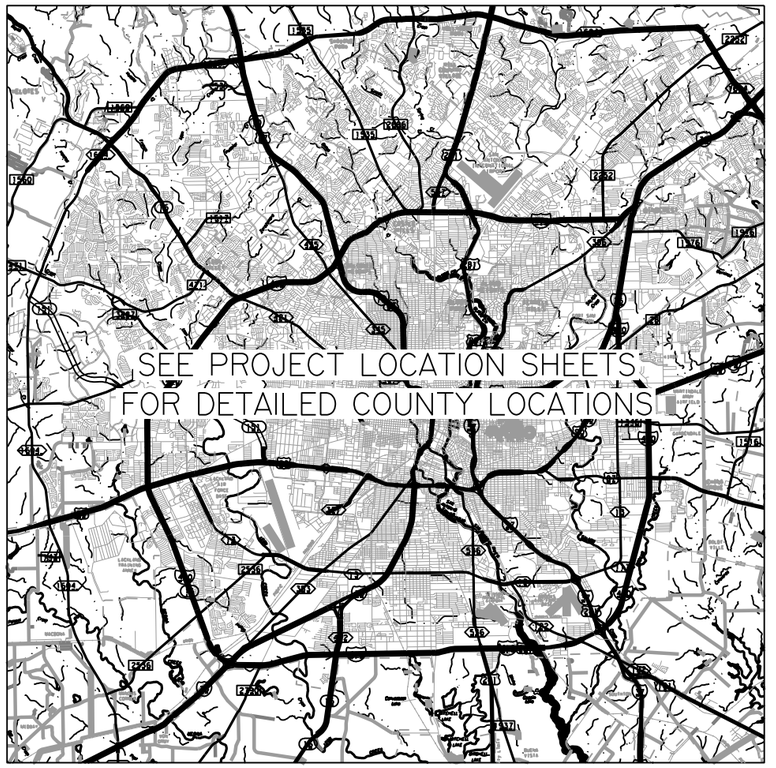
ADT: N/A

ACCESSIBILITY STANDARDS = PROWAG

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

N. T. S.



EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

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

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR 4/25/2023
DocuSigned by: Malcolm Gonzalez, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
4B3B3E15AE53483...

RECOMMENDED FOR 4/25/2023
DocuSigned by: Clayton Kipps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT
74F59ACB883D4EB...

REVIEWED FOR 4/26/2023
DocuSigned by: D C Rogers, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
F29100BAA5084 99...

APPROVED FOR 4/26/2023
DocuSigned by: Gina E. Gallegos, P.E.
DISTRICT ENGINEER
124372CCDF604F5...

FILE LOCATION AND NAME
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LEVELS DISPLAYED
1

COUNTY_____ PROJ. NO._____
HWY. NO._____ LETTING DATE_____
DATE ACCEPTED_____

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Malcolm Gonzalez, P.E.
4B3B3E15AE53483...
4/27/2023
.E. DATE

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

STATE OF TEXAS
LEON BRANDEN FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Leon Flournoy
79F8147C39E9454...
4/27/2023
LEON BRANDEN FLOURNOY, P.E. DATE

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

• STATEWIDE STANDARD
•• SAN ANTONIO DISTRICT STANDARD
••• CITY STANDARD (VARIOUS)

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		2
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

RDWY REF NO	COUNTY	HIGHWAY	NBI	LOCATION	PROJECT COORDINATES	FEATURE CROSSED
15-CULV-1	Bexar	IH 10 CONN	15-015-0-0025-02-204	0.11 MI E OF LP 410	29.437382, -98.388432	DRAIN
15-BM_STL-2	Bexar	IH 10 WB	15-015-0-0025-02-213	0.9 MI SW OF LP 410	29.431720, -98.405206	LOOP 13
15-BM_STL-3	Bexar	LP 410 SB	15-015-0-0521-06-110	1.2 MI NW OF IH 10	29.447718, -98.403460	LP 13 NB (CONN. F FROM 410)
15-BM_STL-4	Bexar	LP 410 SB	15-015-0-0521-06-172	0.8 MI S OF US 87	29.386716, -98.390401	SINCLAIR RD
131-BM_STL-5	Kendall	JOHNS RD	15-131-0-0072-06-131	1.7 MI SE OF US 87	29.795227, -98.752326	IH 10
15-BM_CNC-6	Bexar	IH 35	15-015-0-0017-03-282	5.2 MI SW OF LP 1604	29.249995, -98.746868	LUCKEY RD
15-BM_CNC-7	Bexar	IH 35 SBML	15-015-0-0017-09-127	1.7 MI S OF US 90	29.368216, -98.518368	SOUTHCROSS BLVD
15-BM_CNC-8	Bexar	US 281 NB	15-015-0-0073-08-207	0.9 MI S OF LP 410	29.507877, -98.477716	SUNSET ROAD
15-SCR-9	Bexar	LP 1604	15-015-0-2452-02-104	0.75 MI W OF US 281	29.609338, -98.480724	LORENCE CREEK
15-SCR-10	Bexar	LP 1604	15-015-0-2452-03-124	3.9 MI E OF US 281	29.601653, -98.403993	WATERHOLE CREEK
15-SCR-11	Bexar	FM 78	15-015-0-0025-09-138	6.6 MI NE OF LP 410	29.505088, -98.310816	W BR OF SALITRILLO CRK
15-SCR-12	Bexar	SH 16 NB	15-015-0-0291-10-087	1.0 MI NW OF LP 410	29.492203, -98.614251	HUEBNER CREEK
7-RAIL_STL-13	Atascosa	IH 37 SB	15-007-0-0073-06-166	0.85 MI NW OF FM 791	28.769802, -98.304450	BORREGO CREEK
7-RAIL_STL-14	Atascosa	SH 16	15-007-0-0613-02-003	0.6 MI N OF FM 3350	28.969961, -98.574249	SALT BRANCH
95-RAIL_STL-15	Guadalupe	FM 466	15-095-0-0216-03-013	2.85 MI S OF US 90	29.540104, -97.928670	GUADALUPE RIVER
131-RAIL_STL-16	Kendall	IH 10 WBML	15-131-0-0072-05-126	2.8 MI N OF SH 46	29.814656, -98.754076	CIBOLO CRK & RANGER RD
131-RAIL_STL-17	Kendall	IH 10 EBML	15-131-0-0072-05-127	2.8 MI N OF SH 46	29.814653, -98.754199	CIBOLO CRK & RANGER RD
131-RAIL_CNC-18	Kendall	IH 10 WBML	15-131-0-0072-05-165	8.8 MI NW OF SH 46	29.886774, -98.809110	LITTLE JOSHUA CRK & FM 289
131-RAIL_CNC-19	Kendall	IH 10 EBML	15-131-0-0072-05-174	1.0 MI SE OF US 87	29.969606, -98.892604	GUAD RIV/FM 473/FM 1621
131-RAIL_CNC-20	Kendall	IH 10 EBML	15-131-0-0072-05-178	1.1 MI SE OF FM 1621	29.939244, -98.870060	HOLIDAY CREEK
131-RAIL_CNC-21	Kendall	IH 10 WBML	15-131-0-0072-05-182	2.0 MI NW OF FM 289	29.910537, -98.825050	BIG JOSHUA CRK & RUST RD
131-RAIL_STL-22	Kendall	IH 10 WBFR	15-131-0-0072-05-200	0.03 MI S OF RANGER RD	29.814643, -98.754553	CIBOLO CREEK
131-RAIL_STL-23	Kendall	RM 1376	15-131-0-1899-01-006	0.82 MI S OF RM 473	29.956916, -98.717186	GUADALUPE RIVER
133-RAIL_STL-24	Kerr	IH 10 EB	15-133-0-0142-02-151	0.9 MI S OF KIMBLE CO LN	30.282619, -99.511048	DRAW
133-RAIL_CNC-25	Kerr	IH 10 EB	15-133-0-0142-14-077	6.3 MI SE OF SH 16	30.052721, -99.011914	CYPRESS CREEK & SCHULTZ RD
163-RAIL_STL-26	Medina	IH 35 SBML	15-163-0-0017-05-232	3.57 MI NE OF FRIO C/L	29.120463, -98.907898	SAN FRANCISCO PEREZ CREEK
15-BRG-27	Bexar	IH 10 EB	15-015-0-0072-12-041	0.75 MI SE OF SP 421	29.438565, -98.505302	W POPLAR ST
15-BRG-28	Bexar	IH 37 NB	15-015-0-0073-08-046	0.9 MI S OF IH 10	29.384160, -98.469406	FAIR AVE
15-BRG-29	Bexar	IH 37 SB	15-015-0-0073-08-045	0.6 MI S OF IH 10	29.387528, -98.473504	HACKBERRY ST
15-BRG-30	Bexar	IH 37 NB	15-015-0-0073-08-044	0.6 MI S OF IH 10	29.387797, -98.473518	HACKBERRY ST
15-BRG-31	Bexar	IH 35 SBML	15-015-0-0016-07-164	2.98 MI S OF SH 218	29.539906, -98.379233	WEIDNER RD

RDWY REF NO GUIDE (A-B-Location #)	
A	B
7-Atascosa	CULV - Culvert Interior Wall Repair
15-Bexar	BM_STL - Steel Beam Repair
95-Guadalupe	BM_CNC - Concrete Beam Repair
131-Kendall	SCR - Scour Repair
133-Kerr	RAIL_STL - Steel Rail Repair
163-Medina	RAIL_CNC - Concrete Rail Repair
	BRG - Bearing Seat Repair

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

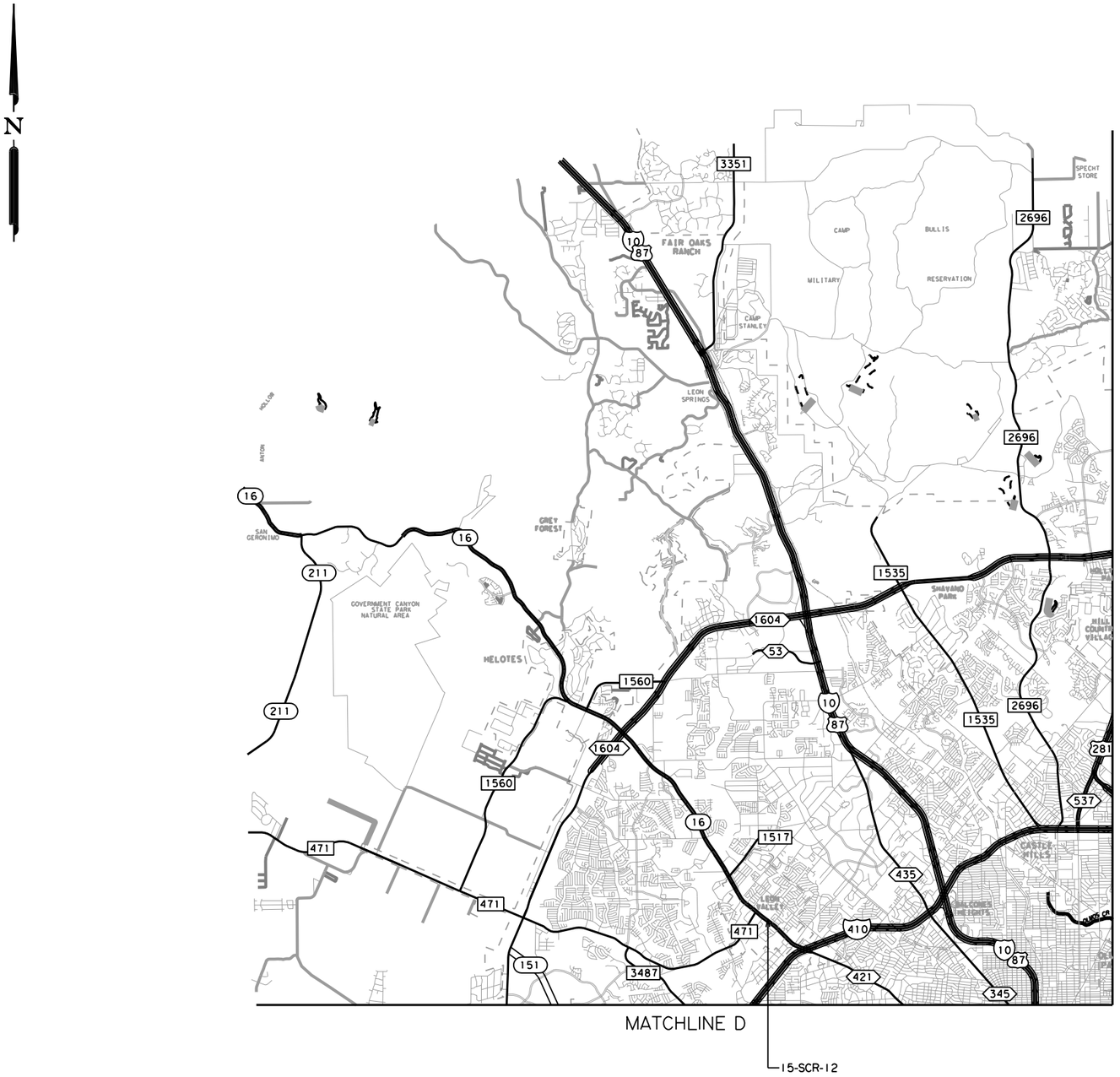
MALCOLM GONZALEZ, P.E. DATE

Texas Department of Transportation

ROADWAY REFERENCE NUMBER

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		3
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

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LOCATION MAP

BEXAR COUNTY

SHEET 1 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		4
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

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LOCATION MAP

BEXAR COUNTY

SHEET 2 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		5
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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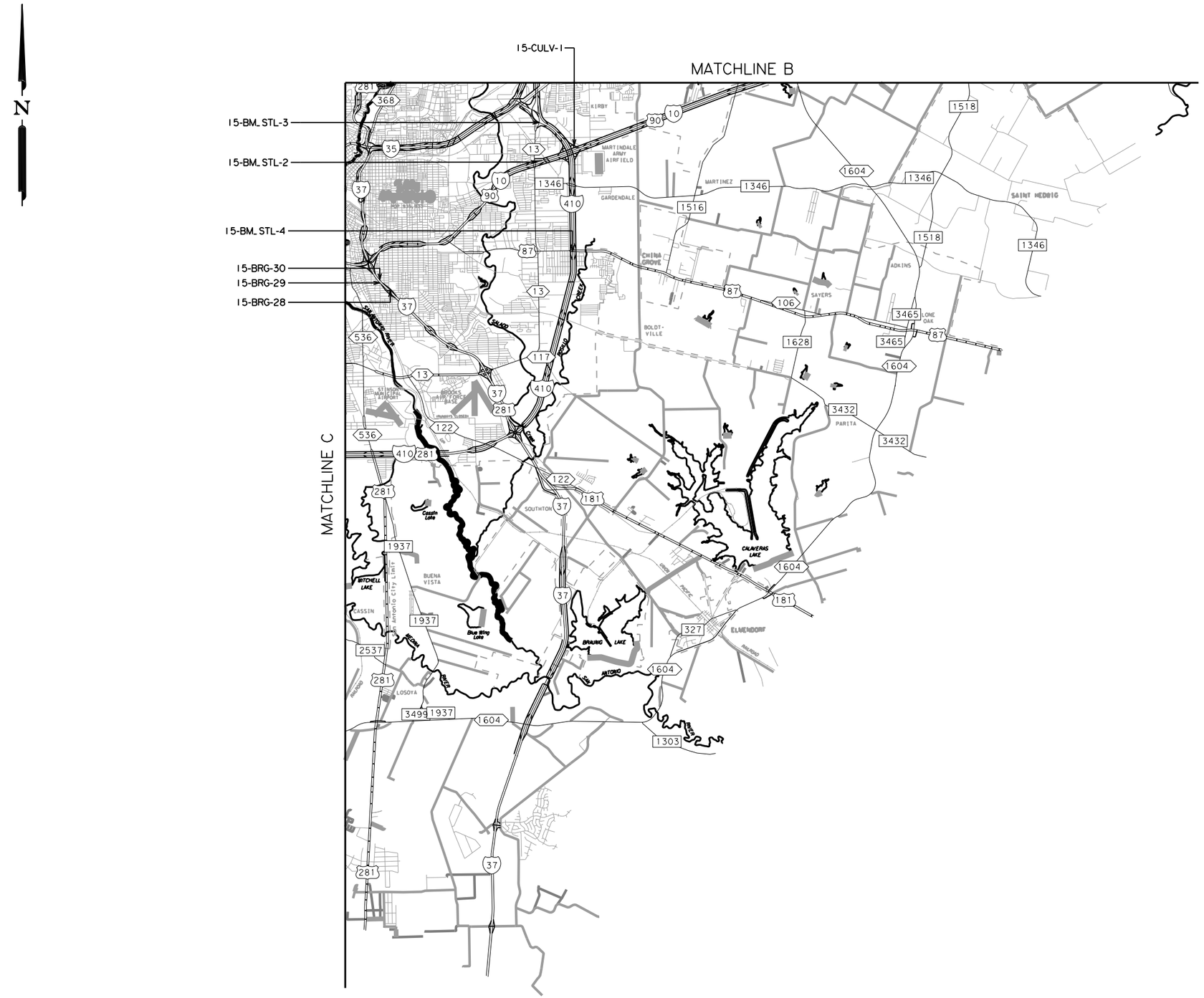


Malcolm Gonzalez, P.E.

MALCOLM GONZALEZ, P.E. — 4/27/2023 DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

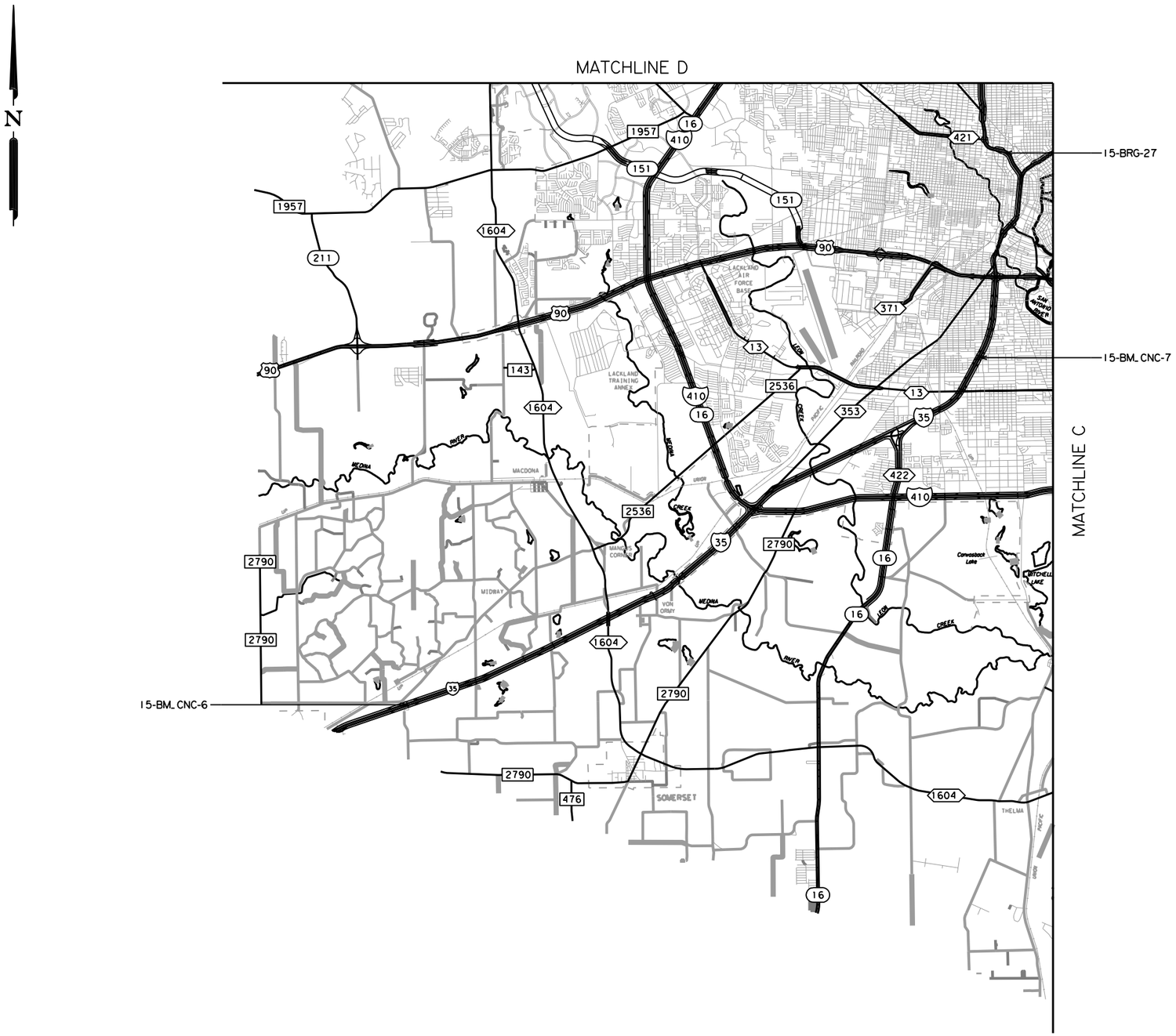
LOCATION MAP

BEXAR COUNTY

SHEET 3 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	6

STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.

4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

LOCATION MAP

BEXAR COUNTY

SHEET 4 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	7

STATE	DIST.	COUNTY
TEXAS	SAT	VARIOUS

CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
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VERTICAL: N.T.S.

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LOCATION MAP

KENDALL COUNTY

SHEET 5 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		8
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.

MALCOLM GONZALEZ, P.E. — 4/27/2023 DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

LOCATION MAP

ATASCOSA COUNTY

SHEET 6 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		9
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.
4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

LOCATION MAP

GUADALUPE COUNTY

SHEET 7 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		10
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

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LOCATION MAP

KERR COUNTY

SHEET 8 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		11
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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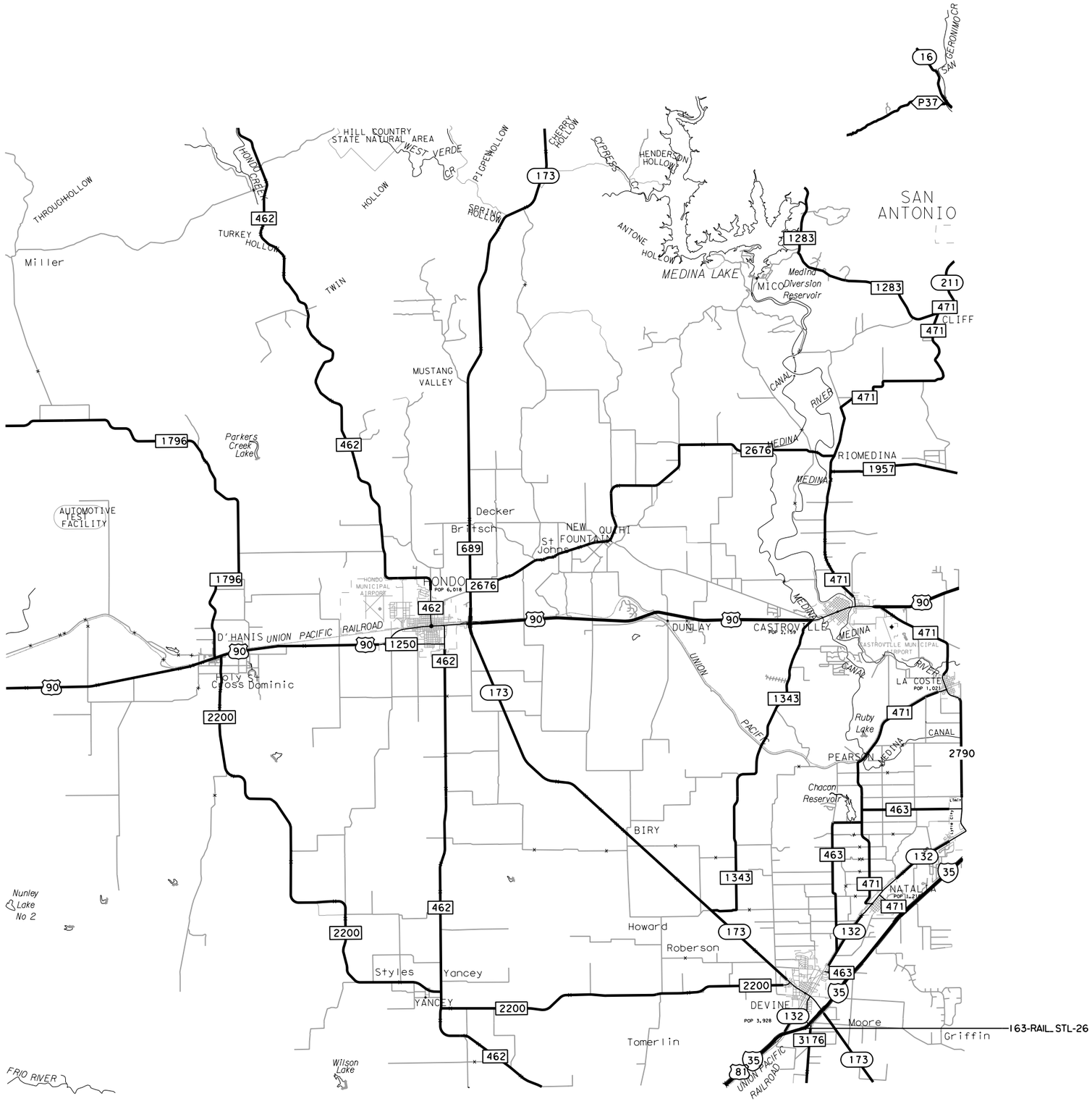

Malcolm Gonzalez, P.E.

4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

LOCATION MAP

MEDINA COUNTY

SHEET 9 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	12

STATE	DIST.	COUNTY
TEXAS	SAT	VARIOUS

CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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

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

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can

interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of

the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

--Item 7--
The total disturbed area within the project is anticipated at less than one (1) acre. Due to this type of construction, the project qualifies for exclusion under the Construction General Permit (CGP) issued by the Texas Commission on Environmental Quality (TCEQ). However, should the sum of the Engineer's anticipated disturbances and the Contractor's (On ROW and off ROW) PSL's equal or exceed the one (1) acre threshold; both TxDOT and the Contractor have project responsibilities under the CGP that reverts to non-exclusion status. Obtain approval for all non-depicted areas of disturbance that increases the initial soil and vegetation disturbed area estimates before work starts at these locations.

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4.: Standard Workweek.

Create and maintain a CPM schedule.

The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2 .

A lane closure assessment fee will be assessed as per the "Lane Closure Assessment Fee Table" in the plans.

The road-user cost liquidated damages shall be $1000 per day.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

--Item 100--
Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

Removal and disposal of existing abandoned utilities that were unable to be identified before letting required to support this project's construction shall be performed under the overall Preparing Right of Way. If you are uncertain whether the utility is active, contact the District Utility Section.

--Item 132--
EMBANKMENT (FINAL)(DENS CONT)(TY C) shall meet the following specifications:

	Percent Retained					LL	PI	PI
Description	1 3/4"	7/8"	3/8"	#4	#40	MAX	MAX	MIN
Embankment (TY C)	0-10	-	-	45-75	60-85	45	20	6

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during “Broadcast Seeding” operations, provided each component is applied at the specified rate.

--Item 166--
Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 401--
A shrinkage compensator is not required for when used for backfilling pipes.

--Item 420--
Mass concrete will be measured in place.

Pier and Bent Concrete will be paid for as “Plans Quantity”.

--Item 421--
Use an automated ticket that contains the same information as shown in the standard specification. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer’s Office (outside the San Antonio area) to inform TxDOT of scheduled structural concrete batching. The Engineer may suspend concrete operations if ticket information is incomplete/incorrect.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

The curing facilities and strength testing equipment is not required for this project.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

--Item 422--
For construction of approach slabs, longitudinal joints shall be placed on lane lines. Joints may be either a saw-cut crack control joint or a construction joint. Saw cut joints shall terminate 1’-0” before reaching the edge of the slab, must be saw cut as soon as possible after placement of concrete, and will be cut within 12 hours of concrete placement. Once sawing begins, it should be a continuous operation and should only be stopped if raveling occurs. Saw cut will be to a depth of 1.5” and filled with approved joint sealant.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

Mobilization bid item includes all site locations on this project.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway’s horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

County: Bexar

Highway: Various

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Temporary Rumble Strips are to be used according to WZ (RS)-22.

Use 2 number of rumble strip arrays.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9:00 PM to 5:00 AM, and at least one lane must remain open at all times.

Control: 0915-00-258

County: Bexar

Highway: Various

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Nighttime: Sunday night through Friday morning, 9:00 PM to 5:00 AM
8 hour closure (With uniformed off duty law enforcement officers)

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays (Bexar County Only)
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Election days (Bexar County Only)
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)
Between March 29 and March 31

Coordinate with the appropriate entity (City of San Antonio, City of New Braunfels, etc.) or TxDOT when left-turn lanes are closed and/or for signal timing revisions as necessary.

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. An Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days if erosion control measures are installed.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 510--
The length of the one-way traffic control section is limited to 1 miles.

For Pilot Car Method, additional flaggers other than the 2 required on each approach, when directed by the Engineer, will be measured by the Flagger Control Method. This may involve stationing additional flaggers at all intersections, public driveways, and commercial driveways as determined by the Engineer.

--Item 512--
Only Single Slope shape CTB may be furnished on the inside shoulder/inside median of the Interstate or Freeway Main Lanes.

More than one shape type of CTB may be furnished on a project, although no mixing of CTB shape types will be permitted along a continuous segment of CTB.

CTB reflectors will not be paid for directly but will be considered subsidiary to the barrier.

--Item 545--
See the Crash Cushion Summary Sheet.

--Item 610--
Ballast/capacitors removed from the light assembly, will remain the property of the State. Assume all ballast/capacitors contain Polychlorinated Biphenyl (PCB), unless a notation appears on the outside of the unit that specifies it does not contain PCB's. All ballast/capacitors with PCB's shall be placed in 55 gallon open top drum in accordance with Department of Transportation (DOT) specifications. Place six (6) inches of sawdust or other absorbent material in the bottom of the drum. Furnish and place a DOT approved PCB warning label on the outside

of the drum. Do not fill a drum more than ¾ of capacity. Avoid rupturing the ballast/capacitor(s). If a ballast/capacitor is ruptured, use proper procedures, specialist trained staff and personal protective equipment for the clean-up operations.

The lamps in light fixtures may contain hazardous levels of mercury, halide, and sodium vapors. Observe and comply with all federal, state, and local laws, ordinances, and regulations regarding the management of these lamps. Prevent the breakage of the lamps. At a minimum, package all lamps removed from the light fixture(s) in a container that minimizes the breakage of the lamps. Broken lamps shall be collected in a sealed plastic bag (i.e. Ziploc). Broken lamps shall be stored in separate containers from unbroken lamps. Furnish a suitable container and attach a label stating "Universal Waste Lamps" on the container. Write the date the first lamp was placed in the container on the "Universal Waste Lamp" label. Within one (1) week after the first lamp is placed in a container, notify the Engineer. The lamps and PCB containing ballast/capacitors, placed in properly labeled containers, will remain the property of the State. Place the container in an area where it is protected from damage and the elements. The Engineer will plan to collect, transport, and dispose/recycle the container. The ballast/capacitor and lamp's removal and storage are subsidiary to this item.

Stencil each illumination assembly with the circuit, light and relay service in black paint on the roadway side of the pole at a 45-degree angle. The numbers shall be in 3" tall and begin 6' from the top of the foundation. This work will be considered subsidiary to this item.

Provide and install steel, locking, theft-deterrent doors on transformer bases to protect against copper theft. Return standard t-base doors to TxDOT.

--Item 618--
It might be necessary to cut concrete for placement of conduit. Saw cut existing concrete, remove the concrete from the steel reinforcement (bars or fabric) and bend the steel to install the conduit. After the conduit has been placed, bend the steel back to its original position and back-fill the trench with an approved concrete. This work is subsidiary to this Item.

The conduit depth for illumination under the City of San Antonio streets is 36 inches.

--Item 6185--
Six (6) shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

**********GENERAL NOTES**********
2014 Specification Book

--General--
Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642
City of New Braunfels: (830) 221-4049

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted

and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

If a sanitary sewer overflow (SSO) occurs:
1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.
3. Call SAWS at (210) 233-2015.

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Carlos Arcila, Carlos.Arcila@txdot.gov
Danny Gallegos, Danny.Gallegos@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-00-258 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY Various

			CONTROL SECTION JOB		**0915-00-258**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00188808**		
			COUNTY		**Bexar**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	529-6002	CONC CURB (TY II)	LF	17.000		17.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	11.000		11.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	11.000		11.000	
	610-6101	REPLACE LUMINAIRE W/LED (150W EQ)	EA	13.000		13.000	
	776-6001	REPAIR (STEEL POST W/ W-BEAM - T101)	LF	25.000		25.000	
	776-6036	REPAIR (STL POST RETROFIT)	EA	32.000		32.000	
	776-6041	REPAIR (STEEL RAIL)	LF	240.000		240.000	
	778-6075	CONC RAIL REPAIR(REMOVE AND REPL RAIL)	LF	84.000		84.000	
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	261.000		261.000	
	784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	11.000		11.000	
	784-6034	REP STL BRIDGE MEMBER(STRAIGHTEN MEMB)	EA	7.000		7.000	
	784-6037	REP STL BRIDGE MEMBER (WEB REP)	EA	6.000		6.000	
	784-6056	REP STL BRDG MEMB (ANCHOR BOLT NUT)	EA	1.000		1.000	
	788-6001	CONCRETE BEAM REPAIR	EA	3.000		3.000	
	788-6003	CONCRETE BEAM REP(STRAND SPLICE & CFRP)	EA	2.000		2.000	
	4002-6001	REPLACE ELASTOMERIC BEARING PADS	EA	24.000		24.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	325.000		325.000	
	6185-6002	TMA (STATIONARY)	DAY	224.000		224.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT RAILROAD FLAGGING (NON-PARTICIPATING)	LS	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-00-258 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY Various

			CONTROL SECTION JOB		**0915-00-258**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00188808**		
			COUNTY		**Bexar**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	10.000		10.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	629.000		629.000	
	110-6002	EXCAVATION (CHANNEL)	CY	117.000		117.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	585.000		585.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	42.000		42.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	138.000		138.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	69.000		69.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	69.000		69.000	
	168-6001	VEGETATIVE WATERING	MG	8.500		8.500	
	401-6001	FLOWABLE BACKFILL	CY	16.000		16.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	247.000		247.000	
	420-6074	CL C CONC (MISC)	CY	37.000		37.000	
	422-6013	BRIDGE SIDEWALK	SF	112.000		112.000	
	429-6002	CONC STR REPAIR (EPOXY MORTAR)	SF	38.000		38.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	100.000		100.000	
	429-6008	CONC STR REPR(RAPID VERT AND OVERHEAD)	SF	45.000		45.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	27.000		27.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	443.000		443.000	
	432-6037	RIPRAP (STONE PROTECTION) (36 IN)	CY	541.000		541.000	
	434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	34.000		34.000	
	442-6011	STR STEEL (PEDESTAL)	LB	5,552.000		5,552.000	
	472-6004	REMOV & RE - LAY PIPE (18 IN)	LF	12.000		12.000	
	495-6002	RAISING EXIST STRUCT	EA	5.000		5.000	
	499-6001	ADJUST STL SHOES	EA	20.000		20.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	11.000		11.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	185.000		185.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	185.000		185.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	433.000		433.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	433.000		433.000	
	510-6001	ONE-WAY TRAF CONT (FLAGGER CONT)	HR	128.000		128.000	
	510-6002	ONE-WAY TRAF CONT (PILOT CAR)	HR	64.000		64.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	870.000		870.000	
	512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	40.000		40.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	150.000		150.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	870.000		870.000	
	512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	40.000		40.000	

ROADWAY REF. NO.	NBI NUMBER	BRIDGE DESCRIPTION	SUMMARY OF BRIDGE QUANTITIES																
			0429-6002	0429-6005	0429-6008	0434-6003	0442-6011	0495-6002	0499-6001	0500-6001	0610-6101	0776-6001	0776-6036	0776-6041	0778-6075	0780-6002	0784-6003	0784-6034	0784-6037
			CONC STR REPAIR (EPOXY MORTAR)	CONC STR REPAIR (DECK FULL DEPTH)	CONC STR REPAIR(RAPID VERT AND OVERHEAD)	ELASTOMERIC BEARING (SPECIAL)	STR STEEL (PEDESTAL)	RAISING EXIST STRUCT	ADJUST STL SHOES	MOBILIZATION	REPLACE LUMINAIRE W/LED (150W EQ)	REPAIR STEEL POST W/ W-BEAM -T101	REPAIR (STL POST RETROFIT)	REPAIR (STEEL RAIL)	CONC RAIL REPAIR(REMO VE AND REPLACE RAIL)	CNC CRACK REPAIR (DISCRETE) (INJECT)	REP STL BRIDGE MEMBER (DIAPHRAGM)	REP STL BRIDGE MEMBER (STRA IGHTEN MEMB)	REP STL BRIDGE MEMBER (WEB REP)
			SF	SF	SF	EA	LB	EA	EA	LS	EA	LF	EA	LF	LF	LF	EA	EA	EA
15-CULV-1	15-015-0025-02-204	IH 10 Connector/Drain			16														
15-BM_STL-2	15-015-0025-02-213	IH 10 WB/Loop 13														110	6	3	3
15-BM_STL-3	15-015-0521-06-110	IH 410 SB/Loop 13 NB(Conn. F from 410)														60	2	2	
15-BM_STL-4	15-015-0521-06-172	IH 410 SB/Sinclair Rd														41	1	1	1
131-BM_STL-5	15-131-0072-06-131	IH10 at Johns Road														40	2	1	2
15-BM_CNC-6	15-015-0017-03-282	IH 35/Luckey Rd																	
15-BM_CNC-7	15-015-0017-09-127	IH 35 SBML/Southcross Blvd																	
15-BM_CNC-8	15-015-0073-08-207	US 281 NB/Sunset Rd														10			
7-RAIL_STL-13	15-007-0073-06-166	IH 37 SB/Borrego Creek		8									2	25					
7-RAIL_STL-14	15-007-0613-02-003	SH16/Salt Branch			5								3						
95-RAIL_STL-15	15-095-0216-03-013	FM 466/Gaudalupe River											3	20					
131-RAIL_STL-16	15-131-0072-05-126	IH10 WBML/Cibolo Creek&Ranger Rd.		8									16	85					
131-RAIL_STL-17	15-131-0072-05-127	IH10 EBML/Cibolo Creek&Ranger Rd.												25					
131-RAIL_CNC-18	15-131-0072-05-165	IH10 WBML/Little Joshua Creek&FM 289													4				
131-RAIL_CNC-19	15-131-0072-05-174	IH10 EBML/Guadelupe River&FM473&FM 1621													5				
131-RAIL_CNC-20	15-131-0072-05-178	IH10 EBML/Holiday Creek			5														
131-RAIL_CNC-21	15-131-0072-05-182	IH10 WBML/Big Joshua Creek&Rust Rd.			7														
131-RAIL_STL-22	15-131-0072-05-200	IH10 WBFR/Cibolo Creek			12									60					
131-RAIL_STL-23	15-131-1899-01-006	RM 1376/Guadelupe River		5								25							
133-RAIL_STL-24	15-133-0142-02-151	IH10 EB/Draw		20									5		70				
133-RAIL_CNC-25	15-133-0142-14-077	IH10 EB/Cypress Creek													5				
163-RAIL_STL-26	15-163-0017-05-232	IH 35 SB ML/Francisco Creek		59									3	25					
15-BRG-27	15-015-0072-12-041	IH 10 EB/N Laredo St	5			3	375	1	3										
15-BRG-28	15-015-0073-08-046	IH 37 NB/Fair Ave	3			1	167	1	17		5								
15-BRG-29	15-015-0073-08-045	IH 37 SB/Hackberry St				20	3340	1			4								
15-BRG-30	15-015-0073-08-044	IH 37 NB/Hackberry St	30			10	1670	1			4								
15-BRG-31	15-015-0016-07-164	IH35 SBML/Weidner Rd						1											
		TOTAL	38	100	45	34	5552	5	20	1	13	25	32	240	84	261	11	7	6

ROADWAY REF. NO.	NBI NUMBER	BRIDGE DESCRIPTION	SUMMARY OF BRIDGE QUANTITIES			
			0784-6056	0788-6001	0788-6003	4002-6001
			REP STL BRDG MEMB (ANCHOR BOLT NUT)	CONCRETE BEAM REPAIR	CONCRETE BEAM REP(STRAND SPLICE & CFRP)	REPLACE ELASTOMERIC BEARING PADS
			EA	EA	EA	EA
15-CULV-1	15-015-0025-02-204	IH 10 Connector/Drain				
15-BM_STL-2	15-015-0025-02-213	IH 10 WB/Loop 13				
15-BM_STL-3	15-015-0521-06-110	IH 410 SB/Loop 13 NB(Conn. F from 410)				
15-BM_STL-4	15-015-0521-06-172	IH 410 SB/Sinclair Rd				
131-BM_STL-5	15-131-0072-06-131	IH10 at Johns Road				
15-BM_CNC-6	15-015-0017-03-282	IH 35/Luckey Rd		1	1	
15-BM_CNC-7	15-015-0017-09-127	IH 35 SBML/Southcross Blvd		1	1	
15-BM_CNC-8	15-015-0073-08-207	US 281 NB/Sunset Rd		1		
7-RAIL_STL-13	15-007-0073-06-166	IH 37 SB/Borrego Creek				
7-RAIL_STL-14	15-007-0613-02-003	SH16/Salt Branch				
95-RAIL_STL-15	15-095-0216-03-013	FM 466/Gaudalupe River				
131-RAIL_STL-16	15-131-0072-05-126	IH10 WBML/Cibolo Creek&Ranger Rd.				
131-RAIL_STL-17	15-131-0072-05-127	IH10 EBML/Cibolo Creek&Ranger Rd.				
131-RAIL_CNC-18	15-131-0072-05-165	IH10 WBML/Little Joshua Creek&FM 289				
131-RAIL_CNC-19	15-131-0072-05-174	IH10 EBML/Guadelupe River&FM473&FM 1621				
131-RAIL_CNC-20	15-131-0072-05-178	IH10 EBML/Holiday Creek				
131-RAIL_CNC-21	15-131-0072-05-182	IH10 WBML/Big Joshua Creek&Rust Rd.				
131-RAIL_STL-22	15-131-0072-05-200	IH10 WBFR/Cibolo Creek				
131-RAIL_STL-23	15-131-1899-01-006	RM 1376/Guadelupe River				
133-RAIL_STL-24	15-133-0142-02-151	IH10 EB/Draw				
133-RAIL_CNC-25	15-133-0142-14-077	IH10 EB/Cypress Creek				
163-RAIL_STL-26	15-163-0017-05-232	IH 35 SB ML/Francisco Creek				
15-BRG-27	15-015-0072-12-041	IH 10 EB/N Laredo St				
15-BRG-28	15-015-0073-08-046	IH 37 NB/Fair Ave	1			
15-BRG-29	15-015-0073-08-045	IH 37 SB/Hackberry St				
15-BRG-30	15-015-0073-08-044	IH 37 NB/Hackberry St				
15-BRG-31	15-015-0016-07-164	IH35 SBML/Weidner Rd				24
		TOTAL	1	3	2	24

DATE: $DATE$ $TIME$
FILE: $FILE$

BRIDGE SUMMARY

Texas Department of Transportation
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CONT	SECT	JOB	HIGHWAY
0915	00	258	VARIES
DIST	COUNTY		SHEET NO.
SAT	VARIES		15

BRIDGE MAINTENANCE ITEMS

ROADWAY REF. NO.	NBI NUMBER	SPEC ITEM # / ITEM DESCRIPTION	0100 6002 PREPARING ROW	0104 6009 REMOVING CONC (RIPRAP)	0110 6002 EXCAVATION (CHANNEL)	0132 6005 EMBANKMENT (FINAL) (ORD COMP) (TY C) *	0160 6003 FURNISHING AND PLACING TOPSOIL (4")	0164 6035 DRILL SEEDING (PERM) (RURAL) (CLAY)	0164 6041 DRILL SEEDING (TEMP) (WARM)	0164 6043 DRILL SEEDING (TEMP) (COOL)	0168 6001 VEGETATIVE WATERING	0401 6001 FLOWABLE BACKFILL	0402 6001 TRENCH EXCAVATION PROTECTION
		UNITS	STA	SY	CY	CY	SY	SY	SY	SY	MG	CY	LF
15-SCR-9	15-015-0-2452-02-104	SL 1604 AT LORENCE CREEK	2	29	22	81						2	
15-SCR-12	15-015-0-0291-10-087	SH 16 AT HUEBNER CREEK	3	127	82	259	42	42	21	21	0.7	5	117
15-SCR-10	15-015-0-2452-03-124	SL 1604 AT UNT TO ELM WATERHOLE CREEK	2		4	42						2	
15-SCR-11	15-015-0-0025-09-138	FM 78 AT WEST SALITRILLO CREEK	3	473	9	203	96	96	48	48	1.5	7	130
		TOTAL	10	629	117	585	138	138	69	69	2.2	16	247

* - CONTRACTOR TO UTILIZE LEAN CLAY

ROADWAY REF. NO.	NBI NUMBER	SPEC ITEM # / ITEM DESCRIPTION	0420 6074 CL C CONC (MISC)	0422 6013 BRIDGE SIDEWALK	0432 6001 RIPRAP (CONC) (4 IN)	0432 6035 RIPRAP (STONE PROTECTION) (24 IN)	0432 6037 RIPRAP (STONE PROTECTION) (36 IN)	0472 6004 REMOV & RE - LAY PIPE (18 IN)	0506 6003 ROCK FILTER DAMS (INSTALL) (TY 3)	0506 6011 ROCK FILTER DAMS (REMOVE)	0506 6038 TEMP SDMT CONT FENCE (INSTALL)	0506 6039 TEMP SDMT CONT FENCE (REMOVE)	0529 6002 CONC CURB (TY II)
		UNITS	CY	SF	CY	CY	CY	LF	LF	LF	LF	LF	LF
15-SCR-9	15-015-0-2452-02-104	SL 1604 AT LORENCE CREEK	6			113					187	187	
15-SCR-12	15-015-0-0291-10-087	SH 16 AT HUEBNER CREEK	20		6	193			125	125			
15-SCR-10	15-015-0-2452-03-124	SL 1604 AT UNT TO ELM WATERHOLE CREEK	1				118				177	177	
15-SCR-11	15-015-0-0025-09-138	FM 78 AT WEST SALITRILLO CREEK	10	112	21	137	423	12	60	60	69	69	17
		TOTAL	37	112	27	443	541	12	185	185	433	433	17

Kimley»Horn F-928

Texas Department of Transportation

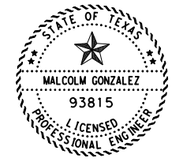
BRIDGE MAINTENANCE QUANTITY SUMMARY

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	16
CONT.	SECT.	JOB	
0915	00	258	

ROADWAY REF. NO.	NBI NUMBER	BRIDGE DESCRIPTION	TRAFFIC CONTROL PLAN	510-6001 ONE-WAY TRAF CONT (FLAGGER CONT) (HR)	510-6002 ONE-WAY TRAF CONT (PILOT CAR) (HR)	512-6001 PORT CTB (FUR & INST) (SGL SLOPE) (TY 1) (LF)	512-6009 PORT CTB (FUR & INST) (LOW PROF) (TY 1) (LF)	512-6025 PORT CTB (MOVE) (SGL SLP)(TY 1) (LF)	512-6049 PORT CTB (REMOVE) (SGL SLP)(TY 1) (LF)	512-6057 PORT CTB (REMOVE) (LOW PROF) (TY 1) (LF)	545-6003 CRASH CUSH ATTEN (MOVE & RESET) (EA)	545-6005 CRASH CUSH ATTEN (REMOVE) (EA)	545-6019 CRASH CUSH ATTEN (INSTL) (SINITL3) (EA)	6001-6001 PORTABLE CHANGEABLE MESSAGE BOARD (DAY)	6185-6002 TMA STATIONARY (DAY)
15-CULV-1	15-015-0025-02-204	IH 10 CONNECTOR / DRAIN	TCP (1-1)											11	
15-BM_STL-2	15-015-0025-02-213	IH 10 WB / LOOP 13	DETOUR LAYOUT											11	3
15-BM_STL-3	15-015-0521-06-110	LP 410 SB AT CONNECTOR F	DETOUR LAYOUT											15	18
15-BM_STL-4	15-015-0521-06-172	LP 410 SB / SINCLAIR ROAD	DETOUR LAYOUT											11	3
131-BM_STL-5	15-131-0072-06-131	JOHNS RD / IH 10	DETOUR LAYOUT											10	8
15-BM_CNC-6	15-015-0017-03-282	IH 35 / LUCKEY ROAD	DETOUR LAYOUT	32	16									13	4
15-BM_CNC-7	15-015-0017-09-127	IH 35 SBML / SOUTHCROSS BLVD	DETOUR LAYOUT											10	2
15-BM_CNC-8	15-015-0073-08-207	US 281 NB / SUNSET ROAD	DETOUR LAYOUT											10	8
15-SCR-9	15-015-2452-02-104	LP 1604 / DRAW	TCP (2-1)												11
15-SCR-10	15-015-2452-03-124	LP 1604 / DRAW	TCP (2-1)												11
15-SCR-11	15-015-0025-09-138	FM 78 / W BR OF SALITRILLO CREEK	TCP (2-1)												
15-SCR-12	15-015-0291-10-087	SH 16 NB / HUEBNER CREEK	TCP (2-1)												
7-RAIL_STL-13	15-007-0073-06-166	I-37 SB BORREGO CREEK	TCP (2-4)			120			120			1	1	9	1
7-RAIL_STL-14	15-007-0613-02-003	SH-16 SALT BRANCH	TCP (2-2)	16	8	180			180			2	2	9	1
95-RAIL_STL-15	15-095-0216-03-013	FM-466 AT GUADALUPE RIVER	TCP (2-2)	32	16							1	1	10	2
131-RAIL_STL-16	15-131-0072-05-126	IH-10 WBML AND EBML AT CIBOLO CREEK AND RANGER ROAD	DETOUR LAYOUT			180			90				1	12	4
131-RAIL_STL-17	15-131-0072-05-127	IH-10 WBML AND EBML AT CIBOLO CREEK AND RANGER ROAD	DETOUR LAYOUT					90	90		1	1		12	4
131-RAIL_CNC-18	15-131-0072-05-165	IH-10 WBML AT LITTLE JOSHUA CREEK AND FM 289	TCP (2-4)											9	1
131-RAIL_CNC-19	15-131-0072-05-174	IH-10 EBML AT GUADALUPE RIVER AND FM 473 AND IDLEWILDE RD	TCP (2-4)											9	1
131-RAIL_CNC-20	15-131-0072-05-178	IH-10 EBML AT HOLIDAY CREEK	TCP (2-4)											9	1
131-RAIL_CNC-21	15-131-0072-05-182	IH-10 WBML AT BIG JOSHUA CREEK AND RUST ROAD	TCP (2-4)											9	1
131-RAIL_STL-22	15-131-0072-05-200	IH-10 WEST FRONTAGE RD AT CIBOLO CREEK	DETOUR LAYOUT				40			40		1	1	11	3
131-RAIL_STL-23	15-131-1899-01-006	RM 1376 AT GUADALUPE RIVER	TCP (2-2)	48	24	120			120			2	2	11	3
133-RAIL_STL-24	15-133-0142-02-151	IH-10 EB DRAW	TCP (2-4)			30			30			1	1	11	3
133-RAIL_CNC-25	15-133-0142-14-077	IH-10 EB AT CYPRESS CREEK	TCP (2-4)			180			180			1	1	9	1
163-RAIL_STL-26	15-163-0017-05-232	IH-35 SB AT FRANCISCO CREEK	TCP (2-4)			60		60	60		1	1	1	10	2
15-BRG-27	15-015-0072-12-041	IH 10 EB / W POPLAR STREET	DETOUR LAYOUT											15	14
15-BRG-28	15-015-0073-08-046	IH 37 NB / FAIR AVE	DETOUR LAYOUT											15	21
15-BRG-29	15-015-0073-08-045	IH 37 SB / HACKBERRY STREET	TCP (6-1)											31	35
15-BRG-30	15-015-0073-08-044	IH 37 NB / HACKBERRY STREET	TCP (6-1)											18	30
15-BRG-31	15-015-0016-07-164	IH35 SBML / WEIDNER ROAD	DETOUR LAYOUT											15	28
			PROJECT TOTAL	128	64	870	40	150	870	40	2	11	11	325	224



Malcolm Gonzalez, P.E.

MALCOLM GONZALEZ, P.E. — 4/27/2023 DATE

Texas Department of Transportation

TCP SUMMARY SHEET

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		17
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

TRAFFIC CONTROL DEVICES

LOCATION	G20-6T	G20-2	R20-3T	E5-4T	G20-1aT	G20-2bT	G20-9T	R20-5T PLAQUE	G20-5T	CW20-5bTR	CW21-10aT	ARROW BOARD	CW20-1D	CW25-1T	R11-2	G20-1bTR	R5-1	CW3-4	E5-2	CW20-4	CW16 -3aP	R11-2bT	CW13-1P	CW20RP-3D	R4-2	CW20-1A	CW20-1B	CW20-1C	CW20-1E	CW20-5aR	CW4-3R	CW21-5aL	G20-1bTL	CW1-6	CW20-7	R11-4	CW21-5bL	CW21-5bR
1																																						
2																																						
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TRAFFIC CONTROL DEVICES

LOCATION	CW8-7	CW1-6aT	CW1-4L/R	PLASTIC BARRELS	CW20RP-3E	PORTABLE CHANGEABLE MESSAGE BOARD	CW20-1F	G20-5aP	R2-1	R2-1	CW20-2D	R4-1	W21-5b	M4-8a	M4-9R (L, S)	R6-1 R, L	R3-5R	R3-1	R5-1A	CW 4-1	W24-1b	W8-1 48x48	M3-4	CW20-5L	E5-2a	CW17-2T	W21-5	M1-6T	M6-2R	M6-2L	E5-2	W9-2L	W9-2R	CW20-3D	M4-10R	M4-8	M3-3	M1-6L
1																																						
2																																						
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X

TRAFFIC CONTROL DEVICES

LOCATION	M6-3	R9-10DBL	M5-1L	M6-1	R11-2	R3-2	M4-9AL	M4-9L	M4-9R	M4-9S	M1-1	M6-2R	M4-12T	R9-11L	R9-9	CW25-1T	R11-2bT	W3-2	R1-2aP	CW20-4D	CW20-1F	R1-2	CW20-5TR	CW20 -5aTL	CW16 -2aP	CW20FY -3D	CW20 -5TL	R3-33CT
1																												
2																												
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TEMPORARY REGULATORY SIGNS SHALL REMAIN
IN PLACE UNTIL PERMANENT SIGNS ARE INSTALLED
OR UNTIL NO LONGER REQUIRED.

GENERAL NOTES - BARRICADES:
LOCATION NO. 1 TO BE USED AT BEGINNING OF THE PROJECT AND ENTERING SIDE STREETS.
LOCATION NO. 2 TO BE USED AT THE END OF THE PROJECT AND EXITING SIDE STREETS.
LOCATION NO. 3 TO BE USED THROUGHOUT THE COURSE OF THE PROJECT AS INDICATED ON DETOUR LAYOUT & STANDARD SHEETS, OR AS DIRECTED BY THE ENGINEER.

NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE MINIMAL CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. IN ACCORDANCE WITH CUREENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION. SIGNS, BARRICADES, AND OTHER WARNING DEVICES WILL BOT BR PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDARY TO ITEM 502.
3. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUCTION WITH WARNING SIGNS.
4. IMPLEMENT DETOURS IN ACCORDANCE WITH THE TEXAS MUTCD. USE CHANGEABLE MESSAGE BOARDS TO GUIDE MOTORISTS THROUGH THE DETOUR.
5. BARRICADES ARE NOT TO BE USED AS A SIGN SUPPORT. SUPORTS FOR SIGNS SHALL BE FIXED OR PARTABLE AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH THE "BC" STANDARD SHEETS AND THE TEXAS MUTCD.
6. BARRICADES AND SIGNS SHALL BE MAINTAINED ON A DAILY BASIS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.

4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

SCHEDULE OF BARRICADES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		18
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (5) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.

(4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES

(5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS

PHASE 1

THE INTENT OF THIS PHASE IS TO PERFORM THE CULVERT WALL REPAIR.

IH 10 CONNECTOR, 15-CULV-1

1. INSTALL SIGNS, BARRICADES, AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
2. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
3. REPAIR INTERIOR CULVERT WALL AS INDICATED IN CULVERT REPAIR SHEET.

PHASE 2

THE INTENT OF THIS PHASE IS TO PERFORM BRIDGE BEAM REPAIRS.

IH 10 WB AT LOOP 13, 15-BM_STL-2

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL DETOUR SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. CLOSE SL 13 (N WW WHITE RD) UNDERPASS AND DETOUR TRAFFIC AS INDICATED ON SL 13 DETOUR LAYOUT.
4. FOLLOW TCP (6-1B) TO CLOSE IH 10 WB OUTSIDE SHOULDER AND OUTSIDE MAIN LANE.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE TO BEAM REPAIR SHEET.
6. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

SB IH 410 AT CONNECTOR F, 15-BM_STL-3

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL DETOUR SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. CLOSE SL 13 NB TO IH 35 CONNECTOR (CONNECTOR F) AND DETOUR TRAFFIC AS INDICATED ON CONNECTOR F DETOUR LAYOUT.
4. FOLLOW TCP (6-6) TO CLOSE ALL IH 410 SB MAIN LANES OVER CONNECTOR F AND DETOUR MAIN LANE AND CONNECTOR TRAFFIC AS INDICATED ON CONNECTOR F DETOUR LAYOUT.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE TO BEAM REPAIR SHEET.

IH 410 AT SINCLAIR RD, 15-BM_STL-4

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL DETOUR SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. CLOSE SINCLAIR RD UNDERPASS LANES AND DETOUR TRAFFIC AS INDICATED IN SINCLAIR RD DETOUR LAYOUT.
4. FOLLOW TCP (6-1B) TO CLOSE IH 410 SB OUTSIDE SHOULDER AND OUTSIDE MAIN LANE.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEAM REPAIR SHEET.
6. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

JOHNS RD OVER IH 10, 131-BM_STL-5

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL DETOUR SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. FOLLOW TCP (6-6) TO CLOSE ALL IH 10 SB MAIN LANES AND DETOUR TRAFFIC AS INDICATED ON JOHNS RD DETOUR LAYOUT.
4. CLOSE JOHNS RD OVERPASS AND UNDERPASS LANES AND DETOUR TRAFFIC AS INDICATED ON JOHNS RD DETOUR LAYOUT
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH BEAM REPAIR SHEET.
6. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

IH 35 AT LUCKEY RD, 15-BM_CNC-6

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. FOLLOW TCP (6-6) TO CLOSE ALL IH 35 NB MAIN LANES AND DETOUR TRAFFIC AS INDICATED ON LUCKEY RD DETOUR LAYOUT.
4. FOLLOW TCP (2-2B) TO CLOSE SB PEARSALL RD OVERPASS LANE AND INSTALL A ONE LANE TWO-WAY TRAFFIC CONTROL WITH FLAGGERS ON NB PEARSALL RD OVERPASS LANE.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEAM REPAIR SHEET.
6. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

IH 35 AT SOUTHCROSS BLVD, 15-BM_CNC-7

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES, AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. CLOSE EB SOUTHCROSS BLVD UNDERPASS LANES AND DETOUR TRAFFIC AS INDICATED ON SOUTHCROSS BLVD DETOUR LAYOUT.
4. FOLLOW TCP (6-1B) TO CLOSE IH 35 SB OUTSIDE SHOULDER AND OUTSIDE MAIN LANE.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEAM REPAIR SHEET.
6. RAMPS ARE TP REMAIN OPEN TO TRAFFIC.

US 281 OVER SUNSET RD, 15-BM_CNC-8

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. CLOSE SUNSET RD UNDERPASS LANES AND DETOUR TRAFFIC AS INDICATED ON SUNSET RD DETOUR LAYOUT.
4. FOLLOW TCP (6-1B) TO CLOSE ALL US 281 NB MAIN LANES EXCEPT FOR THE INSIDE SHOULDER AND INSIDE MAIN LANE.
5. BEAM REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEAM REPAIR SHEET.
6. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

PHASE 3

THE INTENT OF THIS PHASE IS TO PERFORM SCOUR REPAIR AT VARIOUS LOCATIONS. THE LOCATIONS ARE AS FOLLOWS - LP 1604 AT LORENCE CREEK, LOOP 1604 AT UN-NAMED TRIBUTARY(UNT) TO ELM WATERHOLE CREEK, SH 16 AT HUEBNER CREEK, AND FM 78 AT WEST SALITRILLO CREEK.

VARIOUS LOCATIONS

1. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
2. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
3. PREPARE R.O.W.
4. INSTALL WATER FILLED COFFER DAM AS SHOWN ON THE PLANS.
5. REMOVE EXISTING STRUCTURES AS SHOWN ON THE PLANS.
6. PLACE PROPOSED FLOWABLE BACKFILL AND/OR EMBANKMENT AS SHOWN ON THE PLANS.
7. PLACE CONCRETE STRUCTURES, GABION BANSKETS, AND/OR PROPOSED RIPRAP AS SHOWN ON THE PLANS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

SEQUENCE OF WORK

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		19
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

PHASE 4

THE INTENT OF THIS PHASE IS TO PERFORM BRIDGE RAIL REPAIR AT VARIOUS LOCATIONS.

I-37 SB BORREGO CREEK, 7-RAIL_STL-13; IH-10 WBML AT LITTLE JOSHUA CREEK AND FM 289, 131-RAIL_STL-18; IH-10 EBML AT GUADALUPE RIVER AND FM 473 AND IDLEWILDE RD, 131-RAIL_STL-19; IH-10 EBML AT HOLIDAY CREEK, 131-RAIL_STL-20; IH-10 WBML AT BIG JOSHUA CREEK AND RUST ROAD, 131-RAIL_STL-21; IH-10 EB DRAW, 133-RAIL_STL-24, IH-10 EB AT CYPRESS CREEK, 133-RAIL_STL-25; IH-35 SB AT FRANCISCO CREEK, 163-RAIL_STL-26

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
4. FOLLOW TCP AS SHOWN IN TCP STANDARD TCP (2-4).
5. PREPARE R.O.W.
6. REMOVE EXISTING STRUCTURES AS SHOWN ON THE PLANS.
7. INSTALL, CONSTRUCT OR RELOCATE ITEMS AS SHOWN ON THE PLANS.
8. ALL WORK WITH BRIDGE RAILING MUST BE COMPLETED BY END OF BUSINESS DAY OR HAVE A TEMPOARY CTB WITH CCA AS SHOWN IN THE TCP DETAILS.

SH-16 SALT BRANCH, 7-RAIL_STL-14; FM-466 AT GUADALUPE RIVER, 95-RAIL_STL-15; RM 1376 AT GUADALUPE RIVER, 131-RAIL_STL-23

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
4. FOLLOW TCP AS SHOWN IN TCP STANDARD TCP (2-2).
5. PREPARE R.O.W.
6. REMOVE EXISTING STRUCTURES AS SHOWN ON THE PLANS.
7. INSTALL, CONSTRUCT OR RELOCATE ITEMS AS SHOWN ON THE PLANS.
8. ALL WORK WITH BRIDGE RAILING MUST BE COMPLETED BY END OF BUSINESS DAY OR HAVE A TEMPOARY CTB WITH CCA AS SHOWN IN THE TCP DETAILS.

IH-10 / RANGER ROAD, 131-RAIL_STL-16 & 131-RAIL_STL-17

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
4. FOLLOW TCP AS SHOWN IN TCP STANDARD TCP (2-4).
5. PREPARE R.O.W.
6. ROADWAY TO BE CLOSED AT RANGER ROAD OR I-10 UNDER PASS SECTION ONLY.
7. ADD ALL NECESSARY TCP AS SPECIFIED IN THE DETOUR LAYOUT &/OR TCP STANDARDS.
8. REMOVE EXISTING STRUCTURES AS SHOWN ON THE PLANS.
9. INSTALL, CONSTRUCT OR RELOCATE ITEMS AS SHOWN ON THE PLANS.
10. ALL WORK WITH BRIDGE RAILING MUST BE COMPLETED BY END OF BUSINESS DAY OR HAVE A TEMPOARY CTB WITH CCA AS SHOWN IN THE TCP DETAILS.
11. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

IH-10 WBFR / CIBOLO CREEK, 131-RAIL_STL-22

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. INSTALL SW3P AND BMPs AS SHOWN ON THE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER.
4. FOLLOW TCP AS SHOWN IN TCP STANDARD TCP (2-4).
5. PREPARE R.O.W.
6. ROADWAY TO BE CLOSED AT RANGER ROAD EB AT I-10 UNDER PASS & I-10 FRONTAGE NB FROM RANGER CREEK RD TO CREEKSIDE TERRACE.
7. ADD ALL NECESSARY TCP AS SPECIFIED IN THE DETOUR LAYOUT &/OR TCP STANDARDS.
8. REMOVE EXISTING STRUCTURES AS SHOWN ON THE PLANS.
9. INSTALL, CONSTRUCT OR RELOCATE ITEMS AS SHOWN ON THE PLANS.
10. ALL WORK WITH BRIDGE RAILING MUST BE COMPLETED BY END OF BUSINESS DAY OR HAVE A TEMPOARY CTB WITH CCA AS SHOWN IN THE TCP DETAILS.
11. RAMPS ARE TO REMAIN OPEN TO TRAFFIC.

PHASE 5

THE INTENT OF THIS PHASE IS TO PERFORM BRIDGE STEEL BEARING REPAIRS IN BEXAR CO.

IH 10 EB AT W POPLAR ST, 15-BRG-27

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. FOLLOW TCP (6-6) TO CLOSE IH 10 EB LOWER-LEVEL MAIN LANES AND DETOUR TRAFFIC AS INDICATED ON POPLAR ST DETOUR LAYOUT.
4. IH 10 EB UPPER-LEVEL MAIN LANES ARE TO REMAIN OPEN TO TRAFFIC.
5. FOLLOW TCP (6-2) TO CLOSE THE WOODLAWN AVE AND CINCINNATI AVE ON RAMPS.

IH 37 NB AT FAIR AVENUE, 15-BRG-28

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. SB TO NB TURN AROUND AND EB FAIR AVE OUTSIDE LANE TO BE CLOSED TO TRAFFIC DURING BEARING REPAIRS.
4. FOLLOW TCP (6-1B) TO CLOSE ALL IH 37 NB MAIN LANES EXCEPT FOR THE INSIDE SHOULDER AND INSIDE MAIN LANE.
5. NB ON RAMP AT S NEW BRAUNFELS AVE TO BE DETOURED TO FAIR AVE ON RAMP, SEE DETOUR LAYOUT SHEET.
6. ANCHOR BOLT REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEARING REPAIR SHEET.
7. CLOSE OUTSIDE FAIR AVE UNDERPASS LANE WHEN REPLACING LUMINAIRES LOCATED IN BEARING REPAIR SHEET.

IH 37 SB AT HACKBERRY STREET, 15-BRG-29

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. NB HACKBERRY ST OUTSIDE UNDERPASS LANE TO BE CLOSED TO TRAFFIC DURING BEARING REPAIRS.
4. FOLLOW TCP (6-1B) TO CLOSE IH 37 SB INSIDE SHOULDER AND THREE INSIDE MAIN LANES.
5. BEARING REPAIR 1 THRU 5 TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH BEARING REPAIR SHEET.
6. FOLLOW TCP (6-1B) TO CLOSE IH 37 SB OUTSIDE SHOULDER AND THREE OUTSIDE MAIN LANES.
7. BEARING REPAIR 6 THRU 10 TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH BEARING REPAIR SHEET.
8. CLOSE OUTSIDE HACKBERRY ST UNDERPASS LANE WHEN REPLACING LUMINAIRES LOCATED IN BEARING REPAIR SHEET.

IH 37 NB AT HACKBERRY STREET, 15-BRG-30

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. NB AND SB HACKBERRY ST OUTSIDE UNDERPASS LANE TO BE CLOSED TO TRAFFIC DURING BEARING REPAIRS.
4. FOLLOW TCP (6-1B) TO CLOSE IH 37 NB INSIDE SHOULDER AND THREE INSIDE MAIN LANES.
5. BEARING REPAIR 1 THRU 5 TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEARING REPAIR SHEET.
6. FOLLOW TCP (6-1B) TO CLOSE IH 37 NB OUTSIDE SHOULDER AND THREE OUTSIDE MAIN LANES.
7. BEARING REPAIR 6 THRU 10 TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEARING REPAIR SHEET.
8. CLOSE OUTSIDE HACKBERRY ST UNDERPASS LANE WHEN REPLACING LUMINAIRES LOCATED IN BEARING REPAIR SHEET.

IH 35 SB AT WEIDNER RD, 15-BRG-31

1. PORTABLE MESSAGE BOARDS MUST BE PLACED AND OPERATIONAL 7 DAYS PRIOR TO ANY CONSTRUCTION.
2. INSTALL SIGNS, BARRICADES AND TCP ITEMS AS SHOWN ON PLANS AND STANDARDS.
3. TURN AROUND LANES AT WEIDNER RD TO BE CLOSED TO TRAFFIC DURING BEARING REPAIRS.
4. FOLLOW TCP (6-6) TO CLOSE ALL IH 35 SB MAIN LANES AND DETOUR TRAFFIC AS INDICATED IN WEIDNER RD DETOUR LAYOUT.
5. FOLLOW TCP (6-1B) TO CLOSE IH 35 NB INSIDE SHOULDER AND INSIDE MAIN LANE.
6. BEARING REPAIR TO BE CONDUCTED AT NIGHT AND IN ACCORDANCE WITH THE BEARING REPAIR SHEET.
7. IH 35 SBML ENTRACE RAMP NEAR O'CONNER RD TO BE CLOSED AS SHOWN ON THE DETOUR LAYOUT.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N/A
VERTICAL: N/A

Texas Department of Transportation
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SEQUENCE OF WORK

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		20
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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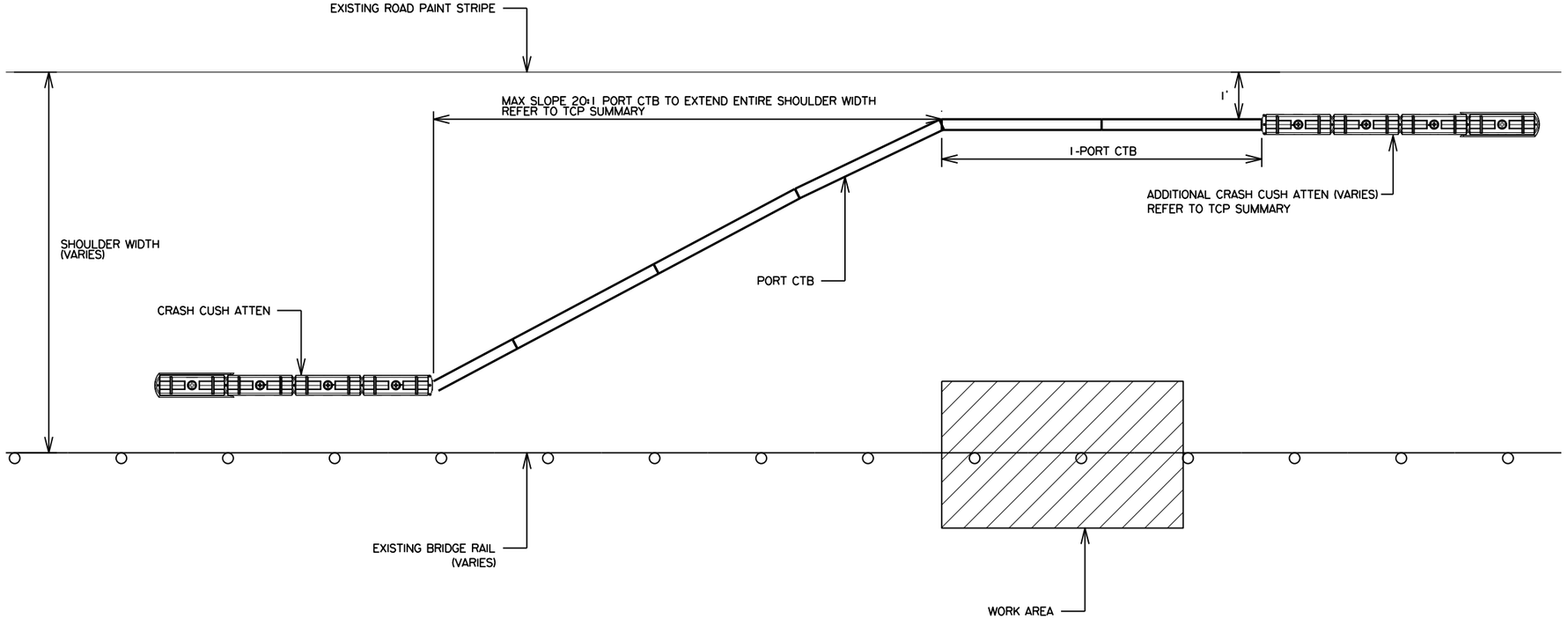


NOTE:

ALL WORK WITH BRIDGE RAILING MUST BE COMPLETED BY END OF BUSINESS DAY OR HAVE A TEMPORARY CTB WITH CCA AS SHOWN IN THIS DETAIL. VARIANCE TO THIS DETAIL CAN BE ALLOWED FOR CONSTRUCTABILITY PURPOSES TEMPORARILY IF THE REQUIRED TCP IS IMPLEMENTED AS SHOWN IN TCP SUMMARY DURING WORKING HOURS ONLY. ALL CTB AND CCA MUST BE REINSTALLED PRIOR TO LEAVING THE JOB SITE.

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.

MALCOLM GONZALEZ, P.E. — 5/1/2023 DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

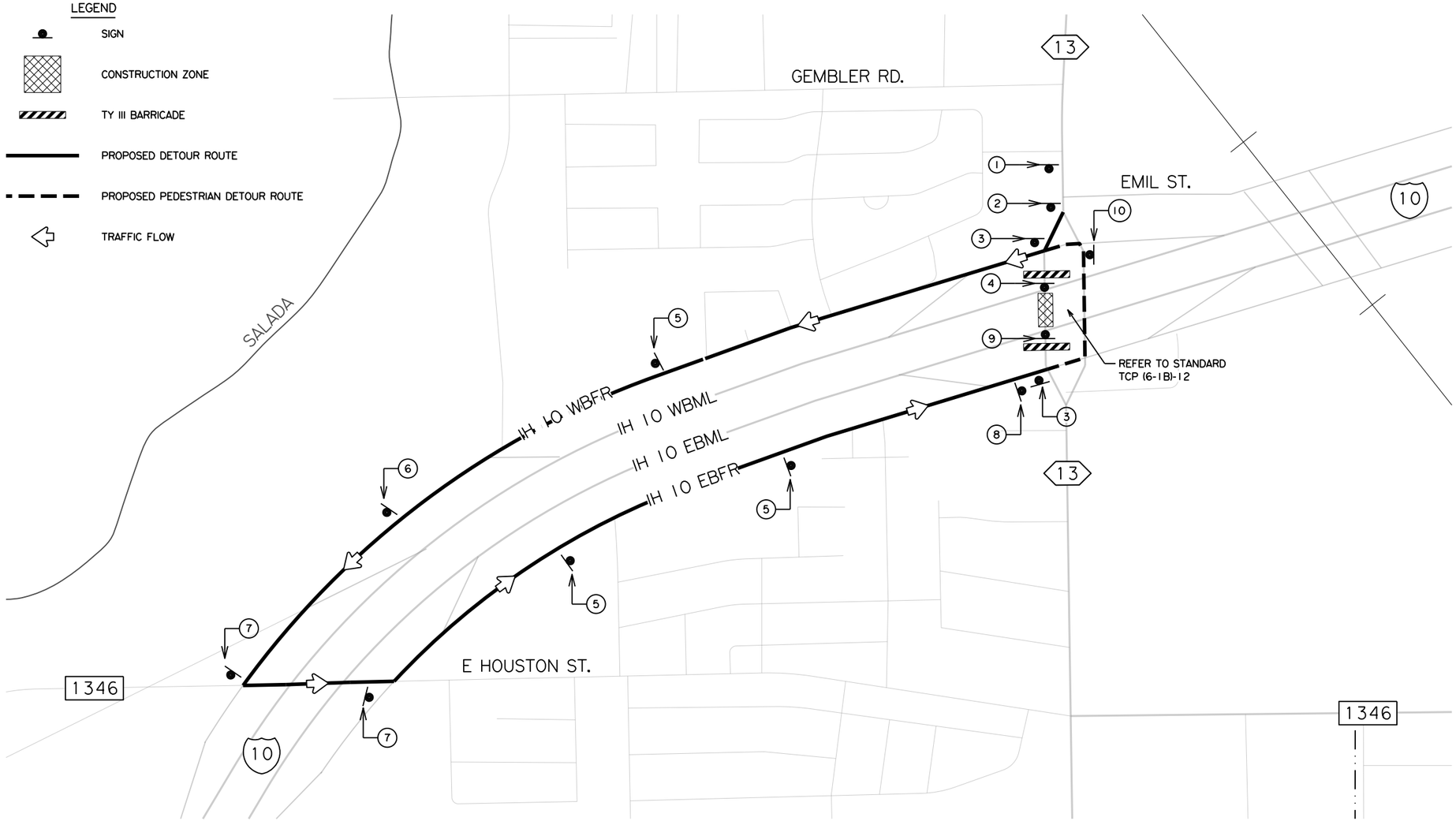
TCP
BRIDGE RAIL
REPAIR DETAIL

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		21
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW



N

DETOUR LENGTH:
2.3 MILES
PEDESTRIAN DETOUR LENGTH:
0.1 MILES

SIGN SPECIFICATIONS

1. ROAD CLOSED AHEAD — CW20-3D
2. DETOUR AHEAD — CW20-2D
3. CROSSWALK CLOSED / USE OTHER SIDE — R9-10DBL
4. ROAD CLOSED — R11-2; DETOUR — M4-10R
5. DETOUR M4-8 / SOUTH M3-3 / LOOP 13 M1-6L / M6-3
6. DETOUR M4-8 / SOUTH M3-3 / LOOP 13 M1-6L / M5-1L
7. DETOUR M4-8 / SOUTH M3-3 / LOOP 13 M1-6L / M6-1
8. END DETOUR — M4-8a
9. ROAD CLOSED — R11-2
10. R3-2

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

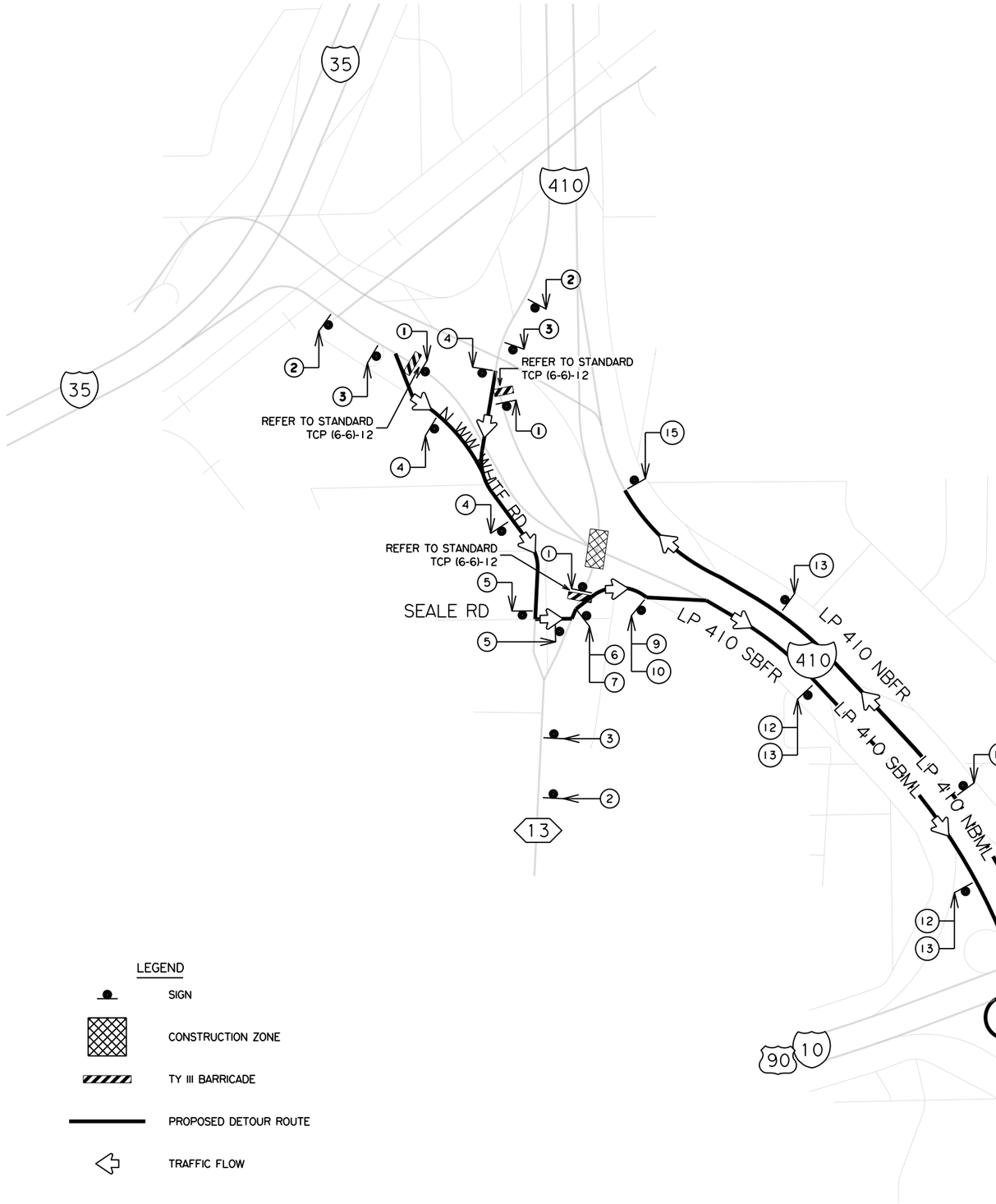
Texas Department of Transportation

DETOUR LAYOUT
IH 10 WB AT LOOP 13

15-BM_STL-2

SHEET 1 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		22
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1. ROAD CLOSED — R11-2
2. ROAD CLOSED AHEAD — CW20-3D
3. DETOUR AHEAD — CW20-2D
4. DETOUR SOUTH M3-3 / INTERSTATE 410 M1-1 / M6-3
5. DETOUR SOUTH M3-3 / INTERSTATE 410 M1-1 / M6-1
6. DETOUR NORTH M3-1 / INTERSTATE 410 M1-1 / M6-2R
7. DETOUR M4-8 / INTERSTATE 35 M1-1 / M6-2R
9. DETOUR NORTH M3-1 / INTERSTATE 410 M1-1 / M6-2L
10. DETOUR M4-8 / INTERSTATE 35 M1-1 / M6-2L
12. DETOUR NORTH M3-1 / INTERSTATE 410 M1-1 / M6-3
13. DETOUR M4-8 / INTERSTATE 35 M1-1 / M6-3
15. END DETOUR — M4-8a

N

NTS
SB IH 410 DETOUR LENGTH: (VARIES)
0.85 MILES (MAX)

NB IH 410 DETOUR LENGTH:
1.7 MILES

NB IH 35 DETOUR LENGTH:
3.4 MILES

SB IH 35 DETOUR LENGTH:
3.3 MILES

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.
5/1/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

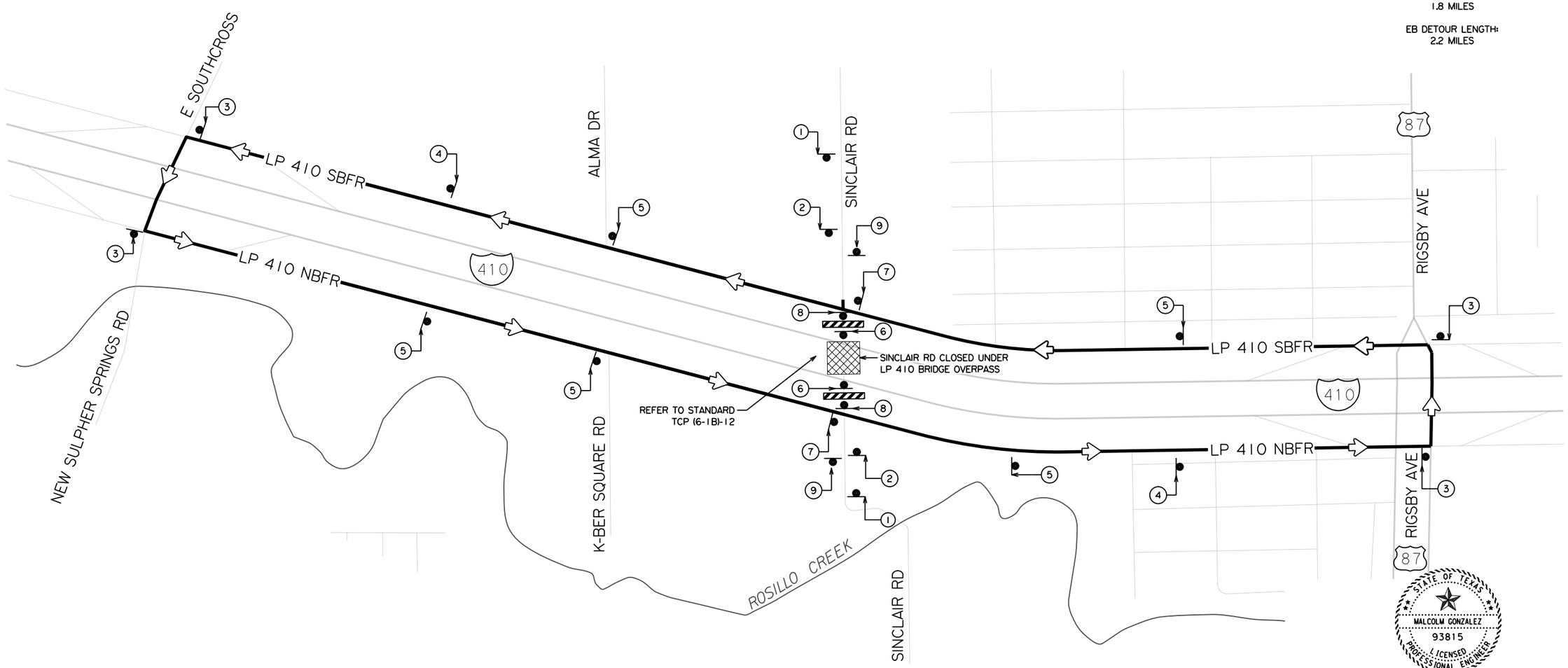
Texas Department of Transportation

DETOUR LAYOUT
LP 410 SB AT CONN. F

15-BM_STL-3

SHEET 2 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		23
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



SIGN SPECIFICATIONS

1. ROAD CLOSED AHEAD — CW20-3D
2. DETOUR AHEAD — CW20-2D
3. SINCLAIR RD M4-12T / DETOUR M4-9L
4. SINCLAIR RD M4-12T / DETOUR M4-9AL
5. SINCLAIR RD M4-12T / DETOUR M4-9S
6. ROAD CLOSED / DETOUR R11-2 48" x 30" M4-10R
7. R3-2
8. SIDEWALK CLOSED R9-9
9. END DETOUR M4-8a

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- TRAFFIC FLOW

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

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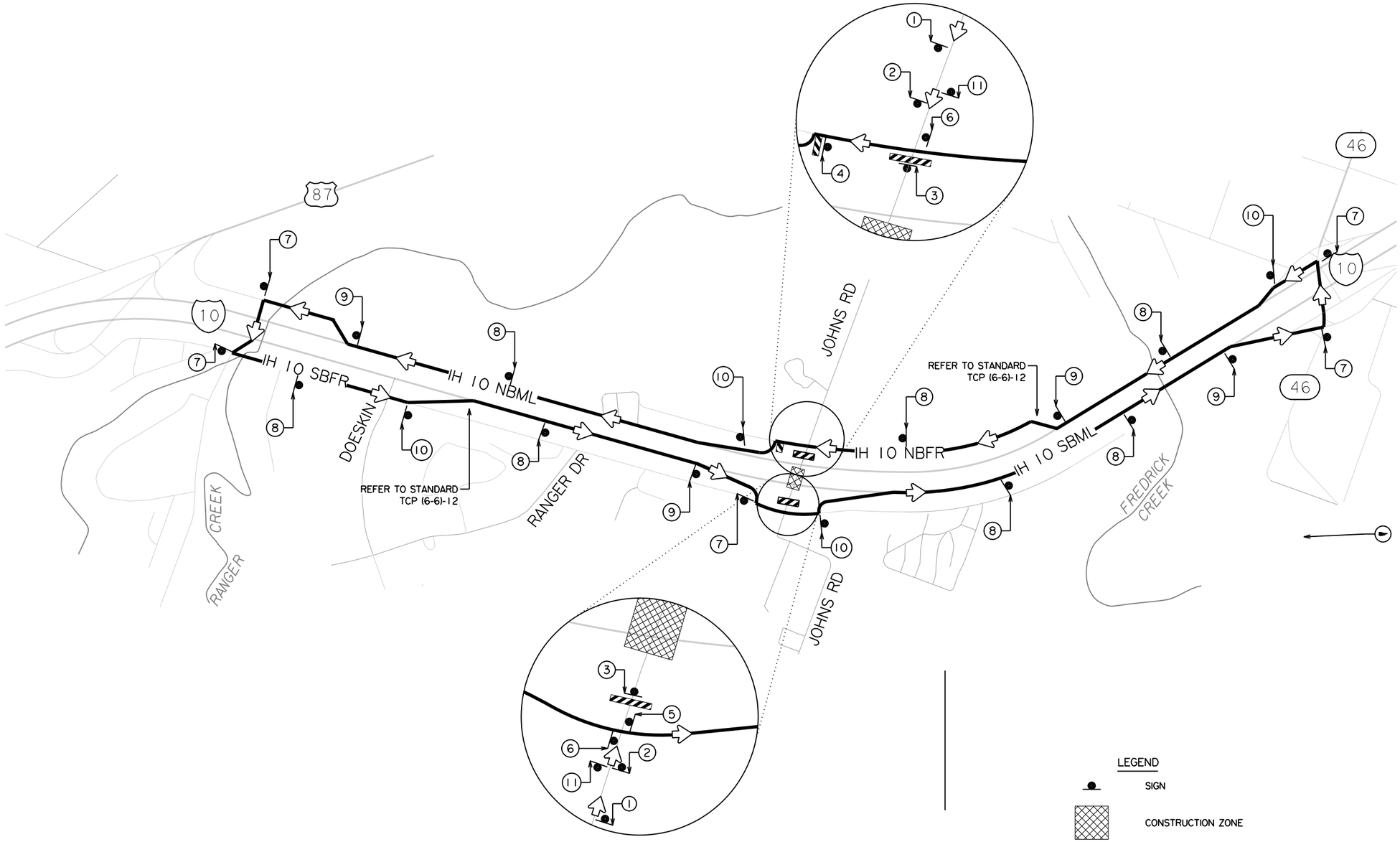
DETOUR LAYOUT
LP 410 SB AT SINCLAIR RD

15-BM_STL-4

SHEET 3 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		24
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



SIGN SPECIFICATIONS

1	ROAD CLOSED AHEAD	CW20-3D
2	DETOUR AHEAD	CW20-2D
3	ROAD CLOSED / DETOUR	R11-2 / M4-10R
4	ROAD CLOSED	R11-2
5		R3-1
6		R3-2
7	JOHNS RD DETOUR ⇦	M4-12T / M4-9L
8	JOHNS RD DETOUR ⇧	M4-12T / M4-9S
9	JOHNS RD DETOUR ⇗	M4-12T / M4-9R
10	JOHNS RD DETOUR ⇖	M4-12T / M4-9L
11	END DETOUR	M4-8a

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- TRAFFIC FLOW

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

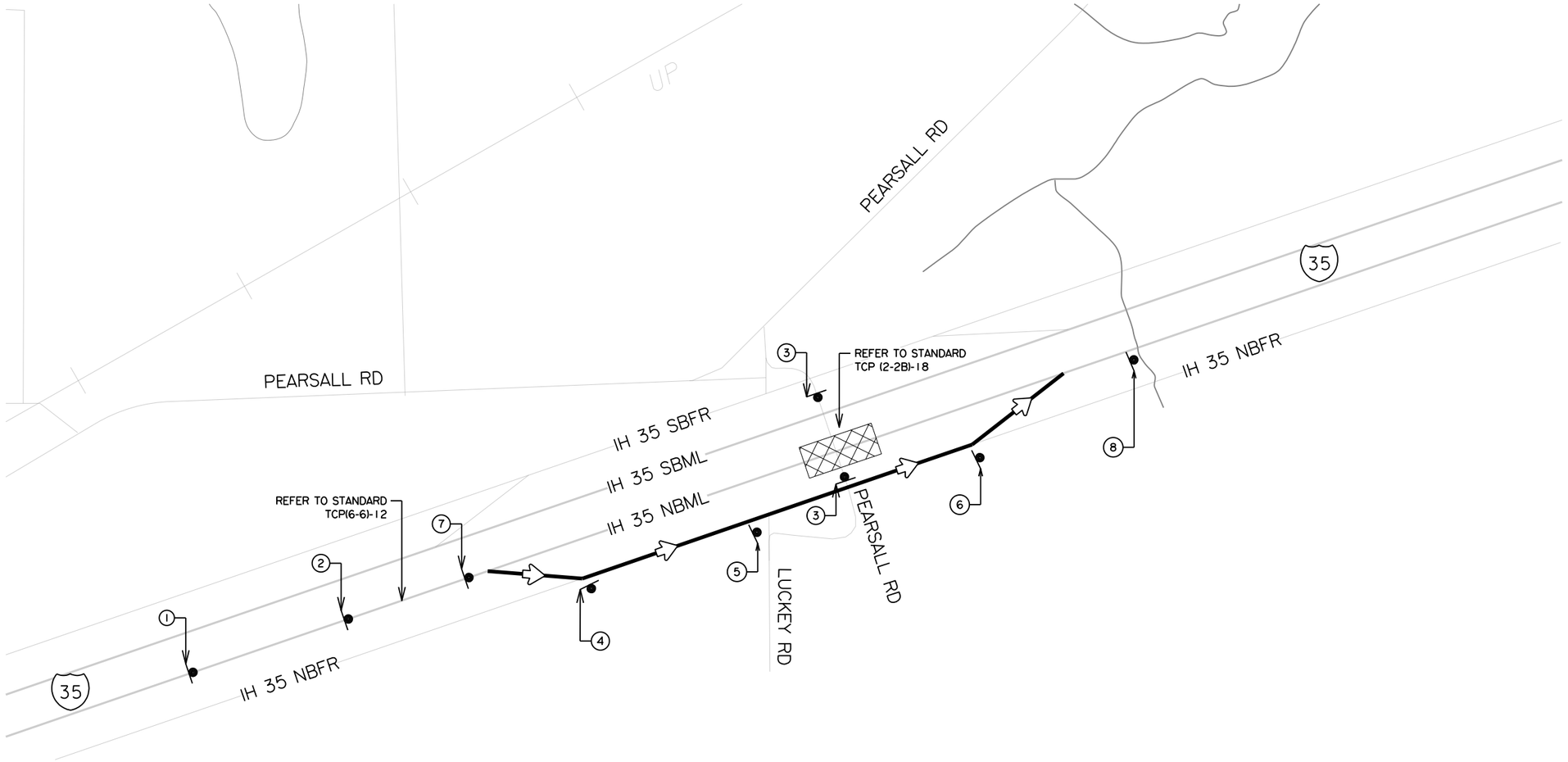
Texas Department of Transportation
© 2023

DETOUR LAYOUT
IH 10 AT JOHNS RD

131-BM_STL-5

SHEET 4 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		25
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



N

NTS
DETOUR LENGTH:
1.0 MILE

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1	ROAD CLOSED AHEAD — CW20-3D	4	DETOUR M4-8 / NORTH M3-1 / AUGUSTA 35 M1-1 / M6-1
2	DETOUR AHEAD — CW20-2D	5	DETOUR M4-8 / NORTH M3-1 / AUGUSTA 35 M1-1 / M6-3
3	CW20-7	6	DETOUR M4-8 / NORTH M3-1 / AUGUSTA 35 M1-1 / M6-2L
7	ROAD CLOSED — R11-2 / CW1-6R	8	END DETOUR — M4-8a

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

DETOUR LAYOUT
IH 35 AT LUCKEY RD

15-BM_CNC-6

SHEET 5 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		26
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

NTS
DETOUR LENGTH:
1.8 MILES
PEDESTRIAN DETOUR LENGTH:
0.1 MILES

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1. ROAD CLOSED AHEAD — CW20-3D
2. DETOUR AHEAD — CW20-2D
3. CROSSWALK CLOSED / USE OTHER SIDE — R9-10DBL
4. DETOUR / ROAD CLOSED — M4-10R / R11-2
5. SOUTHCROSS BLVD M4-12T / DETOUR M4-9S
6. SOUTHCROSS BLVD M4-12T / DETOUR M4-9AL
7. SOUTHCROSS BLVD M4-12T / DETOUR M4-9L
8. END DETOUR — M4-8a
9. ROAD CLOSED — R11-2
10. R3-2

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E.
MALCOLM GONZALEZ, P.E. — 5/1/2023 DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

DETOUR LAYOUT
IH 35 SBML
SOUTHCROSS BLVD

15-BM_CNC-7

SHEET 6 OF 12

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	27

STATE	DIST.	COUNTY
TEXAS	SAT	VARIOUS

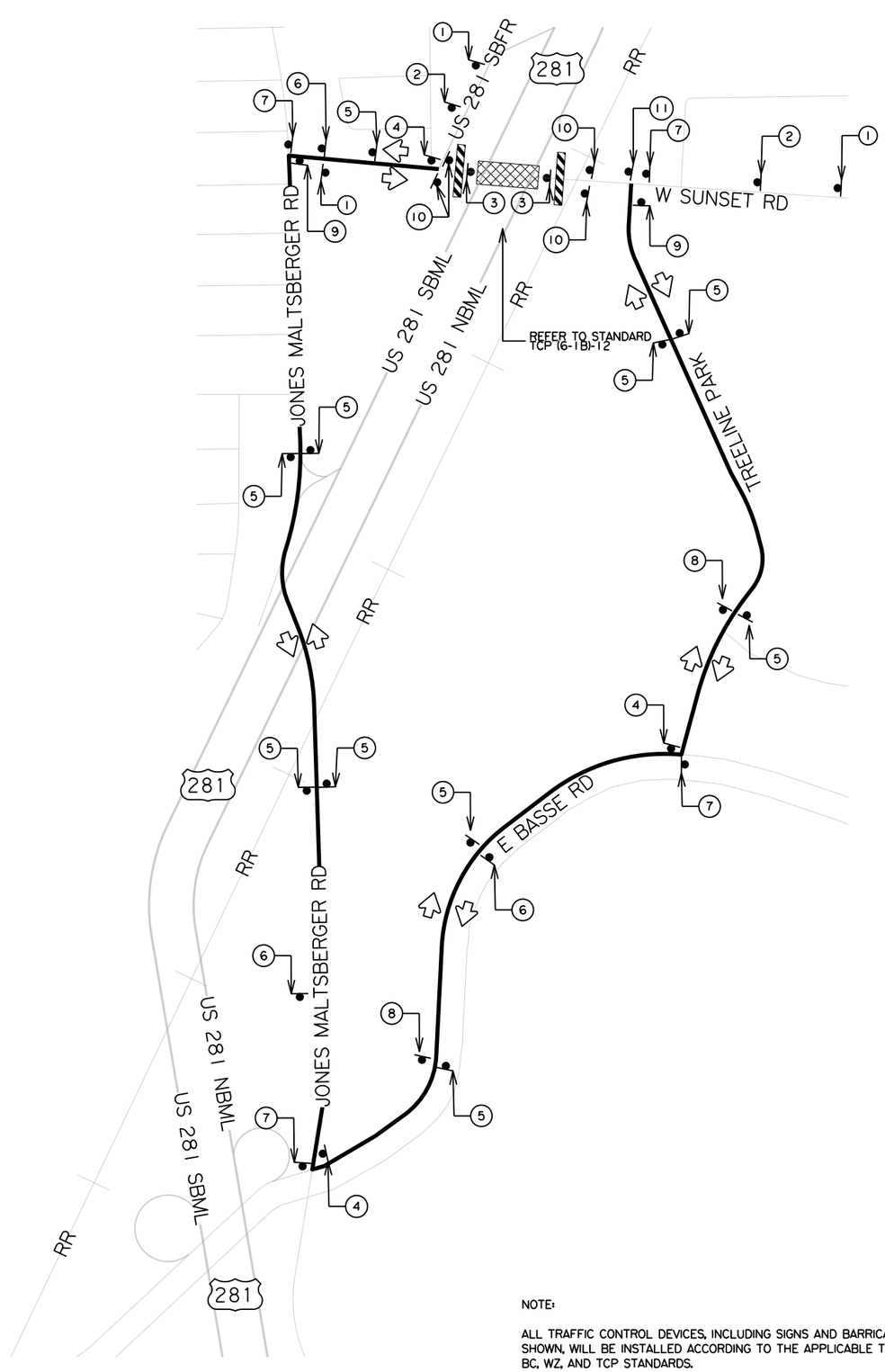
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1. ROAD CLOSED AHEAD — CW20-3D
2. DETOUR AHEAD — CW20-2D
3. ROAD CLOSED — R11-2, 48" x 30"
4. SUNSET RD / DETOUR — M4-12T / M4-9R
5. SUNSET RD / DETOUR — M4-12T / M4-9S
6. SUNSET RD / DETOUR — M4-12T / M4-9AL
7. SUNSET RD / DETOUR — M4-12T / M4-9L
8. SUNSET RD / DETOUR — M4-12T / M4-9AR
9. END DETOUR — M4-8a
10. SIDEWALK CLOSED — R9-9
11. SIDEWALK CLOSED AHEAD / CROSS HERE — R9-11L



N

NTS
DETOUR LENGTH:
2.1 MILES
PEDESTRIAN DETOUR LENGTH:
2.1 MILES

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

DETOUR LAYOUT
US 281 AT SUNSET RD

15-BM_CNC-8

SHEET 7 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		28
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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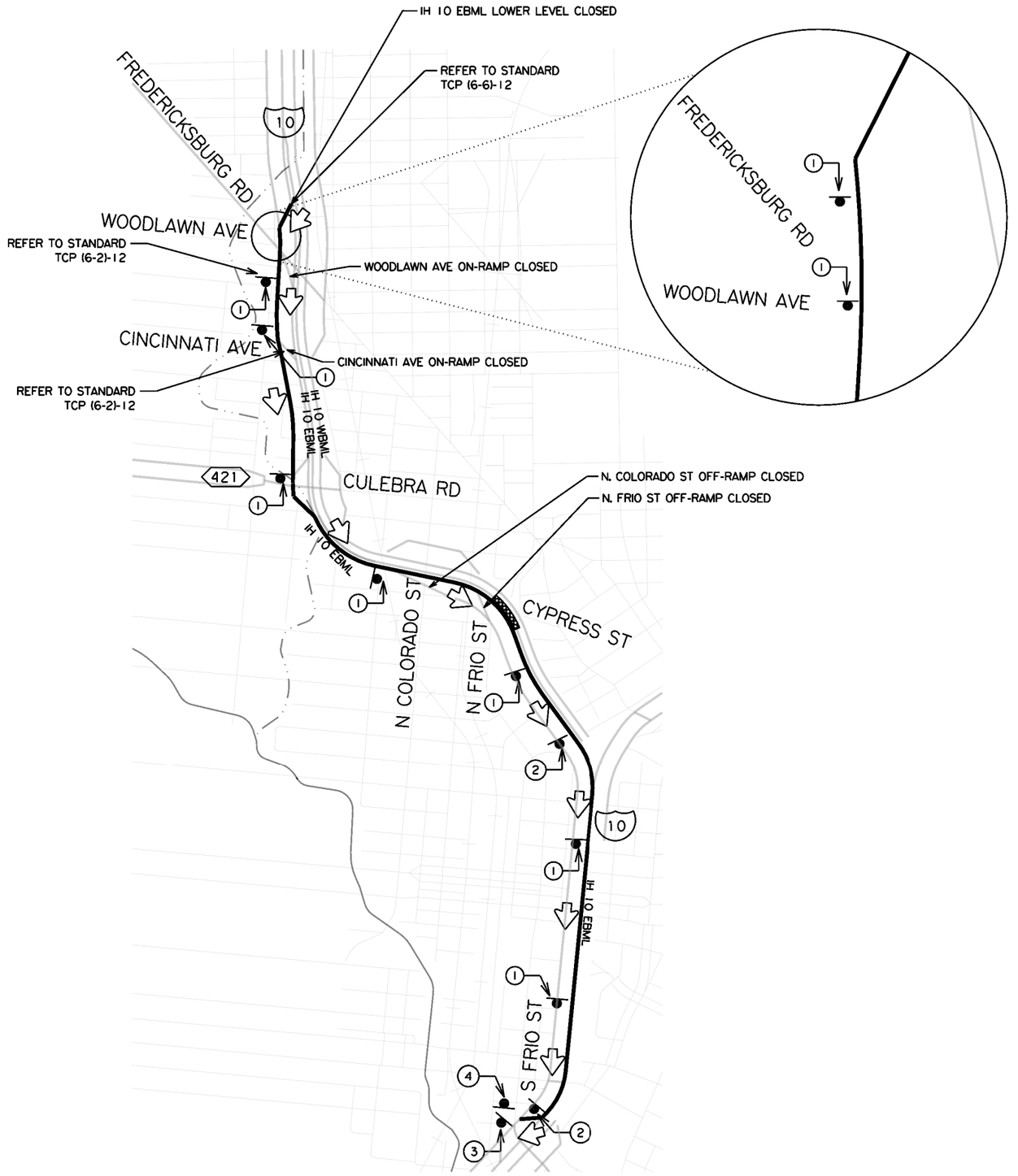

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- TRAFFIC FLOW

N

NTS
DETOUR LENGTH:
3.4 MILES

SIGN SPECIFICATIONS

1
- COLORADO ST M4-12T
- FRIO ST M4-12T
- DETOUR M4-9S

2
- COLORADO ST M4-12T
- FRIO ST M4-12T
- DETOUR M4-9R

3
- FRIO ST M4-12T
- DETOUR M4-9R

4
- END DETOUR M4-8a

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation

DETOUR LAYOUT
IH 10 EB AT W POPLAR ST

15-BRG-27

SHEET 8 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		29
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

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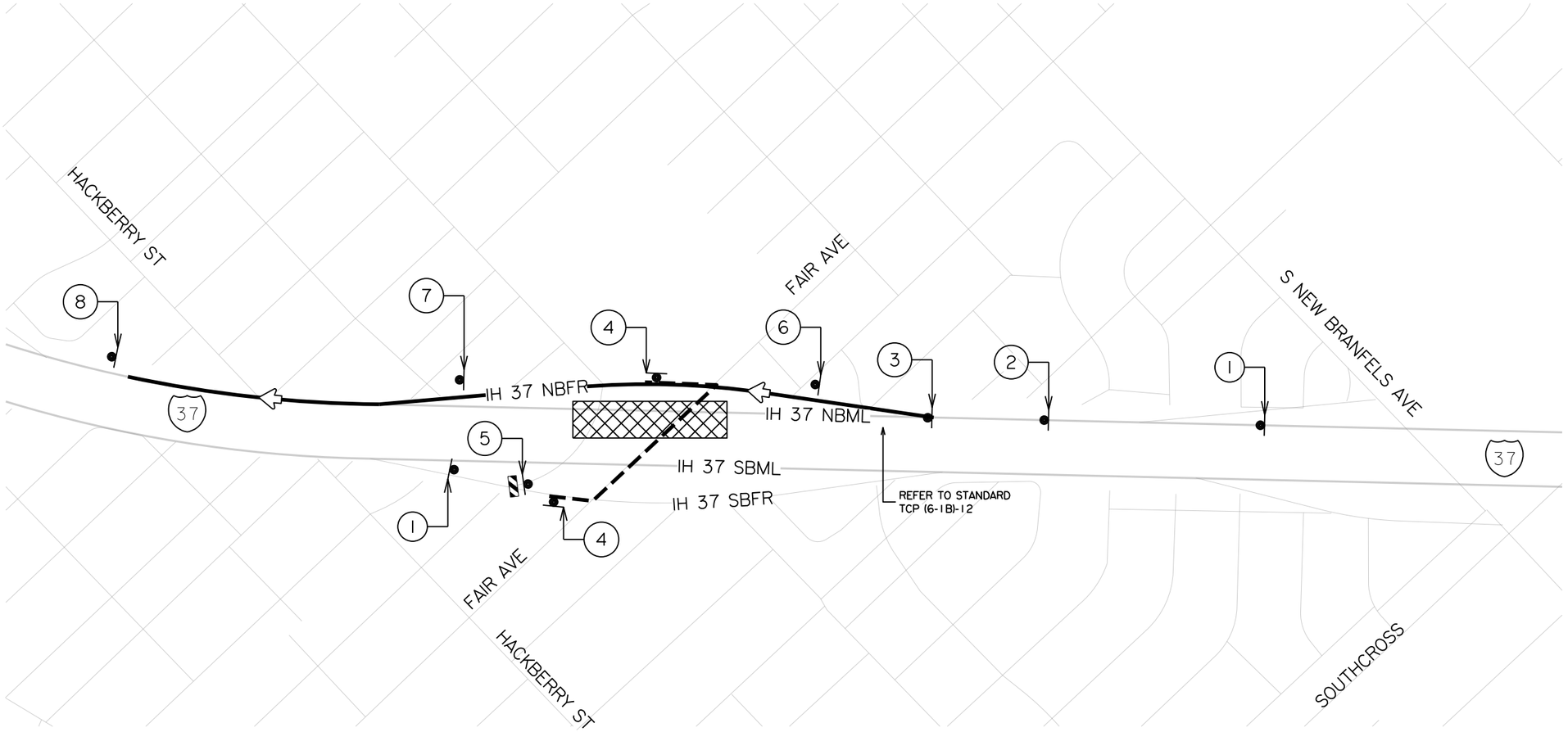

NTS
DETOUR LENGTH:
0.9 MILES
PEDESTRIAN DETOUR LENGTH
0.1 MILES

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1. ROAD CLOSED AHEAD — CW20-3D
2. DETOUR AHEAD — CW20-2D
3. ROAD CLOSED — R11-2; CW1-6R
4. CROSSWALK CLOSED USE OTHER SIDE
5. ROAD CLOSED — R11-2
6. DETOUR NORTH M3-1; INTERSTATE 37 M1-1; M6-3
7. DETOUR NORTH M3-1; INTERSTATE 37 M1-1; M6-2L
8. END DETOUR — M4-8a

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

Texas Department of Transportation
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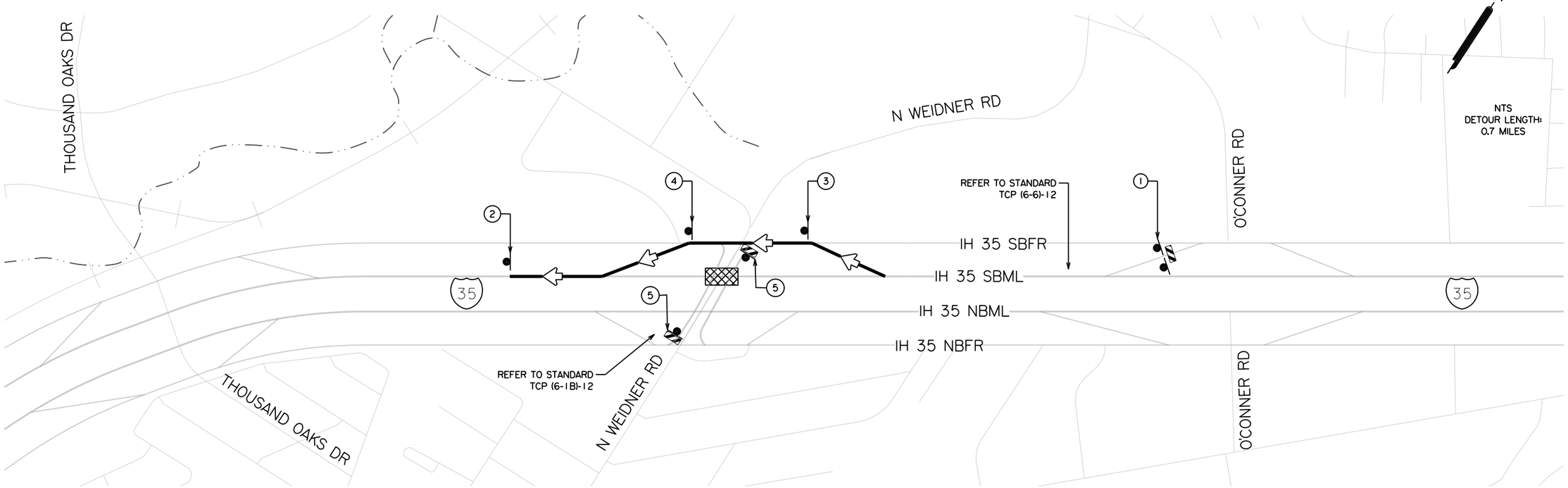
DETOUR LAYOUT
IH 37 NB AT FAIR AVE

15-BRG-28

SHEET 9 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		30
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



SIGN SPECIFICATIONS

1. RAMP CLOSED (R11-2bT) / USE NEXT RAMP (CW25-1T)
2. END DETOUR M4-8a
3. DETOUR M4-8 / SOUTH M3-3 / INTERSTATE 35 M1-1 / M6-3
4. DETOUR M4-8 / SOUTH M3-3 / INTERSTATE 35 M1-1 / M6-2L
5. ROAD CLOSED R11-2

LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRAFFIC FLOW

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 4/27/2023

MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

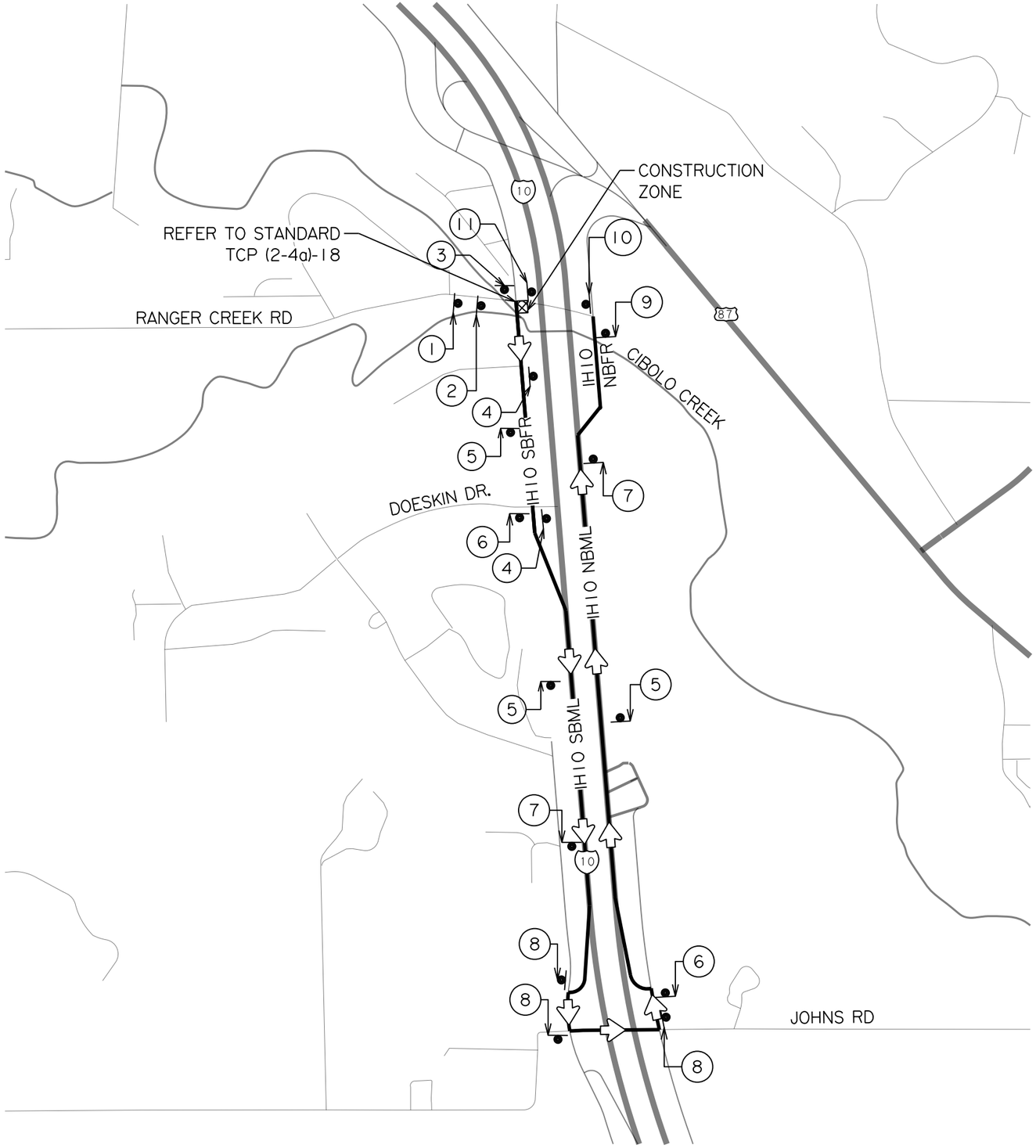
Texas Department of Transportation

DETOUR LAYOUT
IH35 AT WEIDNER RD

15-BRG-31

SHEET 10 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		31
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW

N

NTS
DETOUR LENGTH:
2.9 MILES

SIGN SPECIFICATIONS

1. DETOUR AHEAD — CW20-2D
2. ROAD CLOSED AHEAD — CW20-3D
3. R3-2
4. RANGER CREEK RD / DETOUR — M4-12T / M4-9R
5. RANGER CREEK RD / DETOUR — M4-12T / M4-9S
6. RANGER CREEK RD / DETOUR — M4-12T / M4-9L
7. RANGER CREEK RD / DETOUR — M4-12T / M4-9R
8. RANGER CREEK RD / DETOUR — M4-12T / M4-9L
9. RANGER CREEK RD / END DETOUR — M4-12T / M4-8a
10. ROAD CLOSED — R11-2, 48" x 30"
11. ROAD CLOSED / DETOUR — R11-2, 48" x 30" / M4-10R

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED
PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 5/1/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

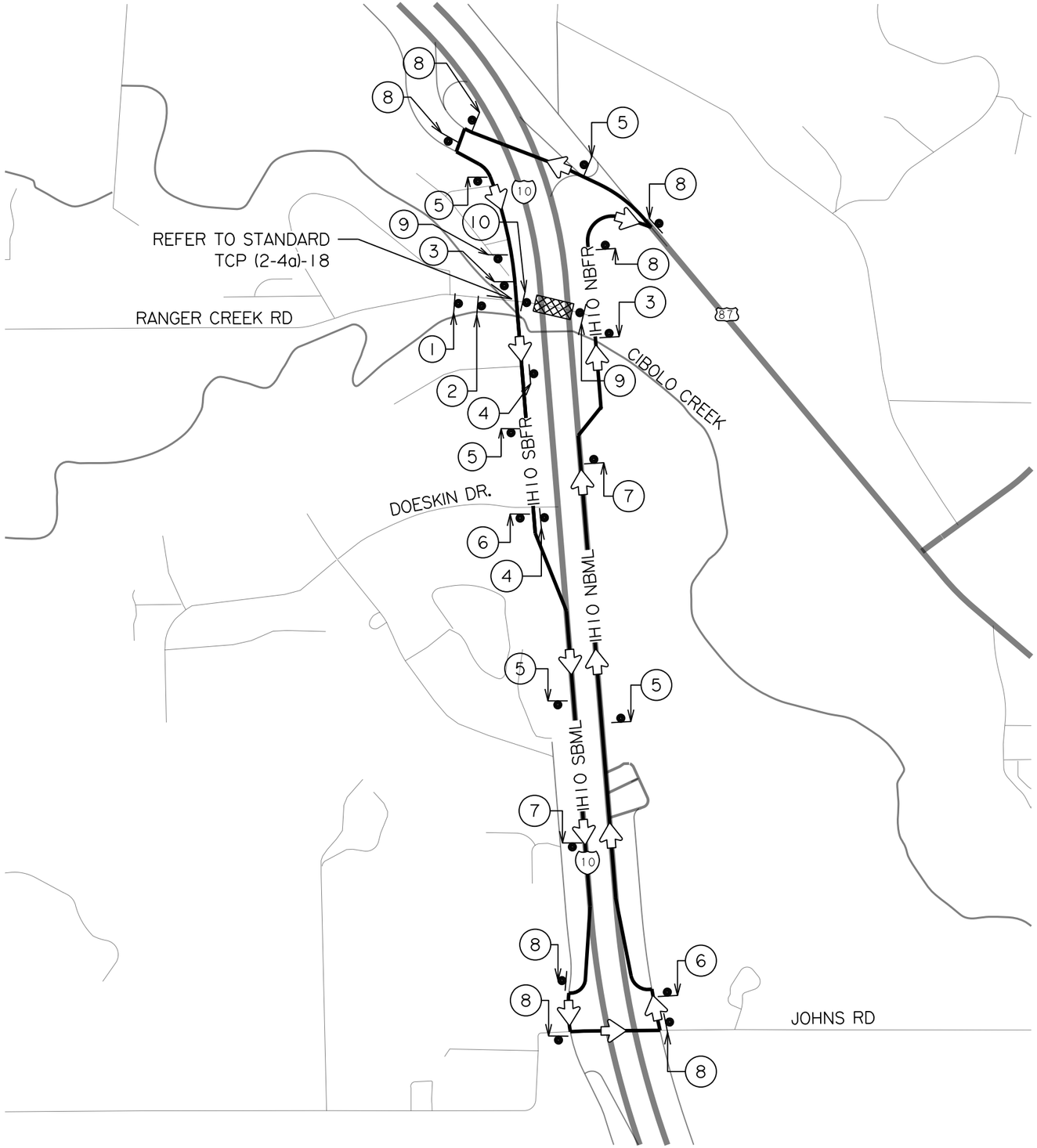
Texas Department of Transportation

DETOUR LAYOUT
IH 10 WBFR/CIBOLO CREEK

131-RAIL_STL-22

SHEET 11 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		32
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS



LEGEND

- SIGN
- CONSTRUCTION ZONE
- TY III BARRICADE
- PROPOSED DETOUR ROUTE
- PROPOSED PEDESTRIAN DETOUR ROUTE
- TRAFFIC FLOW

SIGN SPECIFICATIONS

1. DETOUR AHEAD — CW20-2D
2. ROAD CLOSED AHEAD — CW20-3D
3. R3-2
4. RANGER CREEK RD / DETOUR — M4-12T / M4-9R
5. RANGER CREEK RD / DETOUR — M4-12T / M4-9S
6. RANGER CREEK RD / DETOUR — M4-12T / M4-9L
7. RANGER CREEK RD / DETOUR — M4-12T / M4-9R
8. RANGER CREEK RD / DETOUR — M4-12T / M4-9L
9. RANGER CREEK RD / END DETOUR — M4-12T / M4-8a
10. ROAD CLOSED / DETOUR — R11-2 48" x 30" / M4-10R

N

NTS
DETOUR LENGTH:
EB DETOUR = 3.03 MILES
WB DETOUR = 1.08 MILES

NOTE:

ALL TRAFFIC CONTROL DEVICES, INCLUDING SIGNS AND BARRICADES SHOWN, WILL BE INSTALLED ACCORDING TO THE APPLICABLE TMUTCD, BC, WZ, AND TCP STANDARDS.

STATE OF TEXAS
MALCOLM GONZALEZ
93815
LICENSED PROFESSIONAL ENGINEER

Malcolm Gonzalez, P.E. 5/1/2023
MALCOLM GONZALEZ, P.E. DATE

SCALE
HORIZONTAL: N.T.S.
VERTICAL: N.T.S.

DETOUR LAYOUT
IH 10 / RANGER ROAD

131-RAIL_STL-16
131-RAIL_STL-17

SHEET 12 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C915-00-258		33
STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

NIGHT CLOSURES										
ROADWAY REFERENCE NUMBER	HIGHWAY OR STREET	SEGMENT	12AM TO 5AM	5AM TO 7AM	7AM TO 9AM	9AM TO 4PM	4PM TO 7PM	7PM TO 9PM	9PM TO 12AM	LANE CLOASURE ASSESMENT FEE [$/HOUR/LANE]
15-BM_STL-2	IH 10 WB	IH 410 TO N WW WHITE RD								4,300
15-BM_STL-2	N WW WHITE	AT IH 10								550
15-BM_STL-3	IH 410	IH35 TO LP 13								2,800
15-BM_STL-3	LP 13	LP 13 TO IH 35 N/IH 410 N CONNECTOR								750
15-BM_STL-3	IH 35 NB	NB IH 35 TO IH 410 SB ENTRANCE RAMP								750
15-BM_STL-3	IH 410 SBFR	IH 410 SBFR TO IH 410 ENTERANCE RAMP								750
15-BM_STL-4	LP 410 SB	AT SINCLAIR RD								2,600
15-BM_STL-4	SINCLAIR RD	AT IH 410								850
131-BM_STL-5	SB IH 10	JOHNS RD								1,700
131-BM_STL-5	JOHNS RD	AT IH 10								150
15-BM_CNC-6	LUCKY RD	AT IH 10								150
15-BM_CNC-6	IH 35	AT LUCKY RD								2,500
15-BM_CNC-7	IH 35 SBML	AT W SOUTHCROSS BLVD								4,200
15-BM_CNC-7	W SOUTHCROSS BLVD	AT IH 35								400
15-BM_CNC-8	US 281 NB	AT SUNSET RD								6,800
15-BM_CNC-8	SUNSET RD	AT US281								450
7-RAIL_STL-13	IH 37 SB	BORREGO CREEK								1,000
7-RAIL_STL-14	SH 16	DRAW								500
95-RAIL_STL-15	FM 466	GUADALUPE RIVER								750
131-RAIL_STL-16	IH 10 WBML	CIBOLO CRK & RANGER RD								1,000
131-RAIL_STL-17	IH 10 EBML	CIBOLO CRK & RANGER RD								1,000
131-RAIL_STL-18	IH 10 WBML	LITTLE JOSHUA CRK & FM 289								1,000
131-RAIL_STL-19	IH 10 EBML	GUAD RIV/FM 473/FM 1621								1,000
131-RAIL_STL-20	IH 10 EBML	HOLIDAY CREEK								1,000
131-RAIL_STL-21	IH 10 WBML	BIG JOSHUA CRK & RUST RD								1,000
131-RAIL_STL-22	IH 10 WFR	CIBOLO CREEK								500
131-RAIL_STL-23	RM 1376	GUADALUPE RIVER								750
133-RAIL_STL-24	IH 10 EB	DRAW								1,000
133-RAIL_STL-25	IH 10 EB	CYPRESS CREEK & CO RD								1,000
163-RAIL_STL-26	IH 35 SBML	SAN FRANCISCO PEREZ CREEK								1,000
15-BRG-27	IH 10 EB	W POPLAR ST								8,600
15-BRG-28	IH 37 NB	FAIR AVE								5,400
15-BRG-29	IH 37 SB	HACKBERRY ST								8,850
15-BRG-30	IH 37 NB	HACKBERRY ST								8,400
15-BRG-31	IH 35 SBML	WEIDNER RD								7,500

LEGEND		
	ALLOWABLE LANE CLOSURE (FEES DO NOT APPLY)	
	LANE CLOSURES NOT ALLOWED (FEES APPLY AS INDICATED)	

NOTE:

LANE CLOSURE WILL BE ALLOWED ONLY DURING THE DAYS AND HOURS INDICATED IN THE ABOVE TABLE

IF THE CONTRACTOR FAILS TO RE-OPEN ALL CLOSED LANES ON TIME, LATE CHARGES WILL BE ASSESED AS SHOWN ON THE TABLE. THE TABLE APPLIES TO THE CONTRACTOR FOR CLOSURES OR OBSTRUCTIONS THAT OVERLAP INTO RESTRICTED HOUR TRAFFIC FOR EACH HOUR, PER LANE.

THE CONTRACTOR SHALL REQUEST AND RECEIVE WRITTEN DIRECTION FROM THE ENGINEER A MINIMUM OF 48 HOURS IN ADVANCE OF THE CONSTRUCTION ACTIVITY REQIRING THE LANE CLOSURE.

THE CONTRACTOR SHALL REFER TO THE DETOUR LAYOUTS FOR CLOSURES/DETOURS WHICH CANNOT COINCIDE.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 4/27/2023 DATE

Texas Department of Transportation

LANE ASSESMENT FEE TABLE

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	34

STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

WEEKEND CLOSURES*										
ROADWAY REFERENCE NUMBER	HIGHWAY OR STREET	SEGMENT	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	LANE CLOASURE ASSESMENT FEE [$/HOUR/LANE]
15-BM_STL-2	IH 10 WB	IH 410 TO N WW WHITE RD								4,300
15-BM_STL-2	N WW WHITE	AT IH 10								550
15-BM_STL-3	IH 410	IH35 TO LP 13								2,800
15-BM_STL-3	LP 13	LP 13 TO IH 35 N/IH 410 N CONNECTOR								750
15-BM_STL-3	IH 35 NB	NB IH 35 TO IH 410 SB ENTRANCE RAMP								750
15-BM_STL-3	IH 410 SBFR	IH 410 SBFR TO IH 410 ENTERANCE RAMP								750
15-BM_STL-4	LP 410 SB	AT SINCLAIR RD								2,600
15-BM_STL-4	SINCLAIR RD	AT IH 410								850
131-BM_STL-5	SB IH 10	JOHNS RD								1,700
131-BM_STL-5	JOHNS RD	AT IH 10								150
15-BM_CNC-6	LUCKY RD	AT IH 10								150
15-BM_CNC-6	IH 35	AT LUCKY RD								2,500
15-BM_CNC-7	IH 35 SBML	AT W SOUTHCROSS BLVD								4,200
15-BM_CNC-7	W SOUTHCROSS BLVD	AT IH 35								400
15-BM_CNC-8	US 281 NB	AT SUNSET RD								6,800
15-BM_CNC-8	SUNSET RD	AT US281								450
7-RAIL_STL-13	IH 37 SB	BORREGO CREEK								1,000
7-RAIL_STL-14	SH 16	DRAW								500
95-RAIL_STL-15	FM 466	GUADALUPE RIVER								750
131-RAIL_STL-16	IH 10 WBML	CIBOLO CRK & RANGER RD								1,000
131-RAIL_STL-17	IH 10 EBML	CIBOLO CRK & RANGER RD								1,000
131-RAIL_STL-18	IH 10 WBML	LITTLE JOSHUA CRK & FM 289								1,000
131-RAIL_STL-19	IH 10 EBML	GUAD RIV/FM 473/FM 1621								1,000
131-RAIL_STL-20	IH 10 EBML	HOLIDAY CREEK								1,000
131-RAIL_STL-21	IH 10 WBML	BIG JOSHUA CRK & RUST RD								1,000
131-RAIL_STL-22	IH 10 WFR	CIBOLO CREEK								500
131-RAIL_STL-23	RM 1376	GUADALUPE RIVER								750
133-RAIL_STL-24	IH 10 EB	DRAW								1,000
133-RAIL_STL-25	IH 10 EB	CYPRESS CREEK & CO RD								1,000
163-RAIL_STL-26	IH 35 SBML	SAN FRANCISCO PEREZ CREEK								1,000
15-BRG-27	IH 10 EB	W POPLAR ST								8,600
15-BRG-28	IH 37 NB	FAIR AVE								5,400
15-BRG-29	IH 37 SB	HACKBERRY ST								8,850
15-BRG-30	IH 37 NB	HACKBERRY ST								8,400
15-BRG-31	IH 35 SBML	WEIDNER RD								7,500

• WEEKEND CLOSURES ARE FROM 9PM FRIDAY EVENING TO 5AM MONDAY MORNING.

5:00 AM — 9:00 PM

LEGEND		
	ALLOWABLE LANE CLOSURE (FEES DO NOT APPLY)	
	LANE CLOSURES NOT ALLOWED (FEES APPLY AS INDICATED)	

NOTE:

LANE CLOSURE WILL BE ALLOWED ONLY DURING THE DAYS AND HOURS INDICATED IN THE ABOVE TABLE

IF THE CONTRACTOR FAILS TO RE-OPEN ALL CLOSED LANES ON TIME, LATE CHARGES WILL BE ASSESED AS SHOWN ON THE TABLE. THE TABLE APPLIES TO THE CONTRACTOR FOR CLOSURES OR OBSTRUCTIONS THAT OVERLAP INTO RESTRICTED HOUR TRAFFIC FOR EACH HOUR, PER LANE.

THE CONTRACTOR SHALL REQUEST AND RECEIVE WRITTEN DIRECTION FROM THE ENGINEER A MINIMUM OF 48 HOURS IN ADVANCE OF THE CONSTRUCTION ACTIVITY REQIRING THE LANE CLOSURE.

THE CONTRACTOR SHALL REFER TO THE DETOUR LAYOUTS FOR CLOSURES/DETOURS WHICH CANNOT COINCIDE.

STATE OF TEXAS
RENE ALVARADO III
140515
LICENSED PROFESSIONAL ENGINEER

RENE ALVARADO III, P.E. — 4/27/2023 DATE

LANE ASSESMENT FEE TABLE

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	C915-00-258	35

STATE	DIST.	COUNTY	
TEXAS	SAT	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	VARIOUS

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	4	95	7-RAIL_STL-13	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
2	4	96	7-RAIL_STL-14	N/A	TL-3	BI	N/A	N/A	SSCB	24"	42"	>30'	2X	2X		N/A					X	
3	4	97	95-RAIL_STL-15	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
4	4	98	131-RAIL_STL-16	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
5	4	99	131-RAIL_STL-17	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'		X	X	4					X	
6	4	100	131-RAIL_CNC-18	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
7	4	101	131-RAIL_CNC-19	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
8	4	102	131-RAIL_CNC-20	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
9	4	103	131-RAIL_CNC-21	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
10	4	104	131-RAIL_STL-22	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
11	4	105	131-RAIL_STL-23	N/A	TL-3	BI	N/A	N/A	SSCB	24"	42"	>30'	2X	2X		N/A					X	
12	4	106	133-RAIL_STL-24	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
13	4	107	133-RAIL_CNC-22	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'	X	X		N/A					X	
14	4	108	163-RAIL_STL-26	N/A	TL-3	UNI	N/A	N/A	SSCB	24"	42"	>30'		X	X	14					X	
												TOTALS	11	2	11							

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
	DIST	COUNTY		STATE
	SAT	VARIOUS		TEXAS
	FEDERAL AID PROJECT			SHEET NO.
	C915-00-258			36

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET	FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	6185 6002 TMA (STATIONARY)	6185 6005 TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
1	2	15-BM_STL-2	1		1	3	3	
2	2	15-BM_STL-3	5	1	6	3	18	
3	2	15-BM_STL-4		1	1	3	3	
3	2	15-BM_STL-5		2	2	4	8	
4	2	15-BM_STL-6		2	2	2	4	
5	2	15-BM_STL-7		1	1	2	2	
6	2	15-BM_STL-8		4	4	2	8	
7	3	15-SCR-9		1	1	11	11	
8	3	15-SCR-10		1	1	11	11	
9	4	7-RAIL_STL-13		1	1	1	1	
10	4	7-RAIL_STL-14		1	1	1	1	
11	4	95-RAIL_STL-15		1	1	2	2	
12	4	131-RAIL_STL-16		1	1	4	4	
13	4	131-RAIL_STL-17		1	1	4	4	
14	4	131-RAIL_CNC-18		1	1	1	1	
15	4	131-RAIL_CNC-19		1	1	1	1	
16	4	131-RAIL_CNC-20		1	1	1	1	
17	4	131-RAIL_CNC-21		1	1	1	1	
18	4	131-RAIL_STL-22		1	1	3	3	
19	4	131-RAIL_STL-23		1	1	3	3	
20	4	133-RAIL_STL-24		1	1	3	3	
21	4	133-RAIL_STL-25		1	1	1	1	
22	4	163-RAIL_STL-26		1	1	2	2	
23	5	15-BRG-27		2	2	7	14	
24	5	15-BRG-28		3	3	7	21	
25	5	15-BRG-29		5	5	7	35	
26	5	15-BRG-30		3	3	10	30	
27	5	15-BRG-31		4	4	7	28	
		TOTALS	6	44	50	110	224	

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0915	00	258	VA
	DIST	COUNTY	STATE
	SAT	VARIOUS	TEXAS
	FEDERAL AID PROJECT	SHEET NO.
	C915-00-258	37

DATE: 02/13/2023 03:53 PM
FILE: pw:\txdot.projectwiseonline.com:TxDOT4\Documents\- SAT\Design Projects\0915002586- Design\PIan Set\. TCP\Standards\bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

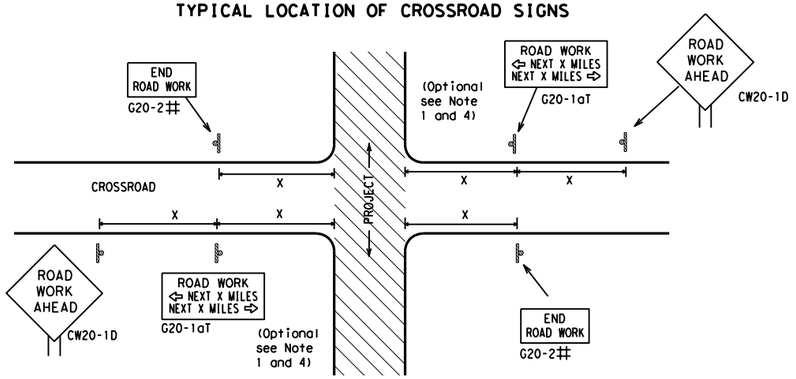
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SAT	VARIOUS		38
5-10 5-21				

DATE: 02/13/2023 03:53 PM
FILE: dwg:\\txdot.projectwiseonline.com\TxDOT4\Documents- SAT\Design Projects\091500258- Design\Plan Set\. TCP\Standards\bc-21.dgn

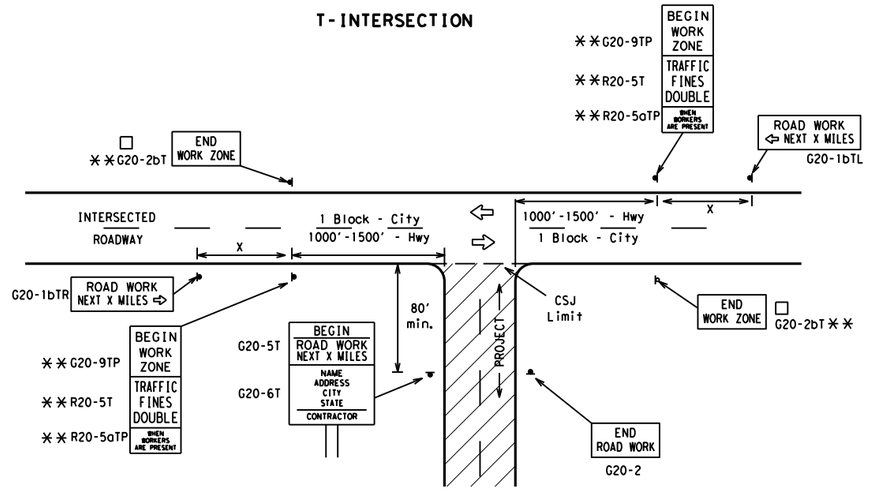
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

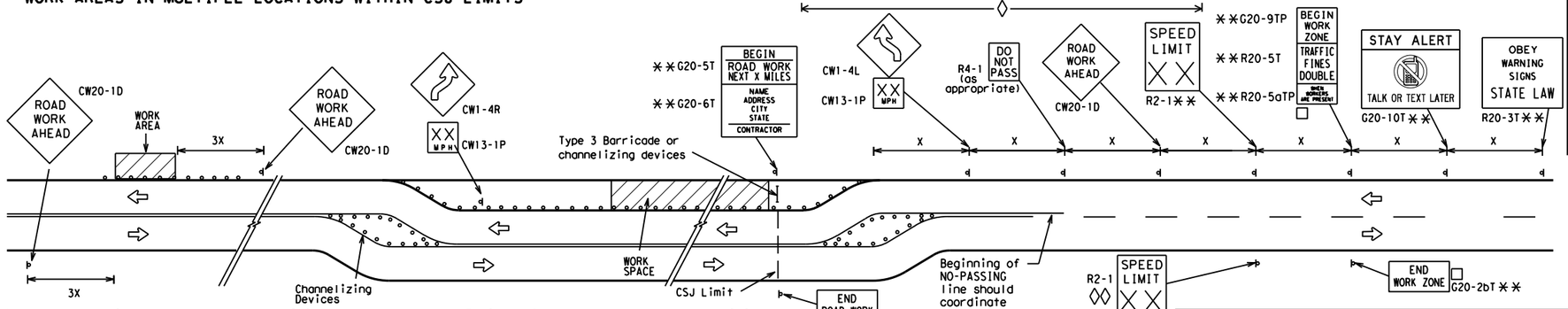
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

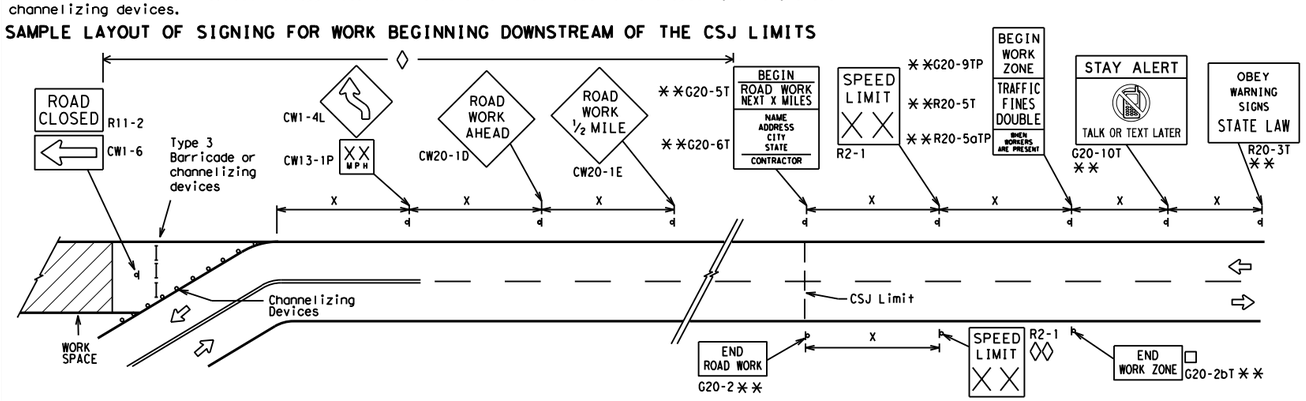
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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	0915	00	258	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	VARIOUS		39

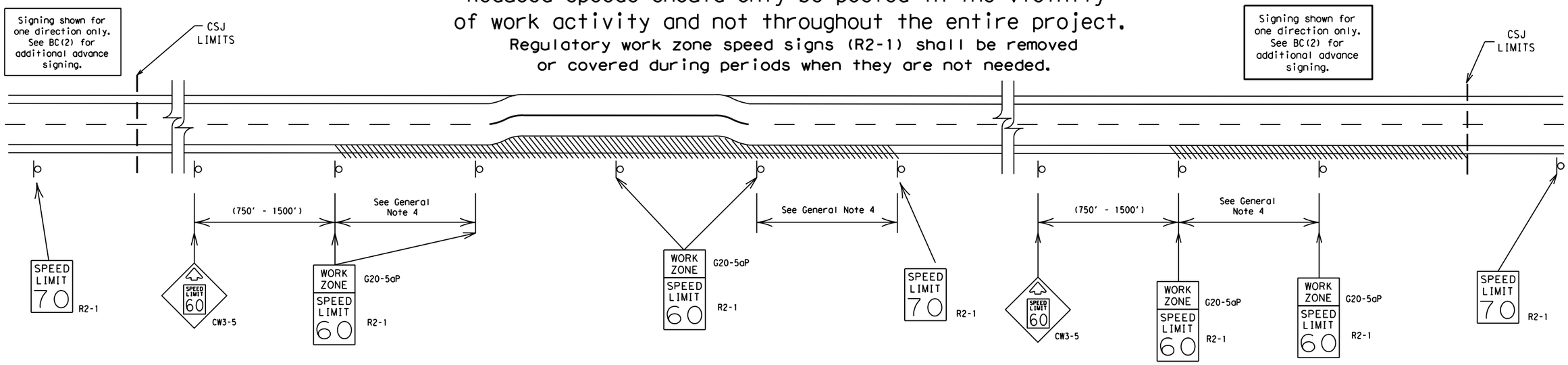
DATE: 02/13/2023 03:53 PM
FILE: bc-21.dgn

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

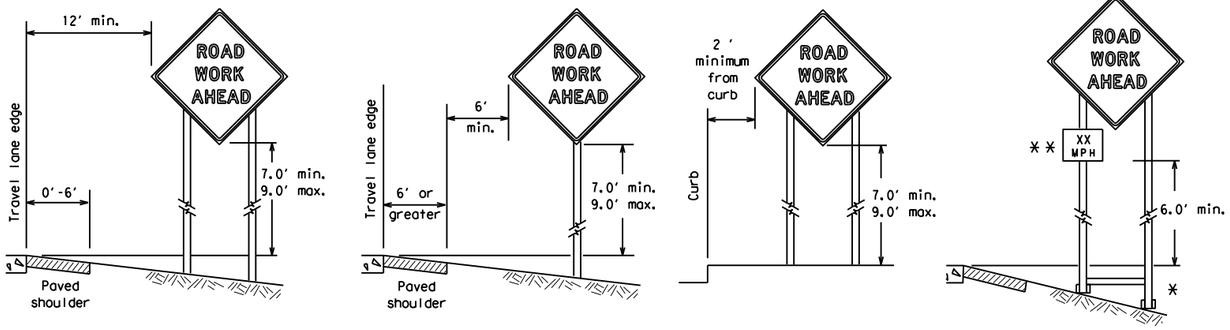
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	VARIOUS		40

DATE: 02/13/2023 03:53 PM
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\- SAT\Design Projects\09150025\- Design\Plan Sets, TCP\Standards\bc-21.dgn

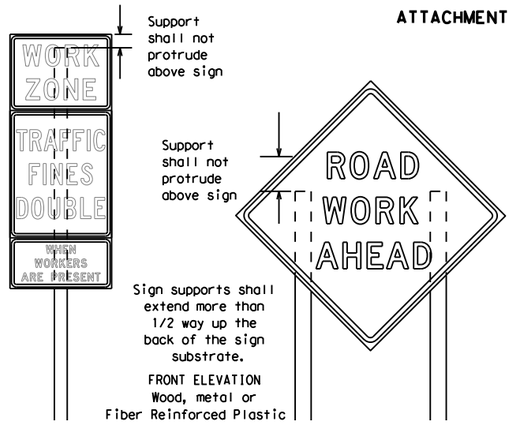
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

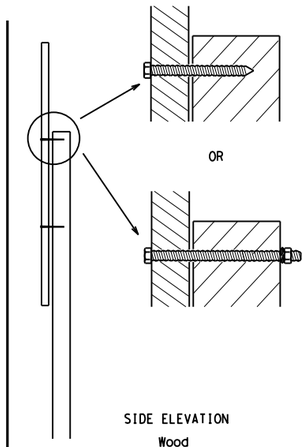


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





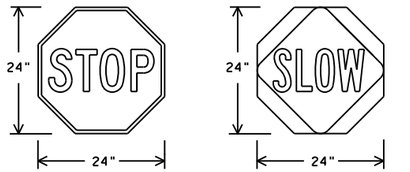
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	SAT	VARIOUS		41

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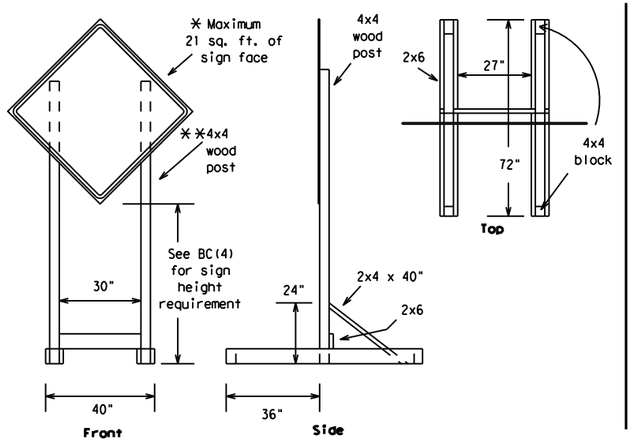
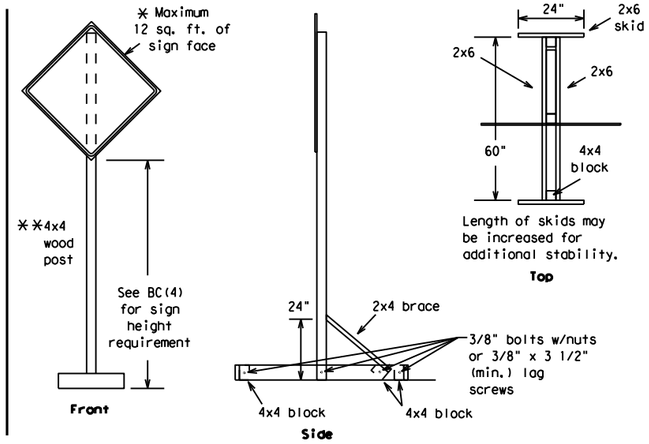
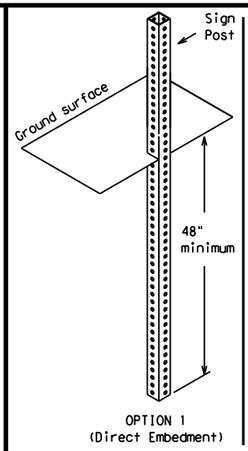
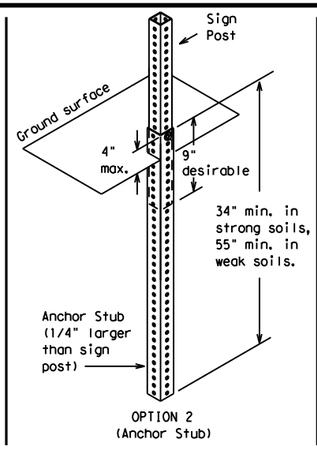


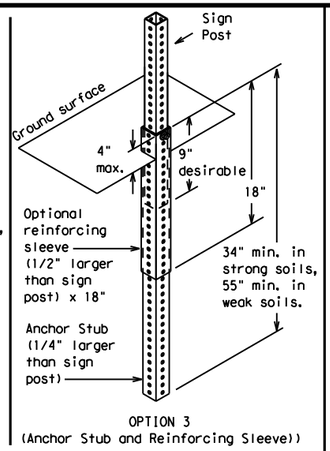


SKID MOUNTED WOOD SIGN SUPPORTS

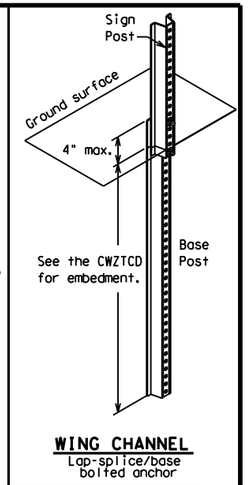
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







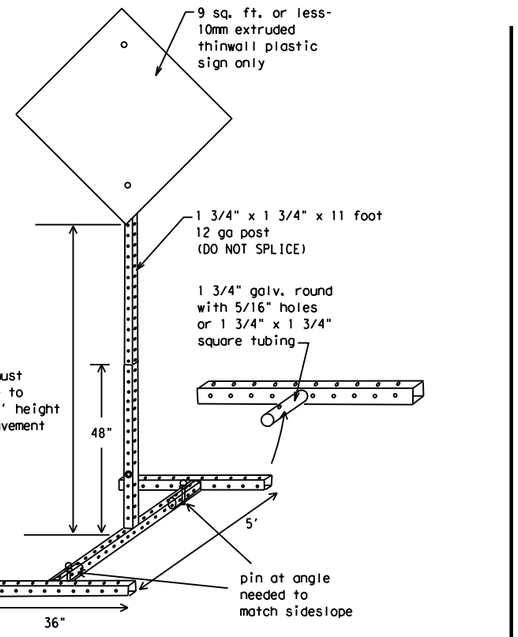
PERFORATED SQUARE METAL TUBING

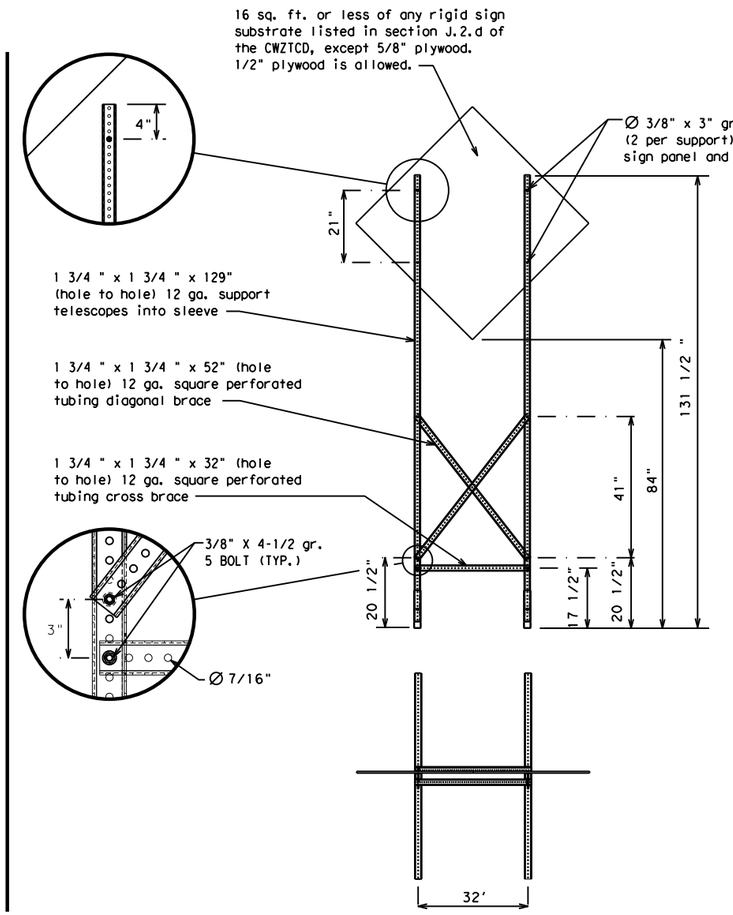


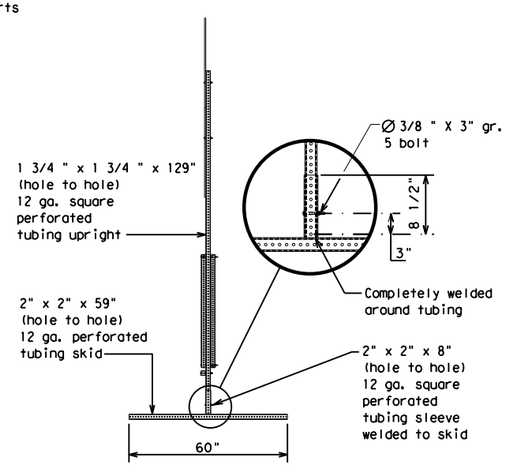
WING CHANNEL
Lap-splice/base bolted anchor

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.

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	VARIOUS		42

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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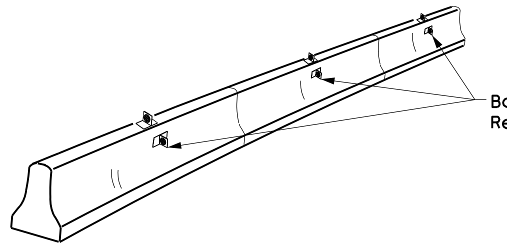
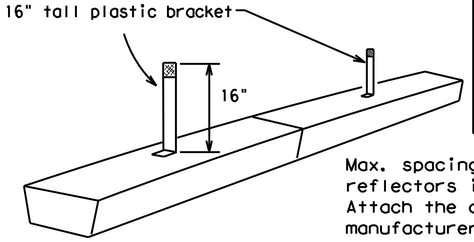
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)



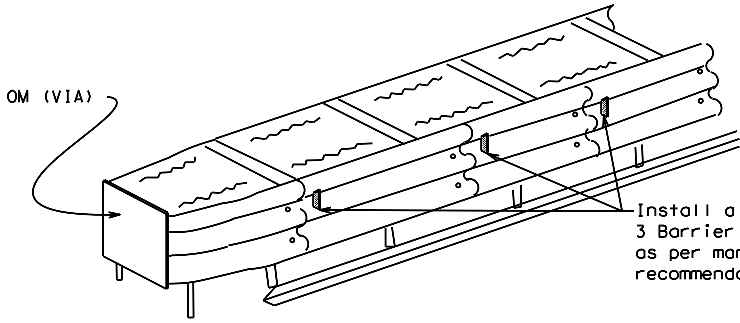
Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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.

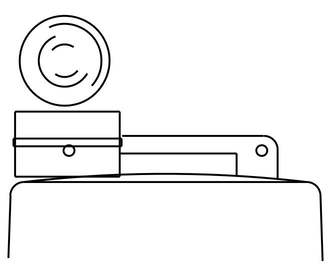


DELINEATION OF END TREATMENTS

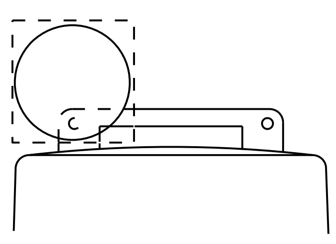
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

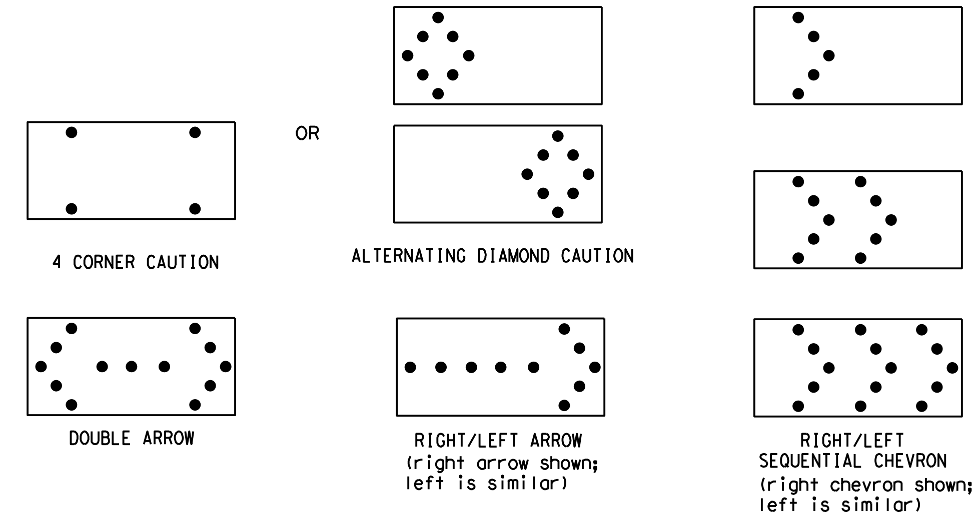
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

REQUIREMENTS

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

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©TxDOT November 2002	CONT 0915	SECT 00	JOB 258	HIGHWAY VA
REVISIONS 9-07 8-14, 7-13 5-21	DIST SAT	COUNTY VARIOUS		SHEET NO. 44

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

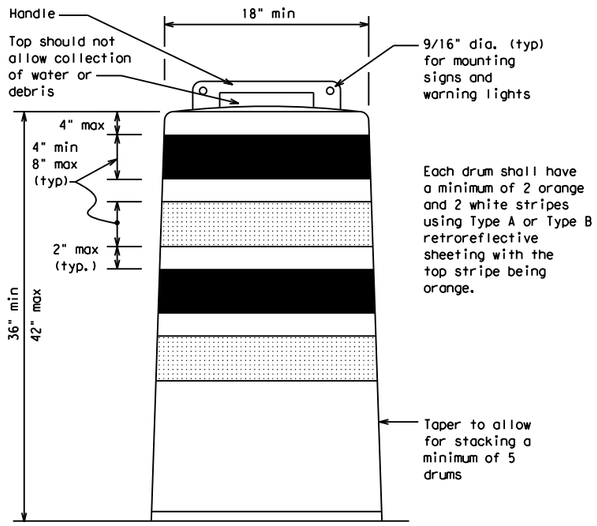
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

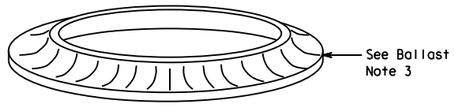
RETROREFLECTIVE SHEETING

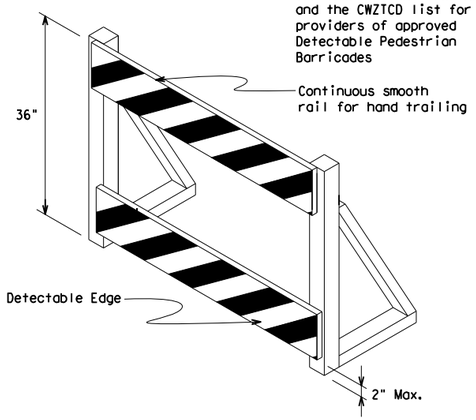
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

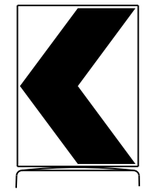




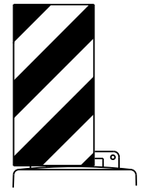


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 5-21	SAT	VARIOUS		45
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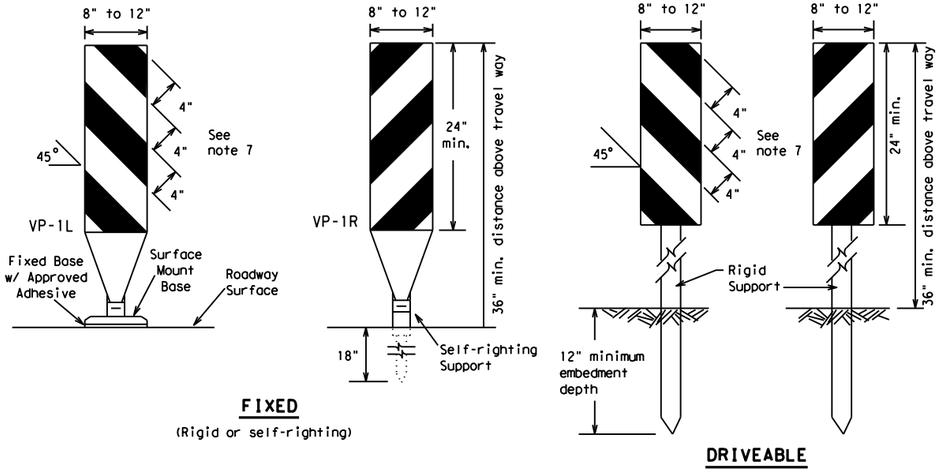
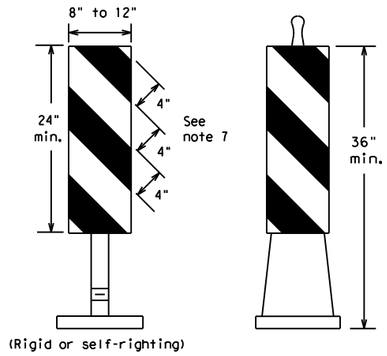


FIXED
(Rigid or self-righting)

DRIVEABLE

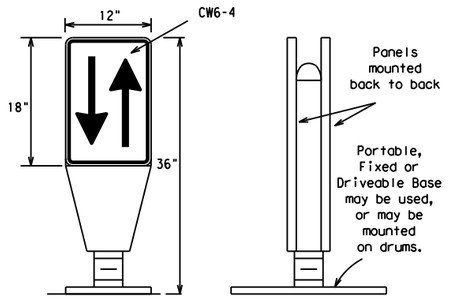


(Rigid or self-righting)

PORTABLE

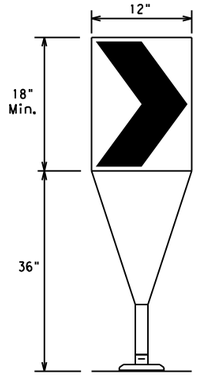
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



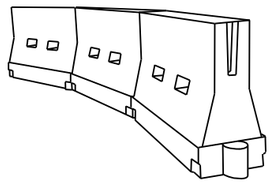
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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7-13 5-21	SAT	VARIOUS		46

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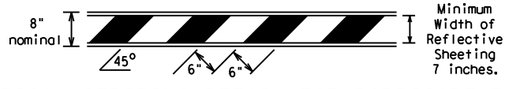
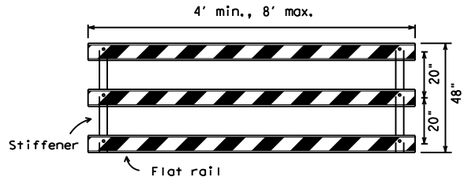
TYPE 3 BARRICADES

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.



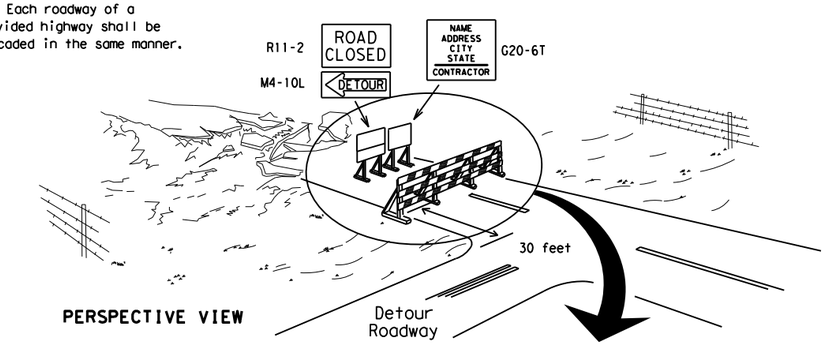
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

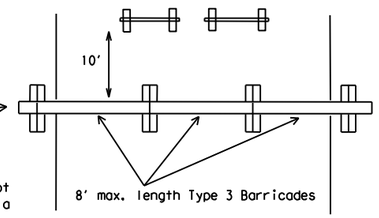
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

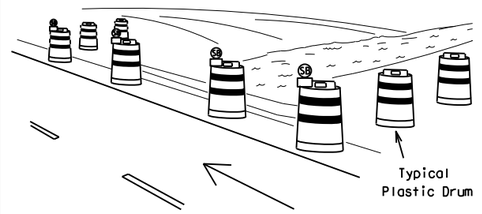
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

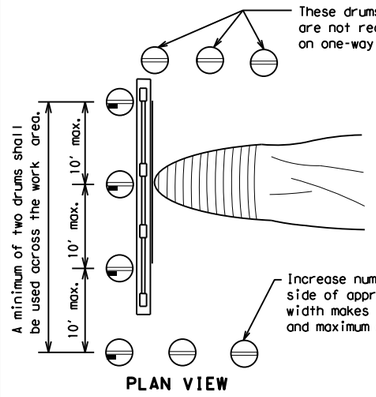
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

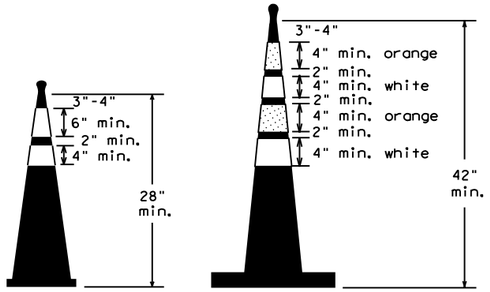
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

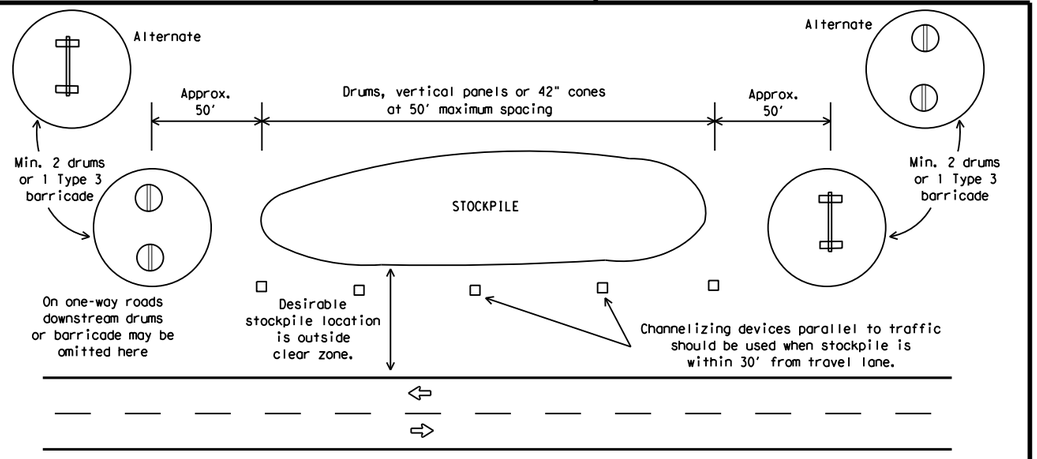
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

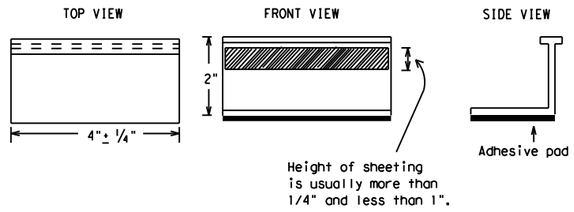
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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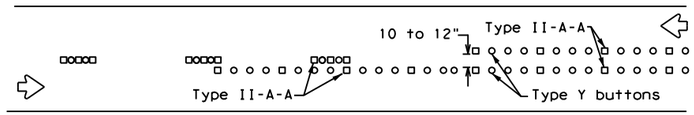
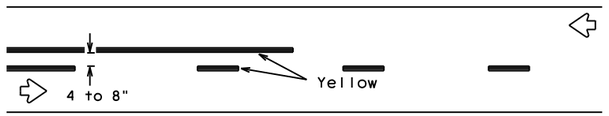
PAVEMENT MARKING PATTERNS

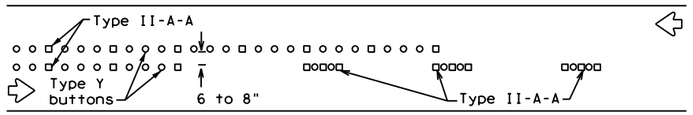
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



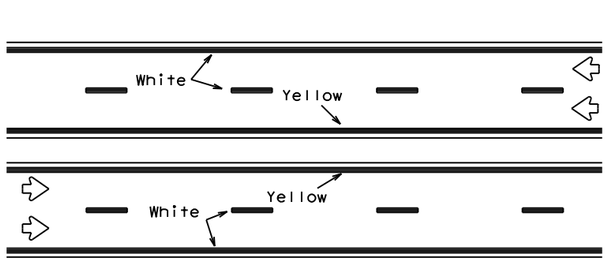
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



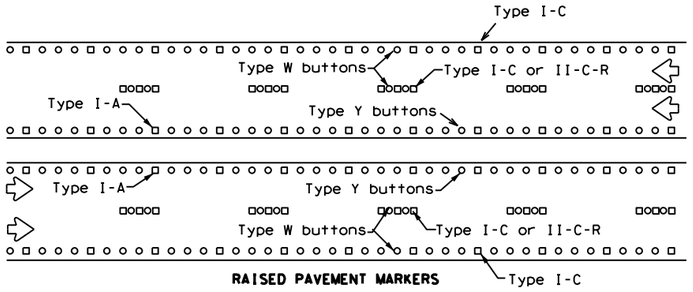
RAISED PAVEMENT MARKERS - PATTERN B

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

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



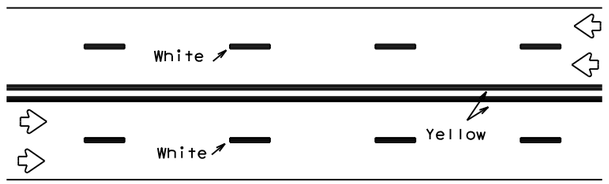
REFLECTORIZED PAVEMENT MARKINGS



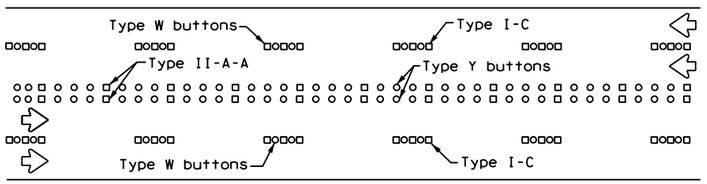
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



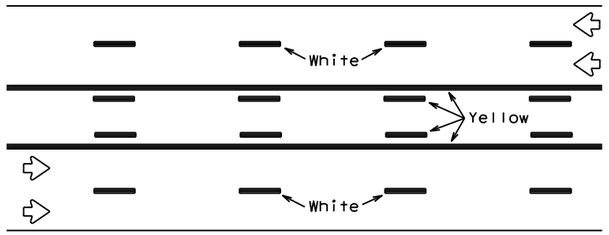
REFLECTORIZED PAVEMENT MARKINGS



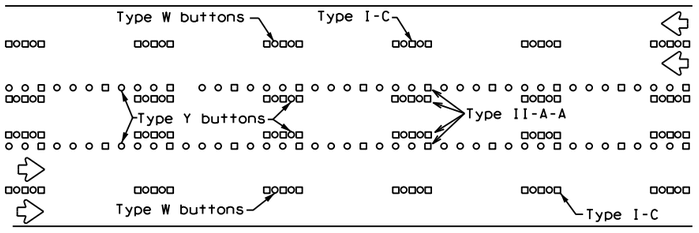
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

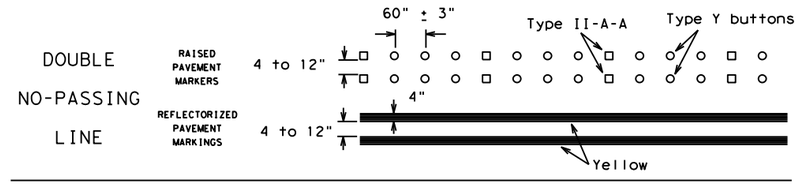
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

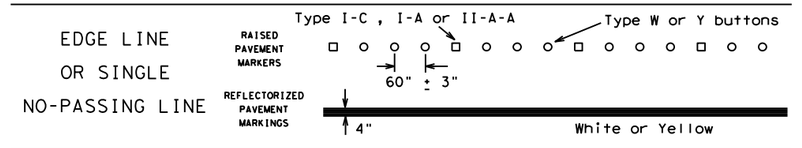
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

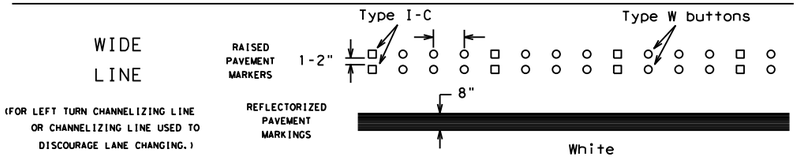


EDGE LINE OR SINGLE NO-PASSING LINE



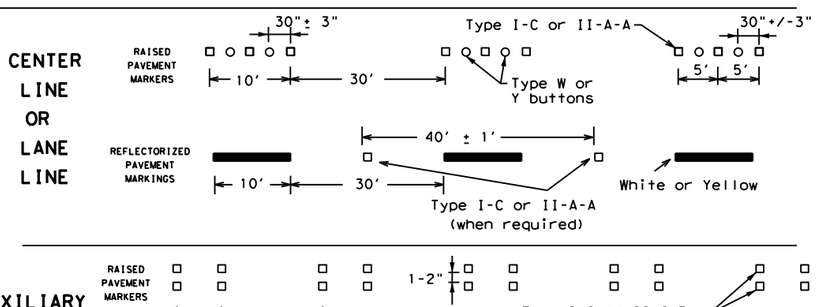
WIDE LINE

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

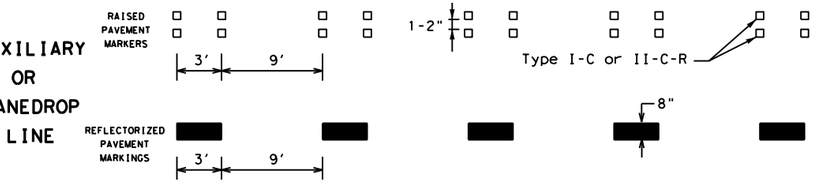


BROKEN LINES

CENTER LINE OR LANE LINE

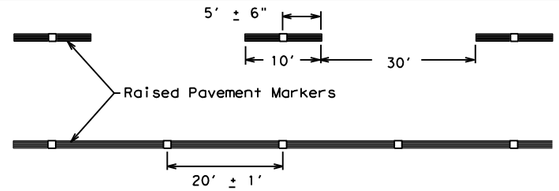


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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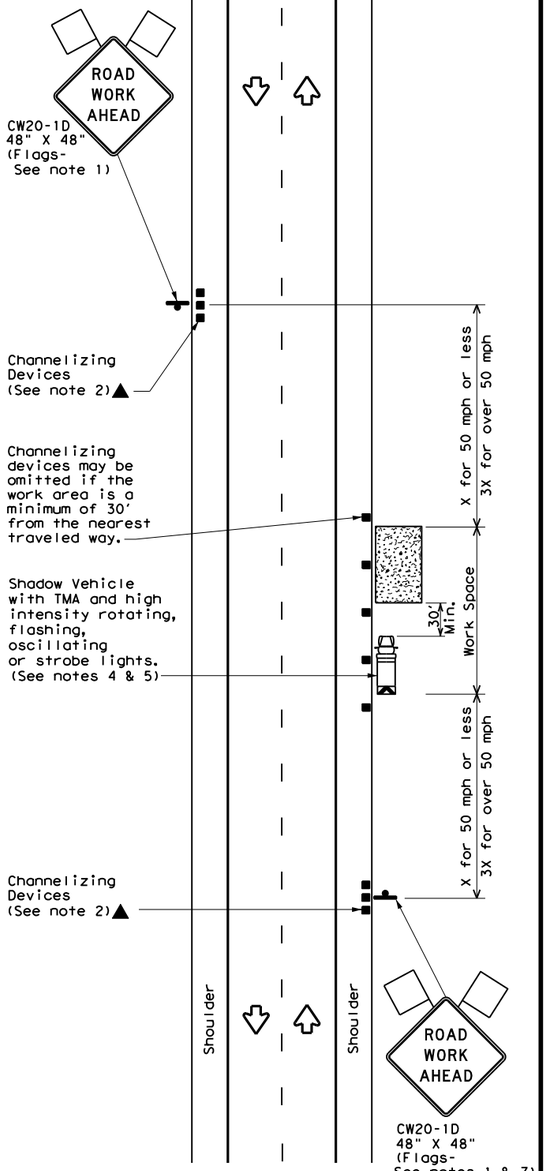
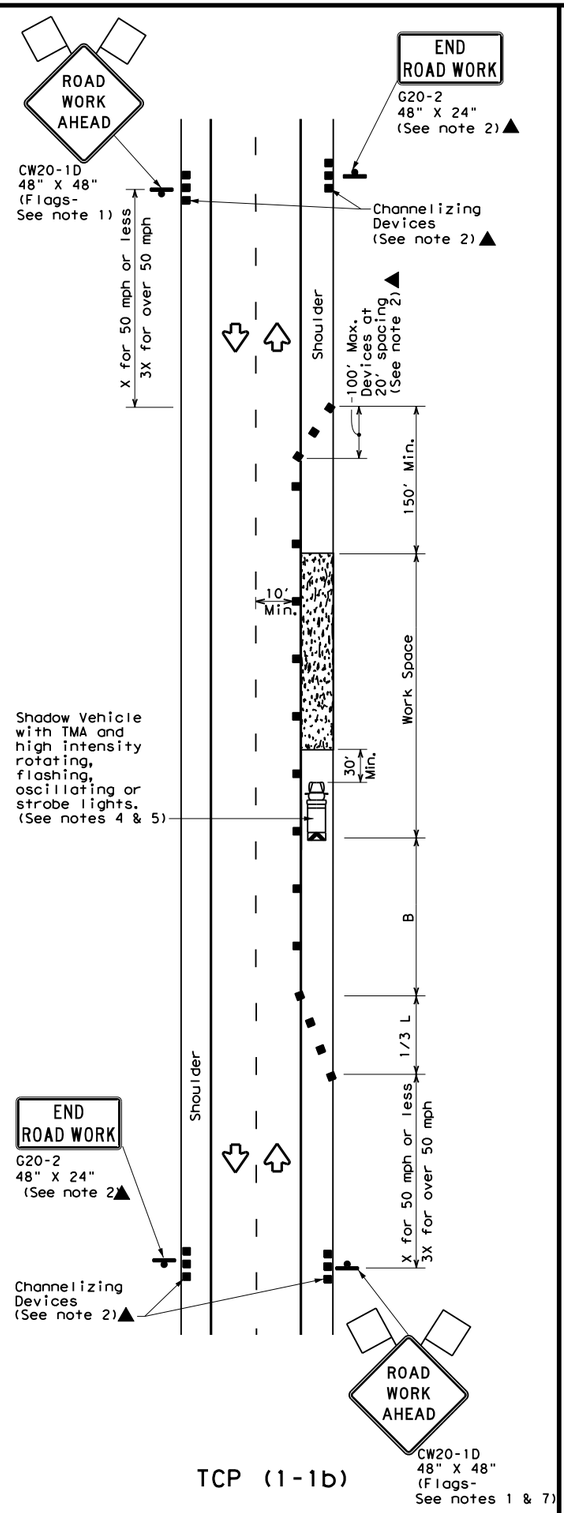


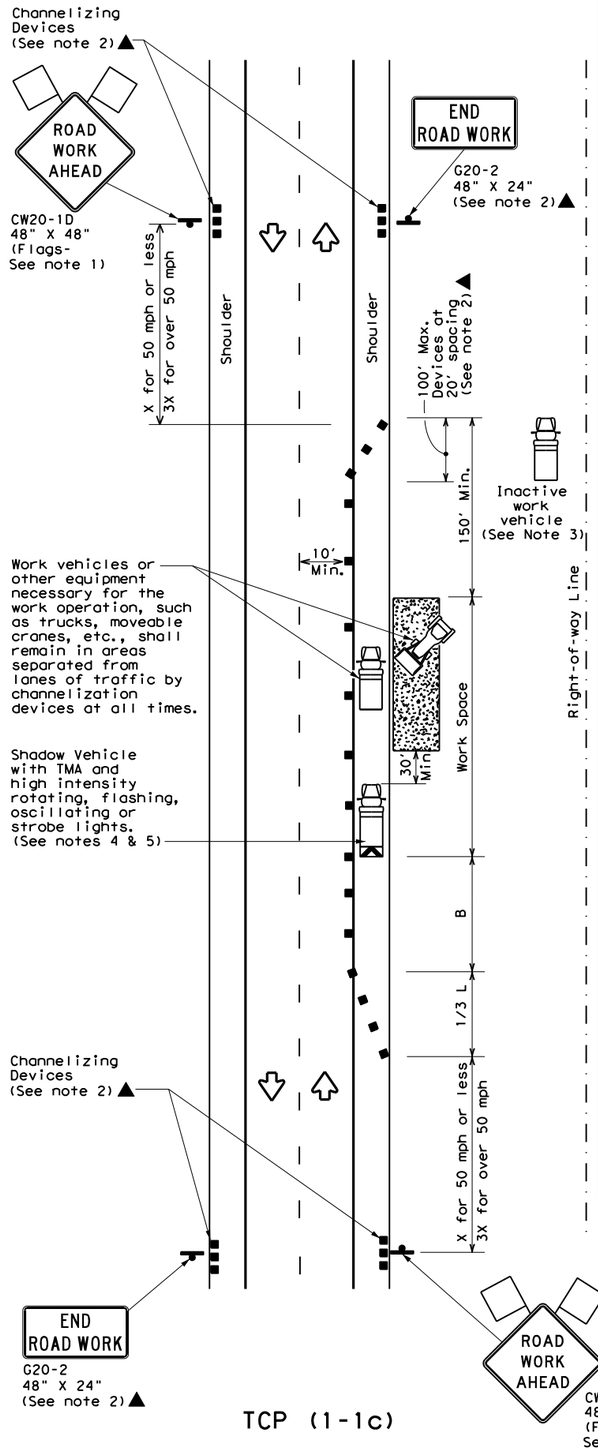
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	VARIOUS		50
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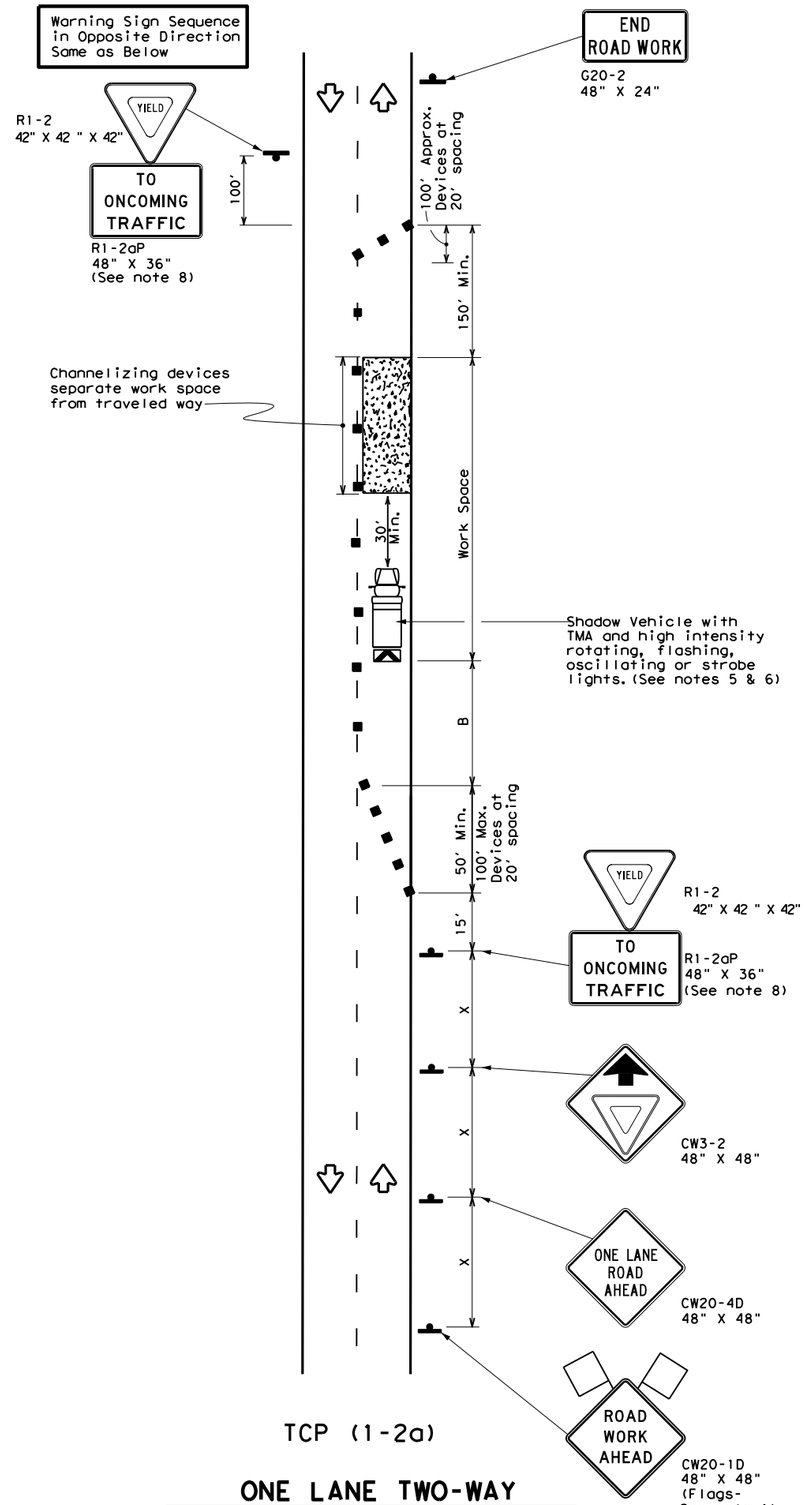
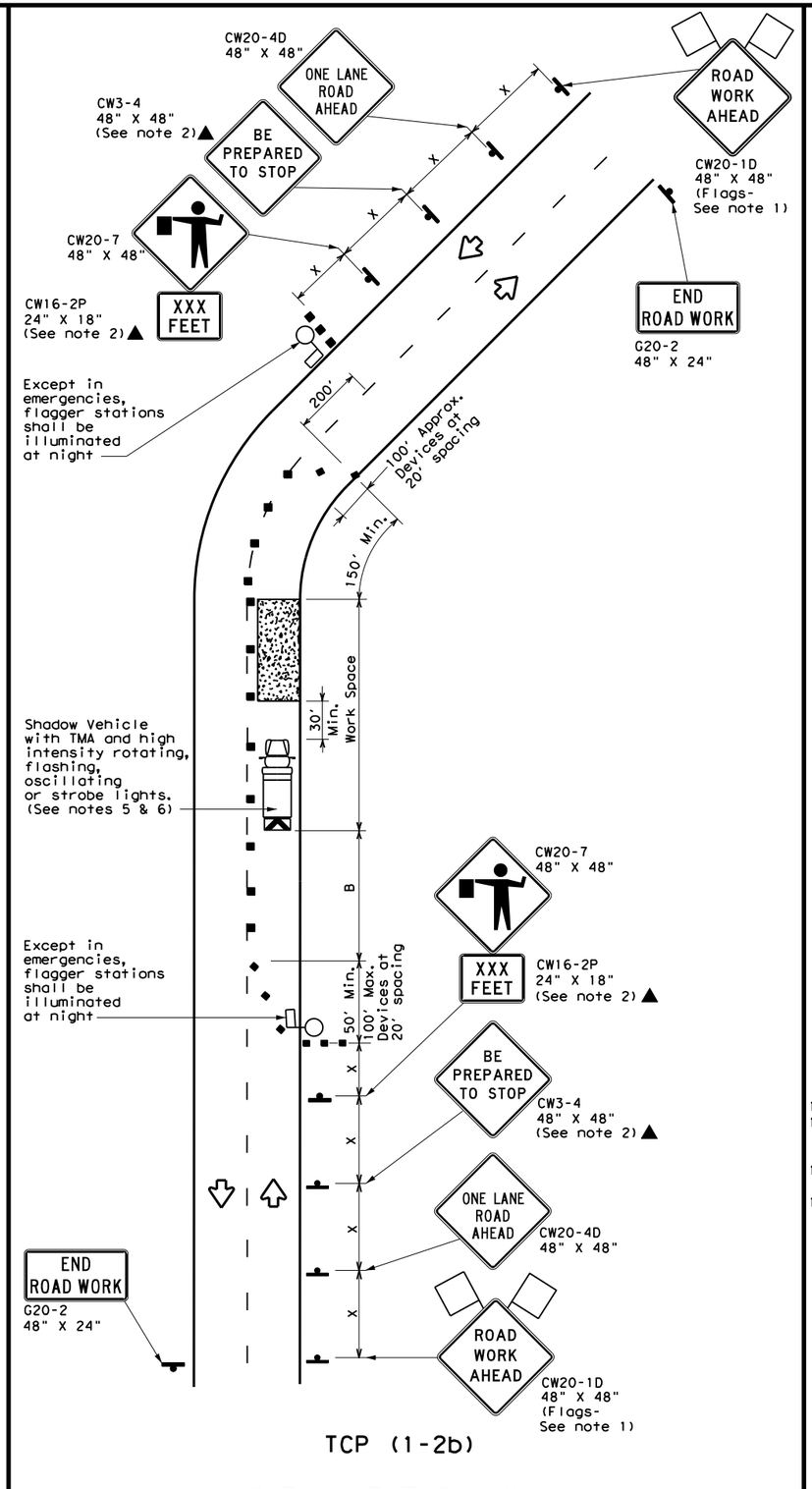


TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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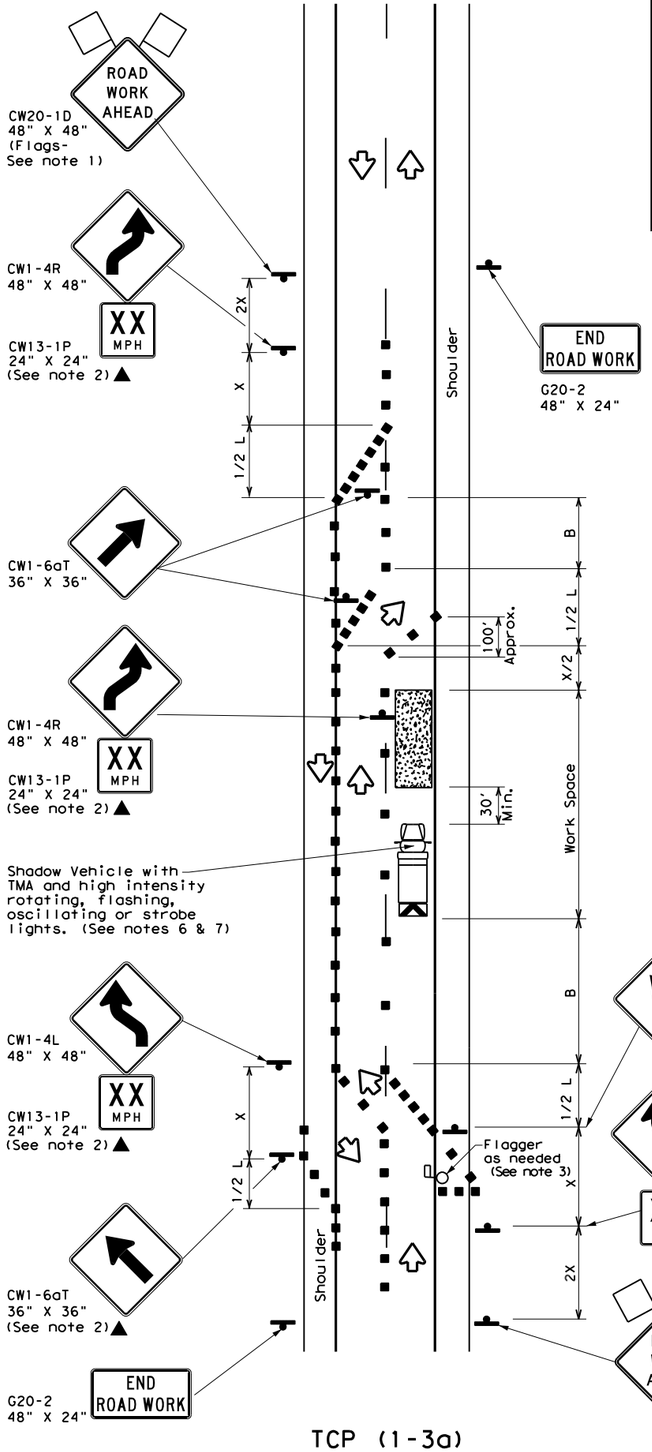
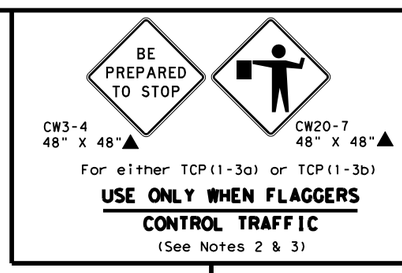
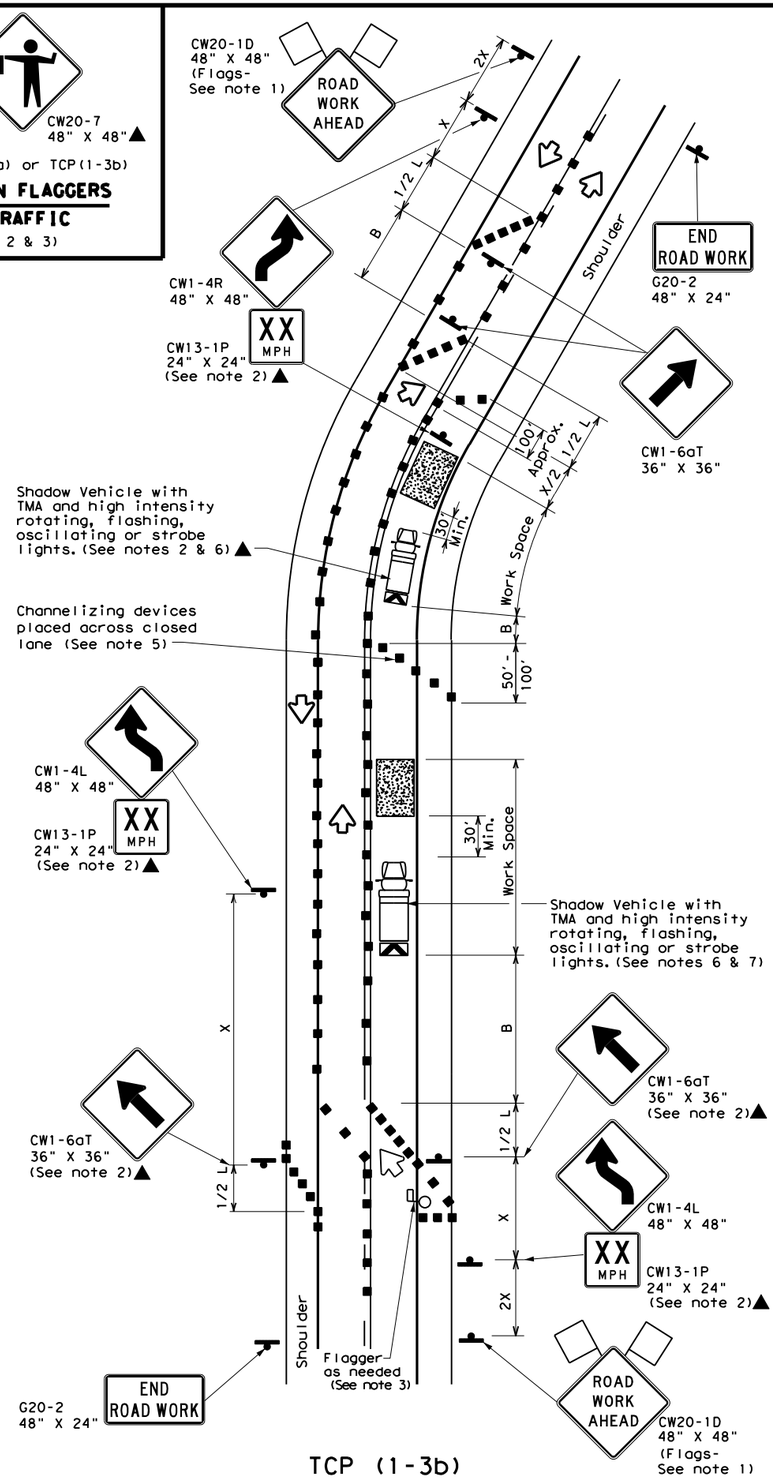


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW





TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. 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 speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	VARIOUS		52
1-97 2-18				

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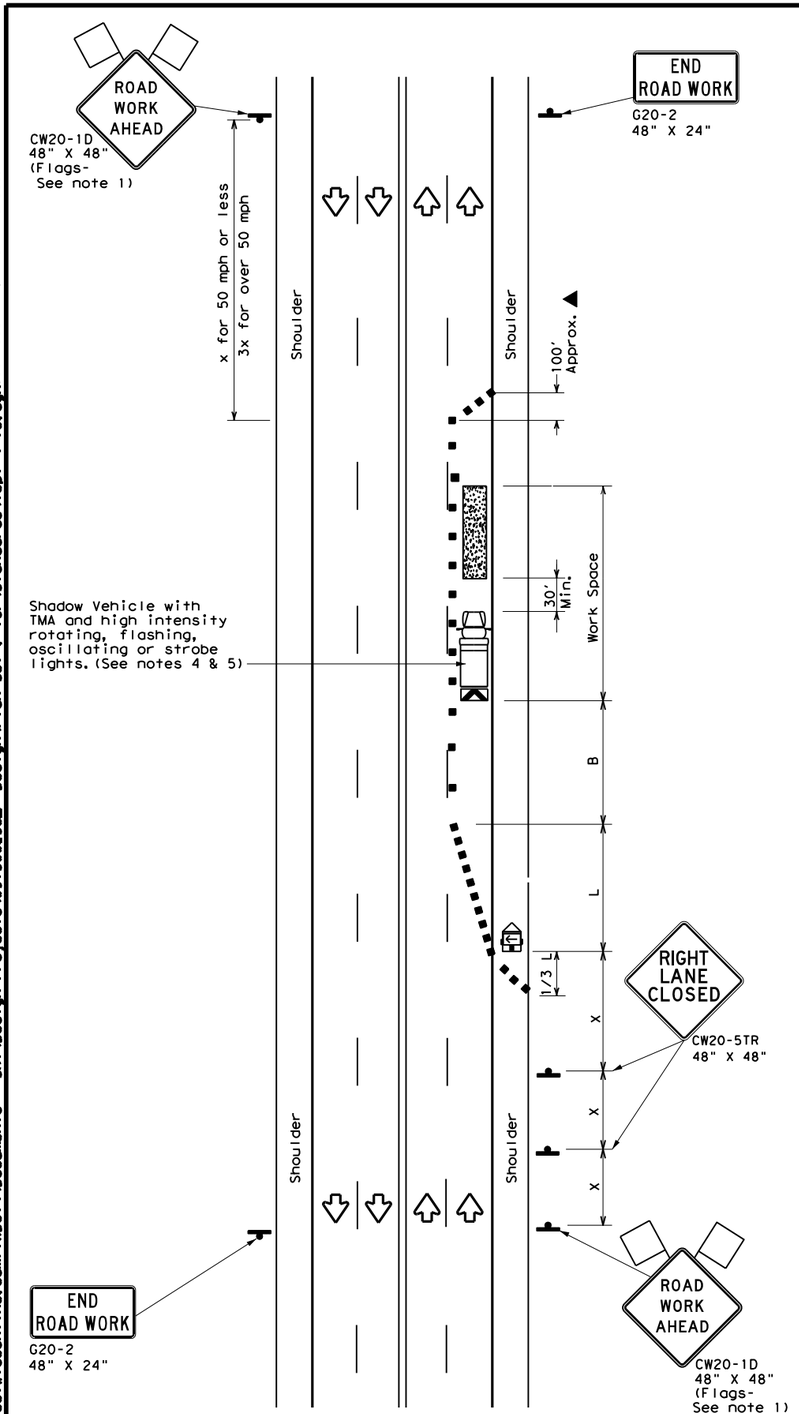
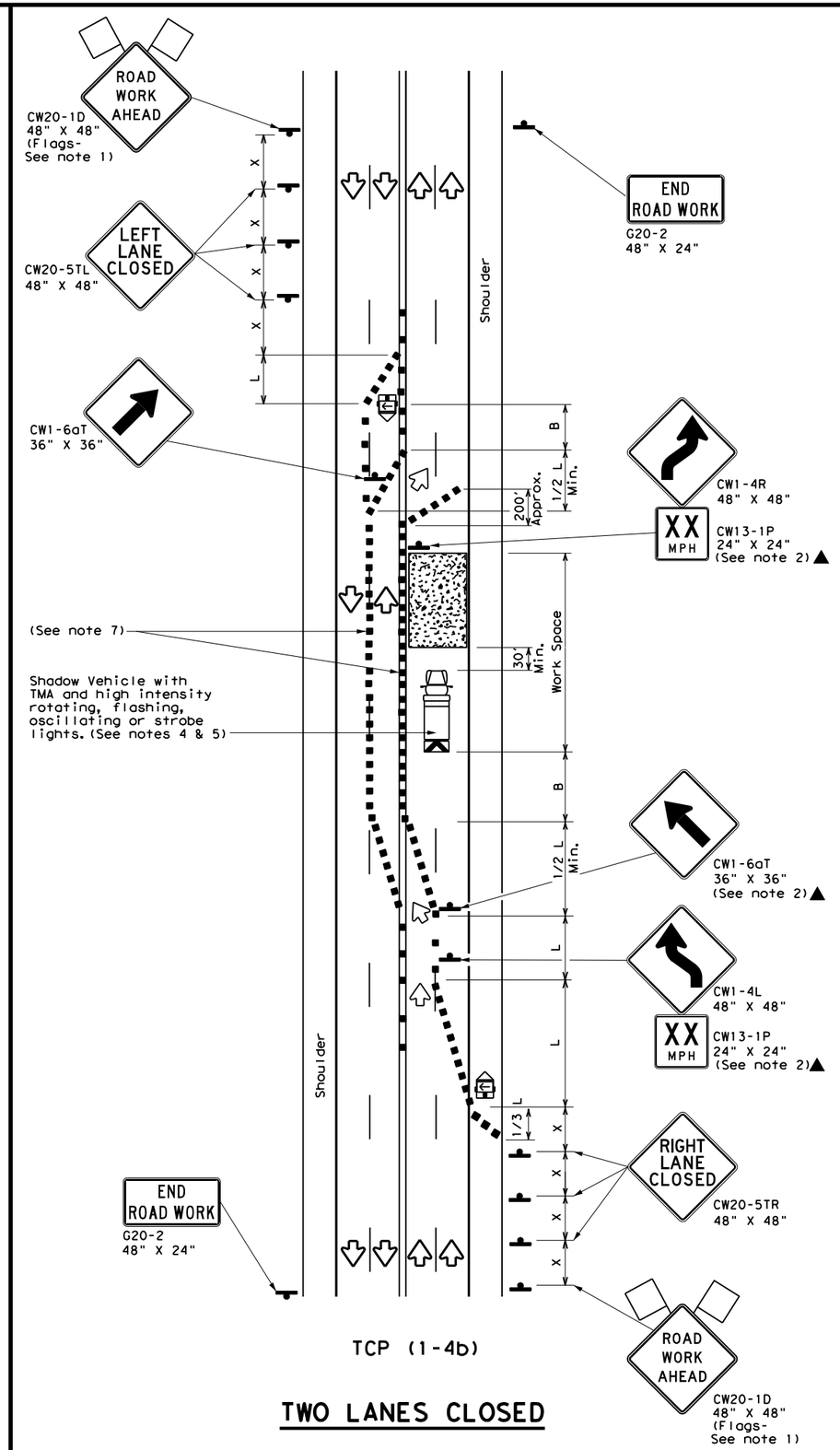


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	VARIOUS		53
1-97 2-18				

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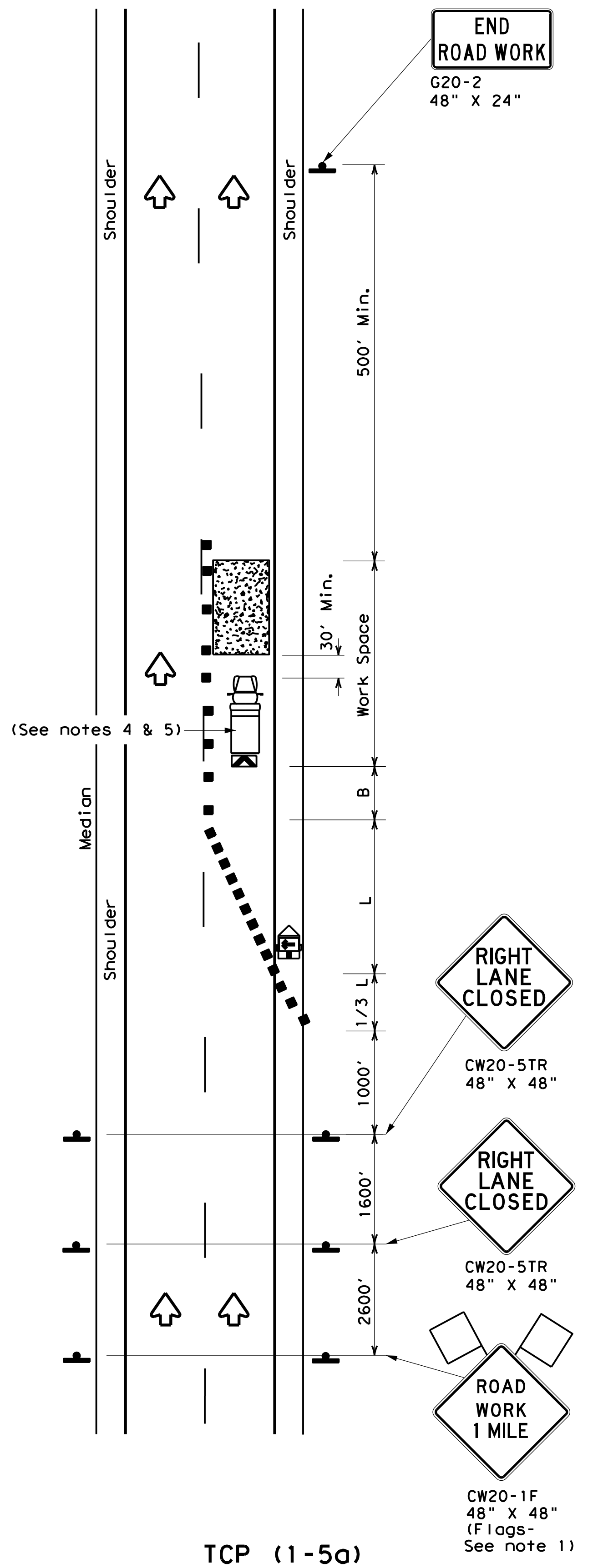
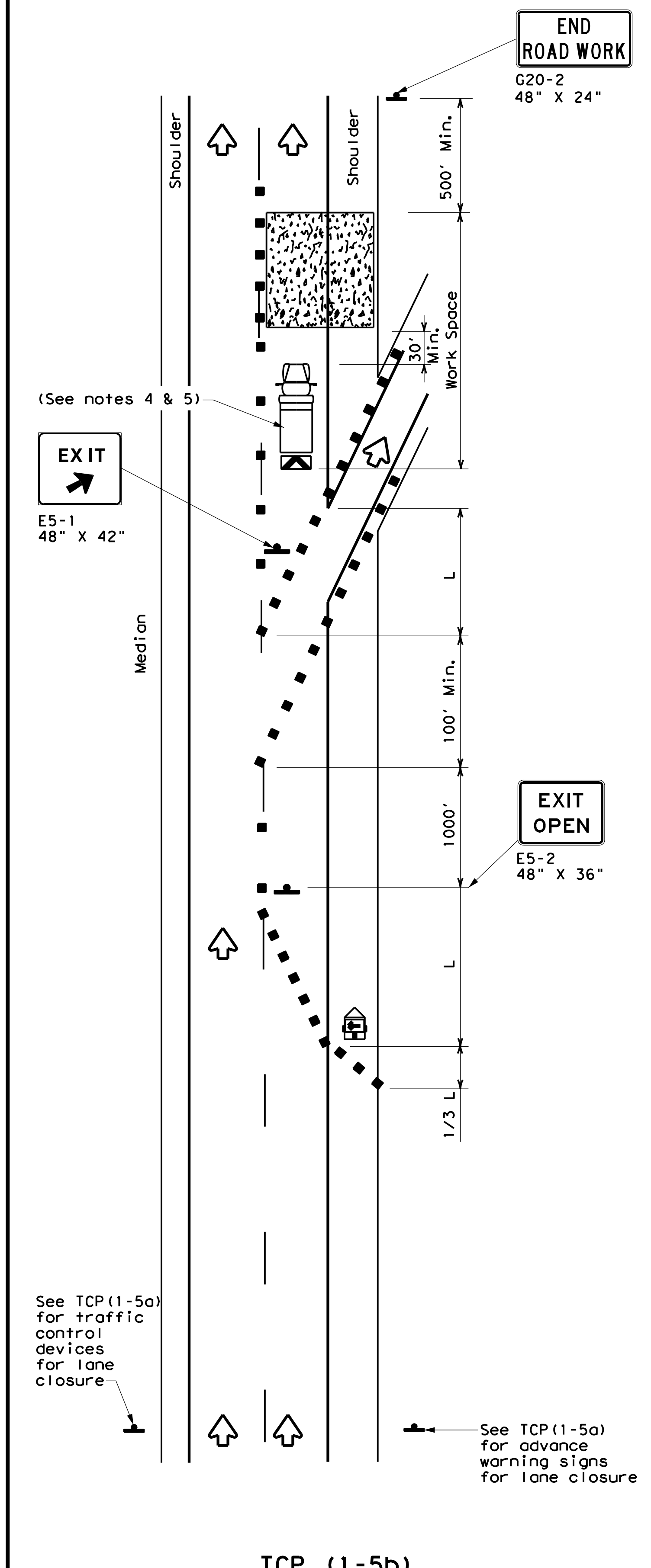
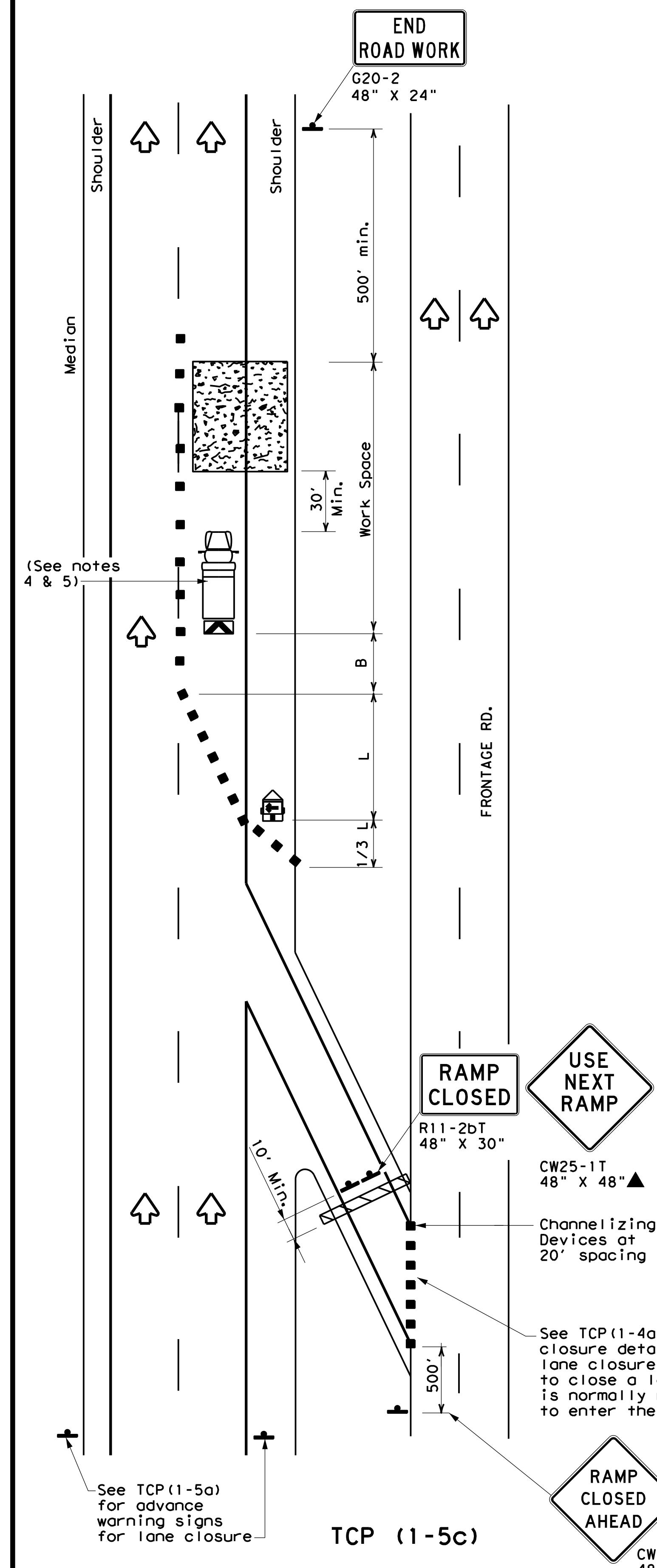


ONE LANE CLOSURE



LANE CLOSURE NEAR EXIT RAMPS



LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

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

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

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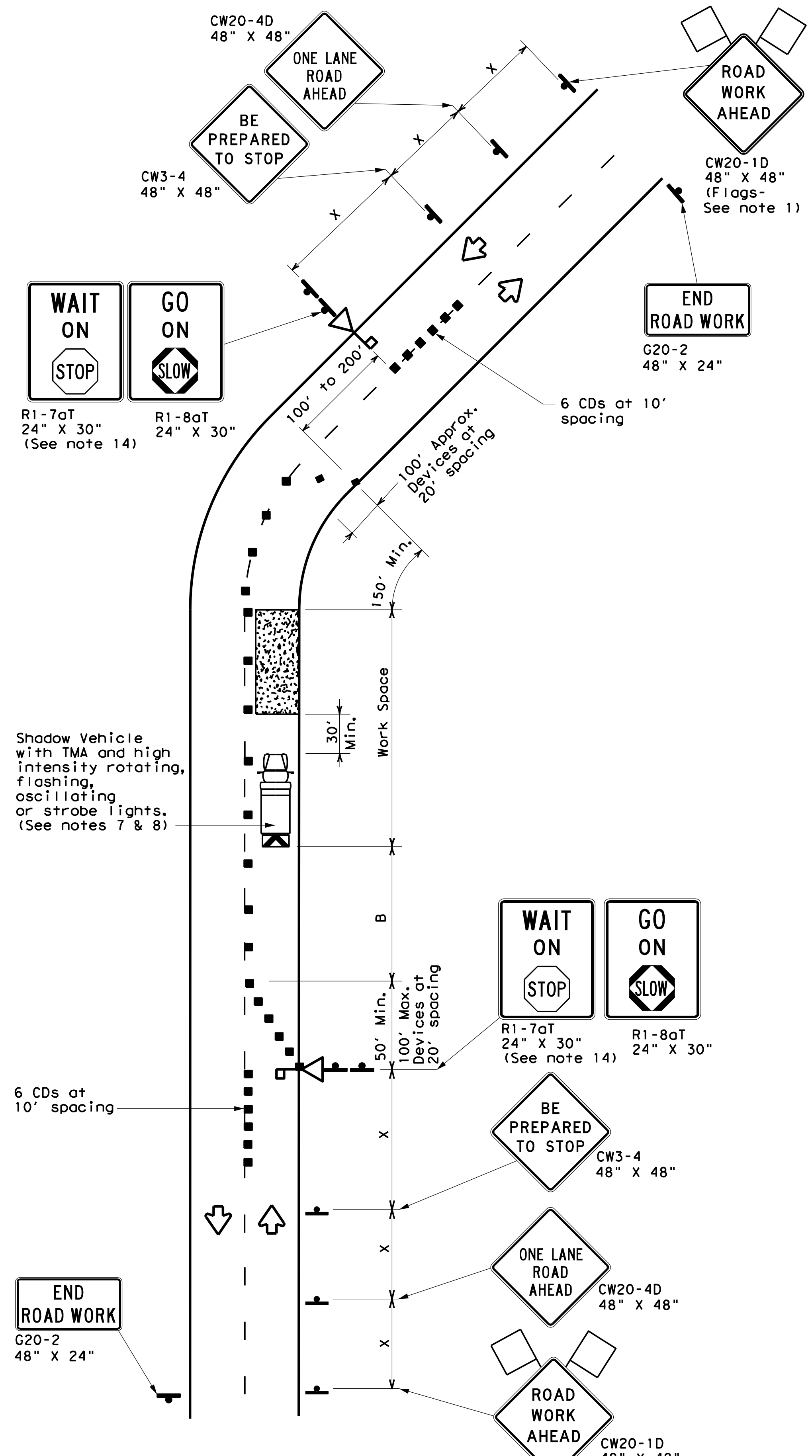
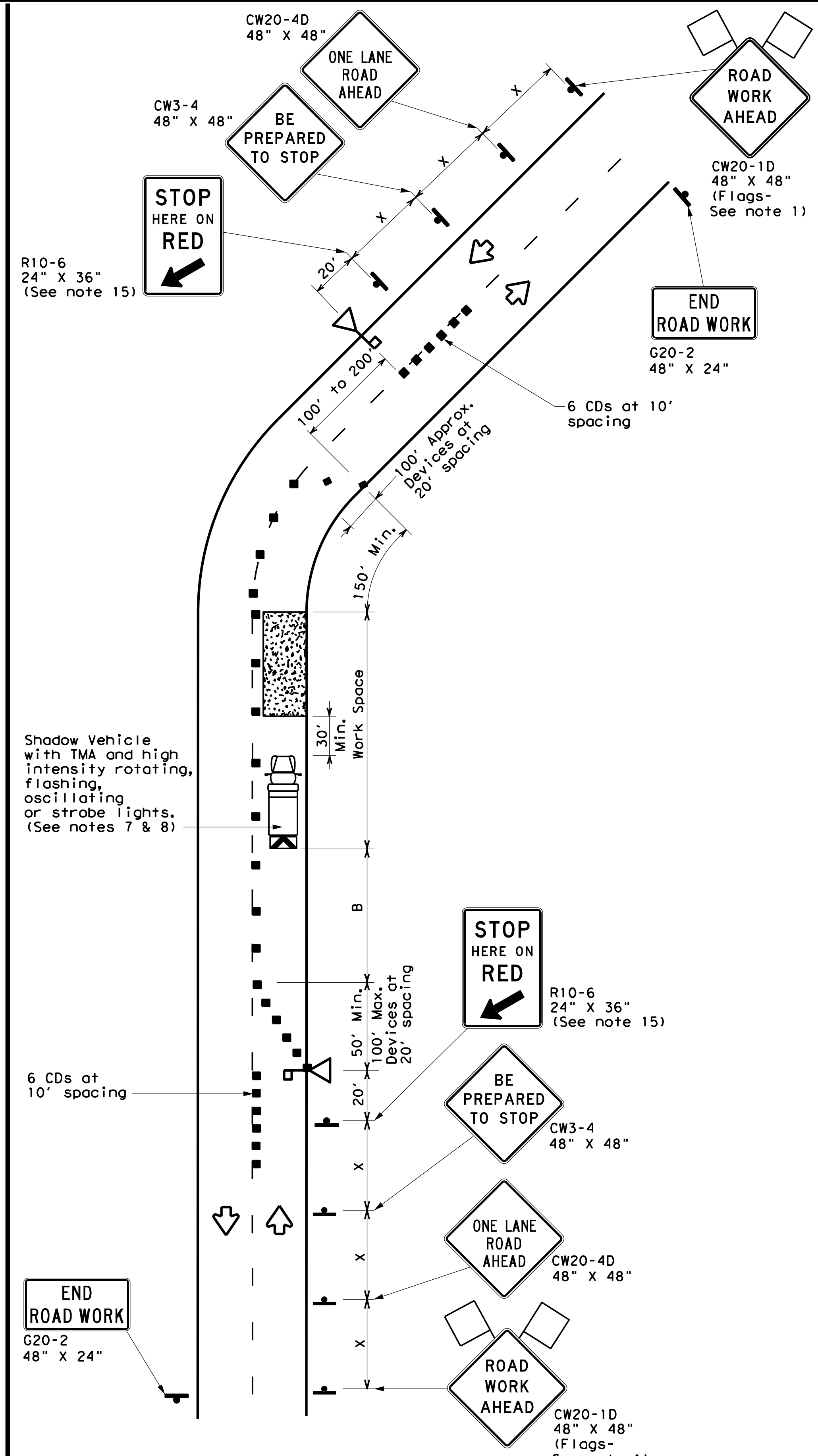
155



TCP (1-6a)

ONE LANE TWO-WAY CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)

ONE LANE TWO-WAY CONTROL WITH RED/YELLOW LENS AFADs

LEGEND

Symbol	Description	Symbol	Description
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
3. Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
4. Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
5. One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
6. When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
7. All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
8. 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.
9. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
13. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
15. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)
TCP(1-6)-18

FILE: tcp1-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0915	00	258	VA
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	SAT		VARIOUS	55

156

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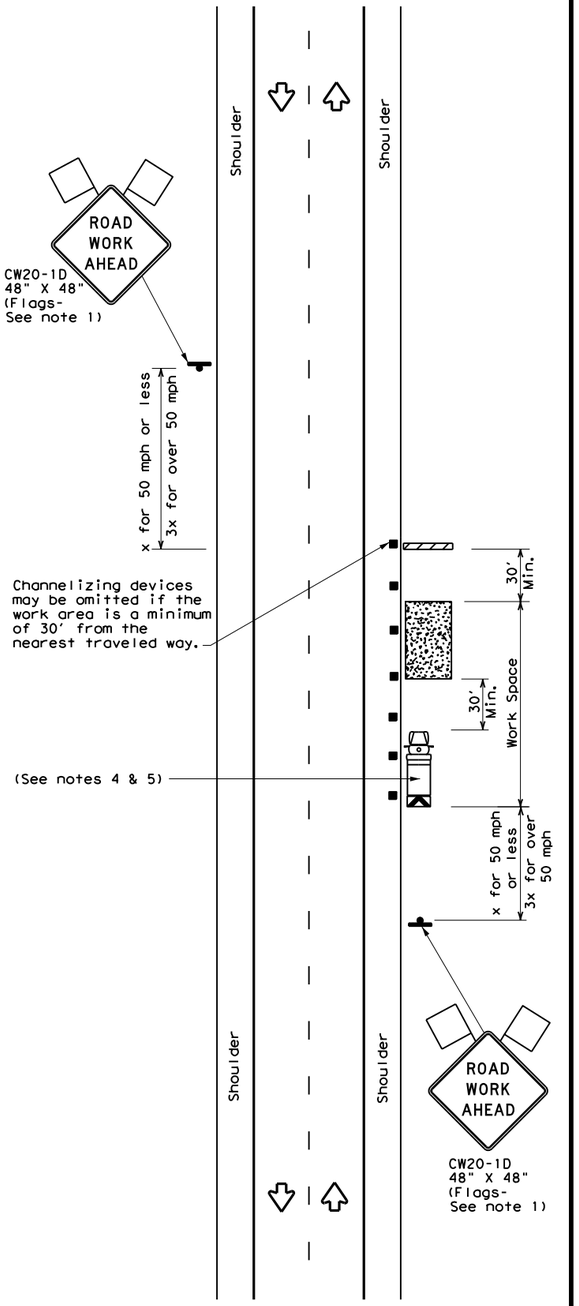
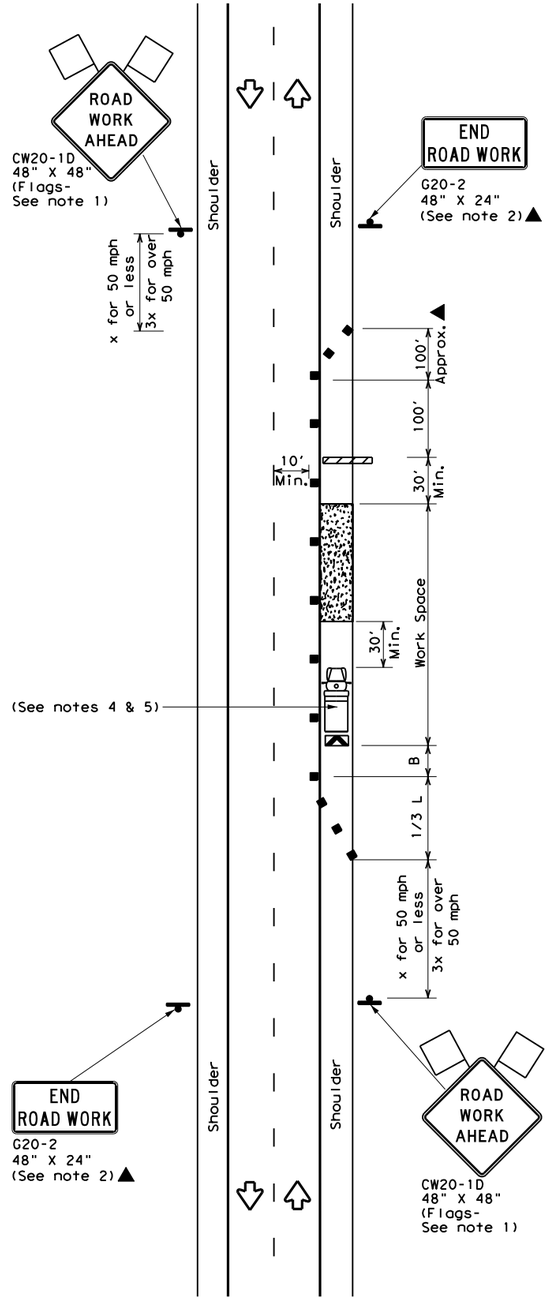


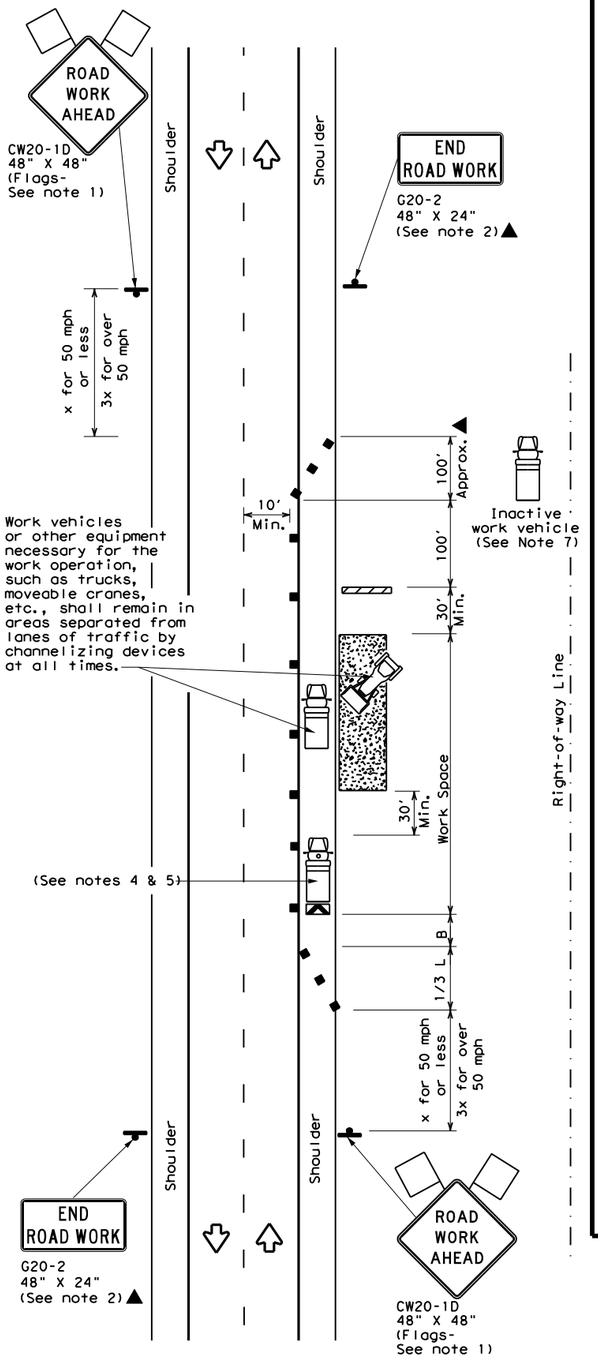
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 2-12	SAT	VARIOUS		56
1-97 2-18				

DATE:
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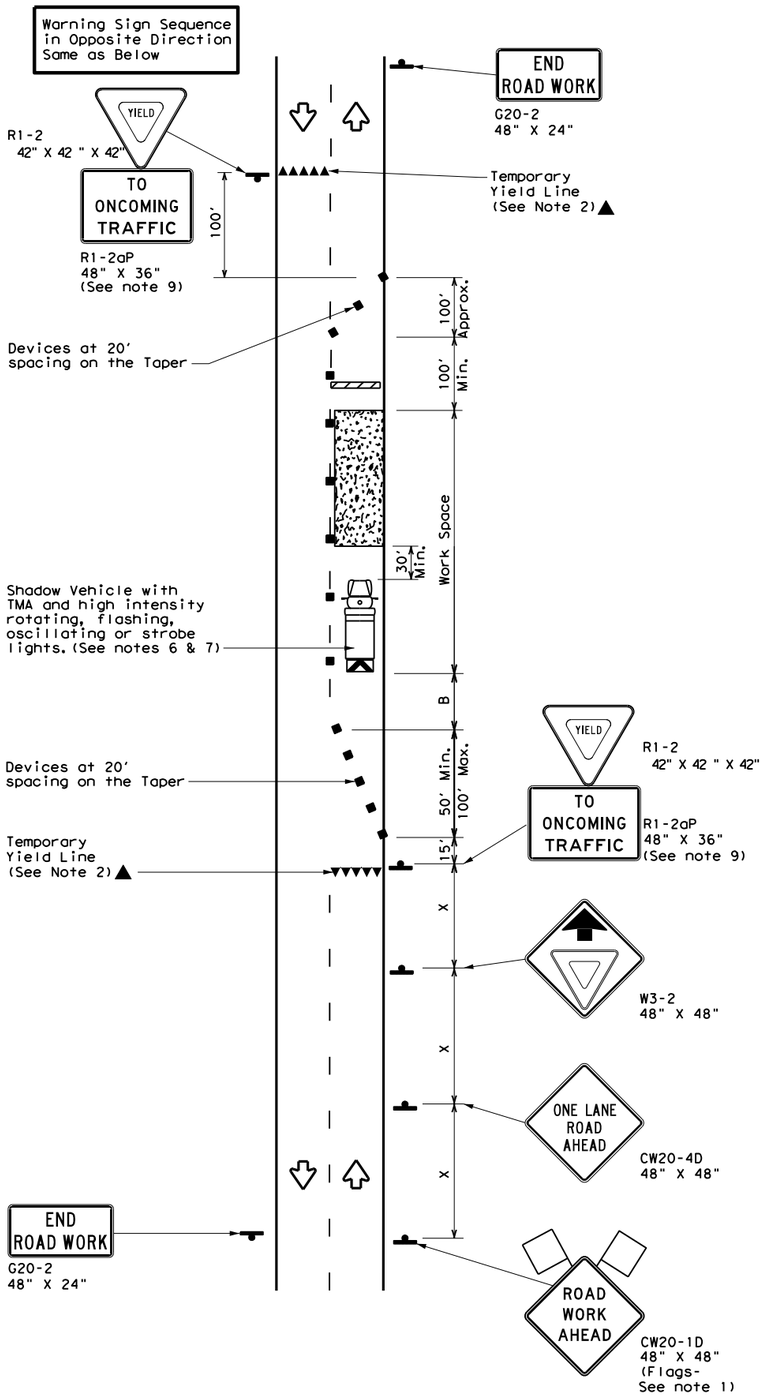
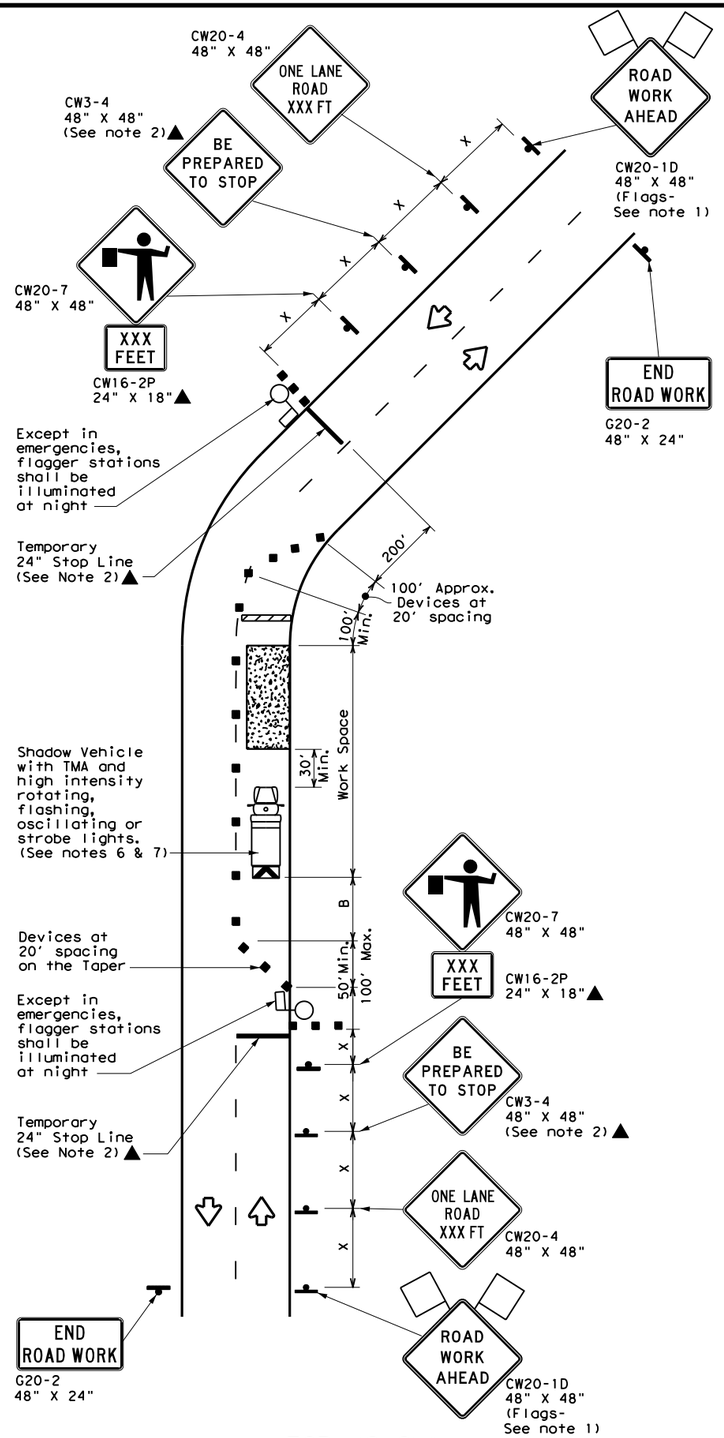


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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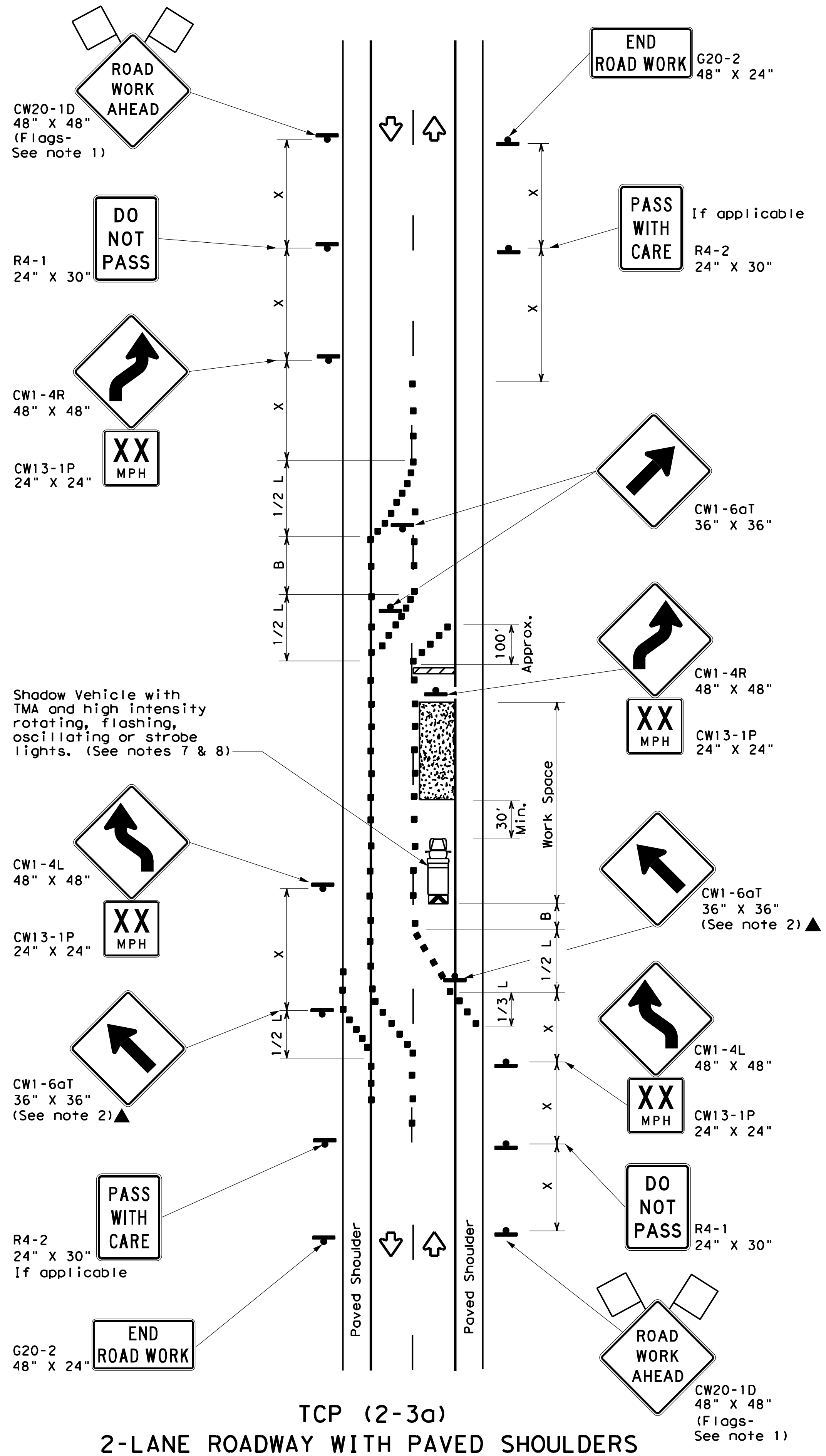
1-97 2-12	SAT	VARIOUS		57
4-98 2-18				

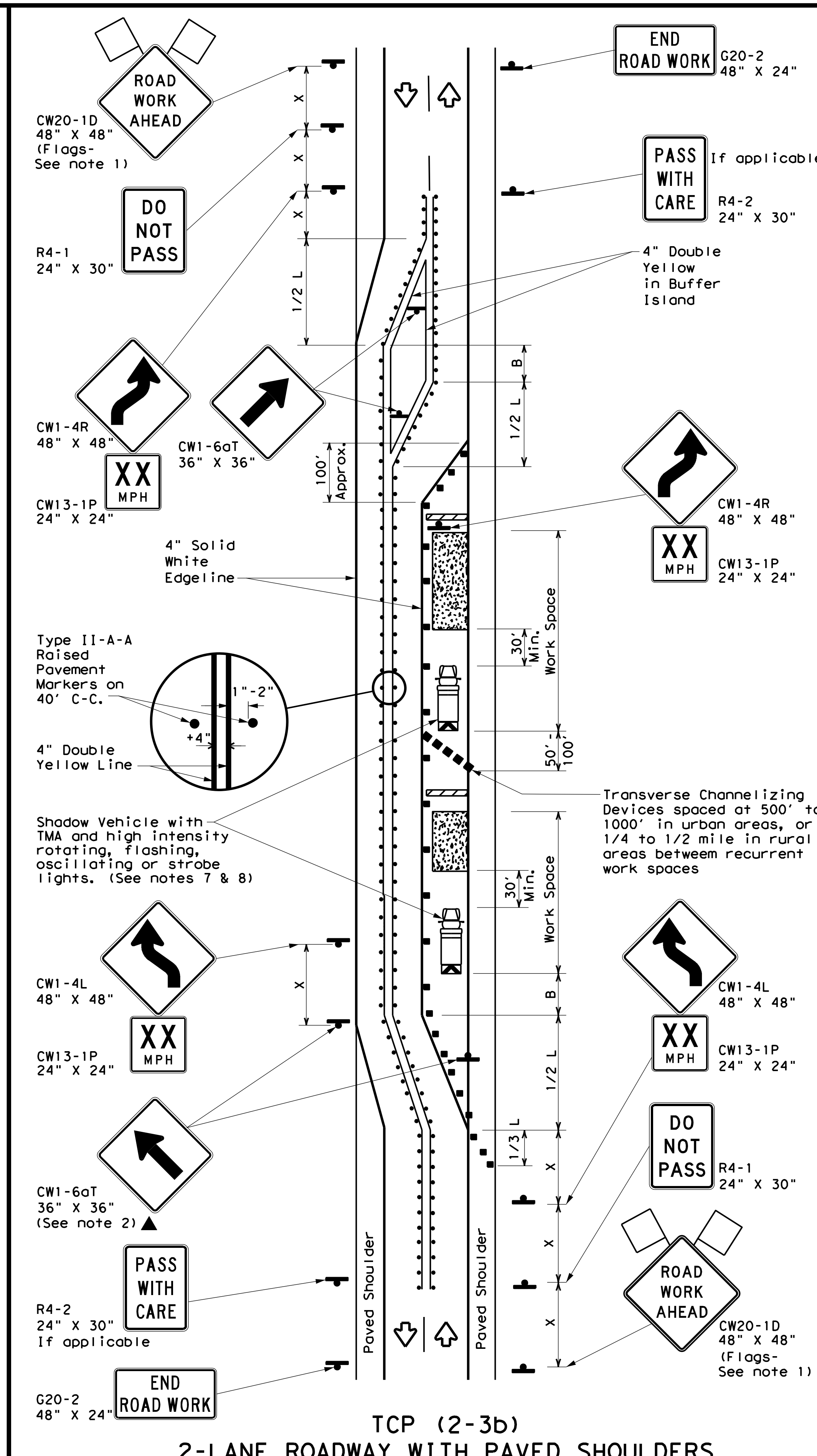


TCP (2-3a)

2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED

ADEQUATE FIELD OF VIEW



TCP (2-3b)

2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED

INADEQUATE FIELD OF VIEW

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

* Conventional Roads Only

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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	SAT		VARIOUS	58

163

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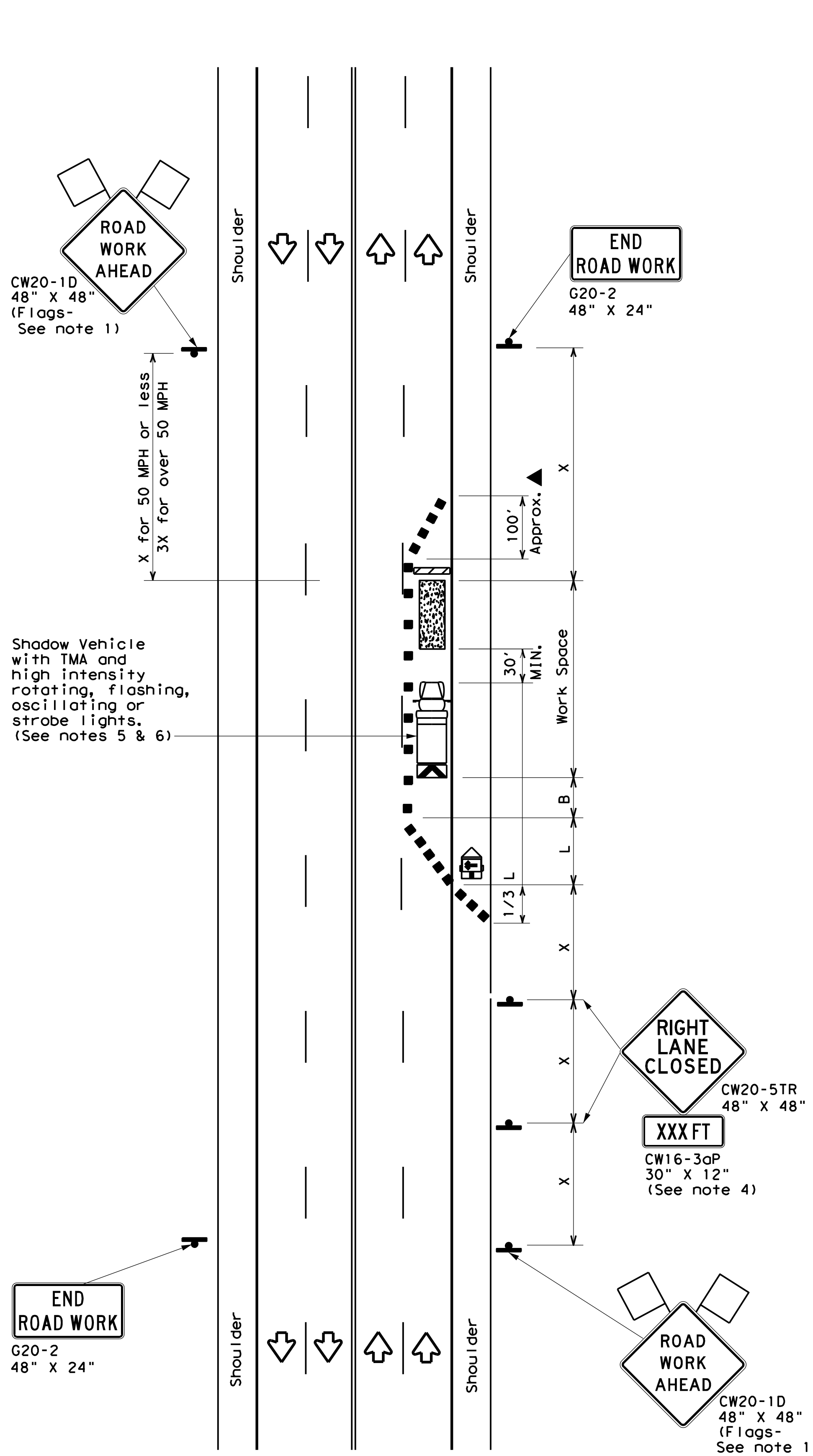
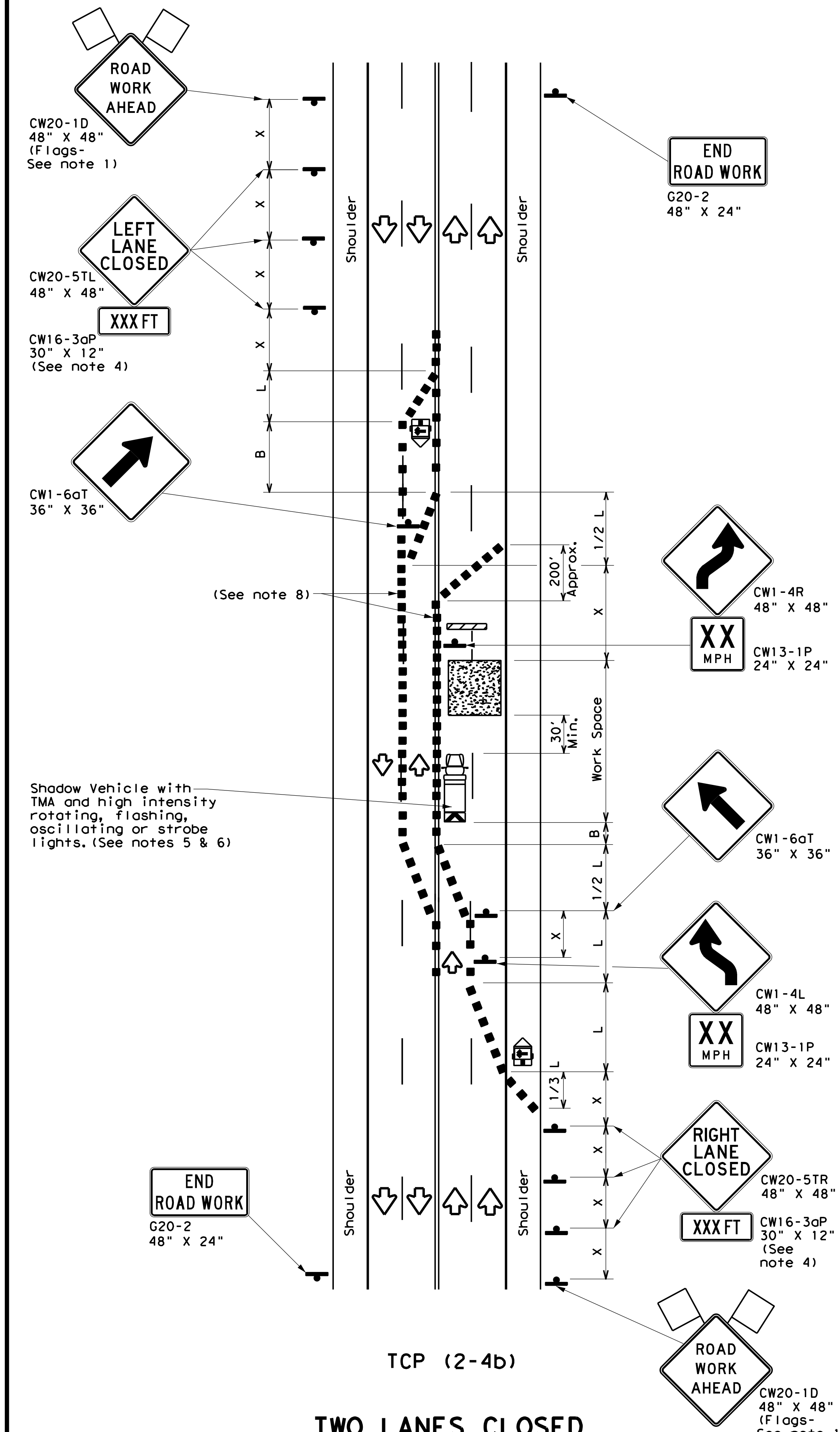


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND

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

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

* Conventional Roads Only

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

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

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© TxDOT December 1985	CONT 0915	SECT 00	JOB 258	HIGHWAY VA
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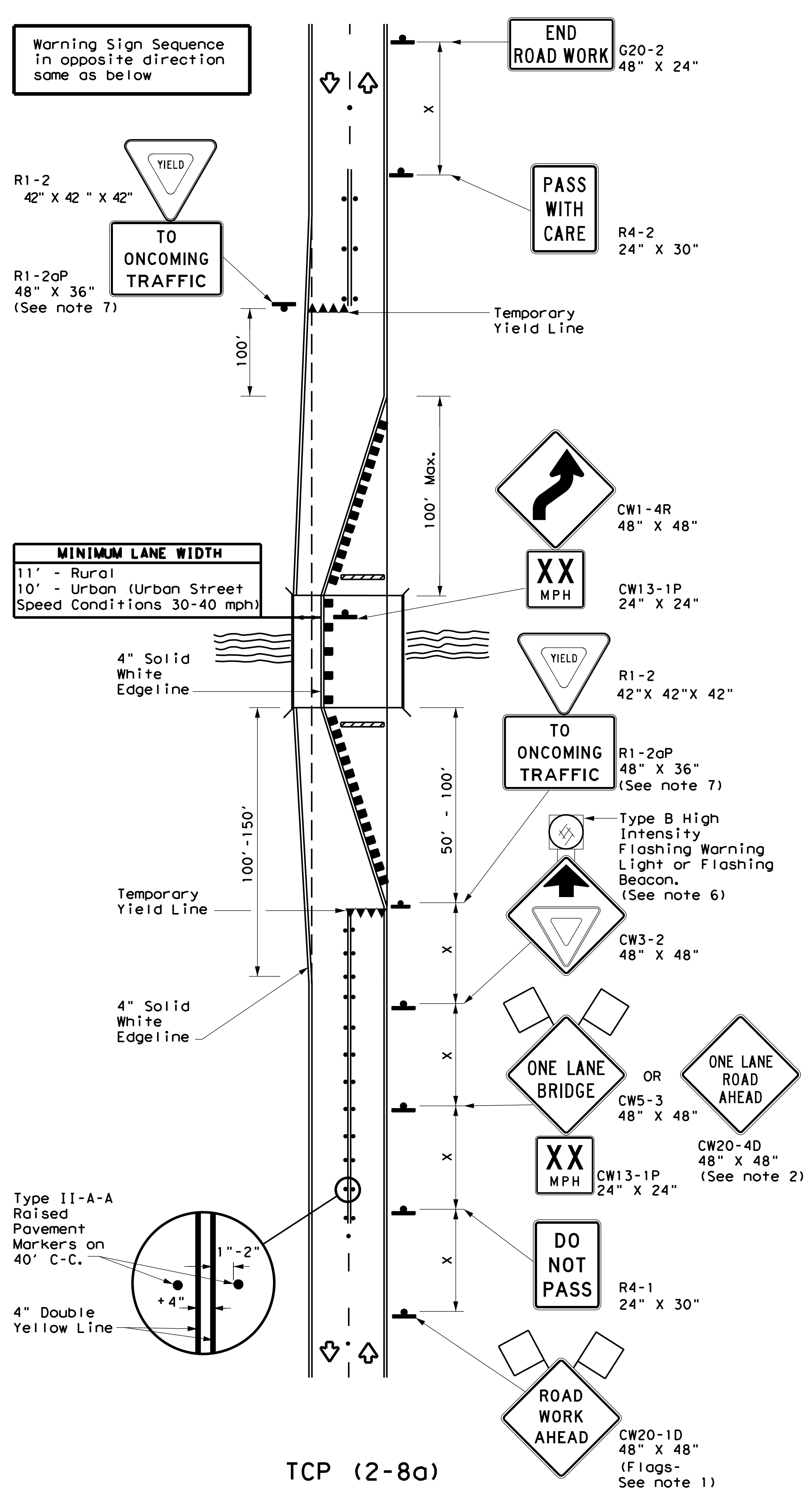
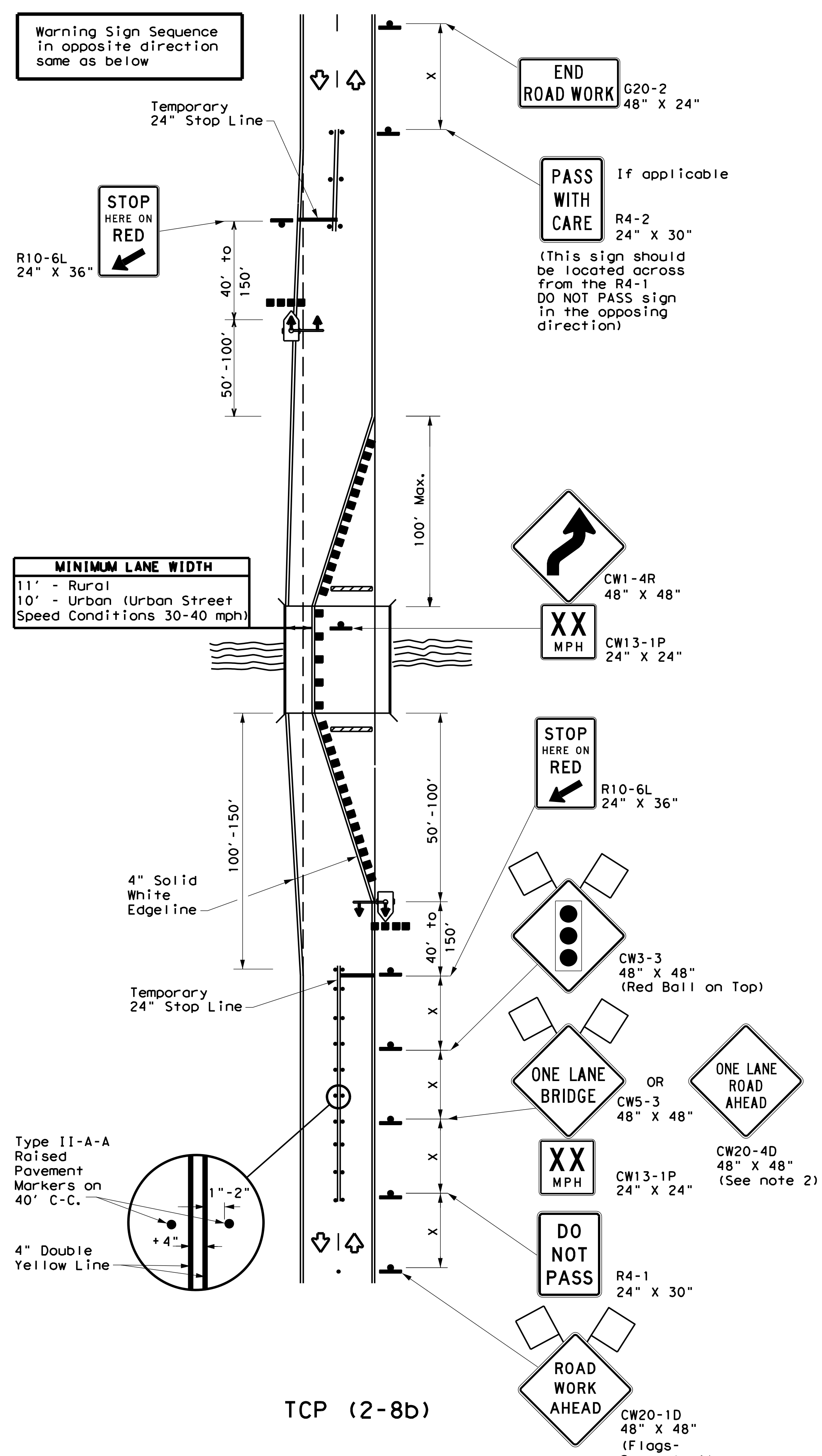


TCP (2-8a)

ONE LANE TWO-WAY TRAFFIC CONTROL WITH YIELD SIGNS

(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND

(symbol)	Type 3 Barricade	(symbol)	Channelizing Devices
(symbol)	Sign	(symbol)	Traffic Flow
(symbol)	Flag	(symbol)	Flagger
• • • •	Raised Pavement Markers Ty II-AA	(symbol)	Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM ONE-LANE TWO-WAY CONTROL

TCP(2-8)-18

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© TxDOT December 1985	CONT 0915	SECT 00	JOB 258	HIGHWAY VA
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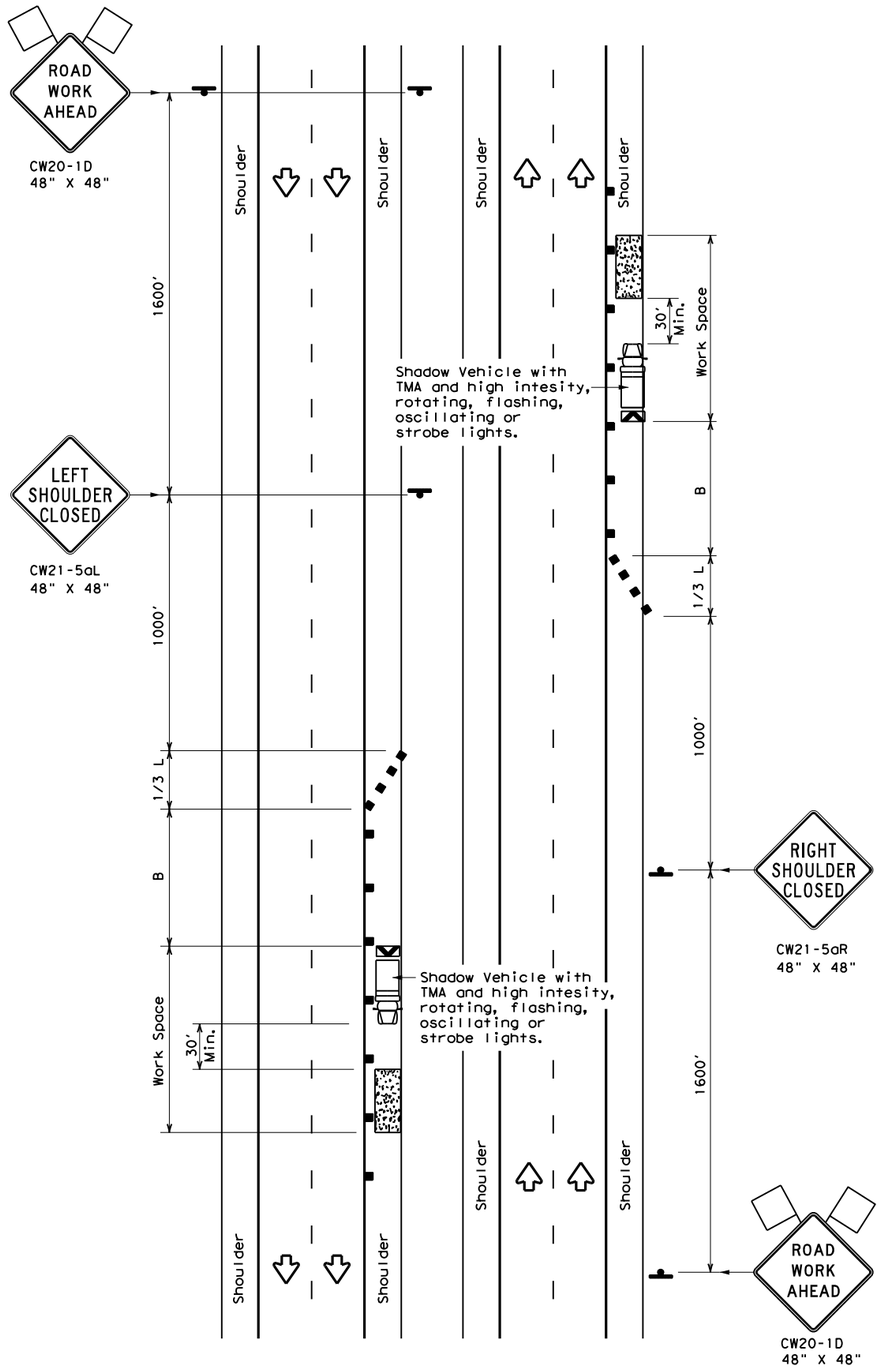
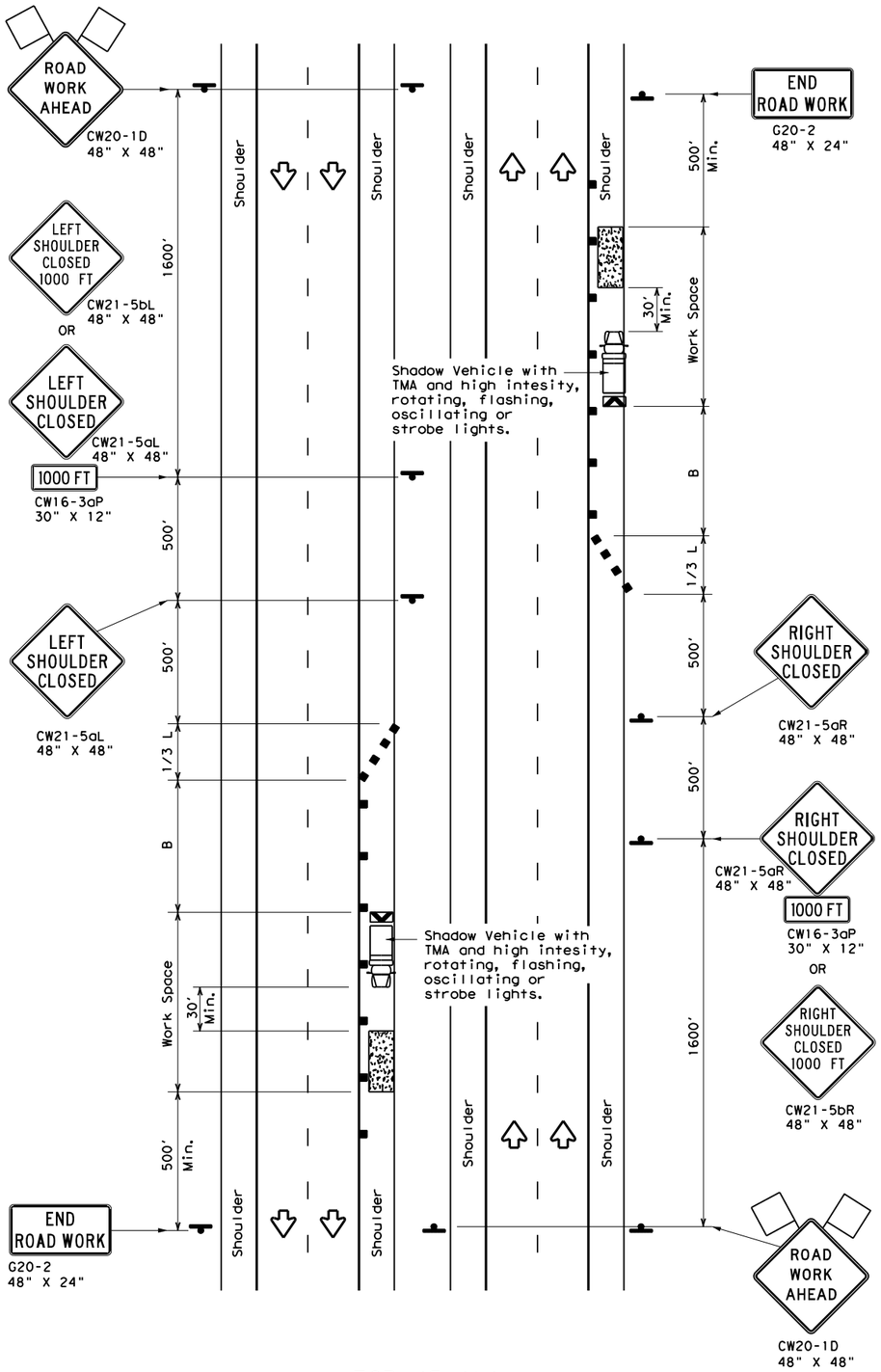


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
2-18	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		61

DATE: 02/15/2023 08:34 AM
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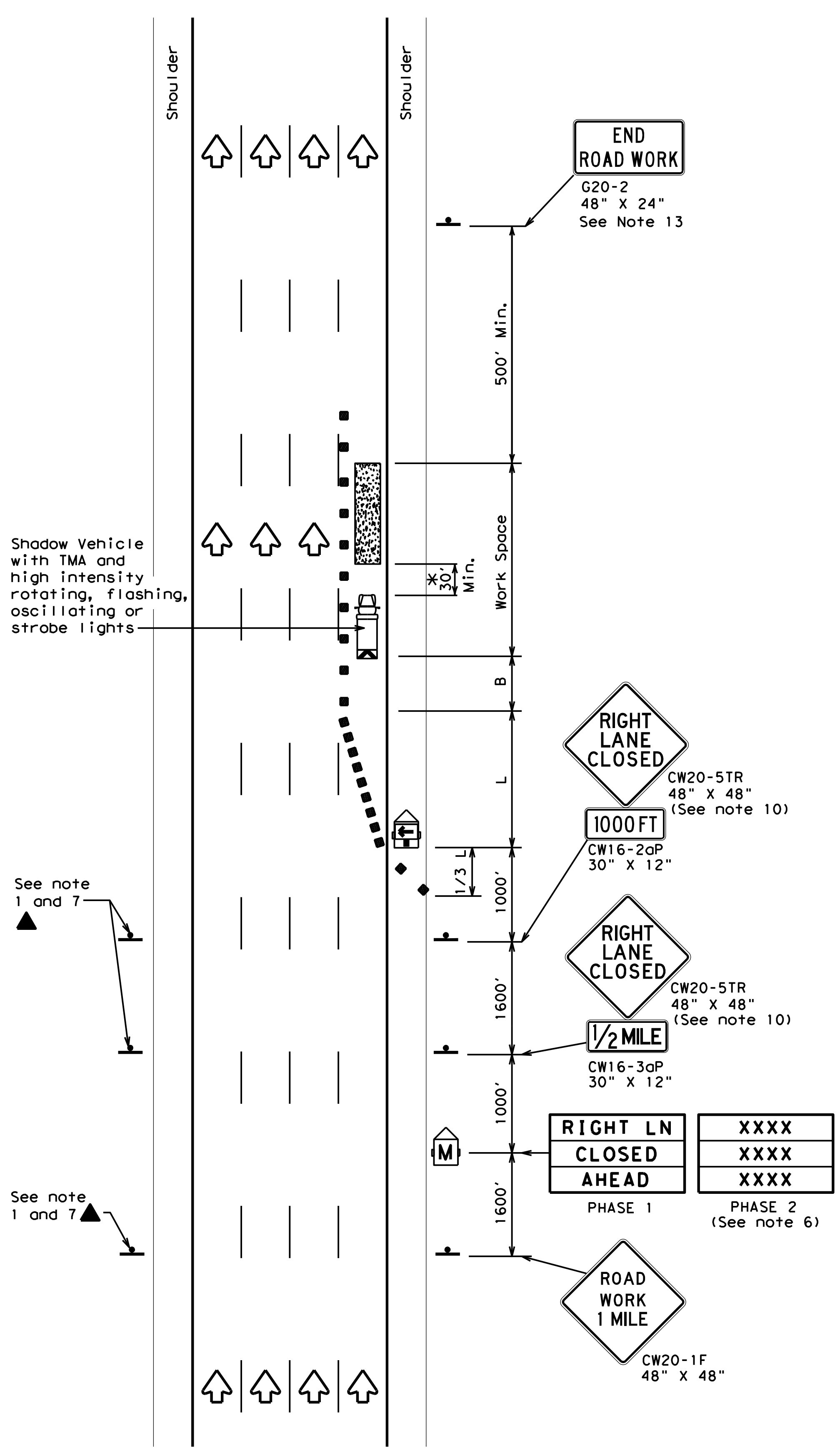
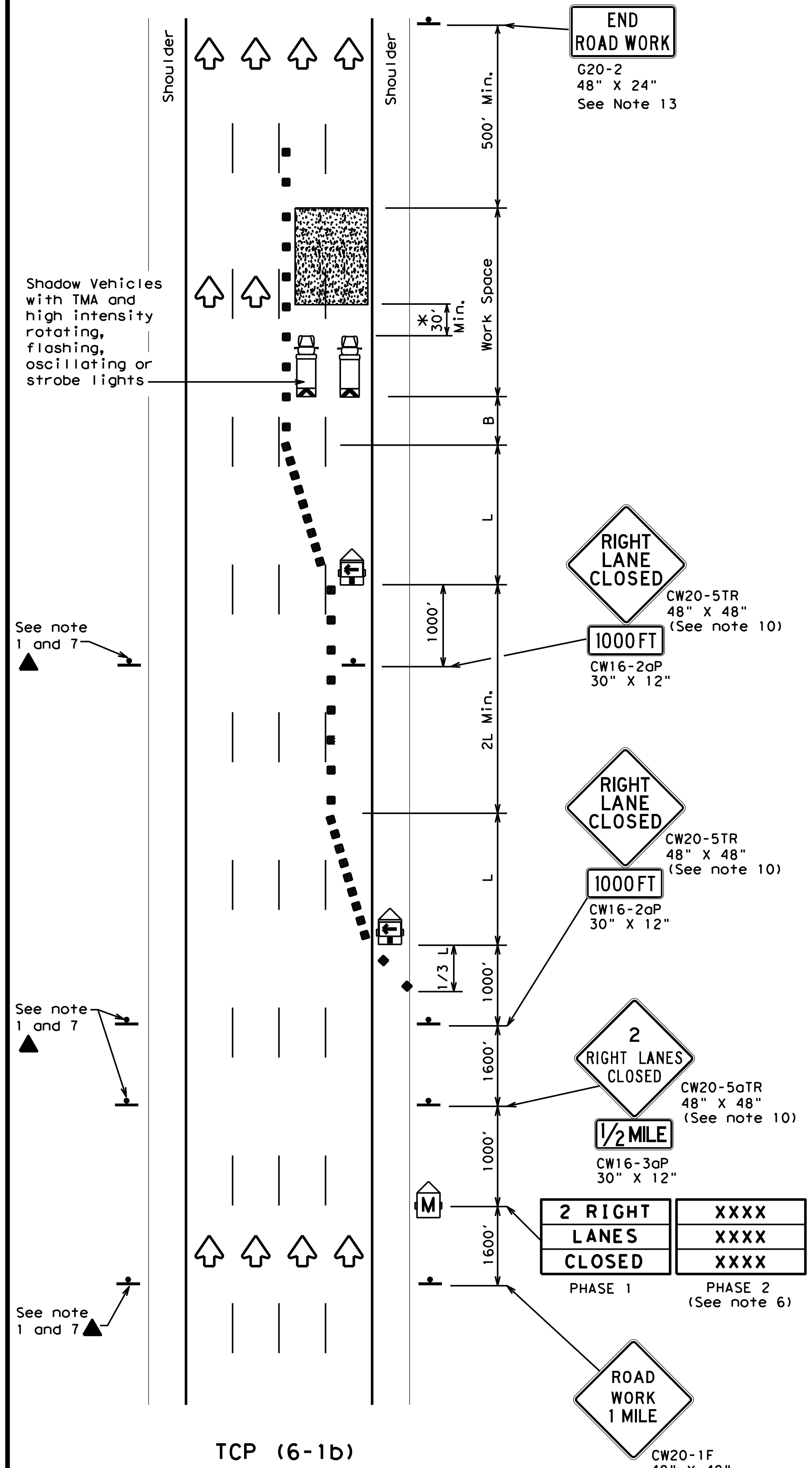


TCP (6-1a)

TYPICAL FREEWAY
ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY
TWO LANE CLOSURE

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0915	00	258	VA
	DIST		COUNTY	SHEET NO.
	SAT		VARIOUS	62

DATE: 03/10/2023 09:33 AM
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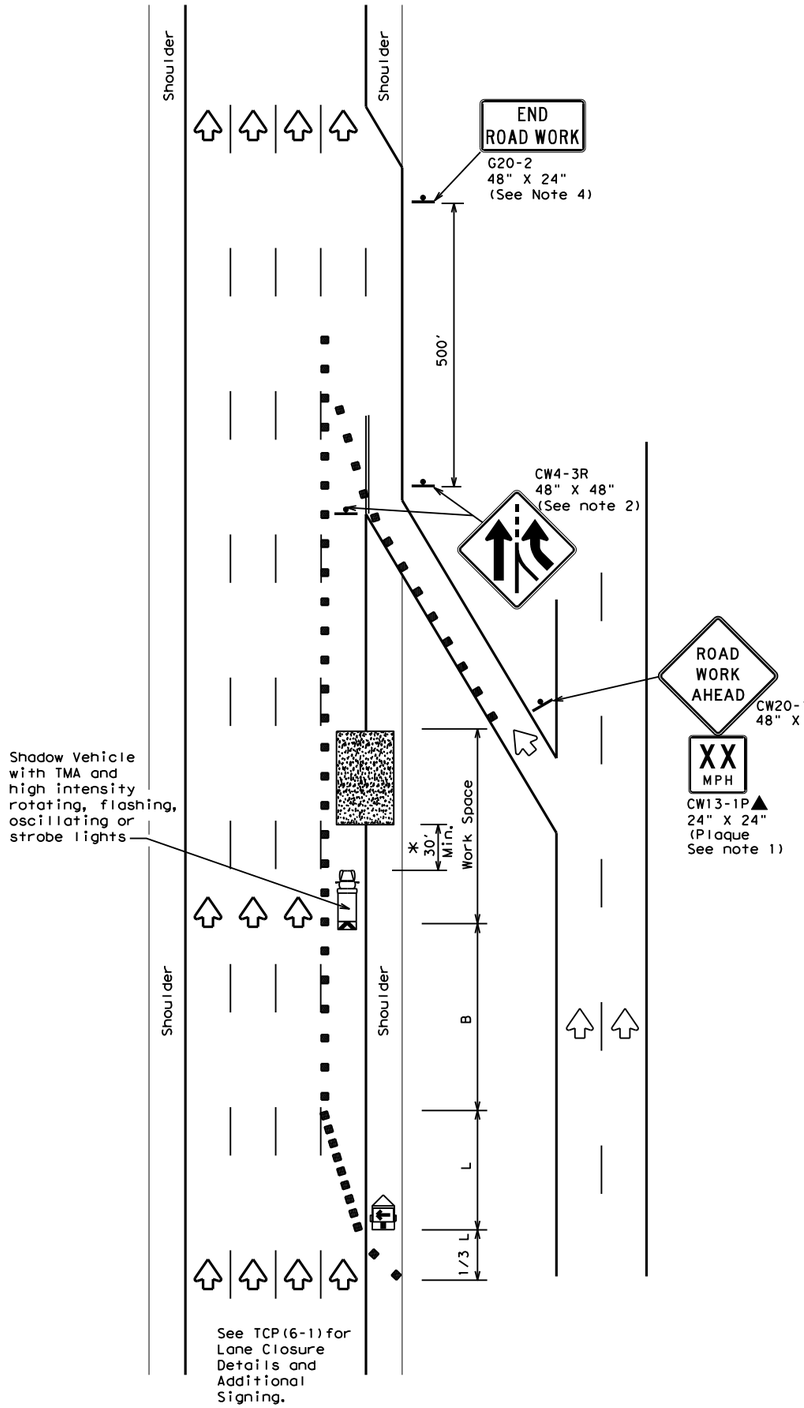
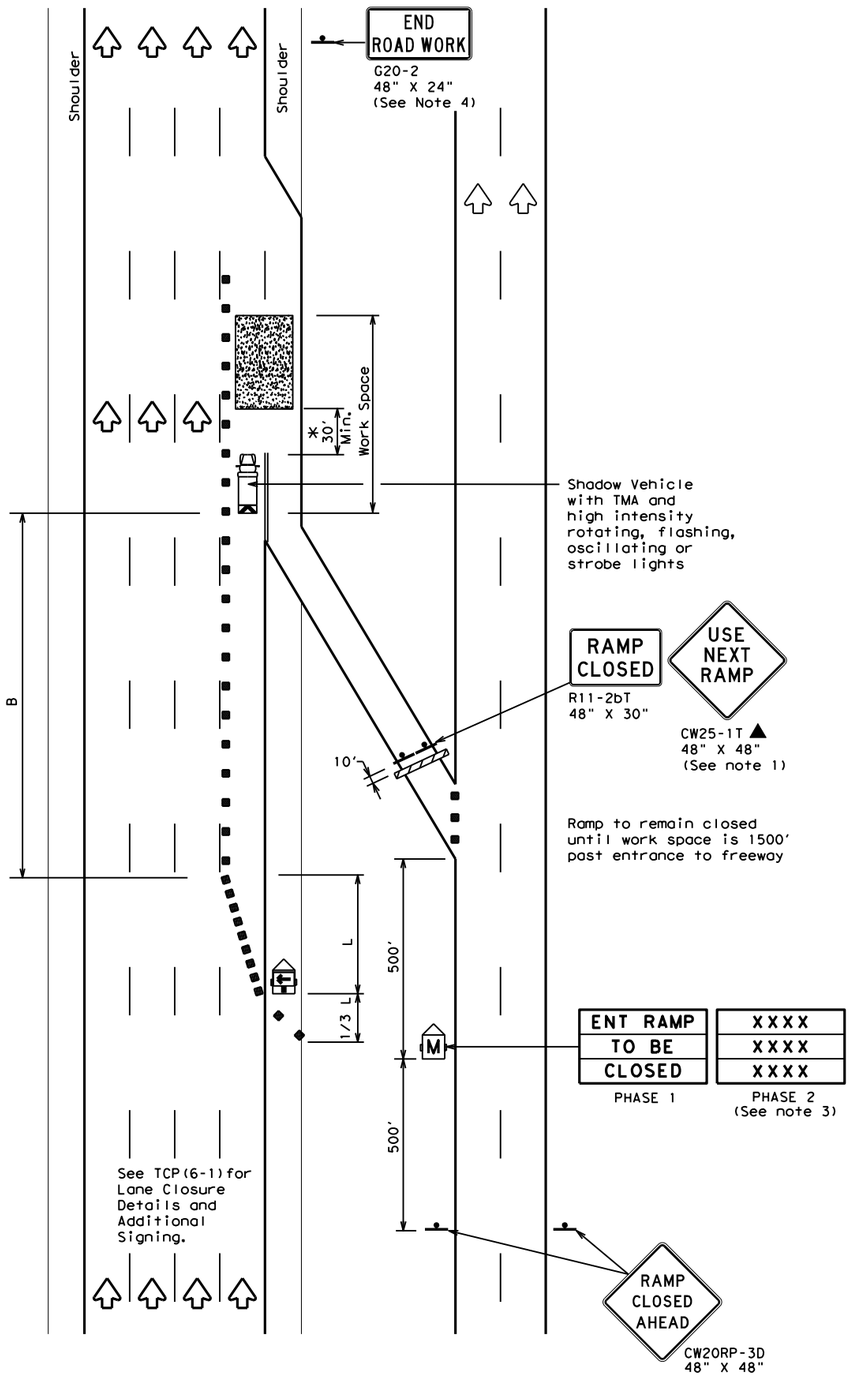


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP 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 "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

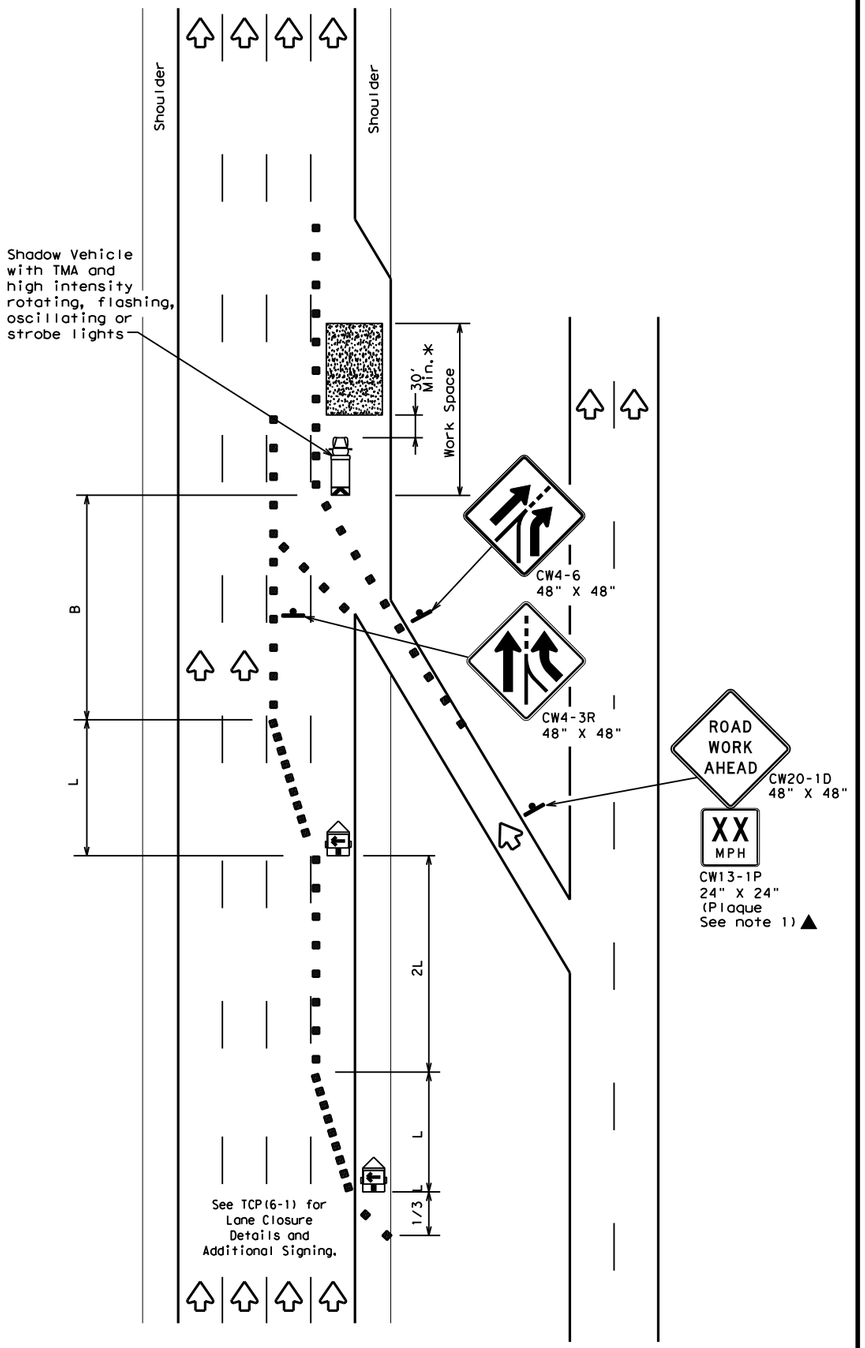
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

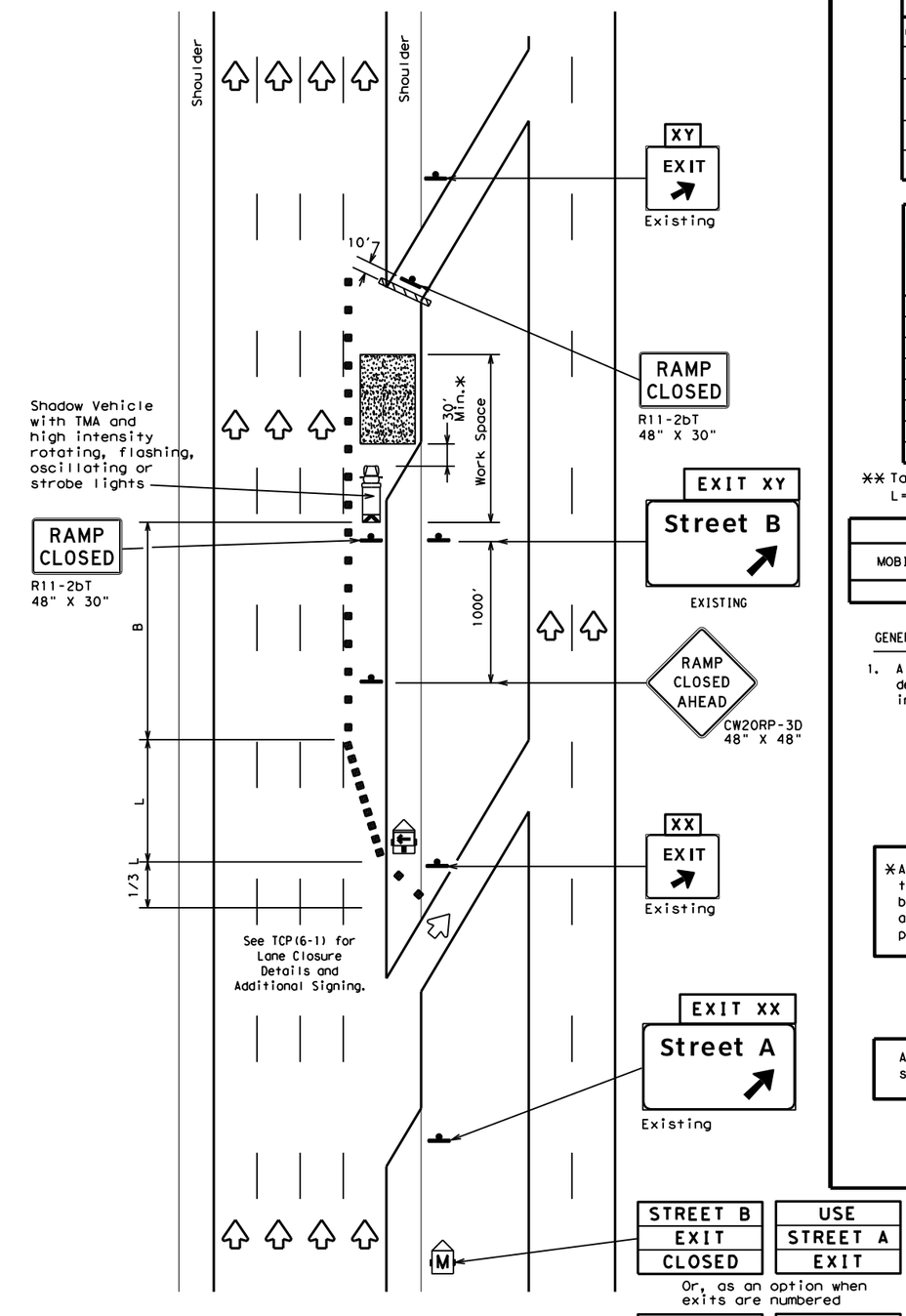
FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	VARIOUS		63

DATE:
FILE:



TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	VARIOUS		64

DATE:
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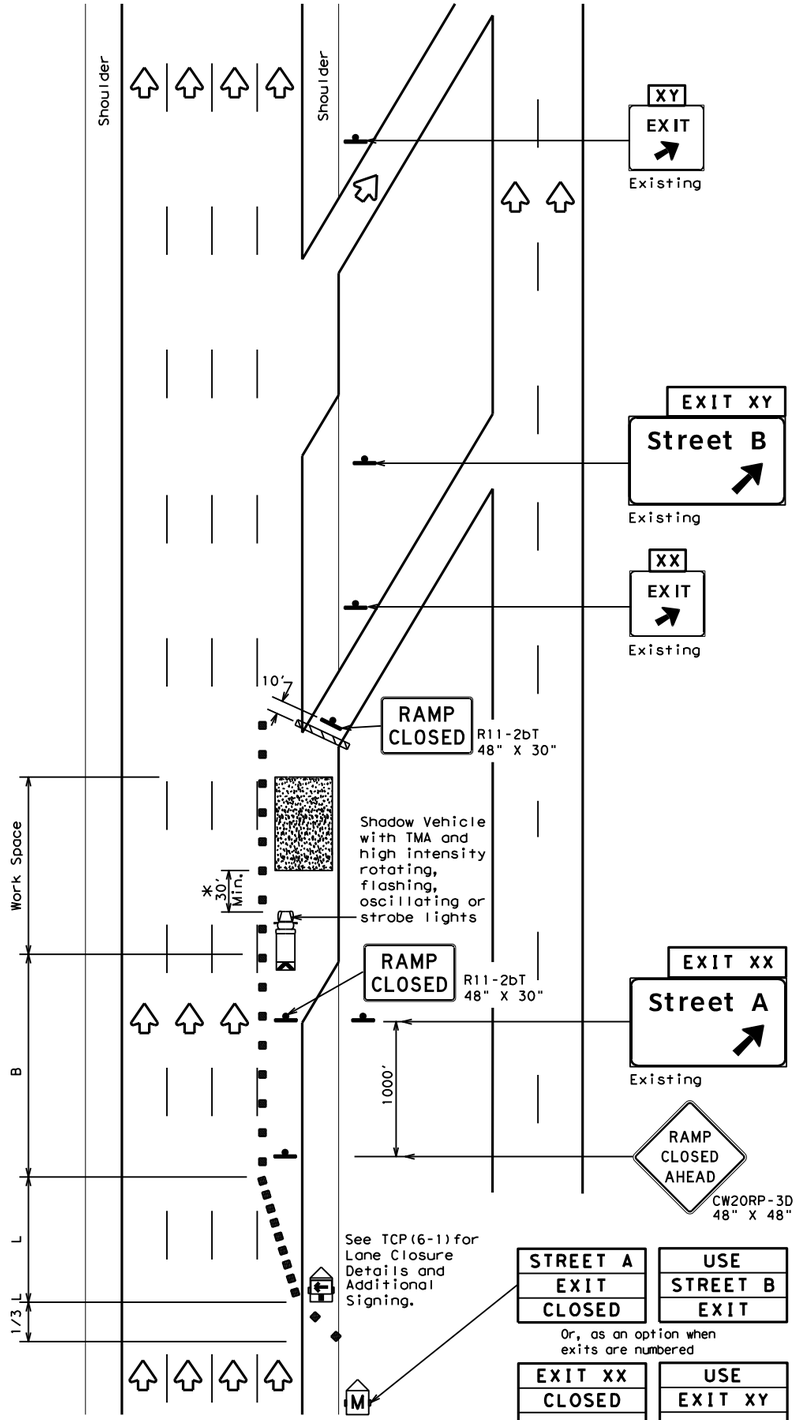
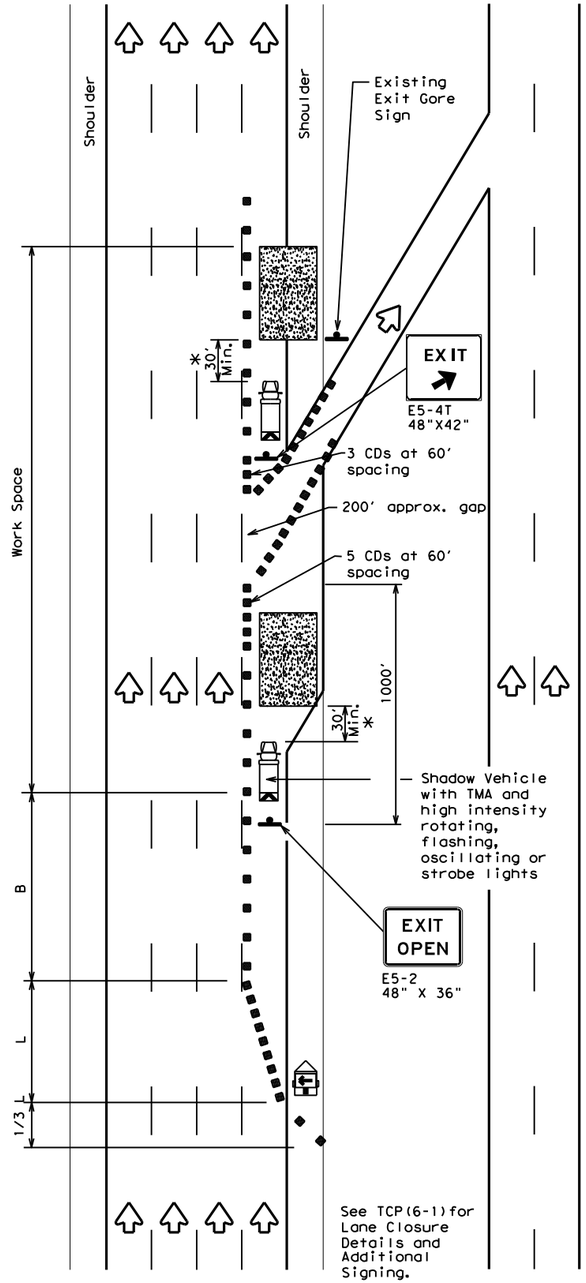


TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

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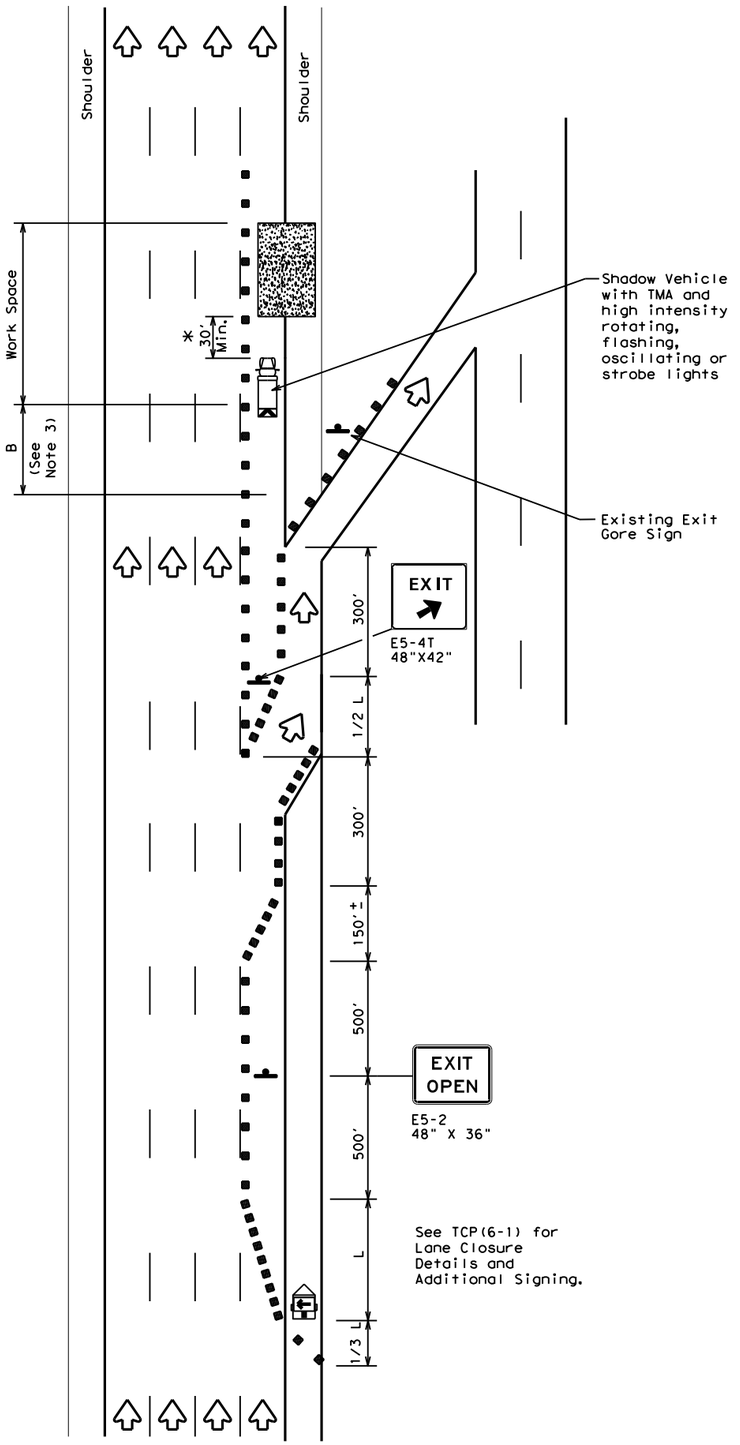
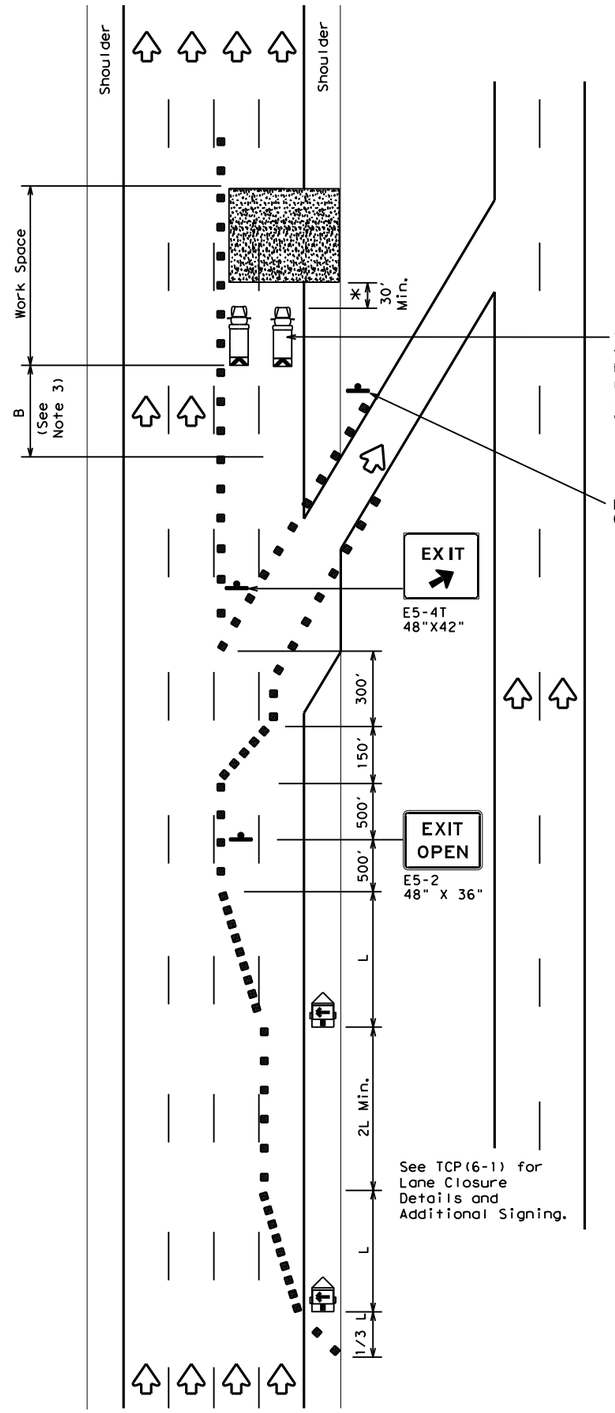
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	VARIOUS		65

DATE:
FILE:



TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	VARIOUS		66

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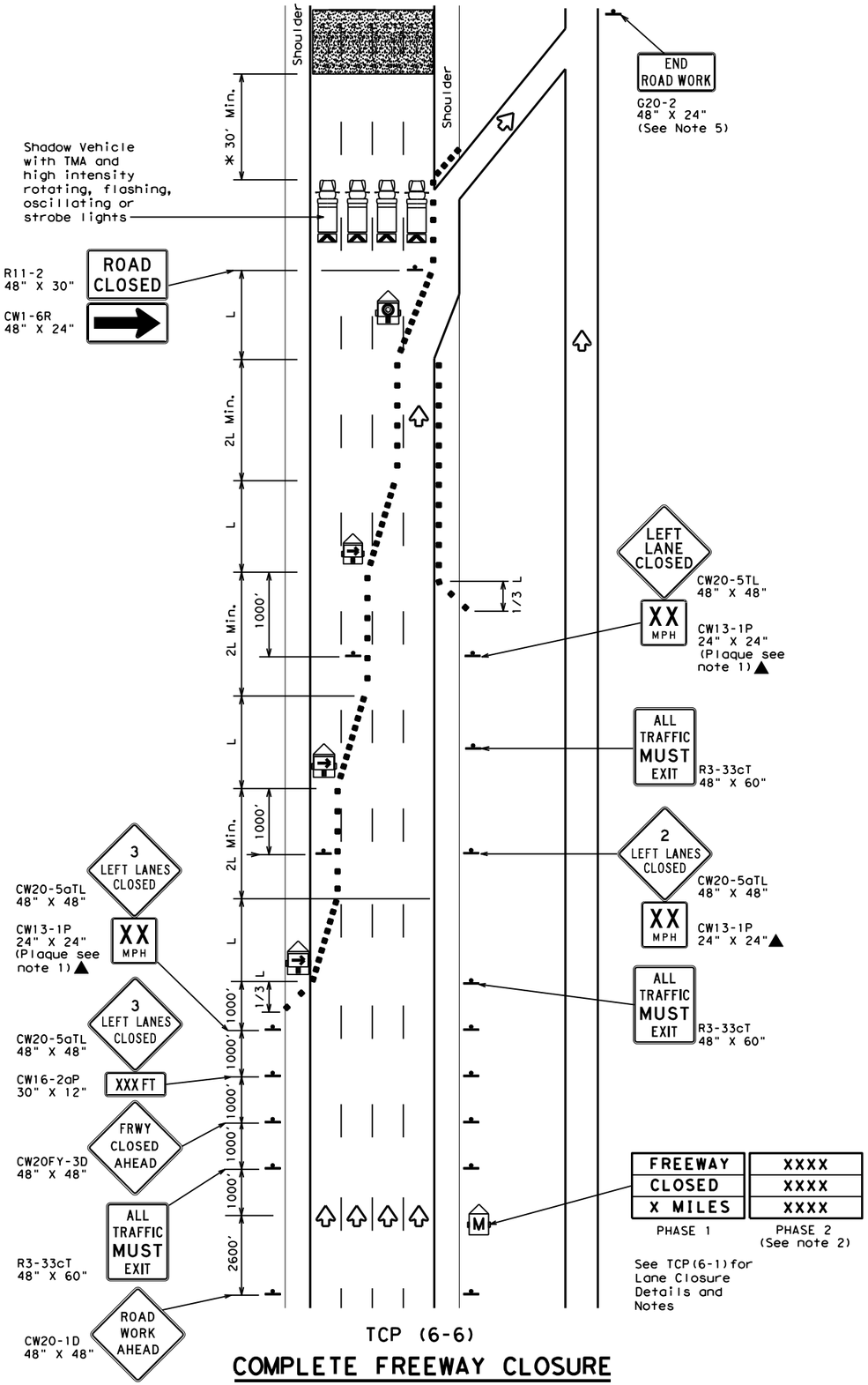

TCP (6-6)

COMPLETE FREEWAY CLOSURE

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
3. Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
4. Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
5. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY CLOSURE

TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	SAT	VARIOUS		67

DATE:
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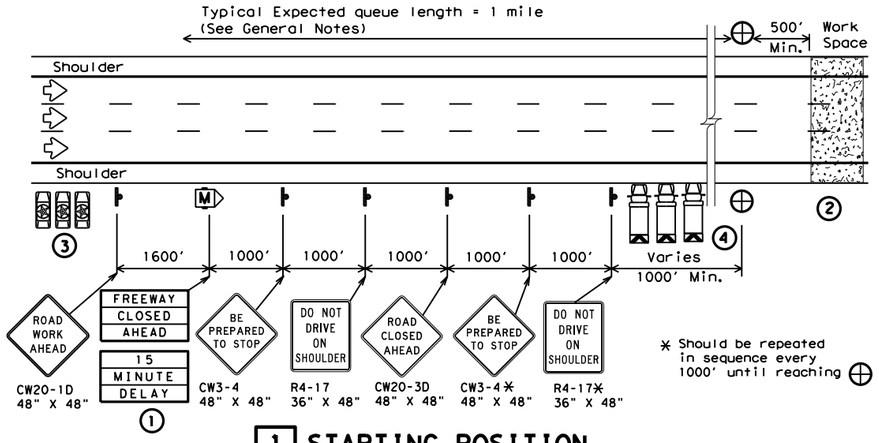


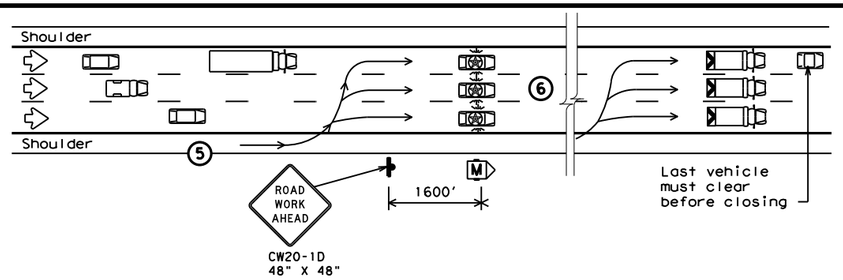
1 STARTING POSITION

① Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

② Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

③ There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

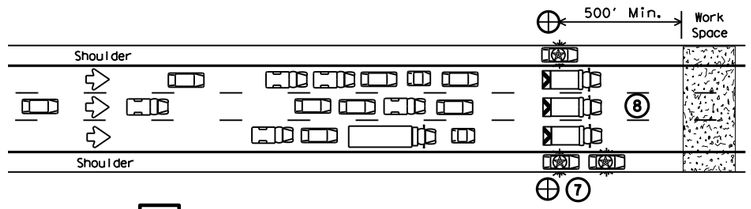
④ One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

⑤ Starting position of the LEOVs should be in advance of the most distant warning signs.

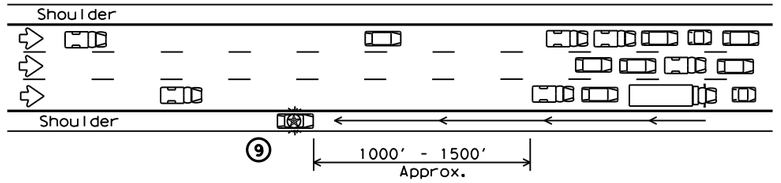
⑥ Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



3 ALL TRAFFIC STOPPED AT CP

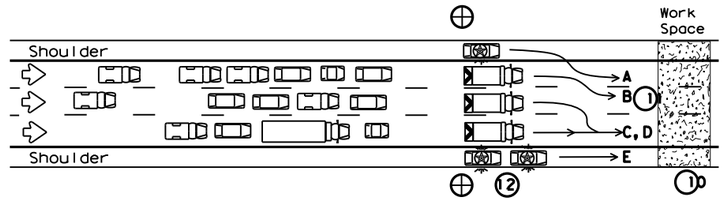
⑦ Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

⑧ The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



4 WARNING THE TRAFFIC QUEUE

⑨ The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed ¼ mile or more in advance of the queue.



5 RELEASING STOPPED TRAFFIC

⑩ All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

⑪ When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

⑫ The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

⑬ LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■ ■	Channelizing Devices	⊕	Control Position (CP)
(M)	Portable Changeable Message Sign (PCMS)		Barrier Vehicle with Truck Mounted Attenuator
	Law Enforcement Officer's Vehicle(LEOV)		Traffic Flow

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

GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).

4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

TCP(6-7)-12

FILE: tcp6-7.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
1-97 8-12	DIST	COUNTY		SHEET NO.
4-98	SAT	VARIOUS		68

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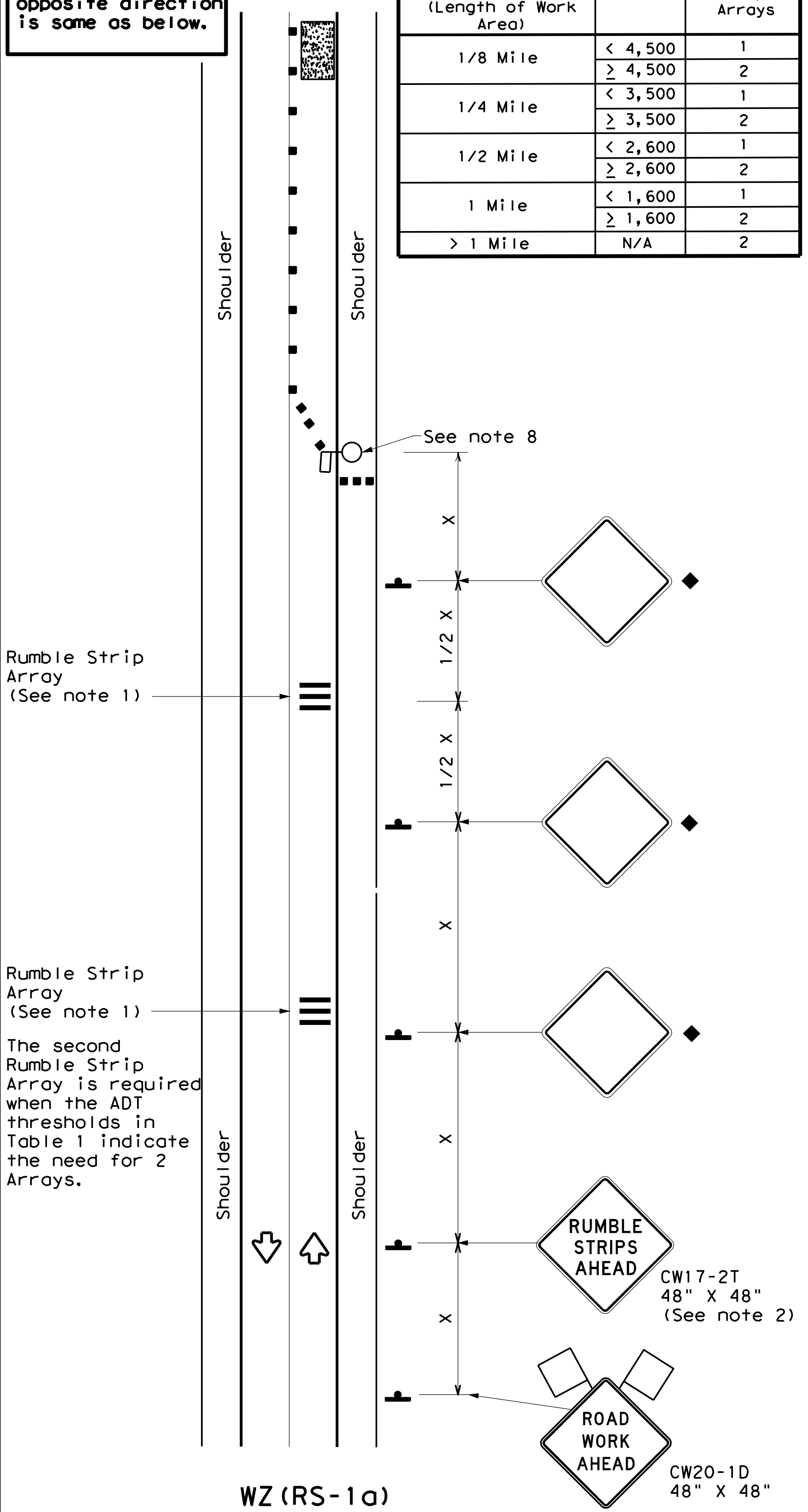
Warning sign and rumble strip sequence in opposite direction is same as below.

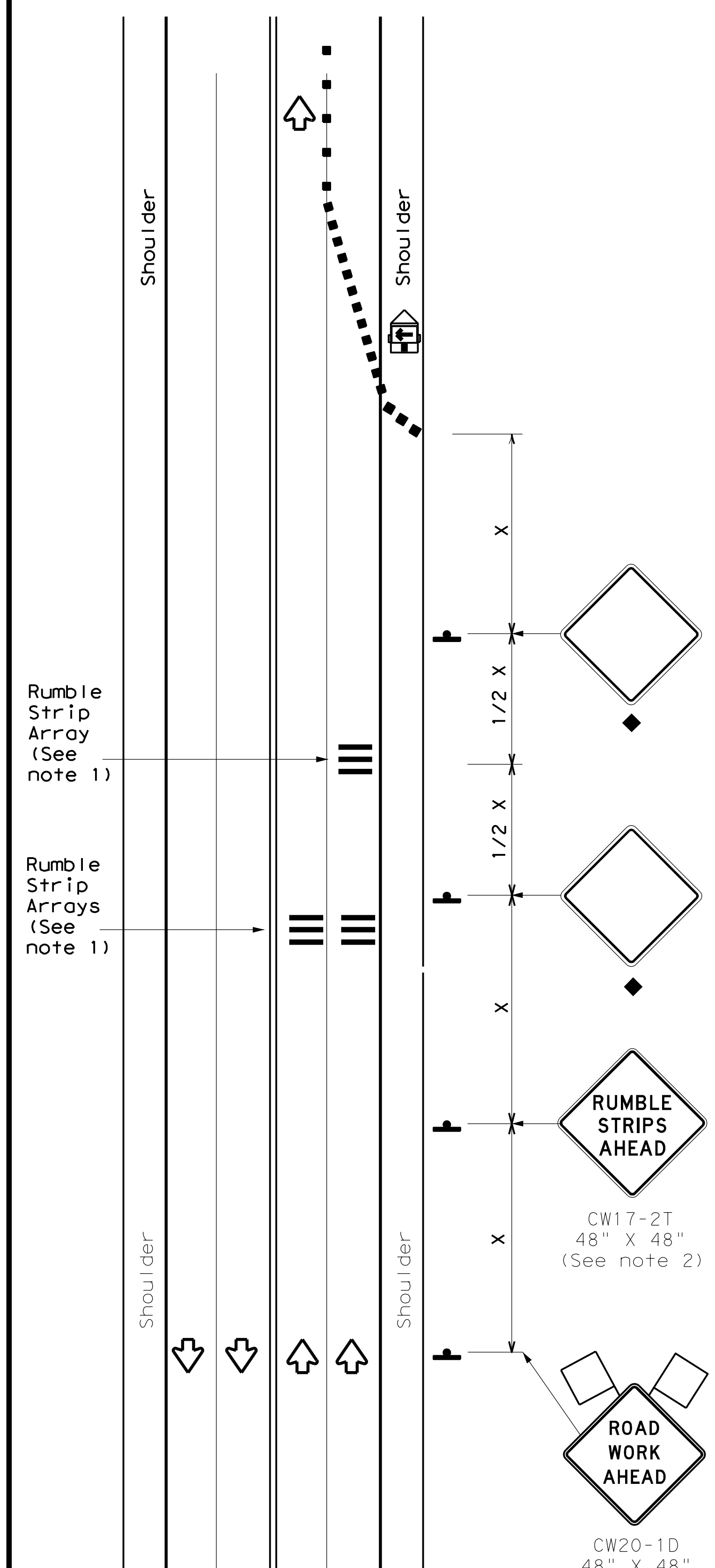
TABLE 1

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

(symbol)	Type 3 Barricade	(symbol)	Channelizing Devices
(symbol)	Heavy Work Vehicle	(symbol)	Truck Mounted Attenuator (TMA)
(symbol)	Trailer Mounted Flashing Arrow Panel	(symbol)	Portable Changeable Message Sign (PCMS)
(symbol)	Sign	(symbol)	Traffic Flow
(symbol)	Flag	(symbol)	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 0915	SECT 00	JOB 258	HIGHWAY VA
REVISIONS 2-14 1-22 4-16	DIST SAT	COUNTY VARIOUS		SHEET NO. 69

117

DATE:
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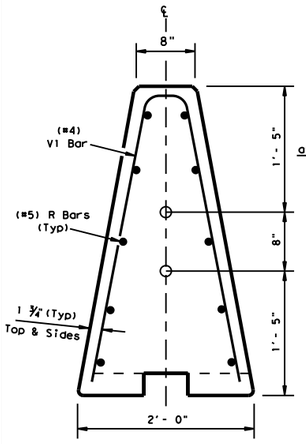
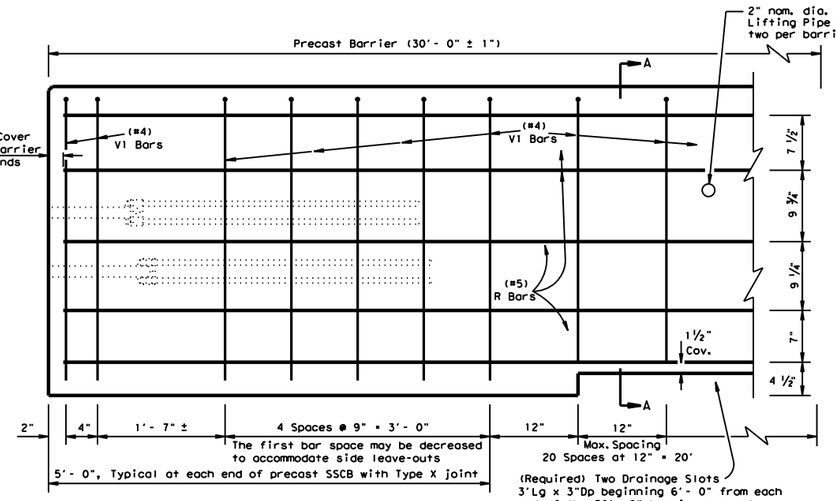


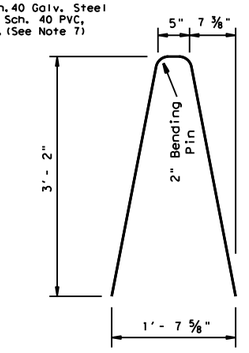
End View
Precast Barrier

Pipe locations for Joint Type X connection



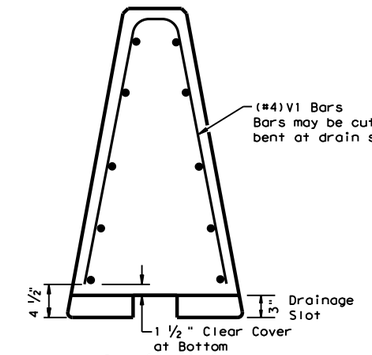
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



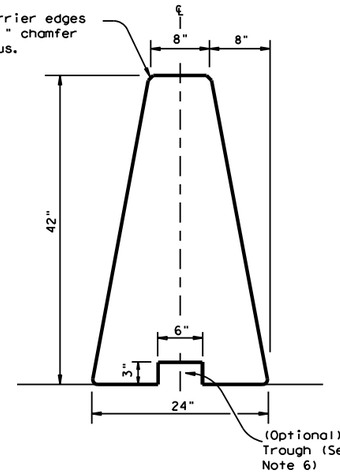
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



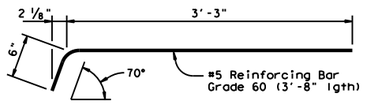
Section A-A
Steel Placement at (Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



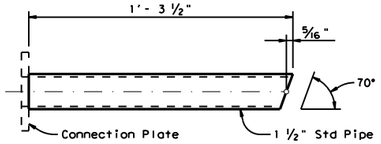
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



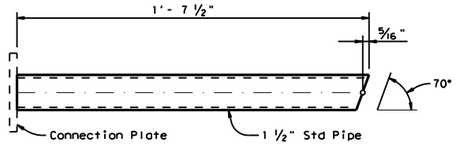
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



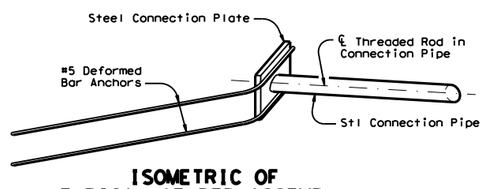
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



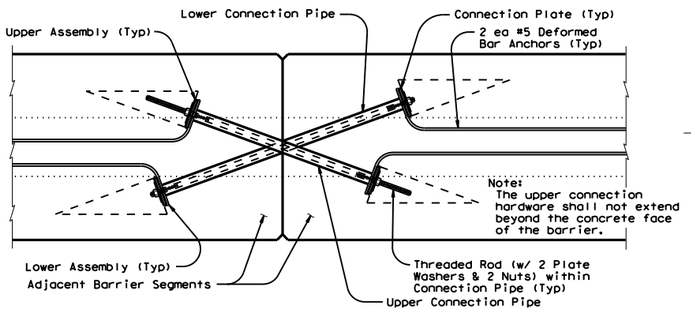
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

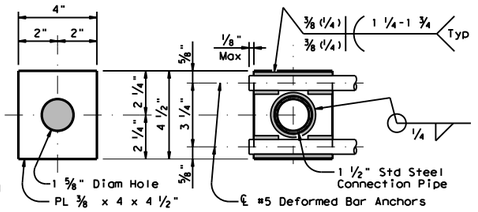
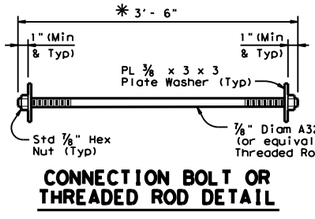


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

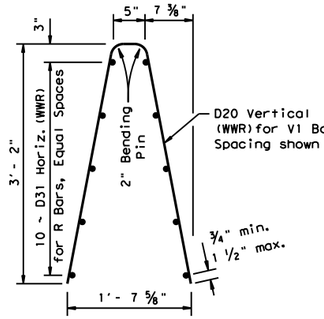
CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.

General Notes

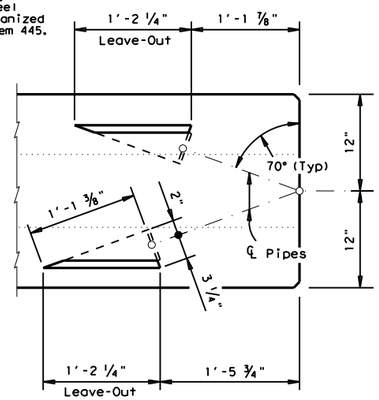
1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



Welded Wire Reinforcement (WWR) Option for Bars R and V1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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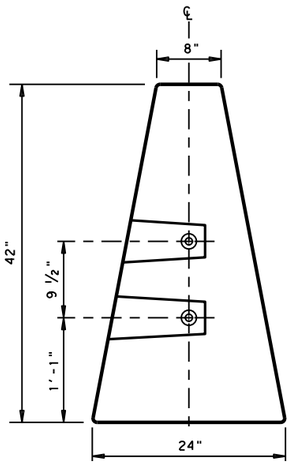
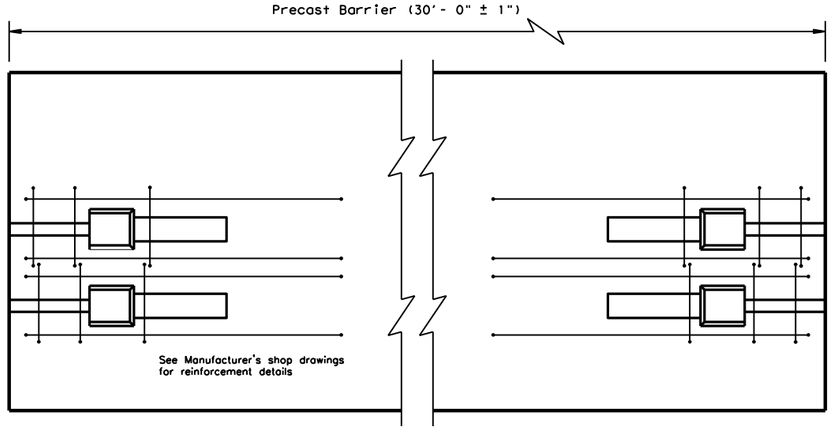
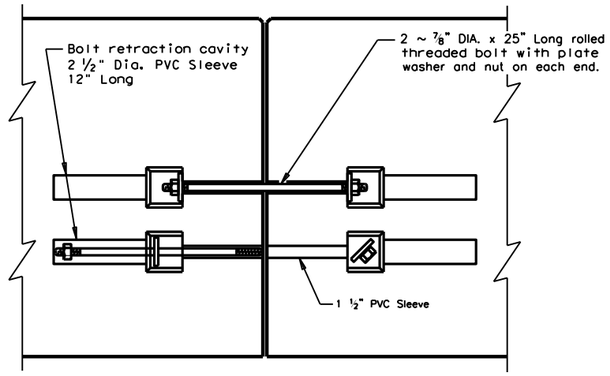


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

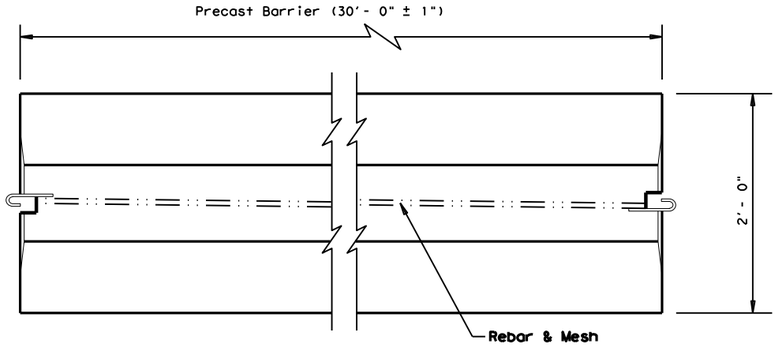


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

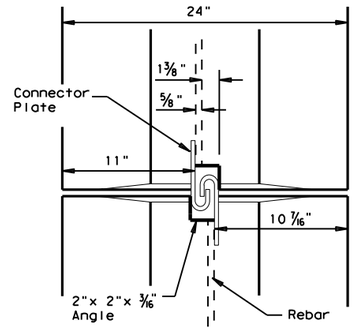


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

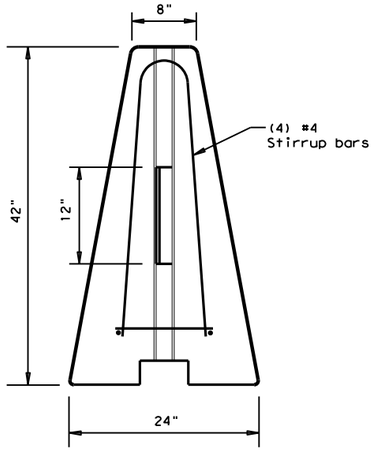
Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



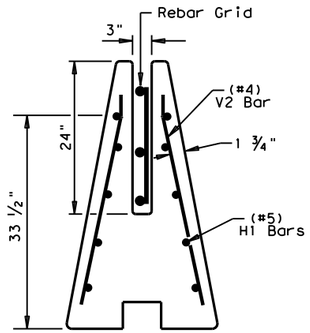
END VIEW

Proprietary Joint Connections (SSCB)

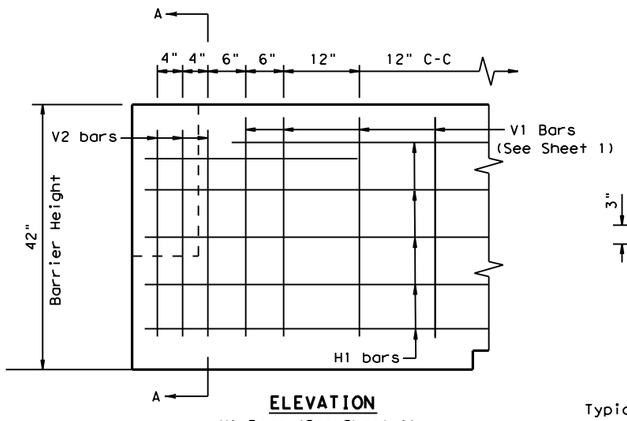
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

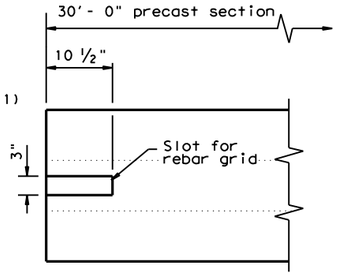
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



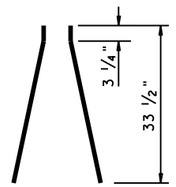
SECTION A-A
Showing (Type R) Rebar Grid



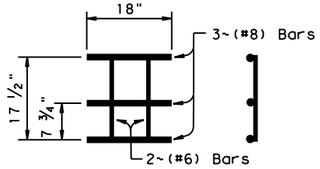
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		71

DATE:
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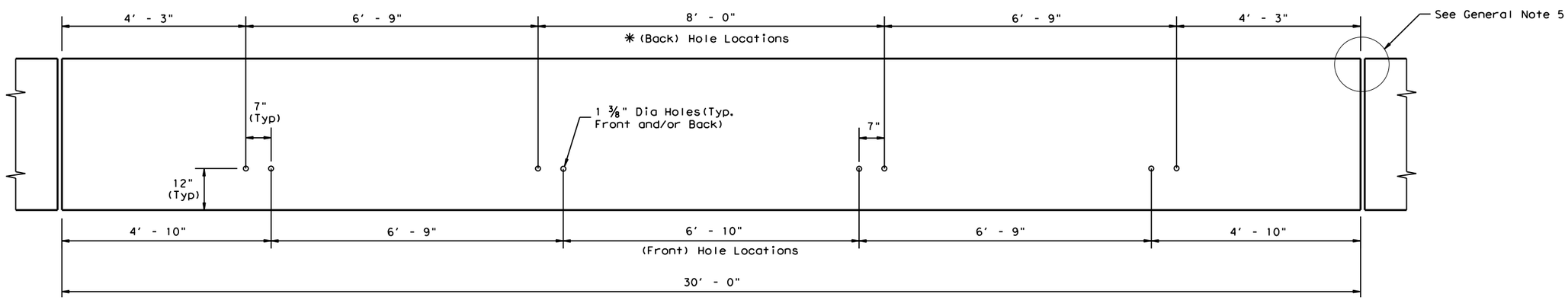
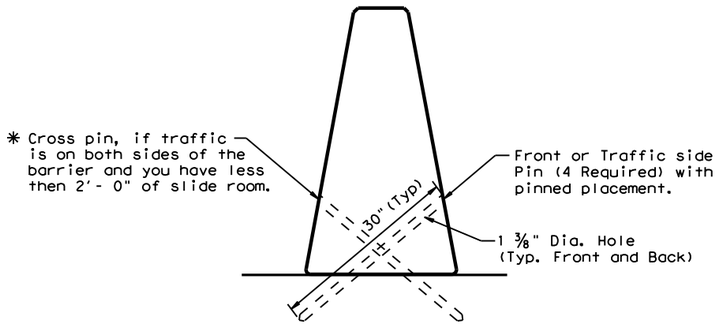


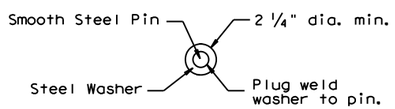
DETAIL 1

Precast SSCB(42")
Showing hole locations

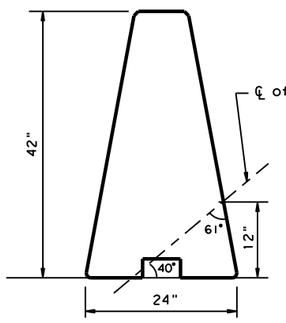


DETAIL 2

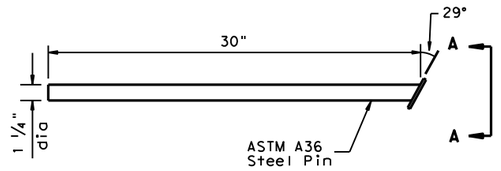
Placement on (ACP)
Asphalt Conc. Pavement
or Treated Base Material
(30" Pin required)



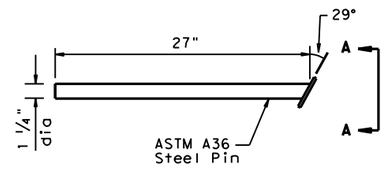
VIEW A-A



HOLE LOCATION DETAIL



(30") PIN DETAIL
See Detail 2

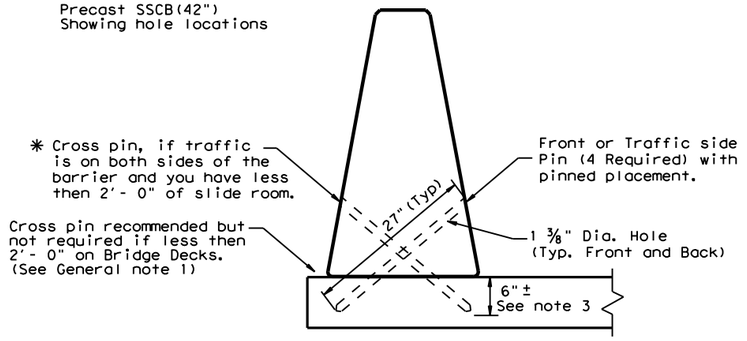


(27") PIN DETAIL
See Detail 3

Note:
Steel washer welded to pin at 29° angle so that the washer is flush with barrier surface. (See View A-A)

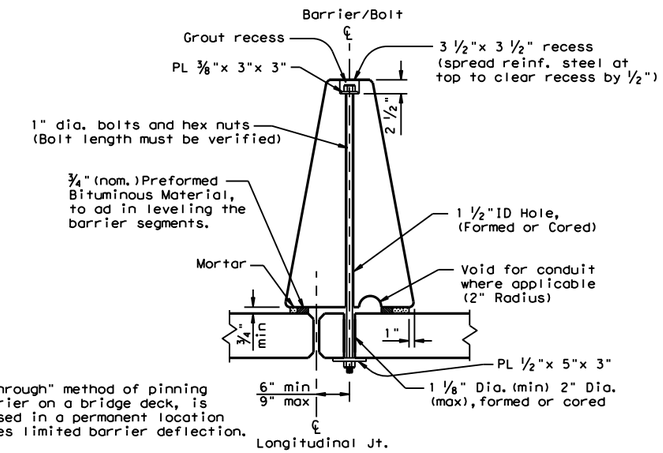
DETAIL 3

Bridge Deck or CRCP
(27" Pin required).



CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less then 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
2. Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8 in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
3. The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing though the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
4. Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
5. See SSCB(2) standard sheet for reinforcement requirements and joint connection types.
6. The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 ¼ in. pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
7. The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
8. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 700 lbs per foot.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)
PINNED PLACEMENT

SSCB(5)-10

FILE: sscb510.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
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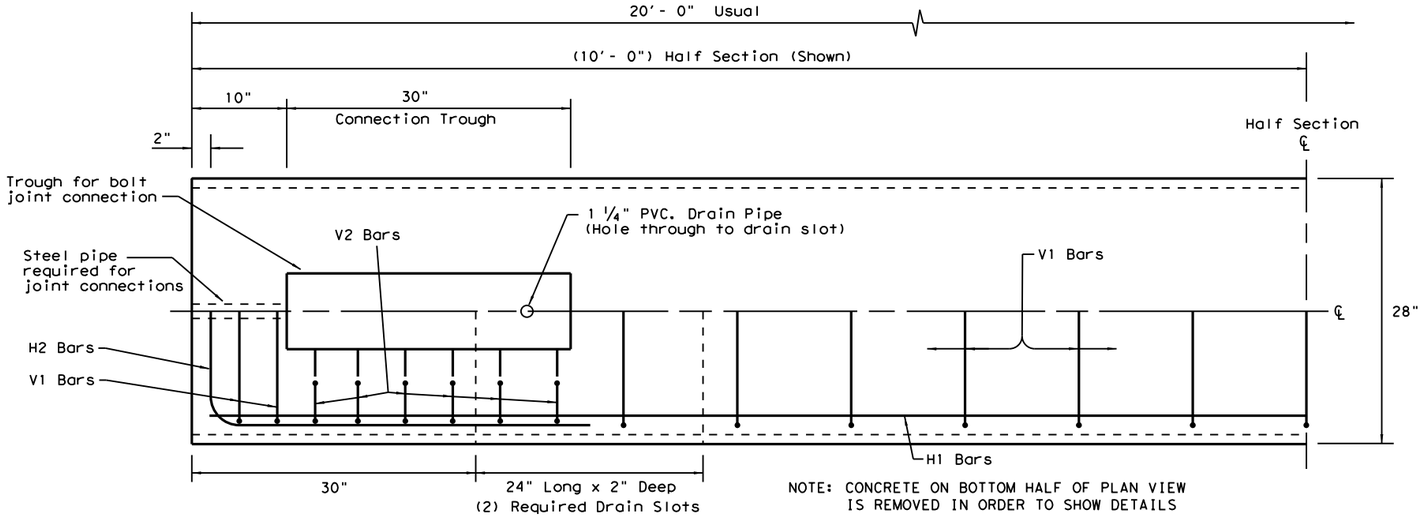
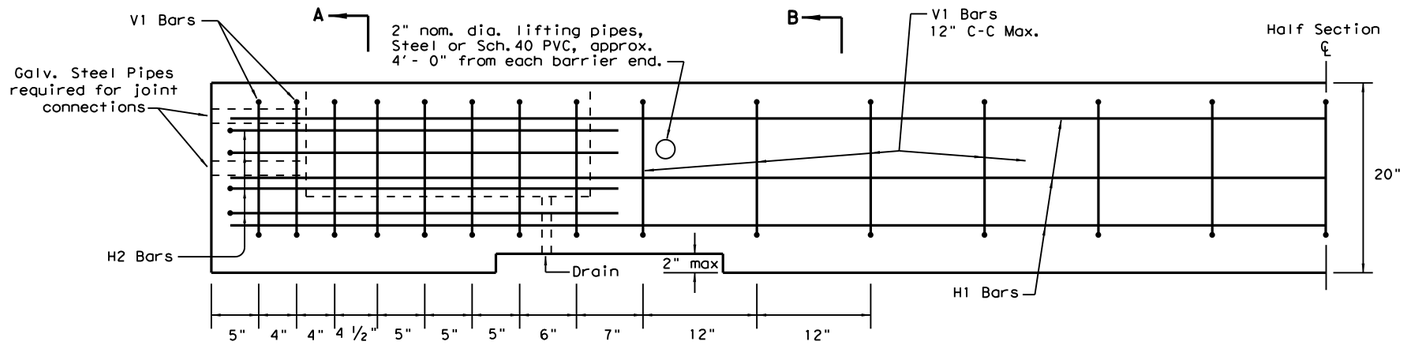
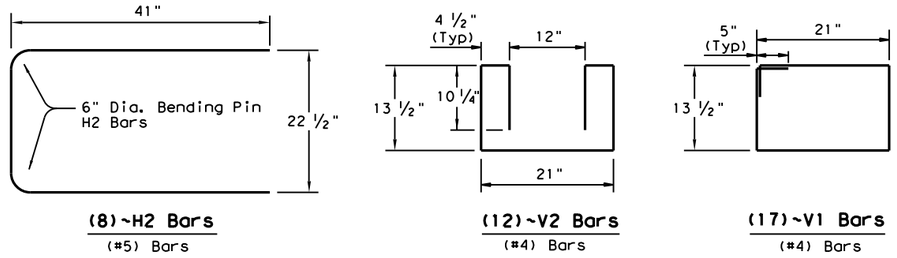


PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



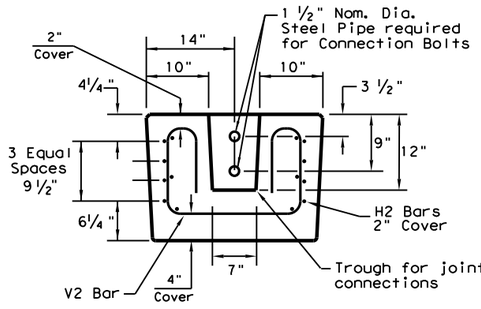
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

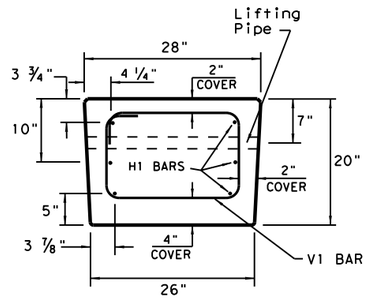
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



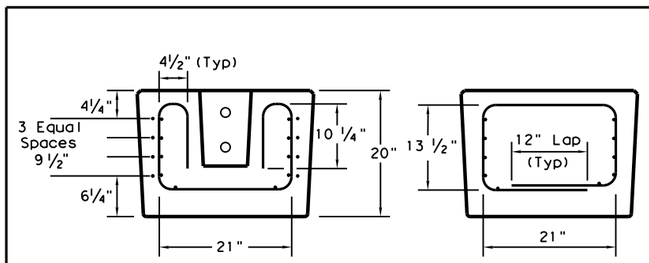
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A

SECTION B-B

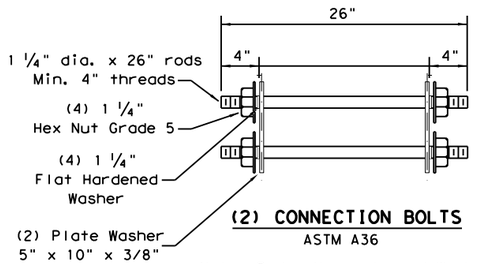
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

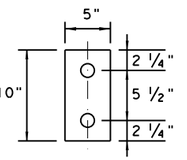


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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	SAT	VARIOUS		73

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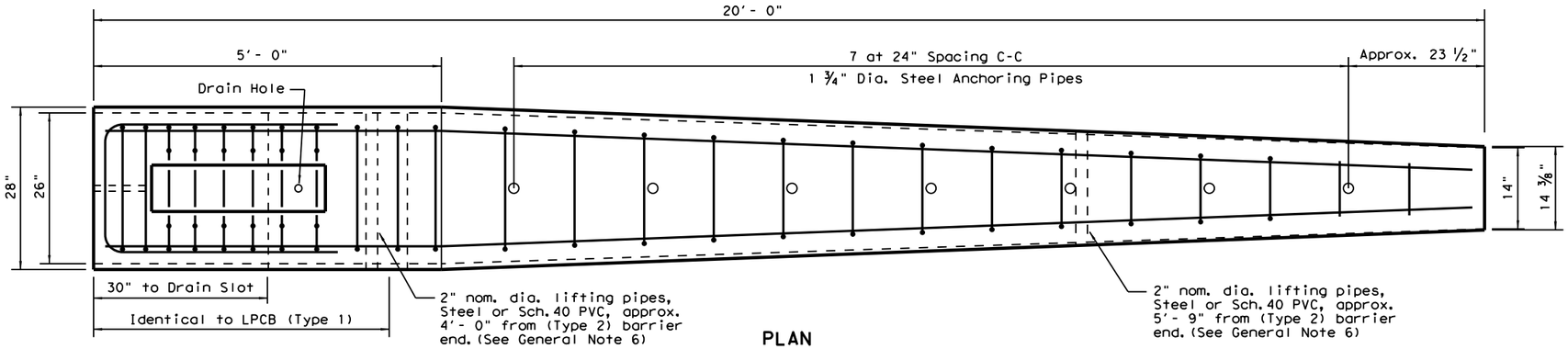
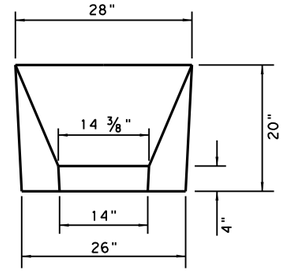
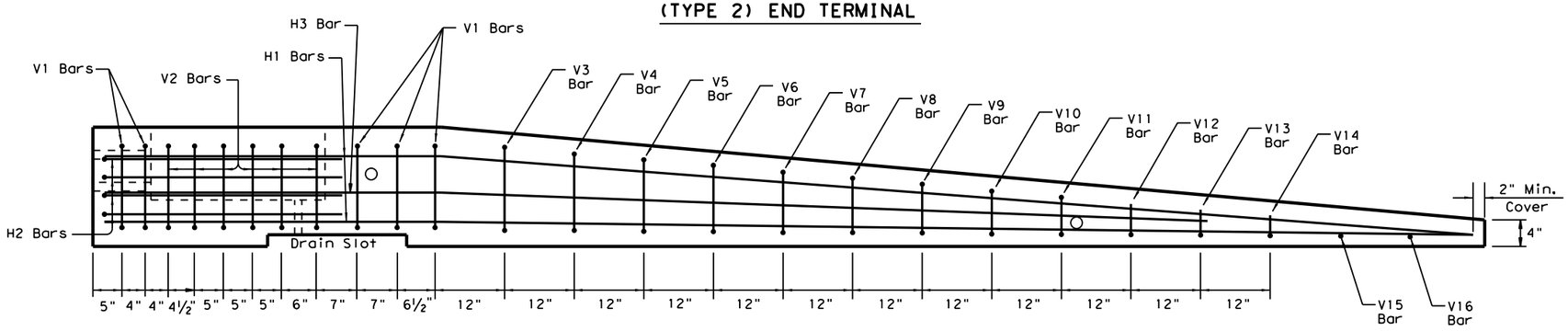


PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

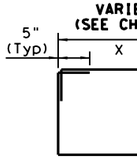


ELEVATION
(TYPE 2) END TERMINAL

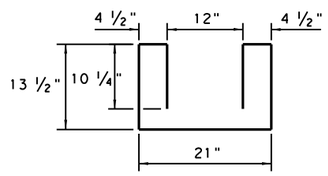
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

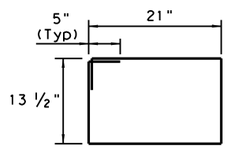
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



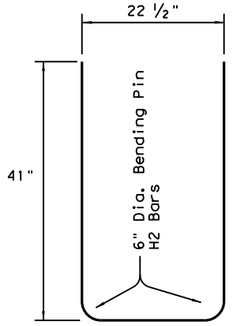
V3-V14 Bars



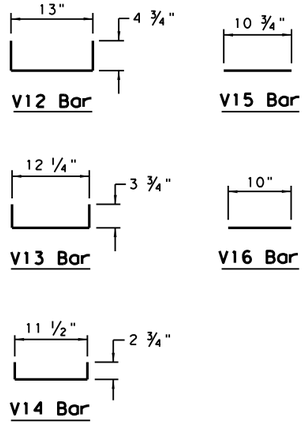
(6)~V2 Bars



(5)~V1 Bars



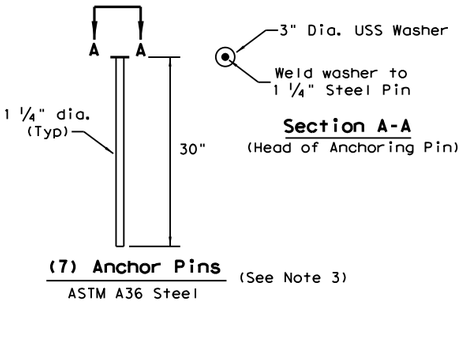
(4)~H2 Bars
(#5) Bars



Note: All V Bars are (#4)

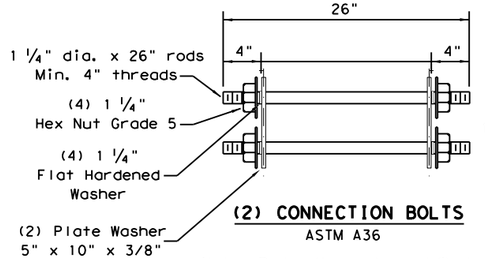
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



Section A-A
(Head of Anchoring Pin)

(7) Anchor Pins
ASTM A36 Steel
(See Note 3)

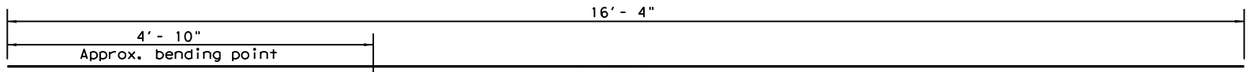


(2) CONNECTION BOLTS
ASTM A36

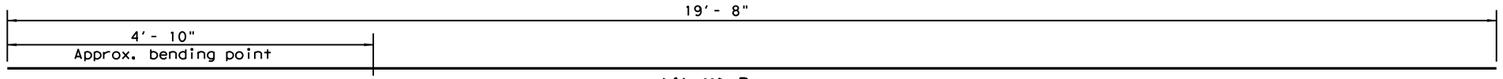
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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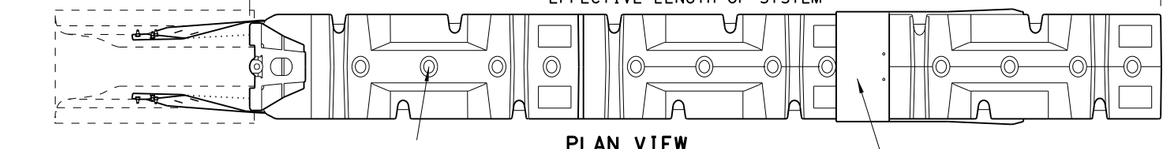
REVISIONS	0915	00	258	VA
	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		74

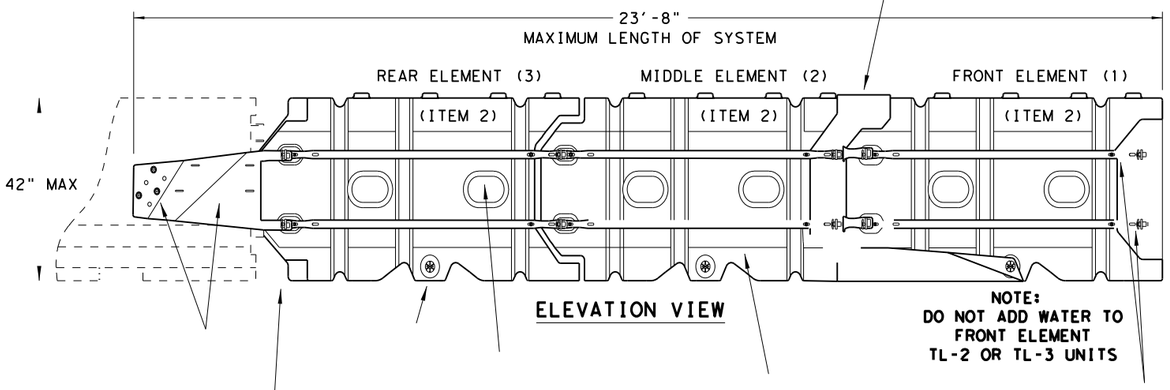
DATE:
FILE:

SYSTEM SHOWN - ABSORB-M TL-3



PLAN VIEW

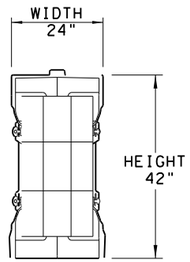
TRAFFIC FLOW



ELEVATION VIEW

NOTE:
DO NOT ADD WATER TO
FRONT ELEMENT
TL-2 OR TL-3 UNITS

TRAFFIC FLOW



SECTION A-A

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

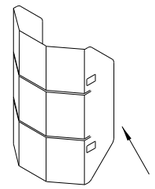
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
3	BSI-4004598	FILL CAPS	8	12
4	BSI-4004599	DRAIN PLUGS	2	3
5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER

** APPLY DECAL



NOSE PLATE

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

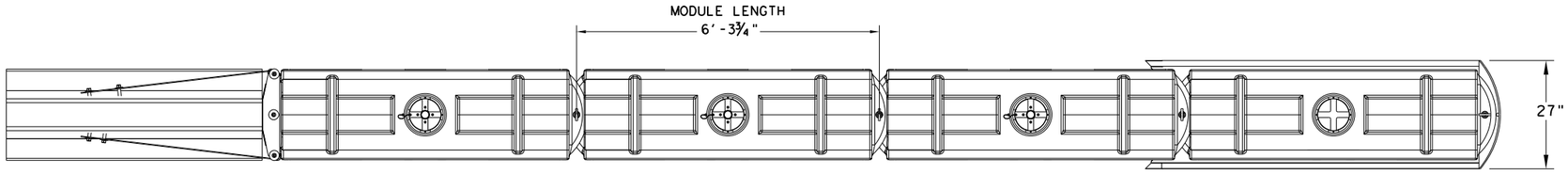
SACRIFICIAL

Texas Department of Transportation | Design Division Standard

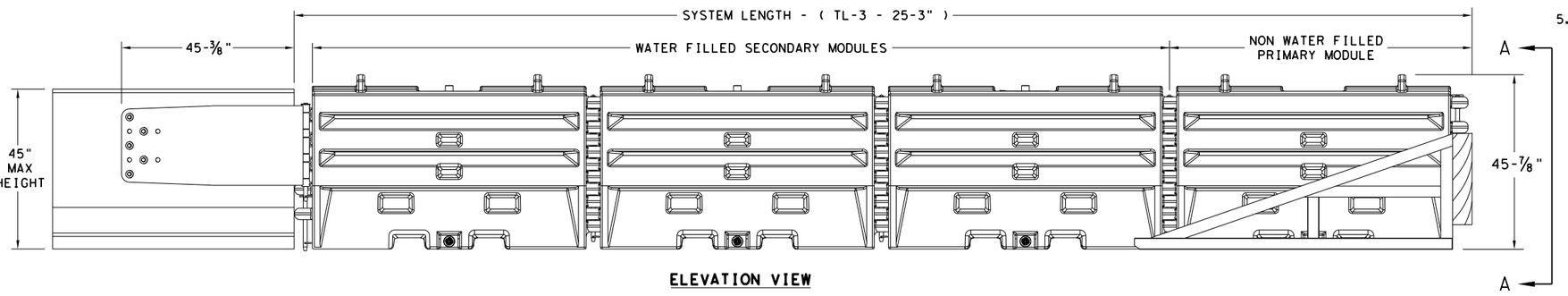
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		75

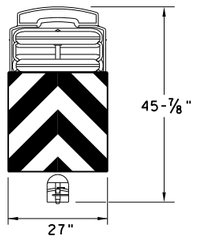
DATE:
FILE:



PLAN VIEW



ELEVATION VIEW



SECTION A-A

NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25' 3"

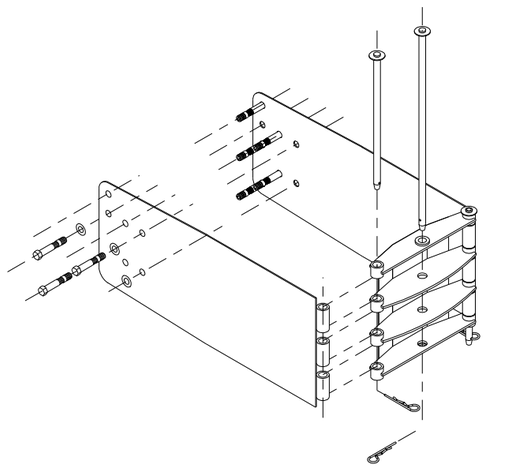
GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

BILL OF MATERIAL

PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation

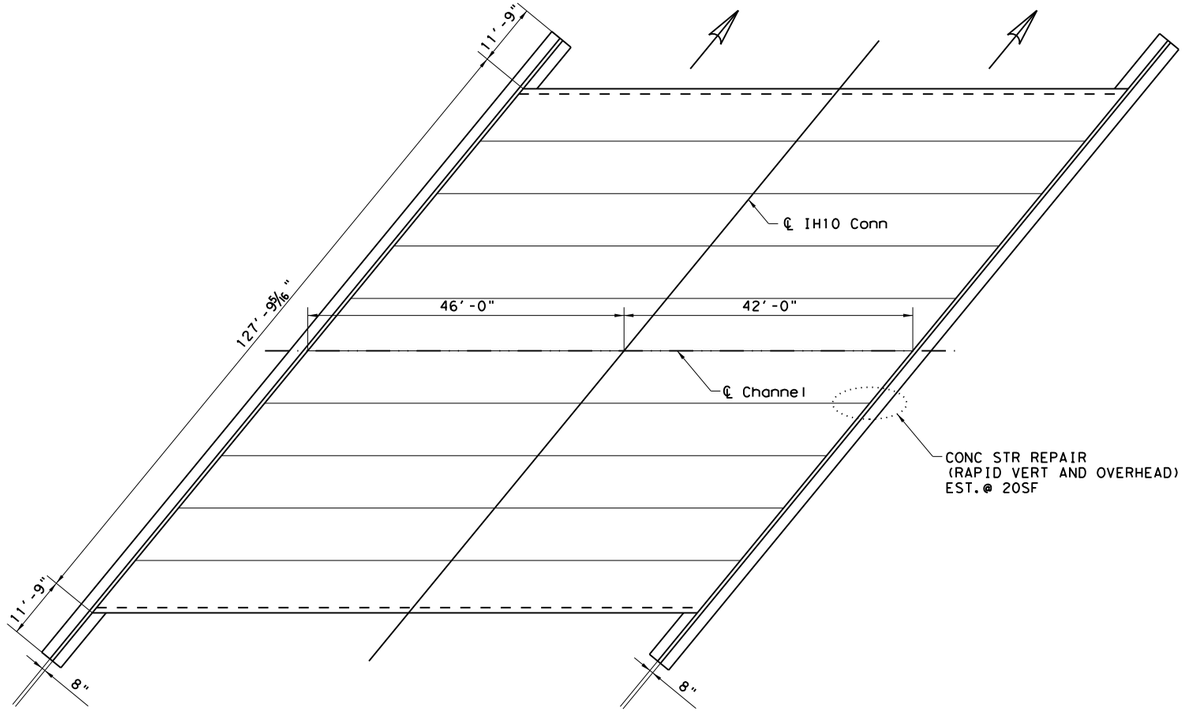
Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

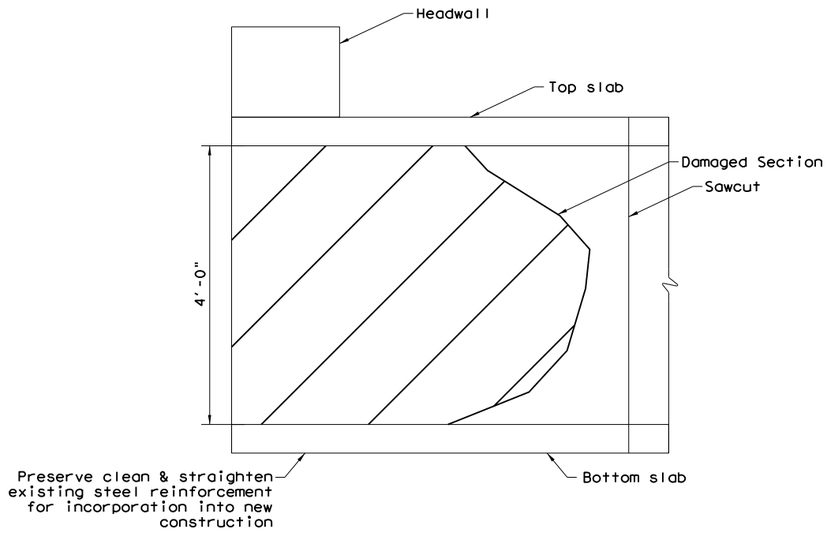
FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		76

NBI: 15-015-0025-02-204

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6008	CONC STR REPR(RAPID VERT AND OVERHEAD)	SF	20



ELEVATION



DAMAGED SECTION

GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Type C concrete repair material listed on the material producer list per DMS 4655.

Interior culvert wall repair should be constructed in accordance with item 429.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

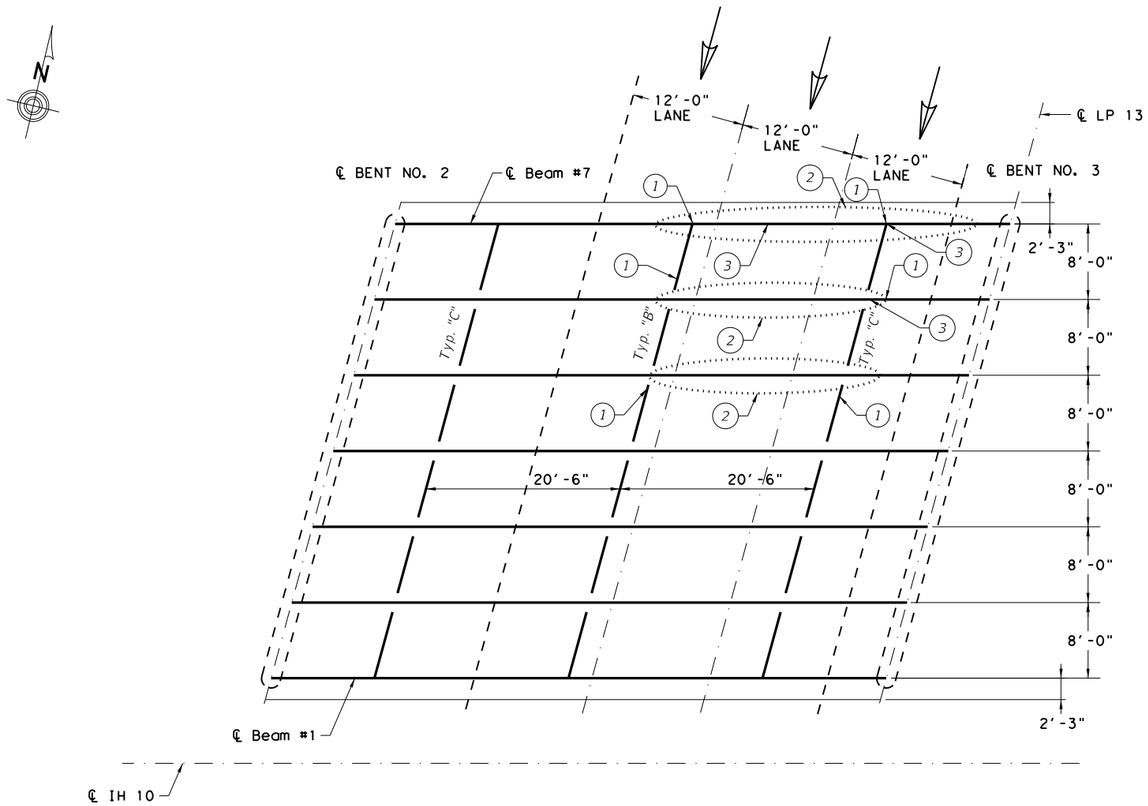
Texas Department of Transportation — San Antonio District

BEAM REPAIR

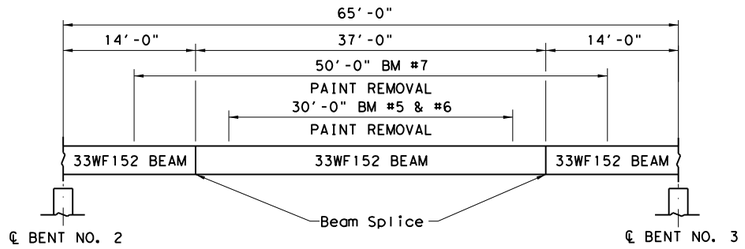
IH 10 Connector/Drain, 15-CULV-1

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT AUGUST ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		82

NBI: 15-015-0025-02-213



PLAN



ELEVATION

(1) Diaphragm Replacement/Repair

(2) Paint Removal

(3) Web Repair

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0784-6034	REP STL BRIDGE MEMBER (STRAIGHTEN MEMB)	EA	3
0784-6037	REP STL BRIDGE MEMBER (WEB REP)	EA	3
0784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	6
0780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	110

GENERAL NOTES:

Damaged areas shown in the details are approximate and for informational purposes only. Carefully examine areas needing repairs prior to beginning work.

Assume existing paint coating contains hazardous materials, unless otherwise noted

Notify TxDOT Bridge Division at least two weeks in advance by e-mailing BRG-FO-STL@txdot.gov prior to beginning work to allow for inspection of repairs by a Bridge Division structural steel inspector.

Use heat-straightening to repair and restore the shape of beams and diaphragms. Heat straighten the members in accordance with Item 784, "Steel Member Repair." Apply sufficient force combined with heat to accomplish work but do not fracture member. Repair additional damage caused by Contractor's operations at no additional cost to the Department. Removal and replacement of diaphragm members is an acceptable alternative to straightening.

Provide temporary supports and jacks to allow jacking of beam to restore contact of flange to bottom of deck.

Provide ASTM A709 steel with minimum Grade 36 in accordance with Item 442, "Metal for Structures" for new diaphragms.

Provide Type IX epoxy for gap injection in accordance with DMS 6100 "Epoxies and Adhesives."

Restore the paint protection for repaired beams and diaphragms with System IA per Item 446, "Field Cleaning and Painting Steel," and as directed by the Engineer. Match the appearance coat with the existing structure.

As-builts are provided for informational purposes only, Adjust as necessary for field conditions.

Payment for item 0780-6002 "CNC CRACK REPAIR (DISCRETE) (INJECTION)" is paying for both sides of top flange per beam.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

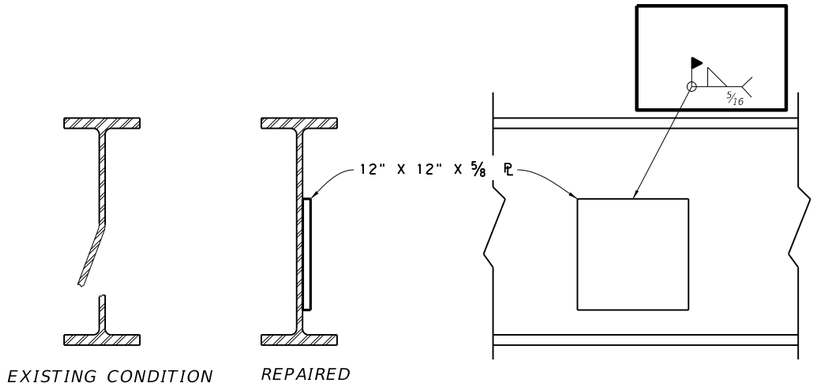
N.T.S. **Sheet 1 of 2**

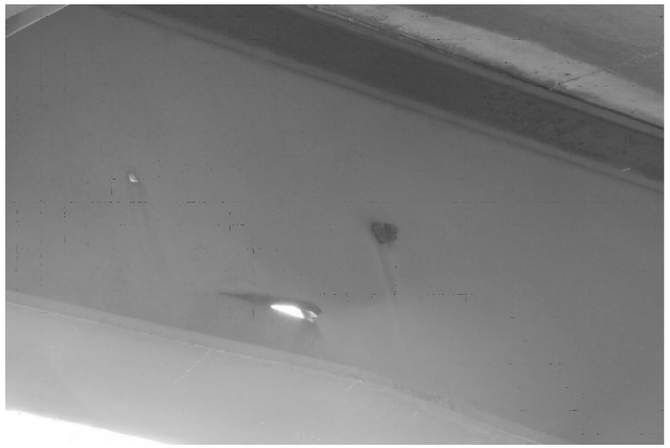
Texas Department of Transportation — San Antonio District

BEAM REPAIR

IH 10 WB/Loop 13, 15-BM_STL-2

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT AUGUST, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		83





WEB REPAIR (2)

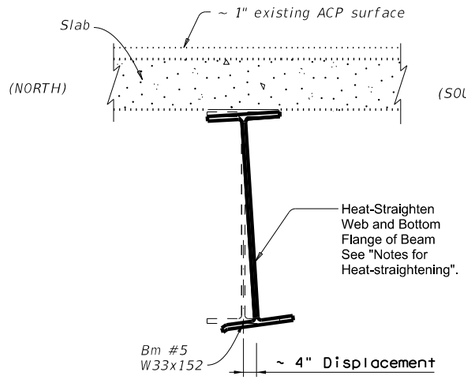
NOTE: Terminate welds 1/2" before corner of plate.

REPAIR PROCEDURE:

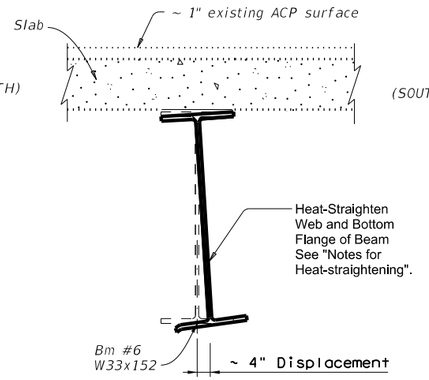
1. Remove paint prior to heat-straightening in heat effected zone.
2. Set traffic control. Close lanes on top of the bridge accordingly to not allow traffic closer than 3 beams from current repair.
3. Check gap (if any) between top of flange and bottom of deck for any debris and clear to allow complete contact to occur.
4. Remove damaged/torn away diaphragms in conflict with heat straightening.
5. Perform heat-straightening on Bm #5,#6, and #7 and bring beams to original alignment.
6. Re-place the diaphragms to Bm #5,#6, and #7 after the beam is restored in both shape and alignment.
7. Repair the slab concrete at cover plate locations and spalls in the bottom of slab along Bm #5,#6, and #7.
8. Perform epoxy injection to seal the gap or seams between the top flange of Bm #5,#6, and #7 and the slab on both sides.
9. Re-paint the steel repaired areas.
10. Resume the traffic as directed by the Engineer.

NOTES FOR HEAT-STRAIGHTENING:

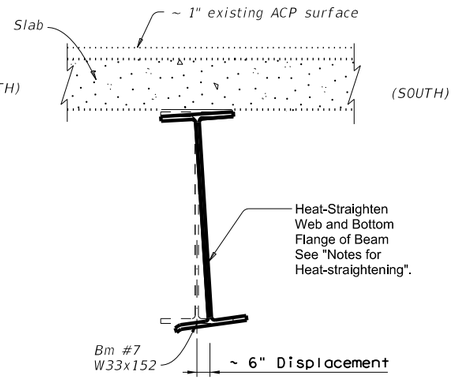
1. External Restraining Force:
   Apply mechanical force for external restraint only.
   Apply the force prior to heating the pattern area and in such way that restraining forces are relieved as straightening occurs during cooling.
2. Limit applied force as follows to prevent over-jacking:
   The maximum horizontal force for restraining laterally bent bottom flanges of Bm #5,#6, and #7 is 3,500 lbs;
   The maximum vertical force for restraining locally bent bottom flanges is 4,000 lbs.
3. Provide jacks with load indicating devices to assure that the maximum applied force is not exceeded.



SECTION OF DAMAGED BM #5



SECTION OF DAMAGED BM #6



SECTION OF DAMAGED BM #7

4/24/2023

N.T.S. Sheet 2 of 2

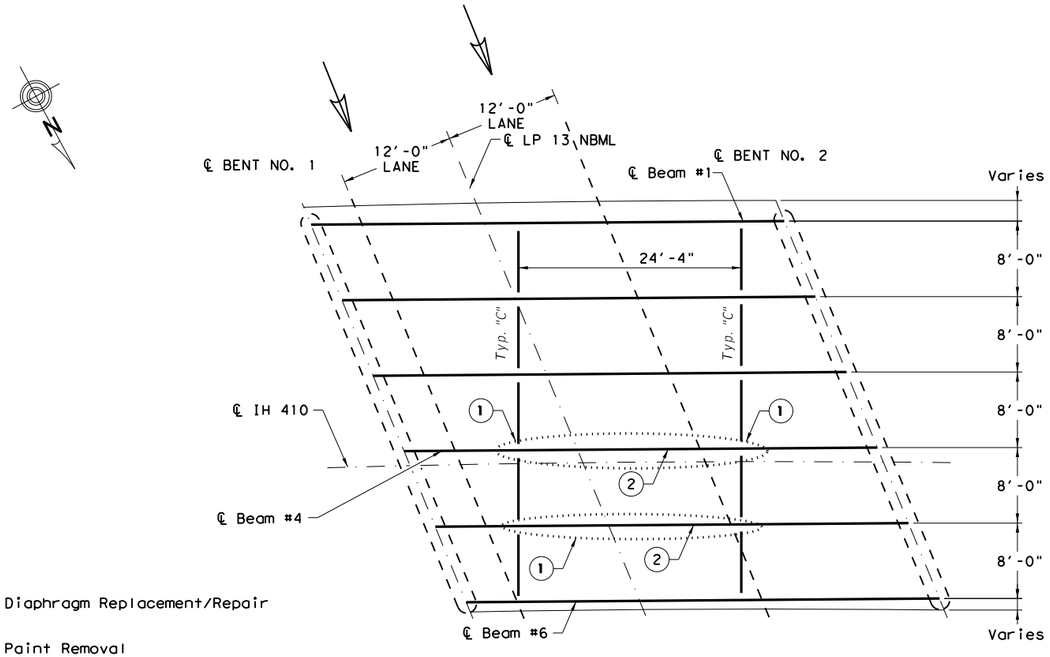
Texas Department of Transportation | San Antonio District

BEAM REPAIR

IH 10 WB/Loop 13, 15-BM_STL-2

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT AUGUST , 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		84

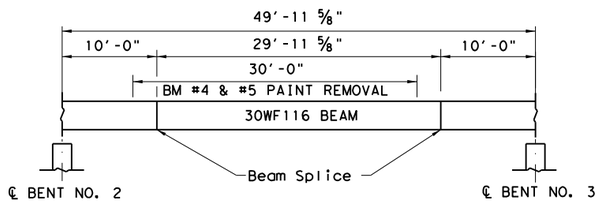
NBI: 15-015-0521-06-110



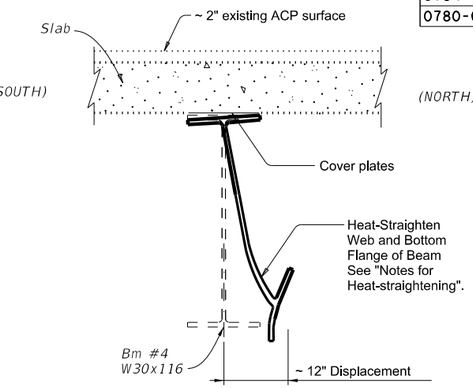
(1) Diaphragm Replacement/Repair

(2) Paint Removal

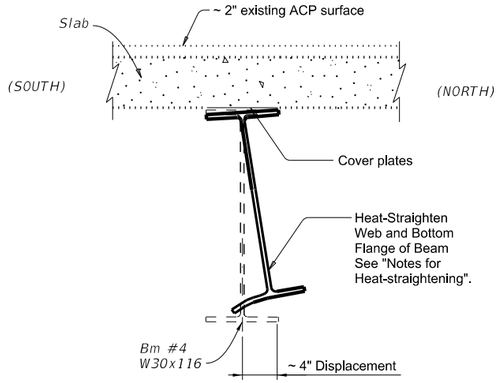
PLAN



ELEVATION



SECTION OF DAMAGED BM #4



SECTION OF DAMAGED BM #5

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	2
0784-6034	REP STL BRIDGE MEMBER(STRAIGHTEN MEMB)	EA	2
0780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	60

GENERAL NOTES:

Damaged areas shown in the details are approximate and for informational purposes only. Carefully examine areas needing repairs prior to beginning work.

Assume existing paint coating contains hazardous materials, unless otherwise noted

Notify TxDOT Bridge Division at least two weeks in advance by e-mailing BRG-FO-STL@txdot.gov prior to beginning work to allow for inspection of repairs by a Bridge Division structural steel inspector.

Use heat-straightening to repair and restore the shape of beams and diaphragms. Heat straighten the members in accordance with Item 784, "Steel Member Repair." Apply sufficient force combined with heat to accomplish work but do not fracture member. Repair additional damage caused by Contractor's operations at no additional cost to the Department. Removal and replacement of diaphragm members is an acceptable alternative to straightening.

Provide temporary supports and jacks to allow jacking of beam to restore contact of flange to bottom of deck.

Provide ASTM A709 steel with minimum Grade 36 in accordance with Item 442, "Metal for Structures" for new diaphragms.

Provide Type IX epoxy for gap injection in accordance with DMS 6100 "Epoxies and Adhesives."

Restore the paint protection for repaired beams and diaphragms with System IA per Item 446, "Field Cleaning and Painting Steel," and as directed by the Engineer. Match the appearance coat with the existing structure.

As-builts are provided for informational purposes only, Adjust as necessary for field conditions.

Payment for item 0780-6002 "CNC CRACK REPAIR (DISCRETE)(INJECTION)" is paying for both sides of top flange per beam.

REPAIR PROCEDURE:

1. Remove paint prior to heat-straightening in the heat effected zone
2. Set traffic control. Close lanes on top of the bridge accordingly to not allow traffic closer than 3 beams from the current repair
3. Check gap (if any) between top of flange and bottom of deck for any dibris and clear to allow complete contact to occur.
4. Remove damaged/torn away diaphragms in conflict with heat straightening.
5. Perform heat-straightening on Bm #4 and #5 and bring beams to original alignment.
6. Replace/repair the diaphragms to Bm #4 and #5 after the beam is restored in both shape and alignment.
7. Repair the slab concrte at cover plate locations and spalls in the bottom of slab along Bm #4 and #5.
8. Perform epoxy injection to seal the gap or seams between the top flange of Bm #4 and #5, and the slab on both sides.
9. Re-paint the steel repaired areas.
10. Resume the traffic as directed by the engineer.

NOTES FOR HEAT-STRAIGHTENING:

1. External Restraining Force:
   Apply mechanical force for external restraint only. Apply the force prior to heating the pattern area and in such way that restraining forces are relieved as straightening occurs during cooling.
2. Limit applied force as follows to prevent over-jacking:
   The maximum horizontal force for restraining laterally bent bottom flanges of Bm #4 an #5 is 3,500 lbs;
   The maximum vertical force for restraining locally bent bottom flanges is 4,000 lbs.
3. Provide jacks with load indicating devices to assure that the maximum applied force is not exceeded.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

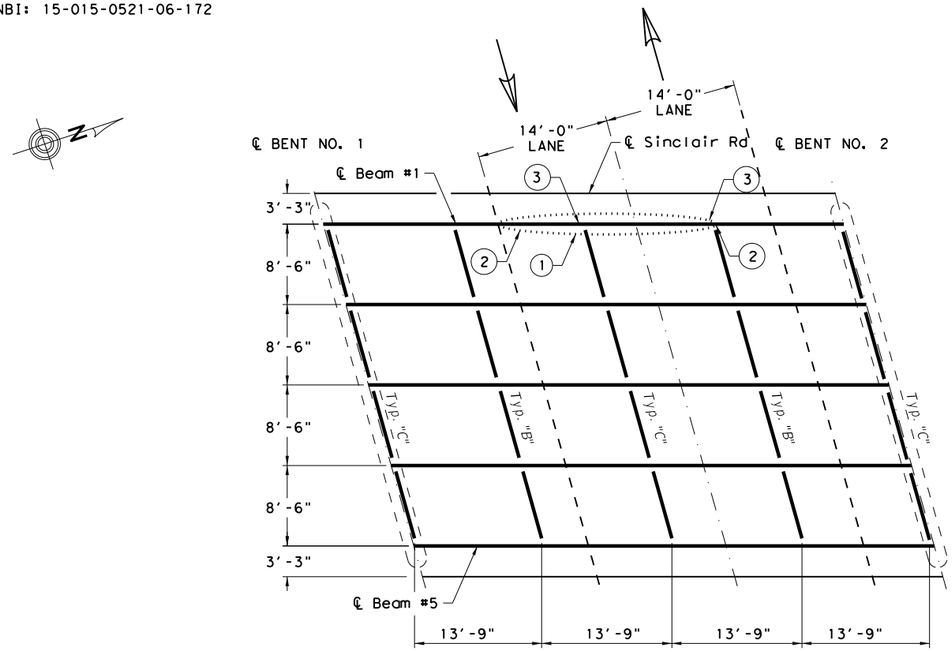
San Antonio District

BEAM REPAIR

IH 410 SB at Connector F,
15-BM_STL-3

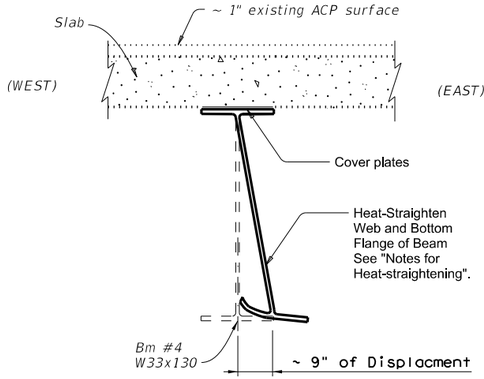
FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT AUGUST ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 410
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		85

NBI: 15-015-0521-06-172



℄ IH 410

PLAN



SECTION OF DAMAGED BM #1

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	1
0784-6034	REP STL BRIDGE MEMBER(STRAIGHTEN MEMB)	EA	1
0784-6037	REP STL BRIDGE MEMBER (WEB REP)	EA	2
0780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	41

GENERAL NOTES:

Damaged areas shown in the details are approximate and for informational purposes only. Carefully examine areas needing repairs prior to beginning work.

Assume existing paint coating contains hazardous materials, unless otherwise noted

Notify TxDOT Bridge Division at least two weeks in advance by e-mailing BRG-FO-STL@txdot.gov prior to beginning work to allow for inspection of repairs by a Bridge Division structural steel inspector.

Use heat-straightening to repair and restore the shape of beams and diaphragms. Heat straighten the members in accordance with Item 784, "Steel Member Repair." Apply sufficient force combined with heat to accomplish work but do not fracture member. Repair additional damage caused by Contractor's operations at no additional cost to the Department. Removal and replacement of diaphragm members is an acceptable alternative to straightening.

Provide temporary supports and jacks to allow jacking of beam to restore contact of flange to bottom of deck.

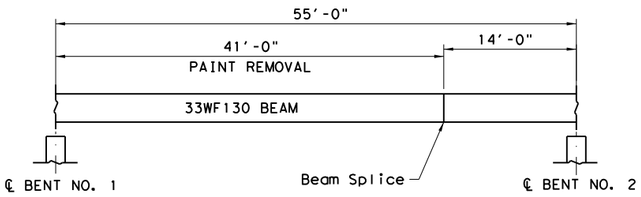
Provide ASTM A709 steel with minimum Grade 36 in accordance with Item 442, "Metal for Structures" for new diaphragms.

Provide Type IX epoxy for gap injection in accordance with DMS 6100 "Epoxies and Adhesives."

Restore the paint protection for repaired beams and diaphragms with System IA per Item 446, "Field Cleaning and Painting Steel," and as directed by the Engineer. Match the appearance coat with the existing structure.

As-builts are provided for informational purposes only, Adjust as necessary for field conditions.

Payment for item 0780-6002 "CNC CRACK REPAIR (DISCRETE) (INJECTION)" is paying for both sides of top flange per beam.



ELEVATION

1. Diaphragm Replacement/Repair
2. Paint Removal
3. Web Repair

N.T.S.

REPAIR PROCEDURE:

1. *Remove paint prior to heat-straightening in the heat effected zone*
2. *Set traffic control. Close lanes on top of the bridge accordingly to not allow traffic closer than 3 beams from the current repair*
3. *Check gap (if any) between top of flange and bottom of deck for any dibris and clear to allow complete contact to occur.*
4. *Remove damaged/torn away diaphragms in conflict with heat straightening.*
5. *Perform heat-straightening on Bm #1 and bring beams to original alignment.*
6. *Replace/repair the diaphragms to Bm #1 after the beam is restored in both shape and alignment.*
7. *Repair the slab concrte at cover plate locations and spalls in the bottom of slab along Bm #1.*
8. *Perform epoxy injection to seal the gap or seams between the top flange of Bm #1 and the slab on both sides.*
9. *Re-paint the steel repaired areas.*
10. *Resume the traffic as directed by the engineer.*

NOTES FOR HEAT-STRAIGHTENING:

1. *External Restraining Force: Apply mechanical force for external restraint only. Apply the force prior to heating the pattern area and in such way that restraining forces are relieved as straightening occurs during cooling.*
2. *Limit applied force as follows to prevent over-jacking: The maximum horizontal force for restraining laterally bent bottom flanges of Bm #1 is 3,500 lbs; The maximum vertical force for restraining locally bent bottom flanges is 4,000 lbs.*
3. *Provide jacks with load indicating devices to assure that the maximum applied force is not exceeded.*

4/24/2023

Texas Department of Transportation — San Antonio District

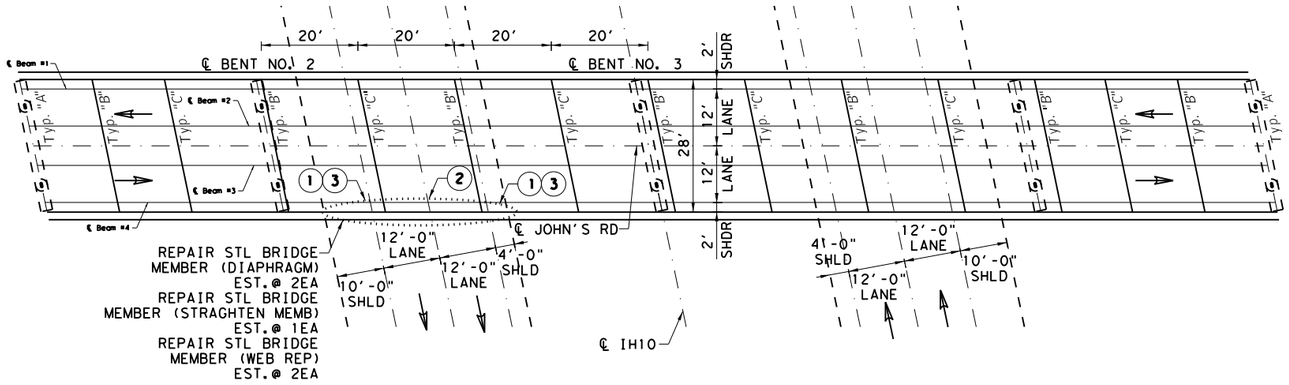
BEAM REPAIR

IH 410 SB/Sinclair Road,
15-BM_STL-4

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT AUGUST ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 410
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		86

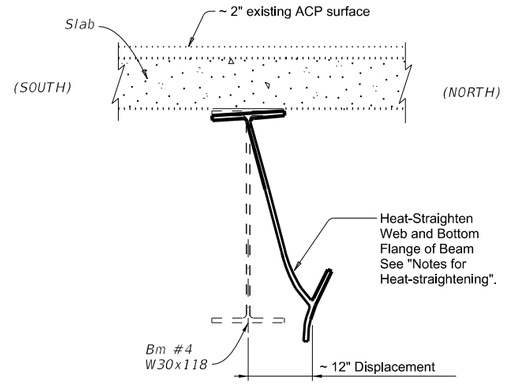
NBI: 15-131-0072-06-131

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0784-6003	REP STL BRIDGE MEMBER (DIAPHRAGM)	EA	2
0784-6034	REP STL BRIDGE MEMBER(STRAIGHTEN MEMB)	EA	1
0784-6037	REP STL BRIDGE MEMBER (WEB REP)	EA	2
0780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	40

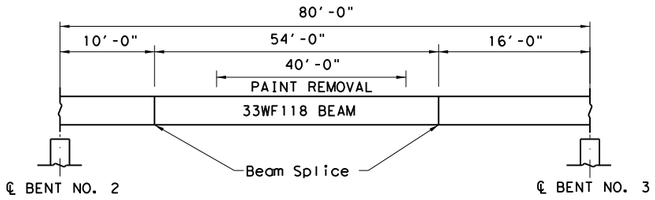


PLAN

1. Diaphragm Replacement/Repair
2. Paint Removal
3. Web Repair



SECTION OF DAMAGED BM #4



ELEVATION

REPAIR PROCEDURE:

1. Remove paint prior to heat-straightening in the heat effected zone
2. Set traffic control. Close lanes on top of the bridge accordingly to not allow traffic closer than 3 beams from the current repair
3. Check gap (if any) between top of flange and bottom of deck for any dibris and clear to allow complete contact to occur.
4. Remove damaged/torn away diaphragms in conflict with heat straightening.
5. Perform heat-straightening on Bm #4 and bring beams to original alignment.
6. Replace/repair the diaphragms to Bm #4 after the beam is restored in both shape and alignment.
7. Repair the slab concrte at cover plate locations and spalls in the bottom of slab along Bm #4.
8. Perform epoxy injection to seal the gap or seams between the top flange of Bm #4 and the slab on both sides.
9. Re-paint the steel repaired areas.
10. Resume the traffic as directed by the engineer.

NOTES FOR HEAT-STRAIGHTENING:

1. External Restraining Force:
   Apply mechanical force for external restraint only.
   Apply the force prior to heating the pattern area and in such way that restraining forces are relieved as straightening occurs during cooling.
2. Limit applied force as follows to prevent over-jacking:
   The maximum horizontal force for restraining laterally bent bottom flanges of Bm #4 is 3,500 lbs;
   The maximum vertical force for restraining locally bent bottom flanges is 4,000 lbs.
3. Provide jacks with load indicating devices to assure that the maximum applied force is not exceeded.

GENERAL NOTES:

Damaged areas shown in the details are approximate and for informational purposes only. Carefully examine areas needing repairs prior to beginning work.

Assume existing paint coating contains hazardous materials, unless otherwise noted

Notify TxDOT Bridge Division at least two weeks in advance by e-mailing BRG-FO-STL@txdot.gov prior to beginning work to allow for inspection of repairs by a Bridge Division structural steel inspector.

Use heat-straightening to repair and restore the shape of beams and diaphragms. Heat straighten the members in accordance with Item 784, "Steel Member Repair." Apply sufficient force combined with heat to accomplish work but do not fracture member. Repair additional damage caused by Contractor's operations at no additional cost to the Department. Removal and replacement of diaphragm members is an acceptable alternative to straightening.

Provide temporary supports and jacks to allow jacking of beam to restore contact of flange to bottom of deck.

Provide ASTM A709 steel with minimum Grade 36 in accordance with Item 442, "Metal for Structures" for new diaphragms.

Provide Type IX epoxy for gap injection in accordance with DMS 6100 "Epoxies and Adhesives."

Restore the paint protection for repaired beams and diaphragms with System IA per Item 446, "Field Cleaning and Painting Steel," and as directed by the Engineer. Match the appearance coat with the existing structure.

As-builts are provided for informational purposes only, Adjust as necessary for field conditions.

Payment for item 0780-6002 "CNC CRACK REPAIR (DISCRETE) (INJECTION)" is paying for both sides of top flange per beam.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

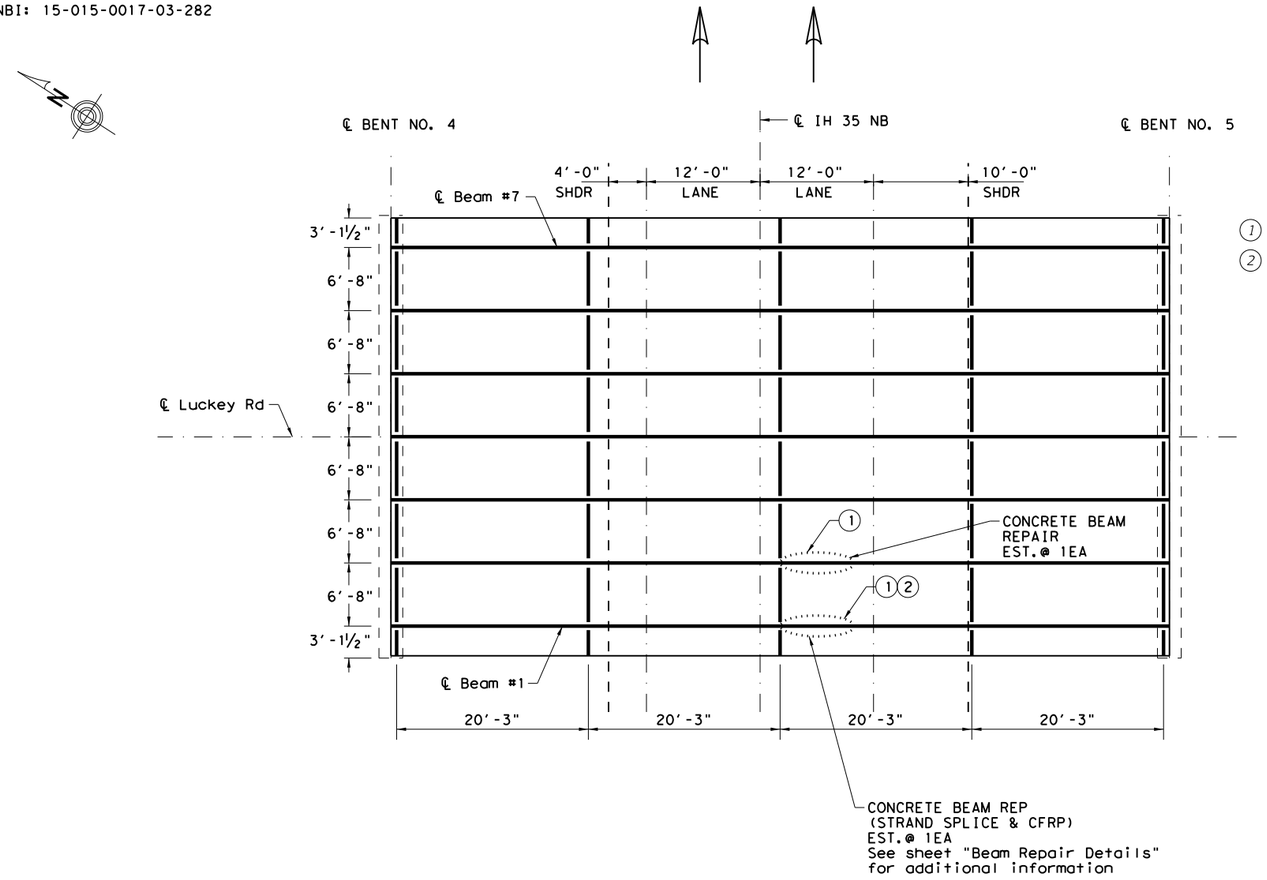
BEAM REPAIR

IH 10/Johns Rd, 131-BM_STL-5

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT AUGUST ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		87

NBI: 15-015-0017-03-282

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0788-6001	CONCRETE BEAM REPAIR	EA	1
0788-6003	CONCRETE BEAM REP(STRAND SPLICE & CFRP)	EA	1



(1) *Remove existing damaged and delaminated concrete.*

(2) *Splice severed strands in accordance with Item 788, "Concrete Beam Repair", and plan sheets "STRAND SPLICING INSTALLATION". Offset splice locations to reduce congestion.*

MATERIAL NOTES:

Choose a FRP system prequalified for Structural Member Protection that meets the requirements of DMS 4700, "Externally Bonded Fiber Reinforced Polymer (FRP) System for Repairing and Strengthening Concrete Structure Members".

Perform CFRP pull-off test according to Item 786, "Carbon Fiber Reinforced Polymer" in the presence of the Engineer.

Use Type C concrete repair material listed on the material producer list per DMS 4655.

GENERAL NOTES:

Refer to TxDOT's Concrete Repair Manual, Chapter 3, Section 5 for details on Epoxy Injection.

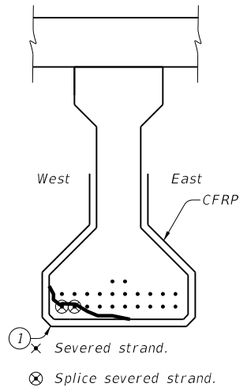
All work for repairing and protecting the beam is paid for in accordance with Item 788, "Concrete Beam Repair".

The strand-splice assembly and dimensions depicted in the repair detail are for the GRABB-IT Cable Splice system as sold by Prestress Supply, Inc. Contractor may propose other strand-splice systems to Engineer for approval.

Damage locations and quantities are based on field assessment performed on 8/5/22. Verify extent of damage and repairs prior to proceeding. Immediately notify Engineer if any discrepancies are noted between the plans and actual conditions.

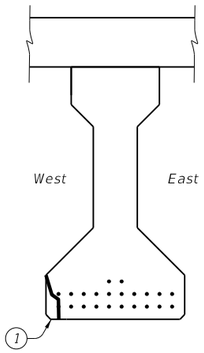
Submit detailed repair procedures, including proposed proprietary materials, for approval prior to beginning work.

Open roadway to traffic after obtaining 3,000 psi.



BEAM #1 DAMAGE

Showing concrete beam repair and strand splicing locations. Remove enough concrete to provide adequate clearance for splices.



BEAM #2 DAMAGE

Showing concrete beam repair and strand splicing locations. Remove enough concrete to provide adequate clearance for splices.

4/24/2023

N.T.S.

Texas Department of Transportation — San Antonio District

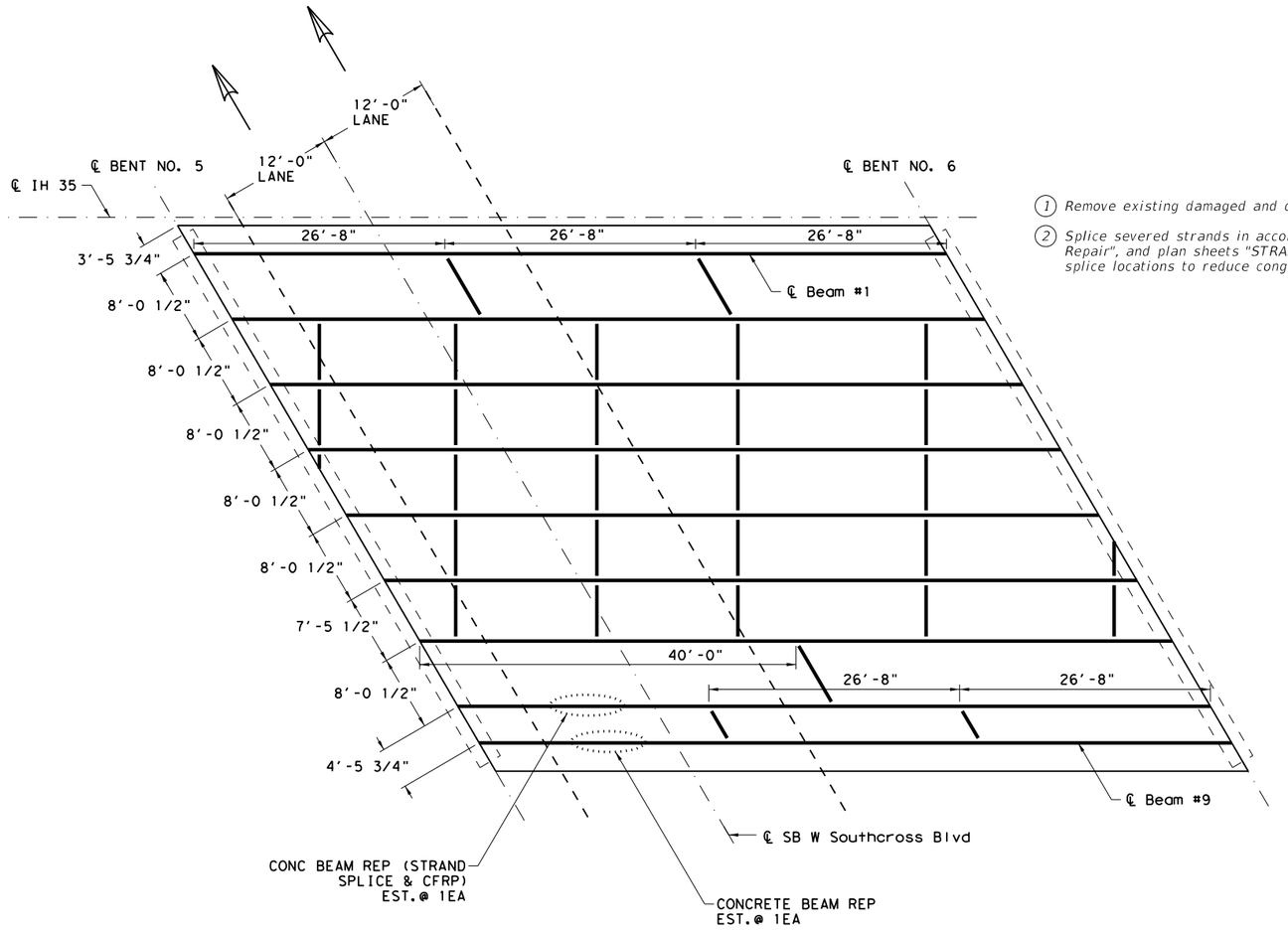
BEAM REPAIR

IH 35/Luckey Road, 15-BM_CNC-6

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		88

NBI: 15-015-0017-09-127

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0788-6001	CONCRETE BEAM REPAIR	EA	1
0788-6003	CONCRETE BEAM REP (STRAND SPLICE & CFRP)	EA	1



(1) *Remove existing damaged and delaminated concrete.*

(2) *Splice severed strands in accordance with Item 788, "Concrete Beam Repair", and plan sheets "STRAND SPLICING INSTALLATION". Offset splice locations to reduce congestion.*

MATERIAL NOTES:

Choose a FRP system prequalified for Structural Member Protection that meets the requirements of DMS 4700, "Externally Bonded Fiber Reinforced Polymer (FRP) System for Repairing and Strengthening Concrete Structure Members".

Perform CFRP pull-off test according to Item 786, "Carbon Fiber Reinforced Polymer" in the presence of the Engineer.

Use Type C concrete repair material listed on the material producer list per DMS 4655.

GENERAL NOTES:

Refer to TxDOT's Concrete Repair Manual, Chapter 3, Section 5 for details on Epoxy Injection.

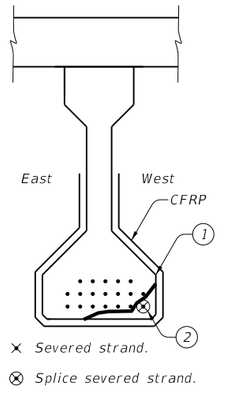
All work for repairing and protecting the beam is paid for in accordance with Item 788, "Concrete Beam Repair".

The strand-splice assembly and dimensions depicted in the repair detail are for the GRABB-IT Cable Splice system as sold by Prestress Supply, Inc. Contractor may propose other strand-splice systems to Engineer for approval.

Damage locations and quantities are based on field assessment performed on 8/5/22. Verify extent of damage and repairs prior to proceeding. Immediately notify Engineer if any discrepancies are noted between the plans and actual conditions.

Submit detailed repair procedures, including proposed proprietary materials, for approval prior to beginning work.

Open roadway to traffic after obtaining 3,000 psi.

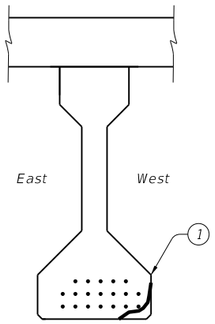


× *Severed strand.*

⊗ *Splice severed strand.*

BEAM #8 DAMAGE

Showing concrete beam repair and strand splicing locations. Remove enough concrete to provide adequate clearance for splices.



BEAM #9 DAMAGE

Showing concrete beam repair and strand splicing locations. Remove enough concrete to provide adequate clearance for splices.

4/24/2023

N.T.S.

Texas Department of Transportation — San Antonio District

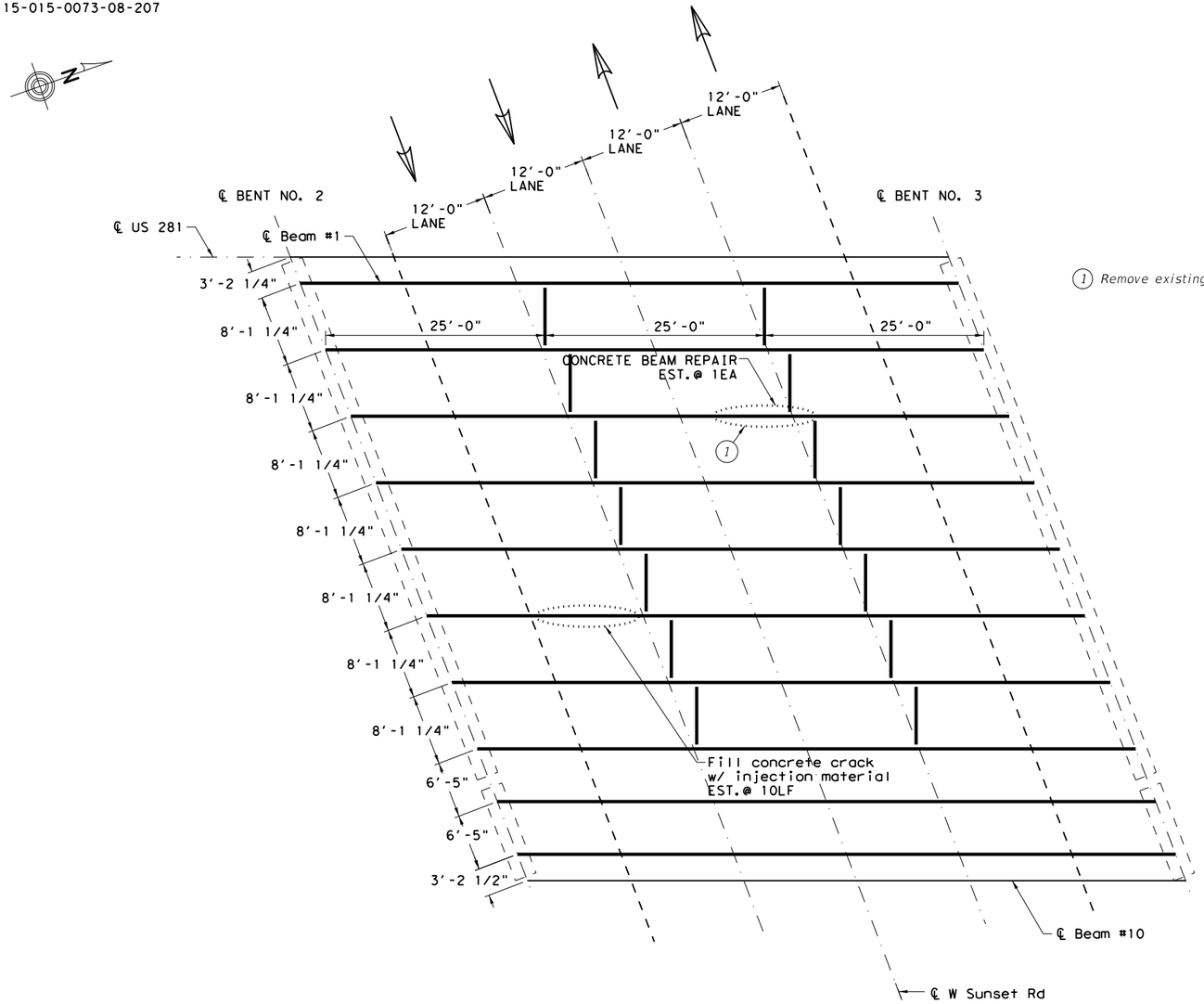
BEAM REPAIR

IH 35 SB/Southcross Blvd,
15-BM_CNC-7

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		89

NBI: 15-015-0073-08-207

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	10
0788-6001	CONCRETE BEAM REPAIR	EA	1



(1) *Remove existing damaged and delaminated concrete.*

MATERIAL NOTES:

Choose a FRP system prequalified for Structural Member Protection that meets the requirements of DMS 4700, "Externally Bonded Fiber Reinforced Polymer (FRP) System for Repairing and Strengthening Concrete Structure Members".

Perform CFRP pull-off test according to Item 786, "Carbon Fiber Reinforced Polymer" in the presence of the Engineer.

Use Type C concrete repair material listed on the material producer list per DMS 4655.

GENERAL NOTES:

Refer to TxDOT's Concrete Repair Manual, Chapter 3, Section 5 for details on Epoxy Injection.

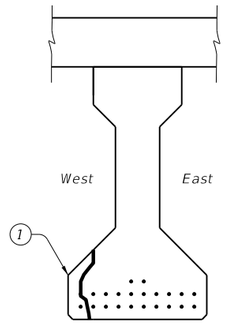
All work for repairing and protecting the beam is paid for in accordance with Item 788, "Concrete Beam Repair".

The strand-splice assembly and dimensions depicted in the repair detail are for the GRABB-IT Cable Splice system as sold by Prestress Supply, Inc. Contractor may propose other strand-splice systems to Engineer for approval.

Damage locations and quantities are based on field assessment performed on 8/5/22. Verify extent of damage and repairs prior to proceeding. Immediately notify Engineer if any discrepancies are noted between the plans and actual conditions.

Submit detailed repair procedures, including proposed proprietary materials, for approval prior to beginning work.

Open roadway to traffic after obtaining 3,000 psi.



BEAM #1 DAMAGE

Showing concrete beam repair and strand splicing locations. Remove enough concrete to provide adequate clearance for splices.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

N.T.S.

Texas Department of Transportation

San Antonio District

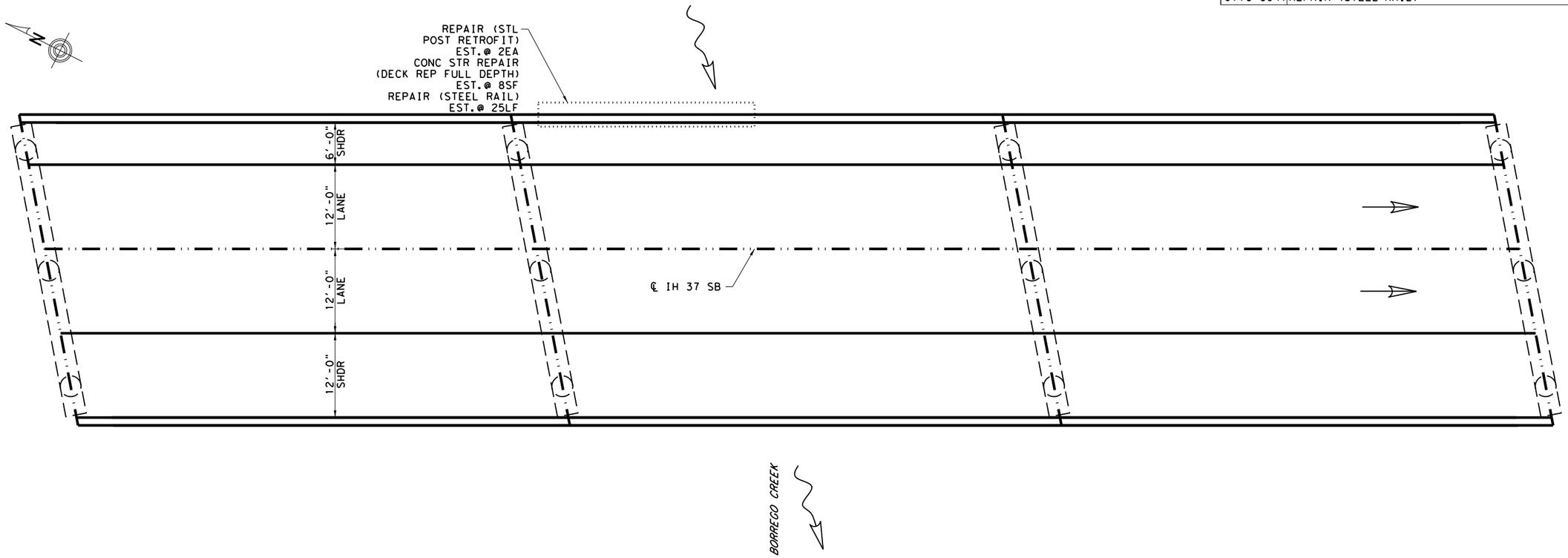
BEAM REPAIR

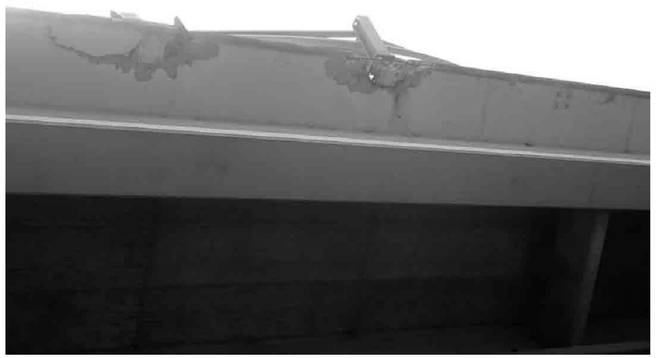
US 281 NB/Sunset Road, 15-BM_CNC-8

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		90

NBI: 15-007-0073-06-166

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP FULL DEPTH)	SF	8
0776-6036	REPAIR (STL POST RETROFIT)	EA	2
0776-6041	REPAIR (STEEL RAIL)	LF	25





GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Type B concrete repair material listed on the material producer list per DMS 4655.

Deck slab repair should be constructed in accordance with item 429.

See sheet "T1 Rail Repair Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

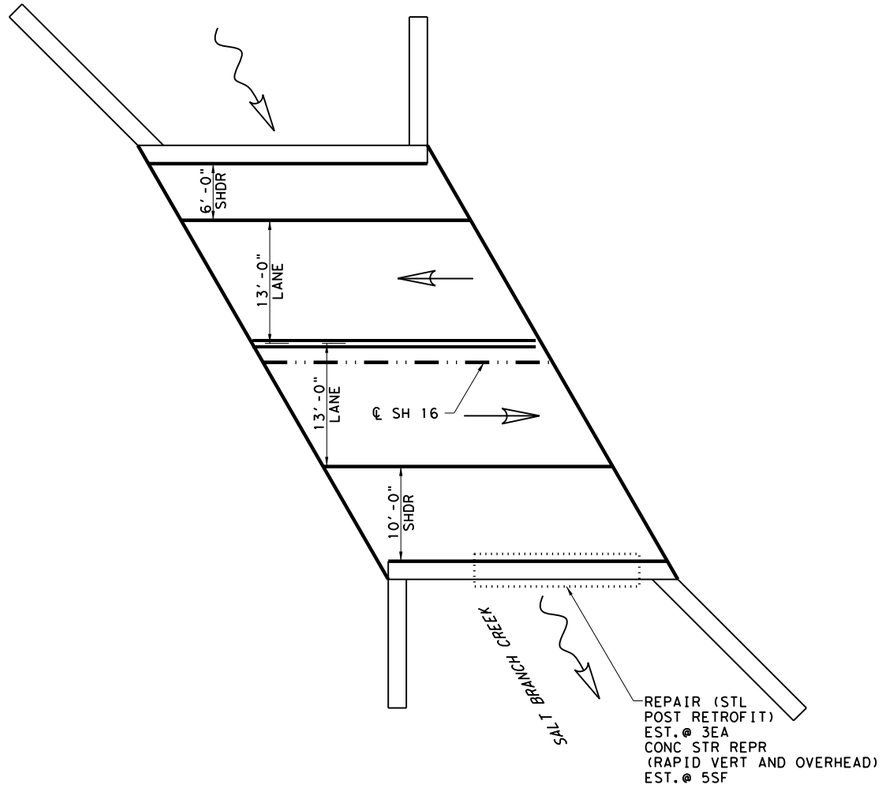
BRIDGE RAIL REPAIR

IH 37 SB/Borrego Creek, 7-RAIL_STL-13

FILE:	DN: MER	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 37
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		95

NBI: 15-007-0613-02-003

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6008	CONC STR REPR(RAPID VERT AND OVERHEAD)	SF	5
0776-6036	REPAIR (STL POST RETROFIT)	EA	3



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Type B concrete repair material listed on the material producer list per DMS 4655.

Headwall repair should be constructed in accordance with item 429.

See sheet "Type 'P' Rail Repair Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

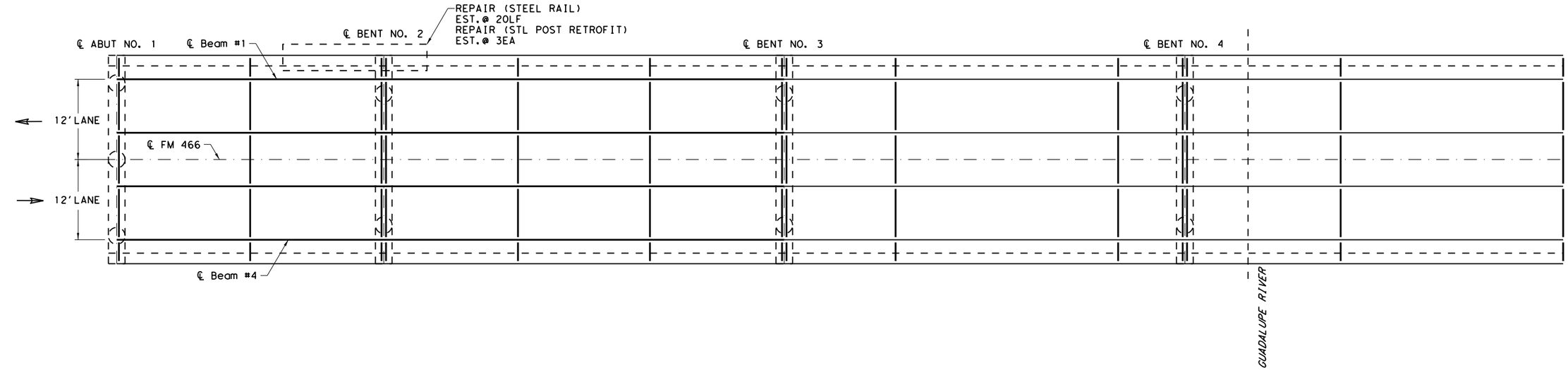
BRIDGE RAIL REPAIR

SH 16/Salt Branch, 7-RAIL_STL-14

FILE:	DN: MER	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	SH 16
	DIST	COUNTY		SHEET NO.
	SAT	ATASCOSA		96

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0776-6036	REPAIR (STL POST RETROFIT)	EA	3
0776-6041	REPAIR (STEEL RAIL)	LF	20

NBI: 15-095-0016-03-013



GENERAL NOTES:

See sheet "Type T2 Steel Rail Details".

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

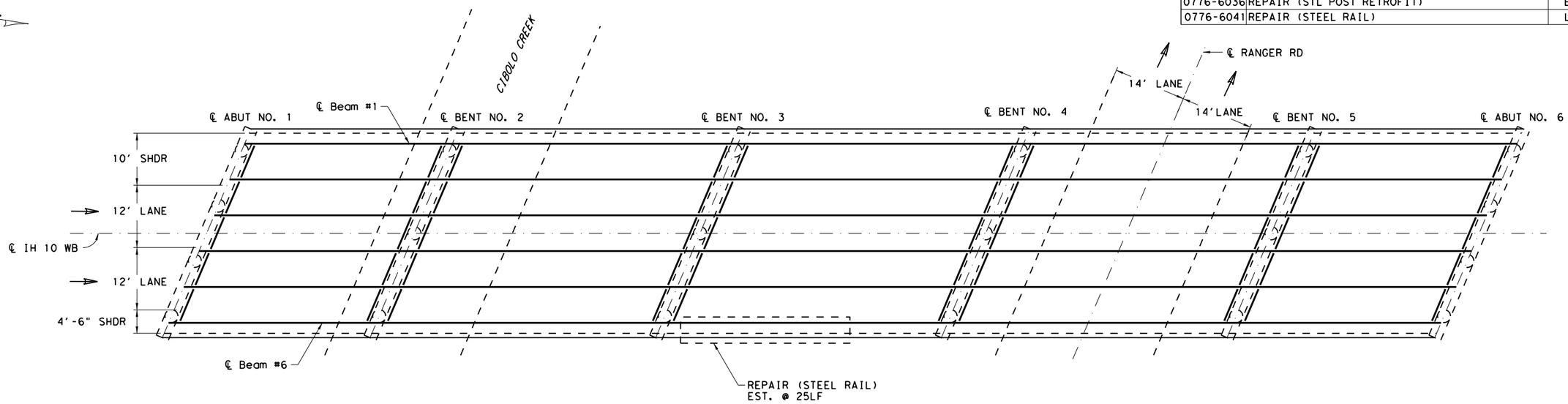
BRIDGE RAIL REPAIR

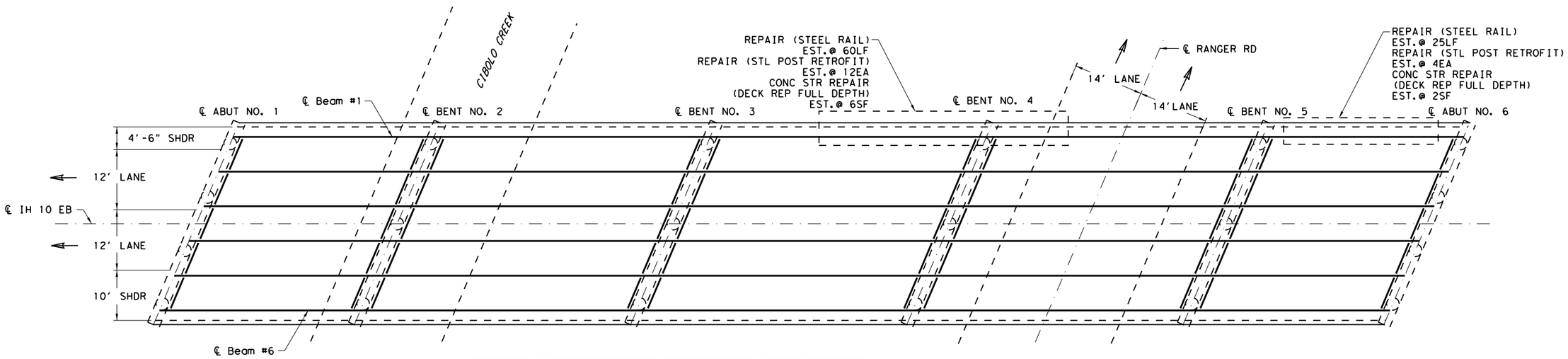
FM 466/Guadalupe River, 95-RAIL_STL-15

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	FM 466
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		97

NBI: 15-131-0072-05-126 (WB)
NBI: 15-131-0072-05-127 (EB)

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP FULL DEPTH)	SF	8
0776-6036	REPAIR (STL POST RETROFIT)	EA	16
0776-6041	REPAIR (STEEL RAIL)	LF	110





NBI: 15-131-0072-05-126 (WB)

GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Deck slab repair should be constructed in accordance with item 429.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

GENERAL NOTES:

See "Traffic Rail Type T6" sheets for anchorage and placement details.

N.T.S.

Texas Department of Transportation

San Antonio District

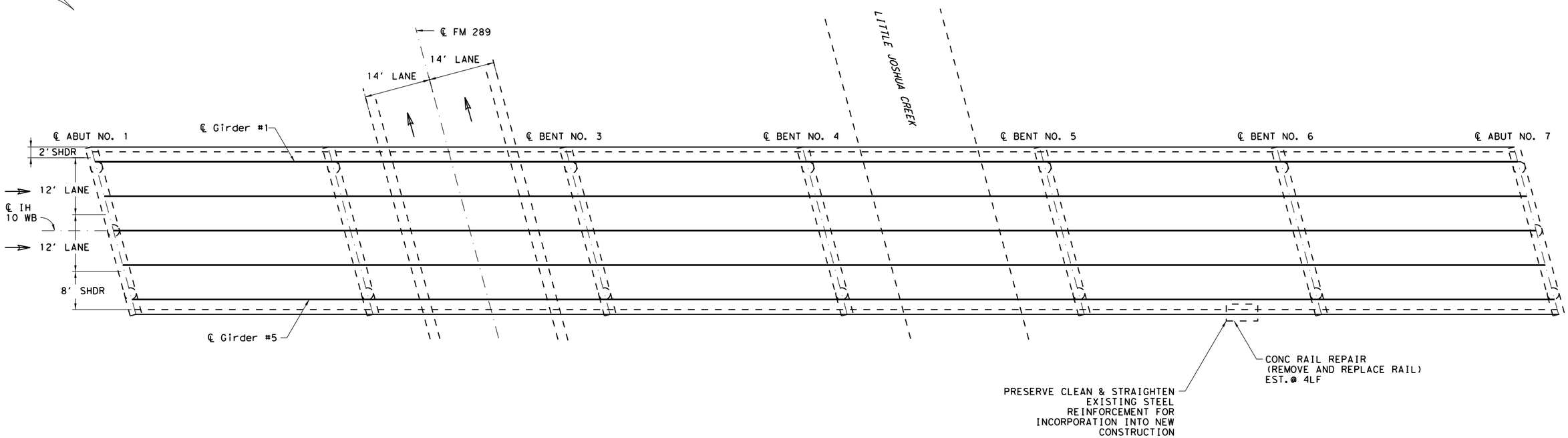
BRIDGE RAIL REPAIR

IH 10 WBML/EBML/Cibolo Creek & Ranger Road, 131-RAIL_STL-16&17

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		98

NBI: 15-131-0072-05-165

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0778-6075	CONC RAIL REPAIR(REMOVE AND REPLACE RAIL)	LF	4



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Removal and disposal of existing railing shall be in accordance with Item 452, "Removing Railing". New Railing shall be in accordance with Item 450, "Railing".

See sheet "Type T2 Concrete Rail Details".

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

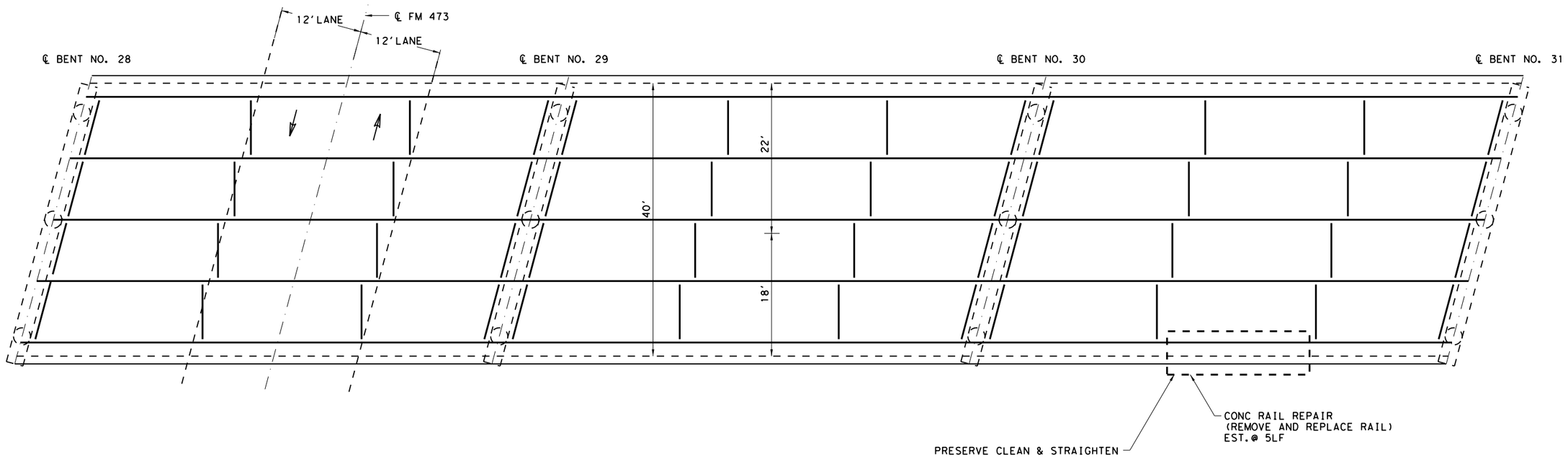
BRIDGE RAIL REPAIR

IH 10 WBML/Little Joshua Creek & FM 289, 131-RAIL_CNC-18

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		99

NBI: 15-131-0072-05-174

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0778-6075	CONC RAIL REPAIR(REMOVE AND REPLACE RAIL)	LF	5



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Removal and disposal of existing railing shall be in accordance with Item 452, "Removing Railing". New Railing shall be in accordance with Item 450, "Railing".

See sheet "Type T2 Concrete Rail Details".

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

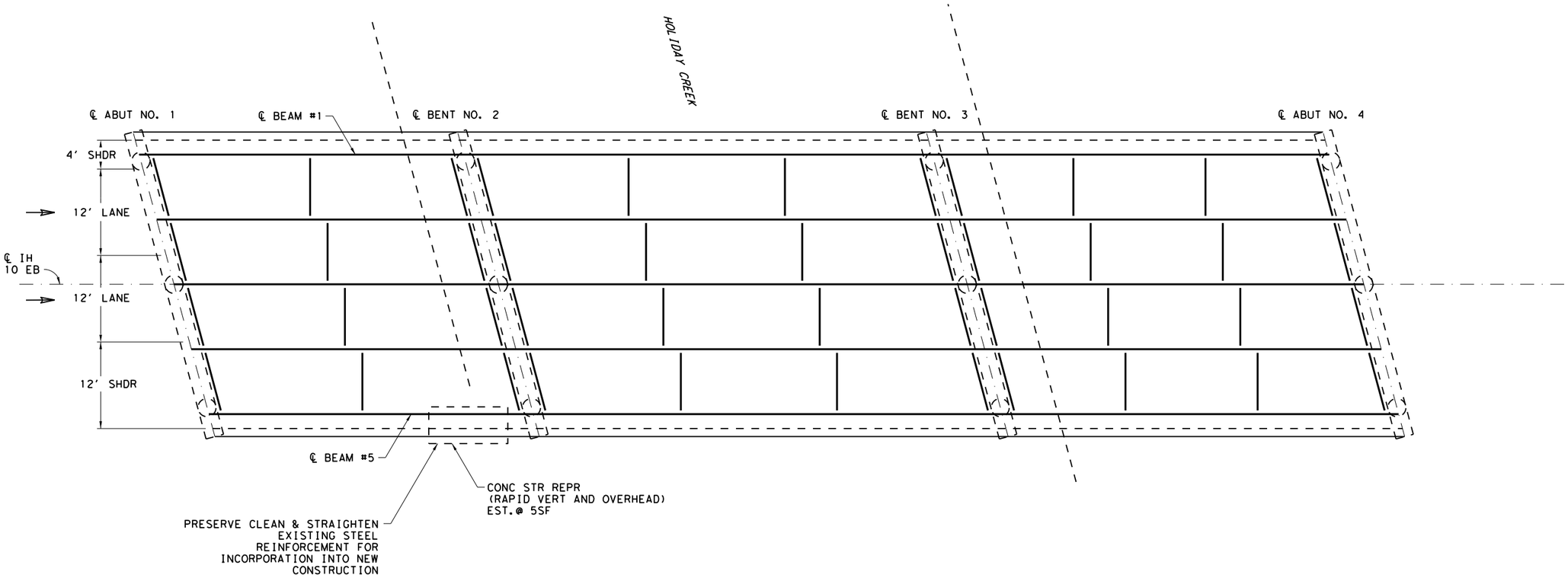
BRIDGE RAIL REPAIR

IH 10 EBML/Guadalupe River & FM 473 and FM 1621, 131-RAIL_CNC-19

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		100

NBI: 15-131-0072-05-178

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6008	CONC STR REPR(RAPID VERT AND OVERHEAD)	SF	5



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.
All concrete for new construction shall be Class "C".
All reinforcing steel shall be Grade 60.
Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.
Use Tybe B concrete repair material listed on the material producer list per DMS 4655.
Removal and disposal of existing railing shall be in accordance with Item 452, "Removing Railing". New Railing shall be in accordance with Item 450, "Railing".

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation — San Antonio District

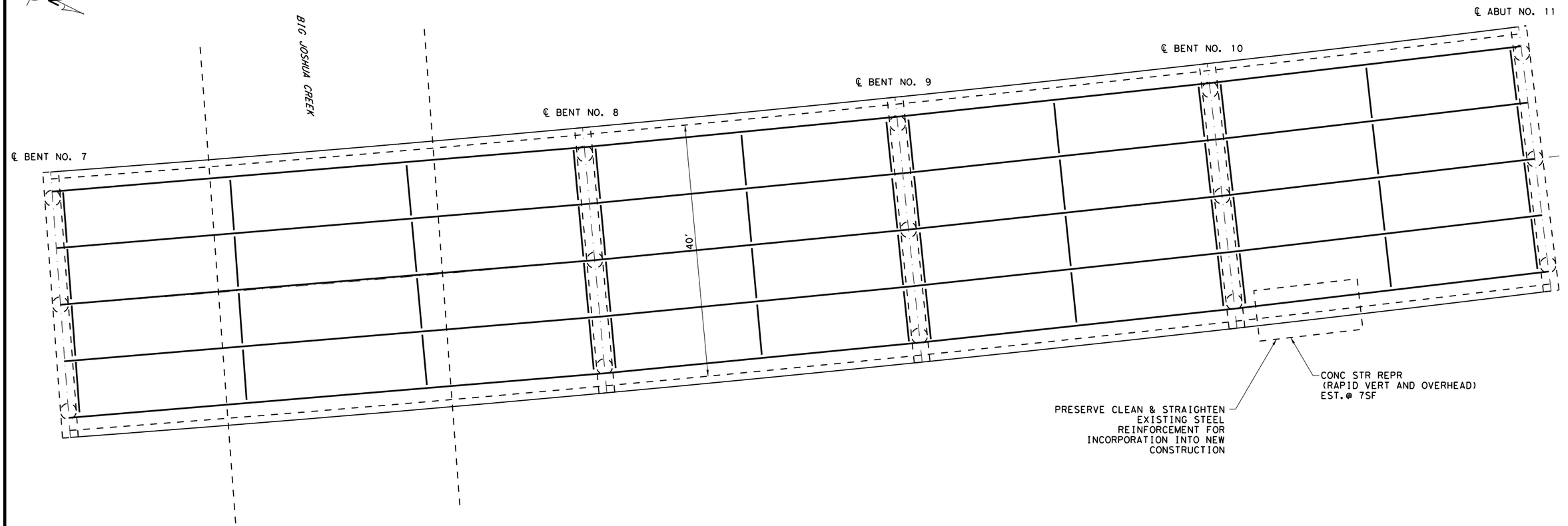
BRIDGE RAIL REPAIR

IH 10 EBML/Holiday Creek, 131-RAIL_CNC-20

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		101

NBI: 15-131-0072-05-182

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6008	CONC STR REPR(RAPID VERT AND OVERHEAD)	SF	7



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Removal and disposal of existing railing shall be in accordance with Item 452, "Removing Railing". New Railing shall be in accordance with Item 450, "Railing".

N.T.S.

STATE OF TEXAS
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4/24/2023

Texas Department of Transportation

San Antonio District

BRIDGE RAIL REPAIR

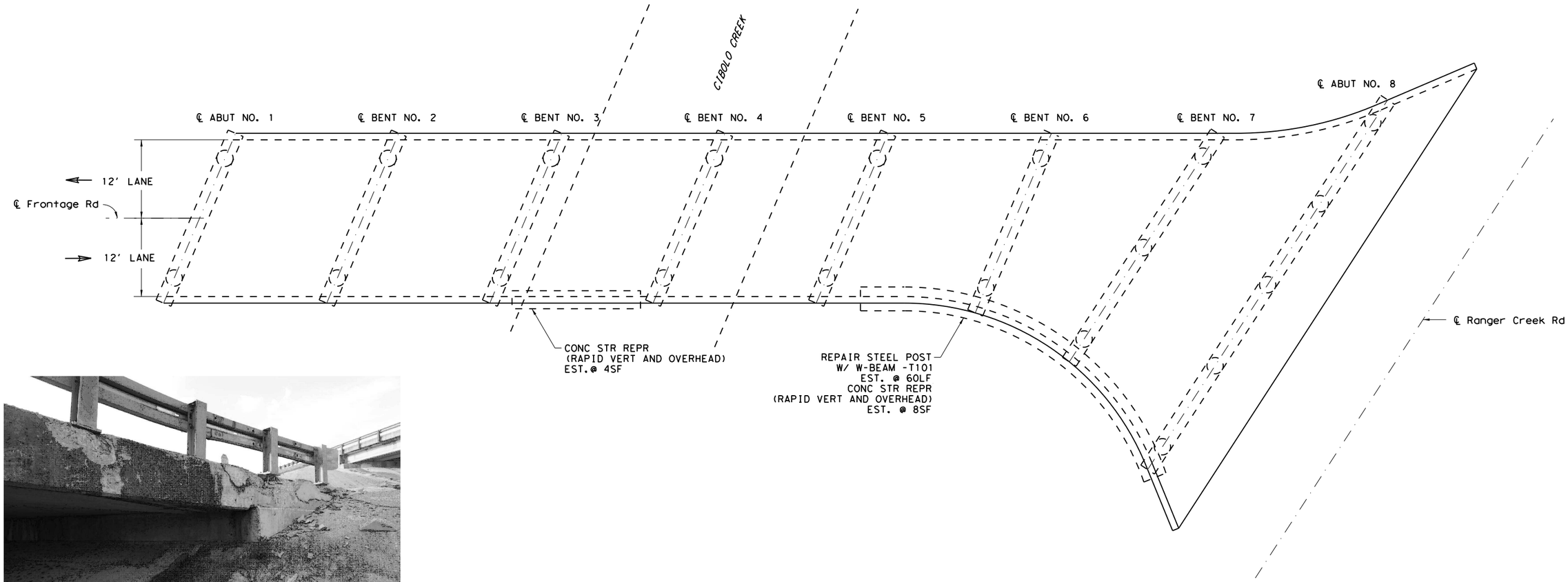
IH 10 WBML/Big Joshua Creek, 131-RAIL_CNC-21

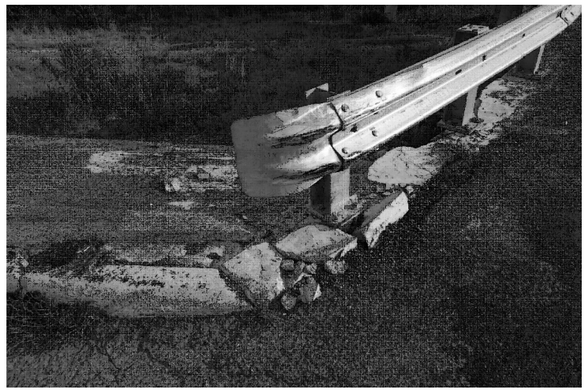
FILE:	DN:	CK:	DW:	CK:
© TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		102

NBI: 15-131-0072-05-200

N

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6008	CONC STR REPR (RAPID VERT AND OVERHEAD)	SF	12
0776-6001	REPAIR STEEL POST W/ W-BEAM -T101	LF	60





GENERAL NOTES:

See "Rail Repair Type T101" sheet for details.

N.T.S.

GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Deck slab repair should be constructed in accordance with item 429.

STATE OF TEXAS
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4/24/2023

Texas Department of Transportation

San Antonio District

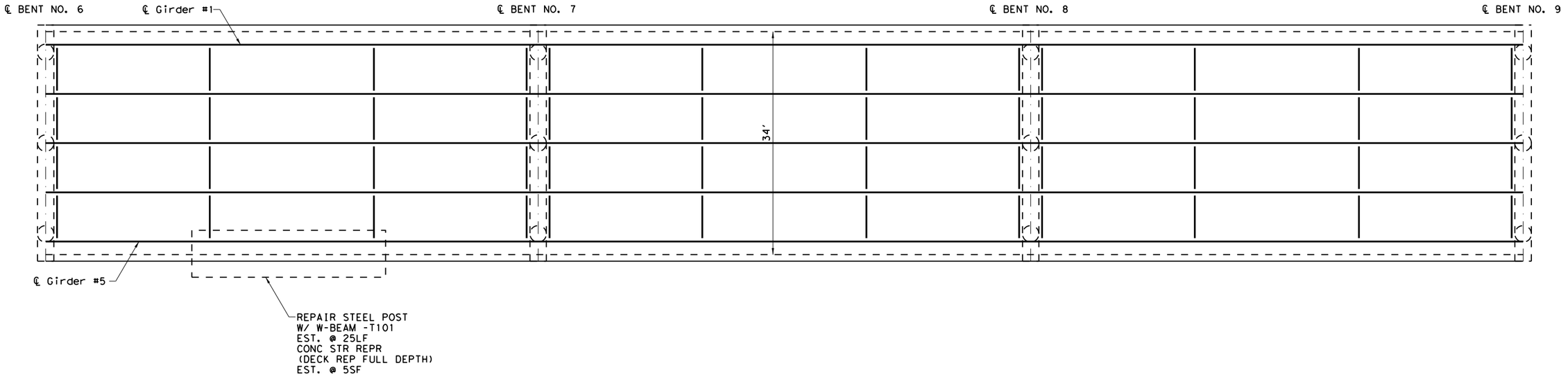
BRIDGE RAIL REPAIR

IH 10 WBFR/Cibolo Creek, 131-RAIL_STL-22

FILE:	DN:	CK:	DW:	CK:
© TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		103

NBI: 15-131-1899-01-006

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP FULL DEPTH)	SF	5
0776-6001	REPAIR STEEL POST W/ W-BEAM -T101	LF	25



GENERAL NOTES:

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

See "Rail Repair Type T101" sheet for details.

N.T.S.

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4/24/2023

Texas Department of Transportation

San Antonio District

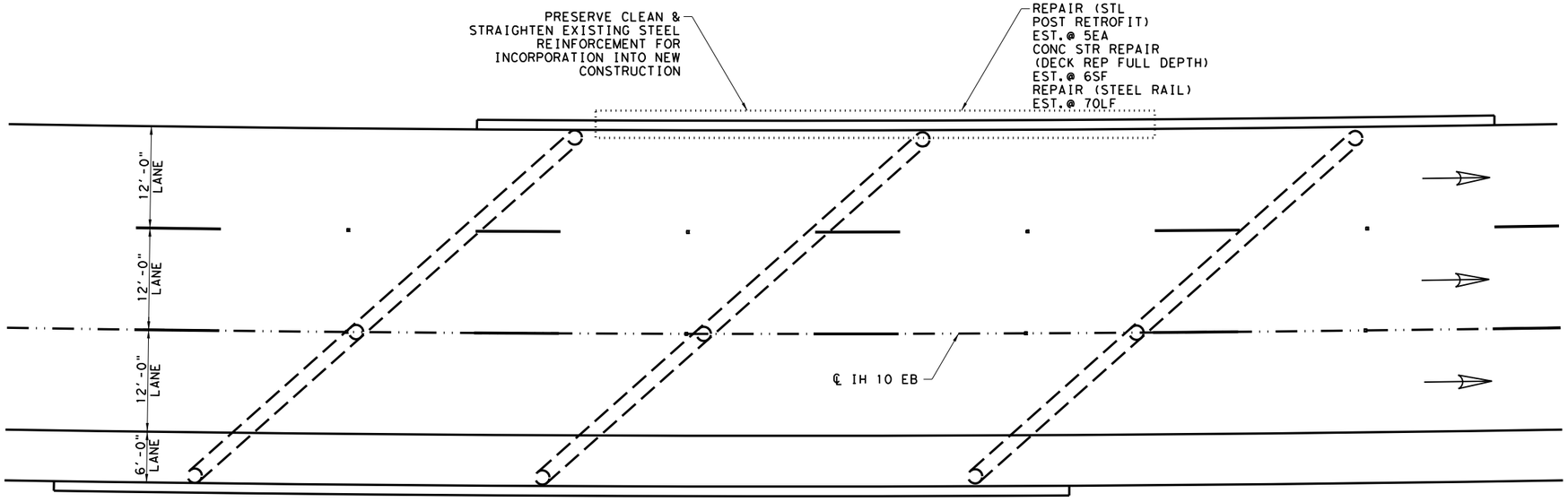
BRIDGE RAIL REPAIR

RM 1376/Guadalupe River,
131-RAIL_STL-23

FILE:	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	RM 1376
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		104

NBI: 15-133-0142-02-151

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP FULL DEPTH)	SF	20
0776-6036	REPAIR (STL POST RETROFIT)	EA	5
0776-6041	REPAIR (STEEL RAIL)	LF	70



GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Deck slab wall repair should be constructed in accordance with item 429.

See sheet "T1 Rail Repair Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

N.T.S.

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4/24/2023

Texas Department of Transportation

San Antonio District

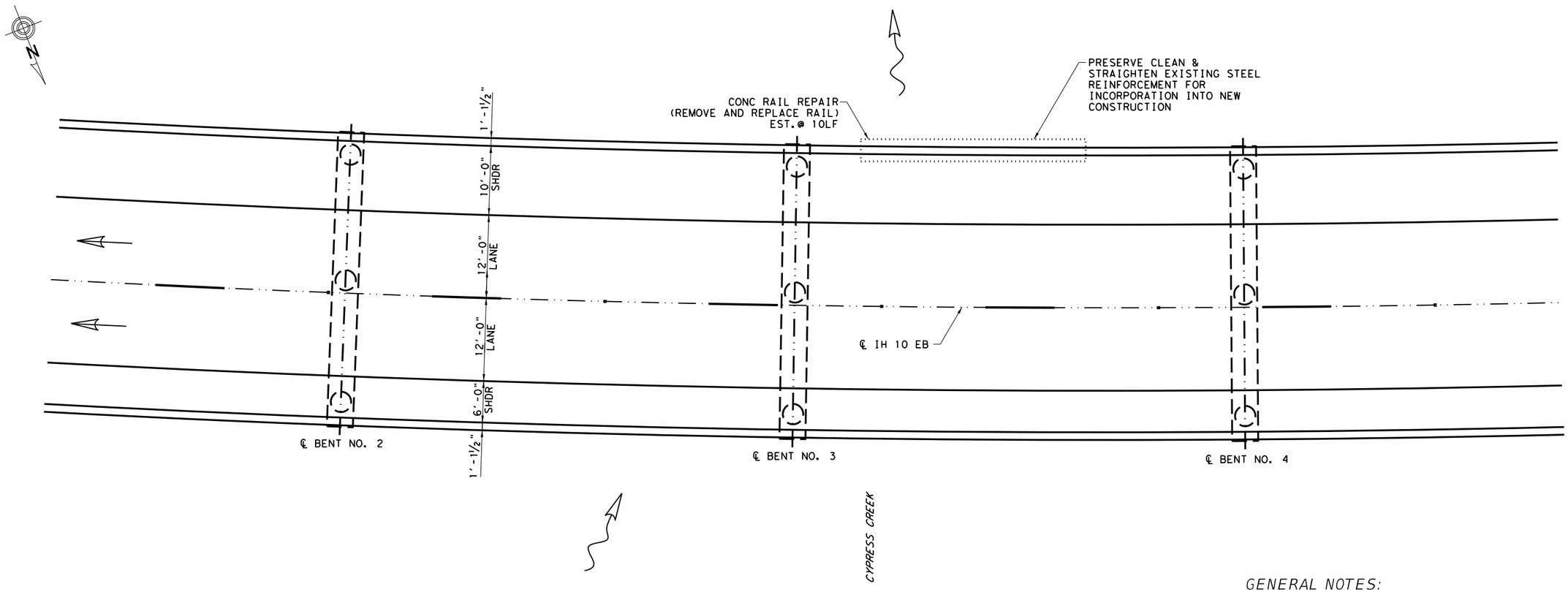
BRIDGE RAIL REPAIR

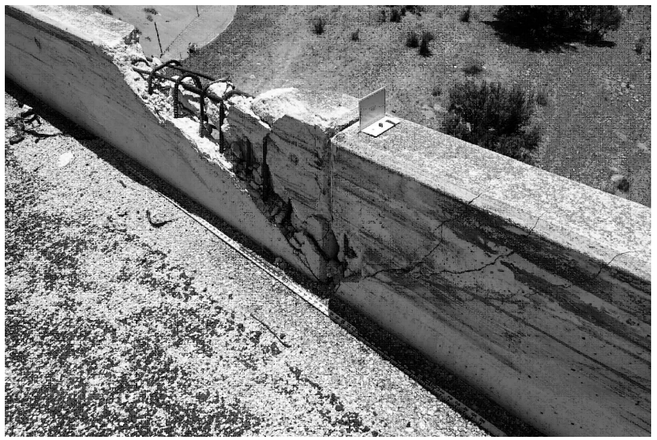
IH 10 EB/Draw, 133-RAIL_STL-24

FILE:	DN: MER	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KERR		105

NBI: 15-133-0142-14-077

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0778-6075	CONC RAIL REPAIR(REMOVE AND REPLACE RAIL)	LF	10





GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.

All concrete for new construction shall be Class "C".

All reinforcing steel shall be Grade 60.

Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.

Use Tybe B concrete repair material listed on the material producer list per DMS 4655.

Removal and disposal of existing railing shall be in accordance with Item 452, "Removing Railing". New Railing shall be in accordance with Item 450, "Railing".

See sheet "T2 Concrete Rail Repair Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

N.T.S.

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4/24/2023

Texas Department of Transportation

San Antonio District

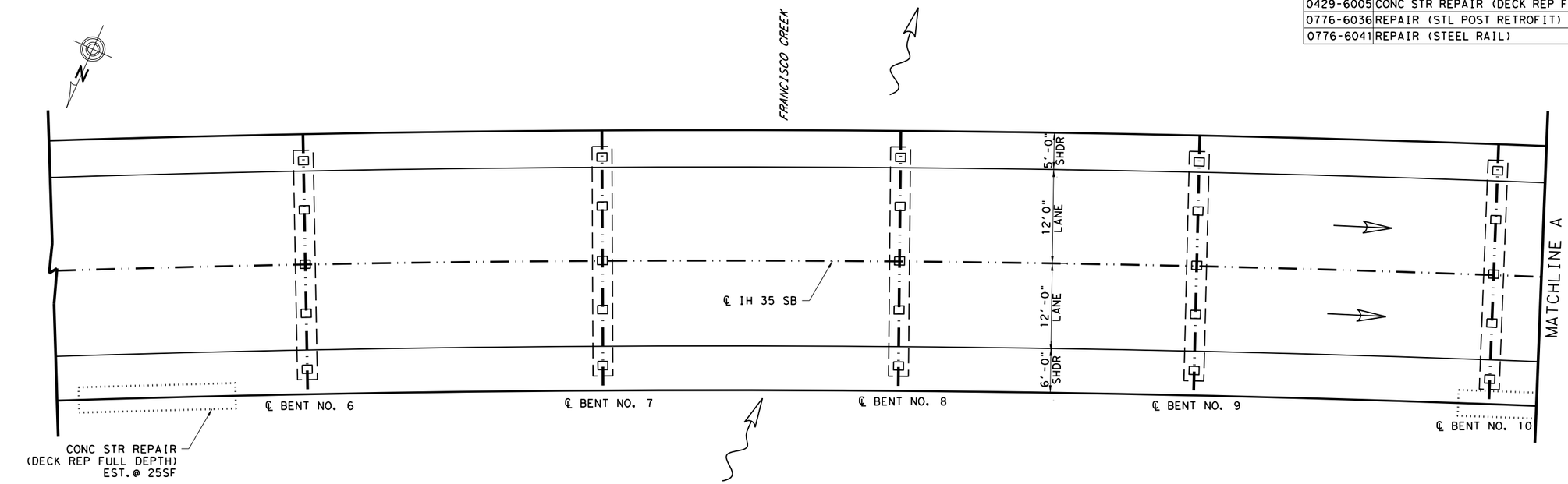
BRIDGE RAIL REPAIR

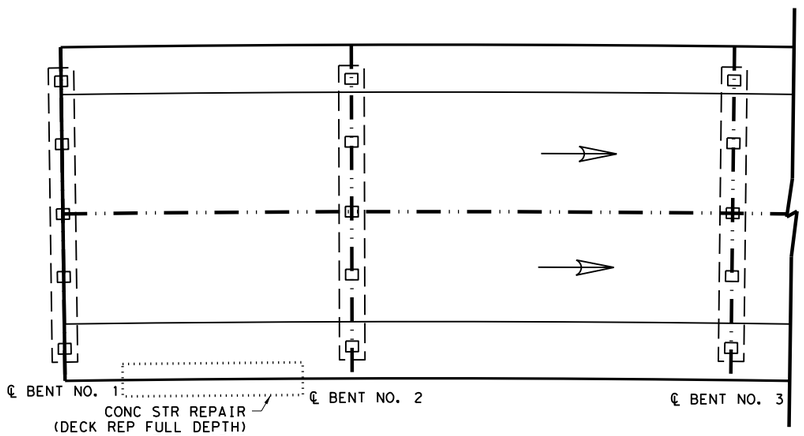
IH 10 EB/Cypress Creek, 133-RAIL_CNC-25

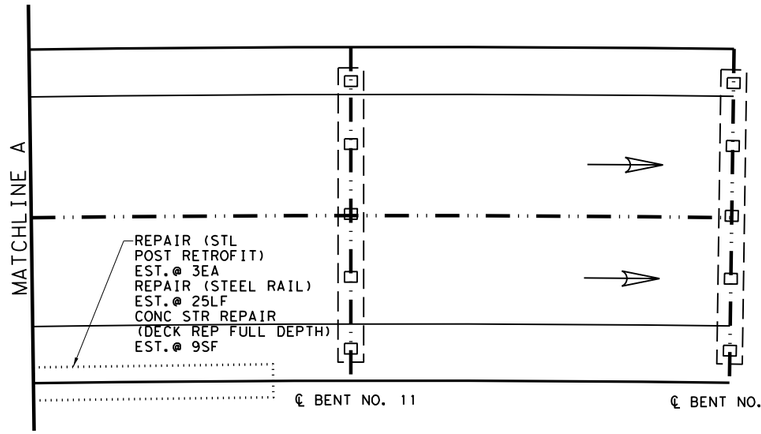
FILE:	DN: MER	CK:	DW:	CK:
© TxDOT OCTOBER, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	KERR		106

NBI: 15-163-0017-05-232

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP FULL DEPTH)	SF	59
0776-6036	REPAIR (STL POST RETROFIT)	EA	3
0776-6041	REPAIR (STEEL RAIL)	LF	25







GENERAL NOTES:

Contractor shall verify existing dimensions and the extent of the repair in the field prior to commencing breakbacks, excavation and construction.
All concrete for new construction shall be Class "C".
All reinforcing steel shall be Grade 60.
Bar lap lengths, where required, shall be 1'-9" minimum for #4 reinforcing and 2'-2" minimum for #5 reinforcing.
Use Type B concrete repair material listed on the material producer list per DMS 4655.
Deck slab wall repair should be constructed in accordance with item 429.

See sheet "T1 Rail Repair Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

N.T.S.

STATE OF TEXAS
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4/24/2023

Texas Department of Transportation

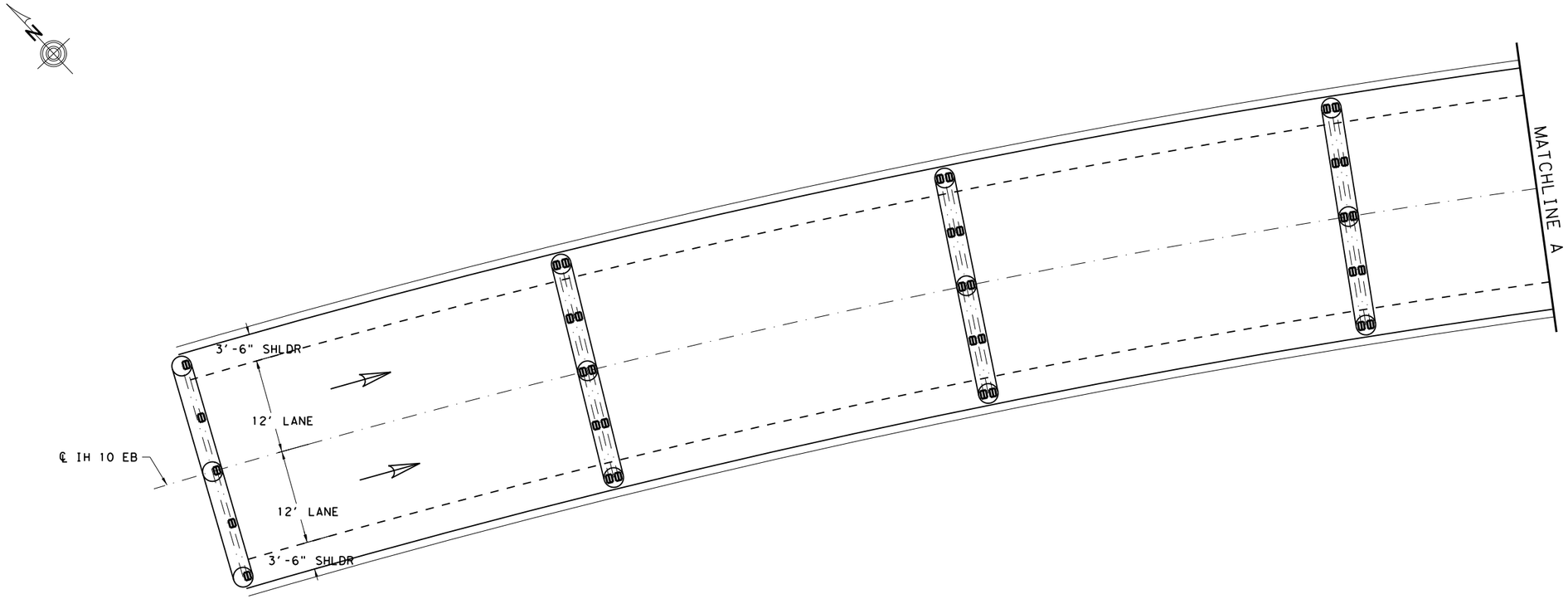
San Antonio District

BRIDGE RAIL REPAIR

IH 35 SBML/San Francisco Perez Creek, 163-RAIL_STL-26

FILE:	DN: MER	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	MEDINA		107

NBI: 15-015-0072-12-041



Unfactored Loads
Dead Load = 35kips

GENERAL NOTES:

Removal of existing expansion bearing is subsidiary to pedestal and pad.
See sheet "Bearing Shoe Replacement Pedestal".
After removal of the existing bearing shoe, repair and resurface the top of the concrete cap in accordance with the TxDOT Concrete Repair Manual, "Minor Spalls", to provide a smooth surface for the pedestal.
Submit jacking plan for review to SAT_BrgShopPlanReview.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

Sheet 1 of 2

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

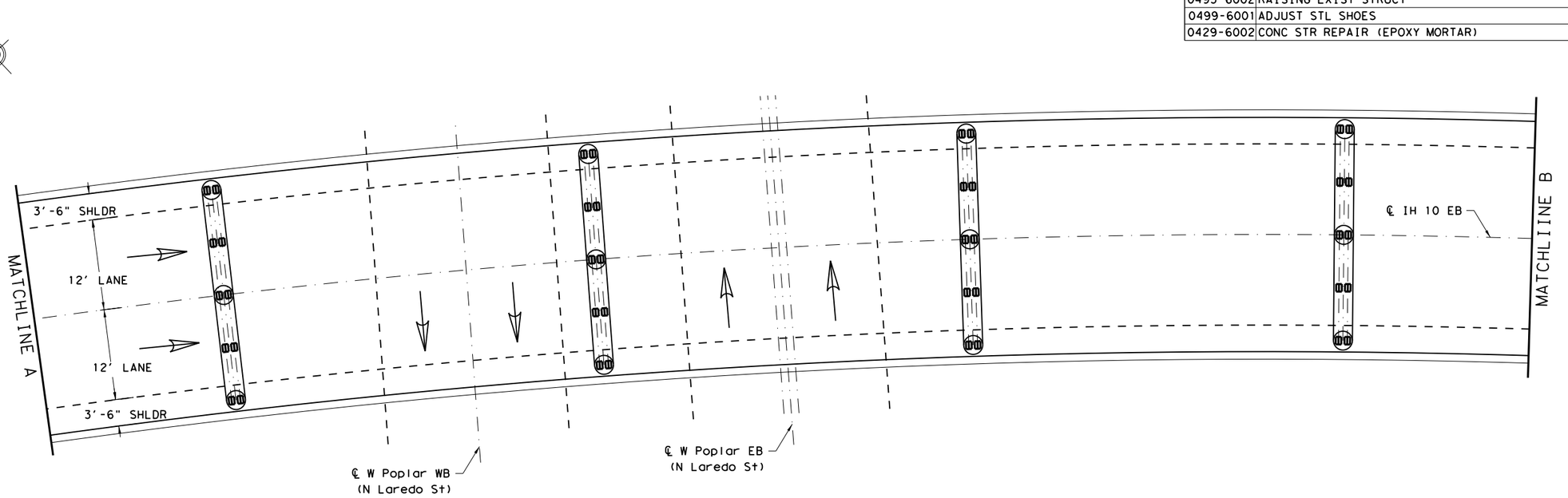
BEARING REPAIR

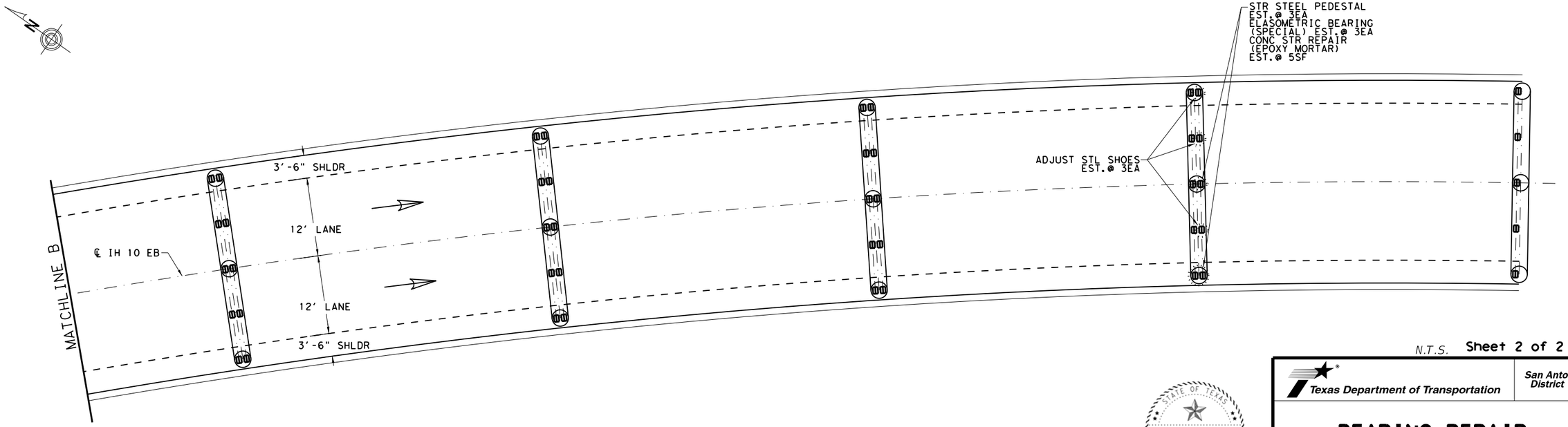
IH 10EB/N Laredo Street, 15-BRG-27

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		108

NBI: 15-015-0072-12-041

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	3
0442-6011	STR STEEL (PEDESTAL)	LB	375
0495-6002	RAISING EXIST STRUCT	EA	1
0499-6001	ADJUST STL SHOES	EA	3
0429-6002	CONC STR REPAIR (EPOXY MORTAR)	SF	5





N.T.S.

Sheet 2 of 2

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

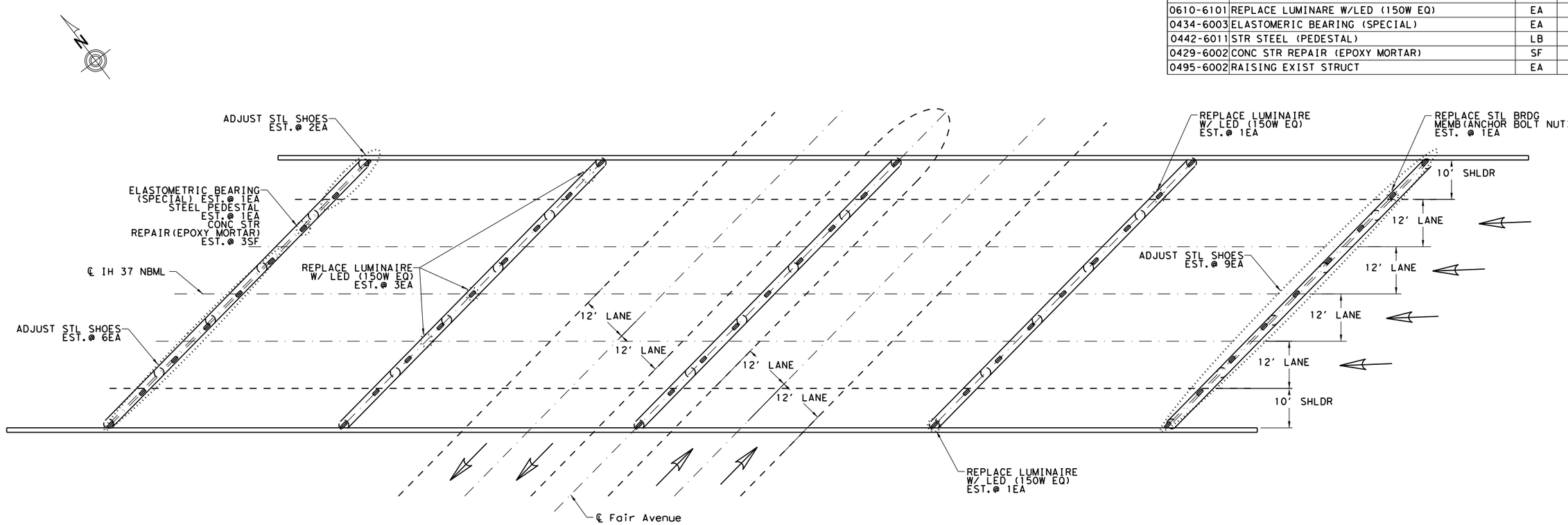
BEARING REPAIR

IH 10EB/N Laredo Street, 15-BRG-27

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 10
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		109

NBI: 15-015-0073-08-046

ITEM NO.	ITEM	UNIT	QUANTITY
0784-6056	REP STL BRDG MEMB (ANCHOR BOLT NUT)	EA	1
0499-6001	ADJUST STL SHOES	EA	17
0610-6101	REPLACE LUMINARE W/LED (150W EQ)	EA	5
0434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	1
0442-6011	STR STEEL (PEDESTAL)	LB	167
0429-6002	CONC STR REPAIR (EPOXY MORTAR)	SF	3
0495-6002	RAISING EXIST STRUCT	EA	1



Unfactored Loads
Dead Load = 34kips

GENERAL NOTES:

Removal of existing expansion bearing is subsidiary to pedestal and pad.
See sheet "Bearing Shoe Replacement Pedestal".
After removal of the existing bearing shoe, repair and resurface the top of the concrete cap in accordance with the TxDOT Concrete Repair Manual, "Minor Spalls", to provide a smooth surface for the pedestal.
Submit jacking plan for review to SAT_BrgShopPlanReview.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

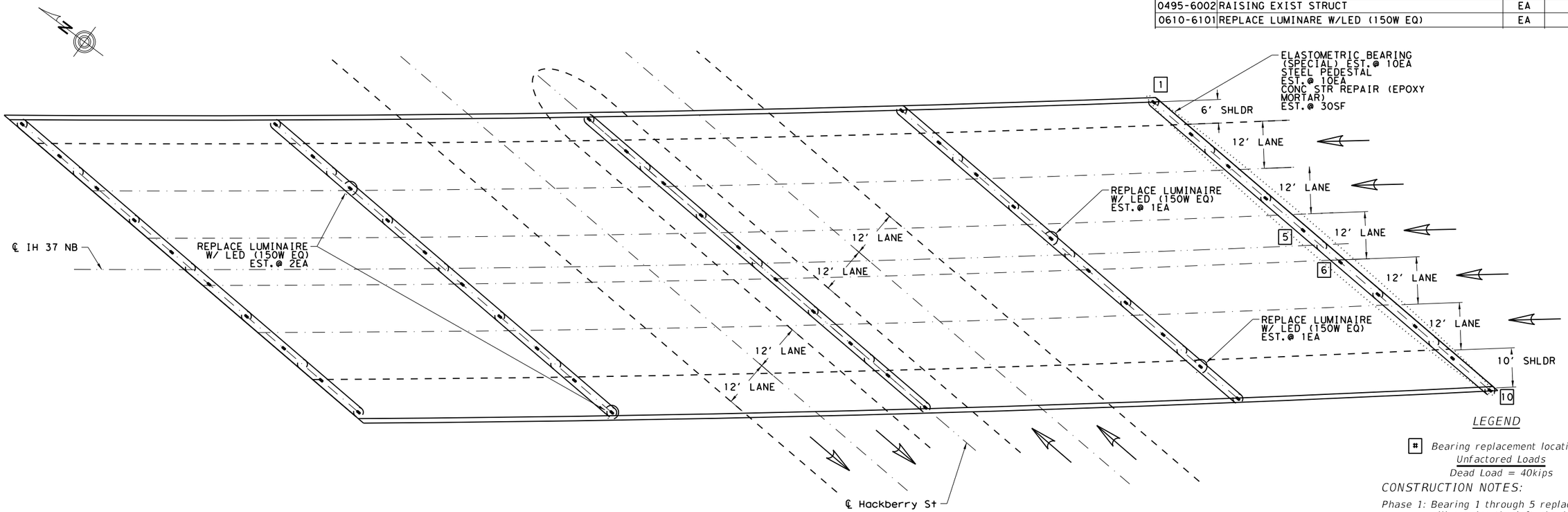
BEARING REPAIR

IH 37 NB/Fair Ave, 15-BRG-28

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 37
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		110

NBI: 15-015-0073-08-044

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	10
0442-6011	STR STEEL (PEDESTAL)	LB	1670
0495-6002	RAISING EXIST STRUCT	EA	1
0610-6101	REPLACE LUMINARE W/LED (150W EQ)	EA	4



LEGEND

[#] *Bearing replacement location*
Unfactored Loads
Dead Load = 40kips

CONSTRUCTION NOTES:

Phase 1: Bearing 1 through 5 replacement will require the left shoulder and the three left lanes to be closed during construction.
Phase 2: Bearing 6 through 10 replacement will require the right shoulder and the three right lanes to be closed during construction.

GENERAL NOTES:

See TCP narrative for construction phasing.
Removal of existing expansion bearing is subsidiary to pedestal and pad.
See sheet "Bearing Shoe Replacement Pedestal".
After removal of the existing bearing shoe, repair and resurface the top of the concrete cap in accordance with the TxDOT Concrete Repair Manual, "Minor Spalls", to provide a smooth surface for the pedestal.
Submit jacking plan for review to SAT_BrgShopPlanReview.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation — San Antonio District

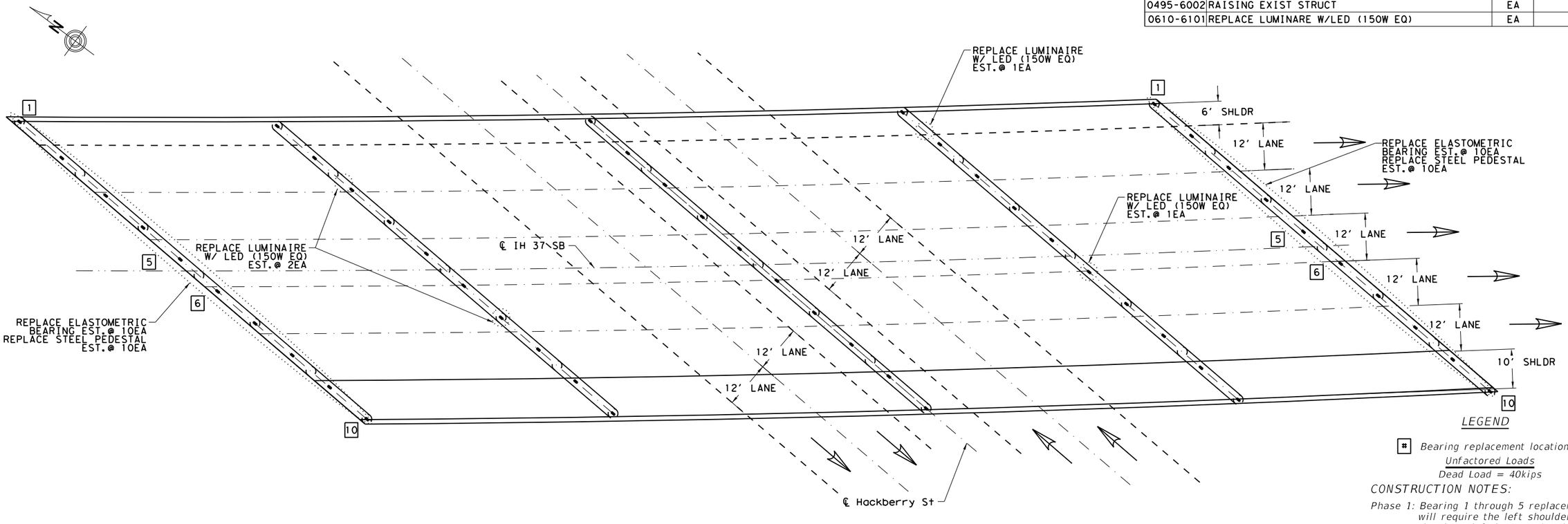
BEARING REPAIR

IH 37 NB/Hackberry Street, 15-BRG-29

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 37
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		111

NBI: 15-015-0073-08-045

	QUANTITY SUMMARY CSJ: 0915-00-258		
ITEM NO.	ITEM	UNIT	QUANTITY
0434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	20
0442-6011	STR STEEL (PEDESTAL)	LB	3340
0495-6002	RAISING EXIST STRUCT	EA	1
0610-6101	REPLACE LUMINARE W/LED (150W EQ)	EA	4



LEGEND

[#] *Bearing replacement location*

Unfactored Loads

Dead Load = 40kips

CONSTRUCTION NOTES:

Phase 1: Bearing 1 through 5 replacement will require the left shoulder and the three left lanes to be closed during construction.

Phase 2: Bearing 6 through 10 replacement will require the right shoulder and the three right lanes to be closed during construction.

GENERAL NOTES:

See TCP narrative for construction phasing.
Removal of existing expansion bearing is subsidiary to pedestal and pad.
See sheet "Bearing Shoe Replacement Pedestal".
After removal of the existing bearing shoe, repair and resurface the top of the concrete cap in accordance with the TxDOT Concrete Repair Manual, "Minor Spalls", to provide a smooth surface for the pedestal.
Submit jacking plan for review to SAT_BrgShopPlanReview.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation

San Antonio District

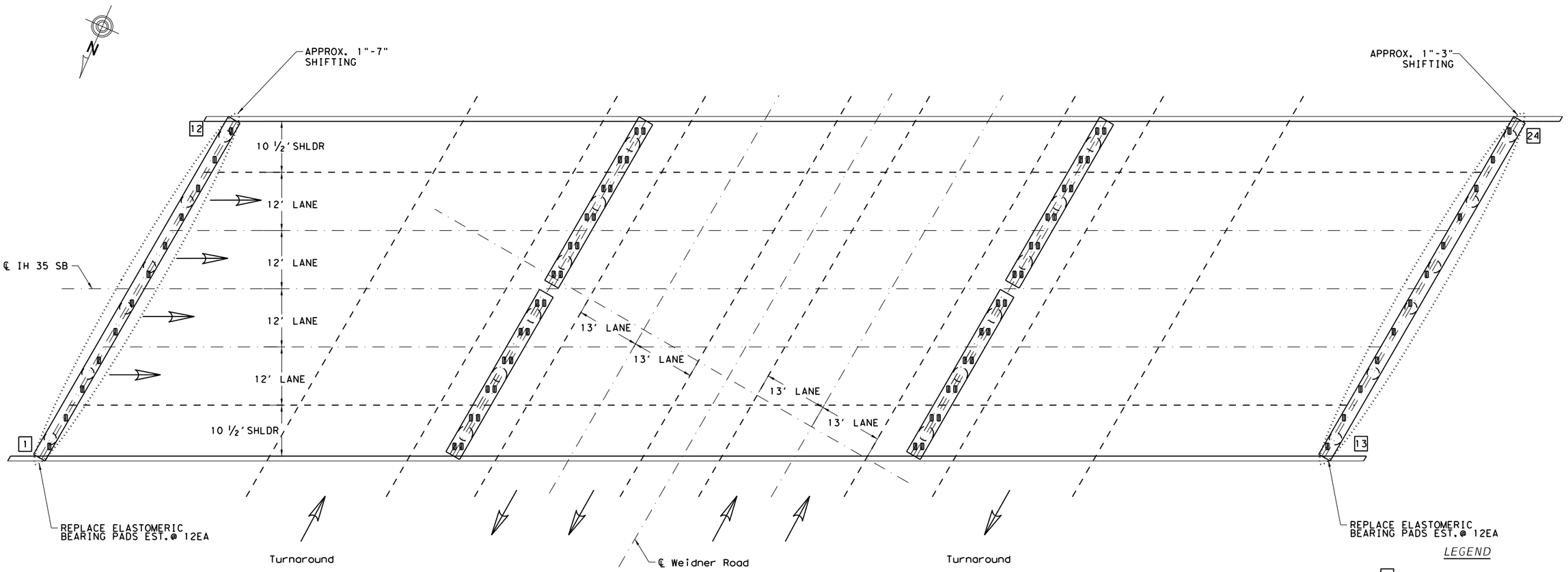
BEARING REPAIR

IH 37 SB/Hackberry Street, 15-BRG-30

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 37
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		112

NBI: 15-015-0016-07-164

QUANTITY SUMMARY CSJ: 0915-00-258			
ITEM NO.	ITEM	UNIT	QUANTITY
4002-6001	REPLACE ELASOMETRIC BEARING PADS	EA	24
0495-6002	RAISING EXIST STRUCT	EA	1



STRUCTURE RAISING PROCEDURE:

1. *Submit jacking plan for review to SAT_BrgShopPlanReview.*
2. *Set traffic control according to TCP narrative.*
3. *Provide jacks in compliance with item 495.*
4. *Raise structure ¼" maximum beyond current state and remove existing pad and replace with new pad for bearings 2-12, 14-24.*
5. *For bearing 1 & 13 labeled on sheet, the adjacent beam on the adjacent structure 15-015-016-07-163 will need to be raised a maximum of ¼" beyond current state siimultaneously with 15-015-0016-07-164 to ensure no damage is caused to the median CTB and utiilities.*

LEGEND

[#] *Bearing replacement location*

Unfactored Loads
Dead Load = 64kips
Live Load = 72kips

GENERAL NOTES:

See sheet "Elasometric Bearing Pad Details".

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

N.T.S.

STATE OF TEXAS
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4/24/2023

Texas Department of Transportation

San Antonio District

BEARING REPAIR

IH 35 SB/Weidner Rd, 15-BRG-31

FILE:	DN: LBF	CK:	DW:	CK:
©TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	IH 35
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		113

DATE:
FILE:

TABLE OF BEARING DATA

Bridge NBI	Abut/ Bent No.	Laminate Plate Quantity (Per Pad)	Quantity (EA)	L	W	T	Slope Span 1	Slope Span 3	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
15-015-0016-07-164	1,4	2	24	9"	19"	1"	-0.00087	-0.01347	0.1825'	0.3162'

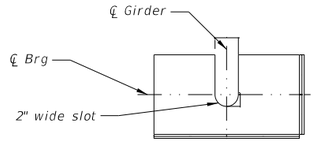
BEARING REPLACEMENT NOTES:

Replace existing bearing per Special Specification 4002, "Elastomeric Bearing Pads".

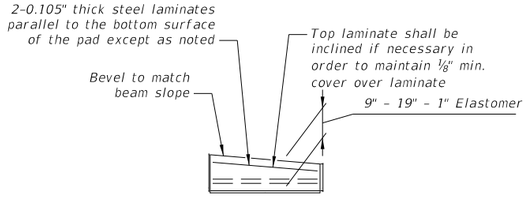
Raise the existing span in accordance with Item 495, "Raising Existing Structures", as required to remove bearings. Locations with existing dowels are indicated in the Table of Repairs. The bearing shall be removed without damaging the existing dowel. This may require the span to be raised on both ends in order to achieve clearance over the dowel to remove the existing pad in accordance with Item 495, "Raising Existing Structures". It is acceptable to cut existing pad to facilitate removal.

New bearing pads shall be manufactured in accordance with Engineer's design.

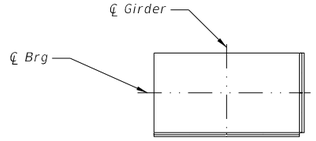
Following installation of new bearing pad apply stripe coat of Type V Epoxy at interface of pad and concrete pedestal to secure pad.



PAD PLAN WITH DOWEL



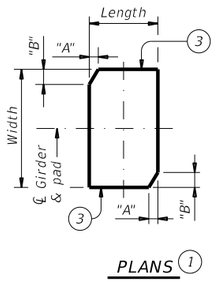
LAMINATED BEARING ELEVATION



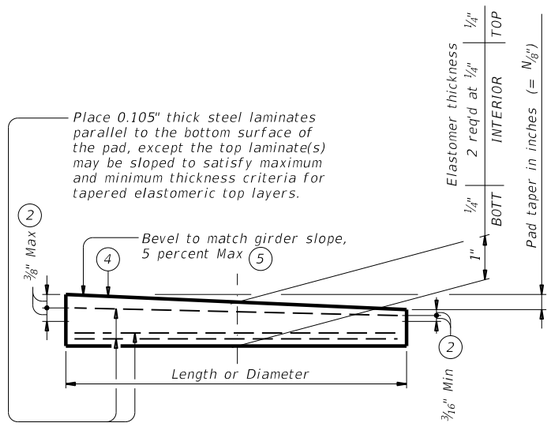
PAD PLAN WITHOUT DOWEL

ELASTOMERIC BEARING REPLACEMENT DETAILS

Scale: 1" = 1'-0"



PLANS (1)



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(1) See Table of Bearing Pad Dimensions for dimensions.

(2) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(3) Locate Permanent Mark here.

(4) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.

(5) Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)

Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

N.T.S.

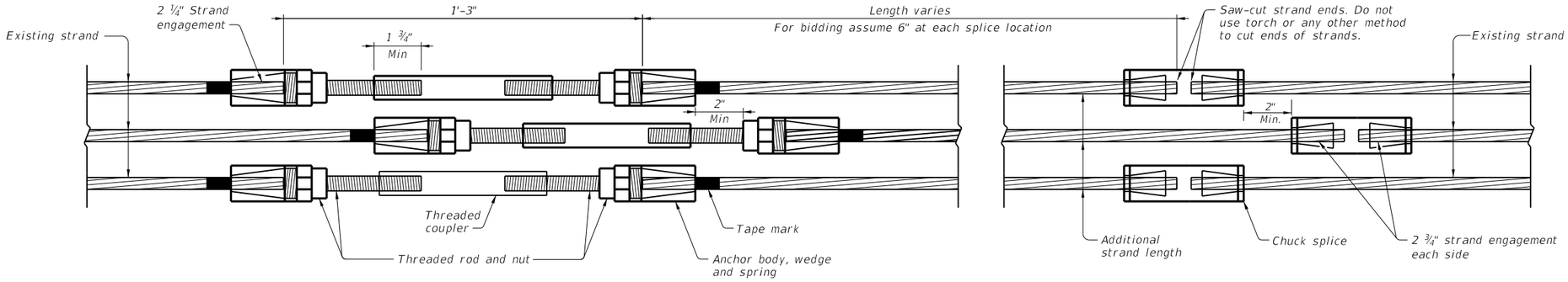
STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

4/24/2023

Texas Department of Transportation — Bridge Division

ELASTOMERIC BEARING REPLACEMENT DETAILS

FILE: XX.dgn	DN: XX	CK: XX	DW: XX	CK: XX
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VARIES
	DIST	COUNTY		SHEET NO.
	SAT	VARIES		114



PRESTRESSED STRAND SPLICE ASSEMBLY DETAIL

(Verify and follow Manufacturer's instructions)

STRAND SPLICE NOTES:

1) Field verify strand size and provide chuck splice and strand engagement to accommodate ½" diameter low relaxation, 270 ksi (LR270) strand for additional length to fill in gaps. Provide 7-wire prestressing strand and prestressing hardware meeting the requirements of Item 425, "Precast Prestressed Concrete Structural Members."

2) Prior to the actual installation of the splice system, perform a mock-up installation with the crew that will perform the production work to demonstrate that the system can be installed in accordance with the manufacturer's instructions and these plans. Refer to Sheet 2 for specific requirements. Schedule mock-up and perform in the presence of the Engineer.

3) Use a saw to remove loose sections of existing strand and to cut new strand for filling in gaps. Cut evenly to leave intact whole end for engagement with splicing system. Plan cutting locations to account for staggering splice assemblies to avoid congestion. Do not use a torch to cut new or existing strand. If installing anchors or pins to bond concrete repair material to substrate, do so prior to proceeding to Step 4.

4) Prior to installation of the splicing system, clean and lubricate the threads in accordance with the manufacturer's instructions. Keep strands, wedges, and splice chucks free of lubricant.

5) Handle and install splicing devices according to manufacturer's instructions. Hand-tighten the splicing system to meet the minimum thread and strand engagement requirements from the manufacturer and this plan sheet. Install splicing system on all strands to be spliced before tensioning any of the splices.

6) Splice severed strands and apply a tensile force as shown in the Stressing Table to each strand. Use the same torque wrench calibrated during the system mock-up. Do not reuse any hardware utilized during the mock-up or calibration for production work.

7) Tension all strand splices gradually to 50%, then all to 75%, and then all to 100% of the required tensile force.

CONCRETE REPAIR NOTES:

1) Remove delaminated, loose, and unsound concrete as indicated on the plans. Remove all previously applied repair material. Use only hand tools or power driven chipping hammers (15 lb. max) to remove concrete and to excavate behind reinforcing bars.

Note: Notify Engineer after completing Step 1. Engineer will verify extent of damage and strand splice locations. Do not proceed to Step 2 until completing strand splice work.

2) Preload the beam by placing a loaded 10 cubic yard dump truck at midspan prior to performing concrete repairs. Leave the truck in place until concrete repair material has obtained a minimum concrete compressive strength of 3,000 psi. The truck may not be removed earlier than 48 hours after applying repair material.

3) Bend, but do not remove, damaged steel reinforcement and strands to ensure there will be 1" minimum concrete cover in the repair area.

4) Remove rust, oil, and other contaminants from concrete and reinforcing steel surfaces. Just prior to applying repair material, blast the repair area using a high-pressure air compressor equipped with filters to remove oil.

5) Apply the repair material and moist cure for a minimum of 48 hours using wet mats, water spray, ponding, or other method approved by Engineer. Follow all Manufacturer instructions for surface preparation, material application, and curing.

STRESSING TABLE

LR270 Strand Dia (in)	Nominal Area (in²)	Required Tensile Force,kips (70% of Ultimate)
b	0.085	16.0
D	0.115	21.0
b	0.153	28.0
0.6	0.217	41.0

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

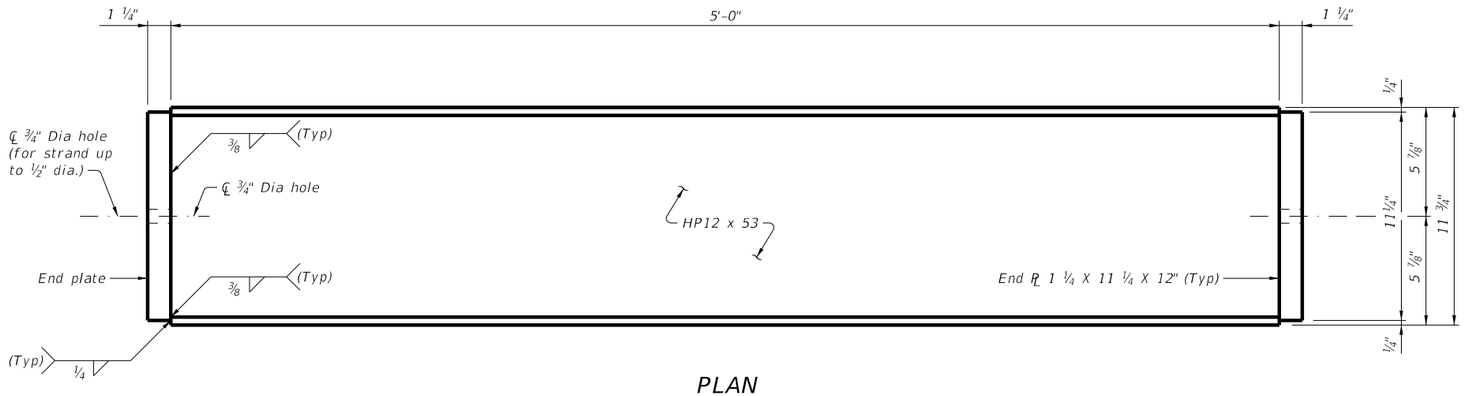
4/24/2023

Texas Department of Transportation
San Antonio District

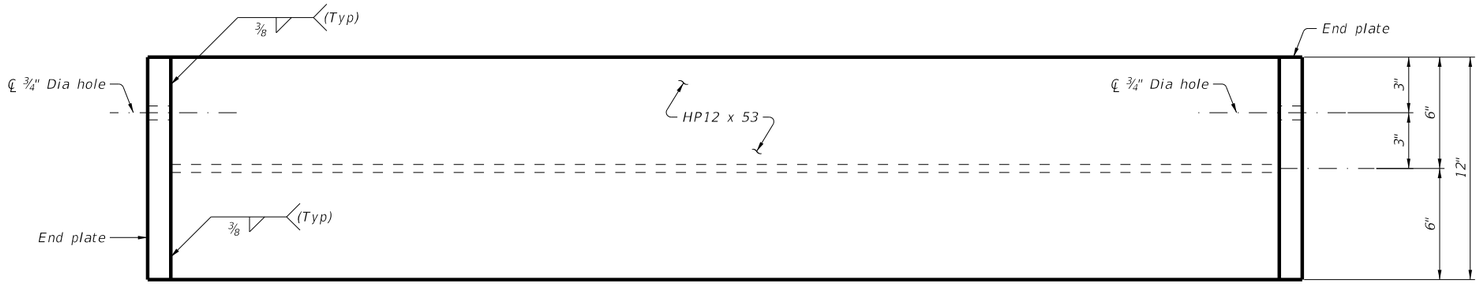
CONCRETE BEAM REPAIR DETAILS
Various bridges

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VARIES
	DIST	COUNTY		SHEET NO.
	SAT	VARIES		115

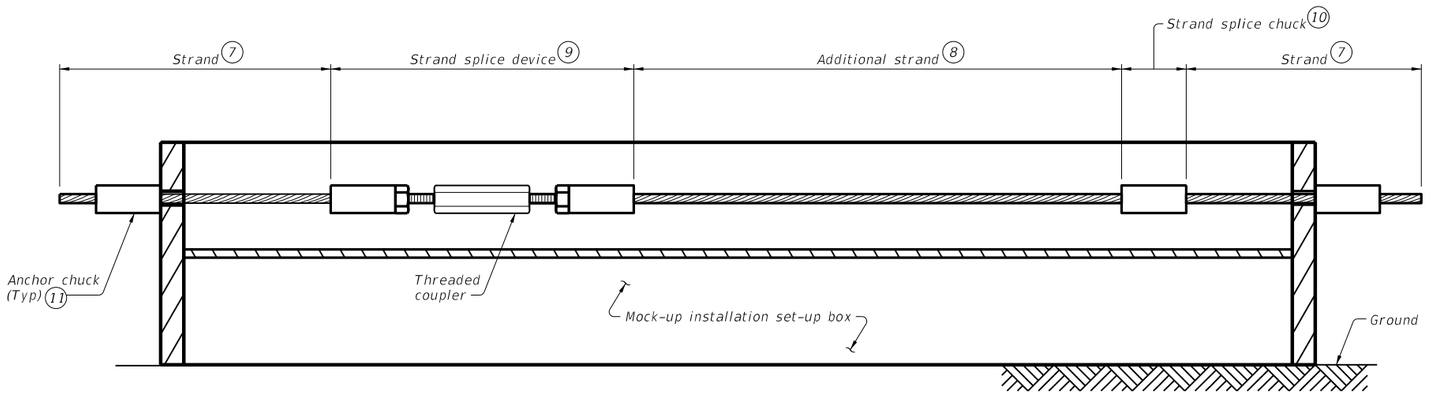
DATE:
FILE:



PLAN



ELEVATION



SETUP OF MOCK-UP INSTALLATION FOR STRAND SPLICING

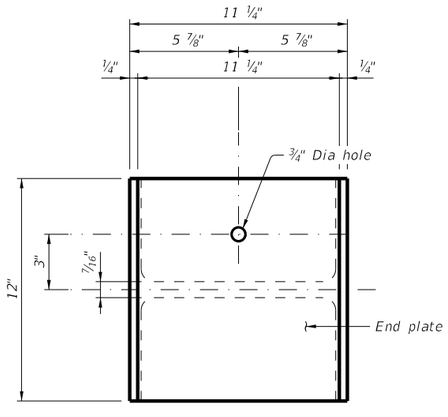
(7) Simulate an end of a broken strand.

(8) Add additional length of strand to fill the gap. The length should include the minimum strand engagements in GRABB-IT anchor and splice chuck.

(9) The length of GRABB-IT is 19 ¾" when thread engagement of the rod and threaded coupler is 1 ¾" which is a minimum engagement required to meet the design strength of a ½" Dia Grade 270 strand. Mark the length of the minimum engagement on threaded rod to ensure that this requirement is met.

(10) One-time-use splice chuck (5 ½" long). Insert (pock) the strand into the chuck until it reaches the stop in the middle of the chuck. Make sure that the strand end is clean and evenly cut before inserting. Mark the length of the engagement on the strand to ensure that the engagement is met.

(11) Reusable anchor chuck for end anchorage.



END VIEW

MOCK-UP NOTES:

This design is to facilitate a mock-up installation for a GRABB-IT Cable Splice, which is a pre-approved strand splice system (a product of Prestress Supply Inc., Florida) to be used for repair of severed prestressed strands in damaged prestressed concrete beams. This design may be used for a similar splice system that is approved to substitute for this system. The purpose of the mock-up is to demonstrate that the installation of the system can be performed by the Contractor to the satisfaction of the Engineer and in accordance with the Manufacturer's instructions. The Contractor may select an alternate design for the mock-up installation subject to approval by the Engineer.

Use Grade 36 or 50 steel for the set-up box. Design the set-up box to hold ultimate strength of 0.5" low relaxation grade 270 strand (LR270). The set-up box may be painted as desired by the Contractor for future uses.

Install and initially tighten the splice by hand satisfying the minimum thread and strand engagements. Tension the spliced strand gradually to 50%, then to 75%, and then to 100% of the required tensile force using a calibrated torque wrench by a 3-person work crew who will perform the installation on the project. Prior to installing the system, thoroughly clean and lubricate threads of the rod and threaded coupler. Do not lubricate the wedges and chucks. Keep strands free of lubricants. Saw cut the strand end evenly. Do not use a torch to cut strands. The tensile force required in the spliced strand is equal to an effective prestress force of an undamaged strand in the existing beam and is estimated by the Engineer as show in the repair plans.

Combine the calibration of the torque wrench with the mock-up installation. A bolt calibrator (Skidmore-Wilhelm or equivalent) or load cell must be installed at one end of the set-up box with an anchor chuck and washers properly arranged to enable the calibrator to measure the tension in the strand. This will enable the torque wrench to be calibrated while the mock-up installation is performed.

The same work crew that performs the mock-up must perform the actual installation.

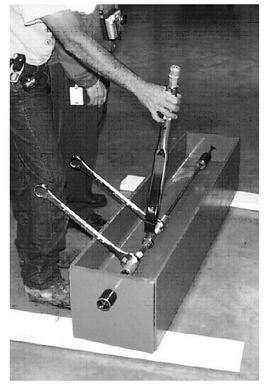


PHOTO OF MOCK-UP INSTALLATION

4/24/2023

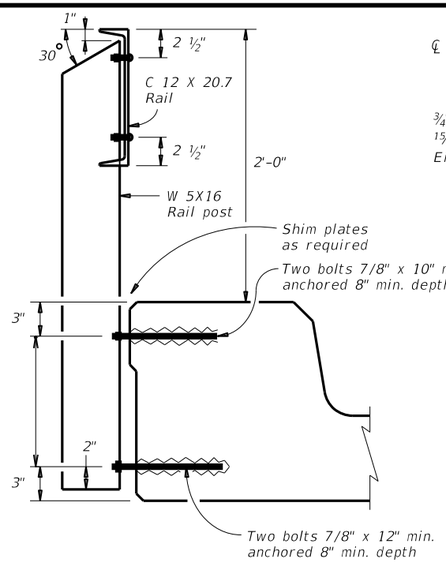
Sheet 2 of 2

Texas Department of Transportation — San Antonio District

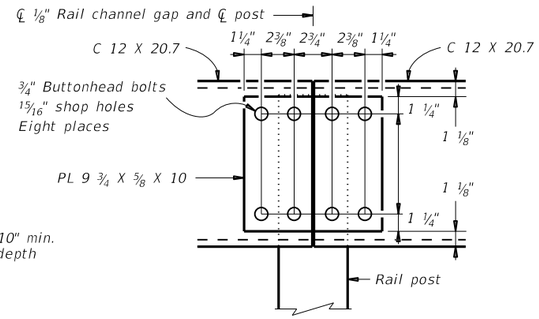
CONCRETE BEAM REPAIR DETAILS
Various bridges

FILE:	DN: LBF	CK:	DW:	CK:
© TxDOT OCTOBER ,2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VARIES
	DIST	COUNTY		SHEET NO.
	SAT	VARIES		116

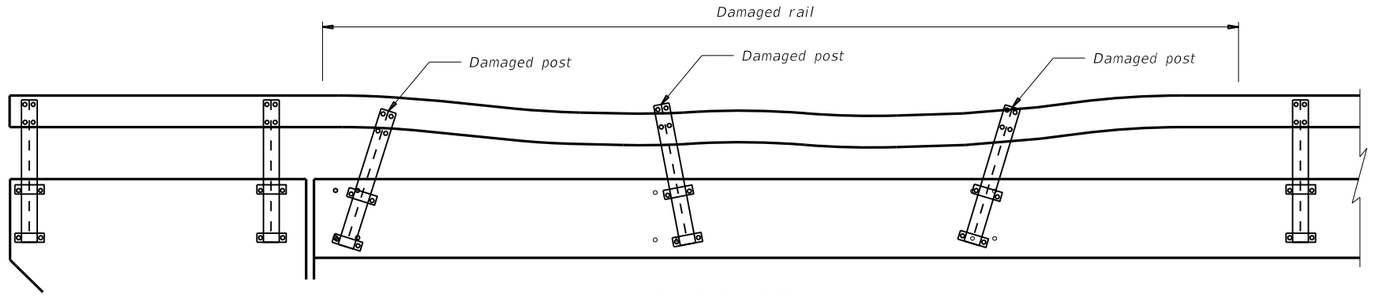
DATE:
FILE:



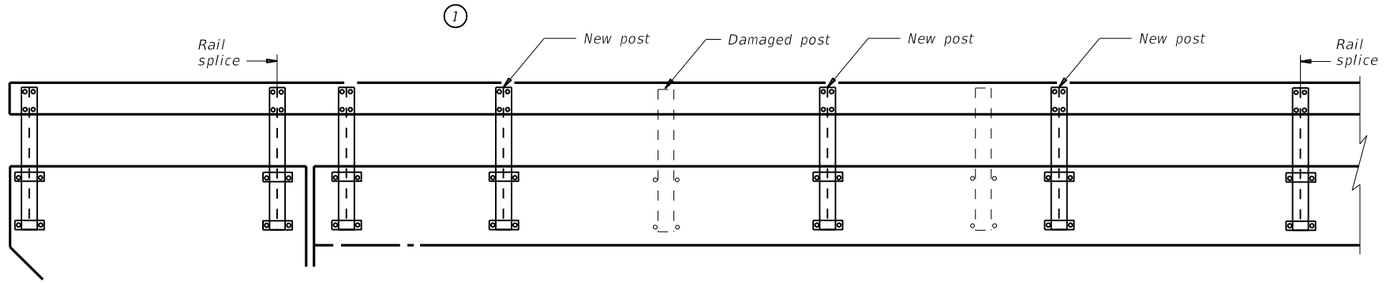
REPAIRED SECTION



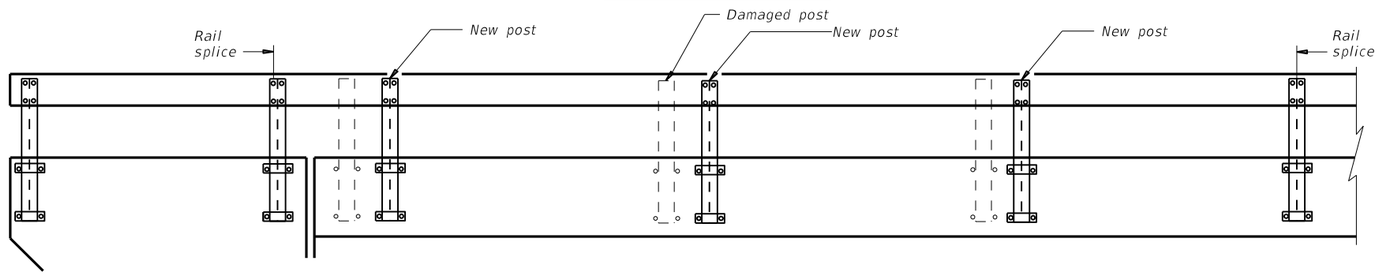
RAIL SPLICE DETAIL



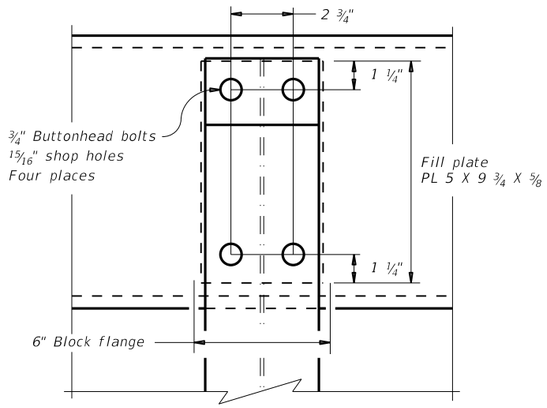
EXISTING CONDITION

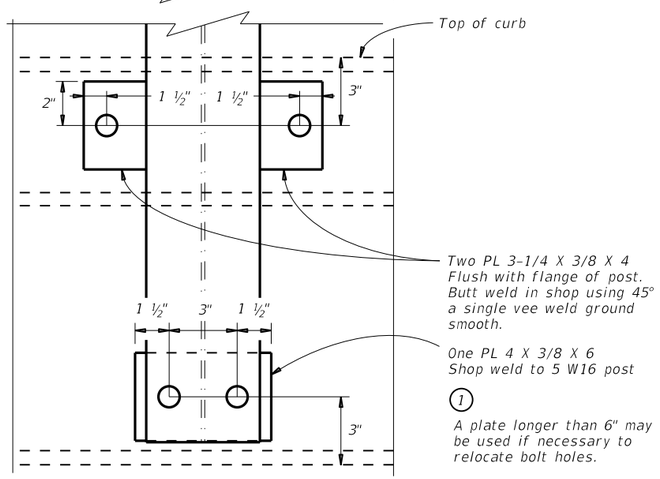


OPTION 1 STRADDLE



OPTION 2 CONSISTENT MOVE

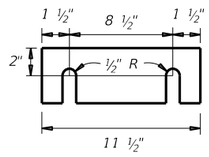




① A plate longer than 6" may be used if necessary to relocate bolt holes.

REPAIRED ELEVATION

Field side



SHIM PLATE DETAIL

PL 4 X ⅛ X 11 ½ or PL 4 X 1/16 X 11 ½

For posts that cannot be moved or adjusted, then existing failed area of concrete where existing damaged post and rail were positioned, must be repaired, including removal of sheared bolts from concrete, concrete repair and redrilling of new holes for new anchor bolts. Posts and plate extensions are to be correctly field measured by the Contractor and shop fabricated in conformance to approved design details on this sheet to be submitted to Engineer for approval.

Contractor is responsible for verifying all dimensions and quantities in the field before beginning work.

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

GENERAL NOTES:

All steel posts and plates must be ASTM A36.

All new (replaced) T2 steel post spacing is to be the same or shorter as what is existing and called out in the as builts (original construction drawings).

For Option 1, straddle spacing shall match existing spacing, and if needed, another post added to either match or shorten the spacing between it and the next existing post in good condition.

For Option 2, when consistently moving over the new posts from the existing damaged posts, existing plan spacing is to be matched and another post added halfway in between the last replaced post and next existing post in good condition to keep required spacing as detailed or closer (shorter) to maintain structural strength of rail as originally designed.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

4/24/2023

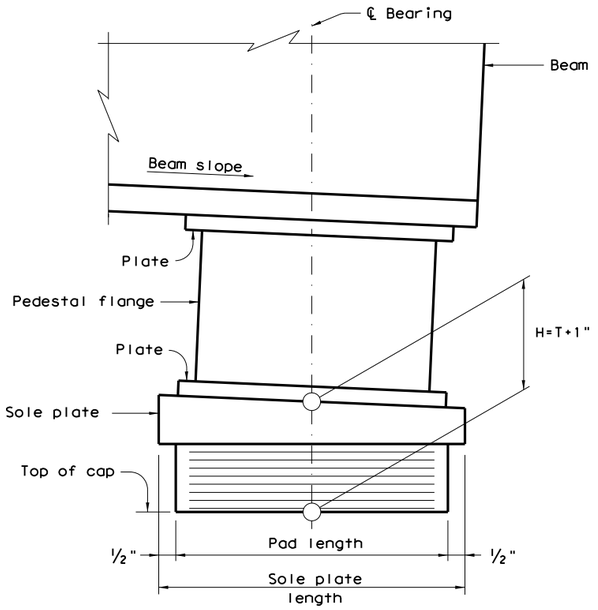
Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

BRIDGE RAIL REPAIR VARIOUS LOCATIONS

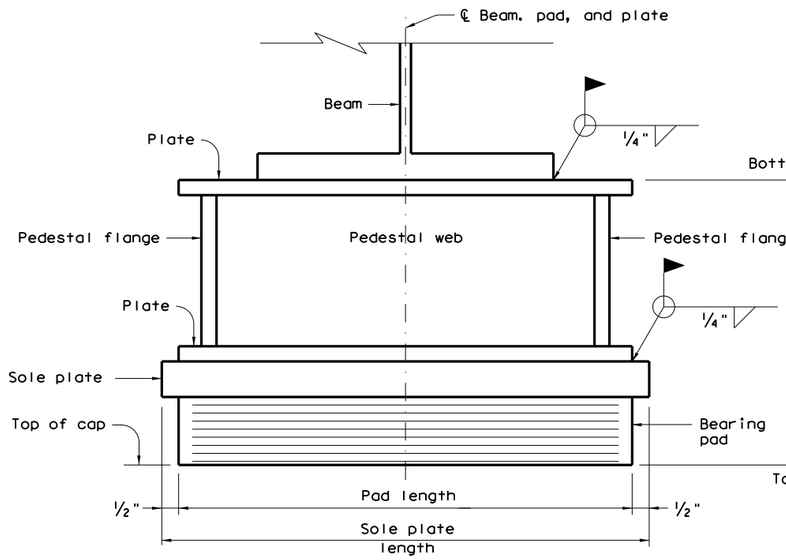
T2 RAIL REPAIR DETAILS

DN: HR	CK:	FILENAME: 000000000 Rail repair.dgn		
DW: SRF	CK:	ORIGINAL DRAWING DATE: October 2021		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6	C915-00-258		BEXAR, ETC
CONTROL	SECTION	JOB	SHEET NO.	HIGHWAY NO.
0915	00	258	118	IH 10, ETC

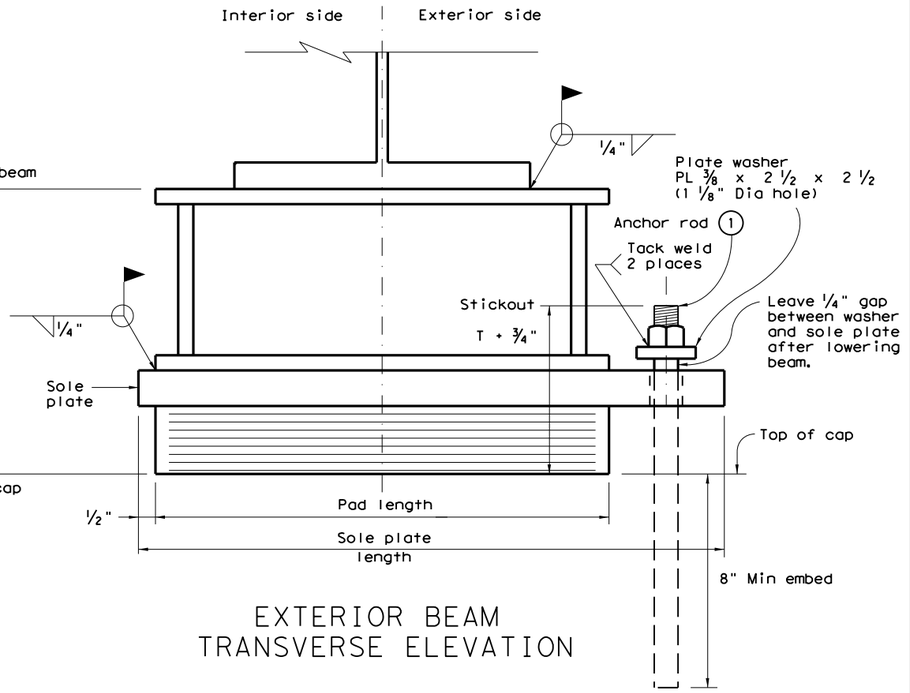
REVISIONS:



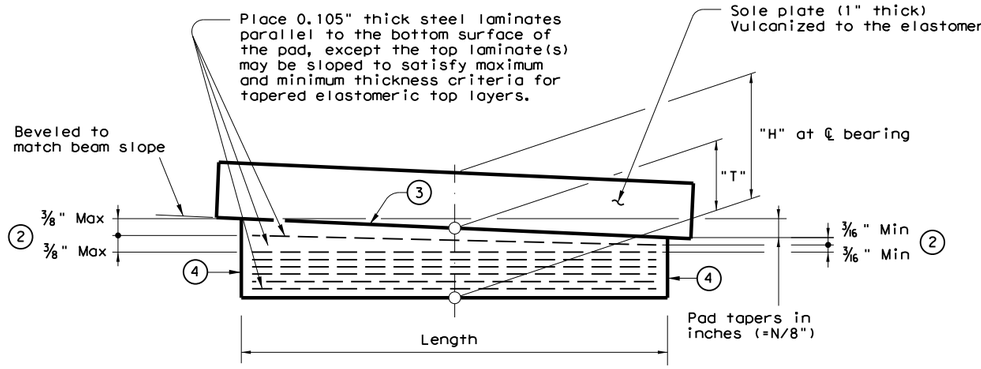
SIDE ELEVATION



INTERIOR BEAM
TRANSVERSE ELEVATION



EXTERIOR BEAM
TRANSVERSE ELEVATION



LAMINATED ELASTOMERIC BEARING PAD DETAILS

50 Durometer - For beam slopes < 3% - Maximum taper ¼"

NOTE - Showing standard bearing pad design. Designer to determine layer thicknesses, pad durometer, and number of layers required and modify detail as needed.

MATERIAL NOTES:

Provide sole plates conforming to ASTM A588.

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436.

Hot dip galvanize rod, nut, and washer as per Item 445, "Galvanizing". Sizing, drilling, and cleaning rod holes must follow the epoxy Manufacturer's directions. Use a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

GENERAL NOTES:

Raise structure per Item 495, "Raising Existing Structures" to facilitate bearing pad replacement. Costs of furnishing and installing elastomeric bearing pads, sole plates, and anchor rod assembly are paid for in accordance with Item 434, "Bridge Bearings".

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. A copy of the bearing layout is to be provided to the Engineer. Permanently mark each bearing in accordance with the bearing layout.

Provide shop drawings for approval.

① 1" Dia threaded rod (ASTM A 193 Gr B7 or F 1554 Gr 105) with heavy hex nut and plate washer. Hot-dip galvanize rod, nut and washer. Sizing, drilling and cleaning rod roles must follow the adhesive Manufacturer's directions. Embed using a Type III (Class C, D, E or F) adhesive meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

② Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

③ Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. Include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper) N=1, (for ⅛" taper) N=2, (for ¼" taper) etc.
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{\text{Length}}\right)$ IN/IN.

④ Locate permanent mark here.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED PROFESSIONAL ENGINEER

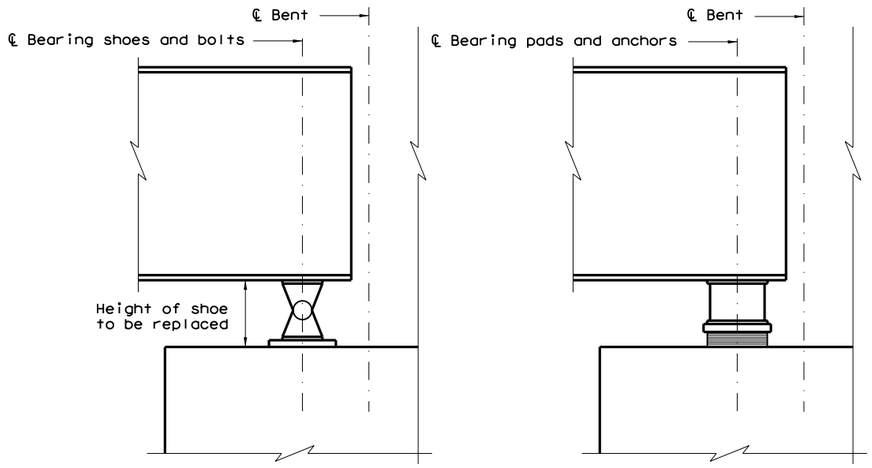
4/26/2023

Texas Department of Transportation — San Antonio District

BEARING SHOE REPLACEMENT PEDESTAL

IH 10 EB at N Laredo Street

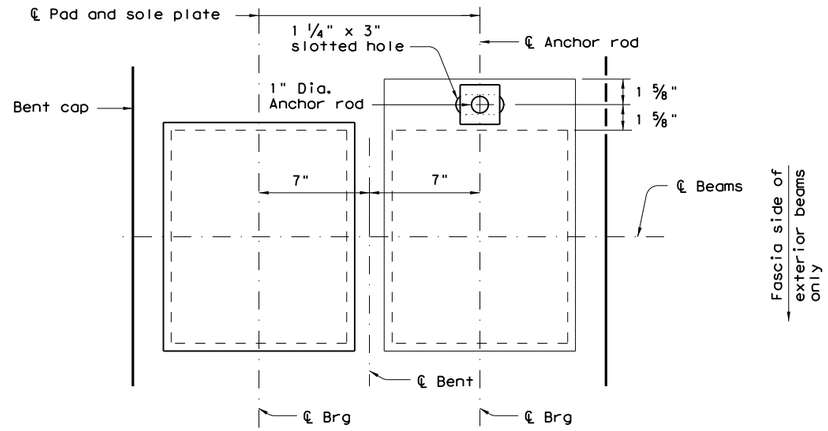
FILE: 091500258 Pedestal details.dgn	DN:		CK:	DW: SRF	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY	
REVISIONS	915	00	258	IH 10	
	DIST	COUNTY		SHEET NO.	
	SAT	BEXAR		119	



EXISTING

REPLACEMENT

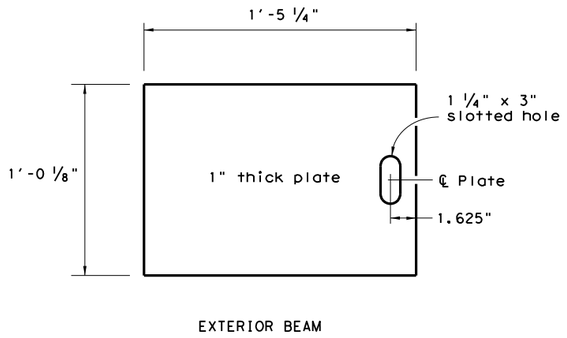
Remove existing shoes and cut anchor bolts flush with top of cap. Remove existing welds if present prior to raising structure.



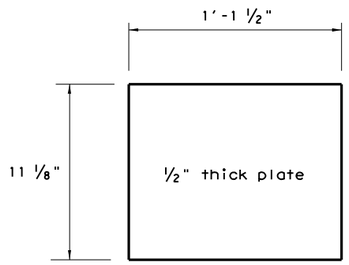
PLAN AT INTERIOR BEAM PLAN AT EXTERIOR BEAM

BEARING PLACEMENT AND ANCHOR ROD DETAIL

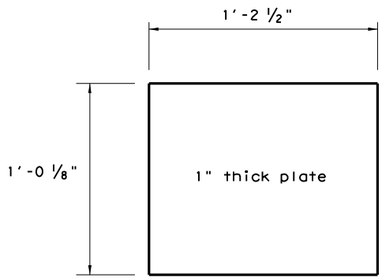
Anchor rod for exterior beams only



EXTERIOR BEAM

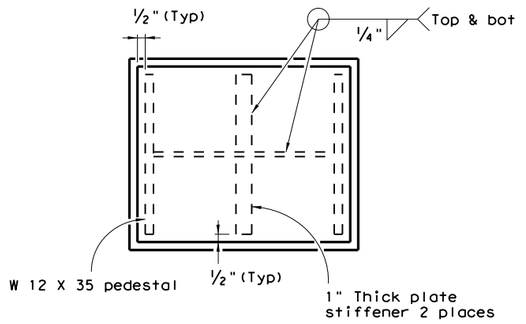


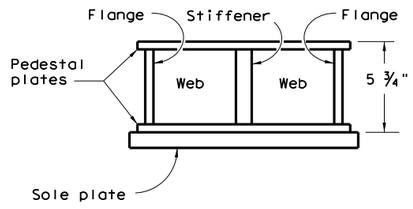
PEDESTAL PLATE
AND BEARING PAD



INTERIOR BEAM

SOLE PLATE





PEDESTAL ASSEMBLY

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

04/26/2023

Sheet 2 of 2

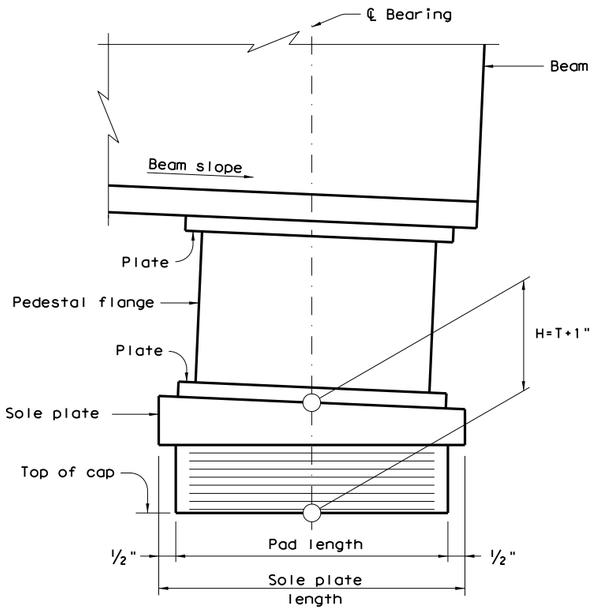
Texas Department of Transportation

San Antonio District

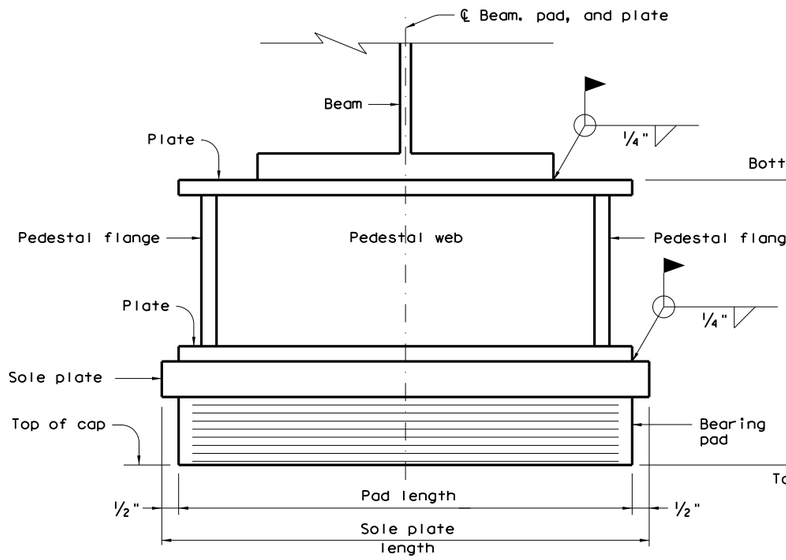
BEARING SHOE REPLACEMENT PEDESTAL

IH 10 EB at N Laredo Street

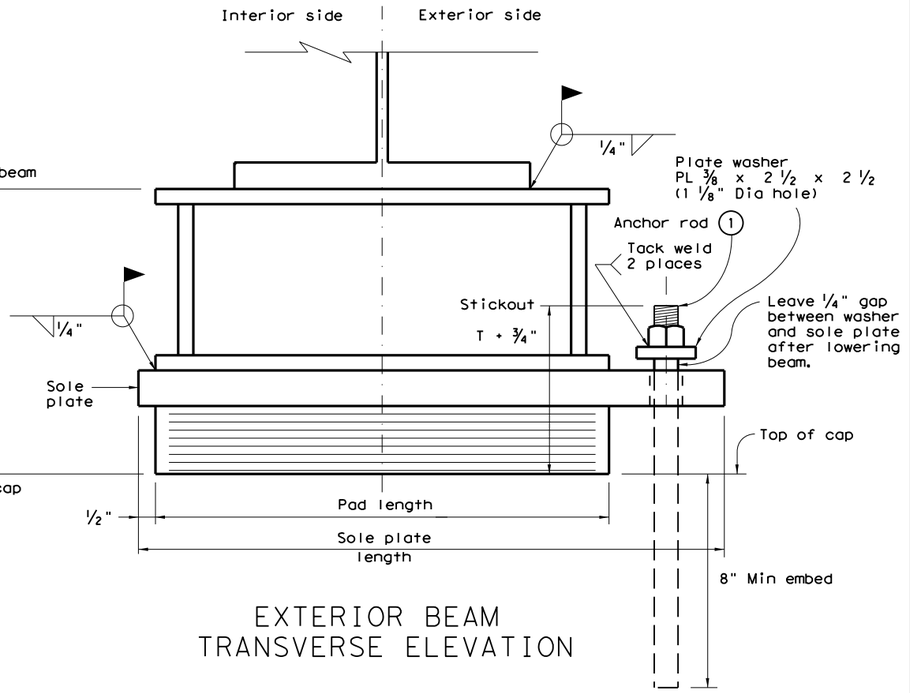
FILE: 091500258 Pedestal details.dgn	DN:		CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB		HIGHWAY
REVISIONS	915	00	258		IH 10
	DIST	COUNTY			SHEET NO.
	SAT	BEXAR			120



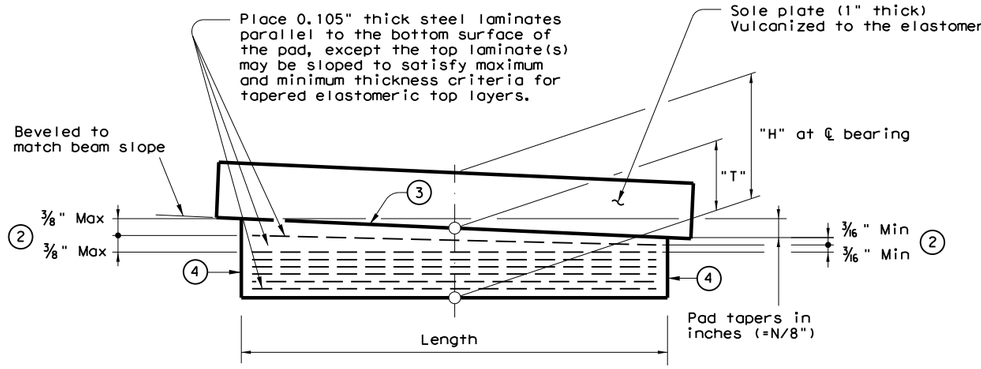
SIDE ELEVATION



INTERIOR BEAM
TRANSVERSE ELEVATION



EXTERIOR BEAM
TRANSVERSE ELEVATION



LAMINATED ELASTOMERIC BEARING PAD DETAILS

50 Durometer - For beam slopes < 3% - Maximum taper ¼"

NOTE - Showing standard bearing pad design. Designer to determine layer thicknesses, pad durometer, and number of layers required and modify detail as needed.

(1) 1" Dia threaded rod (ASTM A 193 Gr B7 or F 1554 Gr 105) with heavy hex nut and plate washer. Hot-dip galvanize rod, nut and washer. Sizing, drilling and cleaning rod roles must follow the adhesive Manufacturer's directions. Embed using a Type III (Class C, D, E or F) adhesive meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

(2) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(3) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. Include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper) N=1, (for ⅛" taper) N=2, (for ¼" taper) etc.
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{\text{Length}}\right)$ IN/IN.

(4) Locate permanent mark here.

MATERIAL NOTES:

Provide sole plates conforming to ASTM A588.

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436.

Hot dip galvanize rod, nut, and washer as per Item 445, "Galvanizing". Sizing, drilling, and cleaning rod holes must follow the epoxy Manufacturer's directions. Use a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

GENERAL NOTES:

Raise structure per Item 495, "Raising Existing Structures" to facilitate bearing pad replacement. Costs of furnishing and installing elastomeric bearing pads, sole plates, and anchor rod assembly are paid for in accordance with Item 434, "Bridge Bearings".

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. A copy of the bearing layout is to be provided to the Engineer. Permanently mark each bearing in accordance with the bearing layout.

Provide shop drawings for approval.

STATE OF TEXAS
LEON B. FLOURNOY
105991
LICENSED
PROFESSIONAL ENGINEER

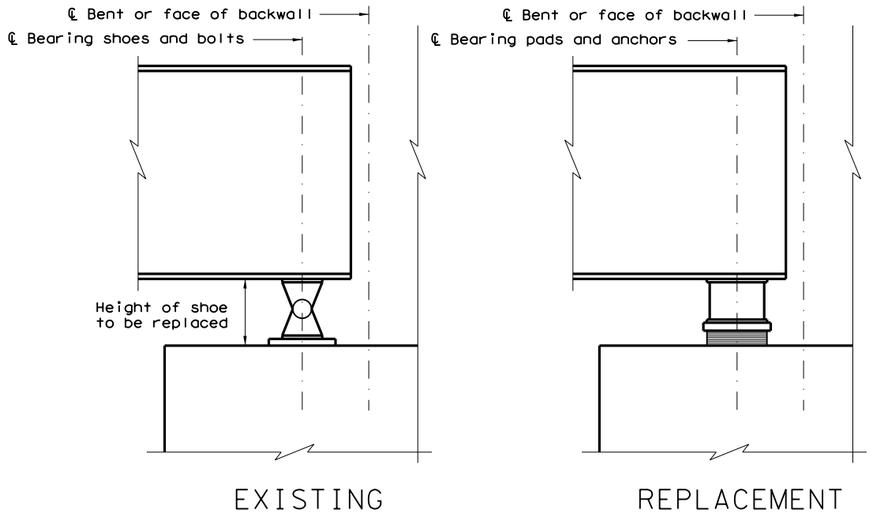
04/26/2023

Texas Department of Transportation
San Antonio District

BEARING SHOE REPLACEMENT PEDESTAL

Various bridges

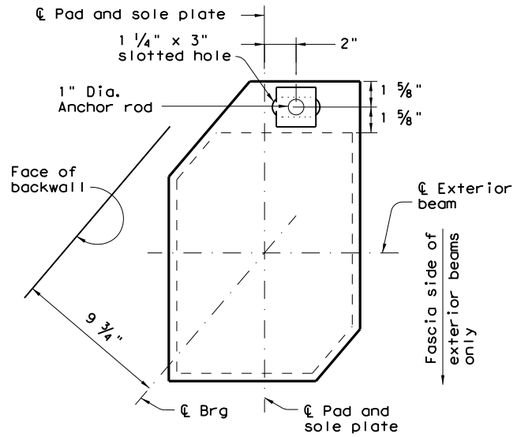
FILE: 091500258 Pedestal details.dgn	DN:		CK:	DW: SRF	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY	
REVISIONS	915	00	258	VARIES	
	DIST	COUNTY		SHEET NO.	
	SAT	BEXAR		121	



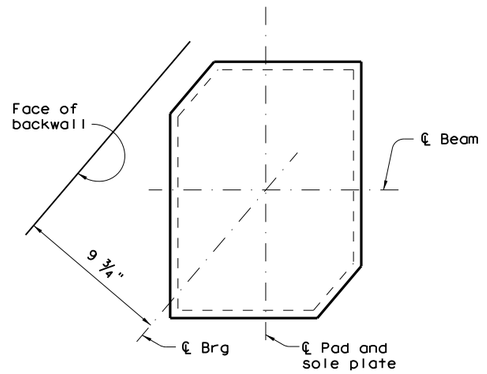
EXISTING

REPLACEMENT

Remove existing shoes and cut anchor bolts flush with top of cap. Remove existing welds if present prior to raising structure.



PLAN AT EXTERIOR BEAM

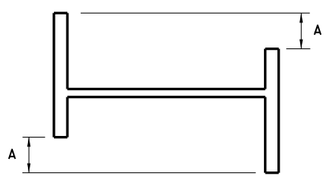


PLAN AT INTERIOR BEAM

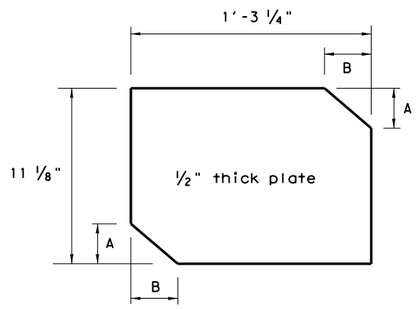
BEARING PLACEMENT AND ANCHOR ROD DETAIL

Anchor rod for exterior beams only

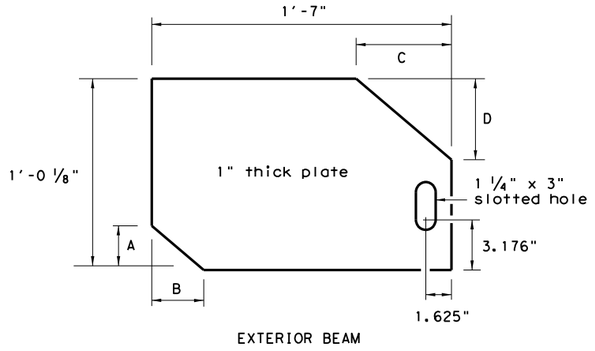
TABLE OF CLIP DIMENSIONS							
Structure	Pedestal	Ped plate & Brg pad		Sole plate			
	A	A	B	A	B	C	D
0073-08-044	2.260"	2.529"	2.974"	2.798"	3.290"	6.043"	5.138"
0073-08-045	2.293"	2.564"	2.974"	2.835"	3.289"	6.043"	5.209"
0073-08-046	2.686"	2.982"	2.925"	3.277"	3.225"	5.979"	6.075"



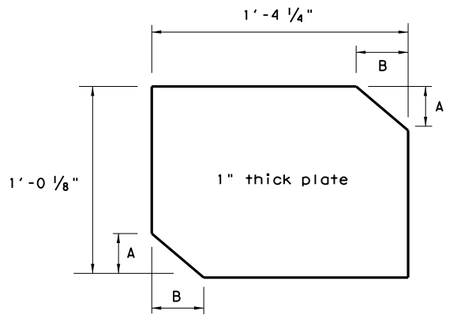
W 14 X 82 PEDESTAL



PEDESTAL PLATE AND BEARING PAD

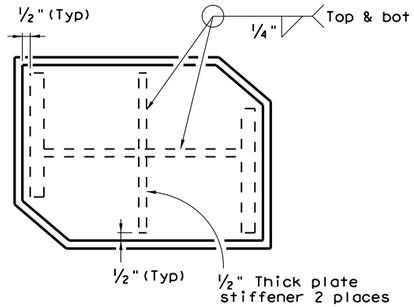


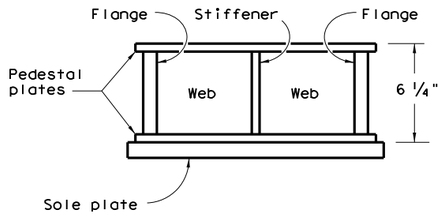
EXTERIOR BEAM



INTERIOR BEAM

SOLE PLATE





PEDESTAL ASSEMBLY

04/26/2023

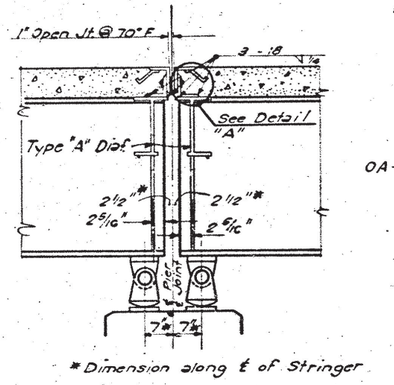
Texas Department of Transportation

San Antonio District

BEARING SHOE REPLACEMENT PEDESTAL

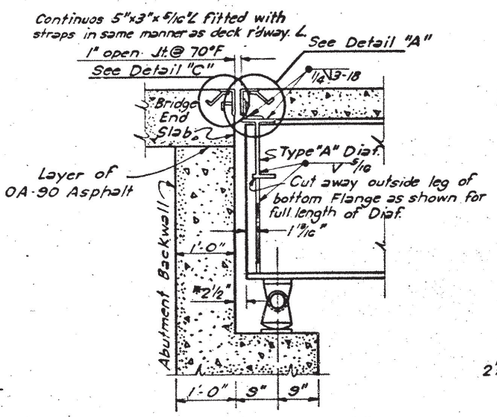
Various bridges

FILE: 091500258 Pedestal details.dgn	DN:		CK:	DW: SRF		CK:
©TxDOT February ,2023	CONT	SECT	JOB		HIGHWAY	
REVISIONS	915	00	258		VARIES	
	DIST	COUNTY			SHEET NO.	
	SAT	BEXAR			122	



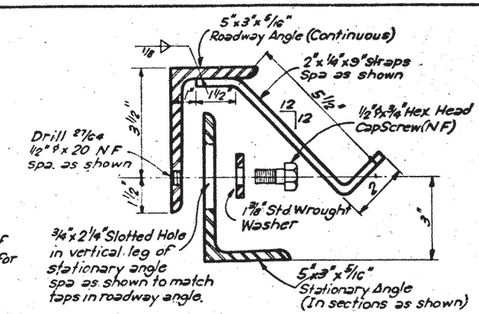
* Dimension along ℄ of Stringer

SECTION SHOWING INTERIOR BEAMS DETAIL

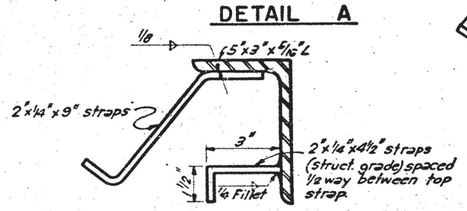


* Dimensions along ℄ of Beams. Other dimensions measured normal to Abut.

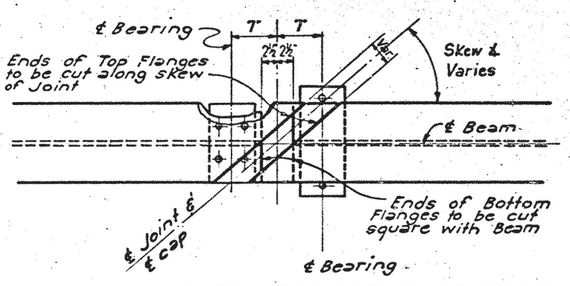
SECTION SHOWING END OF BEAM DETAIL



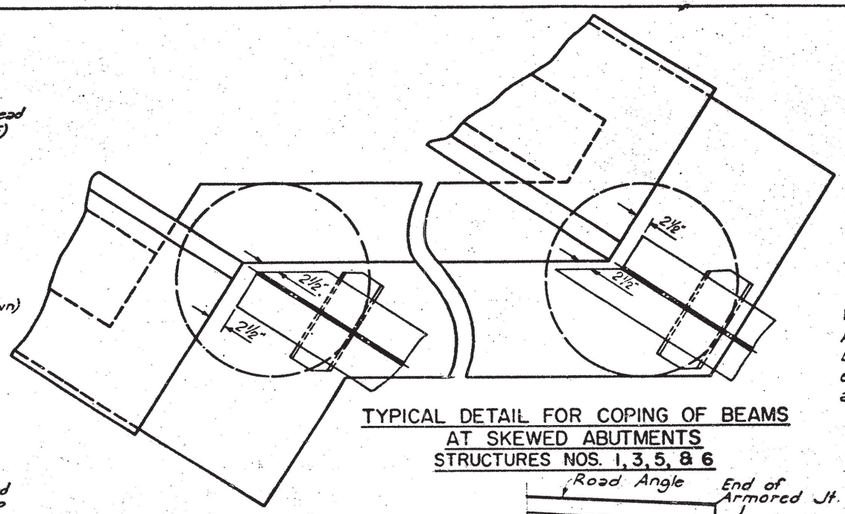
DETAIL A



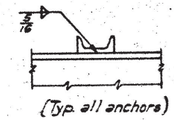
DETAIL C



TYPICAL DETAIL FOR COPING OF BEAMS AT SKEWED INTERIOR OPEN JOINTS

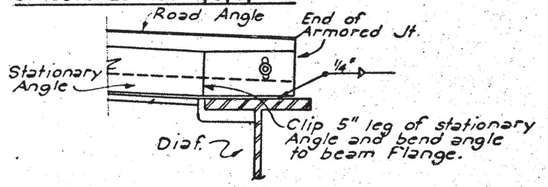


TYPICAL DETAIL FOR COPING OF BEAMS AT SKEWED ABUTMENTS STRUCTURES NOS. 1, 3, 5, & 6

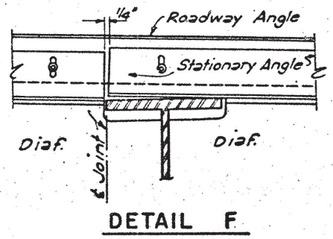


SLAB ANCHORS

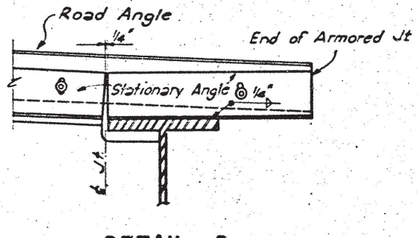
Weld four 4 L 7.25 x 0'-4" slab anchors per concrete pour. The anchors shall be located at quarter points on exterior beams only. Center slab anchors on beam flanges.



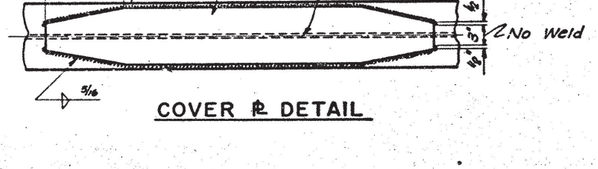
DETAIL E



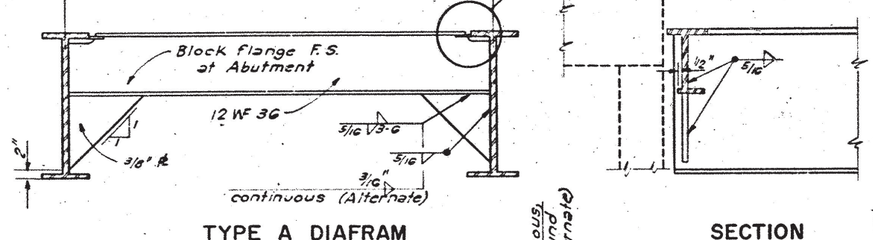
DETAIL F



DETAIL D

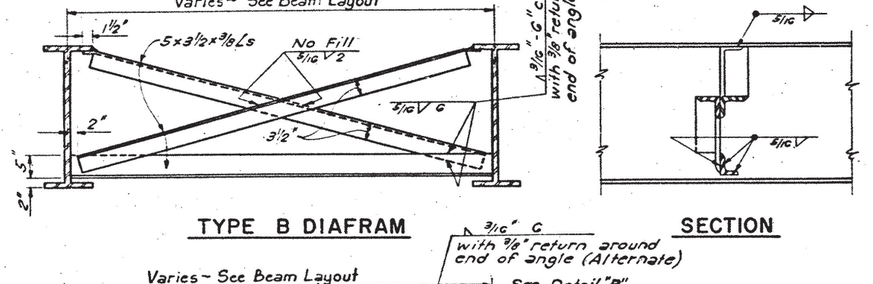


COVER PL DETAIL



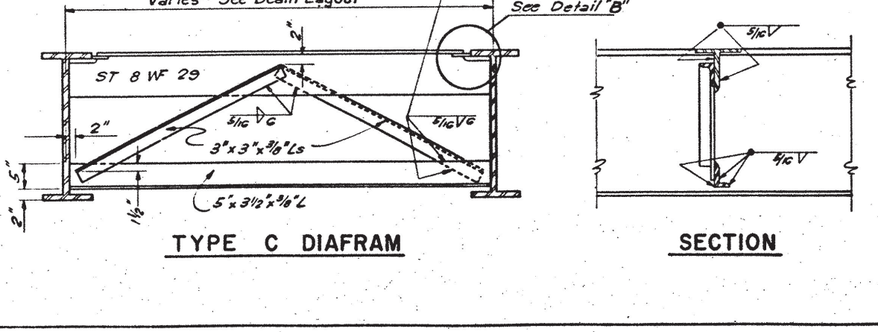
TYPE A DIAFRAM

SECTION



TYPE B DIAFRAM

SECTION



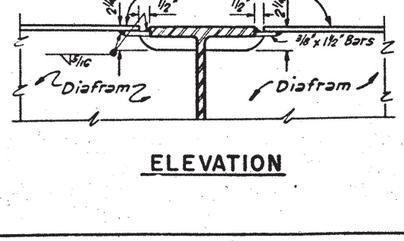
TYPE C DIAFRAM

SECTION

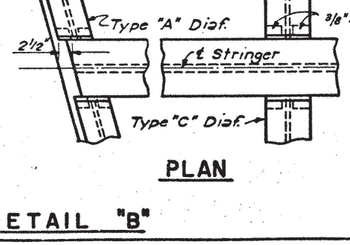
DETAIL "B"

TYPICAL BEAM SPLICE DETAILS

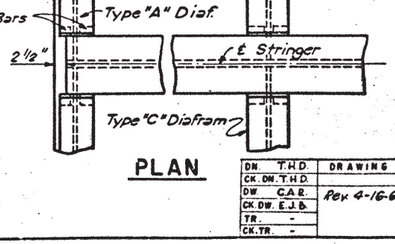
Ends of beams to be welded shall be prepared in the shop taking into account their relative positions in the finished structure due to grade, camber and curvature. Each splice shall be completely shop assembled, checked and matchmarked while assembled by stamping in the metal. Extension bars shall be used in making the butt welds in the flanges as per AWS Specification sect. G04 (j) & G06 (e).



ELEVATION



PLAN

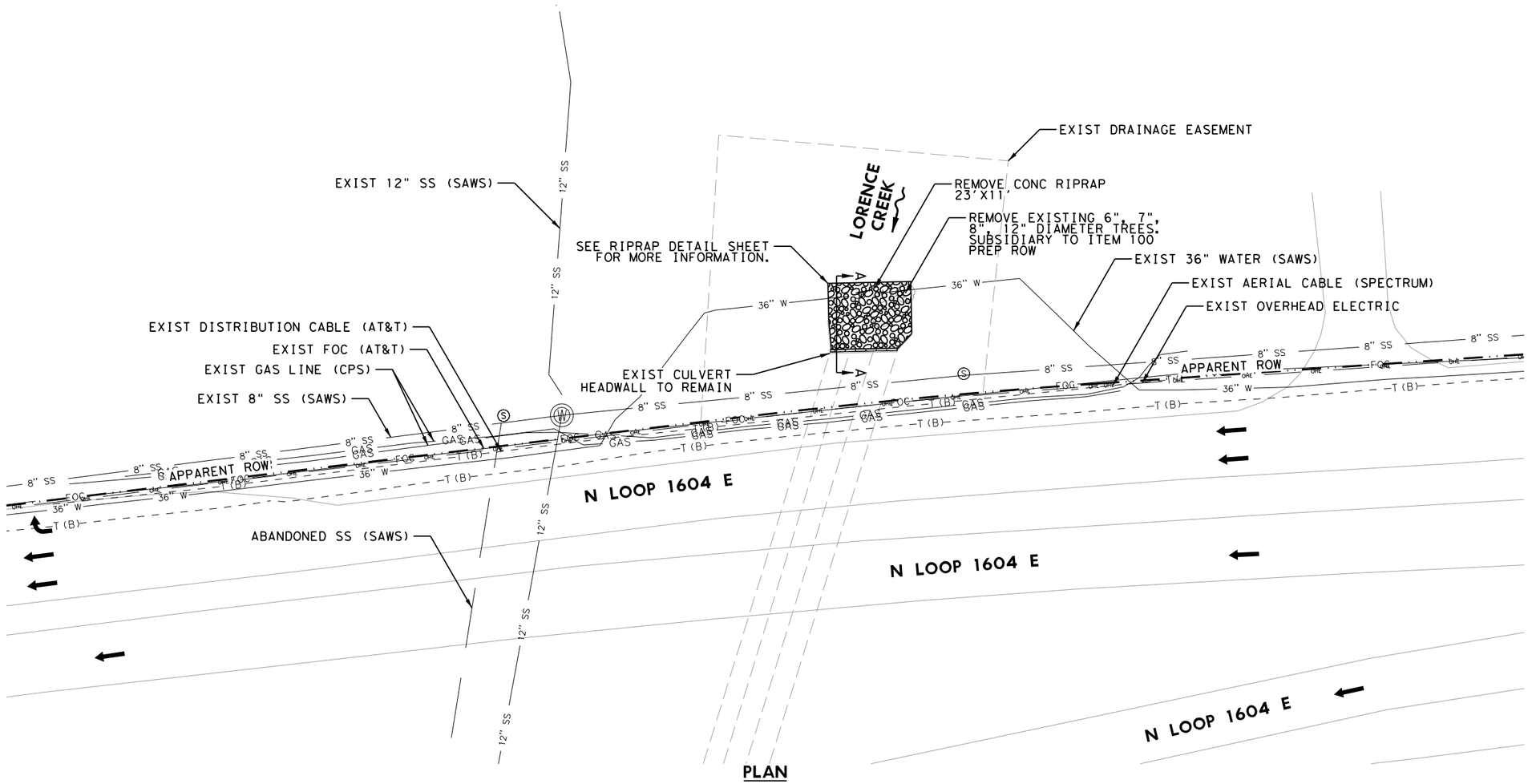


PLAN

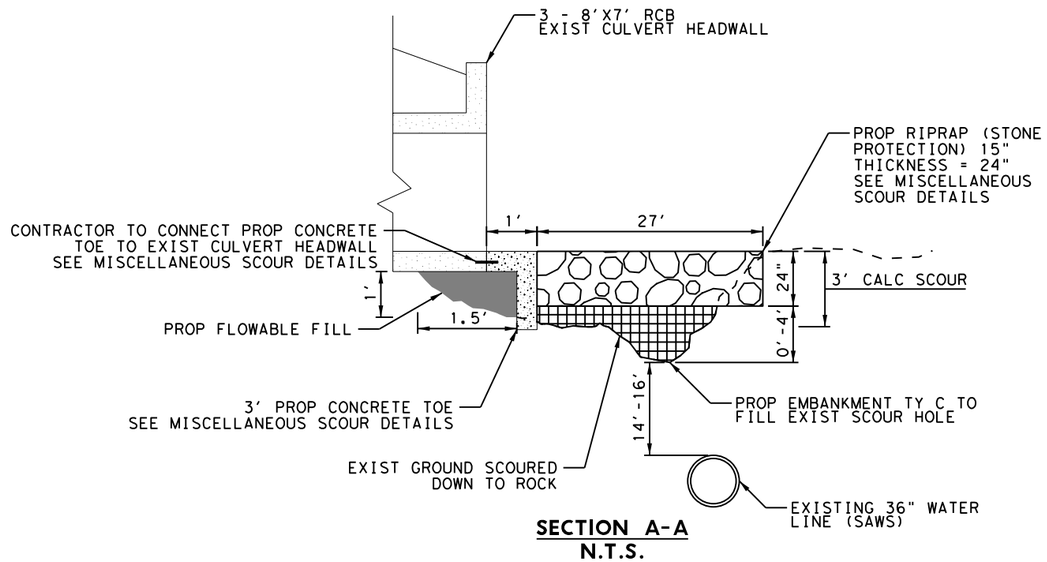
NOTE: Bolt holes in stringer webs shall be filled with Button Head Bolts.

STEEL DETAILS
(ALL STRUCTURES)

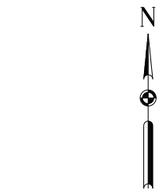
DN. T.H.D.	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
CK. DN. T.H.D.			6	TEXAS	C915-00-258				123
DW. C.A.R.	Rev. 4-16-62		STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
CK. DW. E.J.B.			15	VARIES		0915	00	258	VAR
TR. -									
CK. TR. -									



PLAN



SECTION A-A
N.T.S.



LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 1.00 AC.
3. TOTAL DISTURBED AREA = 0.04 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 3.00' FOR THE 100 YEAR EVENT AND 3.00' FOR THE 500 YEAR STORM EVENT.

0' 25' 50'
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	1
0104 6009	REMOVING CONC (RIPRAP)	SY	29
0110 6002	EXCAVATION (CHANNEL)	CY	7
0132 6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	80
0401 6001	FLOWABLE BACKFILL	CY	2
0420 6074	CL C CONC (MISC)	CY	3
0432 6035	RIPRAP (STONE PROTECTION) (24 IN)	CY	68
0500 6001	MOBILIZATION	LS	0.5

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SL 1604 AT LORENCE CREEK SCOUR PROTECTION LAYOUT

RDWY REF NO. 15-SCR-9
NBI # 15-015-0-2452-02-104

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	130
CONT.	SECT.	JOB	
0915	00	258	

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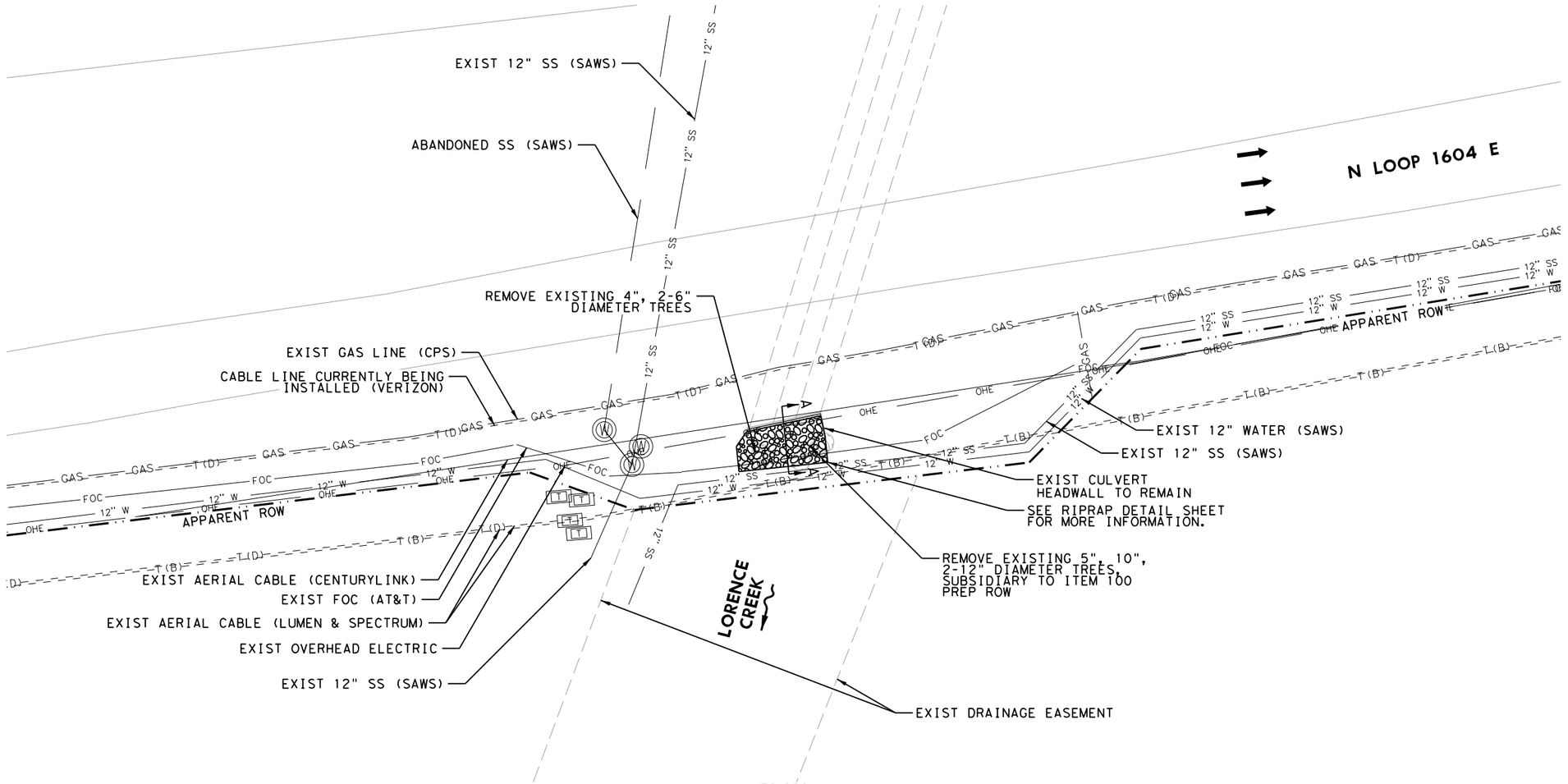
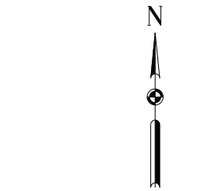


PLAN

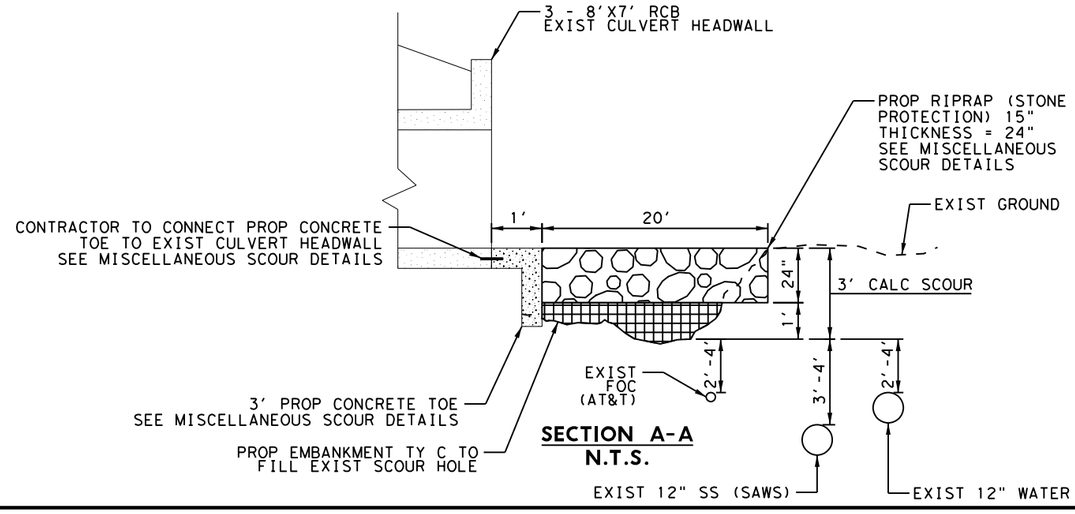


NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 1.00 AC.
3. TOTAL DISTURBED AREA = 0.04 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 3.00' FOR THE 100 YEAR EVENT AND 3.00' FOR THE 500 YEAR STORM EVENT.

0' 25' 50'
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	1
0110 6002	EXCAVATION (CHANNEL)	CY	15
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	1
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	22
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	22
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	11
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	11
0168 6001	VEGETATIVE WATERING	MG	0.4
0420 6074	CL C CONC (MISC)	CY	3
0422 6013	RIPRAP (STONE PROTECTION)(24 IN)	CY	45
0432 6035	MOBILIZATION	LS	0.5
0500 6001	TEMP SEDMT CONT FENCE (INSTALL)	LF	187
0506 6038	TEMP SEDMT CONT FENCE (REMOVE)	LF	187



SECTION A-A
N.T.S.

4/17/2023

AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Kimley»Horn
F-928

Texas Department of Transportation

SL 1604 AT LORENCE CREEK
SCOUR PROTECTION LAYOUT

RDWY REF NO. 15-SCR-9
NBI # 15-015-0-2452-02-104

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	131
CONT.	SECT.	JOB	
0915	00	258	

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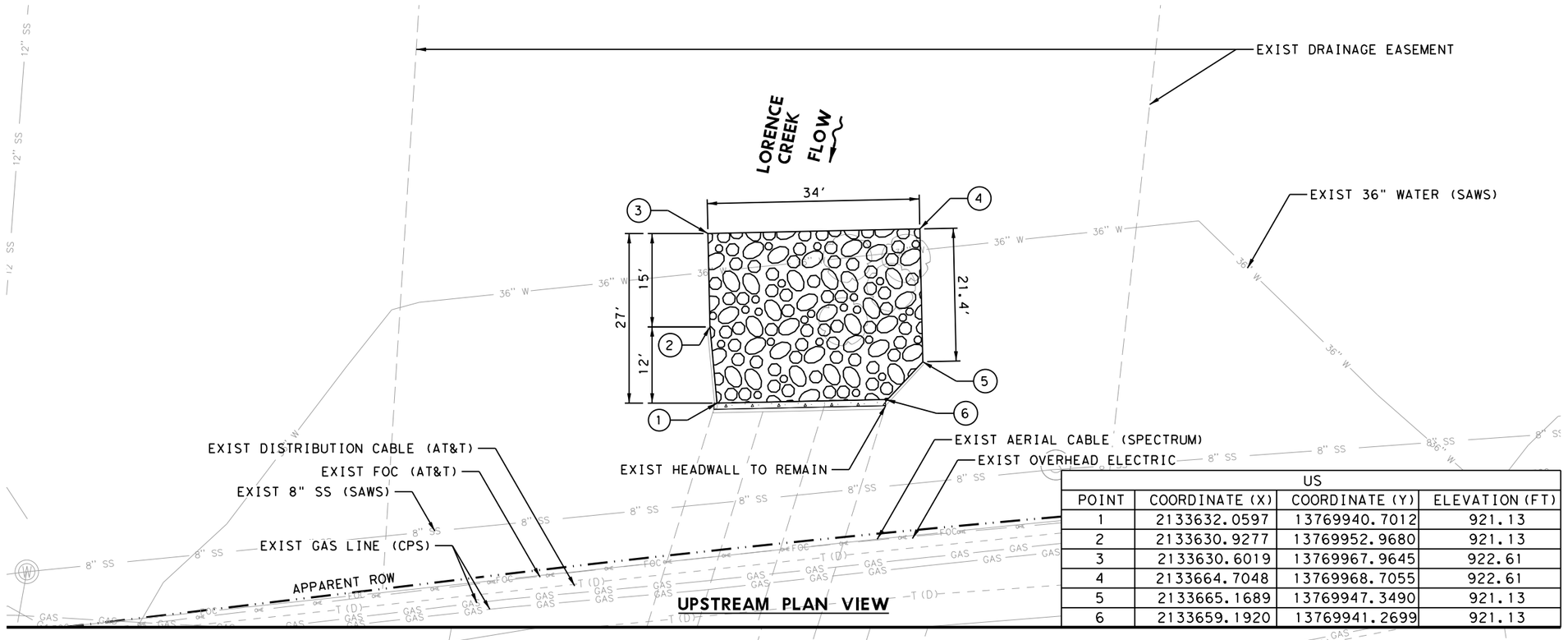
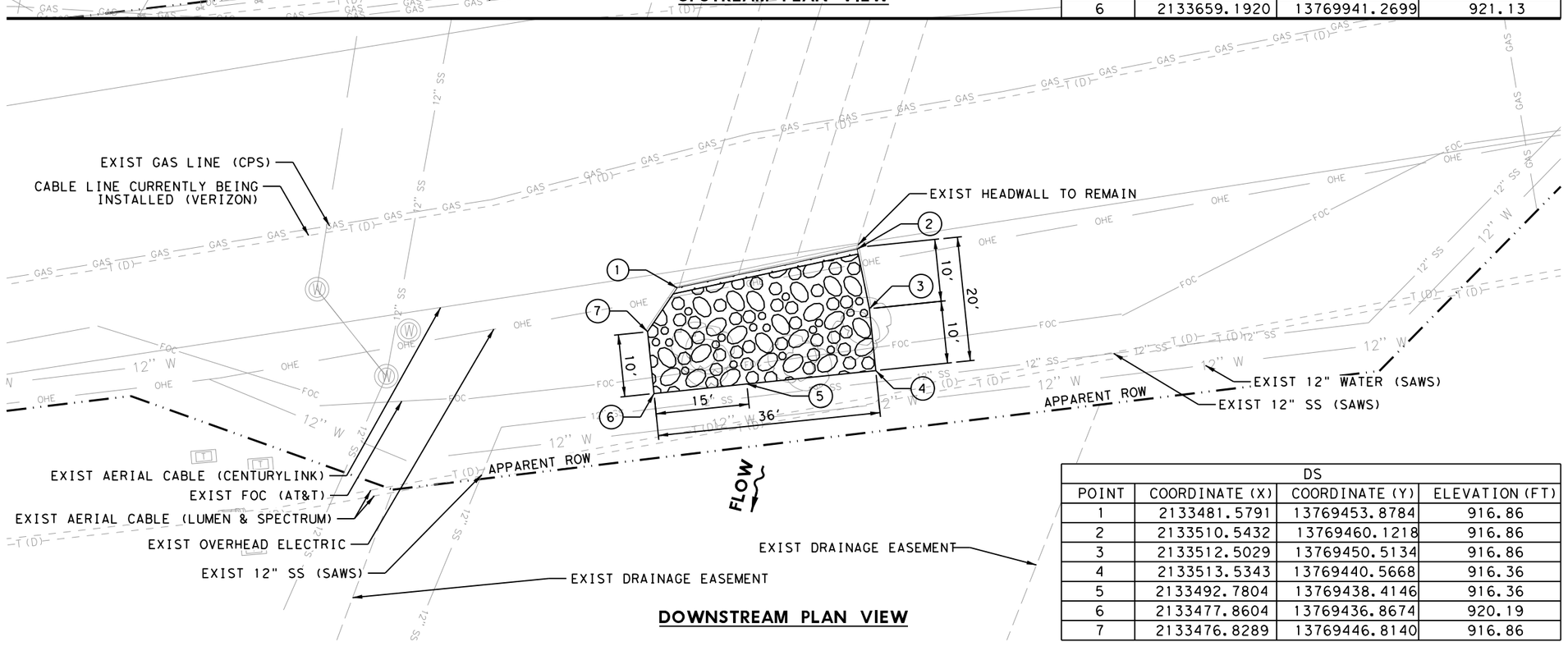


UPSTREAM PLAN VIEW

US			
POINT	COORDINATE (X)	COORDINATE (Y)	ELEVATION (FT)
1	2133632.0597	13769940.7012	921.13
2	2133630.9277	13769952.9680	921.13
3	2133630.6019	13769967.9645	922.61
4	2133664.7048	13769968.7055	922.61
5	2133665.1689	13769947.3490	921.13
6	2133659.1920	13769941.2699	921.13



DOWNSTREAM PLAN VIEW

DS			
POINT	COORDINATE (X)	COORDINATE (Y)	ELEVATION (FT)
1	2133481.5791	13769453.8784	916.86
2	2133510.5432	13769460.1218	916.86
3	2133512.5029	13769450.5134	916.86
4	2133513.5343	13769440.5668	916.36
5	2133492.7804	13769438.4146	916.36
6	2133477.8604	13769436.8674	920.19
7	2133476.8289	13769446.8140	916.86

N

LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

0' 10' 20'
SCALE

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 1.02 AC.
3. TOTAL DISTURBED AREA = 0.10 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 3.00' FOR THE 100 YEAR STORM EVENT AND 3.00' FOR THE 500 YEAR STORM EVENT.
5. ALL COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83)(1993 ADJUSTMENT), TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017.

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SL 1604 AT LORENCE CREEK
RIPRAP DETAIL

RDWY REF NO. 15-SCR-9
NBI # 15-015-0-2452-02-104

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	132
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw:\\kh-pw.bentley.com:kh-pw-01\Documents\01 Active Projects\TX-GEO-064157501 - TXDOT SAT H-H WA1\DesignData\4 - Design\Plan Set\7. Bridge\HHWA1_SCOUR_RIPRAP_01.dgn
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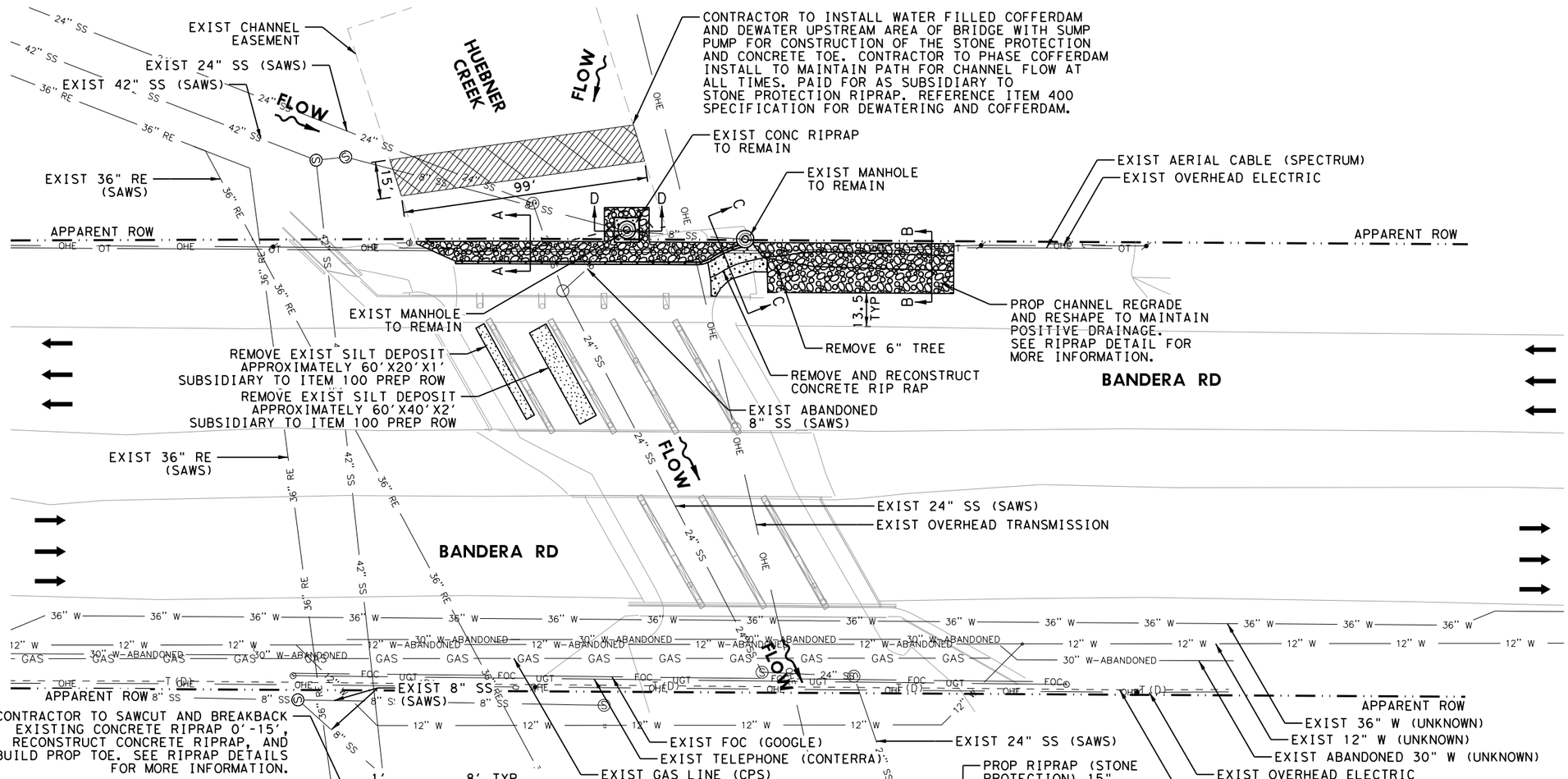
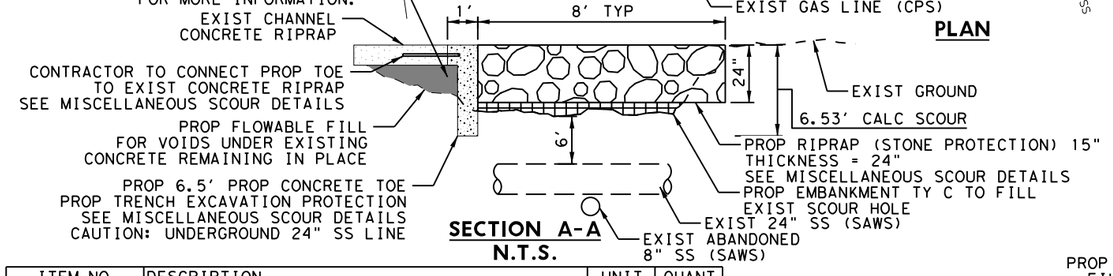
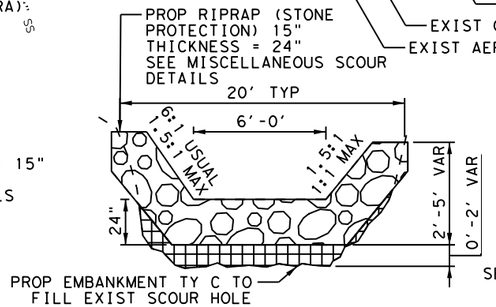




SECTION A-A
N.T.S.



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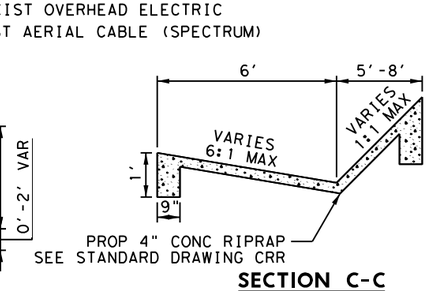
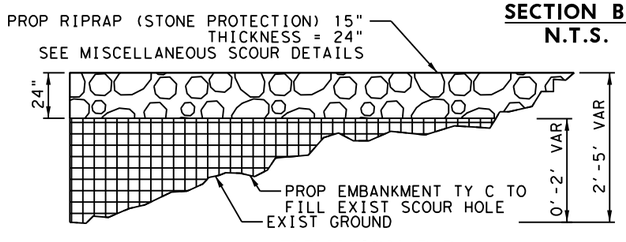
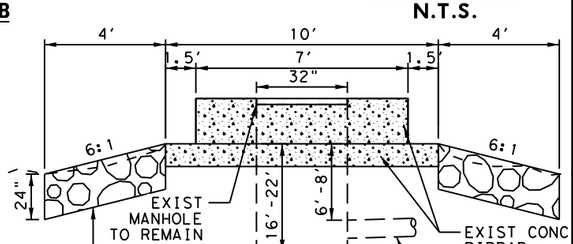


SECTION C-C
N.T.S.



ELEVATION B-B
N.T.S.



SECTION D-D
N.T.S.

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	3
0104 6009	REMOVING CONC (RIPRAP)	SY	127
0110 6002	EXCAVATION (CHANNEL)	CY	82
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	259
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	62
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	62
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	31
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	31
0168 6001	VEGETATIVE WATERING	MG	1
0401 6001	FLOWABLE BACKFILL	CY	5
0402 6001	TRENCH EXCAVATION PROTECTION	LF	117
0420 6074	CL C CONC (MISC)	CY	20
0432 6001	RIPRAP (CONC)(4 IN)	CY	6
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	193
0500 6001	MOBILIZATION	LS	1
0506 6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	125
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	125

LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.36 AC.
3. TOTAL DISTURBED AREA = 0.10 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 2.91' FOR THE 100 YEAR STORM EVENT, 3.56' FOR THE 500 YEAR STORM EVENT AND 6.53' FOR INCIPIENT OVERTOPPING FLOOD EVENT.

0' 25' 50'
SCALE

4/17/2023

AUSTIN S. HELTON 124922 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Kimley»Horn F-928

Texas Department of Transportation

SH 16 AT HUEBNER CREEK SCOUR PROTECTION LAYOUT

RDWY REF NO. 15-SCR-12
NBI # 15-015-0-0291-10-087

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SH 16
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	133
CONT.	SECT.	JOB	
0915	00	258	

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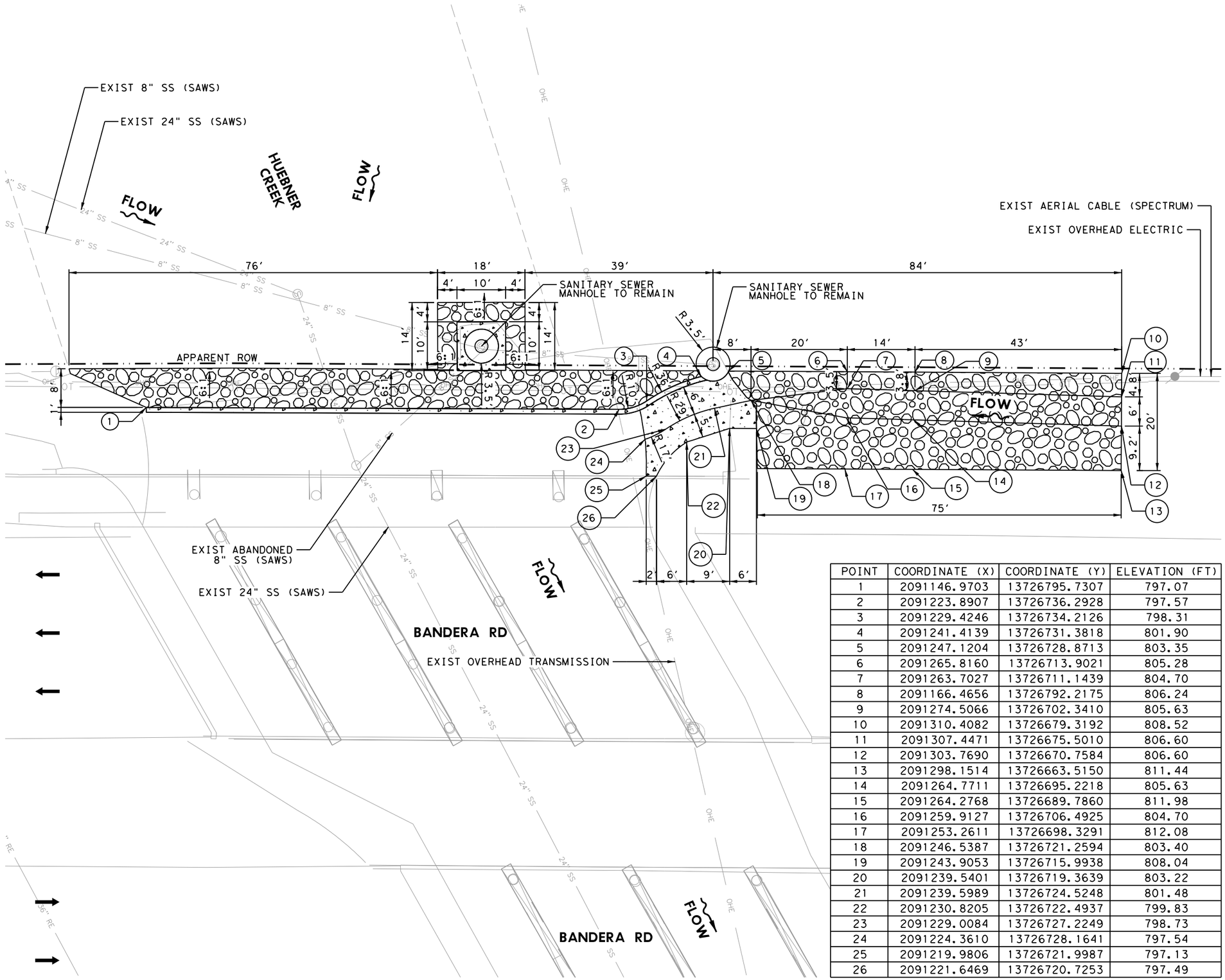

POINT	COORDINATE (X)	COORDINATE (Y)	ELEVATION (FT)
1	2091146.9703	13726795.7307	797.07
2	2091223.8907	13726736.2928	797.57
3	2091229.4246	13726734.2126	798.31
4	2091241.4139	13726731.3818	801.90
5	2091247.1204	13726728.8713	803.35
6	2091265.8160	13726713.9021	805.28
7	2091263.7027	13726711.1439	804.70
8	2091166.4656	13726792.2175	806.24
9	2091274.5066	13726702.3410	805.63
10	2091310.4082	13726679.3192	808.52
11	2091307.4471	13726675.5010	806.60
12	2091303.7690	13726670.7584	806.60
13	2091298.1514	13726663.5150	811.44
14	2091264.7711	13726695.2218	805.63
15	2091264.2768	13726689.7860	811.98
16	2091259.9127	13726706.4925	804.70
17	2091253.2611	13726698.3291	812.08
18	2091246.5387	13726721.2594	803.40
19	2091243.9053	13726715.9938	808.04
20	2091239.5401	13726719.3639	803.22
21	2091239.5989	13726724.5248	801.48
22	2091230.8205	13726722.4937	799.83
23	2091229.0084	13726727.2249	798.73
24	2091224.3610	13726728.1641	797.54
25	2091219.9806	13726721.9987	797.13
26	2091221.6469	13726720.7253	797.49

LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

0' 10' 20'
SCALE

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.36 AC.
3. TOTAL DISTURBED AREA = 0.10 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 2.91' FOR THE 100 YEAR STORM EVENT, 3.56' FOR THE 500 YEAR STORM EVENT AND 6.53' FOR INCIPIENT OVERTOPPING FLOOD EVENT.
5. ALL COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83)(1993 ADJUSTMENT), TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017.

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH 16 AT HUEBNER CREEK
RIPRAP DETAIL

RDWY REF NO. 15-SCR-12
NBI # 15-015-0-0291-10-087

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	134
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw:\\kh-pw.bentley.com:kh-pw-01\Documents\01 Active Projects\TX-GEO-064157501 - TXDOT SAT H-H WA1\DesignData\4 - Design\Plan Set\7. Bridge\HHWA1_SCOUR_RIPRAP_02.dgn
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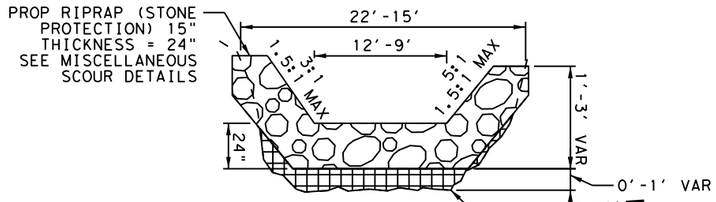
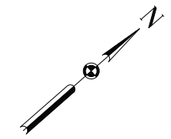
DETAIL "A"

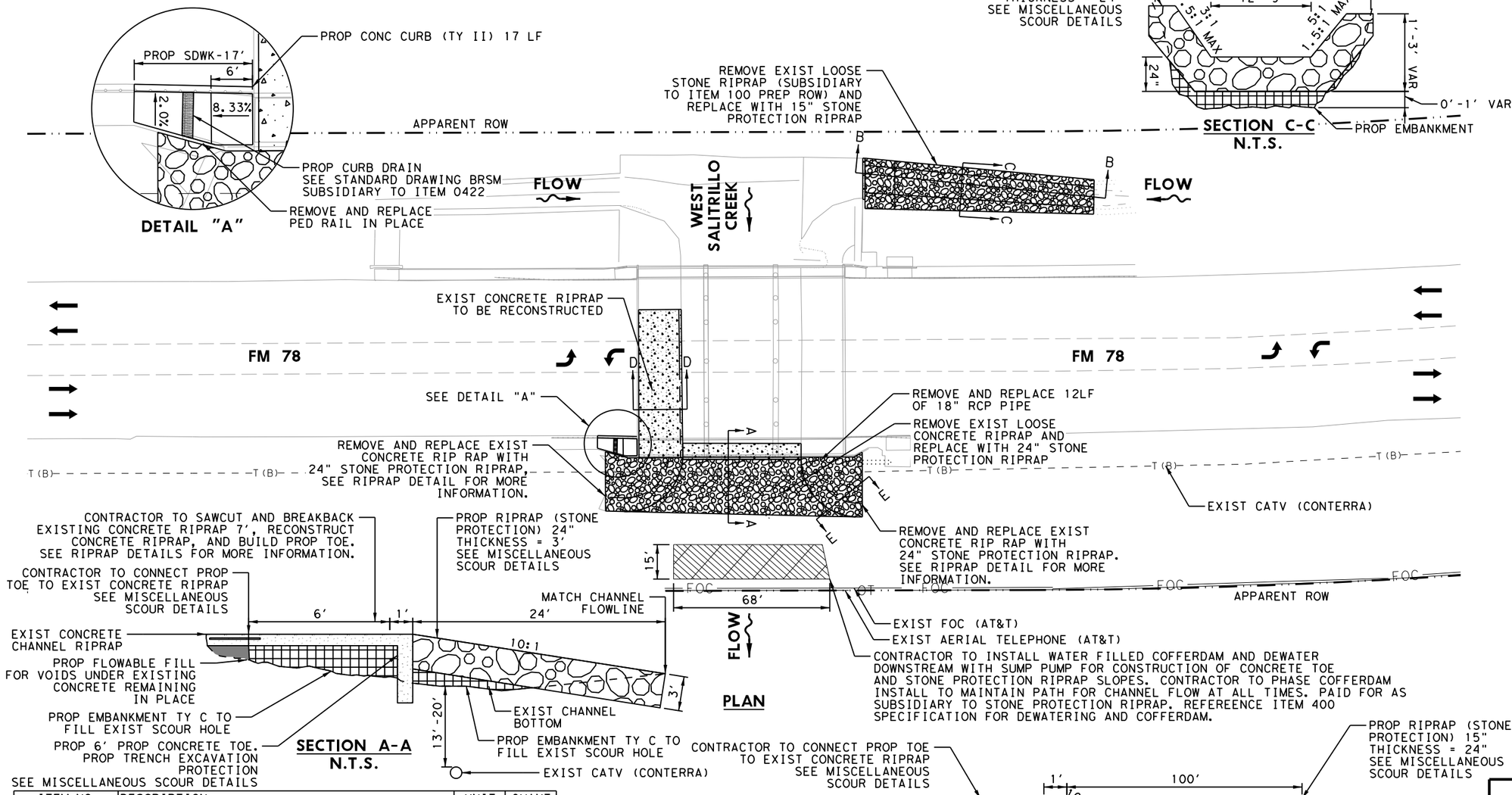


SECTION C-C
N.T.S.



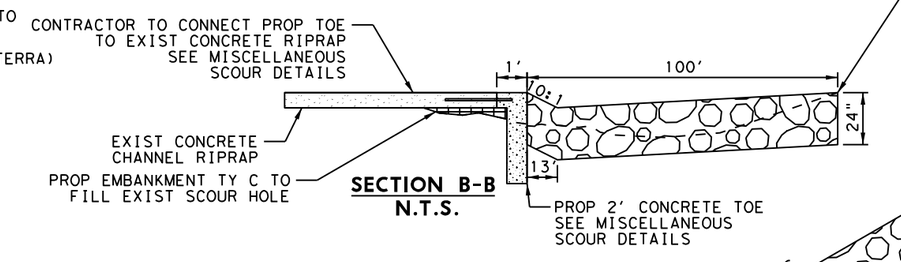
LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

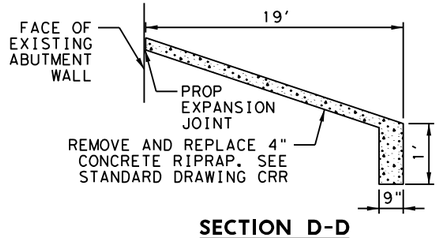


PLAN

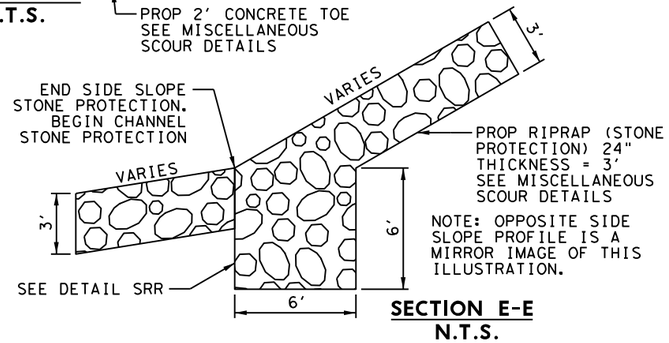
SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



SECTION D-D
N.T.S.



SECTION E-E
N.T.S.

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	3
0104 6009	REMOVING CONC (RIPRAP)	SY	473
0110 6002	EXCAVATION (CHANNEL)	CY	9
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	203
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	42
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	42
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	21
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	21
0168 6001	VEGETATIVE WATERING	MG	0.7
0401 6001	FLOWABLE BACKFILL	CY	7
0402 6001	TRENCH EXCAVATION PROTECTION	LF	130
0420 6074	CL C CONC (MISC)	CY	10
0422 6013	BRIDGE SIDEWALK	SF	112
0432 6001	RIPRAP (CONC)(4 IN)	CY	21
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	137
0432 6037	RIPRAP (STONE PROTECTION) (36 IN)	CY	423
0472 6004	REMOV & RE - LAY PIPE (18 IN)	LF	12
0500 6001	MOBILIZATION	LS	1
0506 6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	60
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	60
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	69
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	69
0529 6002	CONC CURB (TY II)	LF	17

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.46 AC.
3. TOTAL DISTURBED AREA = 0.14 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 0.00' FOR THE 100 YEAR STORM EVENT, 0.00' FOR THE 500 YEAR STORM EVENT, AND 8.87' FOR THE INCIPIENT OVERTOPPING FLOW.

0' 25' 50'
SCALE

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

FM 78 AT WEST SALITRILLO CREEK SCOUR PROTECTION LAYOUT

RDWY REF NO. 15-SCR-11
NBI # 15-015-0-0025-09-138

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		FM 78

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	135
CONT.	SECT.	JOB	
0915	00	258	

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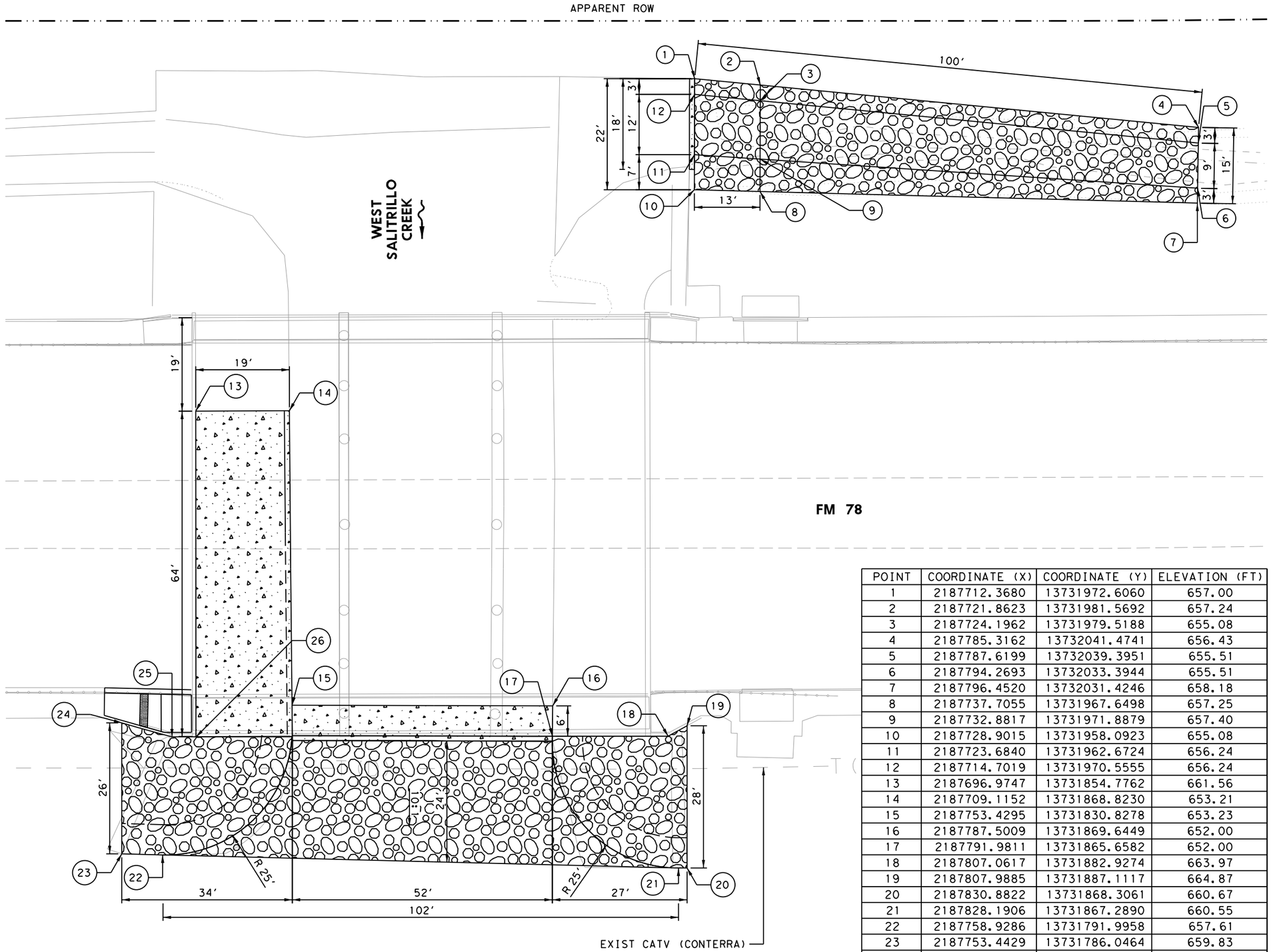

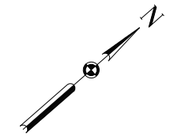

LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

0' 10' 20'
SCALE

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.46 AC.
3. TOTAL DISTURBED AREA = 0.14 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 3.99' FOR THE 100 YEAR STORM EVENT AND 4.56' FOR THE 500 YEAR STORM EVENT.
5. ALL COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83)(1993 ADJUSTMENT), TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017.

POINT	COORDINATE (X)	COORDINATE (Y)	ELEVATION (FT)
1	2187712.3680	13731972.6060	657.00
2	2187721.8623	13731981.5692	657.24
3	2187724.1962	13731979.5188	655.08
4	2187785.3162	13732041.4741	656.43
5	2187787.6199	13732039.3951	655.51
6	2187794.2693	13732033.3944	655.51
7	2187796.4520	13732031.4246	658.18
8	2187737.7055	13731967.6498	657.25
9	2187732.8817	13731971.8879	657.40
10	2187728.9015	13731958.0923	655.08
11	2187723.6840	13731962.6724	656.24
12	2187714.7019	13731970.5555	656.24
13	2187696.9747	13731854.7762	661.56
14	2187709.1152	13731868.8230	653.21
15	2187753.4295	13731830.8278	653.23
16	2187787.5009	13731869.6449	652.00
17	2187791.9811	13731865.6582	652.00
18	2187807.0617	13731882.9274	663.97
19	2187807.9885	13731887.1117	664.87
20	2187830.8822	13731868.3061	660.67
21	2187828.1906	13731867.2890	660.55
22	2187758.9286	13731791.9958	657.61
23	2187753.4429	13731786.0464	659.83
24	2187733.8935	13731803.1155	665.72
25	2187742.5185	13731808.7799	664.64
26	2187745.6349	13731812.3664	662.03

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

FM 78 AT WEST SALITRILLO CREEK RIPRAP DETAIL

RDWY REF NO. 15-SCR-11
NBI # 15-015-0-0025-09-138

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	136
CONT.	SECT.	JOB	
0915	00	258	

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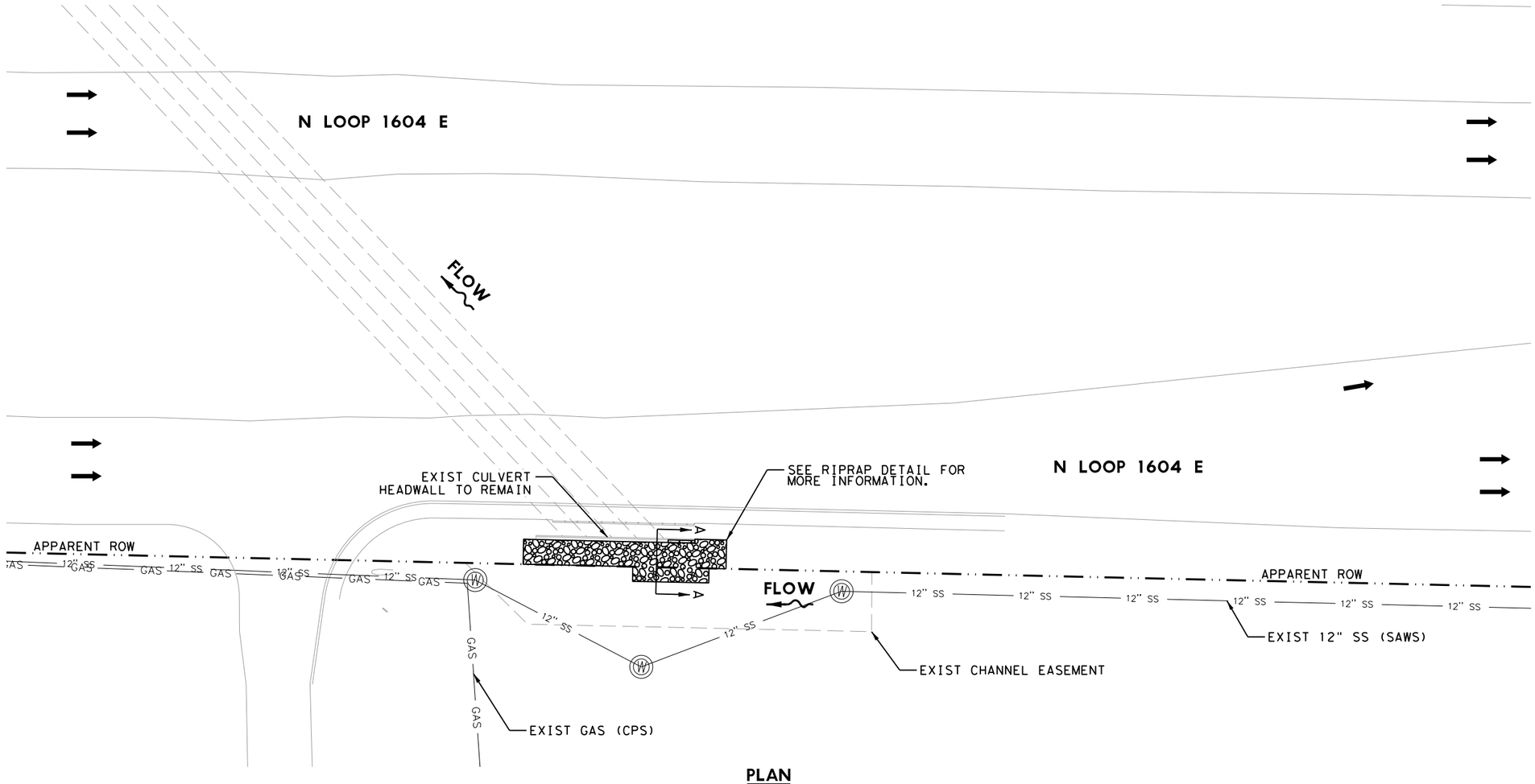
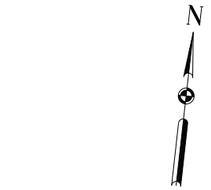


PLAN



LEGEND

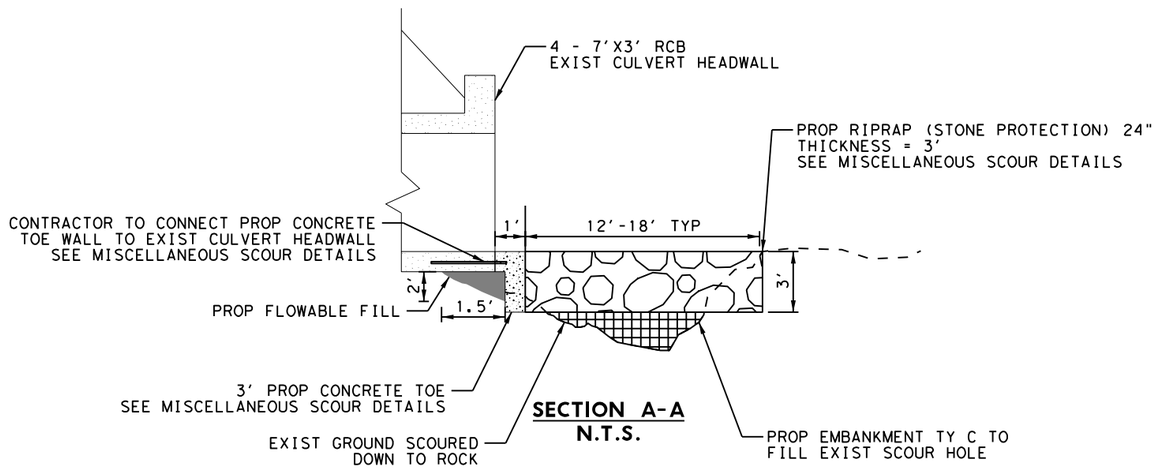
- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.15 AC.
3. TOTAL DISTURBED AREA = 0.02 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 0.00' FOR THE 100 YEAR STORM EVENT AND 0.00' FOR THE 500 YEAR STORM EVENT.

0' 25' 50'
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	2
0110 6002	EXCAVATION (CHANNEL)	CY	4
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	42
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	96
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	96
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	48
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	48
0168 6001	VEGETATIVE WATERING	MG	1.5
0401 6001	FLOWABLE BACKFILL	CY	2
0420 6074	CL C CONC (MISC)	CY	1
0432 6037	RIPRAP (STONE PROTECTION) (36 IN)	CY	118
0500 6001	MOBILIZATION	LS	1
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	177
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	177



SECTION A-A
N.T.S.

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SL 1604 AT UNT TO ELM WATERHOLE CREEK SCOUR PROTECTION LAYOUT

RDWY REF NO. 15-SCR-10
NBI # 15-015-0-2452-03-124

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	137
CONT.	SECT.	JOB	
0915	00	258	

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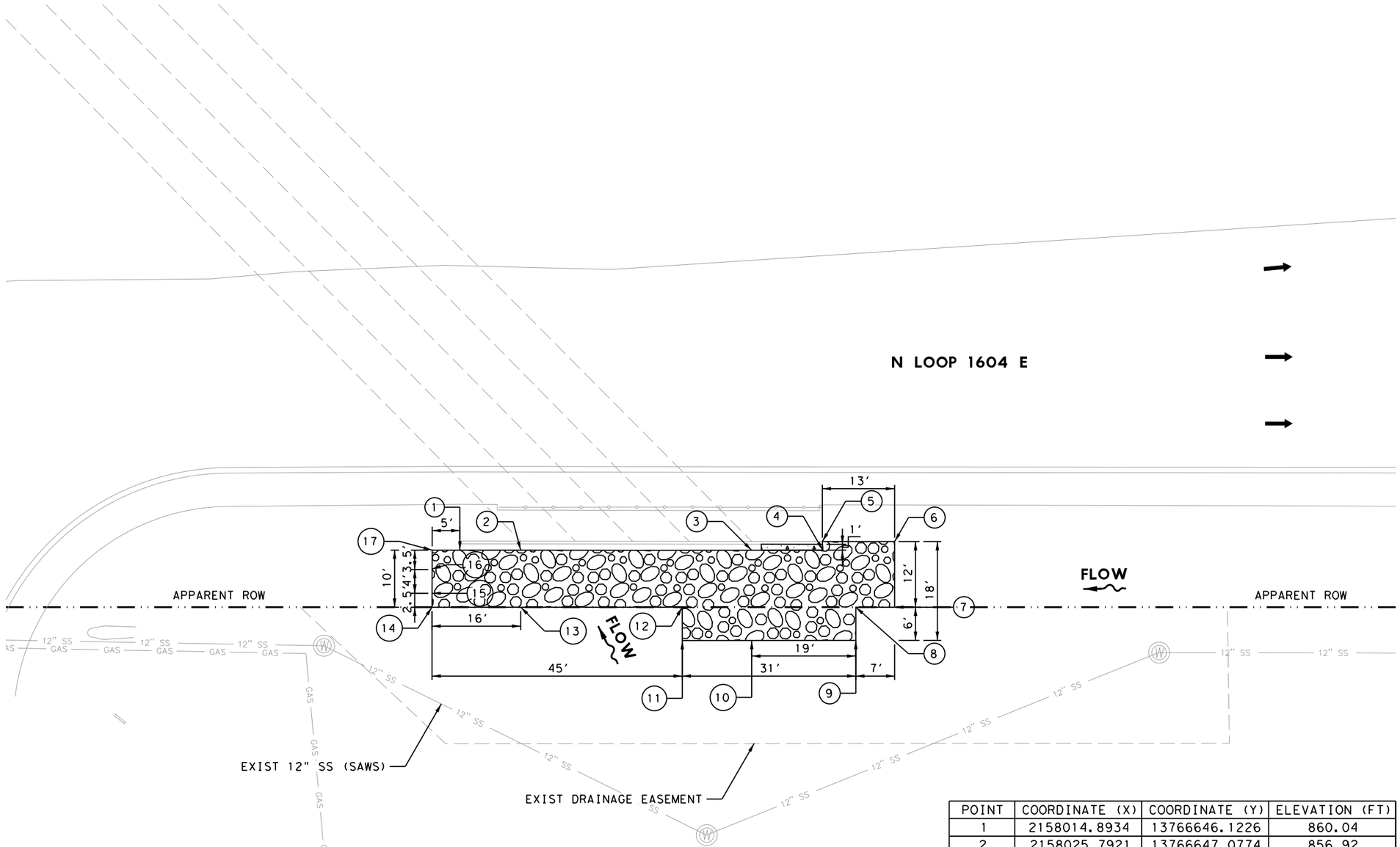

N

LEGEND

- PROP EMBANKMENT
- PROP STONE PROTECTION
- PROP FLOWABLE FILL
- PROP CONCRETE RIPRAP

0' 10' 20'
SCALE

NOTES:

1. CONTRACTOR TO VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. TOTAL PROJECT AREA = 0.15 AC.
3. TOTAL DISTURBED AREA = 0.02 AC.
4. CALCULATED SCOUR FOR THIS LOCATION WAS 0.00' FOR THE 100 YEAR STORM EVENT AND 0.00' FOR THE 500 YEAR STORM EVENT.
5. ALL COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83)(1993 ADJUSTMENT), TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00017.

4/17/2023

STATE OF TEXAS
AUSTIN S HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

POINT	COORDINATE (X)	COORDINATE (Y)	ELEVATION (FT)
1	2158014.8934	13766646.1226	860.04
2	2158025.7921	13766647.0774	856.92
3	2158061.5449	13766650.7423	856.92
4	2158079.9094	13766651.8822	858.38
5	2158079.7072	13766653.4427	858.47
6	2158092.6545	13766654.5751	859.98
7	2158093.7080	13766642.8194	859.98
8	2158086.7353	13766642.2007	859.98
9	2158087.2637	13766636.2496	859.98
10	2158068.6279	13766634.5807	857.52
11	2158056.1760	13766633.4656	857.52
12	2158055.6409	13766639.4417	857.52
13	2158026.6975	13766636.8735	857.52
14	2158010.8064	13766635.4635	860.98
15	2158010.5886	13766637.9540	860.18
16	2158010.2048	13766642.3418	860.18
17	2158009.9122	13766645.6869	861.47

Kimley»Horn F-928

Texas Department of Transportation

SL 1604 AT UNT TO ELM WATERHOLE CREEK RIPRAP DETAIL

RDWY REF NO. 15-SCR-10
NBI # 15-015-0-2452-03-124

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	138
CONT.	SECT.	JOB	
0915	00	258	

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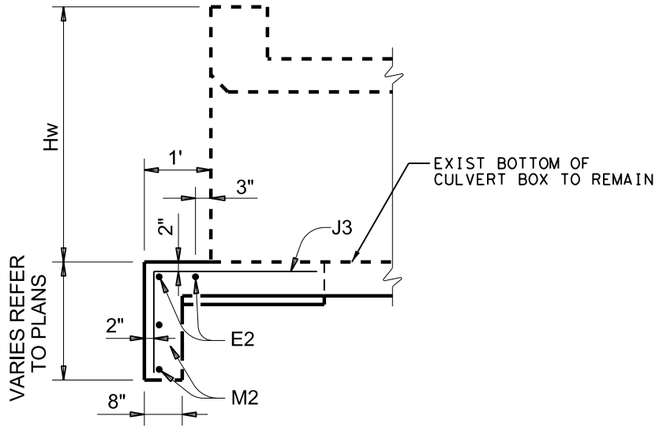
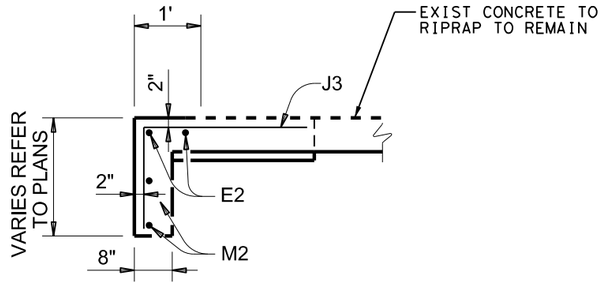
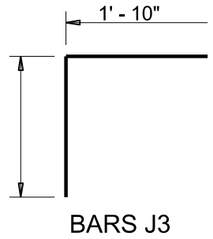


CONCRETE TOE TO EXIST CULVERT



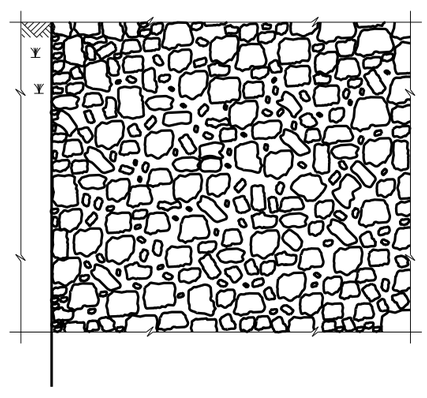
CONCRETE TOE TO EXIST CONCRETE RIPRAP

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.



BARS J3

TABLE OF TOEWALL REINFORCING			
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



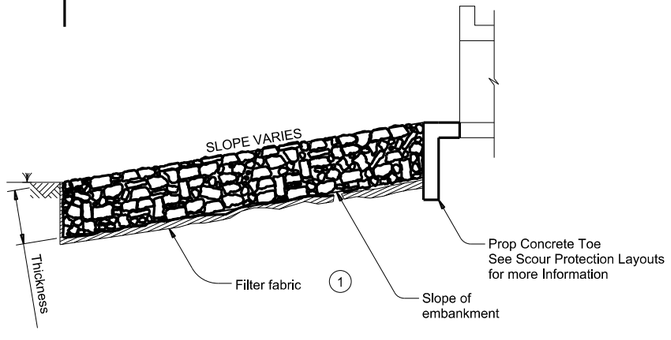


FIGURE 1 ~ PROTECTION STONE RIPRAP (2)

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

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

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

MISCELLANEOUS SCOUR DETAILS

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	139
CONT.	SECT.	JOB	
0915	00	258	

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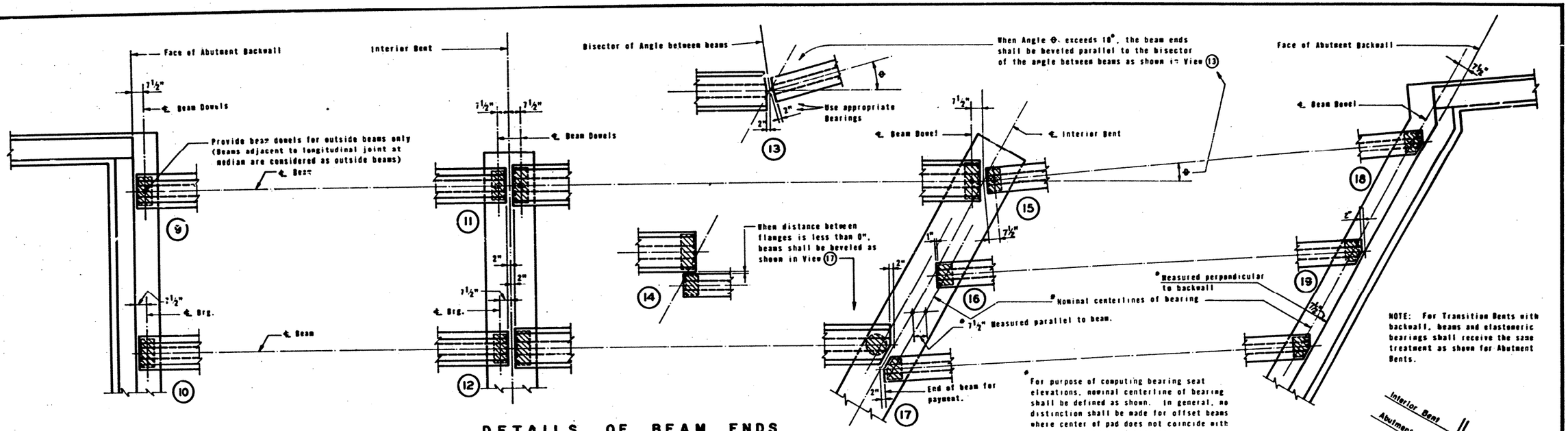
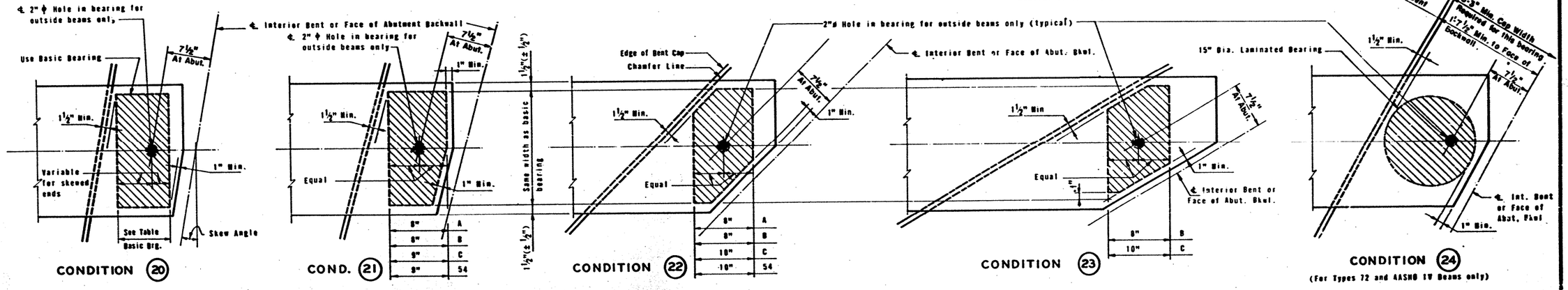
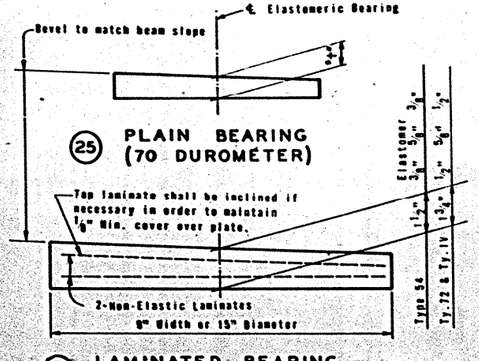


DETAILS OF BEAM ENDS



NOTE: Basic Bearings are to be used for square beam ends and for moderately skewed beam ends as covered in Condition 20. Holes in bearings for square beams shall be centered on pad.

DETAILS OF ELASTOMERIC BEARINGS



25 PLAIN BEARING (70 DUROMETER)

26 LAMINATED BEARING (60 DUROMETER)

BASIC BEARINGS

BM. TYPE	SIZE. THICKNESS "t" & DESCRIPTION	
A	8" X 14" X ¾"	PLAIN
B	8" X 16" X ¾"	PLAIN
C	9" X 19" X 1"	PLAIN
54	9" X 14" X 1½"	LAMINATED
72	9" X 20" X 1¾"	LAMINATED
IV	9" X 22" X 1¾"	LAMINATED

BEARINGS FOR BEVELED BEAM ENDS

BM. TYPE	CONDITION 20	CONDITION 21	CONDITION 22	CONDITION 23	CONDITION 24
A	0° THRU 20°	20° THRU 30°	OVER 30°	NOT APPLICABLE	NOT APPLICABLE
B	0° THRU 15°	15° THRU 30°	30° THRU 55°	OVER 55°	NOT APPLICABLE
C	0° THRU 10°	10° THRU 20°	20° THRU 50°	OVER 50°	NOT APPLICABLE
54	0° THRU 10°	10° THRU 25°	OVER 25°	NOT APPLICABLE	NOT APPLICABLE
72	0° THRU 10°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 10°
IV	0° THRU 8°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 8°

Skew angle of Bm. end

GENERAL NOTES:

Beams shall be seated on elastomeric bearings of the dimensions shown.

Bearings shall be furnished with their thickness varying in one direction depending on the slope of the erected beam.

Constant thickness bearings may be used for moderate beam slopes if the variation is within the allowable dimensional tolerances given in the specifications.

Cost of furnishing and installing elastomeric bearing shall be included in unit price bid for "Prestressed Concrete Beams"

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS

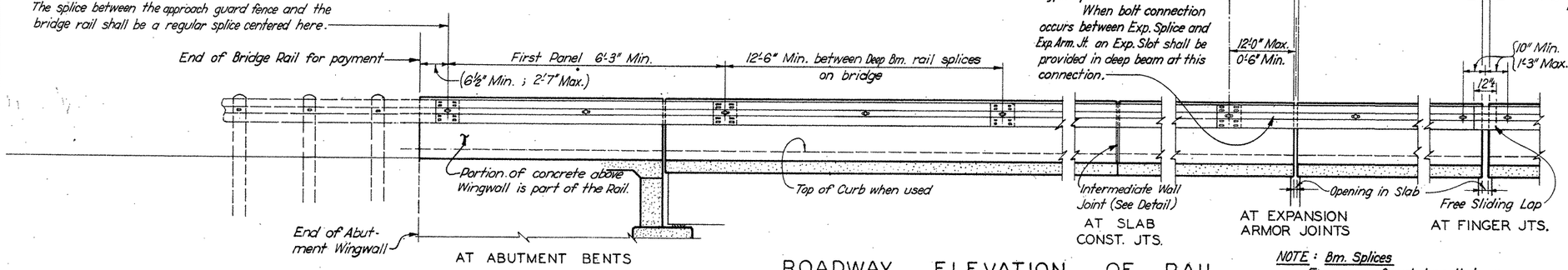
BEAM ENDS & BEARINGS

Gp B

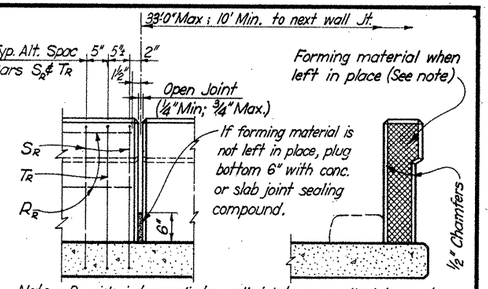
ORIGINAL DRAWING DATE: April 1971	STATE	FEDERAL AID PROJECT	SHEET
DR.:-HJD REVISIONS	15	C915-00-258	140
CK.:-THD	COUNTY		
DR.:-RNS	VARIES	0915 00 258	VAR
CK.:-THD			

10-3-200-170

Note : Metal Beam Guard Fence must be attached to the bridge rail and extended along the embankment. See plan sheet for details and length for payment. The splice between the approach guard fence and the bridge rail shall be a regular splice centered here.



ROADWAY ELEVATION OF RAIL



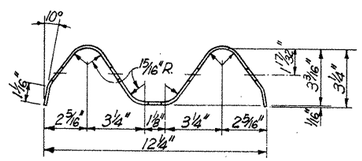
Note : Provide intermediate wall joints over all slab const. joints, over interior supports on continuous units, and at equal intervals in between as necessary to maintain a 33' max. length of unbroken wall.

Material used in forming joint may be left in place if it is compressible and light in color such as the following materials : styrofoam, molded cork granules, sponge rubber sheet, etc.

INTERMEDIATE WALL JOINT

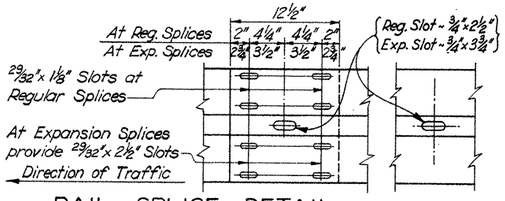
NOTE : Bm. Splices

For spans of such type that pre-molded Exp. Jt. material is used at expansion joints (CGC Spans, Slabs etc.), no expansion type splices will be required in deep beam rail.

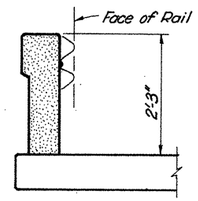


DEEP BEAM RAIL MEMBER
May be either aluminum or steel.

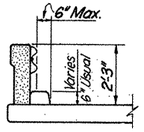
(Aluminum: Nom. thickness = .105")
(Steel: Nom. Thickness = .1046" exclusive of protective coating).



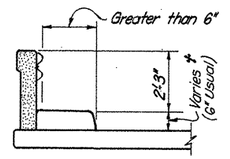
RAIL SPLICE DETAIL
⅝"ϕ Button Hd. Oval Shoulder Bolts with Hex Nuts at all slots.



FOR SLABS WITH NO CURBS



FOR SLABS WITH BRUSH OR DRAINAGE CURBS



FOR SLABS WITH CURBS WIDER THAN 6"

USUAL CONDITION

SPECIAL CONDITIONS

NOTE : THIS RAIL IS INTENDED PRIMARILY FOR USE ON CURBLESS STRUCTURES.

Curbs, if required for special conditions, shall be constructed as shown elsewhere in the project plans, in which case the railing wall height may require adjustment as indicated by the details shown above.

† Wide curbs over 9" high will require special design of parapet wall.

GENERAL NOTES:

Designed according to AASHTO 1973 Standard and current Interim Specifications.

Rail Type T2 is comprised of the following parts ; Concrete railing wall,, Deep Bm. rail member, and all anchorage provisions including bolts, nuts, metal washers and elastomeric washers. All these parts are included in price bid per linear foot of rail.

All concrete for railing wall shall be Class C. Chamfer all exposed corners ¾" unless otherwise shown.

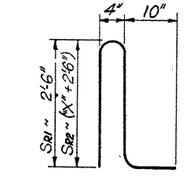
All steel connecting bolts and fasteners for aluminum or steel railing and all anchor bolts, nuts and washers shall be galvanized after fabrication.

Dimensions to reinforcing steel are to centers of bars.
Design stress for reinforcing steel = 20,000 p.s.i.
At Deep Bm. rail expansion splices, tighten bolts, back off one half turn and burr threads.
Shop drawings will not be required for this rail, but before construction, the Contractor shall submit plans showing the location of Deep Bm. splices and connections to concrete wall to the Resident Engineer for approval.

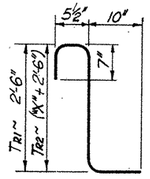
RAILS ON HORIZONTAL CURVES

	Rad. to Face of Rail	Max. Chord Lgth.	Construction or Fabrication
Railing Wall	Over 3200'	33'-0"	† Construct wall to the required radius or in chords shown
	Over 2000'-3200'	20'-0"	
	Over 300'-2000'	10'-0"	
	Thru. 300'	0	Construct wall to the required radius
~	Over 150'		Furnish in straight sections
~	Thru. 150'		Fabricate to the required radius

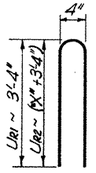
† Based on a maximum angle of intersection of 2°.



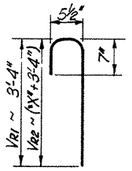
BARS S_{R1} (#5) & S_{R2} (#5)



BARS T_{R1} (#4) & T_{R2} (#5)

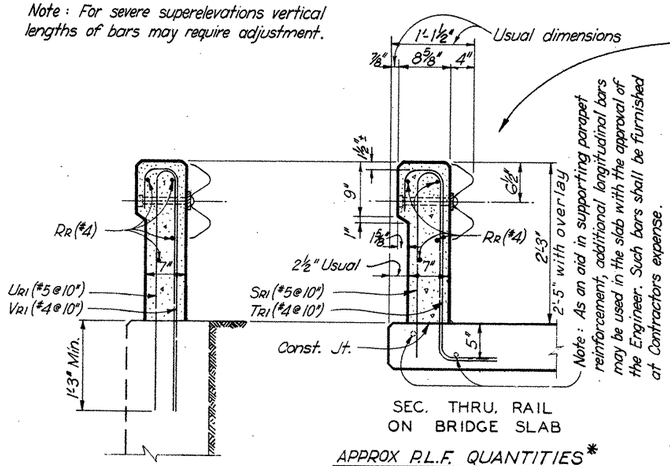


BARS U_{R1} (#5) & U_{R2} (#5)



BARS V_{R1} (#4) & V_{R2} (#5)

Note : For severe superelevations vertical lengths of bars may require adjustment.



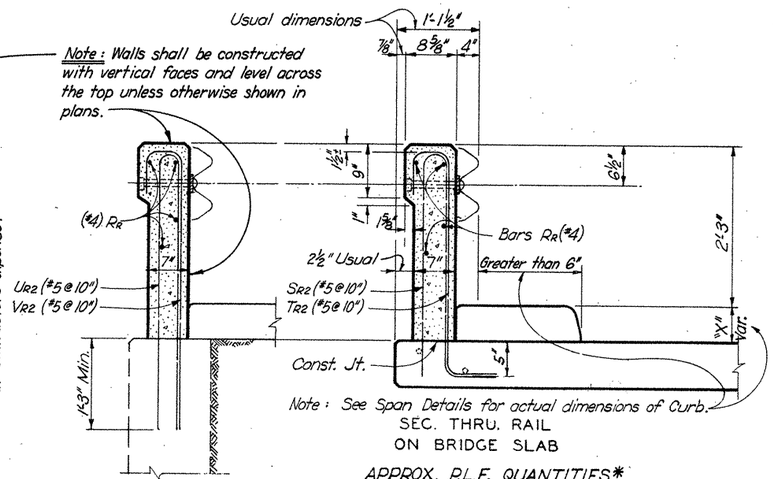
SEC. THRU. RAIL ON BRIDGE SLAB

SEC. THRU. RAIL ON ABUT. WING

APPROX. R.L.F. QUANTITIES*

Concrete	C.Y.	.053
Reinforcing Steel	Lb.	13.89

FOR STRUCTURES WITH NO CURBS OR WITH BRUSH OR DRAINAGE CURBS



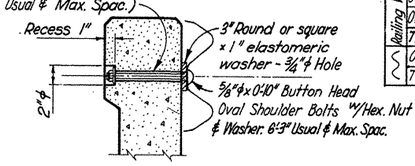
SEC. THRU. RAIL ON BRIDGE SLAB

SEC. THRU. RAIL ON ABUT. WING

APPROX. R.L.F. QUANTITIES*

Curb Height →		"X" = 6"	"X" = 9"
Concrete	C.Y.	.063	.069
Reinf. Steel	Lb.	17.74	18.68

FOR STRUCTURES WITH CURBS OVER 6" WIDE (SPECIAL CONDITION)



TYP. BM. TO WALL CONNECTION

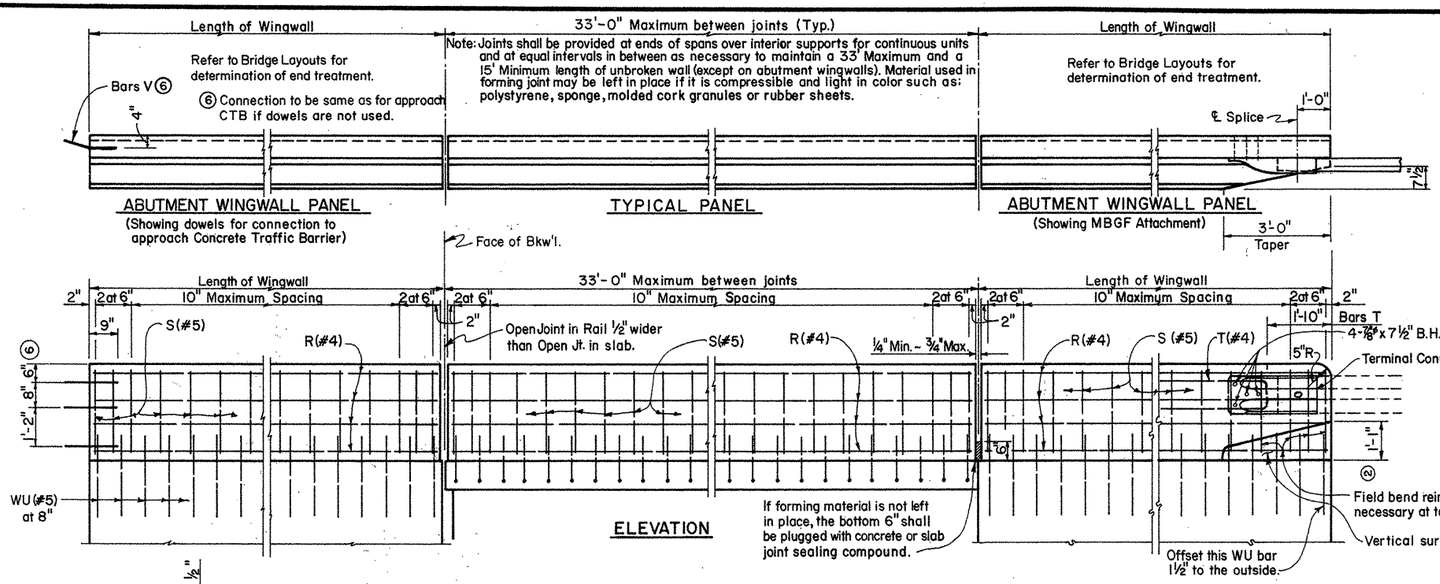
*Note : R.L.F. Quantities shown are for concrete and reinforcing steel in railing wall above main slab, including portions of steel bars anchored in slab. These quantities are for Contractor's information only. Cost of furnishing and installing these materials for railing wall to be included in price bid per linear foot of Rail, Type T2.

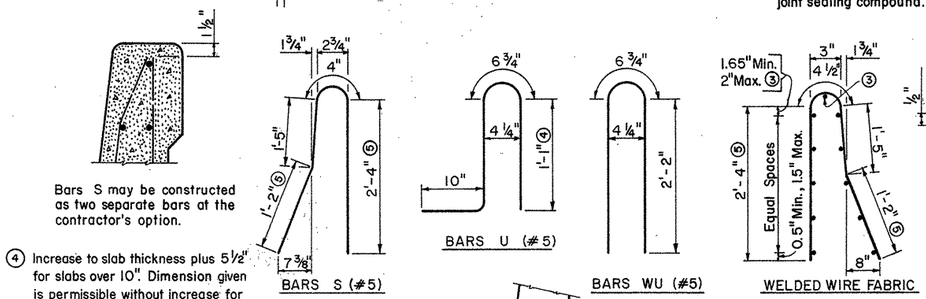
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL TYPE T2

ORIGINAL DRAWING DATE : DEC. 1977	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET.
DN.:-RLR REVISIONS	SAT	6	C915-00-258	142
CK.:-JJP	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
DW.:-RNS	VARIES	0915	00	258	VAR
CK.:-JJP					

ORIGINAL
BRIDGE DIVISION

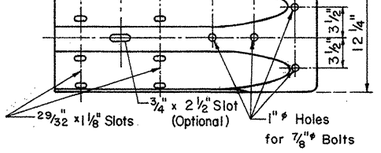




④ Increase to slab thickness plus 5½" for slabs over 10". Dimension given is permissible without increase for slabs 9" or less. Increase by nominal concrete overlay thickness if over 2".

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
1. Minimum (Cumulative Total) Wire Area	0.933 Sq. In.	0.248 Sq. In. Per. Ft.
2. Minimum	No. of Wires 6	Spacing 4"
Maximum	11 ③	12"
3. Maximum Wire Size Differential	The smaller wire shall have an area of 40% or more of the larger wire.	

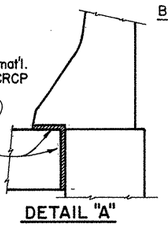
③ Longitudinal wires may be within upper bend if vertical wires are D 8.7 or smaller, in which case the 2" dimension to the next lower bars may be increased to 4" max.



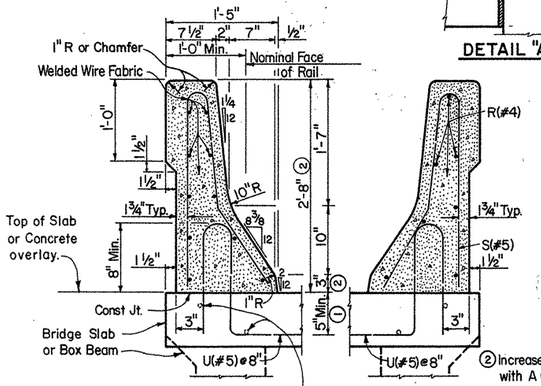
TERMINAL CONNECTOR

Terminal Connector shall receive the same protective coating as the attached Metal Beam Guard Fence.

⑤ Dimension given is permissible for structures with up to 2" of overlay.



DETAIL "A"



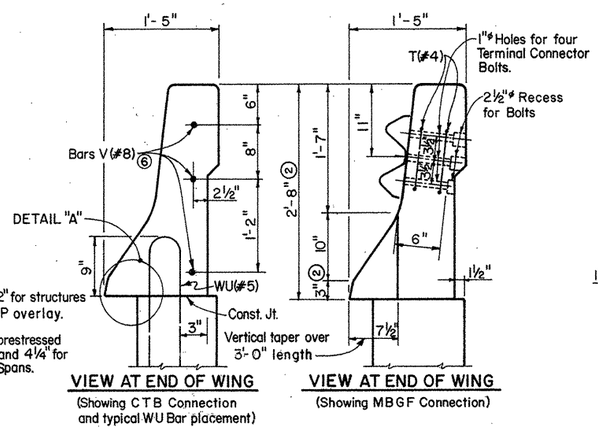
TYPICAL SECTION (Showing W W F)

TYPICAL SECTION (Showing conventional reinf.)

As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars shall be furnished at the Contractors expense.

② Increase 2" for structures with A C P overlay.

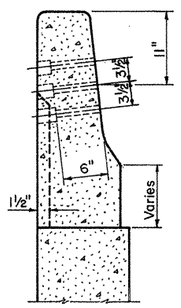
① 4" for prestressed boxes and 4¼" for C G C Spans.



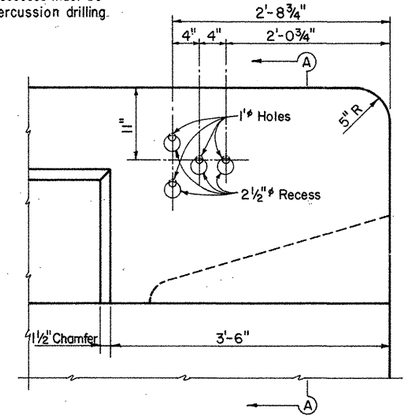
VIEW AT END OF WING (Showing C T B Connection and typical WU Bar placement)

VIEW AT END OF WING (Showing MBGF Connection)

NOTE: Holes and recesses must be formed or cored. Percussion drilling is not permitted.



SEC. A-A



OPTIONAL END TREATMENT

GENERAL NOTES:

Designed according to AASHTO 1977 Standard and current Interim Specifications.

All parts of the railing including concrete parapet wall, reinforcing, terminal connector, bolts, nuts and washers are included in the price bid per linear foot of rail.

All steel components except reinforcing shall be galvanized unless otherwise shown in plans.

All concrete for railing wall shall be Class "C".

Dimensions relating to reinforcing steel are to centers of bars.

Metal Beam Guard Fence or Concrete Traffic Barrier is usually attached to the abutment wingwall panel. See plan sheet for details and length for payment. The splice between the approach guard fence and the terminal connector shall be with the normal eight bolts. The dowel connection to the approach traffic barrier shall be grouted the same as other barrier joints.

Shop drawings will not be required for this rail.

This railing may be constructed with slip-forms with equipment approved by the Engineer. Sensor control for both line and grade must be provided. When slip-forming is used, the concrete may be cured with membrane curing compound.

The back of railing shall be vertical unless otherwise shown in plans.

Welded wire fabric may be used as an option to conventional reinforcement and shall be made in accordance with A S T M A497.

Welded Wire Fabric Detail shown is for D8.4 longitudinal wires and D8.3 vertical wires. Combinations of Reinforcing Steel and Welded Wire Fabric or configurations of Welded Wire Fabric other than shown will be permitted when the conditions in the table are satisfied and the dimension from end of section to first welded vertical wire does not exceed 3".

Additional reinforcing may be tack welded to the upper two thirds of the reinforcing cage to provide bracing when slip-forming is used. Additional anchorage devices may be added when welding is necessary in the lower one third of the cage. Do not weld to U or S bars in the lower one third of the cage.

P L F weight of railing (with no overlay increase) is 326 plf.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL

TYPE T501

ORIGINAL DRAWING DATE: JUNE 1985		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #		SHEET
DN.:-THD	REVISIONS	SAT	6	C915-00-258		143
CK.:-THD	Rev. 10-85 (Added Det. "A")	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW.:-EDS	Rev. 4-86 (Det. A")	VARIES		0915	00	258	VAR
CK.:-JJP	5-87 (Conc. Overlay)						

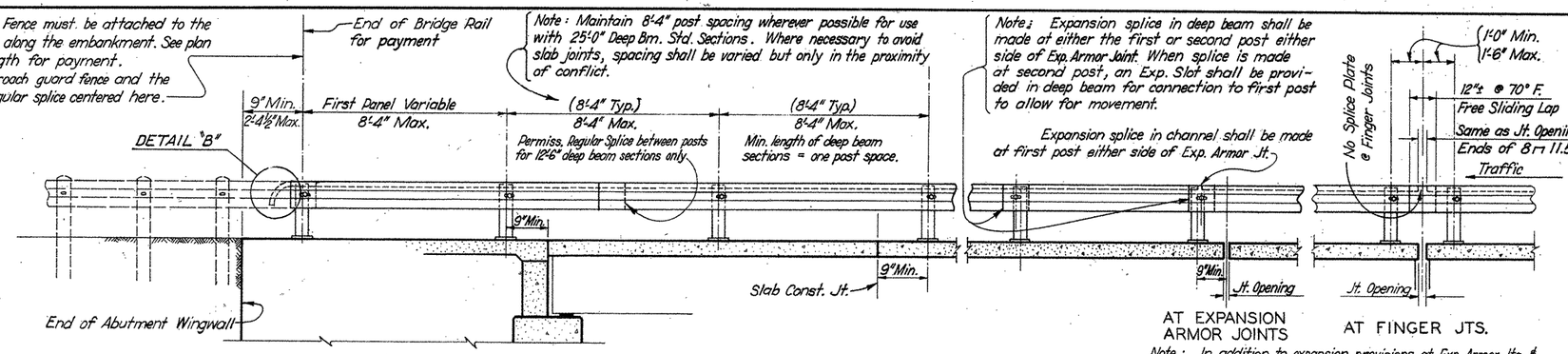
ORIGINAL BRIDGE DIVISION

Note : Metal Beam Guard Fence must be attached to the bridge rail and extended along the embankment. See plan sheet for details and length for payment.
The splice between the approach guard fence and the bridge rail shall be a regular splice centered here.

End of Bridge Rail for payment

Note : Maintain 8'-4" post spacing wherever possible for use with 25'-0" Deep Bm. Std. Sections. Where necessary to avoid slab joints, spacing shall be varied but only in the proximity of conflict.

Note : Expansion splice in deep beam shall be made at either the first or second post either side of Exp. Armor Joint. When splice is made at second post, an Exp. Slot shall be provided in deep beam for connection to first post to allow for movement.



AT ABUTMENT BENTS

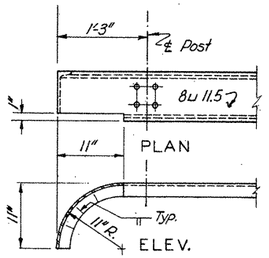
AT EXPANSION ARMOR JOINTS

AT FINGER JTS.

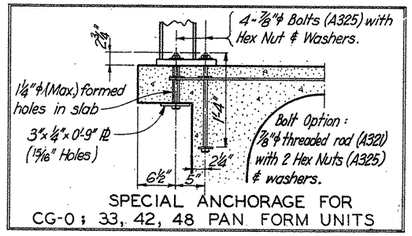
Note : In addition to expansion provisions at Exp. Armor Jts. & finger joints, expansion splices in channel member only shall be provided at other locations so that the maximum length of channel without expansion provisions does not exceed 200'.

ROADWAY ELEVATION OF RAIL

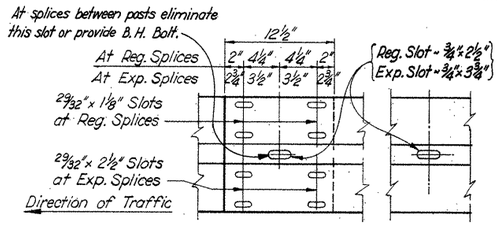
** Loss of half the tolerance provided between bolts and holes, or between splice plates and rail members has been allowed in determining these controls.



DETAIL "B"

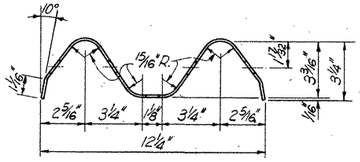


SPECIAL ANCHORAGE FOR CG-0 ; 33, 42, 48 PAN FORM UNITS



RAIL SPLICE DETAIL

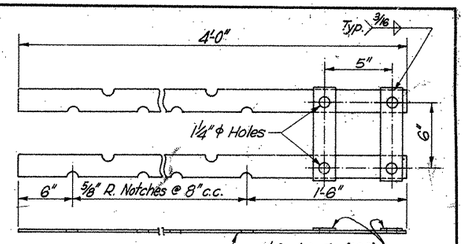
⅝"ϕ Button Hd. Oval Shoulder Bolts w/ Hex Nuts at all slots. (Thickness of Hex Nuts ⅜").



DEEP BEAM RAIL MEMBER

May be either aluminum or steel.

(Aluminum : Nom. thickness = .105"). (Steel : Nom. thickness = .1046" exclusive of protective coating.



Note : Field cut or bend as required to fit special conditions.

(Do not galvanize nor oil this assembly)

BOLT ANCHORAGE PLATES

Note : Install one plate assembly in slab at each rail post. Cost included in price bid per Lin. Ft. of Rail.

GENERAL NOTES :

Design : AASHO 1964 Interim Specifications.

Panel lengths of channel member shall be attached continuously to a minimum of four posts and a maximum of six (except at abutments.).

All bolts, nuts, washers, plates, and elastomeric materials are considered as parts of the rail for payment.

All steel connecting bolts and fasteners for aluminum or steel railing and all anchor bolts, nuts, washers and bottom plates shall be galvanized after fabrication.

For railing not requiring shop drawings, erection drawings showing panel lengths, rail post spacing and anchor bolt setting shall be submitted to the Resident Engineer for approval. If railing requires shop and erection drawings, these drawings shall be submitted to the Bridge Engineer for approval. Shop drawings may be submitted as 11"x17" prints provided they are clearly legible.

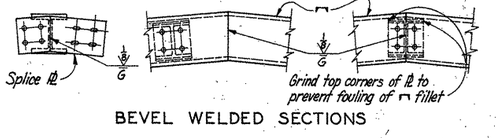
Rail posts shall be seated on elastomeric pads having the same dimensions as post base & ⅛" thick. Additional pads or half pads may be used in shimming for alignment. Post heights shown will increase by the thickness of the pad.

At expansion slots in deep beam rails and channels, tighten bolts, back off one half turn and burr threads.

** RAILS ON HORIZONTAL CURVES

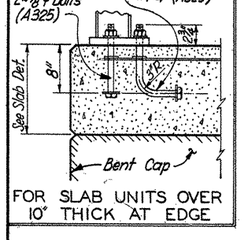
Channel Member	Rad. to Face of Rail	Max. Chord Lgth.	Fabrication
	Over 4000'	41'-8"	Furnish & erect in straight rail panels. ♦
	Over 2230' – 4000'	33'-4"	
	Over 1250' – 2230'	25'-0"	
	Over 480' – 1250'	16'-8"	Bevel weld chord sections of channel or fabricate to the required radius
	Over 250' – 480'	8'-4"	
	Thru. 250'	0	Fabricate to the required radius
<	Over 150'		Furnish in straight sections ♦
<	Thru. 150'		Fabricate to the required radius ♦

♦ Shop drawings will not be required.

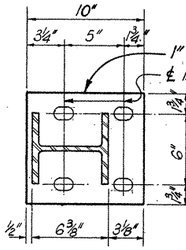


BEVEL WELDED SECTIONS

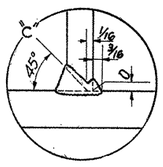
Bolt Option : ⅞"ϕ threaded rod (A321) with 2 Hex. Nuts (A325) & washers.

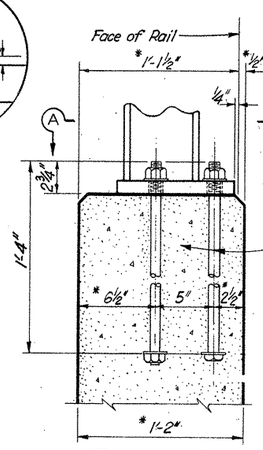


FOR SLAB UNITS OVER 10" THICK AT EDGE



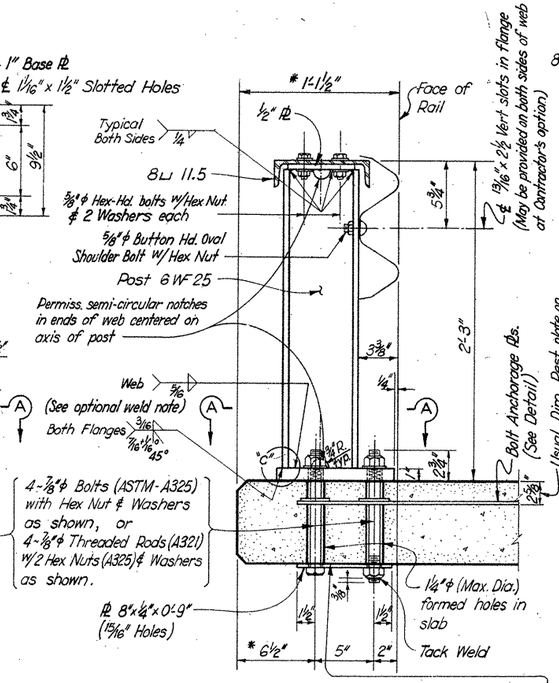
SEC. A-A





SEC. THRU. ABUT. WING

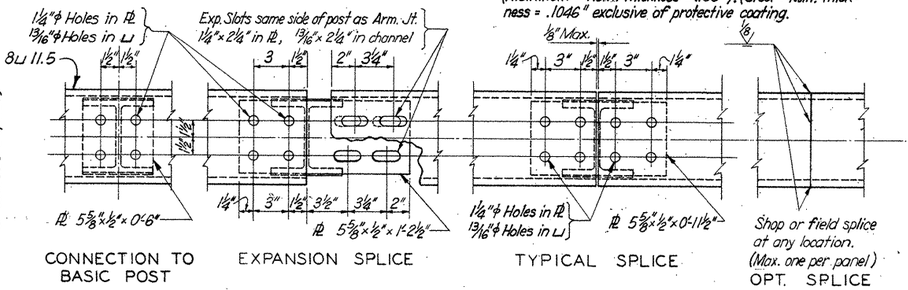
Note : Optional Weld - Post to Base Plate ; ⅜" ⌐ fillet weld all around (including edges of flanges) in lieu of weld shown.



SEC. THRU. BRIDGE SLAB

*Note : These dimensions are usual and will apply unless shown otherwise on Span or Abutment Details.

Note : Bottom plates may be embedded flush with bottom of slab at Contractor's option.



CONNECTION TO BASIC POST

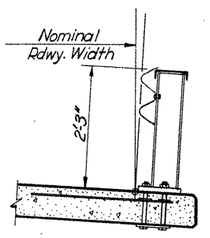
EXPANSION SPLICE

TYPICAL SPLICE

OPT. SPLICE

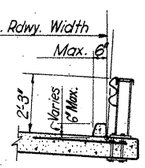
CHANNEL MEMBER DETAILS

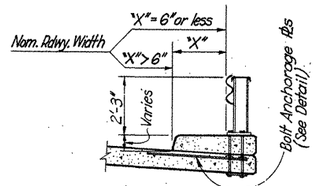
Note : Shim plates 6"x6"x1/16" may be used between top of post and channel member as required for vertical alignment.



FOR SLABS WITH NO CURBS

USUAL CONDITION





Note : If curb is placed monolithically with slab, post anchorage may be as shown for Slab Units (See detail) at the Contractor's option.

SPECIAL CONDITIONS

NOTE : THIS RAIL IS INTENDED PRIMARILY FOR USE ON CURBLESS STRUCTURES. Curbs, if required for special conditions, shall be constructed as shown elsewhere in the project plans in which case the rail posts shall be mounted as indicated by the details shown above.

Rail posts shall be set perpendicular to roadway profile grade and cross slope and to top of curb when so mounted.

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

TRAFFIC RAIL TYPE T1

ORIGINAL DRAWING DATE : OCTOBER 1972	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
DN.: JJP	REVISIONS	6	TEXAS	C915-00-258			144
CK.: RLR Rev. 9-73		STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
DW.: RNS Rev. 2-76		SAT	VARIES	0915	00	258	VAR
CK.: JJP							

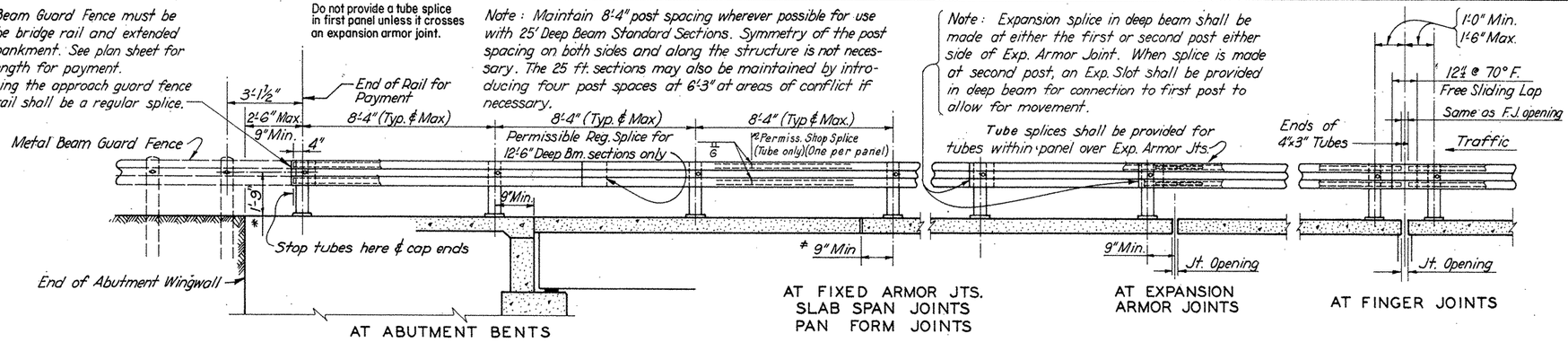
ORIGINAL
BRIDGE DIVISION

Note : Metal Beam Guard Fence must be attached to the bridge rail and extended along the embankment. See plan sheet for details and length for payment.
The splice joining the approach guard fence to the bridge rail shall be a regular splice.

Do not provide a tube splice in first panel unless it crosses an expansion armor joint.

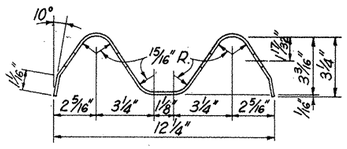
Note : Maintain 8'-4" post spacing wherever possible for use with 25' Deep Beam Standard Sections. Symmetry of the post spacing on both sides and along the structure is not necessary. The 25 ft. sections may also be maintained by introducing four post spaces at 6'-3" at areas of conflict if necessary.

Note : Expansion splice in deep beam shall be made at either the first or second post either side of Exp. Armor Joint. When splice is made at second post, an Exp. Slot shall be provided in deep beam for connection to first post to allow for movement.



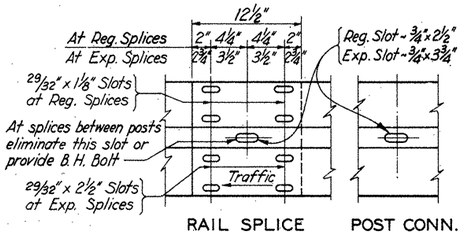
INSIDE ELEVATION OF RAIL

≠ For Prestressed Box Beam Spans the minimum distance from end of box to ℄ of post is 6"



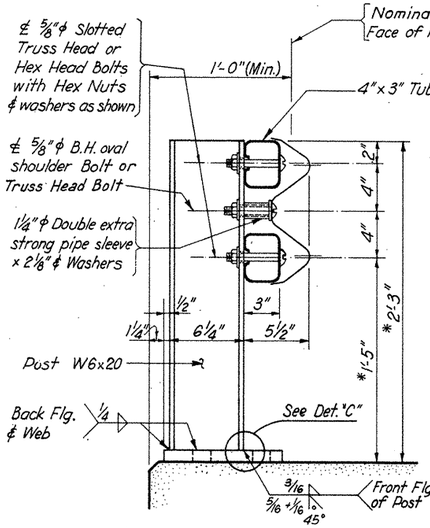
RAIL MEMBER

Member may be either Aluminum ~ Nom. thickness = .105" or Steel ~ Nom. thickness = .1046" exclusive of protective coating.



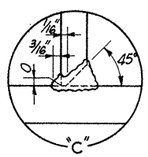
RAIL SPLICE POST CONN.

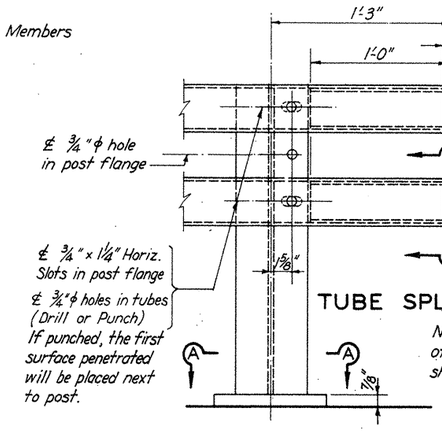
Provide ⅝" ℄ Button Hd. Oval Shoulder Bolts with Hex Nuts at all splice slots.



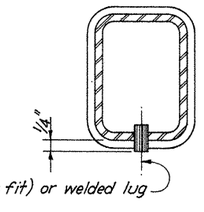
ELEV. OF POST

Note : In lieu of front Flg. weld shown, a ⅜" fillet weld all around including edges of flange may be used.



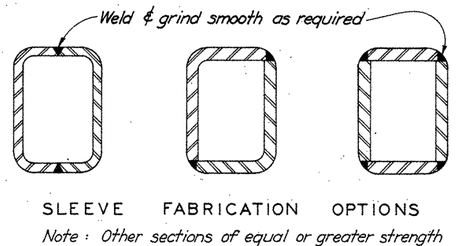


TUBE SPLICE DETAILS



SEC. B-B

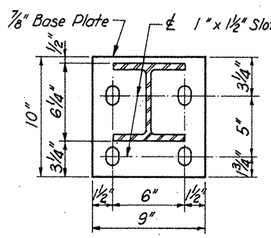
Note : The difference between the outside dimensions of the sleeve and the inside dimensions of the rail shall not exceed .125" along either axis.



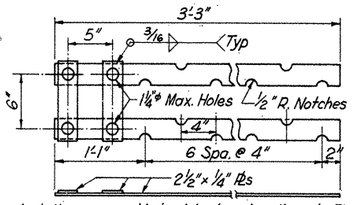
SLEEVE FABRICATION OPTIONS

Note : Other sections of equal or greater strength are acceptable for sleeves.

TUBE & SLEEVE MEMBERS		
Rail Member		Sleeve Thickness
Material	Thickness	Material : A36
A 500 Gr. C	.188"	.188"
A 500 Gr. B	.250"	.250"
A 500 Gr. A or A 501	.313"	.250"

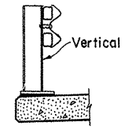


SEC. A-A

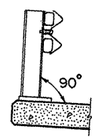


Install one assembly in slab at each rail post. Field cut or bend as required to fit special conditions. Do not galvanize nor oil this assembly.

BOLT ANCHORAGE PLATES

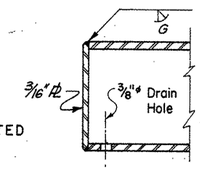


NORMAL



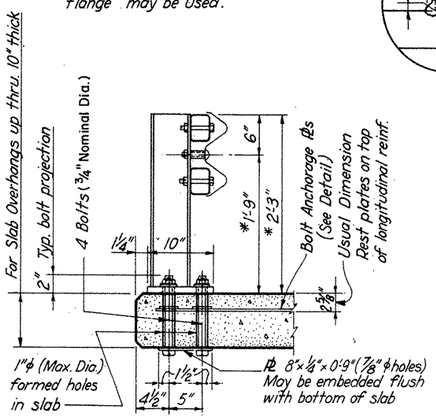
SUPERELEVATED

PLACEMENT DETAIL

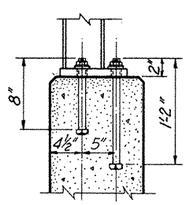


RAIL CAP

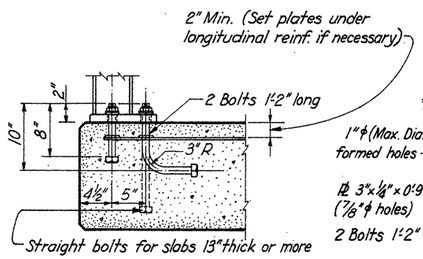
*Increase 2" for Structures with overlay.



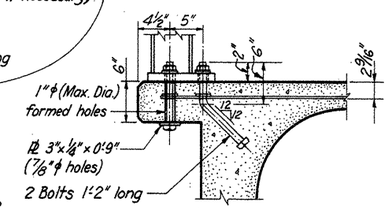
BASIC CONDITION



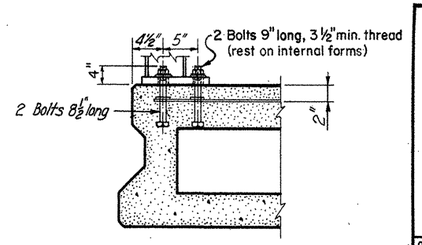
FOR ABUT. WINGWALLS



FOR SLAB UNITS OVER 10" THICK AT EDGE



FOR CG-0 42 & 48 PAN FORM UNITS



FOR PREST. BOX BMS.

POST MOUNTING DETAILS

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL TYPE T101

(STEEL)

PREPARED BY AND FOR THE USE OF TEXAS SDHPT.

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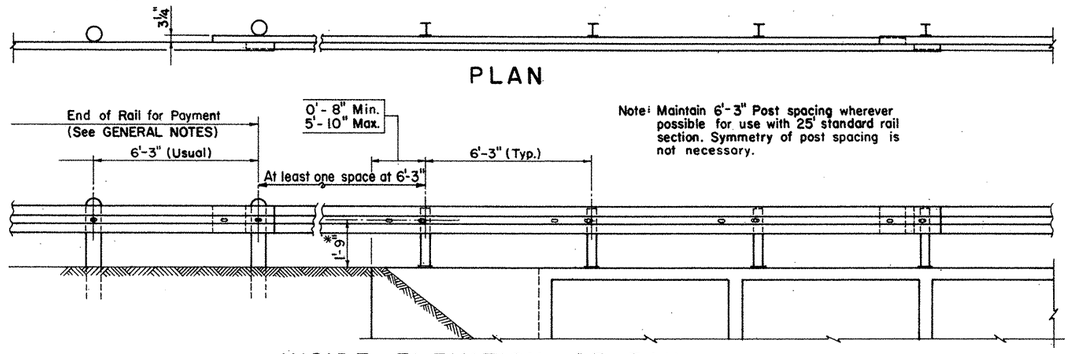
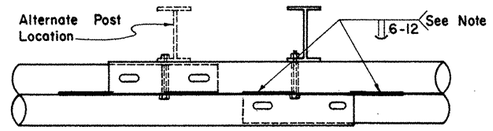
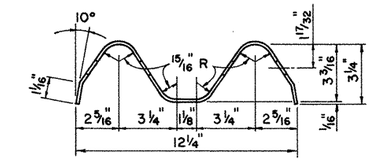
ORIGINAL DRAWING DATE: DEC. 1980	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
DN.:-JJP		SAT	6	C915-00-258				145
CK.:-HJD	Rev. 4-84 (Gen. Notes)	COUNTY		CONTROL	SECTION	JOB	HIGHWAY	
DW.:-RNS	Rev. 9-84	VARIES		0915	00	258	VAR.	
CK.:-JJP	Rev. 10-85 (Anchor Bolts on Box Bms.)							

ORIGINAL
BRIDGE DIVISION

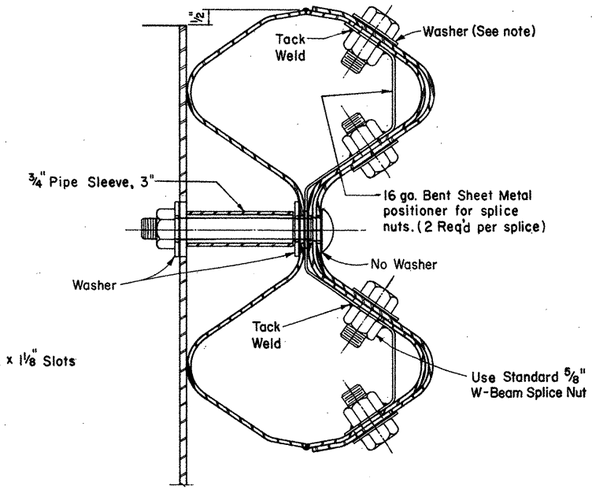






W-BEAM MEMBER

Member shall be 12 gauge steel ~ Nom. thickness = .1046" exclusive of protective coating.



SPLICE DETAIL

NOTE: 8 ~ 5/8" Splice nuts shall be tacked to a bent sheet metal positioner as shown. Other suitable positioning methods or devices may be substituted. The completed splice shall have 16 bolts. Each bolt will include a 1 3/4" x 3" x 3/16" plate washer or a 1 3/4 inch diameter washer.

GENERAL NOTES:

This rail has been successfully evaluated by full scale impact tests conducted in accordance with NCHRP Report 153. Test documentation may be found in Research Report 230-1, "Tubular W-Beam Bridge Rail", of Research Study 2-5-78-230 "Bridge Rail to contain Heavy Trucks and Buses", Texas Transportation Institute, October 1978.

Tubular Rail Member shall be extended and connected to at least the first soil embedded post at each end of the structure. More such posts shall be used to utilize 25 ft. standard sections. Approach guard fence posts shall be spaced at 6'-3" adjacent to the Tubular Rail since its flexibility is similar to standard metal beam guard fence. Do not install additionall posts at 3'-1½" centers. Payment for this rail shall be in increments of 25 feet.

Rail posts may be vertical or perpendicular to adjacent roadway grade and cross slope. Grout may be used under base plates if necessary.

All bolts, nuts, washers, and bottom plates are considered as parts of the rail for payment.

All steel components except reinforcing shall be galvanized unless otherwise shown in plans.

Rail shall be extended across all fixed armor joints, slab span joints, or pan form joints with no change in post spacing or continuity. At expansion armor joints of 1¼" or less, the splice bolts nearest the joint and post mounting bolts at intervening posts shall be snugly tightened to allow for rail expansion. At expansion armor joints over 1¼", suitably longer splice holes shall be provided.

Anchor bolts shall be ⅞" Dia. A307 (or A36 threaded rods with tack welded nuts) with hex nuts and washers as shown. Threaded rods may be 0.781 min. dia. with rolled threads. Nuts shall conform to A307 requirements and shall be tapped or chased after galvanizing. Bolts and nuts shall have Class 2A and 2B fit tolerances.

Shop drawings to be submitted to the Bridge Engineer for approval are required only for the proposed rail splices at armor expansion joints greater than 1¼" and for rails on horizontal curves in which case the tubular rail member shall be fabricated to the required radius if the radius is 600 feet or less. For rails not requiring shop drawings, erection drawings showing splice locations, post spacing, and anchor bolt locations shall be submitted to the Resident Engineer for approval. Shop or Erection Drawings may be 11" by 18" or larger.

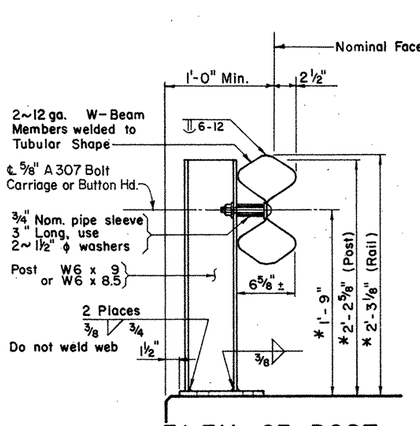
Weight of railing (6'-3" post spacing and no overlay) is 21.7 plf.

This rail is intended to be used only for curbless structures.

Fully anchored guard fence must be attached to both ends of the rail.

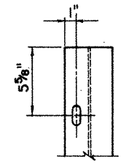
Tests have shown that although this rail deflects horizontaly two or three feet, adequate vehicle containment and re-direction is achieved. The resulting more gradual deceleration thus produces a safer condition than afforded by other bridge railings.

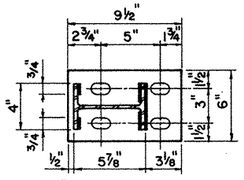
This railing is especially suitable for use on bridge width box culverts. The detail sheet titled: CULVERT MOUNTING FOR T6 TRAFFIC RAIL is then required to show headwall and wingwall modifications and additional reinforcing steel to be included as part of the railing for payment.



ELEV. OF POST

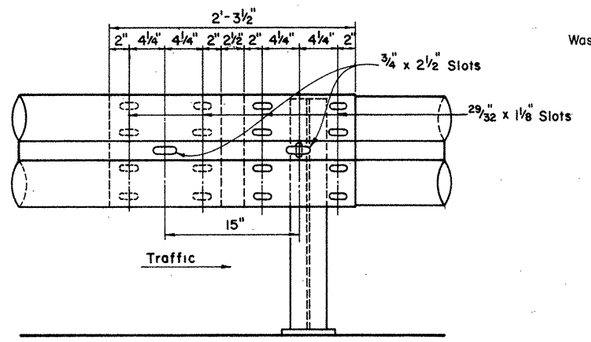
* Increase 2" for structures with overlay.





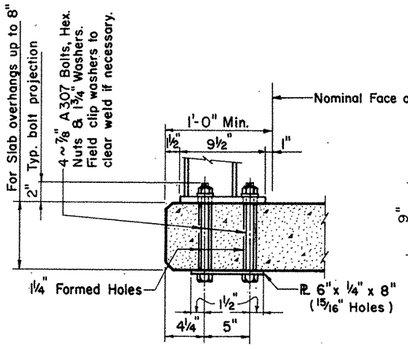
5/8" BASE PLATE

1" x 1½" Slotted Holes

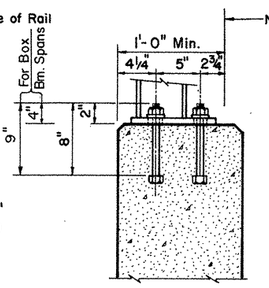


TUBULAR W-BEAM RAIL DETAILS

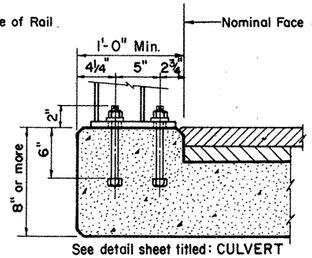
Note: Tubular W-Beam Rail Member is to be fabricated from standard 25' Nominal W-Beam sections. Additional post mounting slots are to be made in each member 15" from the standard slots at 6'-3" centers. Top and bottom seams shall be butt welded 6" at 12" spacing. Continuous seam welding is also acceptable. Welds shall be chipped and cleaned and the complete 25 ft. tubular member shall be galvanized after fabrication.



BASIC CONDITION

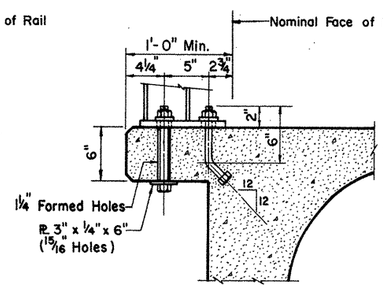


FOR ABUT. WINGWALLS

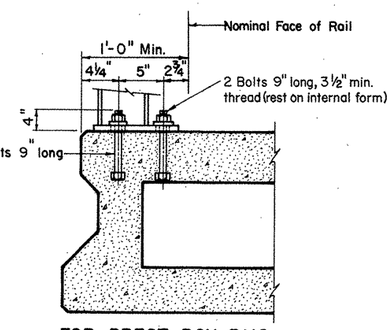


See detail sheet titled: CULVERT MOUNTING FOR T6 TRAFFIC RAIL

FOR CULVERTS OR SLABS 8" THICK OR MORE



FOR CG-0 42 & 48 PAN FORM UNITS



FOR PREST. BOX BMS.

P O S T M O U N T I N G D E T A I L S

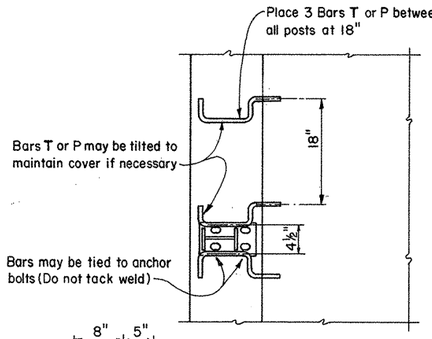
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL TYPE T6

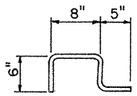
PREPARED BY AND FOR THE USE OF TEXAS SDH&PT

ORIGINAL DRAWING DATE: DEC. 1980	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #		SHEET
DN.:-JJP	Rev. 12-81 Rev. 10-85 (Anchor Bolts on Box Bms.)	SAT	6	C915-00-258		146
CK.:-RLR	Rev. 2-84 5-87 (Carriage Bolts)	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW.:-AS	Rev. 6-84	VARIES		0915	00	258	VAR
CK.:-JJP							

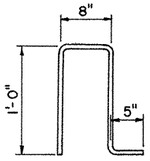
ORIGINAL
BRIDGE DIVISION



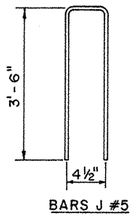
PLAN



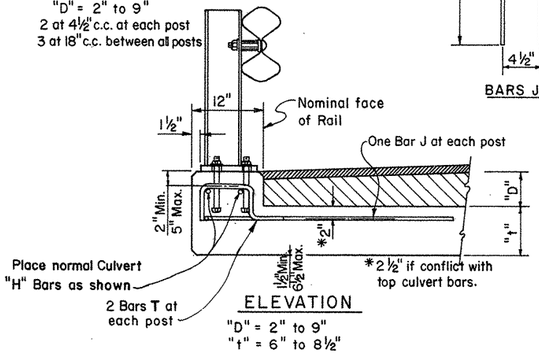
BARS T #5
"D" = 2" to 9"
2 at 4½" c.c. at each post
3 at 18" c.c. between all posts



BARS P #5
"D" = 9½" to 1'-3"
2 at 4½" c.c. at each post
3 at 18"± between all posts



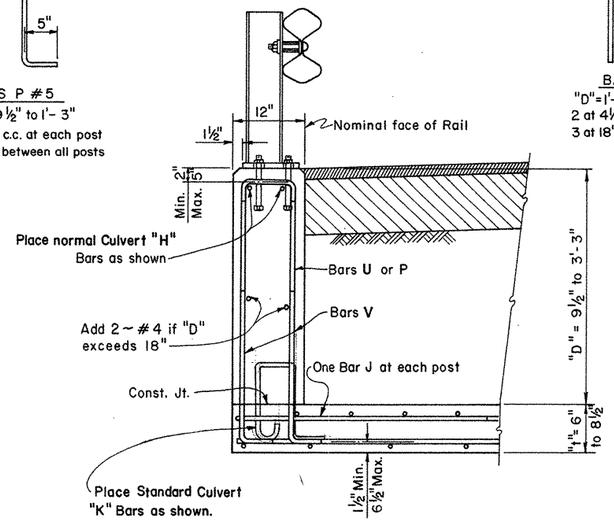
BARS J #5



ELEVATION
"D" = 2" to 9"
"t" = 6" to 8½"

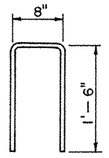
DIRECT TRAFFIC TO 9" FILL

Standard Culvert "K" Bars may be tilted as necessary to maintain cover.

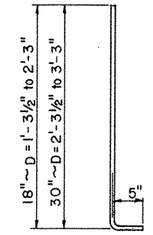


ELEVATION
CULVERT FILL 9½" to 3'-3"

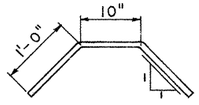
NOTE: Place bars T, P, or U as high as possible within the ranges shown.



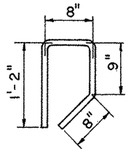
BARS U #5
"D" = 1'-3½" to 3'-3"
2 at 4½" c.c. at each post
3 at 18"± between all posts



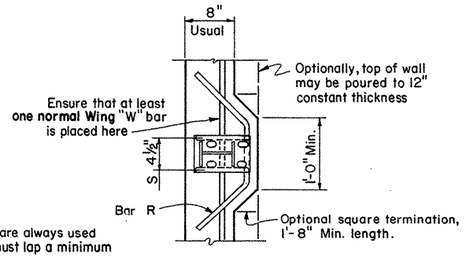
BARS V #5
2 pairs at 4½" c.c. at each post
3 pairs at 18"± between all posts



BARS R #5

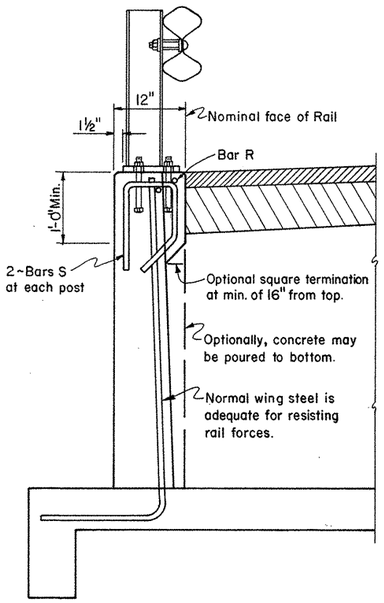


BARS S #5



NOTE: Bars U and N are always used together and must lap a minimum of 9".

PLAN



CULVERT WINGWALLS

See detail sheet titled: TRAFFIC RAIL TYPE T6 for railing, post, and anchor bolt details. These culvert mounting details are not suitable for mounting other rail types such as T101.

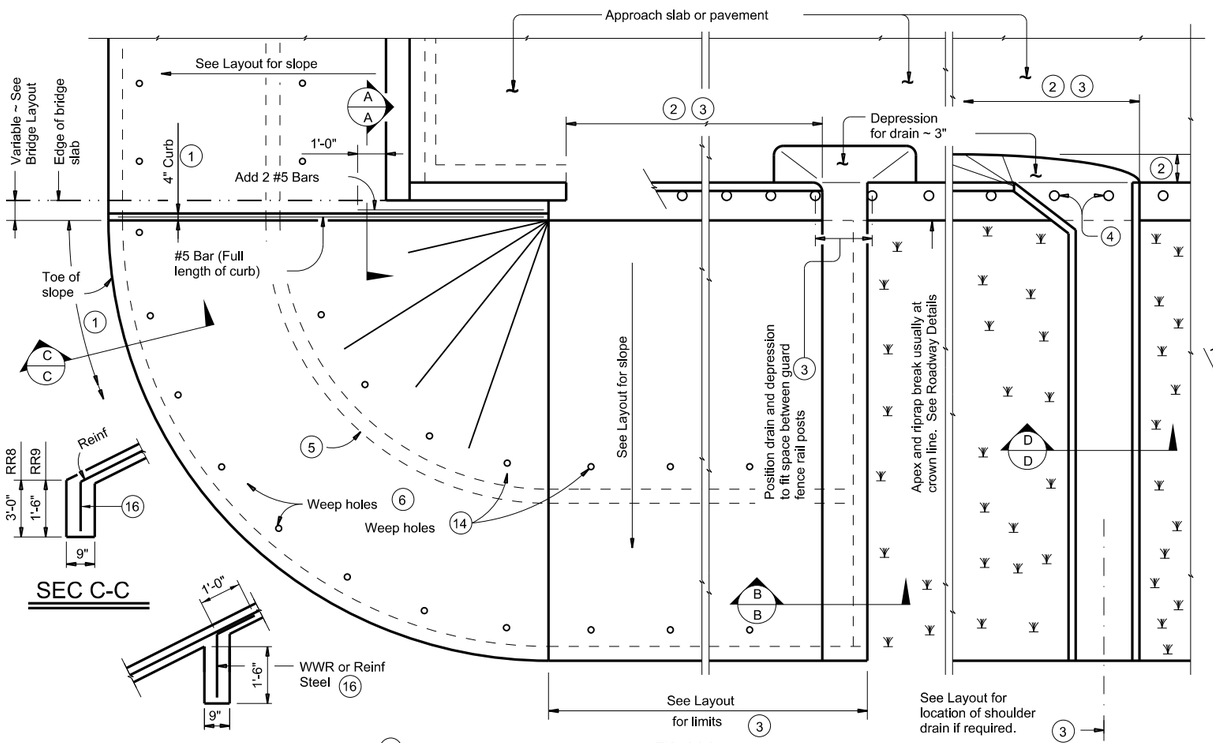
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

CULVERT MOUNTING FOR T6 TRAFFIC RAIL

PREPARED BY AND FOR THE USE OF TEXAS SDHPT.

ORIGINAL DRAWING DATE: DEC. 1980		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #		SHEET
DN.:-JJP	REVISIONS	SAT	6	C915-00-258		147
CK.:-	Rev. 5-84	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW.:-EDS		VARIES		0915	00	258	VAR
CK.:-JJP							

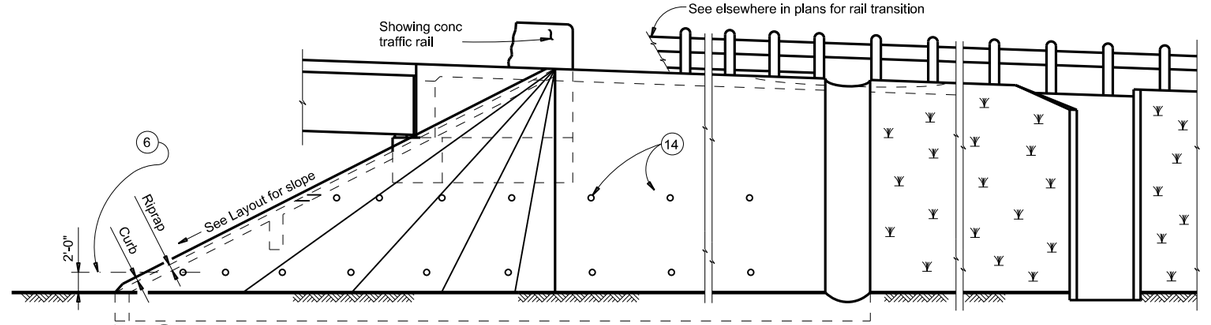
DATE:
FILE:



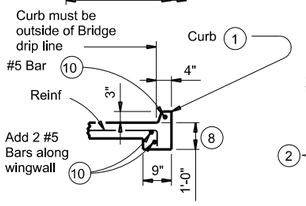
PLAN

SEC C-C

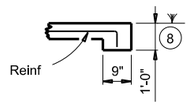
INTERMEDIATE TOEWALL (5)



ELEVATION

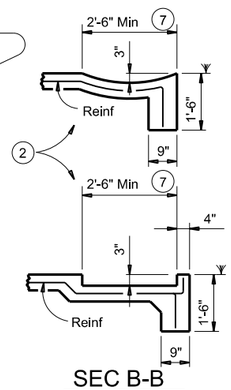


SEC A-A



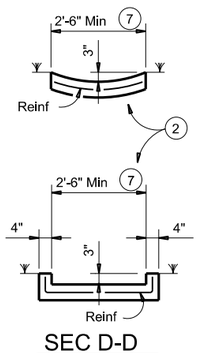
SEC B-B

(No drain)



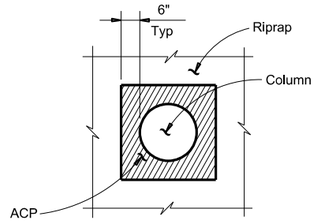
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

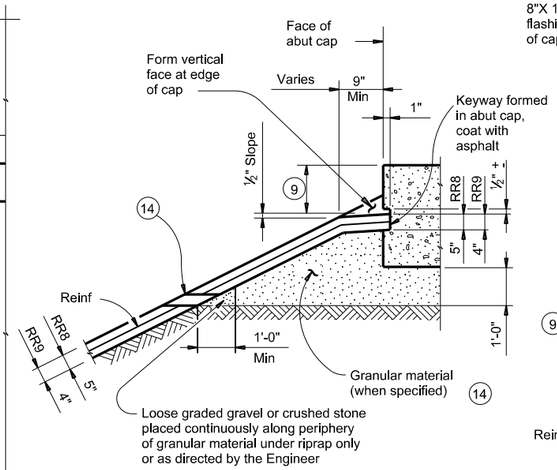
(Shoulder drain)



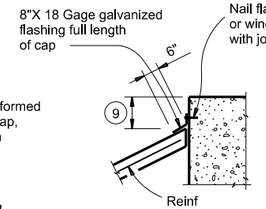
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

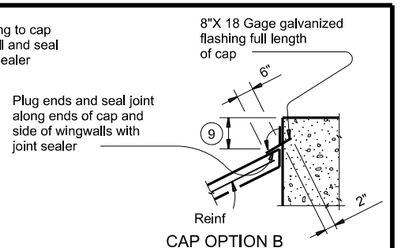
(As directed by the Engineer)



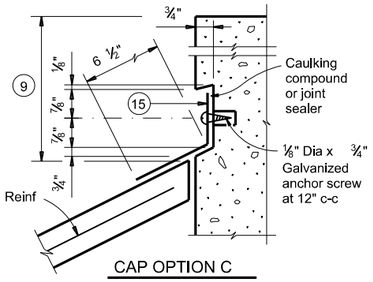
SHOWING KEYWAY OPTION



CAP OPTION A

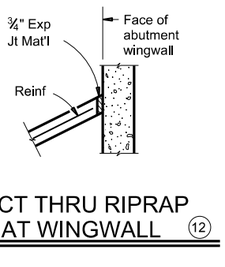


CAP OPTION B

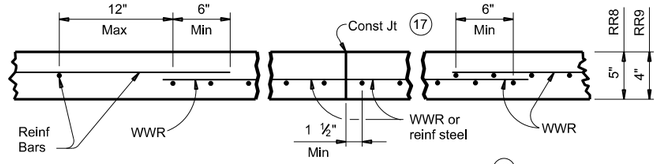


CAP OPTION C

SECTIONS THRU RIPRAP AT CAP (11)



SECT THRU RIPRAP AT WINGWALL (12)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

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

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

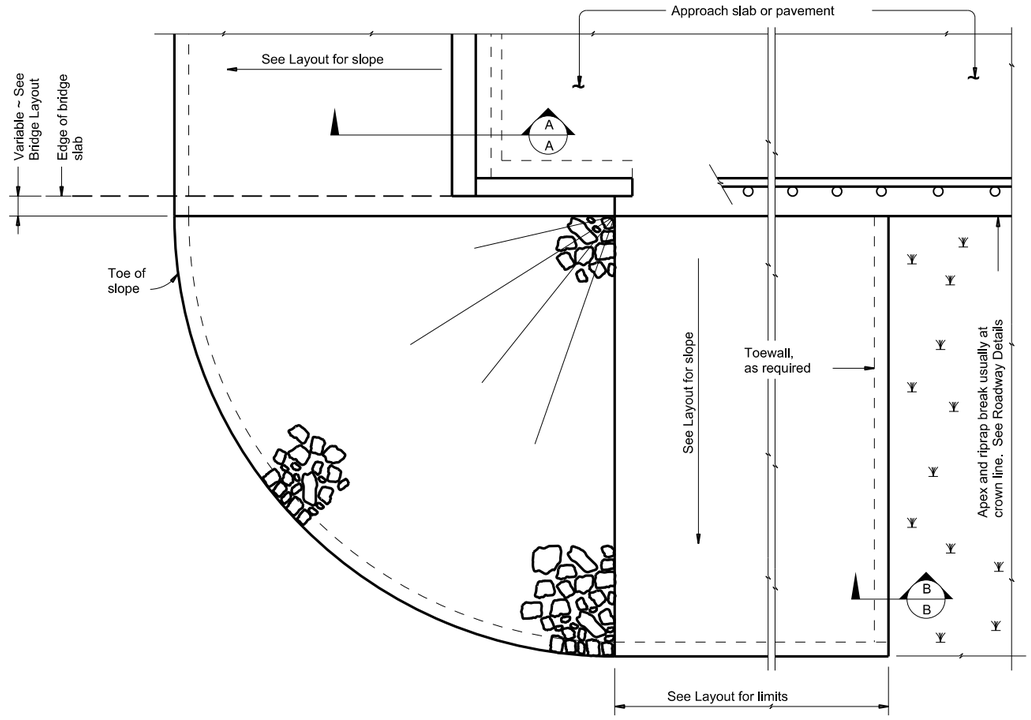
Bridge Division Standard

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

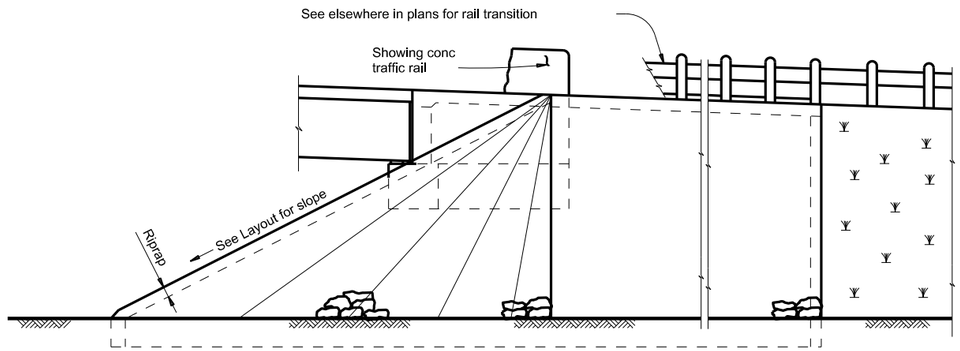
CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	
	DIST	COUNTY		SHEET NO.
		BEXAR		148

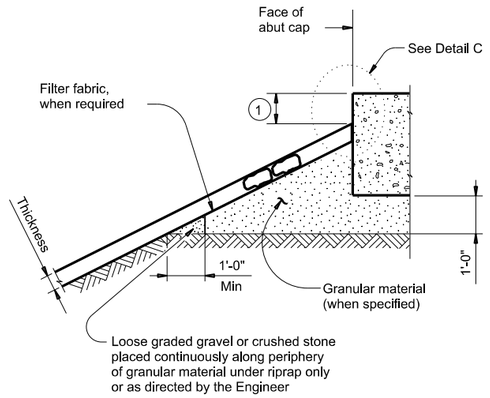
DATE:
FILE:



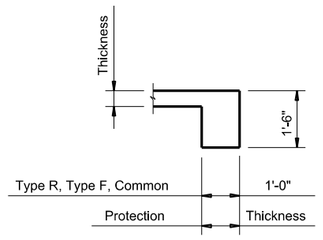
PLAN



ELEVATION

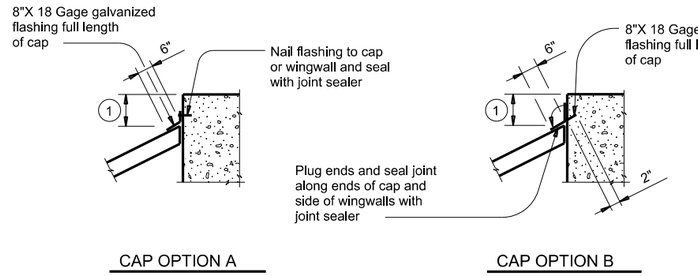


SECTION A-A AT CAP



SECTION B-B

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



CAP OPTION A

CAP OPTION B

DETAIL C

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		149

DATE:
FILE:

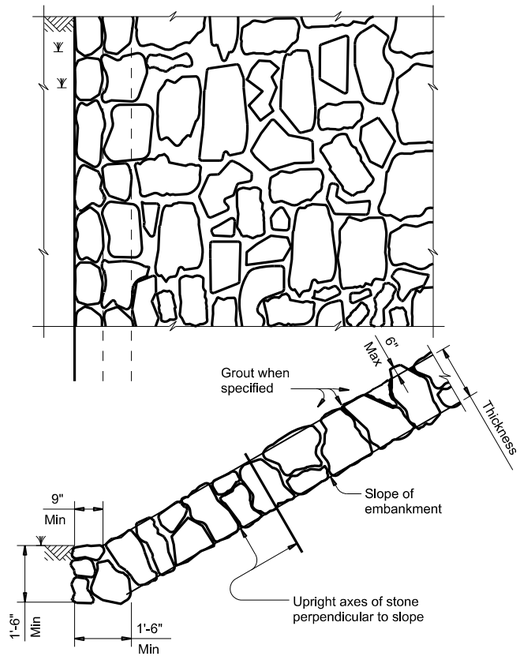


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

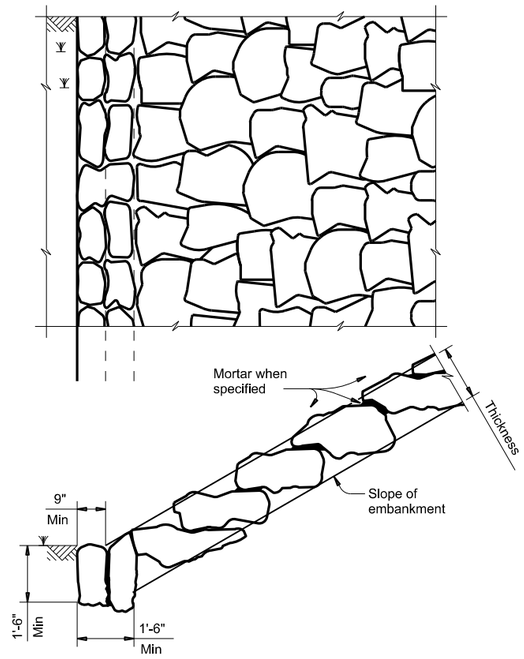


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

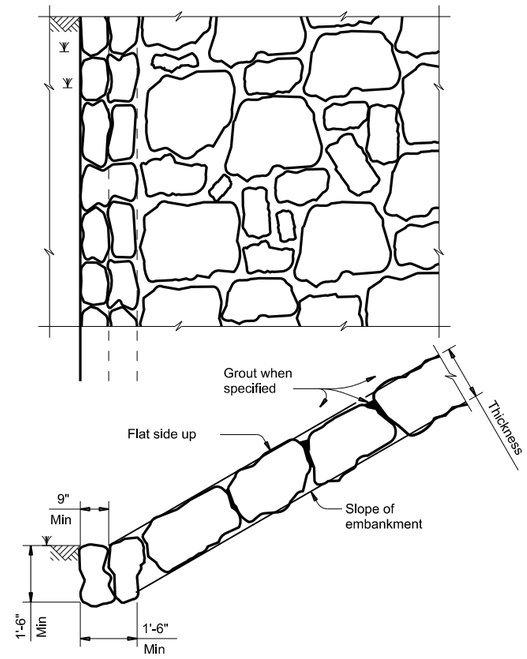


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

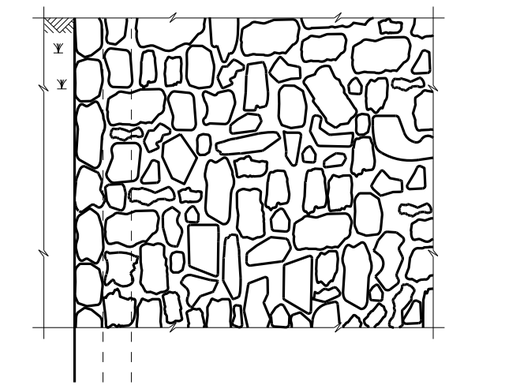


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

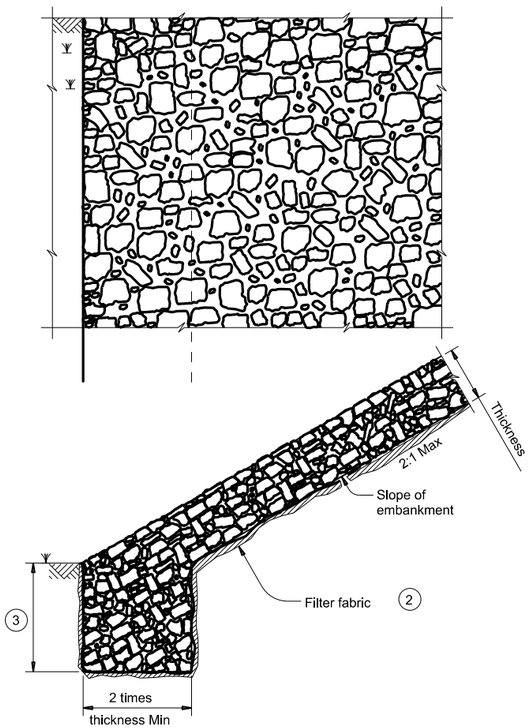


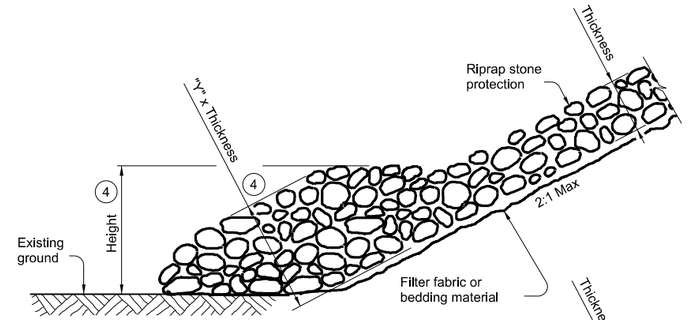
FIGURE 5 ~ PROTECTION STONE RIPRAP 5

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

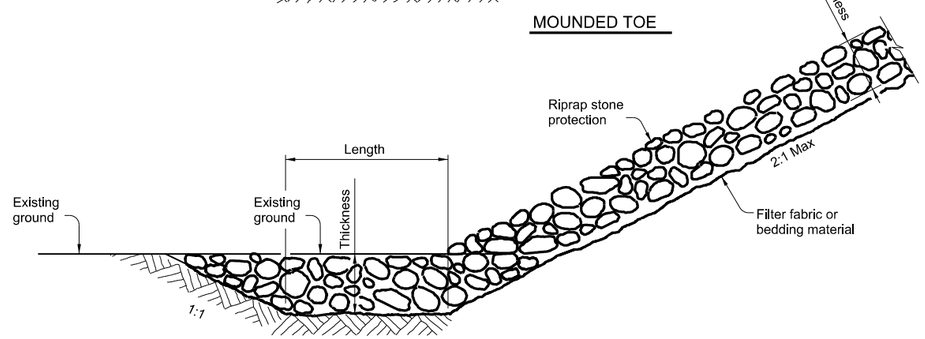
3 Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS 5

SHEET 2 OF 2

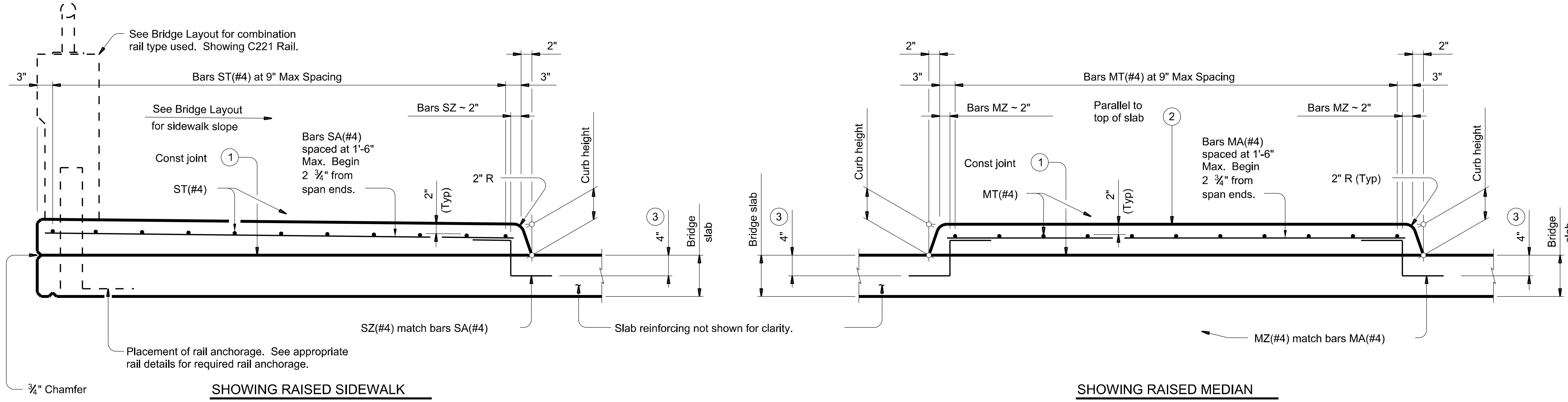
Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

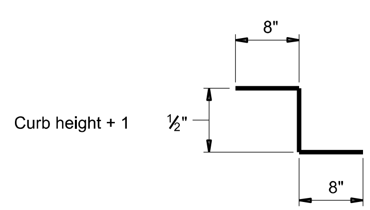
FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		150



TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

1. Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.
2. Unless noted otherwise on the span details.
3. Bars may rest on top of PCPs.



BARS SZ(#4) AND MZ(#4)

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip ®, Steel	www.algrip.com
Mebac ®#3, Steel	www.harscoikg.com
SlipNOT ®Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.
Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.
Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.
Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing". Chamfer or round edges approximately 1⁄16" prior to galvanizing.

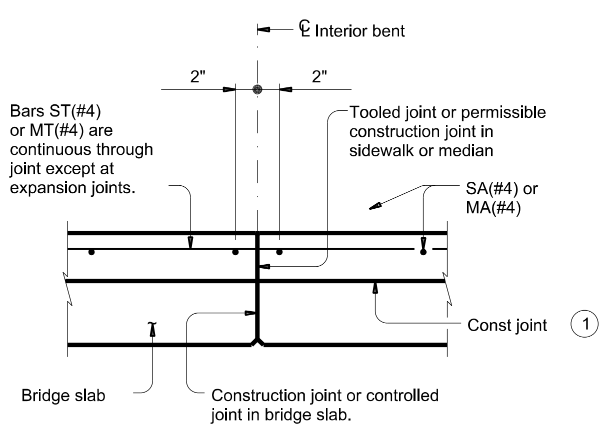
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide the following bar or wire lap lengths when required:
Uncoated, 1'-7" Min
Coated, 2'-5" Min
Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.
Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).
Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

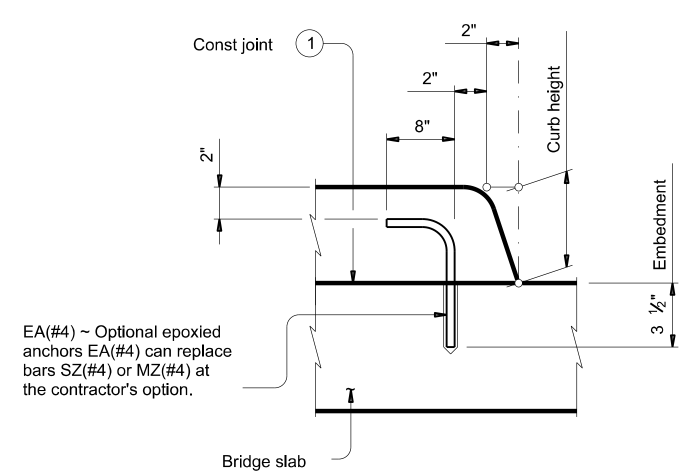
These details do not apply for longitudinal grades exceeding 5 percent.

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



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIONAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT			
©TxDOT April 2019	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0915	00	258				
	DIST		COUNTY		SHEET NO.		
	SAT		BEXAR		151		

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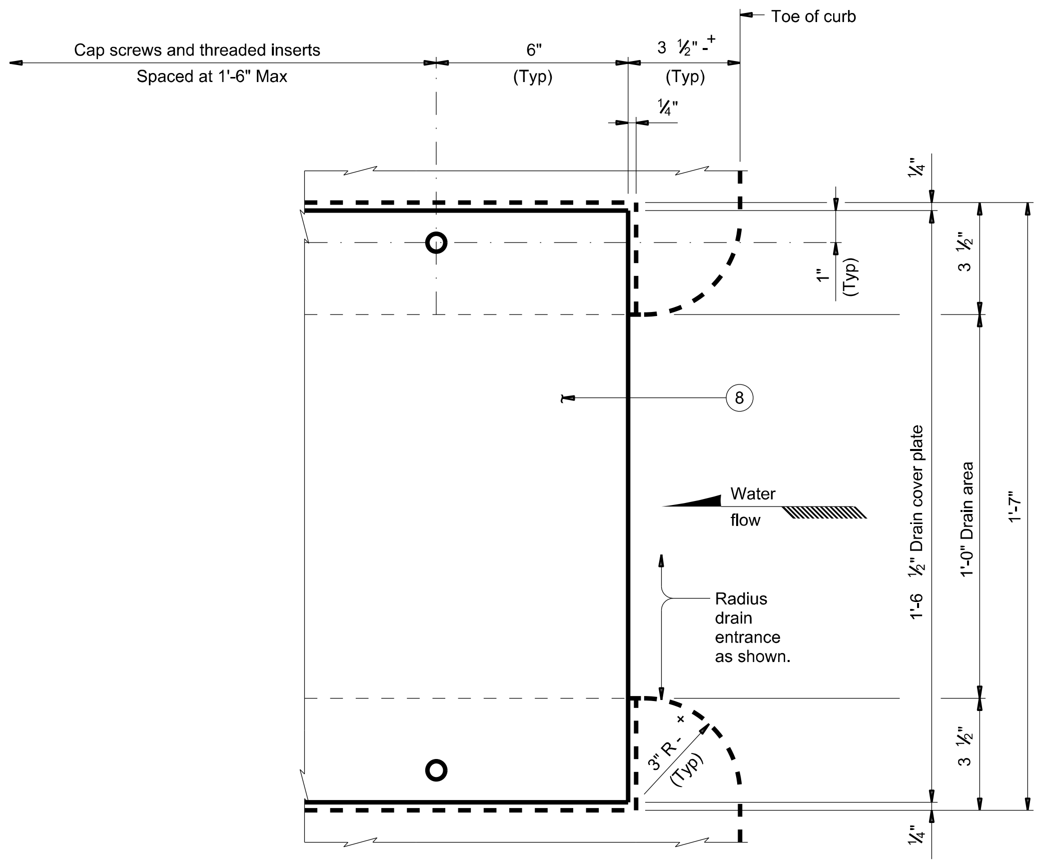
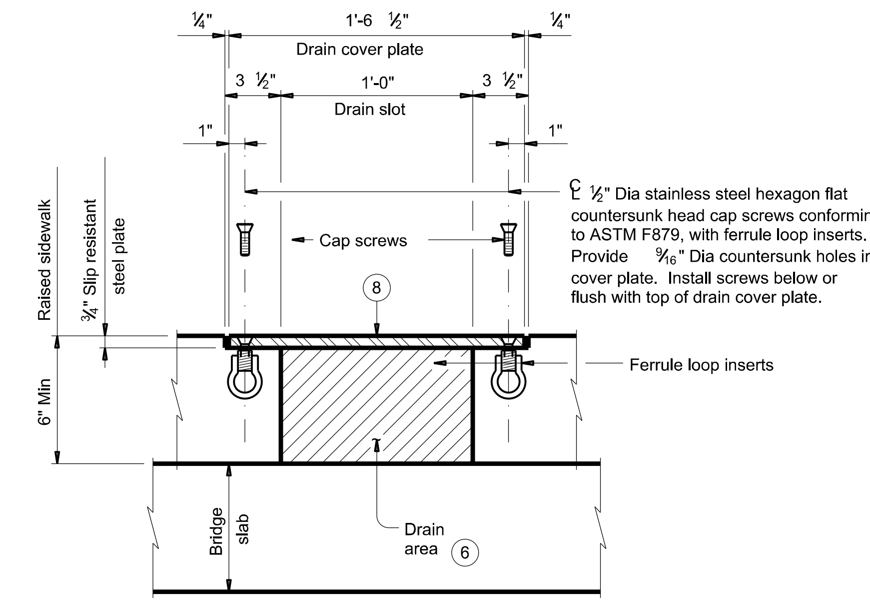


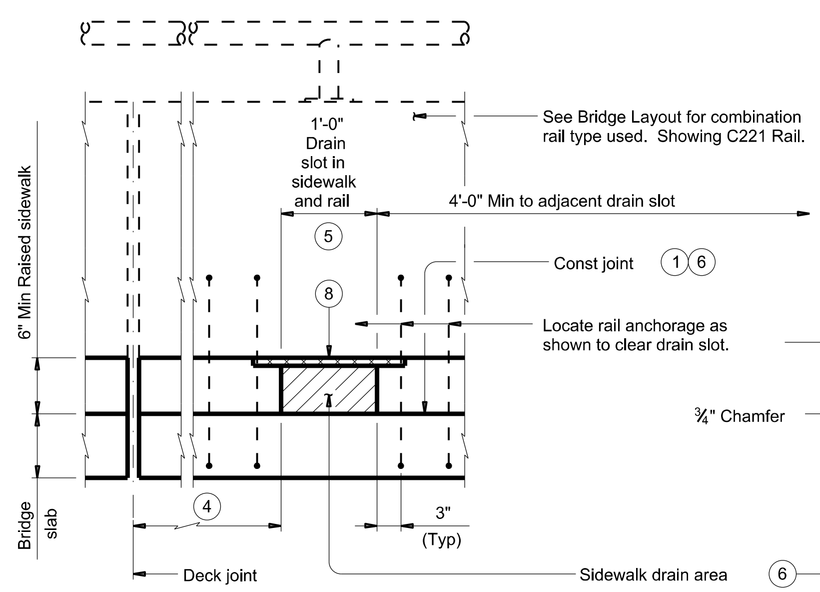
PARTIAL PLAN CURB DRAIN



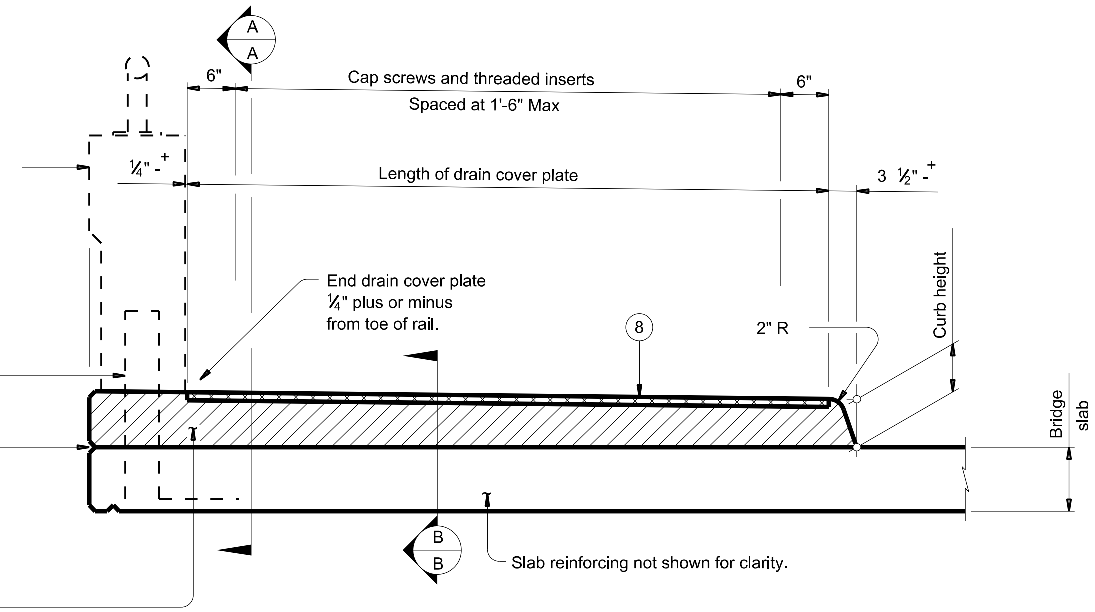
SECTION B-B

Reinforcing not shown for clarity.

1. Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.
4. 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.
5. For rail Type C1W, center drain slots between posts.
6. Steel trowel top surface of bridge deck in drain locations.
7. Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.
8. Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of sidewalk.



SECTION A-A



SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS 7

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		152

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NOTES:

1. THE SARA DRAFT ATLAS 14 HYDROLOGIC MODEL FOR SALADO CREEK IN HEC-HMS V4.3 DATED SEPTEMBER 2021 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. BEST AVAILABLE DRAINAGE AREA LRN-001 WAS SUBDIVIDED TO CAPTURE THE DRAINAGE AREA CONTRIBUTING TO THE POINT OF INTEREST (3-8'X7' MBC).
3. FOR SUBDIVIDED DRAINAGE AREA LRN-001.1, THE PERCENT IMPERVIOUS WAS RECOMPUTED USING THE BEXAR COUNTY 2017 LAND USE SPATIAL DATA. THE LAG TIME WAS RECOMPUTED USING THE SNYDER UNIT HYDROGRAPH METHOD WHICH IS CONSISTENT WITH THE BEST AVAILABLE MODEL. ALL OTHER PARAMETERS WERE KEPT CONSISTENT THE ORIGINAL BASIN LRN-001.
4. POI FLOW IS FROM HMS NODE LRN-001.1.
5. THIS SITE LIES WITHIN A SPECIAL FLOOD HAZARD ZONE (ZONE AE) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP No. 48029C0255G, BEXAR COUNTY, TEXAS, DATED SEPTEMBER 29, 2010.
6. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR SABRINA SANTIAGO ON FEBRUARY 24, 2023.

N

0' 500' 1000'

SCALE

LEGEND

- DRAINAGE AREA
- FLOW DIRECTION
- FEMA STREAM CENTERLINE
- 100-YR FEMA FLOODPLAIN
- EXISTING 5' CONTOURS (2021)
- XXX-XX DRAINAGE AREA ID

Drainage Basin	Area	Snyder Transform Data		Green & Ampt Loss Data					Flow (cfs)			
		Lag Time	Peaking	Initial	Saturated	Suction	Conductivity	Impervious	10-yr	50-yr	100-yr	500-yr
	(acres)	(hr)	Coeff	Content	Content	(in)	(in/hr)	(%)				
LRN-001.1	0.4308	0.38	0.8	0.27	0.475	12.45	0.015	64	1142.7	1542.0	1712.7	2181.4

STATE OF TEXAS
TRAVIS J KAATZ
124859
LICENSED
PROFESSIONAL ENGINEER
2/28/2023

EDGE ENGINEERING
TBPELS Firm Number 20690
3410 Far West Blvd, Ste 315
Austin, TX 78731
512.767.1009
www.cmi-edge.com

Texas Department of Transportation

SL 1604 AT LORENCE CREEK
DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	153
CONT.	SECT.	JOB	
0915	00	258	

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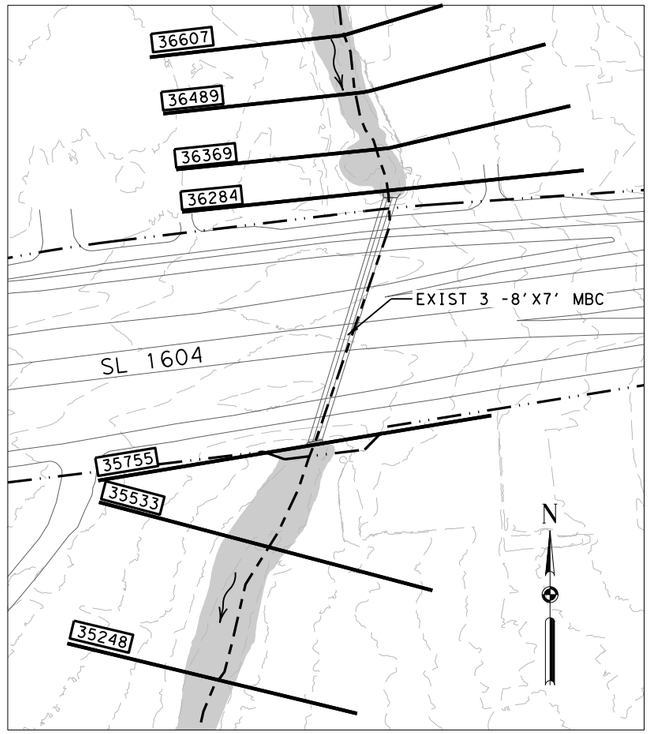


HEC-RAS CROSS-SECTION LAYOUT

SCALE 1" = 300'

HEC-RAS CROSS-SECTION OUTPUT

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
36607	100-yr	1712.7	927.87	933.59	933.59	934.85	0.022238	9.0	190.21	75.16	1.00
36607	500-yr	2181.4	927.87	934.11	934.11	935.48	0.021953	9.4	232.00	85.12	1.00
36489	100-yr	1712.7	925.94	930.72	930.72	931.88	0.022839	8.6	198.28	86.00	1.00
36489	500-yr	2181.4	925.94	932.61		933.14	0.005576	5.8	374.23	101.33	0.53
36369	100-yr	1712.7	922.71	930.40		930.53	0.000961	2.9	588.86	118.76	0.23
36369	500-yr	2181.4	922.71	932.68		932.78	0.000496	2.5	881.95	137.26	0.17
36284	100-yr	1712.7	920.41	929.77	925.94	930.30	0.002337	5.8	295.39	96.57	0.38
36284	500-yr	2181.4	920.41	932.10	926.81	932.59	0.001526	5.6	388.09	140.79	0.32
36000	Loop 1604										
35755	100-yr	1712.7	916.54	922.28	922.28	924.48	0.019776	11.9	144.02	117.30	1.00
35755	500-yr	2181.4	916.54	923.06	923.06	925.63	0.018688	12.9	169.37	135.79	1.00
35533	100-yr	1712.7	913.96	919.10		919.53	0.006078	5.3	323.60	109.91	0.54
35533	500-yr	2181.4	913.96	919.63		920.13	0.005817	5.7	385.48	123.37	0.55
35248	100-yr	1712.7	911.62	916.87		917.22	0.011139	4.7	363.06	105.32	0.45
35248	500-yr	2181.4	911.62	917.46		917.87	0.011218	5.1	427.48	112.28	0.46

HEC-RAS CULVERT OUTPUT

Plan: Lp1604_Scour Lorence Creek
Reach 1 RS: 36000 Profile: 100-yr

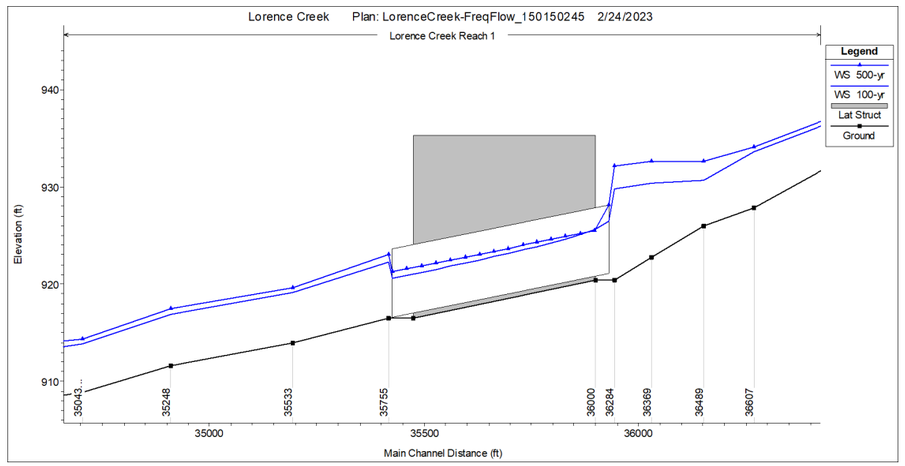
Q Culv Group (cfs)	1712.7	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	13.2
Q Barrel (cfs)	570.9	Culv Vel DS (ft/s)	18.0
E.G. US. (ft)	930.30	Culv Inv El Up (ft)	921.10
W.S. US. (ft)	929.77	Culv Inv El Dn (ft)	916.60
E.G. DS (ft)	924.48	Culv Frctn Ls (ft)	3.63
W.S. DS (ft)	922.28	Culv Exit Loss (ft)	1.11
Delta EG (ft)	5.82	Culv Entr Loss (ft)	1.08
Delta WS (ft)	7.49	Q Weir (cfs)	
E.G. IC (ft)	930.21	Weir Sta Lft (ft)	
E.G. OC (ft)	930.30	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	926.51	Weir Max Depth (ft)	
Culv WS Outlet (ft)	920.58	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.88	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.41	Min El Weir Flow (ft)	935.88

Plan: Lp1604_Scour Lorence Creek
Reach 1 RS: 36000 Profile: 500-yr

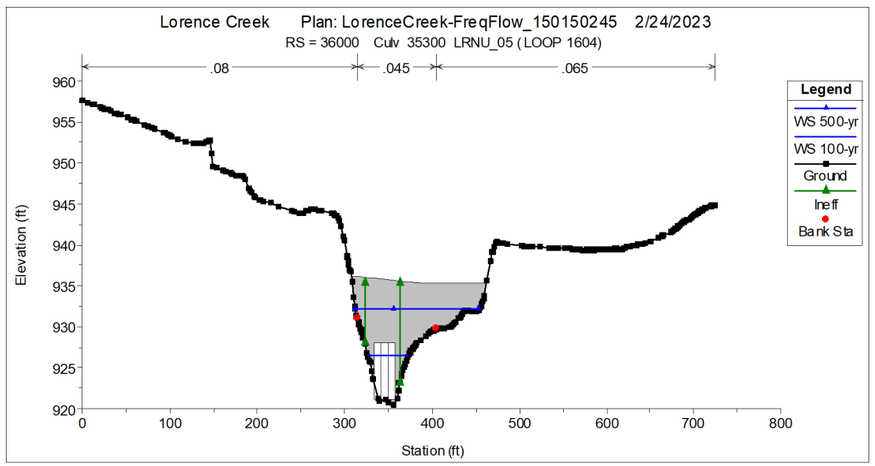
Q Culv Group (cfs)	2181.4	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	13.0
Q Barrel (cfs)	727.1	Culv Vel DS (ft/s)	19.5
E.G. US. (ft)	932.59	Culv Inv El Up (ft)	921.10
W.S. US. (ft)	932.10	Culv Inv El Dn (ft)	916.60
E.G. DS (ft)	925.63	Culv Frctn Ls (ft)	4.38
W.S. DS (ft)	923.06	Culv Exit Loss (ft)	1.53
Delta EG (ft)	6.95	Culv Entr Loss (ft)	1.05
Delta WS (ft)	9.04	Q Weir (cfs)	
E.G. IC (ft)	932.59	Weir Sta Lft (ft)	
E.G. OC (ft)	931.91	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	928.10	Weir Max Depth (ft)	
Culv WS Outlet (ft)	921.27	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.67	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	6.36	Min El Weir Flow (ft)	935.88

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDRAULIC MODEL FOR LORENCE CREEK IN HEC-RAS V5.0.7 DATED OCTOBER 2021 WAS USED AS THE BASIS FOR THIS ANLAYSIS.
2. THE BEST AVAILABLE MODEL WAS UPDATED TO HEC-RAS V6.3. THE CULVERT BOUNDING SECTIONS WERE UPDATED WITH 2021 LIDAR DATA AND PROJECT SURVEY.
3. THE PROPOSED IMPROVEMENTS FILL AN EXISTING SCOUR HOLE AND DO NOT AFFECT THE STREAM OR CULVERT HYRDAULICS SO NO EXISTING VS PROPOSED COMPARISON IS WARRANTED.
4. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR SABRINA SANTIAGO ON FEBRUARY 24, 2023.
5. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). SL 1604 IS CLASSIFIED AS A FREEWAY WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR. THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.



HEC-RAS CHANNEL PROFILE



HEC-RAS CULVERT UPSTREAM

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SL 1604 AT LORENCE CREEK
HYDRAULIC DATA SHEET

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SL 1604
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	154
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_HH_DATA_01.dgn
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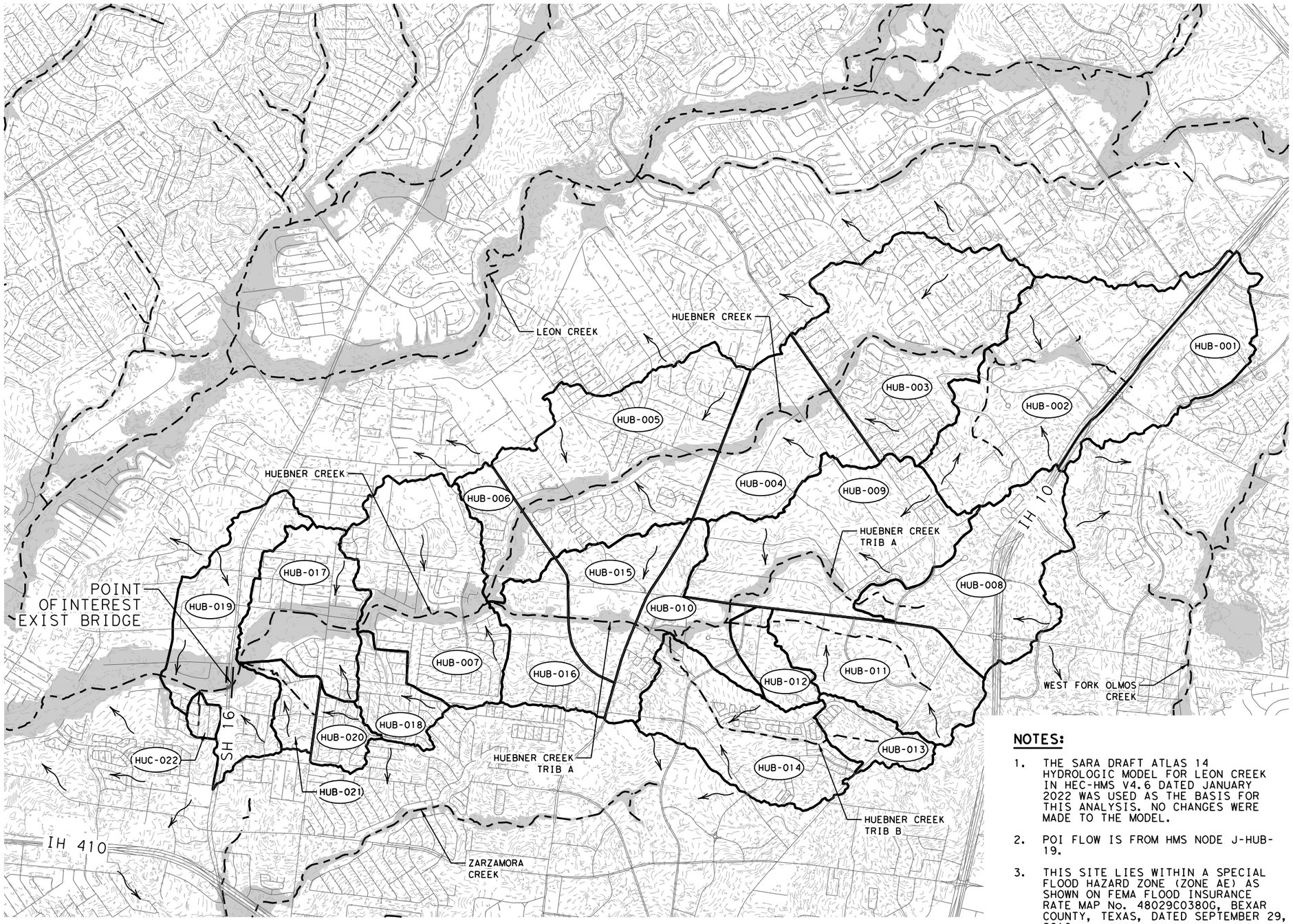
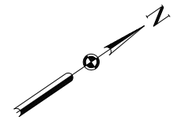


Total Contributing Drainage Area to POI (acres)	Flow (cfs)			
	10-yr	50-yr	100-yr	500-yr
6396.23	8249	12735	14749	20338



0' 1500' 3000'

SCALE

LEGEND

- DRAINAGE AREA
- FLOW DIRECTION
- FEMA STREAM CENTERLINE
- 100-YR FEMA FLOODPLAIN
- EXISTING 5' CONTOURS (2021)
- XXX-XX DRAINAGE AREA ID

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDROLOGIC MODEL FOR LEON CREEK IN HEC-HMS V4.6 DATED JANUARY 2022 WAS USED AS THE BASIS FOR THIS ANALYSIS. NO CHANGES WERE MADE TO THE MODEL.
2. POI FLOW IS FROM HMS NODE J-HUB-19.
3. THIS SITE LIES WITHIN A SPECIAL FLOOD HAZARD ZONE (ZONE AE) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP No. 48029C0380G, BEXAR COUNTY, TEXAS, DATED SEPTEMBER 29, 2010.
4. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR MINDY TEAGUE ON FEBRUARY 24, 2023.

2/28/2023

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Texas Department of Transportation

SH 16 AT HUEBNER CREEK
DRAINAGE AREA MAP

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	155
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_DA_03.dgn
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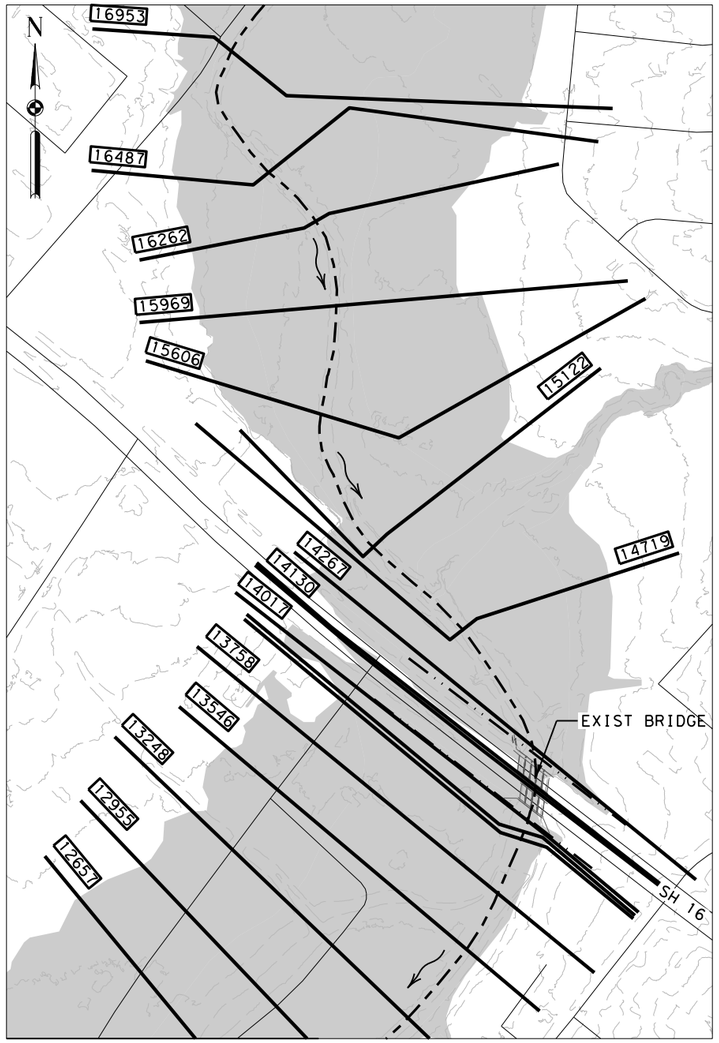


HEC-RAS CROSS-SECTION LAYOUT

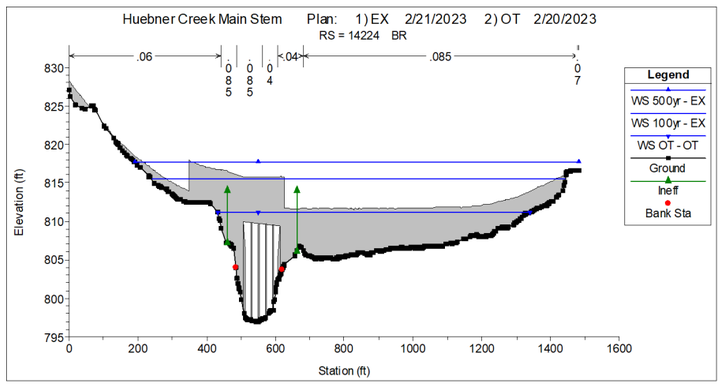
SCALE: 1" = 500'

HEC-RAS CROSS-SECTION OUTPUT

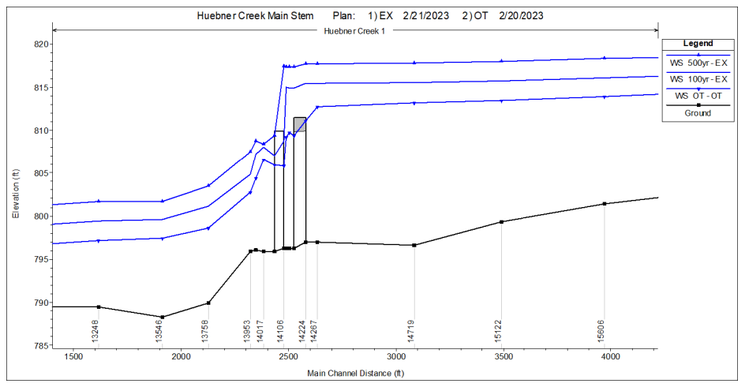
River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
15606	OT	OT	9815	801.44	813.92		814.10	0.000842	3.82	4058.93	1022.19	0.26
15606	100yr	EX	14749	801.44	816.13		816.30	0.000579	3.83	6389.02	1075.44	0.23
15606	500yr	EX	20338	801.44	818.37		818.53	0.000445	3.90	8832.50	1116.47	0.21
15122	OT	OT	9815	799.28	813.47		813.70	0.000801	4.46	3690.20	715.94	0.26
15122	100yr	EX	14749	799.28	815.74		815.99	0.000705	4.87	5554.60	880.46	0.26
15122	500yr	EX	20338	799.28	817.96		818.26	0.000697	5.46	7888.70	1346.02	0.26
14719	OT	OT	9815	796.62	813.20	808.79	813.40	0.000666	4.11	3600.28	1142.94	0.24
14719	100yr	EX	14749	796.62	815.52	810.21	815.72	0.000557	4.37	5317.92	1240.70	0.23
14719	500yr	EX	20338	796.62	817.79	811.19	818.00	0.000473	4.55	7178.68	1358.08	0.22
14267	OT	OT	9815	796.98	812.69	804.39	812.98	0.001143	4.23	2355.23	1081.68	0.20
14267	100yr	EX	14749	796.98	815.41	806.46	815.46	0.000289	2.40	9572.84	1204.39	0.10
14267	500yr	EX	20338	796.98	817.70	807.98	817.76	0.000267	2.51	12438.53	1291.92	0.10
14224	NB SH 16 BRIDGE											
14130	OT	OT	9815	796.28	809.79	804.17	811.01	0.000318	8.87	1106.48	109.02	0.45
14130	100yr	EX	14749	796.28	814.89	806.60	815.38	0.000124	6.46	5229.85	1233.03	0.28
14130	500yr	EX	20338	796.28	817.33	809.15	817.70	0.000095	6.19	8388.46	1342.02	0.25
14116	OT	OT	9815	796.22	809.19	805.16	810.87	0.000582	10.41	952.14	334.64	0.57
14116	100yr	EX	14749	796.22	814.97	808.23	815.29	0.000102	5.86	6695.60	1273.42	0.26
14116	500yr	EX	20338	796.22	817.39	812.33	817.63	0.000078	5.62	9910.57	1365.14	0.23
14106	SB SH 16 BRIDGE											
14017	OT	OT	9815	795.84	806.54	803.48	807.94	0.000554	9.48	1094.69	322.94	0.55
14017	100yr	EX	14749	795.84	808.00	805.46	810.32	0.000761	12.26	1320.46	695.97	0.66
14017	500yr	EX	20338	795.84	808.39	807.53	812.47	0.001284	16.29	1380.17	731.78	0.86
13979	OT	OT	9815	796.03	804.41	804.41	807.42	0.001909	14.17	796.59	139.58	1.02
13979	100yr	EX	14749	796.03	807.20	807.20	810.11	0.001137	14.12	1716.50	786.91	0.84
13979	500yr	EX	20338	796.03	808.79	808.79	811.97	0.001070	15.32	3093.51	980.75	0.84
13953	OT	OT	9815	795.91	802.78	802.78	805.69	0.001890	13.69	716.74	122.51	1.00
13953	100yr	EX	14749	795.91	804.83	804.83	808.29	0.001678	14.92	988.54	143.97	1.00
13953	500yr	EX	20338	795.91	807.47	807.47	810.61	0.001111	14.43	2138.37	830.88	0.83
13758	OT	OT	9815	789.92	798.62	798.62	802.12	0.009870	15.01	653.72	93.12	1.00
13758	100yr	EX	14749	789.92	801.11	801.11	805.27	0.009367	16.35	901.99	108.50	1.00
13758	500yr	EX	20338	789.92	803.52	803.52	808.03	0.008843	17.05	1199.05	147.42	0.99
13546	OT	OT	9815	788.25	797.45	795.18	798.26	0.005023	9.41	1686.59	301.85	0.70
13546	100yr	EX	14749	788.25	799.56	796.48	800.50	0.004339	10.17	2363.80	340.27	0.68
13546	500yr	EX	20338	788.25	801.64	797.94	802.71	0.003719	10.83	3112.06	375.90	0.65

NOTES:

1. THE SARA HYDRAULIC MODEL FOR HUEBNER CREEK IN HEC-RAS v3.1.3 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. THE BEST AVAILABLE MODEL WAS UPDATED TO HEC-RAS v6.3. ALL CROSS SECTIONS WERE UPDATED WITH 2021 LiDAR. CULVERT BOUNDING SECTIONS WERE UPDATED WITH PROJECT SURVEY DATA.
3. THE MODEL WAS TRUNCATED DOWNSTREAM OF THE CROSSING AT XS 11634 AND THE DOWNSTREAM BOUNDARY CONDITION WAS SET TO NORMAL DEPTH WITH A SLOPE OF 0.00286 FT/FT WHICH WAS TAKEN FROM THE WSEL SLOPE OF THE BEST AVAILABLE MODEL.
4. PROFILE OT REPRESENTS THE INCIPIENT OVERTOPPING EVENT.
5. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR MINDY TEAGUE ON FEBRUARY 24, 2023.
6. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). SH 16 IS CLASSIFIED AS A PRINCIPAL ARTERIAL WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.
7. SINCE THE SCOUR DESIGN FREQUENCY FLOOD OVERTOPS THE ROADWAY, THE INCIPIENT OVERTOPPING FLOOD WAS ITERATED AND EVALUATED.



HEC-RAS BRIDGE UPSTREAM



HEC-RAS CHANNEL PROFILE

STATE OF TEXAS
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Texas Department of Transportation

SH 16 AT HUEBNER CREEK
HYDRAULIC DATA SHEET

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	156
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_HH_DATA_03.1.dgn
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HEC-RAS DETAILED BRIDGE OUTPUT

Plan: EX	Huebner Creek	1 RS: 14224	Profile: 100yr	
E.G. US. (ft)	815.46	Element	Inside BR U	Inside BR DS
W.S. US. (ft)	815.41	E.G. Elev (ft)	815.46	815.38
Q Total (cfs)	14749.0	W.S. Elev (ft)	815.41	814.89
Q Bridge (cfs)	4152.9	Crit W.S. (ft)	807.81	808.89
Q Weir (cfs)	10596.1	Max Chl Dpth (ft)	18.43	18.61
Weir Sta Lft (ft)	283.78	Vel Total (ft/s)	4.09	4.93
Weir Sta Rgt (ft)	1415.82	Flow Area (sq ft)	3605.83	2994.61
Weir Submerg	0.92	Froude # Chl	0.17	0.28
Weir Max Depth (ft)	3.98	Specif Force (cu ft)	18311.12	15997.59
Min El Weir Flow (ft)	811.61	Hydr Depth (ft)	4.24	3.64
Min El Prs (ft)	809.90	W.P. Total (ft)	1190.34	1084.35
Delta EG (ft)	0.08	Conv. Total (cfs)		
Delta WS (ft)	0.52	Top Width (ft)	850.29	823.53
BR Open Area (sq ft)	856.95	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.9	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: EX	Huebner Creek	1 RS: 14224	Profile: 500yr	
E.G. US. (ft)	817.76	Element	Inside BR U	Inside BR DS
W.S. US. (ft)	817.70	E.G. Elev (ft)	817.76	817.70
Q Total (cfs)	20338.0	W.S. Elev (ft)	817.70	817.33
Q Bridge (cfs)	3610.5	Crit W.S. (ft)	814.02	814.86
Q Weir (cfs)	16727.5	Max Chl Dpth (ft)	20.73	21.05
Weir Sta Lft (ft)	213.28	Vel Total (ft/s)	3.32	3.64
Weir Sta Rgt (ft)	1482.03	Flow Area (sq ft)	6126.78	5586.51
Weir Submerg	0.96	Froude # Chl	0.13	0.16
Weir Max Depth (ft)	6.28	Specif Force (cu ft)	29495.01	25844.63
Min El Weir Flow (ft)	811.61	Hydr Depth (ft)	4.87	4.30
Min El Prs (ft)	809.90	W.P. Total (ft)	1601.28	1566.99
Delta EG (ft)	0.06	Conv. Total (cfs)		
Delta WS (ft)	0.38	Top Width (ft)	1257.56	1299.54
BR Open Area (sq ft)	856.95	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.2	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: OT	Huebner Creek	1 RS: 14224	Profile: OT	
E.G. US. (ft)	812.98	Element	Inside BR U	Inside BR DS
W.S. US. (ft)	812.69	E.G. Elev (ft)	812.52	811.49
Q Total (cfs)	9815.0	W.S. Elev (ft)	811.13	809.36
Q Bridge (cfs)	9815.0	Crit W.S. (ft)	805.33	805.67
Q Weir (cfs)		Max Chl Dpth (ft)	14.16	13.08
Weir Sta Lft (ft)		Vel Total (ft/s)	9.5	11.7
Weir Sta Rgt (ft)		Flow Area (sq ft)	1037.92	838.03
Weir Submerg		Froude # Chl	0.44	0.63
Weir Max Depth (ft)		Specif Force (cu ft)	10443.16	8825.50
Min El Weir Flow (ft)	811.61	Hydr Depth (ft)		10.72
Min El Prs (ft)	809.90	W.P. Total (ft)	334.90	173.94
Delta EG (ft)	1.96	Conv. Total (cfs)	58801.6	237056.0
Delta WS (ft)	2.90	Top Width (ft)		78.14
BR Open Area (sq ft)	856.95	Frctn Loss (ft)	0.81	0.02
BR Open Vel (ft/s)	11.7	C & E Loss (ft)	0.22	0.45
BR Sluice Coef	0.50	Shear Total (lb/sq ft)	5.39	0.52
BR Sel Method	Energy only	Power Total (lb/ft s)	50.98	6.04

NOTES:

1. THE SARA HYDRAULIC MODEL FOR HUEBNER CREEK IN HEC-RAS v3.1.3 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. THE BEST AVAILABLE MODEL WAS UPDATED TO HEC-RAS v6.3. ALL CROSS SECTIONS WERE UPDATED WITH 2021 LiDAR. CULVERT BOUNDING SECTIONS WERE UPDATED WITH PROJECT SURVEY DATA.
3. THE MODEL WAS TRUNCATED DOWNSTREAM OF THE CROSSING AT XS 11634 AND THE DOWNSTREAM BOUNDARY CONDITION WAS SET TO NORMAL DEPTH WITH A SLOPE OF 0.00286 FT/FT WHICH WAS TAKEN FROM THE WSEL SLOPE OF THE BEST AVAILABLE MODEL.
4. PROFILE OT REPRESENTS THE INCIPIENT OVERTOPPING EVENT.
5. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR MINDY TEAGUE ON FEBRUARY 24, 2023.
6. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). SH 16 IS CLASSIFIED AS A PRINCIPAL ARTERIAL WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.
7. SINCE THE SCOUR DESIGN FREQUENCY FLOOD OVERTOPS THE ROADWAY, THE INCIPIENT OVERTOPPING FLOOD WAS ITERATED AND EVALUATED.

STATE OF TEXAS
TRAVIS J KAATZ
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Texas Department of Transportation

SH 16 AT HUEBNER CREEK
HYDRAULIC DATA SHEET

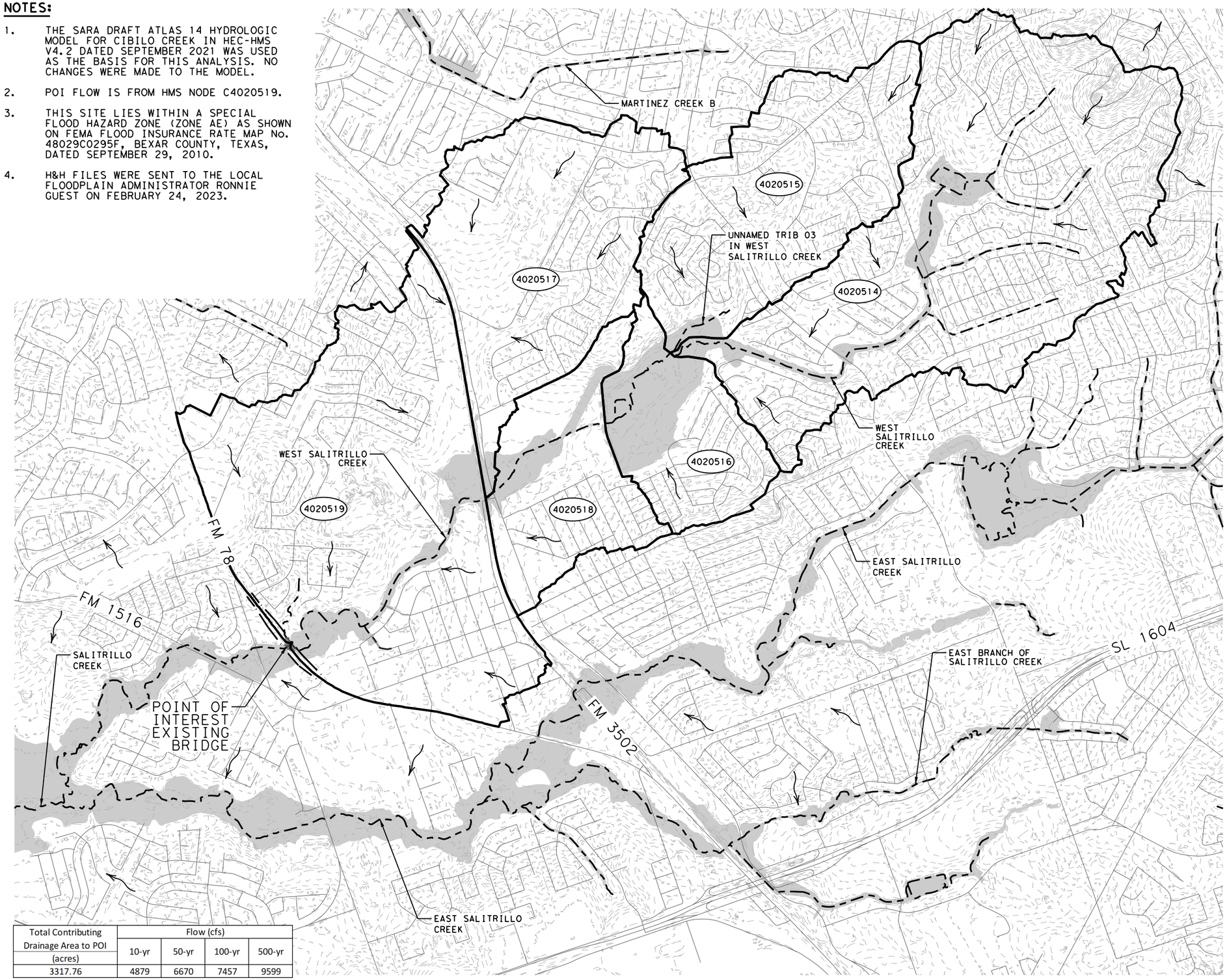
SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	157
CONT.	SECT.	JOB	
0915	00	258	

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDROLOGIC MODEL FOR CIBILO CREEK IN HEC-HMS V4.2 DATED SEPTEMBER 2021 WAS USED AS THE BASIS FOR THIS ANALYSIS. NO CHANGES WERE MADE TO THE MODEL.
2. POI FLOW IS FROM HMS NODE C4020519.
3. THIS SITE LIES WITHIN A SPECIAL FLOOD HAZARD ZONE (ZONE AE) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP No. 48029C0295F, BEXAR COUNTY, TEXAS, DATED SEPTEMBER 29, 2010.
4. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR RONNIE GUEST ON FEBRUARY 24, 2023.



Total Contributing Drainage Area to POI (acres)	Flow (cfs)			
	10-yr	50-yr	100-yr	500-yr
3317.76	4879	6670	7457	9599

N

0' 1000' 2000'

SCALE

LEGEND

- DRAINAGE AREA
- FLOW DIRECTION
- FEMA STREAM CENTERLINE
- 100-YR FEMA FLOODPLAIN
- EXISTING 5' CONTOURS (2021)
- XXX-XX DRAINAGE AREA ID

STATE OF TEXAS
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2/28/2023

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Texas Department of Transportation

FM 78 AT WEST SALITRILLO CREEK DRAINAGE AREA MAP

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		FM 78

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	158
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_DA_04.dgn
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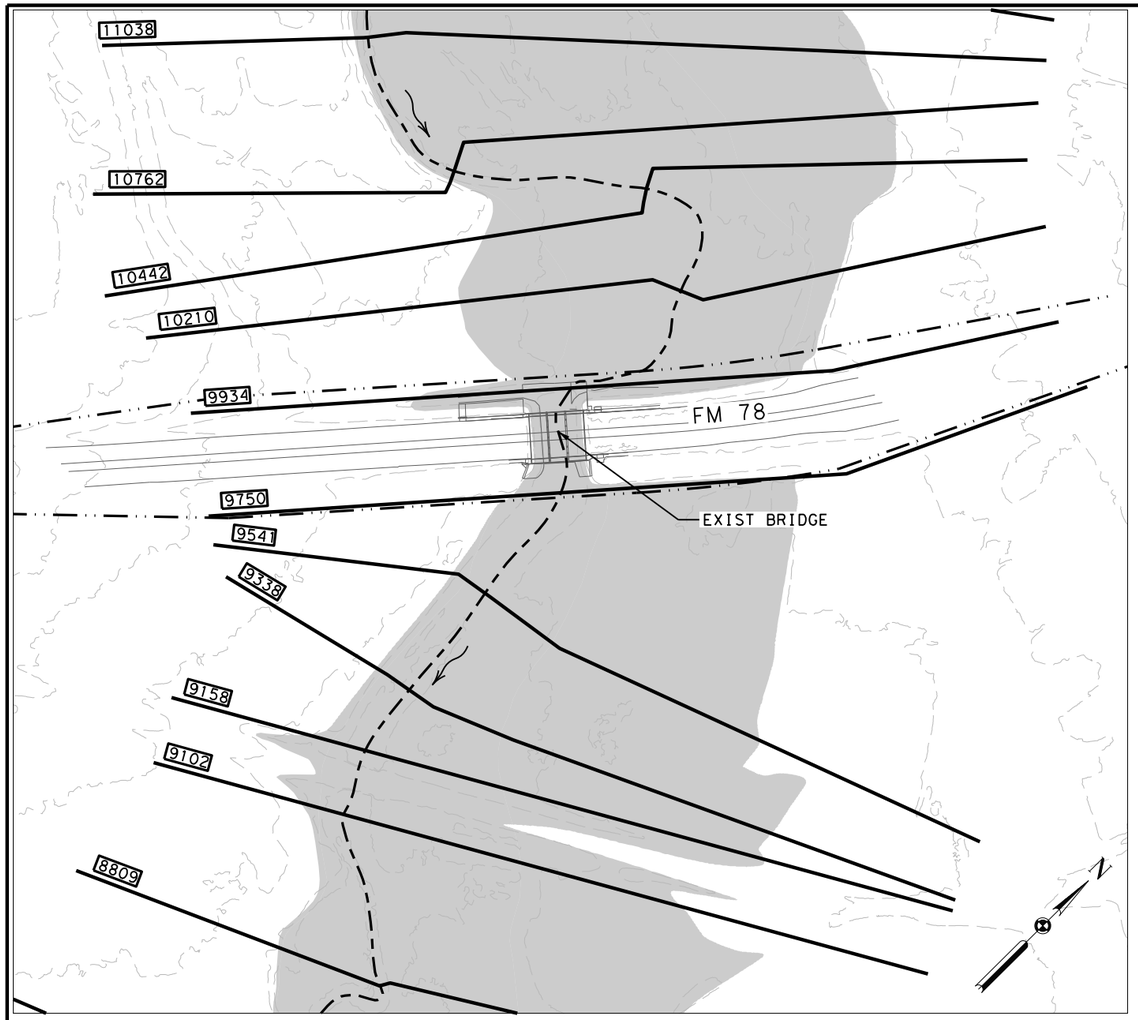
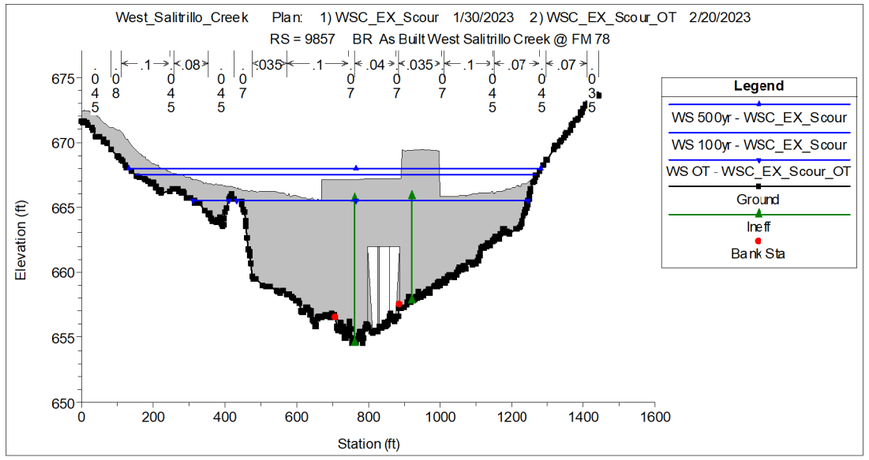


HEC-RAS CROSS-SECTION LAYOUT

SCALE: 1" = 250'



HEC-RAS BRIDGE UPSTREAM

HEC-RAS DETAILED BRIDGE OUTPUT

Plan: WSC_EX_Scour	West Salitrillo_	West Salitrillo_ RS: 9857 Profile: 100yr		
E.G. US. (ft)	667.48	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	667.46	E.G. Elev (ft)	667.48	667.44
Q Total (cfs)	7457.0	W.S. Elev (ft)	667.46	667.04
Q Bridge (cfs)	5094.1	Crit W.S. (ft)	667.47	660.11
Q Weir (cfs)	2362.9	Max Chl Dpth (ft)	12.10	15.40
Weir Sta Lft (ft)	272.23	Vel Total (ft/s)	5.8	6.4
Weir Sta Rgt (ft)	1268.91	Flow Area (sq ft)	1279.96	1167.88
Weir Submerg	0.00	Froude # Chl	0.33	0.37
Weir Max Depth (ft)	1.95	Specif Force (cu ft)	5704.82	8495.85
Min El Weir Flow (ft)	665.60	Hydr Depth (ft)	1.45	1.94
Min El Prs (ft)	662.00	W.P. Total (ft)	1096.91	848.98
Delta EG (ft)	6.60	Conv. Total (cfs)		
Delta WS (ft)	8.19	Top Width (ft)	883.17	601.19
BR Open Area (sq ft)	447.29	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.4	C & E Loss (ft)		
BR Sluice Coef	0.50	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: WSC_EX_Scour	West Salitrillo_	West Salitrillo_ RS: 9857 Profile: 500yr		
E.G. US. (ft)	667.97	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	667.95	E.G. Elev (ft)	667.97	667.92
Q Total (cfs)	9599.0	W.S. Elev (ft)	667.95	667.47
Q Bridge (cfs)	5258.2	Crit W.S. (ft)	667.72	661.45
Q Weir (cfs)	4340.8	Max Chl Dpth (ft)	12.58	15.83
Weir Sta Lft (ft)	230.08	Vel Total (ft/s)	5.6	6.3
Weir Sta Rgt (ft)	1282.82	Flow Area (sq ft)	1728.80	1515.28
Weir Submerg	0.00	Froude # Chl	0.30	0.34
Weir Max Depth (ft)	2.44	Specif Force (cu ft)	6730.47	9440.25
Min El Weir Flow (ft)	665.60	Hydr Depth (ft)	1.83	1.67
Min El Prs (ft)	662.00	W.P. Total (ft)	1157.67	1157.59
Delta EG (ft)	5.95	Conv. Total (cfs)		
Delta WS (ft)	8.04	Top Width (ft)	943.25	909.28
BR Open Area (sq ft)	447.29	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.76	C & E Loss (ft)		
BR Sluice Coef	0.50	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: WSC_EX_Scour_OT	West Salitrillo_	West Salitrillo_ RS: 9857 Profile: OT		
E.G. US. (ft)	665.66	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	665.52	E.G. Elev (ft)	665.66	665.66
Q Total (cfs)	4490.0	W.S. Elev (ft)	665.52	665.52
Q Bridge (cfs)	4487.9	Crit W.S. (ft)	661.12	657.93
Q Weir (cfs)	2.1	Max Chl Dpth (ft)	10.16	13.88
Weir Sta Lft (ft)	626.36	Vel Total (ft/s)	10.0	6.7
Weir Sta Rgt (ft)	668.98	Flow Area (sq ft)	447.29	669.36
Weir Submerg	0.00	Froude # Chl	0.56	0.32
Weir Max Depth (ft)	0.13	Specif Force (cu ft)	4262.17	6356.21
Min El Weir Flow (ft)	665.60	Hydr Depth (ft)		
Min El Prs (ft)	662.00	W.P. Total (ft)	211.33	245.89
Delta EG (ft)	6.61	Conv. Total (cfs)		
Delta WS (ft)	7.37	Top Width (ft)		
BR Open Area (sq ft)	447.29	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.0	C & E Loss (ft)		
BR Sluice Coef	0.50	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDRAULIC MODEL FOR WEST SALITRILLO CREEK IN HEC-RAS v5.0.7 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. THE BEST AVAILABLE MODEL WAS UPDATED TO HEC-RAS v6.3. ALL CROSS SECTIONS WERE UPDATED WITH 2021 LiDAR. CULVERT BOUNDING SECTIONS WERE UPDATED WITH PROJECT SURVEY DATA.
3. THE PROPOSED IMPROVEMENTS DO NOT AFFECT THE STREAM OR BRIDGE HYDRAULICS. NO EXISTING TO PROPOSED COMPARISON IS WARRANTED.
4. PROFILE OT REPRESENTS THE INCIPIENT OVERTOPPING EVENT.
5. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR RONNIE GUEST ON FEBRUARY 24, 2023.
6. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). FM 78 IS CLASSIFIED AS A PRINCIPAL ARTERIAL WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.
7. SINCE THE SCOUR DESIGN FREQUENCY FLOOD OVERTOPS THE ROADWAY, THE INCIPIENT OVERTOPPING FLOOD WAS ITERATED AND EVALUATED.

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Texas Department of Transportation

FM 78 AT WEST SALITRILLO CREEK HYDRAULIC DATA SHEET

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		FM 78

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	159
CONT.	SECT.	JOB	
0915	00	258	

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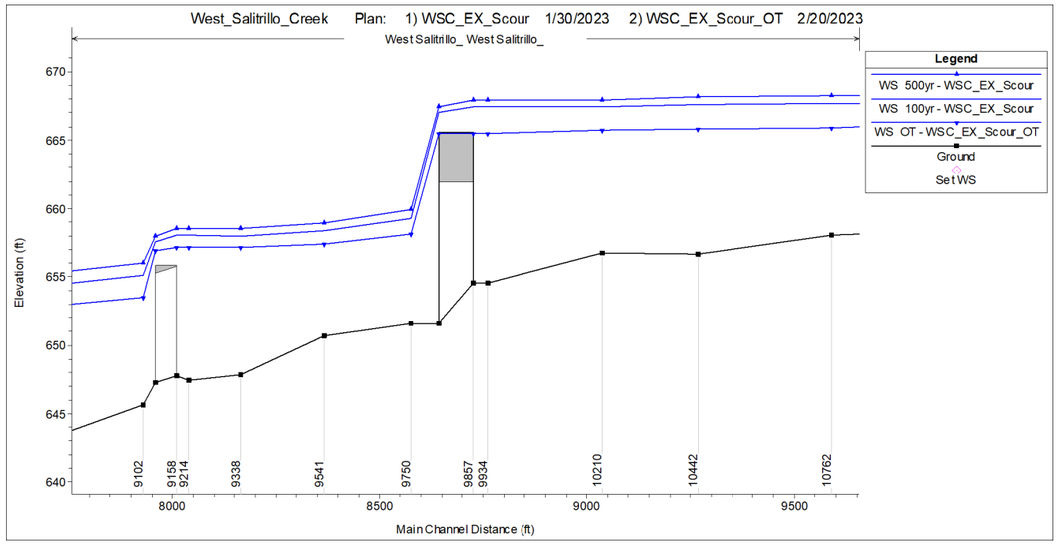
HEC-RAS CROSS-SECTION OUTPUT

River Sta	Profile	PLAN	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
11038	OT	WSC_EX_Scour_OT	4490.0	658.57	666.02	662.91	666.05	0.00069	2.7	3198.79	916.40	0.22
11038	100yr	WSC_EX_Scour	7457.0	658.57	667.79	663.61	667.84	0.00053	2.9	4611.73	981.77	0.20
11038	500yr	WSC_EX_Scour	9599.0	658.57	668.39	663.96	668.45	0.00062	3.4	5089.35	994.32	0.22
10762	OT	WSC_EX_Scour_OT	4490.0	658.03	665.91	661.31	665.95	0.00050	2.7	3608.29	894.24	0.19
10762	100yr	WSC_EX_Scour	7457.0	658.03	667.69	661.99	667.74	0.00050	3.2	4841.83	1030.74	0.20
10762	500yr	WSC_EX_Scour	9599.0	658.03	668.26	662.19	668.33	0.00064	3.8	5241.05	1085.90	0.23
10442	OT	WSC_EX_Scour_OT	4490.0	656.69	665.82	661.82	665.87	0.00043	3.0	3560.04	1058.03	0.19
10442	100yr	WSC_EX_Scour	7457.0	656.69	667.60	662.80	667.67	0.00048	3.6	4736.03	1209.39	0.21
10442	500yr	WSC_EX_Scour	9599.0	656.69	668.14	663.27	668.24	0.00062	4.3	5096.46	1233.60	0.24
10210	OT	WSC_EX_Scour_OT	4490.0	656.78	665.74	660.88	665.80	0.00046	3.1	2861.02	983.68	0.20
10210	100yr	WSC_EX_Scour	7457.0	656.78	667.48	661.66	667.58	0.00058	4.0	3613.17	996.22	0.23
10210	500yr	WSC_EX_Scour	9599.0	656.78	667.97	661.75	668.12	0.00080	4.8	3826.27	1005.49	0.27
9934	OT	WSC_EX_Scour_OT	4490.0	654.53	665.52	659.16	665.66	0.00032	3.0	1493.44	914.96	0.17
9934	100yr	WSC_EX_Scour	7457.0	654.53	667.46	660.30	667.48	0.00007	1.3	7485.69	1118.88	0.07
9934	500yr	WSC_EX_Scour	9599.0	654.53	667.95	661.03	667.97	0.00010	1.6	8039.57	1150.06	0.08
9857	FM 78 BRIDGE											
9750	OT	WSC_EX_Scour_OT	4490.0	651.64	658.15	656.61	659.05	0.00473	7.6	607.75	313.54	0.59
9750	100yr	WSC_EX_Scour	7457.0	651.64	659.27	658.16	660.88	0.00663	10.3	803.42	489.83	0.72
9750	500yr	WSC_EX_Scour	9599.0	651.64	659.91	659.27	662.02	0.00774	11.8	931.2	585.63	0.79
9541	OT	WSC_EX_Scour_OT	4490.0	650.72	657.42		657.83	0.00300	6.1	1224.63	597.75	0.47
9541	100yr	WSC_EX_Scour	7457.0	650.72	658.40		658.96	0.00355	7.4	1664.73	841.59	0.52
9541	500yr	WSC_EX_Scour	9599.0	650.72	658.99		659.64	0.00381	8.2	1934.45	863.13	0.55
9338	OT	WSC_EX_Scour_OT	4490.0	647.86	657.18		657.43	0.00126	5.4	1514.51	655.32	0.33
9338	100yr	WSC_EX_Scour	7457.0	647.86	658.00		658.43	0.00199	7.2	1867.6	858.05	0.42
9338	500yr	WSC_EX_Scour	9599.0	647.86	658.51		659.06	0.00242	8.2	2086.03	923.16	0.46
9214	OT	WSC_EX_Scour_OT	4490.0	647.45	657.18	653.44	657.28	0.00045	3.3	2018.67	724.54	0.20
9214	100yr	WSC_EX_Scour	7457.0	647.45	658.03	655.12	658.19	0.00065	4.3	2743.04	948.36	0.24
9214	500yr	WSC_EX_Scour	9599.0	647.45	658.57	655.90	658.75	0.00073	4.7	3295.78	1035.56	0.26
9158	UPPER SEGUIN RD CULVERT											
9102	OT	WSC_EX_Scour_OT	4490.0	645.62	653.44		653.82	0.00224	6.2	1214.29	359.32	0.42
9102	100yr	WSC_EX_Scour	7457.0	645.62	655.09		655.50	0.00200	6.8	1856.87	438.79	0.41
9102	500yr	WSC_EX_Scour	9599.0	645.62	656.00		656.43	0.00192	7.1	2277.38	469.07	0.41



HEC-RAS CHANNEL PROFILE

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDRAULIC MODEL FOR WEST SALITRILLO CREEK IN HEC-RAS v5.0.7 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. THE BEST AVAILABLE MODEL WAS UPDATED TO HEC-RAS v6.3. ALL CROSS SECTIONS WERE UPDATED WITH 2021 LiDAR. CULVERT BOUNDING SECTIONS WERE UPDATED WITH PROJECT SURVEY DATA.
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5. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR RONNIE GUEST ON FEBRUARY 24, 2023.
6. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). FM 78 IS CLASSIFIED AS A PRINCIPAL ARTERIAL WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.
7. SINCE THE SCOUR DESIGN FREQUENCY FLOOD OVERTOPS THE ROADWAY, THE INCIPIENT OVERTOPPING FLOOD WAS ITERATED AND EVALUATED.

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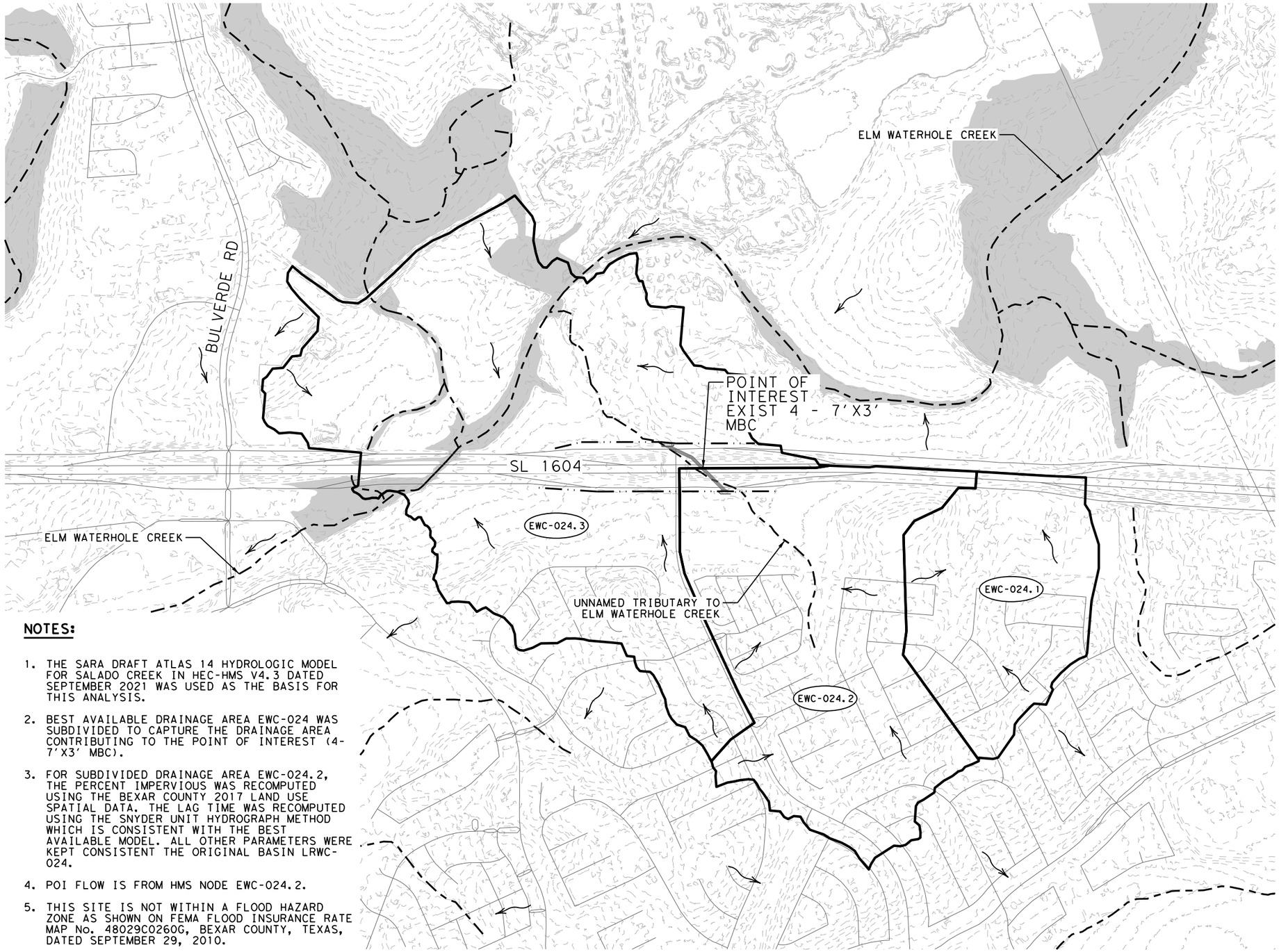
FM 78 AT WEST SALITRILLO CREEK
HYDRAULIC DATA SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			FM 78
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	160
CONT.	SECT.	JOB	
0915	00	258	



N

0' 500' 1000'

SCALE

LEGEND

- DRAINAGE AREA
- FLOW DIRECTION
- FEMA STREAM CENTERLINE
- 100-YR FEMA FLOODPLAIN
- EXISTING 5' CONTOURS (2021)
- XXX-XX DRAINAGE AREA ID

NOTES:

1. THE SARA DRAFT ATLAS 14 HYDROLOGIC MODEL FOR SALADO CREEK IN HEC-HMS V4.3 DATED SEPTEMBER 2021 WAS USED AS THE BASIS FOR THIS ANALYSIS.
2. BEST AVAILABLE DRAINAGE AREA EWC-024 WAS SUBDIVIDED TO CAPTURE THE DRAINAGE AREA CONTRIBUTING TO THE POINT OF INTEREST (4-7'X3' MBC).
3. FOR SUBDIVIDED DRAINAGE AREA EWC-024.2, THE PERCENT IMPERVIOUS WAS RECOMPUTED USING THE BEXAR COUNTY 2017 LAND USE SPATIAL DATA. THE LAG TIME WAS RECOMPUTED USING THE SNYDER UNIT HYDROGRAPH METHOD WHICH IS CONSISTENT WITH THE BEST AVAILABLE MODEL. ALL OTHER PARAMETERS WERE KEPT CONSISTENT THE ORIGINAL BASIN LRWC-024.
4. POI FLOW IS FROM HMS NODE EWC-024.2.
5. THIS SITE IS NOT WITHIN A FLOOD HAZARD ZONE AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP No. 48029C0260G, BEXAR COUNTY, TEXAS, DATED SEPTEMBER 29, 2010.

Drainage Basin	Area	Snyder Transform Data		Green & Ampt Loss Data					Flow (cfs)			
		Lag Time	Peaking	Initial	Saturated	Suction	Conductivity	Impervious	10-yr	50-yr	100-yr	500-yr
	(acres)	(hr)	Coeff	Content	Content	(in)	(in/hr)	(%)				
EWC-024.2	163.01	0.331	0.8	0.278	0.476	12.061	0.055	56.8	729.1	984.1	1093.6	1390.3

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SL 1604 AT UNT TO ELM WATERHOLE CREEK DRAINAGE AREA MAP

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	161
CONT.	SECT.	JOB	
0915	00	258	

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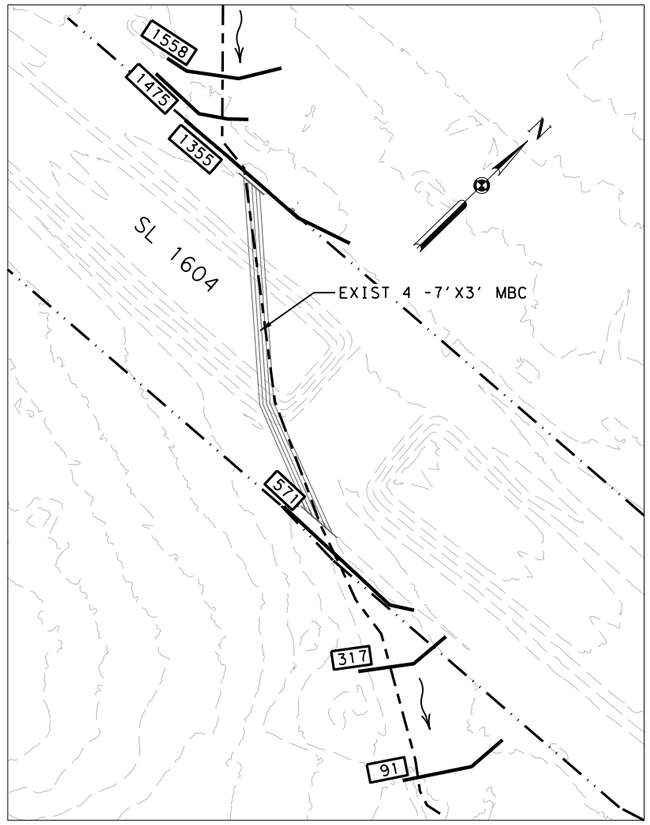


HEC-RAS CROSS-SECTION LAYOUT

SCALE: 1" = 300'

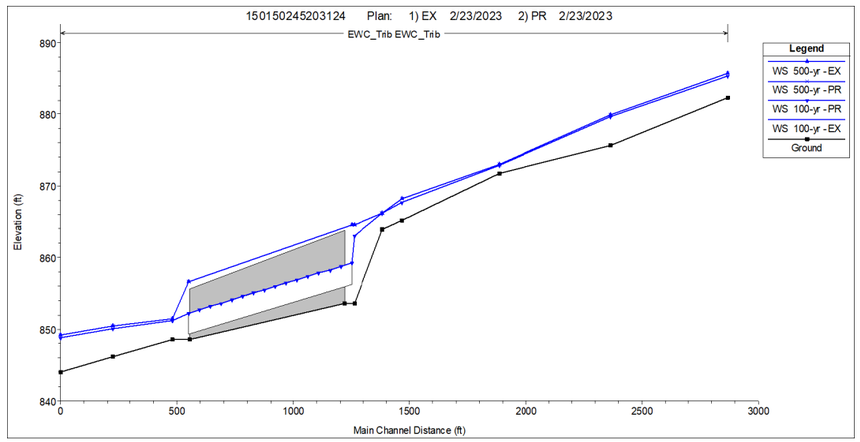
HEC-RAS CULVERT OUTPUT (PROPOSED)

Plan: PR EWC_Trib EWC_Trib RS: 1340 Culv Group: Culvert #1 Profile: 100-yr			
Q Culv Group (cfs)	1093.6	Culv Full Len (ft)	700.00
# Barrels	4	Culv Vel US (ft/s)	13.0
Q Barrel (cfs)	273.4	Culv Vel DS (ft/s)	13.0
E.G. US. (ft)	863.20	Culv Inv El Up (ft)	856.25
W.S. US. (ft)	863.04	Culv Inv El Dn (ft)	849.26
E.G. DS (ft)	852.12	Culv Frctn Ls (ft)	7.26
W.S. DS (ft)	851.19	Culv Exit Loss (ft)	2.77
Delta EG (ft)	11.08	Culv Entr Loss (ft)	1.05
Delta WS (ft)	11.85	Q Weir (cfs)	
E.G. IC (ft)	864.55	Weir Sta Lft (ft)	
E.G. OC (ft)	863.20	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	859.25	Weir Max Depth (ft)	
Culv WS Outlet (ft)	852.26	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.47	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.00	Min El Weir Flow (ft)	864.31

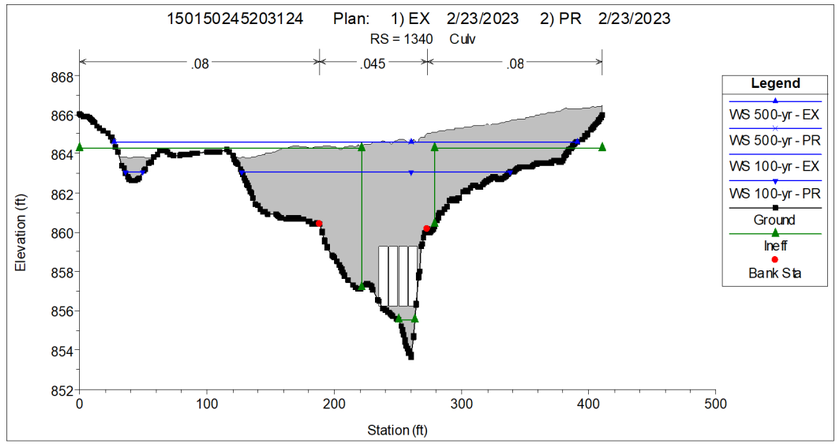
Plan: PR EWC_Trib EWC_Trib RS: 1340 Culv Group: Culvert #1 Profile: 500-yr			
Q Culv Group (cfs)	1162.6	Culv Full Len (ft)	700.00
# Barrels	4	Culv Vel US (ft/s)	13.8
Q Barrel (cfs)	290.7	Culv Vel DS (ft/s)	13.8
E.G. US. (ft)	864.63	Culv Inv El Up (ft)	856.25
W.S. US. (ft)	864.58	Culv Inv El Dn (ft)	849.26
E.G. DS (ft)	852.61	Culv Frctn Ls (ft)	8.20
W.S. DS (ft)	851.51	Culv Exit Loss (ft)	2.63
Delta EG (ft)	12.02	Culv Entr Loss (ft)	1.19
Delta WS (ft)	13.08	Q Weir (cfs)	227.7
E.G. IC (ft)	864.72	Weir Sta Lft (ft)	26.45
E.G. OC (ft)	864.63	Weir Sta Rgt (ft)	265.52
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	859.25	Weir Max Depth (ft)	0.90
Culv WS Outlet (ft)	852.26	Weir Avg Depth (ft)	0.49
Culv Nml Depth (ft)	2.58	Weir Flow Area (sq ft)	112.37
Culv Crt Depth (ft)	3.00	Min El Weir Flow (ft)	864.31

NOTES:

1. NO BEST AVAILABLE MODEL FOR UNNAMED TRIB TO ELM WATERHOLE CREEK EXISTS SO A NEW MODEL WAS CREATED IN HEC-RAS V6.3.
2. 2021 LIDAR DATA AND PROJECT SURVEY WERE UTILIZED FOR ALL CROSS-SECTIONS.
3. THE DOWNSTREAM BOUNDARY CONDITION WAS SET TO NORMAL DEPTH WITH A SLOPE OF 0.0088 FT/FT WHICH WAS TAKEN FROM THE 2021 LIDAR.
4. THE EXISTING SCOUR HOLE IS LARGE AND IS REFLECTED WITHIN THE UPSTREAM CROSS-SECTION. IN THE EXISTING CONDITIONS THE SCOUR HOLE IS SET AS A PERMANENT INEFFECTIVE AREA. THE PROPOSED CONDITIONS REFLECTS THE HOLE BEING FILLED IN USING A BLOCKED OBSTRUCTION.
5. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). SL 1604 IS CLASSIFIED AS A FREEWAY WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN A 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.



HEC-RAS CHANNEL PROFILE



HEC-RAS CULVERT UPSTREAM

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SL 1604 AT UNT TO ELM WATERHOLE CREEK HYDRAULIC DATA SHEET

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	162
CONT.	SECT.	JOB	
0915	00	258	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_HH_DATA_02.1.dgn
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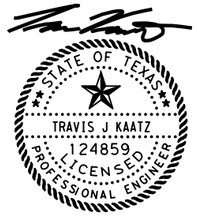
HEC-RAS CROSS-SECTION OUTPUT

River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
2960	100-yr	EX	1093.6	882.38	885.29	885.29	886.24	0.011507	7.97	157.41	99.25	0.92
2960	100-yr	PR	1093.6	882.38	885.29	885.29	886.24	0.011507	7.97	157.41	99.25	0.92
2960	500-yr	EX	1390.3	882.38	885.70	885.70	886.71	0.010234	8.37	200.55	111.04	0.89
2960	500-yr	PR	1390.3	882.38	885.70	885.70	886.71	0.010234	8.37	200.55	111.04	0.89
2457	100-yr	EX	1093.6	875.63	879.67	879.16	880.16	0.008160	5.89	228.90	153.01	0.62
2457	100-yr	PR	1093.6	875.63	879.67	879.16	880.16	0.008160	5.89	228.90	153.01	0.62
2457	500-yr	EX	1390.3	875.63	879.96	879.53	880.55	0.008903	6.57	278.02	181.87	0.66
2457	500-yr	PR	1390.3	875.63	879.96	879.53	880.55	0.008903	6.57	278.02	181.87	0.66
1977	100-yr	EX	1093.6	871.71	872.87	872.87	873.25	0.031903	4.98	224.45	315.97	1.00
1977	100-yr	PR	1093.6	871.71	872.87	872.87	873.25	0.031903	4.98	224.45	315.97	1.00
1977	500-yr	EX	1390.3	871.71	873.01	873.01	873.44	0.029282	5.33	269.49	324.31	0.98
1977	500-yr	PR	1390.3	871.71	873.01	873.01	873.44	0.029282	5.33	269.49	324.31	0.98
1558	100-yr	EX	1093.6	865.25	867.73		867.91	0.004832	3.83	387.64	229.61	0.46
1558	100-yr	PR	1093.6	865.25	867.73		867.91	0.004832	3.83	387.64	229.61	0.46
1558	500-yr	EX	1390.3	865.25	868.26		868.43	0.003415	3.73	513.49	237.90	0.40
1558	500-yr	PR	1390.3	865.25	868.26		868.43	0.003415	3.73	513.49	237.90	0.40
1475	100-yr	EX	1093.6	863.91	866.21	866.21	867.03	0.031376	9.50	201.86	164.76	1.16
1475	100-yr	PR	1093.6	863.91	866.21	866.21	867.03	0.031376	9.50	201.86	164.76	1.16
1475	500-yr	EX	1390.3	863.91	866.17	866.17	867.58	0.055319	12.44	194.89	160.24	1.54
1475	500-yr	PR	1390.3	863.91	866.17	866.17	867.58	0.055319	12.44	194.89	160.24	1.54
1355	100-yr	EX	1093.6	853.64	863.04	858.85	863.20	0.000848	3.24	350.55	224.54	0.22
1355	100-yr	PR	1093.6	855.51	863.04	858.85	863.20	0.000832	3.24	350.54	224.54	0.22
1355	500-yr	EX	1390.3	853.64	864.58	859.32	864.63	0.000237	1.88	1146.74	364.19	0.12
1355	500-yr	PR	1390.3	855.51	864.57	859.32	864.62	0.000236	1.88	1143.80	363.94	0.12
1340			Culvert									
571	100-yr	EX	1093.6	848.56	851.19	851.19	852.12	0.023904	7.74	141.32	286.54	1.00
571	100-yr	PR	1093.6	848.56	851.19	851.19	852.12	0.023904	7.74	141.32	286.54	1.00
571	500-yr	EX	1390.3	848.56	851.51	851.51	852.61	0.023326	8.42	165.11	290.17	1.01
571	500-yr	PR	1390.3	848.56	851.51	851.51	852.61	0.023326	8.42	165.11	290.17	1.01
317	100-yr	EX	1093.6	846.19	850.14		850.28	0.002216	3.00	369.98	149.50	0.32
317	100-yr	PR	1093.6	846.19	850.14		850.28	0.002216	3.00	369.98	149.50	0.32
317	500-yr	EX	1390.3	846.19	850.51		850.69	0.002295	3.33	427.54	154.85	0.34
317	500-yr	PR	1390.3	846.19	850.51		850.69	0.002295	3.33	427.54	154.85	0.34
91	100-yr	EX	1093.6	844.08	848.82	848.26	849.35	0.008805	6.03	225.89	147.41	0.64
91	100-yr	PR	1093.6	844.08	848.82	848.26	849.35	0.008805	6.03	225.89	147.41	0.64
91	500-yr	EX	1390.3	844.08	849.15	848.78	849.73	0.008816	6.50	275.74	157.51	0.65
91	500-yr	PR	1390.3	844.08	849.15	848.78	849.73	0.008816	6.50	275.74	157.51	0.65

NOTES:

1. NO BEST AVAILABLE MODEL FOR UNNAMED TRIB TO ELM WATERHOLE CREEK EXISTS SO A NEW MODEL WAS CREATED IN HEC-RAS V6.3.
2. 2021 LIDAR DATA AND PROJECT SURVEY WERE UTILIZED FOR ALL CROSS-SECTIONS.
3. THE DOWNSTREAM BOUNDARY CONDITION WAS SET TO NORMAL DEPTH WITH A SLOPE OF 0.0088 FT/FT WHICH WAS TAKEN FROM THE 2021 LIDAR.
4. THE EXISTING SCOUR HOLE IS LARGE AND IS REFLECTED WITHIN THE UPSTREAM CROSS-SECTION. IN THE EXISTING CONDITIONS THE SCOUR HOLE IS SET AS A PERMANENT INEFFECTIVE AREA. THE PROPOSED CONDITIONS REFLECTS THE HOLE BEING FILLED IN USING A BLOCKED OBSTRUCTION.
5. THE PURPOSE OF THE HYDRAULIC MODELING WAS TO PERFORM SCOUR ANALYSIS IN ACCORDANCE WITH WITH THE TXDOT SCOUR EVALUATION GUIDE (AUGUST 2020). SL 1604 IS CLASSIFIED AS A FREEWAY WITH A HYDRAULIC DESIGN FREQUENCY OF 50-YR; THEREFORE, ACCORDING TO TABLE 6-1 OF THE TXDOT SCOUR EVALUATION GUIDE THE SCOUR DESIGN FREQUENCY IS 100-YR WITH A 200-YR CHECK FREQUENCY. THE BEST-AVAILABLE HYDROLOGIC MODEL DOES NOT CONTAIN A 200-YR PRECIPITATION SO THE 500-YR WAS USED INSTEAD.



2/28/2023

EDGE ENGINEERING
TBPELS Firm Number 20690
3410 Far West Blvd, Ste 315
Austin, TX 78731
512.767.1009
www.cMI-edge.com

Texas Department of Transportation

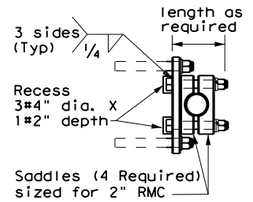
SL 1604 AT UNT TO ELM WATERHOLE CREEK HYDRAULIC DATA SHEET

SHEET 2 OF 2

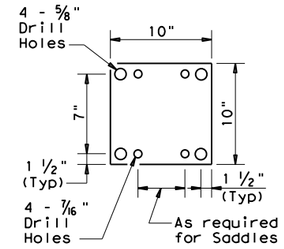
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	163
CONT.	SECT.	JOB	
0915	00	258	

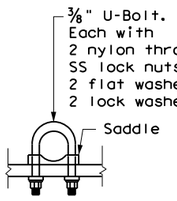
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-GEO-064157501 - TXDOT SAT H-H WA1/DesignData/4 - Design/Plan Set/5. Drainage/HHWA1_DRG_HH_DATA_02.2.dgn
PLOTTED: 2/28/2023 3:55:20 PM



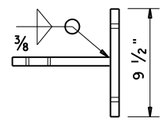
SECTION A-A



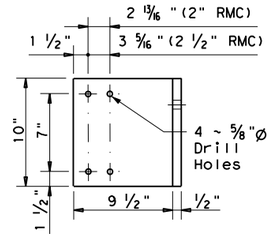
MOUNTING PLATE
(ASTM A-36 or better)



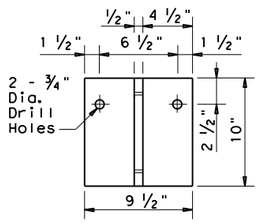
CLAMP DETAIL
(2 Req'd)



PLAN VIEW

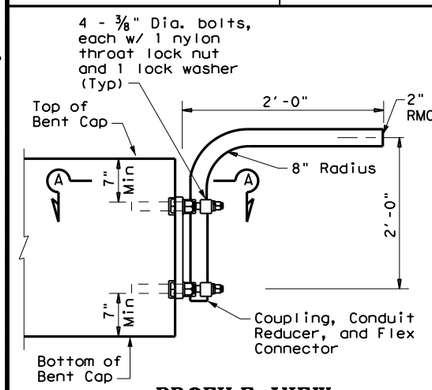


FRONT

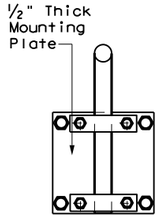


SIDE

BRACKET DETAIL
Make from 1/2" plate (ASTM A-36 or better)

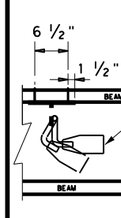


PROFILE VIEW
Or as Required
(See Note A.3)

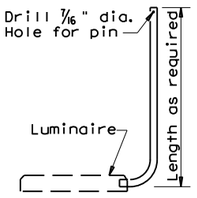


END VIEW

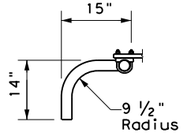
UNDERPASS LIGHTING ARM



PLAN VIEW



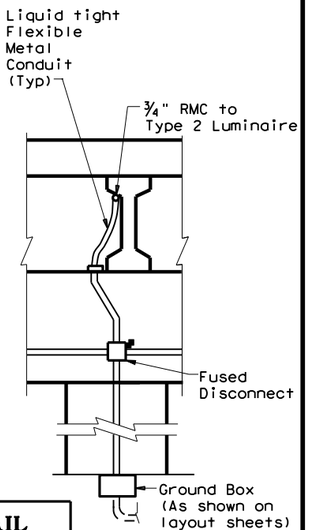
SIDE

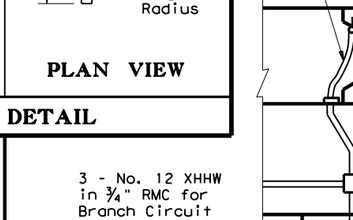


PLAN VIEW

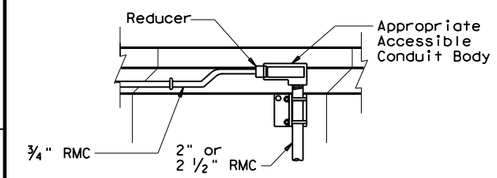
FIXTURE ORIENTATION

ARM DETAIL

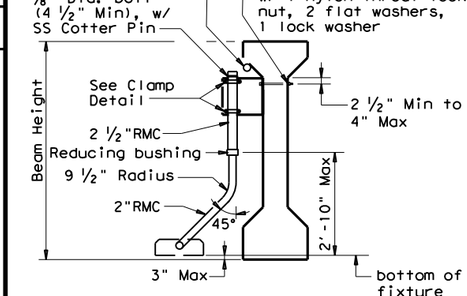




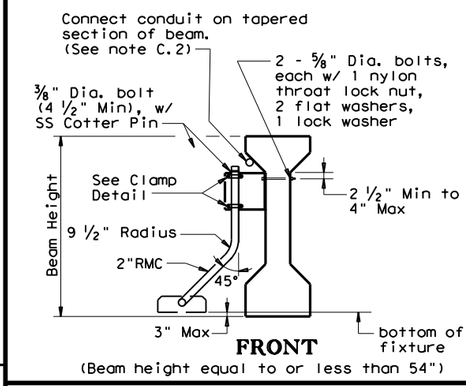
CONDUIT DETAIL



CONDUIT CONNECTION PROFILE



FRONT
(Beam height greater than 54")



FRONT
(Beam height equal to or less than 54")

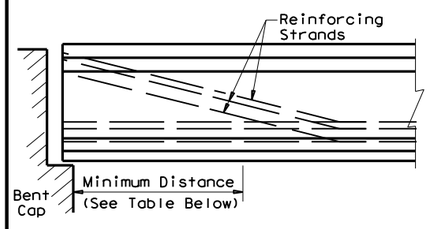
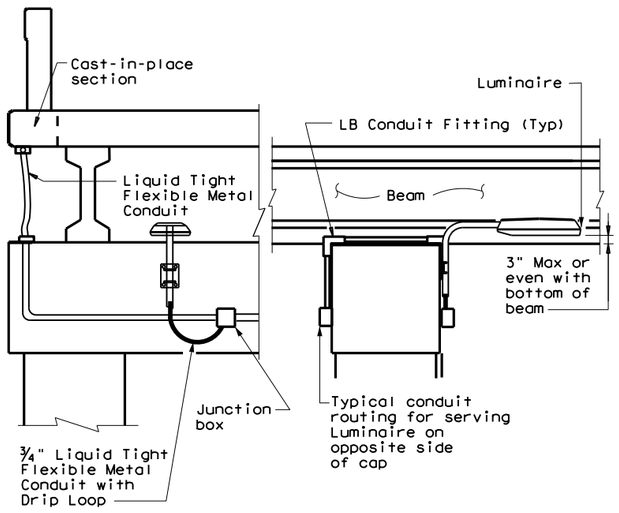


TABLE 5

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET TABLE

SPAN LENGTH	MINIMUM DISTANCE
≤ 50'	10'-0"
50' - 70'	15'-0"
70' - 90'	20'-0"
> 90'	25'-0"



IN RD IL AM (U/P)(TY 1)
If bridge has pre-cast panels under deck, run circuit under deck edge.

UNDERPASS LIGHTING TYPE 1

IN RD IL AM (U/P)(TY 2)

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET

UNDERPASS LIGHTING TYPE 2

GENERAL NOTES:

A. ALL 150 watt HPS and 150 watt equivalent LED Luminaires

1. Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
2. Conduit will be paid for under Item 618, "Conduit" and conductors will be paid for under Item 620, "Electrical Conductors," unless otherwise shown on the plans.
3. Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and plans. Where practicable, place luminaires so the bottom of luminaire is above the bottom of the beam, maximum of 3 in. (See detail UNDERPASS LIGHTING ARM TYPE 2)
4. Except as noted, galvanize all structural steel and exposed bolts, nuts, and washers in accordance with Item 445 "Galvanizing".
5. Fabrication of brackets and support arms will not be paid for directly but is subsidiary to Item 610, "Roadway Illumination Assemblies."
6. Install a heavy duty NEMA 3R fused disconnect or breaker enclosure rated at 30 amps and 480 volts to switch underpass luminaires as shown on plans, with at least one per bridge circuit. Install 20 amp time-delay fuses or inverse-time circuit breakers. Mount disconnect or breaker enclosure 10 ft.(min) above grade on columns or bent caps as approved by the Department. Modify disconnect to allow padlocking in the "ON" and "OFF" positions. Padlocks and disconnect switches or circuit breakers for underpass fixtures will not be paid for directly but are subsidiary to the various bid items of the contract.
7. Conduit on columns, caps, and slab is shown surface mounted. For new columns and caps, embed PVC conduit in concrete. Bond and ground metal junction boxes and conduit.

B. TYPE 1

1. Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) for Type 1 arm shaft.
2. Use 3/8 in. stainless steel bolt or stud non-epoxy type expansion anchors for concrete for Type 1 mounting. Except as noted, provide an allowable 2650 lbs minimum pull-out force (after consideration of adjustment factors for edge distance and bolt spacing) for each anchor. Install each anchor to the embedment depth recommended by the manufacturer.
3. Attach conduit to plate with 4 saddles, four - 3/8 in. diameter bolts, nylon throat lock nuts, and lock washers.

C. TYPE 2

1. Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) or provide a combination of 2 1/2 in. (2.875" O.D., 0.193" wall) and 2 in. (2.375" O.D., 0.146" wall) rigid metal conduits with a reducing bushing as beam height stipulated for Type 2 arm shaft. Field cutting and threading will be permitted. Paint cut and threaded areas with zinc rich paint after conduit is connected to adjacent fitting.
2. Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 in.
3. Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Use drilling location and method as directed by the Engineer. See Location of Underpass Lighting Mounting Bracket detail. The locations shown in the table are such that reinforcing strands will not be damaged.

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

(UNDERPASS LIGHT FIXTURES)

RID(3)-20

FILE: rid3-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	VARIES
2-14	DIST	COUNTY		SHEET NO.
7-17	SAT	BEXAR		164
12-20				

72C

DATE: $DATE$ $TIME$
FILE: $FILE$

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0915-00-258

1.2 PROJECT LIMITS:
From: SEE SCOUR PROTECTION SHEETS

To:

1.3 PROJECT COORDINATES:
BEGIN: (Lat) SEE PLAN SHEET #3, (Long) SEE PLAN SHEET #3

END: (Lat) SEE PLAN SHEET #3, (Long) SEE PLAN SHEET #3

1.4 TOTAL PROJECT AREA (Acres): SEE SCOUR PROTECTION SHEETS

1.5 TOTAL AREA TO BE DISTURBED (Acres): SEE SCOUR PROTECTION SHEETS

1.6 NATURE OF CONSTRUCTION ACTIVITY:
WORK CONSISTING OF STONE RIPRAP, GABION BASKETS, FLOWABLE FILL, AND EMBANKMENT

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Cb, CRAWFORD, STONY AND BEXAR SOILS, 0 TO 5 PERCENT SLOPES.	SL 1604 AT LORENCE CREEK
Tf, TINN AND FRIO SOILS, 0 TO 1 PERCENT SLOPES, FREQUENTLY FLOODED.	SH 16 AT HUEBNER CREEK FM 78 AT WEST SALITRILLO CREEK
LvB, LEWISVILLE SILTY CLAY, 1 TO 8 PERCENT SLOPES.	SL 1604 AT UNT TO ELM WATERHOLE CREEK

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

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

Type	Sheet #s
VEGETATION LINED DITCHES	168-171

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

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
UPPER SALADO CREEK (SL 1604 - LORENCE CREEK)	Unclassified, Freshwater Stream
LOWER LEON CREEK (SH 16)	Classified, Freshwater Stream
UPPER SALADO CREEK (SL 1604 - UNT TO ELM WATERHOLE CREEK)	Unclassified, Freshwater Stream
SALITRILLO CREEK (FM 78)	Unclassified, Freshwater Stream

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- ☒ Development of plans and specifications
- ☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- ☐ Post Construction Site Notice
- ☐ Submit NOI/CSN to local MS4
- ☒ Perform SWP3 inspections
- ☒ Maintain SWP3 records and update to reflect daily operations
- ☐ Complete and submit Notice of Termination to TCEQ
- ☒ Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- ☒ Day To Day Operational Control
- ☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- ☐ Post Construction Site Notice
- ☐ Submit NOI/CSN to local MS4
- ☒ Maintain schedule of major construction activities
- ☒ Install, maintain and modify BMPs
- ☐ Complete and submit Notice of Termination to TCEQ
- ☒ Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
No MS4s receive stormwater discharge from the site

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			165
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☒ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
STONE PROTECTION RIPRAP	SEE SCOUR PROTECTION LAYOUTS	

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			166
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	00	258	

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ 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 Storm Water Pollution Prevention Plan (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 Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

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

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

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

☐ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☒ Other Nationwide Permit Required: NWP# 3

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

1. SL 1604 AT LORENCE CREEK

2. SH 16 AT HUEBNER CREEK

3. FM 78 AT WEST SALITRILLO CREEK

4. SL 1604 AT UNT TO ELM WATERHOLE CREEK

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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.

2.

3.

4.

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. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

3.

4.

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 immediated 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 appropiate for any hazardous materials used.

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

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

Contact the Engineer if any of the follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

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	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		167

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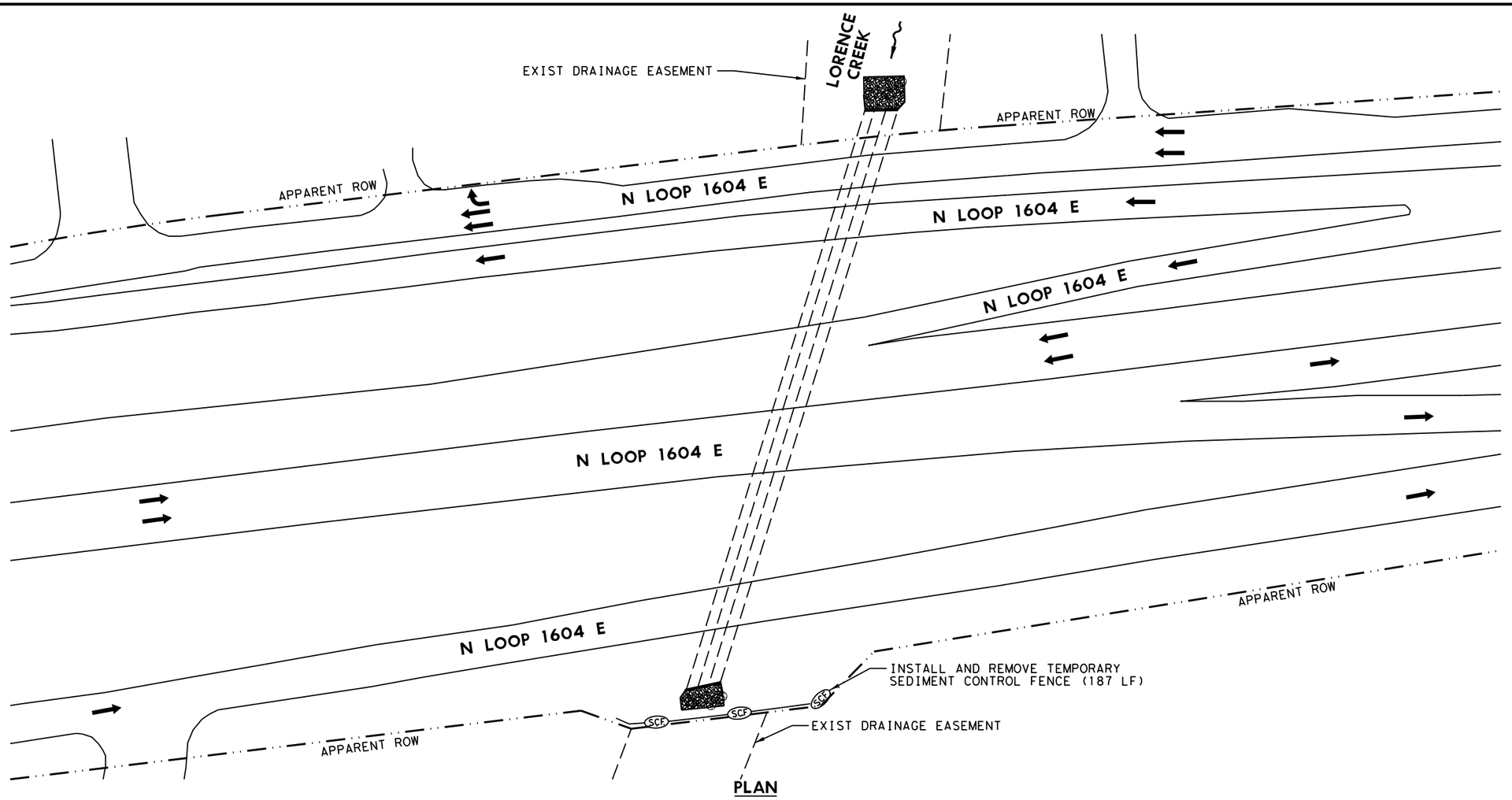

PLAN

N

LEGEND

- SCF — PROP SEDIMENT CONTROL FENCE
- RFD — PROP ROCK FILTER DAM (TY 3)
- PROP SEEDING AND TOPSOIL

0' 50' 100'
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	2
0104 6009	REMOVING CONC (RIPRAP)	SY	29
0110 6002	EXCAVATION (CHANNEL)	CY	22
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	81
0401 6001	FLOWABLE BACKFILL	CY	2
0420 6074	CL C CONC (MISC)	CY	6
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	113
0500 6001	MOBILIZATION	LS	1
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	187
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	187

AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
4/17/2023

Kimley»Horn
F-928

Texas Department of Transportation

SL 1604 AT LORENCE CREEK
SWPPP LAYOUT

RDWY REF NO. 15-SCR-9
NBI # 15-015-0-2452-02-104

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	168
CONT.	SECT.	JOB	
0915	00	258	

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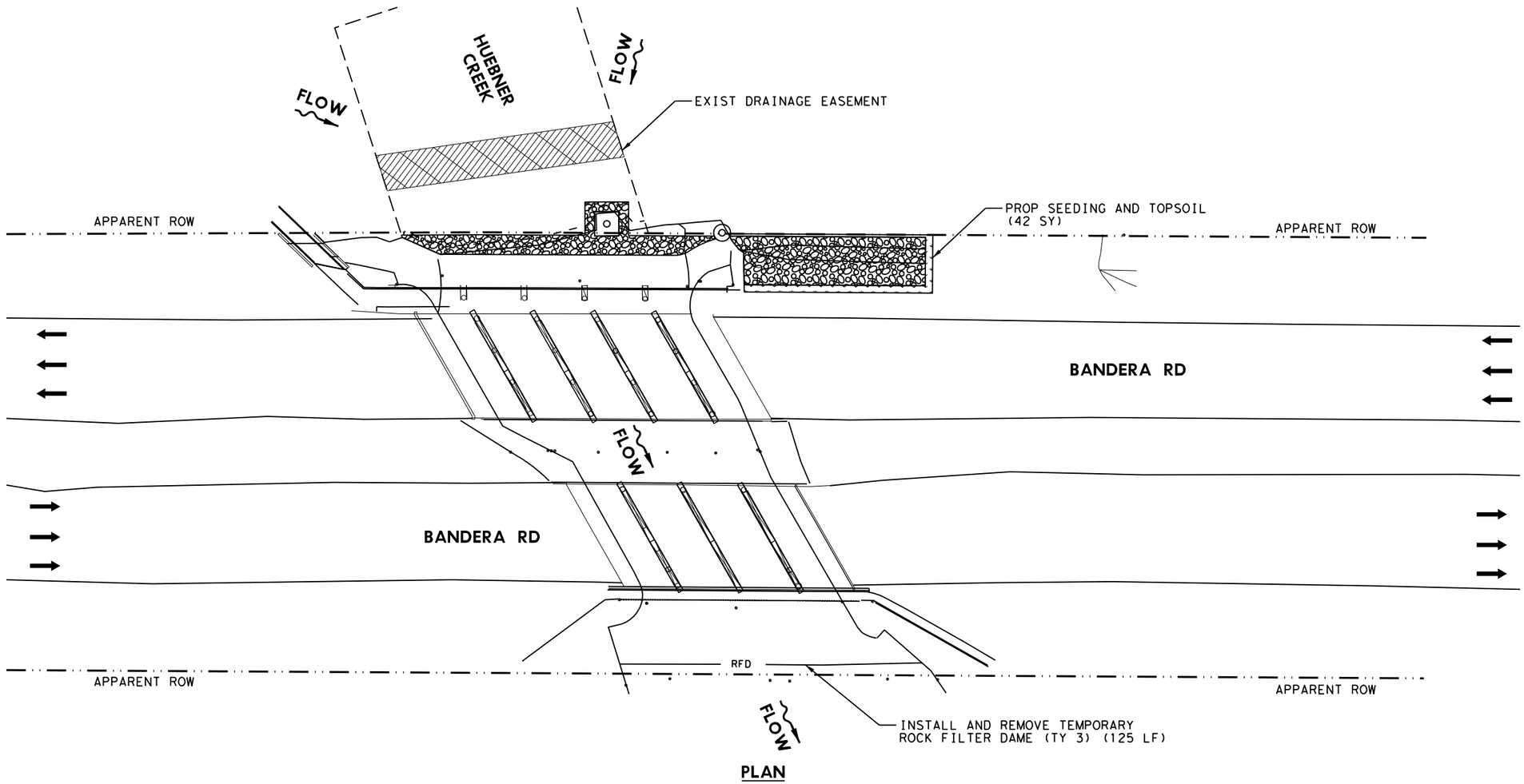

PLAN

N

LEGEND

- SCF — PROP SEDIMENT CONTROL FENCE
- RFD — PROP ROCK FILTER DAM (TY 3)
- PROP SEEDING AND TOPSOIL

0' 25' 50'
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	3
0104 6009	REMOVING CONC (RIPRAP)	SY	127
0110 6002	EXCAVATION (CHANNEL)	CY	82
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	259
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	42
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	42
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	21
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	21
0168 6001	VEGETATIVE WATERING	MG	0.7
0401 6001	FLOWABLE BACKFILL	CY	5
0402 6001	TRENCH EXCAVATION PROTECTION	LF	117
0420 6074	CL C CONC (MISC)	CY	20
0432 6001	RIPRAP (CONC)(4 IN)	CY	6
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	193
0500 6001	MOBILIZATION	LS	1
0506 6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	125
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	125

4/17/2023

AUSTIN S. HELTON 124922 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Kimley»Horn F-928

Texas Department of Transportation

SH 16 AT HUEBNER CREEK
SWPPP LAYOUT

RDWY REF NO. 15-SCR-12
NBI # 15-015-0-0291-10-087

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 16

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	169
CONT.	SECT.	JOB	
0915	00	258	

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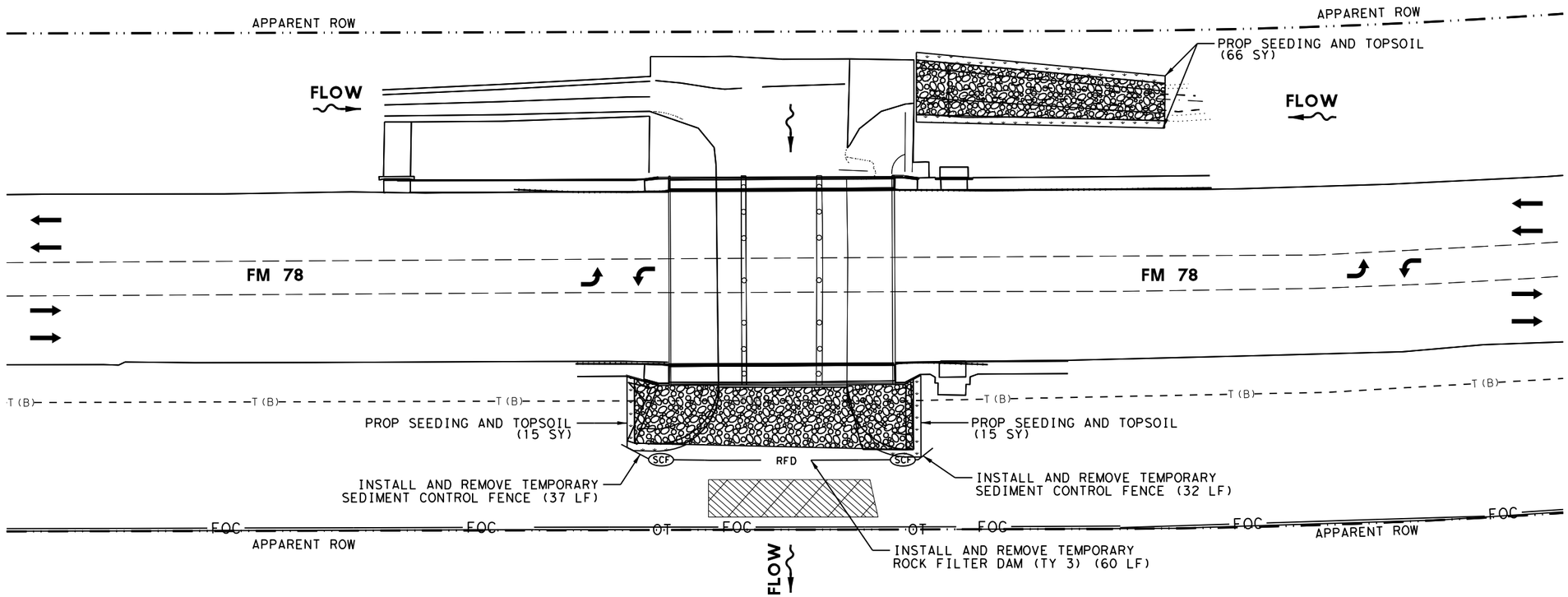

PLAN

LEGEND

- SCF — PROP SEDIMENT CONTROL FENCE
- RFD — PROP ROCK FILTER DAM (TY 3)
- PROP SEEDING AND TOPSOIL

0′ 25′ 50′
SCALE

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	3
0104 6009	REMOVING CONC (RIPRAP)	SY	473
0110 6002	EXCAVATION (CHANNEL)	CY	9
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	203
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	96
0164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	96
0164 6041	DRILL SEEDING (TEMP) (WARM)	SY	48
0164 6043	DRILL SEEDING (TEMP) (COOL)	SY	48
0168 6001	VEGETATIVE WATERING	MG	1.5
0401 6001	FLOWABLE BACKFILL	CY	7
0402 6001	TRENCH EXCAVATION PROTECTION	LF	130
0420 6074	CL C CONC (MISC)	CY	10
0422 6013	BRIDGE SIDEWALK	SF	112
0432 6001	RIPRAP (CONC)(4 IN)	CY	21
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	137
0432 6037	RIPRAP (STONE PROTECTION) (36 IN)	CY	423
0472 6004	REMOV & RE - LAY PIPE (18 IN)	LF	12
0500 6001	MOBILIZATION	LS	1
0506 6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	60
0506 6011	ROCK FILTER DAMS (REMOVE)	LF	60
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	69
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	69
0529 6002	CONC CURB (TY II)	LF	17

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

FM 78 AT WEST SALITRILLO CREEK
SWPPP LAYOUT

RDWY REF NO. 15-SCR-11
NBI # 15-015-0-0025-09-138

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		FM 78

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	170
CONT.	SECT.	JOB	
0915	00	258	

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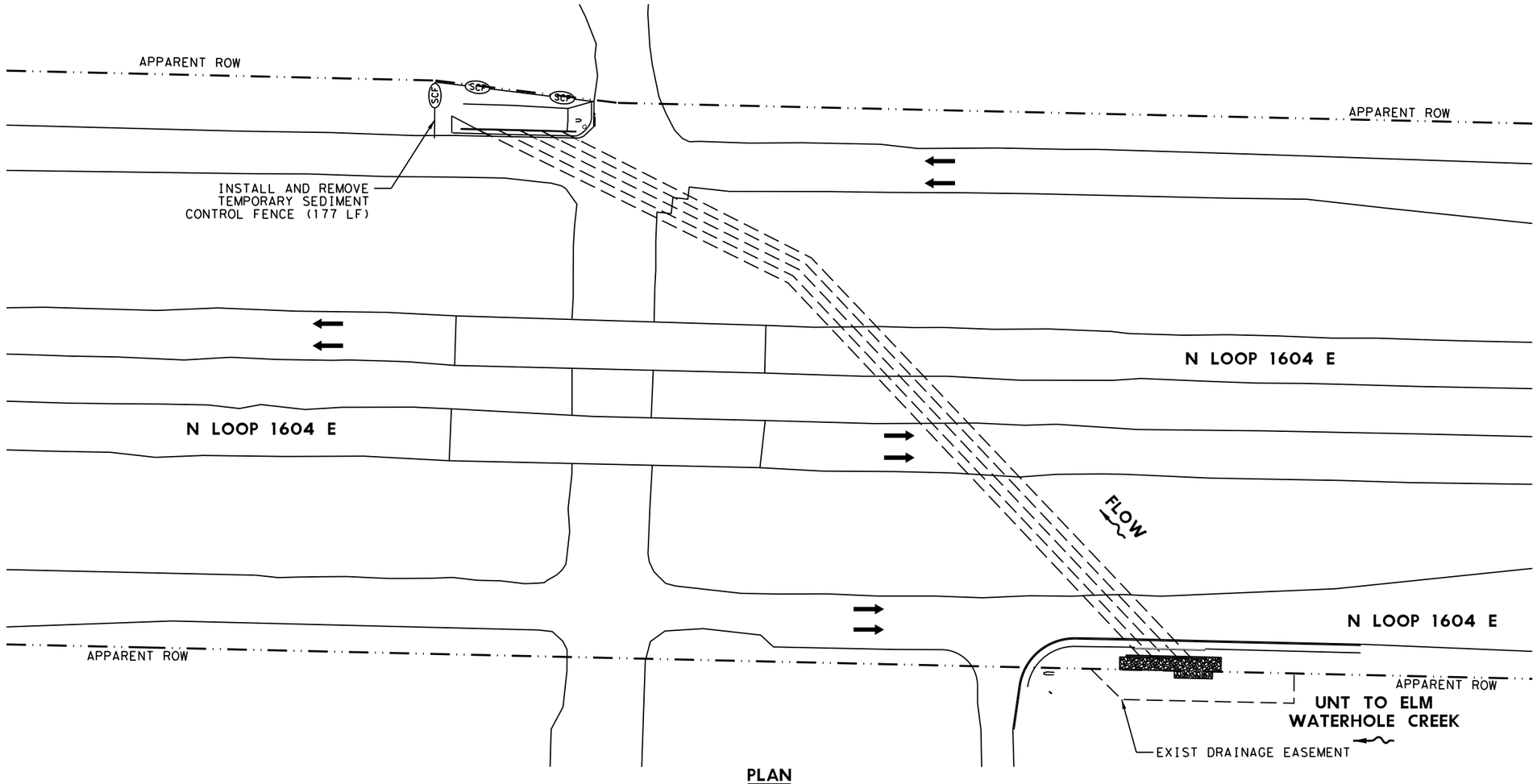

PLAN

N

LEGEND

- SCF — PROP SEDIMENT CONTROL FENCE
- RFD — PROP ROCK FILTER DAM (TY 3)
- PROP SEEDING AND TOPSOIL

0' 50' 100'

SCALE

4/17/2023

STATE OF TEXAS
AUSTIN S. HELTON
124922
LICENSED
PROFESSIONAL ENGINEER

ITEM NO.	DESCRIPTION	UNIT	QUANT
0100 6002	PREPARING ROW	STA	2
0110 6002	EXCAVATION (CHANNEL)	CY	4
0132 6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	42
0401 6001	FLOWABLE BACKFILL	CY	2
0420 6074	CL C CONC (MISC)	CY	1
0432 6037	RIPRAP (STONE PROTECTION) (36 IN)	CY	118
0500 6001	MOBILIZATION	LS	1
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	177
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	177

Kimley»Horn F-928

Texas Department of Transportation

SL 1604 AT UNT TO ELM WATERHOLE CREEK SWPPP LAYOUT

RDWY REF NO. 15-SCR-10
NBI # 15-015-0-2452-03-124

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SL 1604

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	BEXAR	171
CONT.	SECT.	JOB	
0915	00	258	

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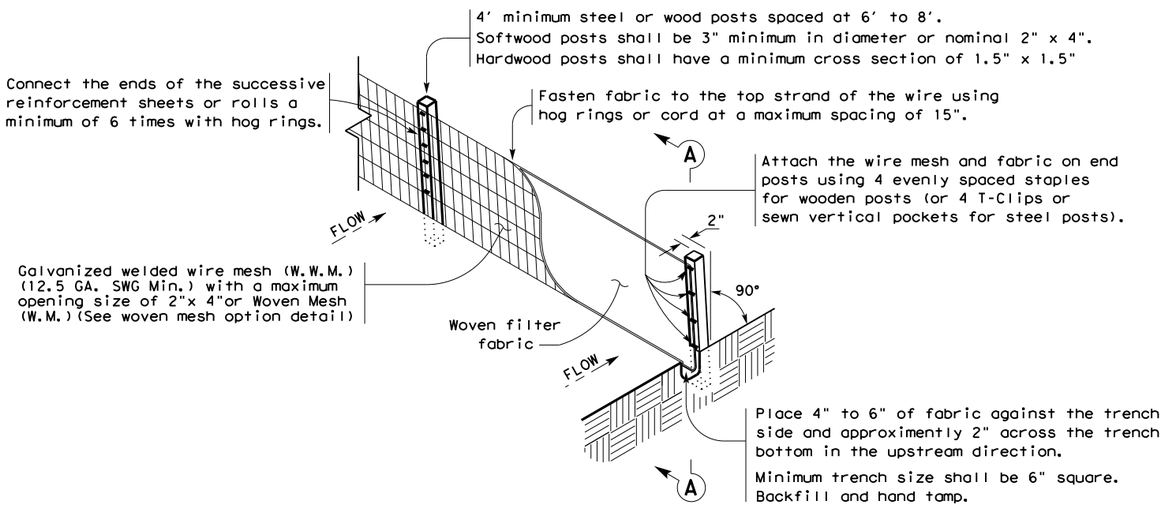
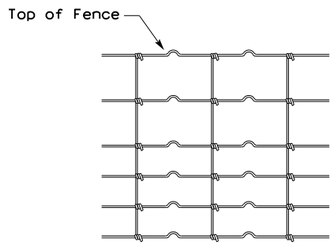
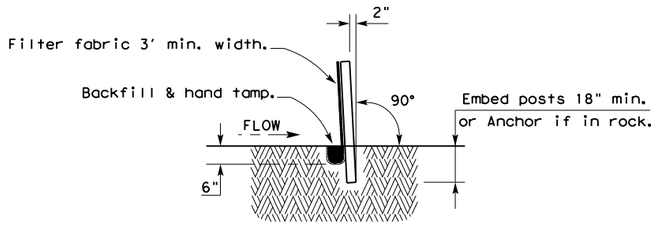


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

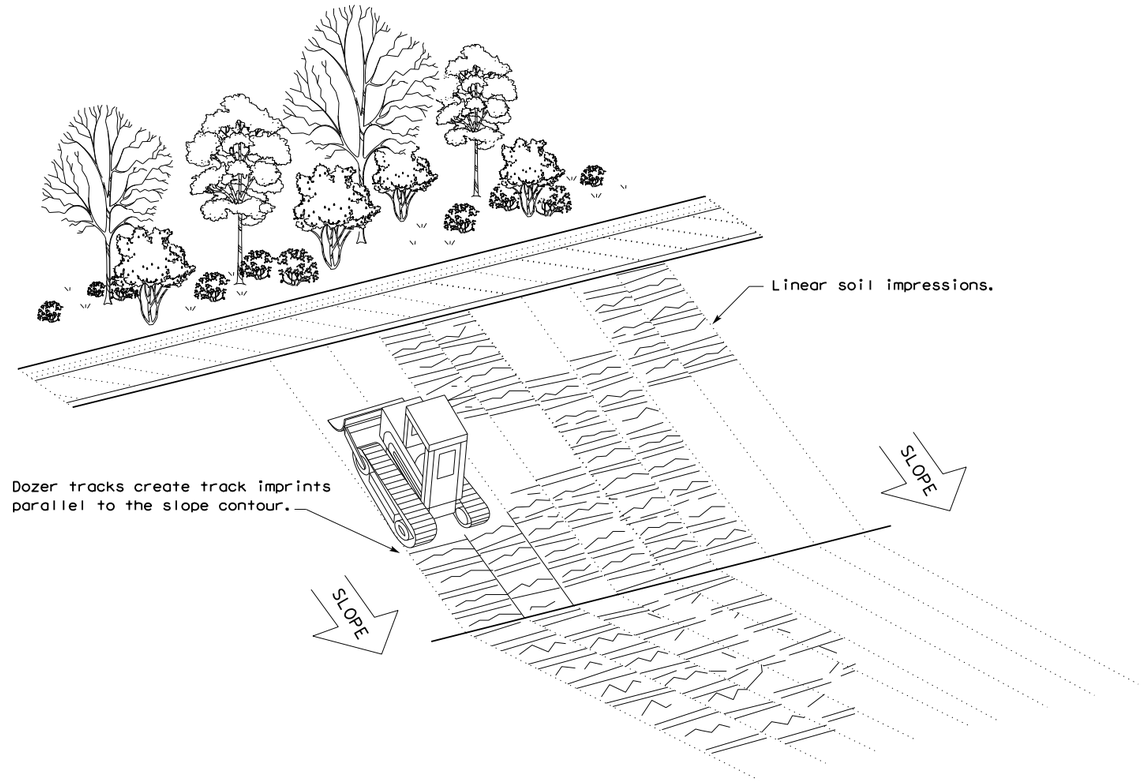
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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	DIST	COUNTY					SHEET NO.
	SAT	BEXAR					172

DATE
FILE

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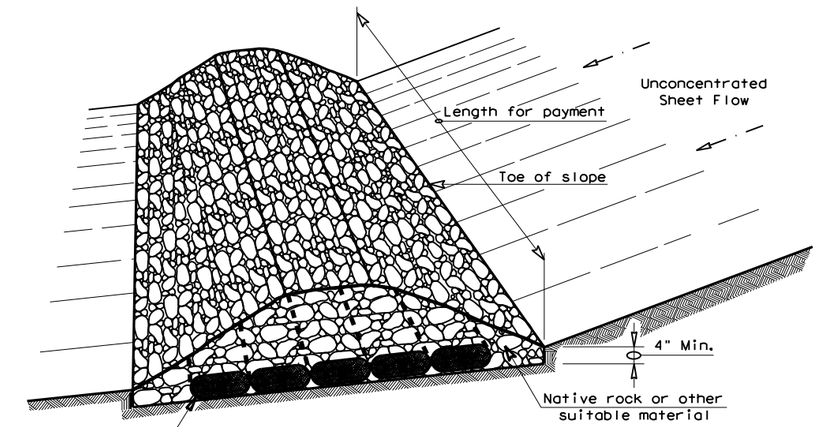
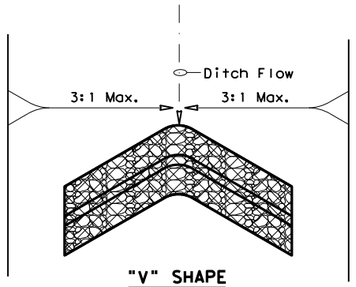
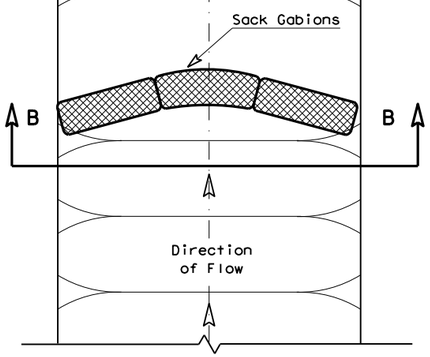


FILTER DAM AT TOE OF SLOPE

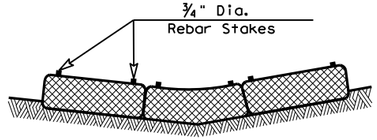
RFD1



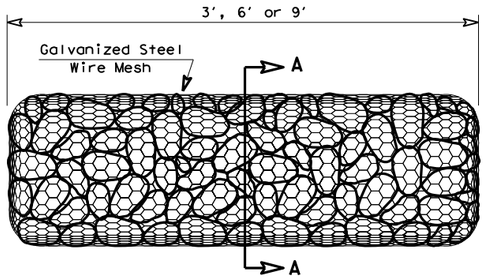
"V" SHAPE PLAN VIEW



PLAN VIEW

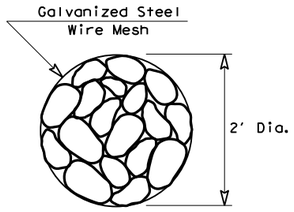


SECTION B-B

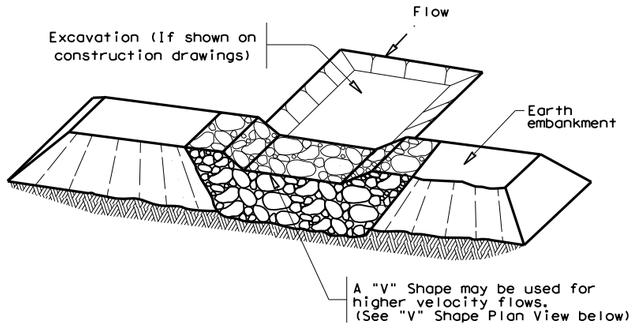


TYPE 4 (SACK GABIONS)

RFD4

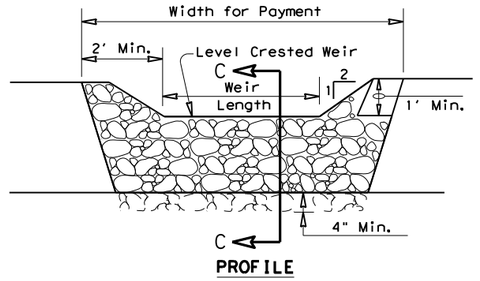


SECTION A-A

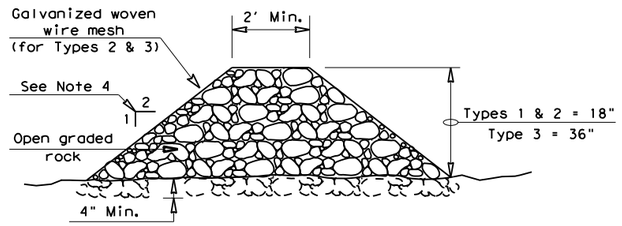


FILTER DAM AT SEDIMENT TRAP

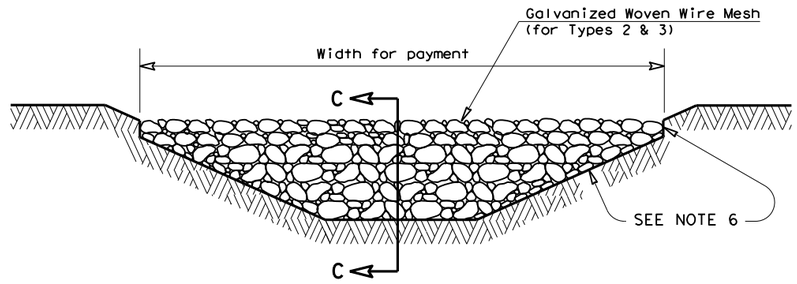
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

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

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

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

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

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

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

GENERAL NOTES

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

PLAN SHEET LEGEND

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

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	00	258	
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		173

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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

DOT #: 432501X
Crossing Type: ** At grade
RR Company Owning Track at Crossing: UP RR
Operating RR Company at Track: UPRR
RR MP: 253.05
RR Subdivision: Austin
City: San Antonio
County: Bexar
CSJ at this Crossing: 0915-00-258
Highway/Roadway name crossing the railroad: W Sunset Rd
# of regularly scheduled trains per day at this crossing: 12
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:
Nightly Traffic Control to include alternating lane closures to repair concrete beam -outside UPRR ROW- on adjacent structure (US 281/McAllister fwy)

Scope of Work at this Crossing to Be Performed by Railroad Company: Railroad flagging ---- if needed

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

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

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 3

On this project, night or weekend flagging is:

X 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
- UP.request@nrssinc.net
Call Center 877-984-6777

☐ 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: UPRR Maintenance Consent Letter. TxDOT CST to assist.

☐ 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 Union Pacific Railroad (UPRR)
Railroad Emergency Line at 888-877-7267
Location: DOT 432501X
RR Milepost 253.05
Subdivision Austin

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	0915	00	258	US 281
9/2021	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		174

DATE: DATE TIME
FILE: DOCUMENT NAME

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	0915	00	258	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		175

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	0915	00	258	VARIOUS
	DIST	COUNTY		SHEET NO.
	SAT	VARIOUS		176

DATE:
FILE: