CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
AUS	TRAVIS		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

US 183, ETC.

CSJ 0152-01-080, ETC.

STATE PROJECT CC 152-1-80, ETC.

NET LENGTH OF PROJECT = 3,674.77 FEET = 0.696 MILES
- ROADWAY = 3,674.77 FEET = 0.696 MILES
- BRIDGE = 0.00 FEET = 0.000 MILES

TRAVIS COUNTY

LIMITS: FROM: 0.08 MI. SOUTH OF LAVA HILL RD TO 0.11 MI. NORTH OF McKENZIE RD, ETC.

FOR THE CONSTRUCTION OF: INTERSECTION IMPROVEMENTS WITH RIGHT AND/OR LEFT TURN LANES. CONSISTING OF: ADD LEFT TURN LANE AND RIGHT-TURN DECELERATION LANE.

BEGIN PROJECT
US 183
CSJ 0152-01-080

STA. 115+80.64
REF. MARKER = 528
MILE PT. - 31.836
DFO =

END PROJECT
US 183
CSJ 0152-01-080

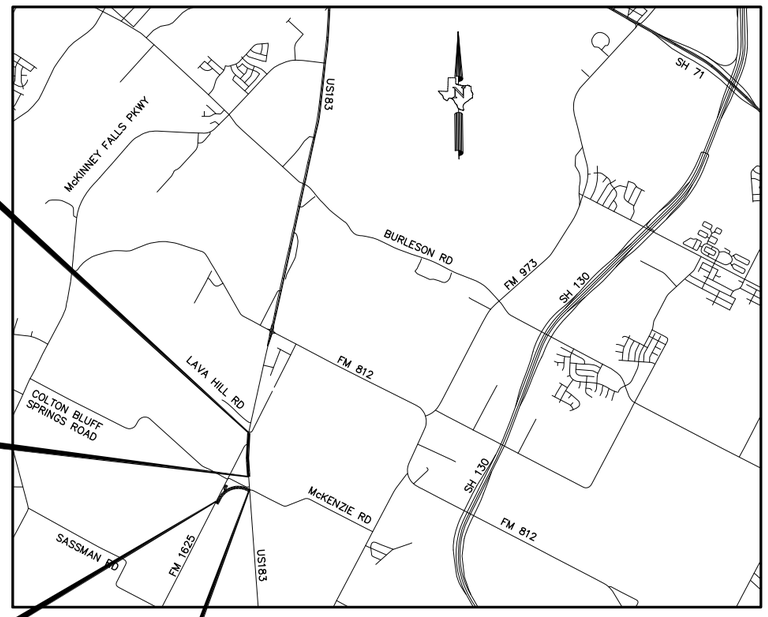
STA. 133+75.95
REF. MARKER = 528
MILE PT. - 32.187
DFO =

END PROJECT
FM 1625
CSJ 1535-01-012

STA. 19+17.22
REF. MARKER = 450
MILE PT. - 0.562
DFO =

BEGIN PROJECT
FM 1625
CSJ 1535-01-012

STA. 0+37.76
REF. MARKER = 450
MILE PT. - 0.231
DFO =



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

I CERTIFY THAT THIS PROJECT WAS CONSTRUCTED IN SUBSTANTIAL COMPLIANCE WITH THE FINAL AS-BUILT PLANS AND SPECIFICATIONS.

_____ DATE

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

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Cover

DESIGN SPEED

FM 1625 = 45 MPH
US 183 = 60 MPH
FUNCTIONAL CLASS: URBAN PRINCIPAL ARTERIAL

A.D.T.

US 183
2018 ADT = 15,779 VPD
2038 ADT = 25,887 VPD

FM 1625
2018 ADT = 4,911VPD
2038 ADT = 7,773 VPD

Plans and H&H files were sent to the Travis County Floodplain Administrator, Shawn Snyder, on January 22, 2021.

FINAL PLANS

DATE OF LETTING: _____

DATE WORK BEGAN:

DATE WORK COMPLETED AND ACCEPTED: _____

FINAL CONTRACT COST:

CONTRACTOR: _____

LIST OF APPROVED CHANGE ORDERS:

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED PROFESSIONAL ENGINEER

W. Morgan P.E. 01/15/2021
ENGINEER
PELOTON LAND SOLUTIONS
DATE

RECOMMENDED FOR LETTING: 4/6/2021

DocuSigned by:
Dwayne Hellweg, P.E.
198012497A804A0...
DISTRICT DESIGN ENGINEER

SUBMITTED FOR LETTING: 3/31/2021

DocuSigned by:
Eric Gregg, P.E.
A5A9883ECD1E4F7...
AREA ENGINEER

APPROVED FOR LETTING: 4/6/2021

DocuSigned by:
Heather Ashley-Nguyen
8912AF18F45A416...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

GENERAL

US 183 TRAFFIC CONTROL SHEETS

FM 1625 TRAFFIC CONTROL SHEETS

STANDARDS

US 183 ROADWAY SHEETS

FM 1625 ROADWAY SHEETS

STANDARDS

US 183 DRAINAGE SHEETS

FM 1625 DRAINAGE SHEETS

STANDARDS

US 183 EXISTING UTILITY SHEETS

FM 1625 EXISTING UTILITY SHEET

US 183 EROSION CONTROL SHEETS

FM 1625 EROSION CONTROL SHEETS

STANDARDS

US 183 TRAFFIC ITEMS

FM 1625 TRAFFIC ITEMS

STANDARDS

>> THE STANDARDS SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

W. Morgan

WADE A. MORGAN, P.E. 93700

P.E.

03/02/2021

DATE

US 183, ETC.

INDEX SHEET

SHEET 1 OF 1

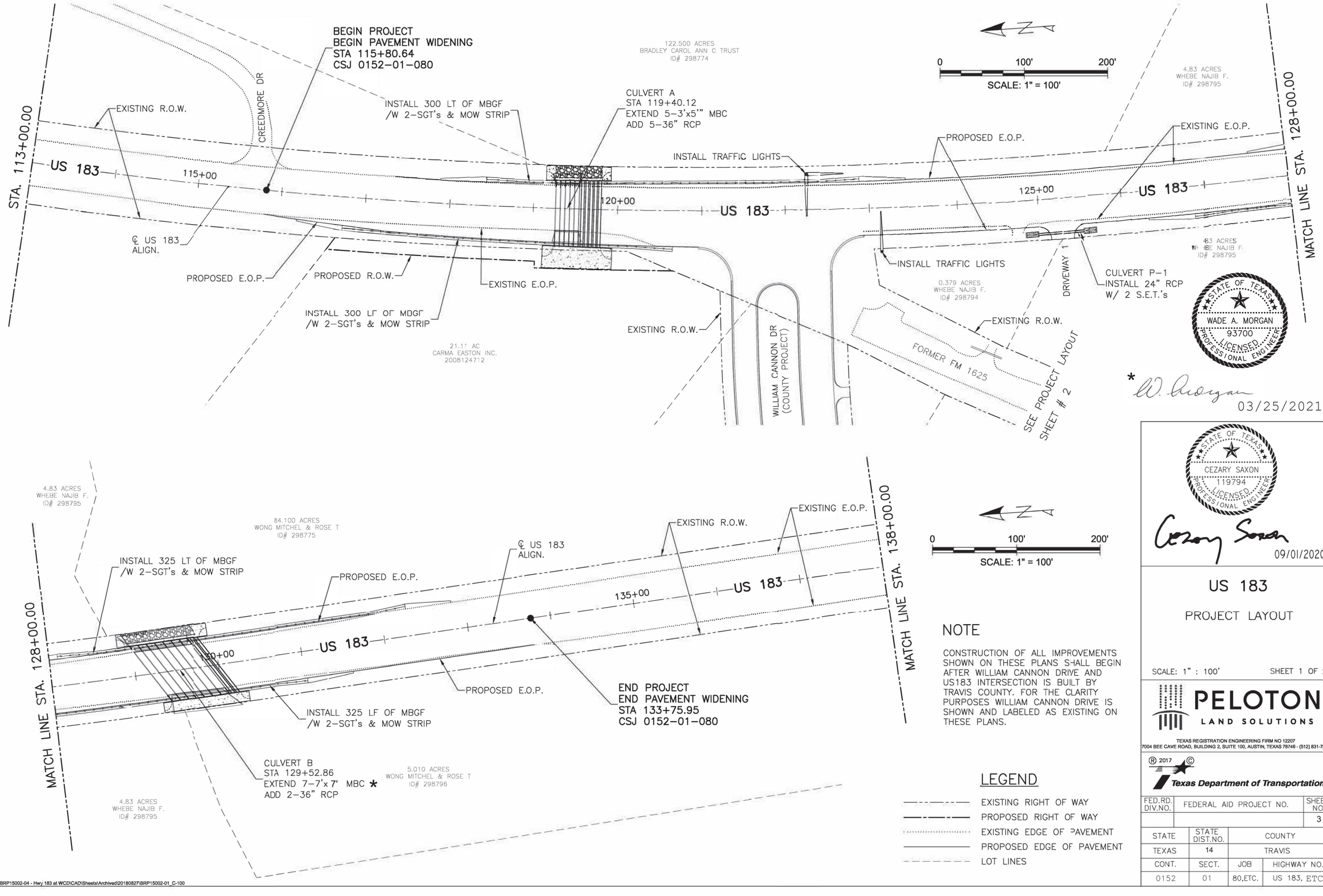
PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			2

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



NOTE

CONSTRUCTION OF ALL IMPROVEMENTS SHOWN ON THESE PLANS SHALL BEGIN AFTER WILLIAM CANNON DRIVE AND US183 INTERSECTION IS BUILT BY TRAVIS COUNTY. FOR THE CLARITY PURPOSES WILLIAM CANNON DRIVE IS SHOWN AND LABELED AS EXISTING ON THESE PLANS.

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES

US 183

PROJECT LAYOUT

SCALE: 1" : 100' SHEET 1 OF 2

PELOTON LAND SOLUTIONS

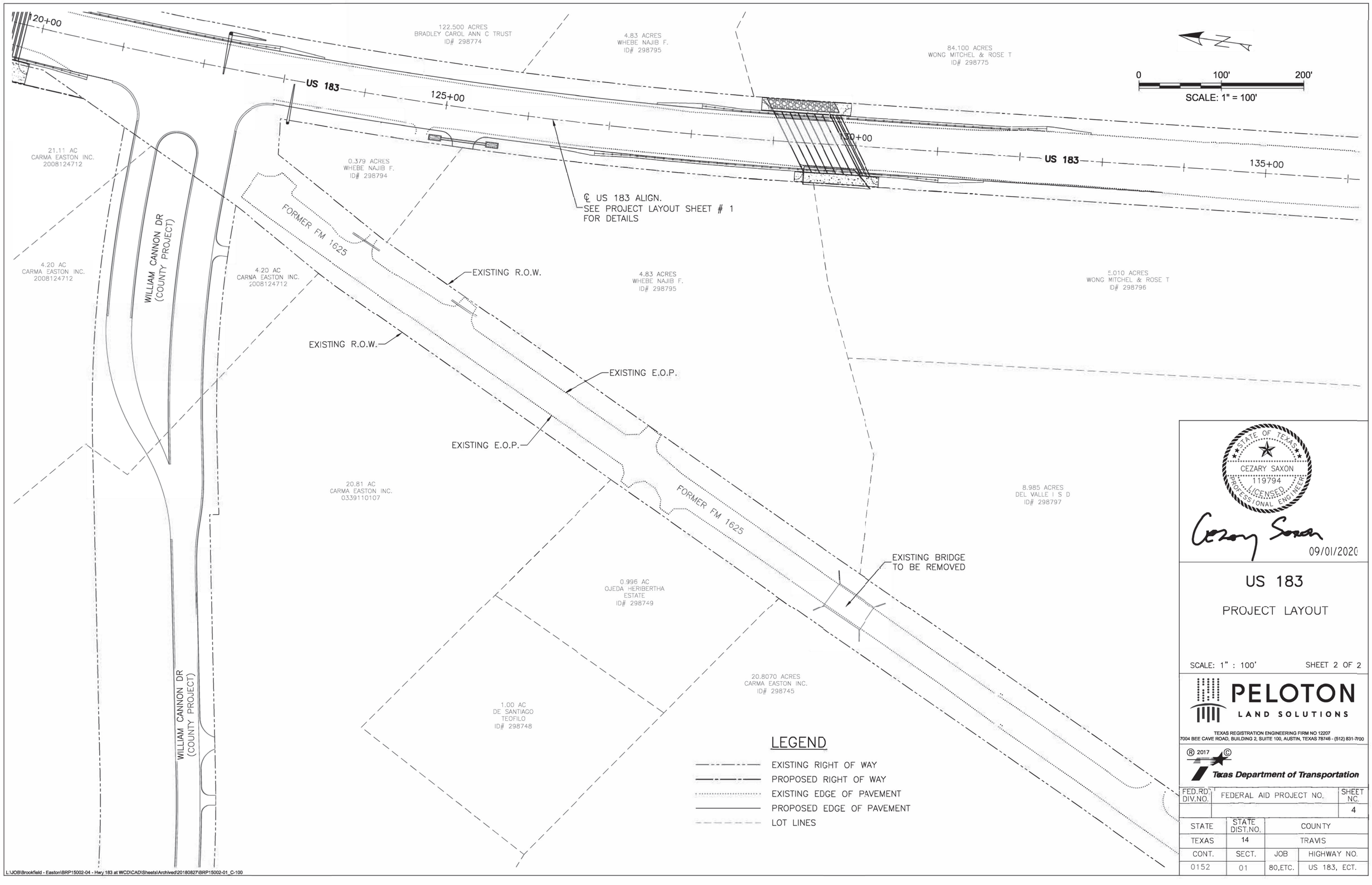
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			3

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	80,ETC.	US 183, ETC

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\Archived\20180827\BRP15002-01_C-100



L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\Archived\20180827\BRP15002-01_C-100

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

09/01/2020

US 183

PROJECT LAYOUT

SCALE: 1" : 100'

SHEET 2 OF 2

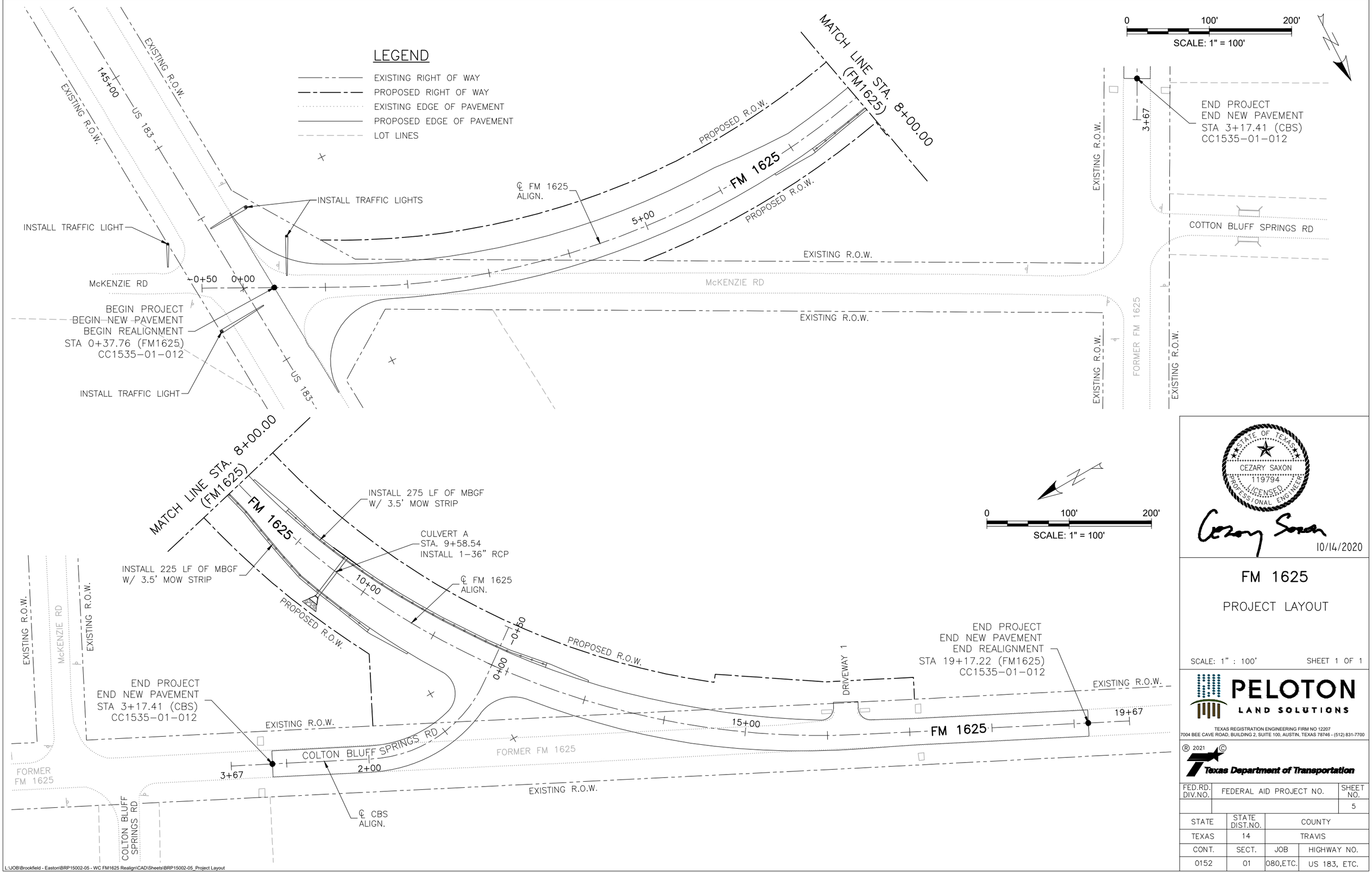
PELOTON
LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		4

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	80,ETC.	US 183, ECT.



CEZARY SAXON
119794
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
10/14/2020

FM 1625

PROJECT LAYOUT

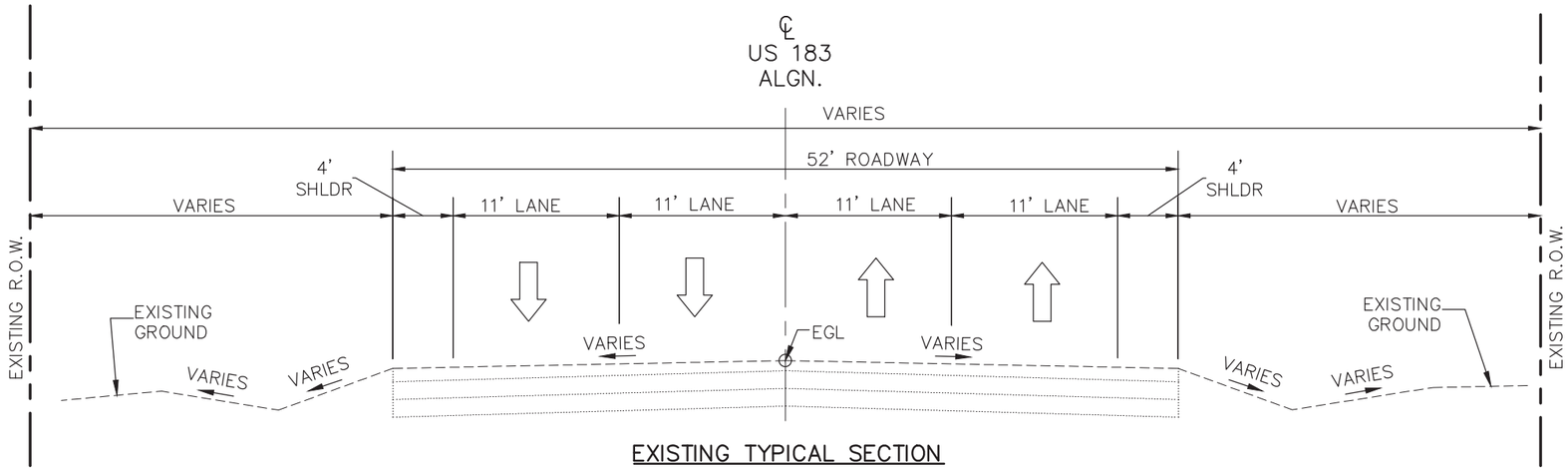
SCALE: 1" : 100' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		5

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Project Layout

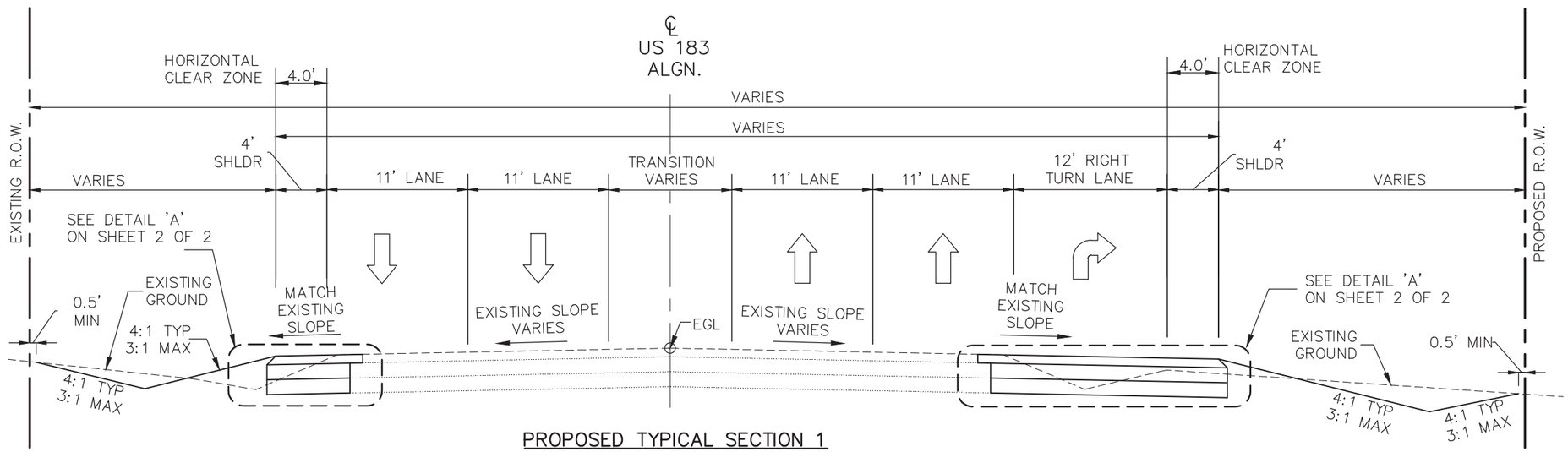


EXISTING TYPICAL SECTION

STA. 115+80.64 (US183) – STA. 133+75.95 (US183)
N.T.S.

PAVEMENT TRANSITIONS:

1. FROM EXISTING TYP. SECTION TO PROPOSED TYP. SECTION 1 STA 115+80.64 TO 117+30.64
2. FROM PROPOSED TYP. SECTION 1 TO PROPOSED TYP. SECTION 2 STA 120+90.64 TO 122+92.60
3. FROM PROPOSED TYP. SECTION 2 TO EXISTING SECTION



PROPOSED TYPICAL SECTION 1

STA. 117+30.64 (US183) – STA. 120+90.64 (US183)
N.T.S.

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER
10/14/2020

US 183

TYPICAL ROAD SECTIONS

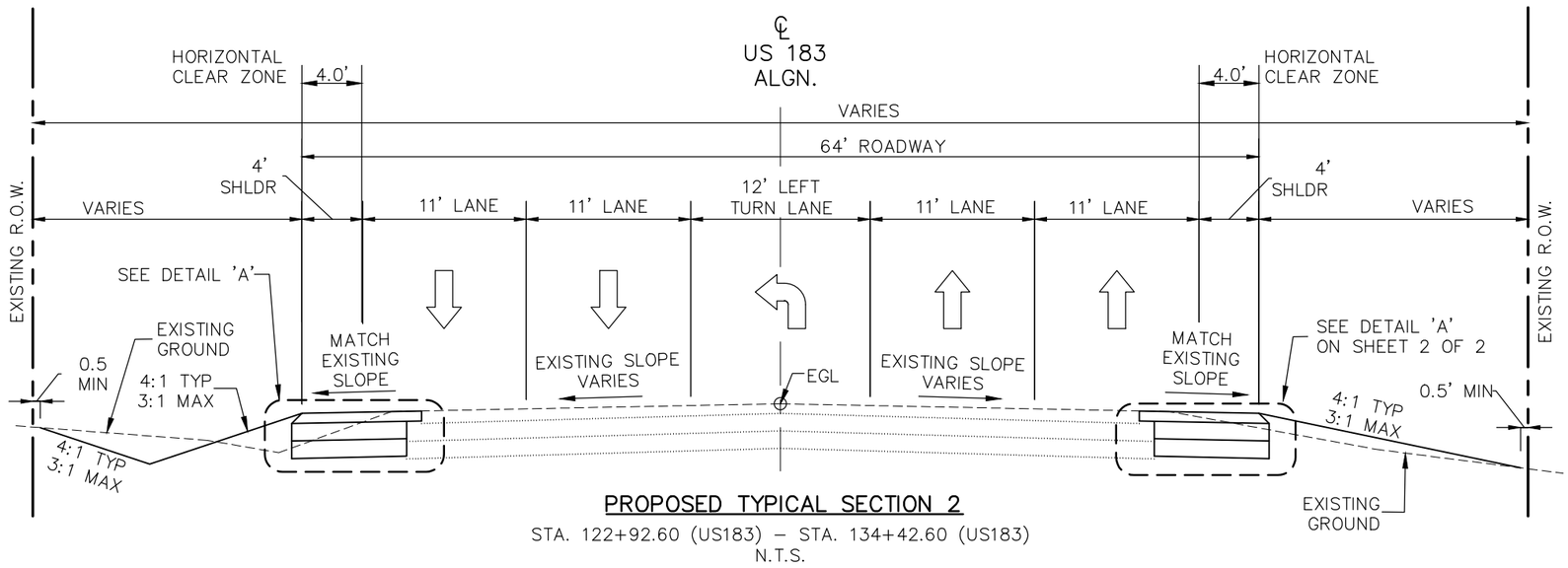
SHEET 1 OF 2

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

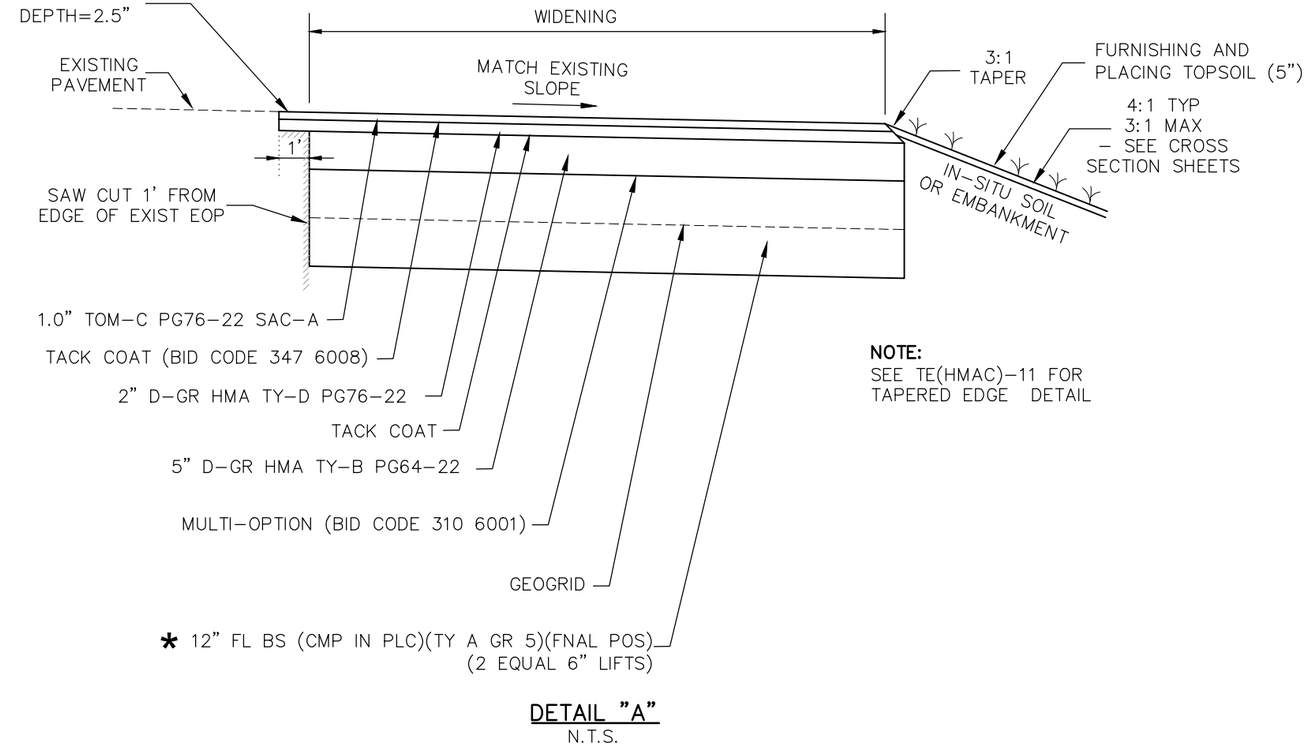
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		6

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



PROPOSED TYPICAL SECTION 2

STA. 122+92.60 (US183) – STA. 134+42.60 (US183)
N.T.S.



NOTE:
SEE TE(HMAC)-11 FOR
TAPERED EDGE DETAIL

DETAIL "A"
N.T.S.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

* 03/10/2021

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

US 183

TYPICAL ROAD SECTIONS

SHEET 2 OF 2

PELOTON LAND SOLUTIONS

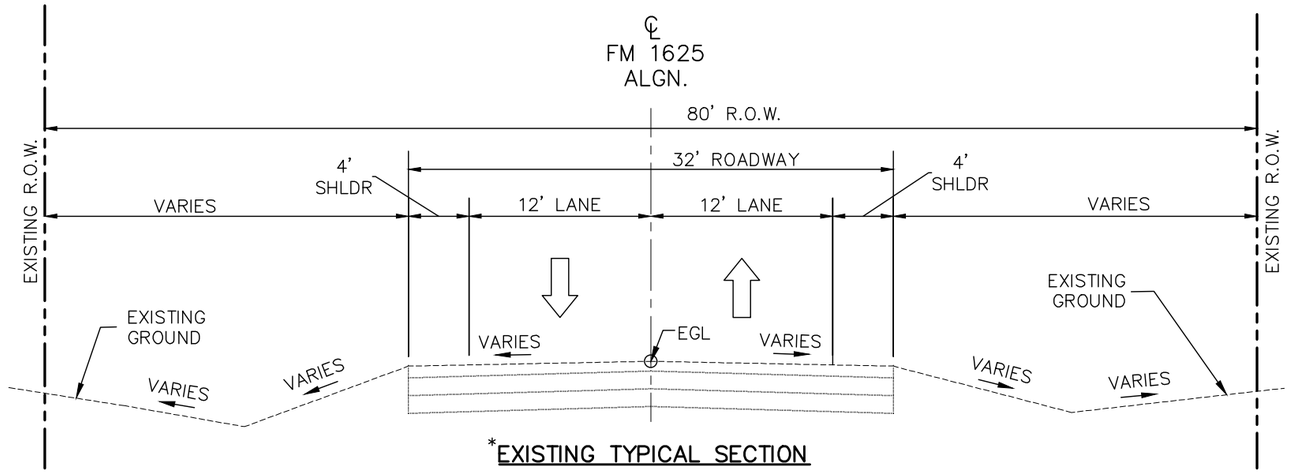
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			7

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Typical Cross Sections



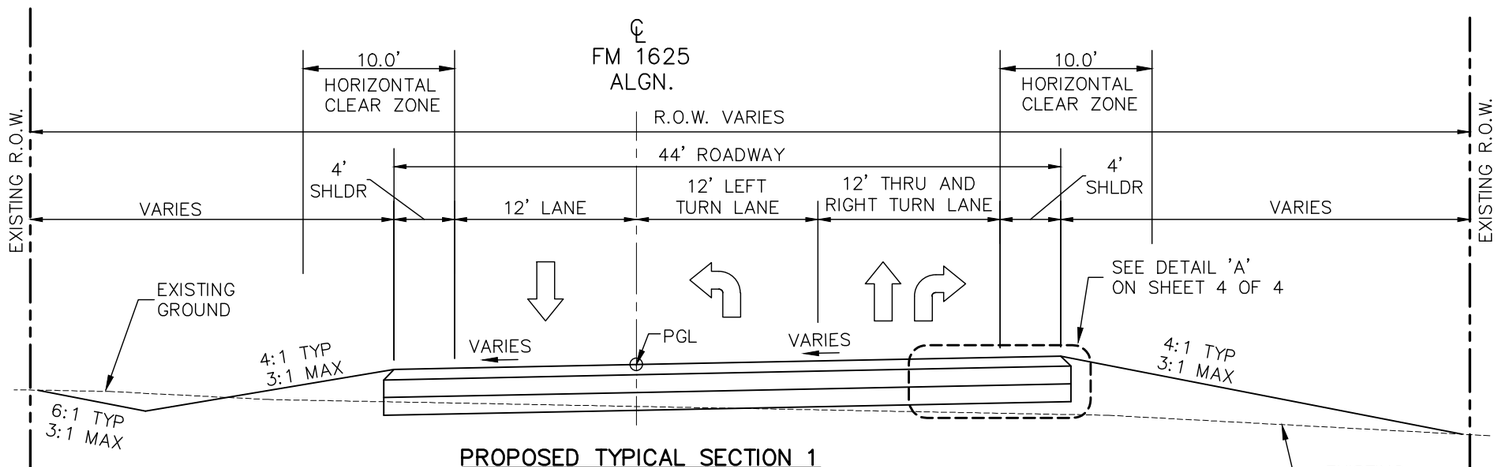
*EXISTING TYPICAL SECTION

N.T.S.

*NOTE:
ROAD WAS RE-ALIGNED
NO STATIONING FOR EXISTING TYPICAL SECTION IS AVAILABLE

PROPOSED TYPICAL SECTION TRANSITIONS:

- FROM TYP. SECTION 1 TO TYP. SECTION 2 STA. 6+07 TO 7+07
- FROM TYP. SECTION 2 TO TYP. SECTION 3 STA. 8+30 TO 9+30
- FROM TYP. SECTION 3 TO TYP. SECTION 4 STA. 11+30 TO 12+37



PROPOSED TYPICAL SECTION 1

STA. 1+73 (FM1625) – STA. 6+07 (FM1625)
N.T.S.

CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
10/14/2020

FM 1625

TYPICAL SECTIONS

SCALE: N.T.S

SHEET 1 OF 4

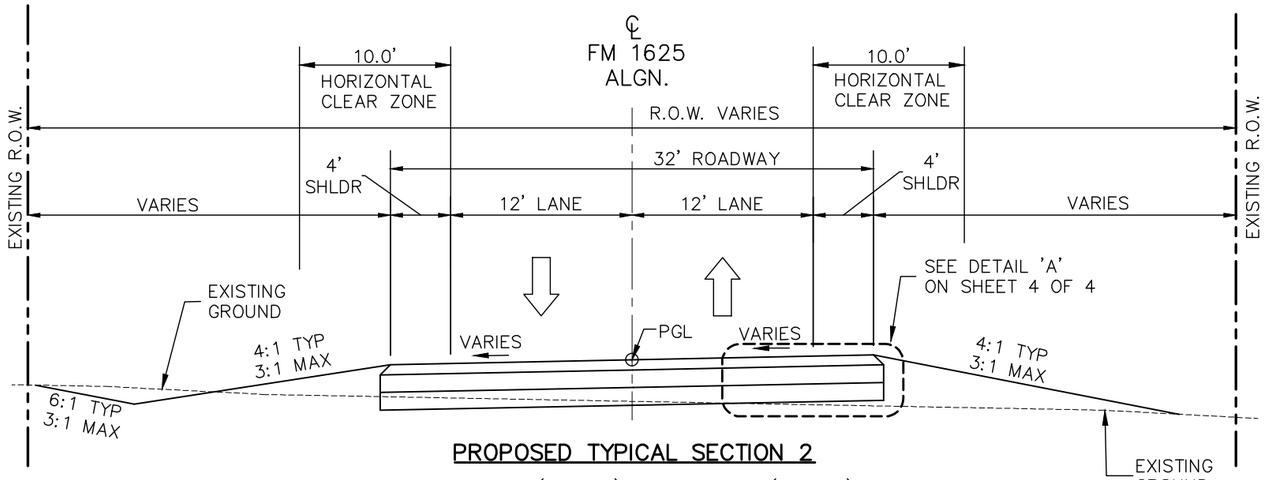
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		8

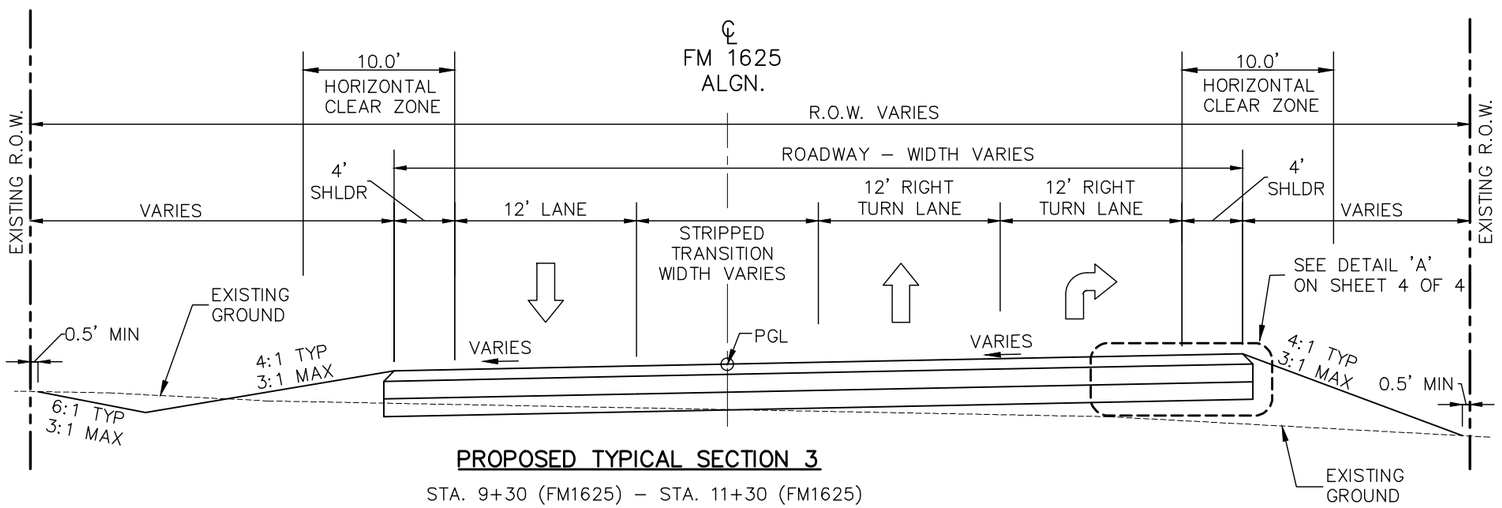
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Typical Sections



PROPOSED TYPICAL SECTION 2

STA. 7+07 (FM1625) – STA. 8+30 (FM1625)
STA. 17+07 (FM1625) – STA. 19+17 (FM1625)
N.T.S.



PROPOSED TYPICAL SECTION 3

STA. 9+30 (FM1625) – STA. 11+30 (FM1625)
N.T.S.

PROPOSED TYPICAL SECTION TRANSITIONS:

- FROM TYP. SECTION 1 TO TYP. SECTION 2 STA. 6+07 TO 7+07
- FROM TYP. SECTION 2 TO TYP. SECTION 3 STA. 8+30 TO 9+30
- FROM TYP. SECTION 3 TO TYP. SECTION 4 STA. 11+30 TO 12+37

10/14/2020

FM 1625

TYPICAL SECTIONS

SCALE: N.T.S

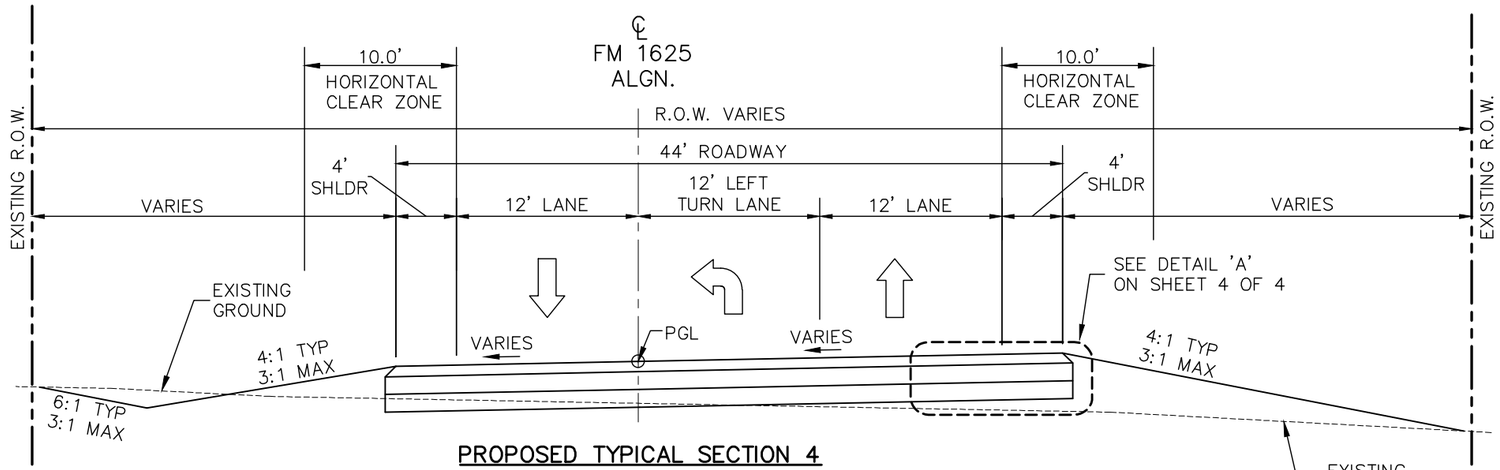
SHEET 2 OF 4

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

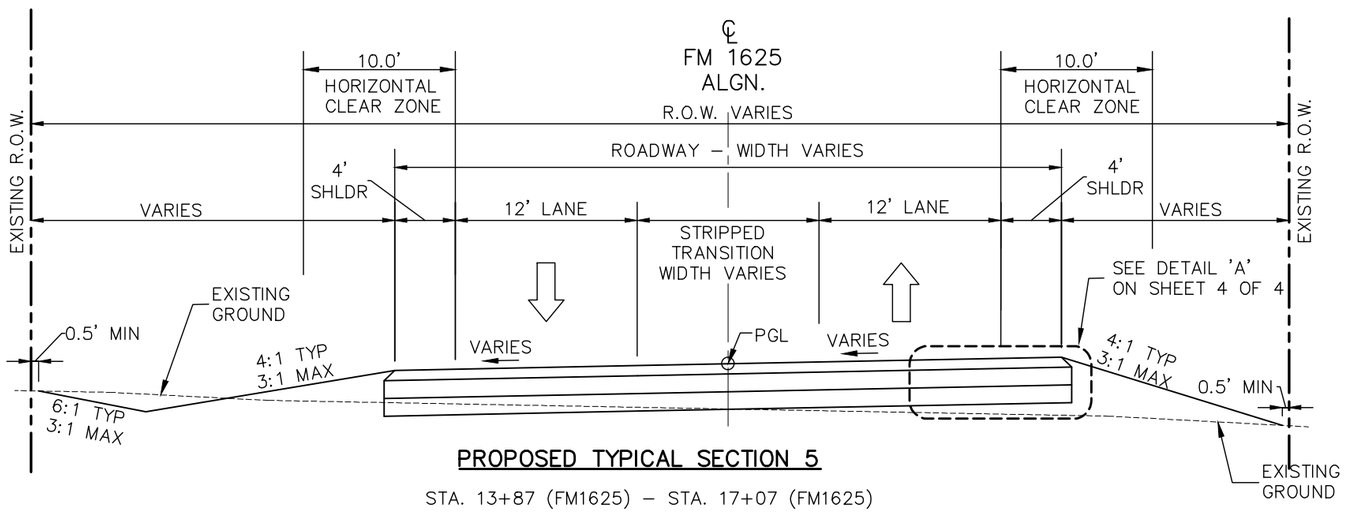
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			9

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



PROPOSED TYPICAL SECTION 4

STA. 12+37 (FM1625) – STA. 13+87 (FM1625)
N.T.S.



PROPOSED TYPICAL SECTION 5

STA. 13+87 (FM1625) – STA. 17+07 (FM1625)
N.T.S.

PROPOSED TYPICAL SECTION TRANSITIONS:

- FROM TYP. SECTION 1 TO TYP. SECTION 2 STA. 6+07 TO 7+07
- FROM TYP. SECTION 2 TO TYP. SECTION 3 STA. 8+30 TO 9+30
- FROM TYP. SECTION 3 TO TYP. SECTION 4 STA. 11+30 TO 12+37

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

FM 1625

TYPICAL SECTIONS

SCALE: N.T.S

SHEET 3 OF 4

PELOTON LAND SOLUTIONS

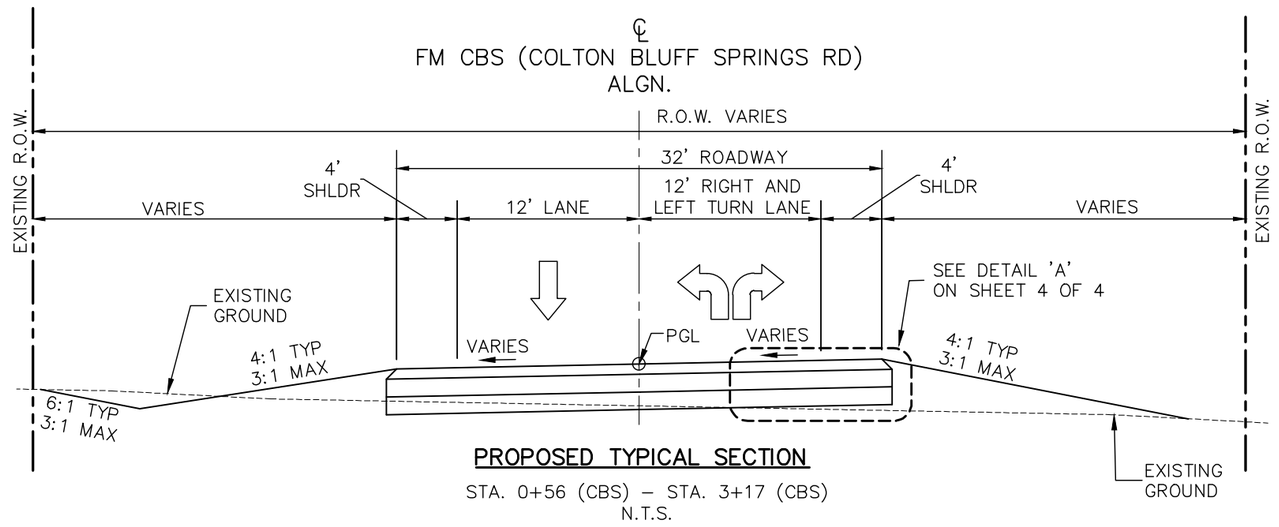
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			10

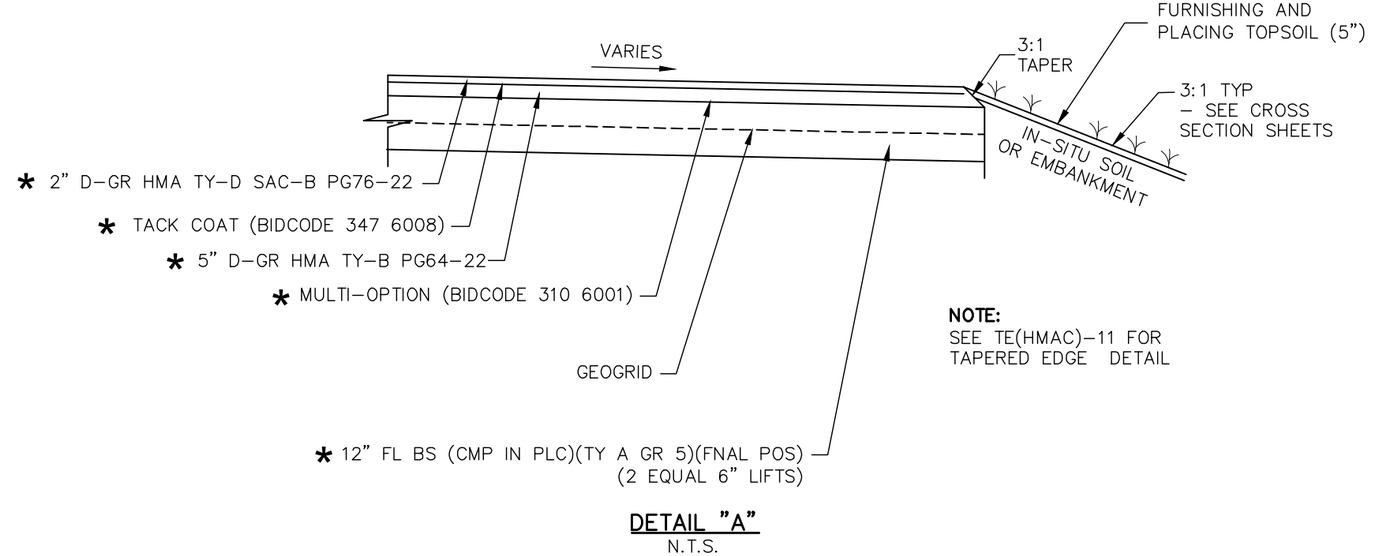
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Typical Sections



PROPOSED TYPICAL SECTION

STA. 0+56 (CBS) – STA. 3+17 (CBS)
N.T.S.



NOTE:
SEE TE(HMAC)-11 FOR TAPERED EDGE DETAIL

DETAIL "A"
N.T.S.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER
* 03/10/2021

PROPOSED TYPICAL SECTION TRANSITIONS:

- FROM TYP. SECTION 1 TO TYP. SECTION 2 STA. 6+07 TO 7+07
- FROM TYP. SECTION 2 TO TYP. SECTION 3 STA. 8+30 TO 9+30
- FROM TYP. SECTION 3 TO TYP. SECTION 4 STA. 11+30 TO 12+37

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER
10/14/2020

FM 1625

TYPICAL SECTIONS

SCALE: N.T.S SHEET 4 OF 4

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		11

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

GENERAL NOTES: Version: December 1, 2020

Item	Description	**Rate
247	**Flexible Base (CMP IN PLC)**	132 LB/CF
310	**Prime Coat**	0.20 GAL/SY
316	**Underseals Asphalts (Multi Option)**	0.20 GAL/SY
	Surface Treatments	
	Seal Coat	
	Grade 4	
	Asphalt	0.38 GAL/SY
	Aggregate	1 CY/120 SY
	Grade 5	
	Asphalt	0.32 GAL/SY
	Aggregate	1 CY/150 SY
	Two Course Surface Treatment	
	Asphalt 1st Application	0.28 GAL/SY
	Asphalt 2nd Application	0.24 GAL/SY
	Aggregate 1st Application Grade 4	1 CY/110 SY
	Aggregate 2nd Application Grade 4	1 CY/130 SY
340/3078, 341/3076, 344/3077	**Dense-Graded Hot-Mix Asphalt and Superpave**	110 LB/SY/IN
347	**Thin Overlay Mixtures (TOM) - Surface**	
	Asphalt	7.0 LB/SY/IN
	Aggregate (SACB)	106.0 LB/SY/IN
	Aggregate (SACA)	109.0LB/SY/IN
3085	**Underseal Course**	0.20GAL/SY
	Tack Coat	0.08 GAL/SY

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

South Austin Michelle.RomageChambers@txdot.gov
South Austin Tommy.Abrego@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

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

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Contact the supervisor for the passenger facility at Capital Metro and request the relocation of Capital Metro signs. Contact the supervisor at (512) 385-0190.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 48 hours before commencing any work that might affect present ITS Infrastructure. Use caution if working in these areas to avoid damaging or interfering with existing facilities. Repair any damage to this system within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Failure of the Contractor to repair damage to any infrastructure that conveys any corridor information to TxDOT/CTECC will result in the Contractor being billed for the full cost of emergency repairs.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

Coordinate and obtain approval for all bridgework over existing roadways.

Bridge Vertical Clearance and Traffic Handling
Notify TxDOT project staff and the local bridge engineer 10 business days prior to the following: change in vertical clearance, placing beams/girders over traffic, opening or removing traffic from a bridge or portion of a bridge, and completion of bridge work. This requirement includes bridge class culverts. Provide vertical clearance for all structures (including signal mast arms, span wires, and overhead sign bridge structures) within the project limit. Submit information and notices to local bridge engineer at AUS_BRG_Notify@txdot.gov.

During evacuation periods for Hurricane events the Contractor will cooperate with Department for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts.

ITEM 5 – CONTROL OF THE WORK
Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

Provide a 72 hour advance email notice to AUS_Locate@TxDOT.gov to request illumination, traffic signal, ITS, or toll equipment utility locates. Provide AUS_Locate@TxDOT.gov an electronic pdf of as-builts within 21 calendar days of illumination, traffic signal, ITS, or toll equipment being placed into operation. As-built shall include GPS coordinates of manholes and junction boxes. Include final version of RFI's and revised plan sheets.

Electronic Shop Drawing Submittals:
Submit electronic shop drawing submittals according to the current Guide to Electronic Shop Drawing Submittal https://www.txdot.gov/business/resources/specifications/shop-drawings.html (TxDOT.gov Business > Resources - General > Shop Drawings). Pre-approved producers can be found online at TxDOT.gov > Business > Resources - Material Producer List. Use the following contact list for all submittals that are not required to be sent to Bridge Division and to copy the Engineer for all submittals to the Bridge Division.
Submittal Contact List
South Austin Michelle.RomageChambers@txdot.gov AUS_SA-ShopReview@txdot.gov

ITEM 6 - CONTROL OF MATERIALS
Give a minimum of 1 business day notice for materials, which require inspection at the Plant.

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES
Terrestrial Reptile BMPs
Where feasible install sod, or if not available apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If sodding or hydromulching and/or hydroseeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven, natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.

For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (I :1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.

Inform contractors that if reptiles are found on project site allow species to safely leave the project area.

Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.

Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

Roadway closures during key dates and/or special events are prohibited. See notes for Item 502 for the key dates and/or special events.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Track all exposed soil, stockpiles, and slopes. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes and stockpiles after each rain event or every 14 days, whichever occurs first. This work is subsidiary.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.
Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.
Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed SW3P sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL.

PSL in USACE Jurisdictional Area.
Do not initiate activities in a PSL associated with a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The jurisdictional area includes all waters of the U.S. including wetlands or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Consult with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of all USACE coordination and approvals before initiating activities.

Proceed with activities in PSLs that do not affect a USACE jurisdictional area if self-determination has been made that the PSL is non-jurisdictional or proper clearances have been obtained in USACE jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. Document any determinations that PSL activities do not affect a USACE jurisdictional area. Maintain copies of PSL determinations for review by the Department or any regulatory agency. The Contractor must document and coordinate with the USACE, if required, before any excavation material hauled from or embankment material hauled into a USACE jurisdictional area by either (1) or (2) below.

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.** When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
    a. suitable excavation of required material in the areas shown on the plans and cross sections as specified in Standard Specification Item 110, Excavation is used for permanent or temporary fill within a USACE jurisdictional area;
    b. suitable embankment from within the USACE jurisdictional area is used as fill within a USACE evaluated area;

    c. Unsuitable excavation or excess excavation that is disposed of at an approved location within a USACE evaluated area.

2. **Contractor Materials from Areas Other than Previously Evaluated Areas.** Provide the Department with a copy of all USACE coordination and approvals before initiating any activities in a jurisdictional area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
    a. Standard Specification Item 132, Embankment is used for temporary or permanent fill within a USACE jurisdictional area;
    b. Unsuitable excavation or excess excavation that is disposed of outside a USACE evaluated area.

Work over or near Bodies of Water (Lakes, Rivers, Ponds, Creeks, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

DSHS Asbestos and Demolition Notification.
Complete and provide the Texas Department of State Health Services (DSHS) notification form to TxDOT and AUS_BRG_Notify@txdot.gov at least 30 calendar days prior to bridge removal or renovation. Notify the Engineer via email of any changes to the work start and end dates.

Migratory Birds and Bats.
Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.
Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to TxDOT 30 business days prior to begin work.

No extension of time or compensation will be granted for a delay or suspension due to the above bird, bat and tree/brush requirements.

Law Enforcement Personnel.
Submit charge summary and invoices using the Department forms.

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

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of $70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2.

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

Alterations to the cancellation and maximum rate must be approved by the Engineer or pre-determined by official policy of the officers governing authority.

ITEM 8 – PROSECUTION AND PROGRESS
Electronic versions of schedules will be saved in Primavera P6 format.

Lane Closure Assessment Fee.
The monthly estimate will be deducted a fee per 15-minute interval according to the following schedule for each closure or obstruction that extends beyond the allowable closure time.

Lane Closure Assessment Fee				
	Roadway =	**Road**	**N/A**	**N/A**
	0:00 - 0:15	$95	N/A	N/A
	0:16 - 0:30	$158	N/A	N/A
	0:31 - 0:45	$190	N/A	N/A
	0:46 - 1:00	$221	N/A	N/A
Each additional 15 minutes	+0:15	$95	N/A	N/A

ITEM 100 - PREPARING RIGHT OF WAY
Prep ROW must not begin until accessible trees designated for preservation have been protected, items listed in the EPIC have been addressed, and SW3P controls installed in accessible areas.

Backfill material will be Type B Embankment using ordinary compaction.

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush.

Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas within 30 ft. of edge of pavement under construction. 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 14 ft. vertical clearance under all trees. This work is subsidiary.

ITEM 110 – EXCAVATION
The Engineer will define unsuitable material.

ITEM 132 – ALL EMBANKMENT
At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation. Embankment placed over the area of MSE backfill must meet the same backfill requirements for the type specified under Item 423.

The Engineer will define unsuitable material. Material which the Contractor might deem to be unsuitable due to moisture content will not be considered unsuitable material.

Prior to begin embankment of existing area, correct or replace unstable material to a depth of 6 in. below existing grade. Embankment areas will be inspected prior to beginning work.

Rock or broken concrete produced by the project is allowed in earth embankments. The size of the rock or broken concrete will not exceed the layer thickness requirements in Section 132.3.4., "Compaction Methods." The material will not be placed vertically within 5 ft. of the finished subgrade elevation.

Embankment placed vertically within 5 ft. of the finished subgrade elevation or within the edges of the subgrade and treated with lime, cement, or other calcium based additives must have a sulfate content less than 3000 ppm. Allow 5 business days for testing. Treatment of sulfate material 3000 ppm to 7000 ppm requires 7 days of mellowing and continuous water curing, in accordance TxDOT guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures (9/2005). Material over 7000 ppm is not allowed.

ITEM 160 - TOPSOIL
Off-site topsoil will have a minimum PI of 25.

No Sandy Loam allowed.

Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources. Construct topsoil stockpiles of no more than five (5) feet in height.

It is permissible to use topsoil dikes for erosion control berms within the right of way, as directed.

Seed or track slopes within 14 days of placement.

Salvage topsoil from sites of excavation and embankment. Maximum salvage depth is 6 inches.

Windrowing of topsoil obtained from the Right of Way (ROW) is not allowed.

ITEM 168 – VEGETATIVE WATERING
Water all areas of project to be seeded or sodded.

Maintain the seedbed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ inch or greater, but will be resumed before the soil dries out. Continue watering until final acceptance.

Vegetative watering rates and quantities are based on ¼ inch of watering per week over a 3-month watering cycle. The actual rates used and paid for will be as directed and will be based on prevailing weather conditions to maintain the seedbed.

Obtain water at a source that is metered (furnish a current certification of the meter being used) or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer, each day that watering takes place, before watering, so that meter readings or truck counts can be verified.

ITEM 169 – SOIL RETENTION BLANKETS
Type A blankets containing straw fibers are not allowed.

ITEM 216 - PROOF ROLLING
Correct and perform "Proof Rolling" retest at the Contractor's expense, to the satisfaction of the Engineer, when initial "Proof Rolling" yields a failing result.

ITEM 247 - FLEXIBLE BASE
The lift thickness will be 4" to 6" unless shown in the plans. When compacted in multiple lifts, the density of the bottom and middle lifts will be 95% and 98% of the maximum dry density, respectively.

Correction of subgrade soft spots is subsidiary.

Complete all subgrade, ditches, slopes, and place all drainage structures to conform to required lines, grades, and cross-sections, as shown and directed, prior to the placement of Flex Base.
Do not use a vibratory roller to compact the material directly over a box culvert.

ITEM 310 – PRIME COAT
Apply blotter material to all driveways and intersections. This work is subsidiary.
When Multi Option is allowed, provide MC 30, EC 30 or AE-P. MC 30 is not allowed in Travis County.

Rolling to ensure penetration is required.

ITEM 316 – SEAL COAT
Ensure that all underseals are covered by HMACP before exposing to traffic for roadways listed in Table 1 of Item 502 or ADT greater than 5,000.

Aggregates (Multi Option) for seal coats not exposed to traffic and underseals shall be Type E, PA, PB, A or B. The Grade shall range between 4 and 5.

Use a medium pneumatic roller in accordance with Item 210.

Surface all transitions, tapers, climbing lanes and intersections to the limits as directed.

Remove and dispose of off the ROW the audible/profile markings, reflectorized markings, and raised markers. Blade pavement edges to remove vegetation. Any areas with excessive asphalt or aggregate will be removed. Continue sweeping excess aggregate off the roadway, riprap, and shoulder up to two weeks after completing the work. This work is subsidiary.

ITEM 340/3078 & 341/3076 - DENSE-GRADED HOT-MIX ASPHALT
Core holes may be filled with an Asphaltic patching material meeting the requirements of DMS-9203 or with SCM meeting requirements of DMS-9202.

Install transverse butt joints with 50 ft. H: 1 in. V transition from the new ACP to the existing surface. Install a butt joint with 24 in. H: 1 in. V transition from the new ACP to a driveway, pullout or intersection. Saw cut the existing pavement at the butt joints. This work is subsidiary.

Use a device to create a maximum 3H:1V notched wedge joint on all longitudinal joints of 2 in. or greater. This work is subsidiary.

Prior to milling, core the existing pavement to verify thickness. This work is subsidiary.

Ensure placement sequence to avoid excess distance of longitudinal joint lap back not to exceed one day's production rates.

Submit any proposed adjustments or changes to a JMF before production of the new JMF.

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar.
Provide a minimum transition of 10' for intersections, 10' for commercial driveways, and 6' for residential driveways unless otherwise shown on the plans.

Irregularities will require the replacement of a full lane width using an asphalt paver. Replace the entire sublot if the irregularities are greater than 40% of the sublot area.

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC "A" requirement.

When using RAP or RAS, include the management methods of processing, stockpiling, and testing the material in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted.

Asphalt content and binder properties of RAP and RAS stockpiles must be documented when recycled asphalt content greater than 20% is utilized.

No RAS is allowed in surface courses.

Department approved warm-mix additives is required for all surface mix application when RAP is used. Dosage rates will be approved during JMF approval.

The Hamburg Wheel Test will have a minimum rut depth of 3mm.

Use the SGC for design and production testing of all mixtures. Design all Dense-Graded Type D mixtures as a surface mix, maximum 15% RAP and no RAS.

When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

The Hamburg Wheel minimum number of passes for PG 64 or lower is reduced to 7,000. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

ITEM 420, 425, 441, & 462 - STRUCTURES
Bridge Vertical Clearance and Traffic Handling
Notify TxDOT project staff and the local bridge engineer 10 business days prior to the following: change in vertical clearance, placing beams/girders over traffic, opening or removing traffic from a bridge or portion of a bridge, and completion of bridge work. This requirement includes bridge class culverts. Provide vertical clearance for all structures (including signal mast arms, span wires, and overhead sign bridge structures) within the project limit. Submit information and notices to local bridge engineer at AUS_BRG_Notify@txdot.gov.

ITEM 420 – CONCRETE SUBSTRUCTURES
Do not use PMDF in areas where a "Free Joint" is indicated in the plans.

Check the sign plans for locations of clearance signs and brackets on structures, which will require inserts in the pre-stressed beams.

Where Retaining Walls are integral parts of the abutment header, do not place the abutment cap prior to backfilling the wall and the abutment area up to the elevation of the bottom of the abutment cap.

Mass placements are defined as placements with a least dimension greater than or equal to 5 ft., or designated elsewhere on the plans.
The "H" values shown on Bridge Layouts are estimated column heights. Calculate the actual column heights based on field conditions.

Perform work during good weather unless otherwise directed. If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by the weather, the Contractor is responsible for all costs associated with repairs/replacement.

Upon completion of the structure, stencil the National Bridge Inventory (NBI) number (structure number) using black paint and 4 in. tall numbers at 4 locations designated by TxDOT. This work is subsidiary.

Bonding agents are required at construction joints. Do not use membrane curing for structural concrete as defined in Item 421, Table 8.

Remove all loose Formwork and other Materials from the floodplain or drainage areas daily.

Bus stop pads pavement structure will be 6" thick and 4" base bedding unless detailed in the plans. Furnish base meeting the requirement for any type or grade in accordance with Item 247. Compressive strengths for flexible base are waived. In lieu of flexible base, RAP may be supplied. RAP must be 100% passing a 1-3/4" sieve. Base and RAP will be placed using ordinary compaction. Class A concrete is required and may use Coarse Aggregate Grades 1-8. Expansion joints will be placed every 20'. Expansion joints will be constructed as detailed in the latest TxDOT Concrete Curb and Curb and Gutter standard. Reinforcement will be No. 3 or No. 4 bars placed in accordance with concrete riprap Item 432.3.1.

ITEM 432 - RIPRAP
Mow strip riprap will be 4 in. and all other riprap will be 5 in. unless otherwise shown on the plans or in the pay items. Mow strip for cable barrier may be placed monolithically with the barrier foundations if using concrete in accordance with Item 543. Fiber reinforcement is not allowed except in mow strip for cable barrier if foundation and mow strip are placed monolithically.

Saw-cut existing riprap then epoxy 12 in. long No. 3 or No. 4 bars 6 in. deep at a maximum spacing of 18 in. in each direction to tie new riprap to existing riprap. This work is subsidiary.

For cement-stabilized riprap, provide Type A Grade 5 flexible base. Compressive strengths for Item 247 are waived.

SGT approach taper, paid using mow strip item, shall be installed using concrete, flexible base coated with SS-1 at a rate of 0.12 GAL/SY, or HMA Type B/C/D. Placement shall be ordinary compaction and does not require placement using an asphalt paver.

ITEM 460 - CORRUGATED METAL PIPE

Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all field cuts with asphalt paint. Cut ditches to grade before laying pipe.

ITEM 462 - CONCRETE BOX CULVERTS AND DRAINS
Concrete box culvert extensions shall be cast in place.

ITEM 467 - SAFETY END TREATMENT
Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all metal field cuts or exposed reinforcement with asphalt paint.

ITEM 496 - REMOVING STRUCTURES
Submit a demolition plan to the Engineer. Have the plan signed and sealed by a licensed professional engineer when the structure will continue to accommodate traffic after removal has begun and the removal impacts any part of the structure below the deck or riding surface. If applicable, the plan must detail requirements for meeting the U.S. Army Corps of Engineers' Section 404 Permit. The demolition plan must detail handling of roadway and waterway traffic. Waterway traffic must be maintained at all times unless a closure is approved by the Engineer.

No debris is allowed to fall into a body of water. Debris that falls into the water must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

Table 1

Roadway	Limits	Allowable Closure Time
IH 35	All (1 lane closed)	9 P to 5 A
IH 35	All (2 lanes closed, see allowable work below)	9 P to 5 A
IH 35	All (2 lanes closed, all work)	11 P to 5 A
SH 45	US 183 to SH130	8 P to 5 A
LP 1	William Cannon to Parmer Lane	8 P to 5 A
US 183	SH 29 to FM 1327	8 P to 5 A
SH 71	SH 130 to IH 35	8 P to 5 A
SH 71	SH 304 to Tahitian Drive	8 P to 5 A
SH 71	US 290 W to RM 3238	8 P to 5 A
US 290 W	IH 35 to Nutty Brown Rd	8 P to 5 A
US 290 E	IH 35 to SH 95	8 P to 5 A
FM 734	FM 1431 to US 290 E	8 P to 5 A
US 79	IH 35 to Bus 79 in Taylor	8 P to 5 A
RM 1431	Lohmans Ford Rd to IH 35	8 P to 5 A
SH 29	LP 332 western terminus to SH 130	8 P to 5 A
SH 80	Charles Austin to River Road	8 P to 5 A
RM 2222	All	8 P to 5 A
RM 620	All	8 P to 5 A
RM 2244	All	8 P to 5 A
SPUR 69	All	8 P to 5 A

LP 360	All	8 P to 5 A
LP 343	All	8 P to 5 A
LP 275	All	8 P to 5 A
FM 1325	All	8 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 7 P to 6 A. Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways.

Two lanes closed on IH 35 allowed to begin at 9 P for main lane (shoulder work not included) hotmix overlay or pavement repair operations (does not include bridge joint work).

Full closures only allowed Friday night thru Monday morning for bridge beam installation, bridge demolition, or OSB truss removal/installation. Full closures only allowed for roadways with frontage roads or if a designated detour route is provided in the plans.

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend. Closures the Sunday of the Super Bowl will not be allowed from 1 P to 11 P. No closures will be allowed on Friday and the weekends for projects within 20 miles of Formula 1 at COTA, ACL Fest, SXSW, ROT Rally, UT home football games (includes games not on a Friday or weekend), sales tax holiday, Dell Match Play (includes Thursday) or other special events that could be impacted by the construction. All lanes will be open by noon of the day before these special events.

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed. Submit an emailed request for a lane closure (LCN) to TxDOT. The email will be submitted in the format provided. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal. Provide 2 hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday.

For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Cover, relocate or remove existing signs that conflict with traffic control. Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify traffic control, if at any time the queue becomes greater than 20 minutes. Have a contingency plan of how modification will occur. Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.
Place a 28-inch cone, meeting requirements of BC (10), on top of foundations that have protruding studs. This work is subsidiary.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

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.

ITEM 504 - FIELD OFFICE AND LABORATORY
Projects with more than 500 CY of structural class concrete, 5000 SY of Class P concrete, and/or 2000 CY of non-structural concrete will include a concrete testing facility. Provide a structure with at least 200 sq. ft. of gross floor area in room 8 ft. high. The structure will include the laboratory equipment and all other related items to perform the contract-controlling test procedures.

Projects with HMAC, furnish a Type D structure for the Engineer's exclusive use. The structure will include high speed internet service with WIFI signal, one desk, two chairs, and one file

cabinet. Provide a minimum of three 120-volt circuits with 20-amp breakers and at most two grounded convenience outlets per circuit.

All labs and offices will include cleaning at least once a week. The cleaning will include sweeping and mopping of floors, cleaning the toilet and lavatory, and emptying wastebaskets. Space heaters are not considered adequate heating.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS
Install, maintain, remove erosion, sedimentation and environmental control measures in areas of the right of way utilized by the contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Consider the SW3P for this project to consist of the following items, as directed:
Temporary Sediment Control Fence, Rock Filter Dams, Construction Exits, and Earthwork for Erosion and Sediment Control.

ITEM 512 – PORTABLE TRAFFIC BARRIER
In lieu of a crash cushion, place 25:1 Class C concrete transition where PTB terminates adjacent to existing concrete barrier. Installation and removal will be paid using Item 512.
Any increase in temporary barrier quantities that occur due to Contractor changes in the sequence of work or the traffic control plan will not be paid.

ITEM 530 – INTERSECTIONS, DRIVEWAYS, AND TURNOUTS
Notify property owners a minimum of 48 hr. in advance of beginning work on their driveway. Provide a list of each notification and contact prior to each closure. Only close driveways for reconstruction if duration and alternate access are approved. Install and maintain material across a work zone as temporary access. Temporary access must not have grade breaks that exceed 8%. This work is subsidiary.

Grade breaks must not exceed 8%. Sidewalk crossing slope will be 1.5% and 5 ft. wide with width reduction in approved locations.

For ACP or SURF TREAT, the pavement structure will match the adjacent roadway unless detailed on the plans. HMA, including surface, may use a maximum allowable amount of 40% RAP and 5% RAS for private driveways, public driveways for 2-lane roadways or smaller, and turnouts. Blending of 2 or more sources is allowed. Furnish base meeting the requirement for any type or grade in accordance with Item 247. Compressive strengths for flexible base are waived. Base must be placed using ordinary compaction.

For CONC, the pavement structure will be 6 in. thick and have 3 in. base bedding unless detailed on the plans. Furnish base meeting ACP or SURF TREAT requirements. Class A concrete is required and may use Coarse Aggregate Grades 1-8. Expansion joints will be placed every 20 ft. Expansion joints will be constructed as detailed in the latest TxDOT Concrete Curb and Curb and Gutter Standard. Reinforcement will be in accordance with concrete riprap for Item 432.3.1., unless specified on the plans.

ITEM 540, 542, & 544 - METAL BEAM GUARD FENCE AND GUARDRAIL END TREATMENTS
Furnish round timber posts for guard fence. Steel posts for low fill culverts are subsidiary. Stake the locations for approval prior to installation. Adjust the limits of the fence to meet field conditions. Install delineators before opening the road to traffic.

Retain all materials. Contractor may reuse all existing materials that are structurally sound and dent free. All reused material shall be from this project and in compliance with current standards. Structurally sound rust spots with the largest dimension of 4 in. may be cleaned and repaired in accordance with 540.3.5. Contractor may punch or field drill holes in the metal rail element to accommodate post spacing. Additional holes for splice or connections are not allowed. The holes shall be spaced in accordance with the latest standard and shall not be closer than the minimum spacing shown on the current standard.

Remove, replace, and install mow strip block out material. Construct new block outs and backfill unused block outs with class B concrete. This work is subsidiary.

Repair of mow strip damage, not caused by contractor negligence, and installation of new mow strip will be paid with appropriate bid items. Backfill and shoulder up of area around fence and mow strip will be paid using embankment item.

ITEM 600s– ITS, LIGHTING, SIGNING, MARKINGS, AND SIGNALS
Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

Contractor shall provide all service, equipment and material required to provide a functional item and interface with existing equipment and software.

For signal shop contact Charles Vaughn Jr (Charles.Vaughn@txdot.gov) and Douglas Turner (Douglas.L.Turner@txdot.gov).

Use the TxDOT provided form to submit an electrical, illumination, and signal checklist prior to request for signal activation or a punch list.

Provide a 7 day advance email notice to the Engineer to request illumination or traffic signal punch list inspection.

Provide a 14 day advance email notice to the Engineer with signal technician contact information and signal locations prior to working or assuming operations of illumination or traffic signal.

Provide a 60 day advance email notice to the Engineer to request signal timing if timing is not provided in the plans.

Provide a 180 day advance email notice to the Engineer for equipment to be provided by TxDOT.

Prior to relief of maintenance, a Test Period is required for signals and ITS equipment in accordance with Item 680.3.1.8. Response time to reported trouble calls shall be less than 2 hours. Complete repairs within 24 hours. Notify the Engineer and maintain a logbook in the controller cabinet of each trouble call. Do not clear the error log in the conflict monitor without approval.

Maintain the existing ITS equipment and HUB buildings operational during construction. ITS downtime is allowed from 12A to 4A. Downtime is restricted to one time per HUB or equipment.

Definitions of abbreviations used to designate ITS equipment, material, etc. can be provided by the Engineer.

ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES
Triangular slip base that use set screws to secure the post will require 1 of the set screws to penetrate the post by drilling a hole in the post at the location of the screw. All set screws shall be treated with anti-seize compound.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS
Notify the Engineer at least 24 hr. before beginning work.

Place longitudinal markings nightly for IH 35 main lanes or roadways with AADT greater than 100,000. Use of temporary flexible reflective roadway marker tabs is subsidiary and at the Contractor's option. Replace missing or damaged tabs nightly. If using tabs, place longitudinal markings weekly by 5 AM Friday for all weekday work and by 5 AM Monday for all weekend work. Failure to maintain tabs or place longitudinal markings by deadline will require nightly placement of longitudinal markings.

Place longitudinal markings no later than 7 calendar days after placement of the surface for roadways with AADT greater than 20,000.
When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

When using black shadow to cover existing stripe apply a non-retroreflective angular abrasive bead drop. The marking color shall be adjusted to resemble the pavement color. If Item 677 is not used prior to placement of black shadow, scrape the top of the marking with a blade or large piece of equipment unless surface is a seal coat. The scraping of the marking is subsidiary.

ITEM 680 - HIGHWAY TRAFFIC SIGNALS
Luminaire arms shall be aligned with the signal head support. If multiple signal head supports, the luminaire arm shall be aligned with the support over the higher volume roadway.

Install 250W EQ LED illumination fixtures as shown in the plans. Test in accordance with Item 616. This work is subsidiary

Furnish all materials and install signs mounted on the traffic signal wire, traffic signal poles, mast arms, and pedestal pole assemblies. Remove all conflicting signs and sign foundations when signal is placed into operation. This work is subsidiary.

Use a Vulcan swinger sign mounting bracket or equivalent for all signs mounted on span wires.

Place the traffic signal into operation after the traffic signal and stripe have been completed. The signal shop will be present to program the controller and assist with detection setup. Have a qualified technician and a representative from the controller supplier on the project site to place the traffic signals in operation.

If shown on the plans, install the Emergency Response Detection equipment supplied by the City.

Upon removal, contact signal shop to stockpile a maximum of 4 signal poles and mast arms that meet the current TxDOT standards at the Austin District Headquarters located at 7901 North IH 35, 78753. If signal shop declines receipt of material, Contractor will be responsible for disposal.

For city operated signals, the city may assist in determining how the detector loop lead-in cables are to be connected, and will also program the controller for operation, the video detection, hook up the conflict monitor, detector units and other equipment, and turn on the controller.

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS
Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Use UV rated tie wraps.

Traffic signal heads will be aluminum unless otherwise shown on the plans. Back plates will be black aluminum.

Provide louvers, which have five vanes with a black finish on inside surfaces when required. Fasten a hardware cloth screen, securely, with ⅝" or smaller mesh size to the front face of each louver to prevent bird nesting.
Use the four point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR
The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

ITEM 680 - HIGHWAY TRAFFIC SIGNALS
The list of material below is for the Contractor's information only and is subsidiary. It is the responsibility of the Contractor to verify all items and quantities listed below.

DESCRIPTION	UNIT	QUANTITY
REGULATORY SIGN PANEL (10-17T)	EA	1

QUANTITY SHEET

CONTROLLING PROJECT ID 0152-01-080 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY FM 1625, US 183

			CONTROL SECTION JOB	**0152-01-080**		**1535-01-012**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059603**		**A00060780**			
			COUNTY	**Travis**		**Travis**			
			HIGHWAY	**US 183**		**FM 1625**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	19.000		24.000		43.000	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	2,590.000				2,590.000	
	106-6002	OBLITERATING ABANDONED ROAD	SY			4,749.000		4,749.000	
	110-6001	EXCAVATION (ROADWAY)	CY	150.000		950.000		1,100.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	1,500.000		6,500.000		8,000.000	
	160-6010	FURNISH AND PLACE TOPSOIL (5")	SY	4,759.000		12,516.000		17,275.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	4,759.000		12,516.000		17,275.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	4,759.000		12,516.000		17,275.000	
	168-6001	VEGETATIVE WATERING	MG	96.000		250.000		346.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	4,759.000		12,516.000		17,275.000	
	216-6001	PROOF ROLLING	HR	6.000		12.000		18.000	
	247-6366	FL BS (CMP IN PLC)(TY A GR 5)(FNAL POS)	CY	680.000		3,588.000		4,268.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	409.000		2,153.000		2,562.000	
	340-6011	D-GR HMA(SQ) TY-B PG64-22	TON	19.400		71.000		90.400	
	340-6136	D-GR HMA(SQ) TY-D SAC-B PG76-22	TON	21.000		95.000		116.000	
	347-6001	TOM (ASPHALT) PG 76-22	TON	21.000				21.000	
	347-6002	TOM-C (AGGREGATE) SAC-A	TON	326.000				326.000	
	347-6008	TACK COAT	GAL	386.000		100.000		486.000	
	403-6001	TEMPORARY SPL SHORING	SF	5,833.000		300.000		6,133.000	
	416-6003	DRILL SHAFT (30 IN)	LF			11.000		11.000	
	416-6004	DRILL SHAFT (36 IN)	LF			13.000		13.000	
	416-6006	DRILL SHAFT (48 IN)	LF			44.000		44.000	
	420-6054	CL C CONC (HEADWALL)	CY	133.000				133.000	
	420-6057	CL C CONC (WINGWALLS)	CY	119.000				119.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY			224.000		224.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	63.400		13.000		76.400	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY			3.000		3.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	128.000				128.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	83.000		44.000		127.000	
	460-6002	CMP (GAL STL 18 IN)	LF	80.000		80.000		160.000	
	462-6051	CONC BOX CULV (5 FT X 3 FT)(EXTEND)	LF	123.000				123.000	
	462-6062	CONC BOX CULV (7 FT X 7 FT)(EXTEND)	LF	135.000				135.000	
	464-6008	RC PIPE (CL III)(36 IN)	LF			62.000		62.000	
	464-6020	RC PIPE (CL IV)(36 IN)	LF	572.000				572.000	
	466-6009	HEADWALL (CH - FW - 0) (DIA= 36 IN)	EA			1.000		1.000	
	466-6101	HEADWALL (CH - PW - 0) (DIA= 36 IN)	EA			1.000		1.000	
	467-6348	SET (TY II) (18 IN) (CMP) (6: 1) (P)	EA	2.000		2.000		4.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0152-01-080 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY FM 1625, US 183

			CONTROL SECTION JOB		**0152-01-080**		**1535-01-012**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00059603**		**A00060780**			
			COUNTY		**Travis**		**Travis**			
			HIGHWAY		**US 183**		**FM 1625**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	476-6025	JACK BOR OR TUN PIPE(36 IN)(RC)(CL IV)	LF	405.000				405.000	
	496-6004	REMOV STR (SET)	EA	2.000		1.000		3.000	
	496-6005	REMOV STR (WINGWALL)	EA	4.000				4.000	
	496-6006	REMOV STR (HEADWALL)	EA	4.000				4.000	
	496-6007	REMOV STR (PIPE)	LF	24.000		40.000		64.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000				1.000	
	500-6001	MOBILIZATION	LS	50.00%		50.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000		12.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	281.000		263.000		544.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	281.000		263.000		544.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	120.000		120.000		240.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	120.000		120.000		240.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2,341.000		4,658.000		6,999.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2,341.000		4,658.000		6,999.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	2,220.000				2,220.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	2,070.000				2,070.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	2,220.000				2,220.000	
	530-6005	DRIVEWAYS (ACP)	SY	57.000		86.000		143.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,276.000		500.000		1,776.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	2,590.000				2,590.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	8.000		4.000		12.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	12.000				12.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000				2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	3.000				3.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	3.000				3.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF			195.000		195.000	
	618-6029	CONDT (PVC) (SCH 40) (3")	LF			370.000		370.000	
	618-6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF			630.000		630.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF			1,220.000		1,220.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF			1,750.000		1,750.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF			40.000		40.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF			80.000		80.000	
	624-6006	GROUND BOX TY BATTERY (162915)W/APRON	EA			1.000		1.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA			5.000		5.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2.000		8.000		10.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	3.000		9.000		12.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA			1.000		1.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0152-01-080 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY FM 1625, US 183

			CONTROL SECTION JOB		**0152-01-080**		**1535-01-012**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00059603**		**A00060780**			
			COUNTY		**Travis**		**Travis**			
			HIGHWAY		**US 183**		**FM 1625**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	644-6031	IN SM RD SN SUP&AM TYS80(1)SA(T-2EXT)	EA	1.000		2.000		3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	6.000		11.000		17.000	
	644-6078	REMOVE SM RD SN SUP&AM (SIGN ONLY)	EA			2.000		2.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	21.000				21.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	31.000				31.000	
	666-6005	REFL PAV MRK TY I (W)4"(DOT)(090MIL)	LF	43.000				43.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	1,509.000		887.000		2,396.000	
	666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	66.000		223.000		289.000	
	666-6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	EA	5.000		4.000		9.000	
	666-6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	EA	5.000		4.000		9.000	
	666-6146	REFL PAV MRK TY I (Y)24"(SLD)(090MIL)	LF	42.000				42.000	
	666-6155	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	EA	1.000		1.000		2.000	
	666-6167	REFL PAV MRK TY II (W) 4" (BRK)	LF	916.000				916.000	
	666-6168	REFL PAV MRK TY II (W) 4" (DOT)	LF	43.000				43.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	4,136.000		4,592.000		8,728.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1,509.000		887.000		2,396.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	66.000		223.000		289.000	
	666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	5.000		4.000		9.000	
	666-6192	REFL PAV MRK TY II (W) (WORD)	EA	5.000		4.000		9.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	4,700.000		5,170.000		9,870.000	
	666-6214	REFL PAV MRK TY II (Y) 24" (SLD)	LF	42.000				42.000	
	666-6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	1.000		1.000		2.000	
	666-6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	916.000				916.000	
	666-6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF	4,136.000		4,592.000		8,728.000	
	666-6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF	4,700.000		5,170.000		9,870.000	
	672-6007	REFL PAV MRKR TY I-C	EA	105.000		46.000		151.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	220.000		195.000		415.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF			16.000		16.000	
	680-6003	INSTALL HWY TRF SIG (SYSTEM)	EA			1.000		1.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA			1.000		1.000	
	680-6011	INSTALL HWY TRF SIG (UPGRADE)	EA	1.000				1.000	
	681-6001	TEMP TRAF SIGNALS	EA	1.000				1.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	1.000		11.000		12.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	2.000		4.000		6.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	1.000		13.000		14.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	3.000		4.000		7.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	1.000		11.000		12.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0152-01-080 **DISTRICT** Austin **COUNTY** Travis
HIGHWAY FM 1625, US 183

			CONTROL SECTION JOB	**0152-01-080**		**1535-01-012**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059603**		**A00060780**			
			COUNTY	**Travis**		**Travis**			
			HIGHWAY	**US 183**		**FM 1625**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	1.000		2.000		3.000	
	682-6022	BACK PLATE (12")(2 SEC)	EA	2.000		13.000		15.000	
	684-6028	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	LF			10.000		10.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF			1,978.000		1,978.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF			1,124.000		1,124.000	
	685-6004	INSTL RDSD FLSH BCN ASSM (SOLAR PWRD)	EA			1.000		1.000	
	686-6031	INS TRF SIG PL AM(S)1 ARM(28')LUM	EA			1.000		1.000	
	686-6051	INS TRF SIG PL AM(S)1 ARM(48')LUM	EA			1.000		1.000	
	686-6055	INS TRF SIG PL AM(S)1 ARM(50')LUM	EA			1.000		1.000	
	686-6061	INS TRF SIG PL AM(S)1 ARM(60')	EA			1.000		1.000	
	5000-6001	GEOGRID REINFORCE EMBANKMENTS (TY A)	SY	2,046.000		10,767.000		12,813.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA			4.000		4.000	
	6054-6002	COAXIAL CABLE	LF			60.000		60.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA			1.000		1.000	
	6185-6002	TMA (STATIONARY)	DAY	2.000		2.000		4.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	3.000		3.000		6.000	
	6292-6003	RVDS(PRESENCE AND ADVANCE DET)	EA			4.000		4.000	
	7000-6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	15.000				15.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000				1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	

SUMMARY OF ROADWAY ITEMS

PLAN AND PROFILE	100 6002 PREPARING ROW	110 6001 EXCAVATION (ROADWAY)	132 6003 EMBANKMENT (FINAL)(ORD COMP)(TY B)	216 6001 PROOF ROLLING	247 6366 FL BS (CMP IN PLC)(TY A GR 5)(FNAL POS)	310 6001 PRIME COAT(MULTI OPTION)	340 6011 D-GR HMA TY-B PG64-22	340 6136 D-GR HMA TY-D SAC-B PG76-22	347 6001 TOM (ASPHALT) PG 76-22	347 6002 TOM-C (AGGREGATE) SAC-A	432 6045 RIPRAP (MOW STRIP)(4 IN)	540 6001 MTL W-BEAM GD FEN (TIM POST)	544 6001 GUARDRAIL END TREATMENT (INSTALL)	347 6008 TACK COAT	5000 6001 GEOGRID REINFORCE EMBANKMENTS (TY A)
	STA	CY	CY	HR	CY	GAL	TON	TON	TON	TON	CY	LF	EA	GAL	SY
SHEET 1 OF 3	6	70	700	2	276	167	8.0	8	8	128	36	510	3	84	834
SHEET 2 OF 3	11	70	700	3	389	233	11.0	12	12	189	38	766	4	117	1165
SHEET 3 OF 3	2	10	100	1	15	9	0.4	1	1	9	9		1	5	47
PROJECT TOTALS	**19**	**150**	**1500**	**6**	**680**	**409**	**19.4**	**21**	**21**	**326**	**83**	**1276**	**8**	**206**	**2046**

SUMMARY OF PERMANENT EROSION CONTROL ITEMS

EROSION/SEDIMENTATION CONTROL PLAN	160 6010 FURNISH AND PLACE TOPSOIL (5")	164 6023 CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	168 6001 VEGETATIVE WATERING	169 6001 SOIL RETENTION BLANKETS (CL 1) (TY A)	432 6002 RIPRAP (CONC)(5 IN)	506 6002 ROCK FILTER DAMS (INSTALL) (TY 2)	506 6011 ROCK FILTER DAMS (REMOVE)	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	506 6024 CONSTRUCTION EXITS (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	MG	SY	CY	LF	LF	SY	SY	LF	LF
SHEET 1 OF 1	4759	4759	96	4759	63.4	281	281	120	120	2341	2341
PROJECT TOTALS	**4759**	**4759**	**96**	**4759**	**63.4**	**281**	**281**	**120**	**120**	**2341**	**2341**

SUMMARY OF REMOVAL ITEMS

REMOVAL PLAN	104 6054 REMOVING CONCRETE(MOW STRIP)	496 6004 REMOV STR (SET)	496 6005 REMOV STR (WINGWALL)	496 6006 REMOV STR (HEADWALL)	496 6007 REMOV STR (PIPE)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)	542 6001 REMOVE METAL BEAM GUARD FENCE	544 6003 GUARDRAIL END TREATMENT (REMOVE)
	LF	EA	EA	EA	LF	EA	LF	EA
SHEET 1 OF 2	1719	2	4	4	24		1719	8
SHEET 2 OF 2	871					1	871	4
PROJECT TOTALS	**2590**	**2**	**4**	**4**	**24**	**1**	**2590**	**12**

SUMMARY OF DRIVEWAY AND INTERSECTION ITEMS

LOCATION	460 6002 CMP (GAL STL 18 IN)	467 6348 SET (TY II) (18 IN) (CMP) (6: 1) (P)	530 6005 DRIVEWAYS (ACP)
PLAN AND PROFILE	LF	EA	SY
SHEET 1 OF 2			
SHEET 2 OF 2	80	2	57
PROJECT TOTALS	**80**	**2**	**57**

SUMMARY OF DRAINAGE ITEMS

CULVERT PLAN AND PROFILE	403 6001 TEMPORARY SPL SHORING	432 6002 RIPRAP (CONC)(5 IN)	432 6035 RIPRAP (STONE PROTECTION) (24 IN)	462 6051 CONC BOX CULV (5 FT X 3 FT)	462 6062 CONC BOX CULV (7 FT X 7 FT)	464 6020 RC PIPE (CL IV)(36 IN)	7000 6001 REMIL & DISPL SOFTWOOD & DEBRIS	476 6025 JACK, BORING, OR TUNNELING PIPE(36 IN)(RC)(CL IV)	420 6054 CUSTOM HEADWALL
	SF	CY	CY	LF	LF	LF	CY	LF	CY
CULVERT A	1865	55	56	123		400	6	275	32
CULVERT B	3968	45	74		135	172	9	130	101
PROJECT TOTALS	**5833**	**100**	**130**	**123**	**135**	**572**	**15**	**405**	**133**

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

SUMMARY OF QUANTITIES

PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		14

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

SUMMARY OF ROADWAY ITEMS

PLAN AND PROFILE	100 6002 PREPARING ROW	110 6001 EXCAVATION (ROADWAY)	132 6003 EMBANKMENT (FINAL)(ORD COMP)(TY B)	216 6001 PROOF ROLLING	247 6366 FL BS (CMP IN PLC)(TY A GR 5)(FNAL POS)	310 6001 PRIME COAT (MULTI OPTION)	340 6011 D-GR HMA(SQ) TY-B PG64-22	340 6136 D-GR HMA(SQ) TY-D SAC-B PG76-22	432 6045 RIPRAP (MOW STRIP)(4 IN)	540 6001 MTL W-BEAM GD FEN (TIM POST)	544 6001 GUARDRAIL END TREATMENT (INSTALL)	347 6008 TACK COAT	5000 6001 GEOGRID REINFORCE EMBANKMENTS (TY A)
	STA	CY	CY	HR	CY	GAL	TON	TON	CY	LF	EA	GAL	SY
SHEET 1 OF 3	10	350	2500	5	1734	1041	34	46	25	500	2	521	5206
SHEET 2 OF 3	10	350	2500	5	1467	880	29	39	19		2	440	4402
SHEET 3 OF 3	4	250	1500	2	387	232	8	10				116	1159
PROJECT TOTALS	**24**	**950**	**6500**	**12**	**3588**	**2153**	**71**	**95**	**44**	**500**	**4**	**1077**	**10767**

SUMMARY OF PERMANENT EROSION CONTROL ITEMS

LOCATION	160	164	168	169	432	432	506	506	506	506	506	506
	6010	6023	6001	6001	6001	6002	6002	6011	6020	6024	6038	6039
EROSION/SEDIMENTATION CONTROL PLAN	FURNISHING AND PLACING TOPSOIL (5")	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	RIPRAP (CONC)(4 IN)	RIPRAP (CONC)(5 IN)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	MG	SY	CY	CY	LF	LF	SY	SY	LF	LF
SHEET 1 OF 1	12516	12516	250	12516	224	13	263	263	120	120	4658	4658
PROJECT TOTALS	**12,516**	**12,516**	**250**	**12,516**	**224**	**13**	**263**	**263**	**120**	**120**	**4,658**	**4,658**

SUMMARY OF DRAINAGE ITEMS

LOCATION	464 6008	466 6101	466 6009	432 6033	403 6001
CULVERT PLAN AND PROFILE	RC PIPE (CL III)(36 IN)	HEADWALL (CH - PW - 0) (DIA= 36 IN)	HEADWALL (CH - FW - 0) (DIA= 36 IN)	RIPRAP (STONE PROTECTION)(18 IN)	TEMPORARY SPL SHORING
	LF	EA	EA	CY	SF
CULVERT A	62	1	1	3	300
PROJECT TOTALS	**62**	**1**	**1**	**3**	**300**

SUMMARY OF DRIVEWAY AND INTERSECTION ITEMS

LOCATION	460 6002	467 6348	530 6005
PLAN AND PROFILE	CMP (GAL STL 18 IN)	SET (TY II) (18 IN) (CMP) (6: 1) (P)	DRIVEWAYS (ACP)
	LF	EA	SY
SHEET 1 OF 3			
SHEET 2 OF 3	80	2	86
SHEET 3 OF 3			
PROJECT TOTALS	**80**	**2**	**86**

SUMMARY OF REMOVAL ITEMS

PLAN AND PROFILE	496 6004 REMOV STR (SET)	496 6007 REMOV STR (PIPE)	106 6002 OBLITERATING ABANDONED ROAD
	EA	LF	SY
SHEET 1 OF 3			1053
SHEET 2 OF 3	1	40	3696
SHEET 3 OF 3			
PROJECT TOTALS	**1**	**40**	**4749**

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

3/11/2021

FM 1625

SUMMARY OF QUANTITIES

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		14A

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

TRAFFIC SIGNAL QUANTITIES

CONTRACTOR PROVIDED AND INSTALLED ITEMS				
TXDOT SPECS		DESCRIPTION	UNIT	QUANTITY
ITEM NO.	DESC. CODE			
680	6011	INSTALL HWY TRF SIG (UPGRADE)	EA	1
*	*	REGULATORY SIGN PANEL (R10-17T)(36"X42")	EA	1
*	*	REMOVE SIGN ON MAST ARM	EA	3
682	6001	VEH SIG SEC (12")LED(GRN)	EA	1
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	2
682	6003	VEH SIG SEC (12")LED(YEL)	EA	1
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	3
682	6005	VEH SIG SEC (12")LED(RED)	EA	1
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	1
682	6024	BACK PLATE (12")(4 SEC)	EA	1
682	6025	BACK PLATE (12")(5 SEC)	EA	1

NOTES
* SUBSIDIARY TO ITEM 680 6011.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC SIGNAL QUANTITIES

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			15

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

TRAFFIC SIGNAL QUANTITIES

CONTRACTOR PROVIDED AND INSTALLED ITEMS				
TXDOT SPECS				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QUANTITY
416	6003	DRILL SHAFT (30 IN)	LF	11
416	6004	DRILL SHAFT (36 IN)	LF	13
416	6006	DRILL SHAFT (48 IN)	LF	44
618	6023	CONDT (PVC) (SCH 40) (2")	LF	185
618	6029	CONDT (PVC) (SCH 40) (3")	LF	370
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	630
620	6007	ELEC CONDR (NO.8) BARE	LF	1220
620	6008	ELEC CONDR (NO.8) INSULATED	LF	1750
620	6009	ELEC CONDR (NO.6) BARE	LF	20
620	6010	ELEC CONDR (NO.6) INSULATED	LF	40
624	6010	GROUND BOX TY D (162922)W/APRON	EA	5
680	6003	INSTALL HWY TRF SIG (SYSTEM)	EA	1
*	*	CONTROLLER FOUNDATION	EA	1
*	*	TRAFFIC SIGNAL CONTROLLER(INSTALL ONLY)	EA	1
*	*	TRAFFIC SIGNAL CABINET(INSTALL ONLY)	EA	1
*	*	REGULATORY SIGN (R10-17T)(36"X42")	EA	2
*	*	STREET NAME SIGN	EA	4
*	*	WIND DAMPER	EA	1
*	*	LED LUMINAIRE	EA	3
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
682	6001	VEH SIG SEC (12")LED(GRN)	EA	11
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	11
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4
682	6005	VEH SIG SEC (12")LED(RED)	EA	11
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	2
682	6023	BACK PLATE (12")(3 SEC)	EA	9
682	6024	BACK PLATE (12")(4 SEC)	EA	4
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	1978
684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	1124
686	6031	INS TRF SIG PL AM(S)1 ARM(28')LUM	EA	1
686	6051	INS TRF SIG PL AM(S)1 ARM(48')LUM	EA	1
686	6055	INS TRF SIG PL AM(S)1 ARM(50')LUM	EA	1
686	6061	INS TRF SIG PL AM(S)1 ARM(60')	EA	1
6054	6002	COAXIAL CABLE (CAT-5E)	LF	60
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1
6292	6003	RVDS (PRESENCE AND ADVANCE DET)	EA	4
**	**	RVDS COMM CABLE	LF	2011
**	**	RVDS PROCESSOR SYSTEM (4 CHANNEL)	EA	2

STATE FURNISHED MATERIALS***				
TXDOT SPECS				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QUANTITY
		TRAFFIC SIGNAL CONTROLLER	EA	1
		DUAL BAND ETHERNET RADIO/ANTENNA(2.4/5.8)	EA	1
		MANAGED HARDENDED ETHERNET SWITCH	EA	1
		POWER SUPPLY(FOR SWITCH)	EA	1

NOTES
* SUBSIDIARY TO ITEM 680 6003.
** SUBSIDIARY TO ITEM 6293 6003.
*** STATE FURNISHED ITEMS SHALL BE PICKED UP FROM TXDOT BY CONTRACTOR.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
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PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC SIGNAL QUANTITIES

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		16

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

SIGNING AND PAVEMENT MARKINGS

LOCATION	644 6001	644 6004	644 6031	644 6076	658 6060	658 6062	666 6005	666 6035	666 6047	666 6053	666 6077	666 6146	666 6155
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(T-2EXT)	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	REFL PAV MRK TY I (W)4"(DOT)(090MIL)	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	REFL PAV MRK TY I (W)(ARROW)(090MIL)	REFL PAV MRK TY I (W)(WORD)(090MIL)	REFL PAV MRK TY I (Y)24"(SLD)(090MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)
	EA	EA	EA	EA	EA	EA	LF	LF	LF	EA	EA	LF	EA
US 183 1 OF 3	2	1	-	1	11	12	43	467	66	3	3	-	1
US 183 2 OF 3	-	2	1	4	10	19	-	1,000	-	2	1	-	-
US 183 3 OF 3	-	-	-	1	-	-	-	42	-	-	1	42	-
TOTAL	2	3	1	6	21	31	43	1,509	66	5	5	42	1

SIGNING AND PAVEMENT MARKINGS CONT'D

LOCATION	666 6167	666 6168	666 6170	666 6178	666 6182	666 6184	666 6192	666 6207	666 6214	666 6217	666 6299	666 6302	666 6314
	REFL PAV MRK TY II (W) 4" (BRK)	REFL PAV MRK TY II (W) 4" (DOT)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 8" (SLD)	REFL PAV MRK TY II (W) 24" (SLD)	REFL PAV MRK TY II (W) (ARROW)	REFL PAV MRK TY II (W) (WORD)	REFL PAV MRK TY II (Y) 4" (SLD)	REFL PAV MRK TY II (Y) 24" (SLD)	REFL PAV MRK TY II (Y) (MED NOSE)	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
	LF	LF	LF	LF	LF	EA	EA	LF	LF	EA	LF	LF	LF
US 183 1 OF 3	313	43	1,749	467	66	3	3	2,010	-	1	313	1,749	2,010
US 183 2 OF 3	507	-	2,001	1,000	-	2	1	2,002	-	-	507	2,001	2,002
US 183 3 OF 3	96	-	386	42	-	-	1	688	42	-	96	386	688
TOTAL	916	43	4,136	1,509	66	5	5	4,700	42	1	916	4,136	4,700

SIGNING AND PAVEMENT MARKINGS CONT'D

LOCATION	672 6007	672 6009
	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	EA	-
US 183 1 OF 3	23	88
US 183 2 OF 3	74	100
US 183 3 OF 3	8	32
TOTAL	105	220

TRAFFIC CONTROL QUANTITIES

TXDOT SPECS		DESCRIPTION	UNIT	QUANTITY
ITEM NO.	DESC. CODE			
502	6001	BARRICADES, SIGNS, AND TRAFFIC HANDLING	MO	3
512	6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	2220
512	6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	2070
512	6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	2220
545	6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	3
545	6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2
545	6005	CRASH CUSH ATTEN (REMOVE)	EA	3
6185	6002	TMA (STATIONARY)	EA	2
6185	6005	TMA (MOBILE OPERATION)	DAY	3

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

PAVEMENT MARKING AND SIGNING QUANTITIES

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		17

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

SIGNING AND PAVEMENT MARKINGS

LOCATION	618 6023	620 6009	620 6010	624 6006	644 6001	644 6004	644 6030	644 6031	644 6067	644 6076	644 6078	666 6035	666 6047	666 6053	666 6077
	CONDT (PVC) (SCH 40) (2")	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.6) INSULATED	GROUND BOX TY BATTERY (162915)W/APRON	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(T-2EXT)	IN SM RD SN SUP&AM (INST SIGN ONLY)	REMOVE SM RD SN SUP&AM	REMOVE SM RD SN SUP&AM (SIGN ONLY)	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	REFL PAV MRK TY I (W)(ARROW)(090MIL)	REFL PAV MRK TY I (W)(WORD)(090MIL)
	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA
FM 1625 1 OF 5	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
FM 1625 2 OF 5	-	-	-	-	-	1	-	-	-	2	-	131	210	1	1
FM 1625 3 OF 5	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
FM 1625 4 OF 5	10	20	40	1	4	4	1	-	-	2	-	756	13	3	3
FM 1625 5 OF 5	-	-	-	-	4	4	-	-	1	-	2	-	-	-	-
SIGNING REMOVALS	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-
TOTAL	10	20	40	1	8	9	1	2	1	11	2	887	223	4	4

SIGNING AND PAVEMENT MARKINGS CONT'D

LOCATION	666 6155	666 6170	666 6178	666 6182	666 6184	666 6192	666 6207	666 6217	666 6302	666 6314	672 6007	672 6009
	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 8" (SLD)	REFL PAV MRK TY II (W) 24" (SLD)	REFL PAV MRK TY II (W) (ARROW)	REFL PAV MRK TY II (W) (WORD)	REFL PAV MRK TY II (Y) 4" (SLD)	REFL PAV MRK TY II (Y) (MED NOSE)	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	EA	LF	LF	LF	EA	EA	LF	EA	LF	LF	EA	EA
FM 1625 1 OF 5	-	-	-	-	-	-	-	-	-	-	-	-
FM 1625 2 OF 5	-	692	131	210	1	1	264	-	692	264	7	14
FM 1625 3 OF 5	-	-	-	-	-	-	-	-	-	-	-	-
FM 1625 4 OF 5	1	2,491	756	13	3	3	2,820	1	2,491	2,820	39	126
FM 1625 5 OF 5	-	1,409	-	-	-	-	2,086	-	1,409	2,086	-	55
SIGNING REMOVALS	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1	4,592	887	223	4	4	5,170	1	4,592	5,170	46	195

SIGNING AND PAVEMENT MARKINGS CONT'D

LOCATION	677 6007	682 6003	684 6028	685 6004
	ELIM EXT PAV MRK & MRKS (24")	VEH SIG SEC (12")LED(YEL)	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	INSTL RDSD FLSH BCN ASSM (SOLAR PWRD)
	LF	EA	LF	EA
FM 1625 1 OF 5	-	-	-	-
FM 1625 2 OF 5	16	-	-	-
FM 1625 3 OF 5	-	-	-	-
FM 1625 4 OF 5	-	2	10	1
FM 1625 5 OF 5	-	-	-	-
SIGNING REMOVALS	-	-	-	-
TOTAL	16	2	10	1

TRAFFIC CONTROL QUANTITIES

TXDOT SPECS		DESCRIPTION	UNIT	QUANTITY
ITEM NO.	DESC. CODE			
502	6001	BARRICADES, SIGNS, AND TRAFFIC HANDLING	MO	3
6001	6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4
6185	6002	TMA (STATIONARY)	EA	2
6185	6005	TMA (MOBILE OPERATION)	DAY	3

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

PAVEMENT MARKING AND SIGNING QUANTITIES

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		18

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

SUMMARY OF SMALL SIGNS

PMKS PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
1	1	R3-7R	RIGHT LANE MUST TURN RIGHT	36"X36"	X		10BWG	1	SA	P		
	2	D21-TR	CREEDMOOR RD (→)	84"x12"	X		10BWG	1	SA	T		
	3	R3-7R	RIGHT LANE MUST TURN RIGHT	36"X36"	X		10BWG	1	SA	P		
2	1	I-3	North Fork Dry Creek	48"X18"	X		10BWG	1	SA	T		
	2	D3-2	William Cannon Dr NEXT SIGNAL	96"X30"	X		S80	1	SA	T	2EXT	
	3	I-3	North Fork Dry Creek	48"X18"	X		10BWG	1	SA	T		

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
4-16	DIST	COUNTY		SHEET NO.
8-16	14	TRAVIS		19

18

DATE: 1/21/2021 10:27:05 AM
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SUMMARY OF SMALL SIGNS

PMKS PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	D1-2	MCKENZIE RD(←)/FM 1625(→)	102"X30"	X		S80	1	SA	T	2EXT	
2	1	W1-2	CURVE WARNING(LEFT)	30"X30"	X		10BWG	1	SA	T		
		W13-1	45 MPH	18"X18"	X							
3	1	D1-2	FM 1625(←)/MCKENZIE RD(→)	102"X30"	X		S80	1	SA	T		
4	1	W2-2R	INTERSECTION WARNING(RIGHT)	30"X30"	X		10BWG	1	SA	T		
	2	D1-2	(←) AUSTIN/LOCKHART(→)	84"X30"	X		S80	1	SA	T		
	3	R3-8MR	ADVANCE INTERSECTION LANE CONTROL(LT,R)	30"X30"	X		10BWG	1	SA	T		
	4	M3-3	SOUTH	24"X12"	X		10BWG	1	SA	P		
		M1-6F	FM 1625	24"X24"	X							
	5	D3-1G	FM 1625	42"X12"	X		10BWG	1	SA	T		
		D3-1G	FINIAL DR	36"X12"	X							
		R1-1	STOP	30"X30"	X							
	6	M1-6F	FM 1625	24"X24"	X		10BWG	1	SA	P		
		M6-4	DIRECTIONAL ARROW (↔)	21"X15"	X							
	7	M2-1	JUNCTION	21"X15"	X		10BWG	1	SA	P		
		M1-4	HWY 183	30"X24"	X							
	8	R3-7R	RIGHT LANE MUST TURN RIGHT	36"X36"	X		10BWG	1	SA	P		
	9	W3-3	SIGNAL AHEAD(ROADSIDE FLASHING BEACON)	30"X30"	X		10BWG	1	SA	T	SPRFBA(1)-13	
5	1	W2-2R	INTERSECTION WARNING(LEFT)	30"X30"	X		10BWG	1	SA	T		
	2	W1-2R	CURVE WARNING(RIGHT)	30"X30"	X		10BWG	1	SA	T		
		W13-1	45 MPH	18"X18"	X							
	3	R2-1	SPEED LIMIT (55 MPH)	24"X30"	X		10BWG	1	SA	P		
	4	D1-2	FINIAL DR (←)	60"X12"	X		10BWG	1	SA	T		
	5	D3-1G	FINIAL DR	36"X12"	X		MOUNT ON EXISTING POLE					
	6	W1-8R	CHEVRON	18"X24"	X		10BWG	1	SA	P		
		W1-8L	CHEVRON	18"X24"	X							
	7	W1-8R	CHEVRON	18"X24"	X		10BWG	1	SA	P		
		W1-8L	CHEVRON	18"X24"	X							
	8	W1-8R	CHEVRON	18"X24"	X		10BWG	1	SA	P		
		W1-8L	CHEVRON	18"X24"	X							
	9	W1-1L	TURN WARNING (LEFT)	30"X30"	X		10BWG	1	SA	T		
		W13-1	20 MPH	18"X18"	X							

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
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ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
4-16	DIST	COUNTY		SHEET NO.
8-16	14	TRAVIS		20

TB

DATE: 3/24/2021 3:31:14 PM
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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	PHASE 2	1 OF 3	SB US 183	113+19.35	3	BI			CONCRETE TRAFFIC BARRIER	24"	32"	30′	X								X	
2	PHASE 2	2 OF 3	SB US 183	120+75.79	3	BI			CONCRETE TRAFFIC BARRIER	24"	32"	30′	X								X	
3	PHASE 2	2 OF 3	SB US 183	123+11.35	3	BI			CONCRETE TRAFFIC BARRIER	24"	32"	30′	X								X	
4	PHASE 3	1 OF 3	NB US 183	116+38.64	3	BI			CONCRETE TRAFFIC BARRIER	24"	32"	30′		X	X	1					X	
3	PHASE 3	3 OF 3	NB US 183	138+52.61	3	BI			CONCRETE TRAFFIC BARRIER	24"	32"	30′		X	X	2					X	
												TOTALS	3	2	2							

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/rdwylse.htm

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

HDR Engineering, Inc.
(Texas Registered Engineering Firm No. F-754)
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Austin, Texas 78701

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY	
	14	TRAVIS	
	FEDERAL AID PROJECT		SHEET NO.
			21

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR, PEDESTRIAN, AND BICYCLE TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER. ALL TRAFFIC HANDLING SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

2. TRAFFIC CONTROL PHASING MUST BE COMPLETED IN THE SEQUENCE OF CONSTRUCTION AS SHOWN ON THE PLAN SET UNLESS DIRECTED OTHERWISE BY THE ENGINEER AND APPROVED BY THE COUNTY.

3. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THE PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

4. BEFORE THE COMMENCEMENT OF ANY PHASE, STAGE OR STEP OF CONSTRUCTION, INSTALL ADVANCE WARNING SIGNS, MODIFY EXISTING/PROPOSED SIGNS, INSTALL EROSION CONTROL MEASURES FOLLOWING THE REQUIREMENTS OF THE STORM WATER POLLUTION PREVENTION PLANS AND INSTALL TEMPORARY SIGNING AND BARRICADES, AND WORK ZONE PAVEMENT MARKINGS AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

5. DURING VARIOUS PHASES OF WORK, COVER EXISTING AND/OR NEWLY ERECTED SIGNS THAT MAY BE IN CONFLICT WITH APPLICABLE TRAFFIC CONTROL DEVICES DURING THAT PHASE.

6. AT NO TIME SHALL TWO CONSECUTIVE INTERSECTING ROADWAYS BE CLOSED AT ONE TIME DURING CONSTRUCTION, UNLESS APPROVED BY THE ENGINEER.

7. THE CONTRACTOR WILL NOTIFY THE ENGINEER IN WRITING OF IMPENDING/UPCOMING LANE CLOSURES FIVE WORKING DAYS IN ADVANCE OF LANE CLOSURES.

8. PROVIDE UNIFORMED OFF DUTY POLICE OFFICERS FOR LANE CLOSURES AS DIRECTED BY THE ENGINEER.

9. WORK HOURS ARE FROM 9AM TO 4PM MONDAY TO FRIDAY AND 7AM TO 7PM ON WEEKENDS.

10. CONTRACTOR WILL USE TAPE AND/OR BUTTONS FOR WORK ZONE PAVEMENT MARKINGS TO MINIMIZE PAVEMENT SCARRING OF PAVEMENT OUTSIDE THE LIMITS OF MILL AND OVERLAY. CONTRACTOR WILL MAINTAIN WORK ZONE PAVEMENT MARKINGS IN PROPER CONDITION THROUGHOUT THE DURATION OF CONSTRUCTION.

SAFETY

1. THE CONTRACTOR WILL PROVIDE, CONSTRUCT, AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC(1-12)-14. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARDS SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS."

2. BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS REQUIRED BY FIELD CONDITIONS, TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES.

3. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL.

4. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.

5. 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.

6. 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 RE- COMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

GENERAL

1. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES AND SW3P ITEMS AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. PROVIDE 7 DAY ADVANCE NOTICE OF ANY WORK THROUGH THE USE OF PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS). THE ENGINEER MUST APPROVE ANY MODIFICATIONS TO THE PCMS.

2. CONTRACTOR TO STAKE ALL DRILLED SHAFT LOCATIONS TO FACILITATE COORDINATION WITH UTILITIES.

3. CONTRACTOR TO POTHOLE ALL DRILLED SHAFT LOCATIONS PRIOR TO DRILLING.

US 183 PHASE 1 (CULVERT INSTALLATION)

1. US 183 AND FM 1625/MCKENZIE ROAD PROPOSED OR TEMPORARY SIGNAL SHOULD BE IN OPERATION PRIOR TO INITIATION OF THIS PHASE.

2. US 183 AND WILLIAM CANNON DR PROPOSED SIGNAL SHOULD BE IN OPERATION PRIOR TO INITIATION OF THIS PHASE.

3. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.

4. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.

5. CLOSE SHOULDERS ALONG US 183 ALONG WORK ZONE.

6. BORE NEW CULVERTS UNDER ROADWAY AND EXTEND EXISTING CULVERTS.

7. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

US 183 PHASE 2 (SB ROADWAY WIDENING)

1. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.

2. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.

3. CLOSE SOUTHBOUND SHOULDER ALONG US 183 ALONG WORK ZONE.

4. CONSTRUCT SOUTHBOUND RIGHT TURN LANE AND CONSTRUCT NEW PAVEMENT ALONG WESTERN SIDE OF US 183.

5. REOPEN SOUTHBOUND US 183 SHOULDER AND RIGHT-TURN LANE.

6. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

US 183 PHASE 3 (NB ROADWAY WIDENING)

1. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.

2. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.

3. CLOSE NORTHBOUND SHOULDER ALONG US 183 ALONG WORK ZONE.

4. CONSTRUCT NEW PAVEMENT ALONG EASTERN SIDE OF US 183.

5. INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNING ON US 183 PRIOR TO THE COMPLETION OF THIS PHASE. REMOVE ALL CONFLICTING PAVEMENT MARKINGS TO MATCH CONDITIONS SHOWN IN THIS SET.

6. INSTALL PROPOSED HEADS AND EQUIPMENT FOR THE FINAL CONFIGURATION OF US 183 AND WILLIAM CANNON DRIVE SIGNAL. SEE SIGNAL PLANS IN THIS SET.

7. OPEN US 183 TO FINAL CONFIGURATION.

8. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

01/22/2020

US 183

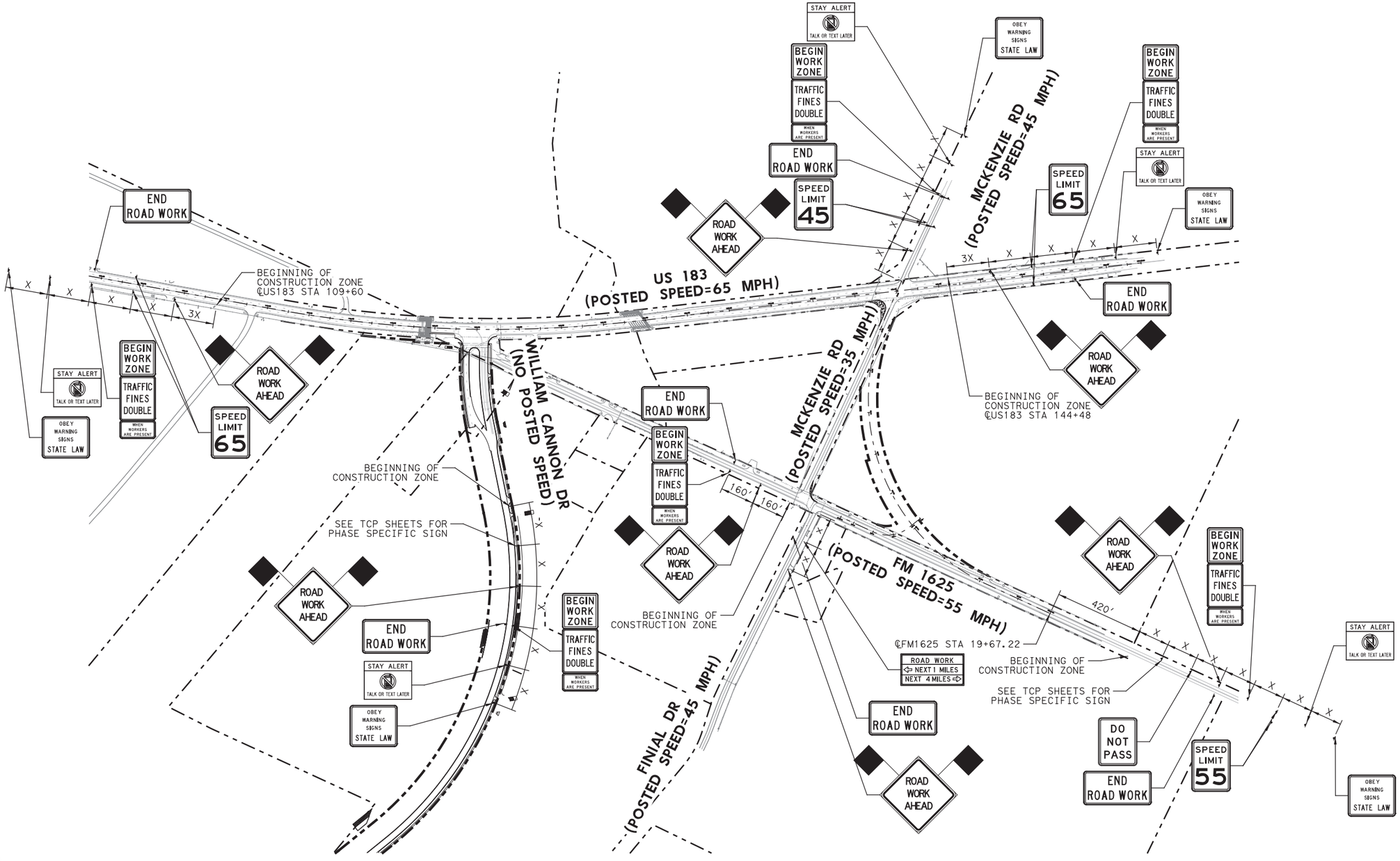
TRAFFIC CONTROL SEQUENCE OF WORK

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		22

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



NOTES

1. ALL ADVANCED WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION.
2. REFER TO BC(2)-14 AND TCP STANDARDS FOR X, DISTANCE BETWEEN SIGNS AND ALL RELATED DETAILS.
3. FM 1625 NORTH OF MCKENZIE RD IS PERMANENTLY CLOSED DUE TO CONSTRUCTION OF WILLIAM CANNON DR. THIS SECTION OF ROADWAY IS TO PROVIDE ACCESS FOR PROPERTY OWNERS. ADVANCE WARNING SIGNS ARE PLACED AT 160' SPACING FROM CONSTRUCTION ZONE DUE TO FUTURE DEMOLITION OF BRIDGE NORTH OF MCKENZIE RD.
4. REFER TO TCP PLANS FOR SIGNS WITHIN WORK ZONE.

0 250 500
SCALE IN FEET

LEGEND

EXIST. RIGHT OF WAY

PROP. RIGHT OF WAY

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

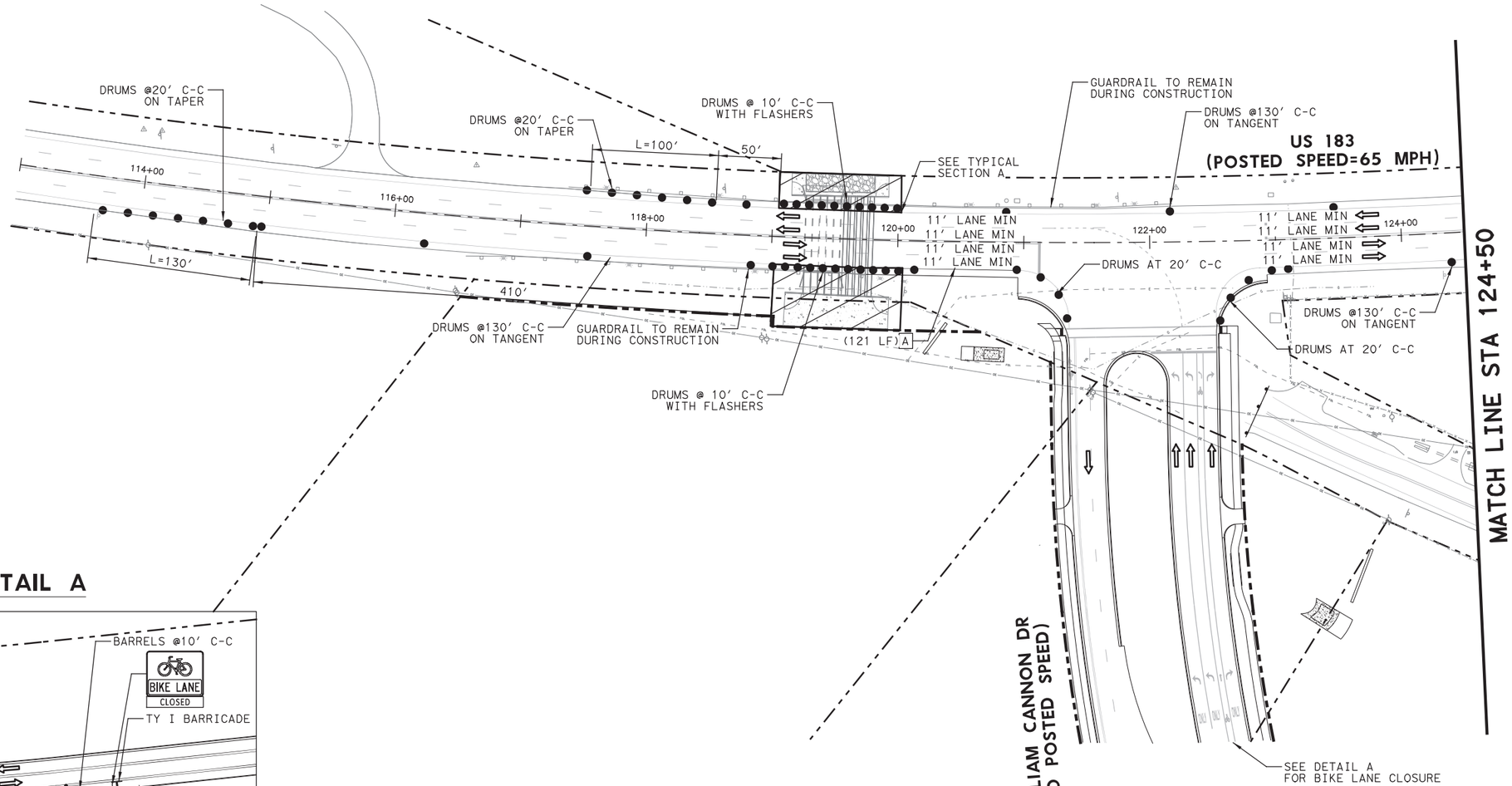
ADVANCED WARNING SIGN PLACEMENT

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		23

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



0 50 100
SCALE IN FEET

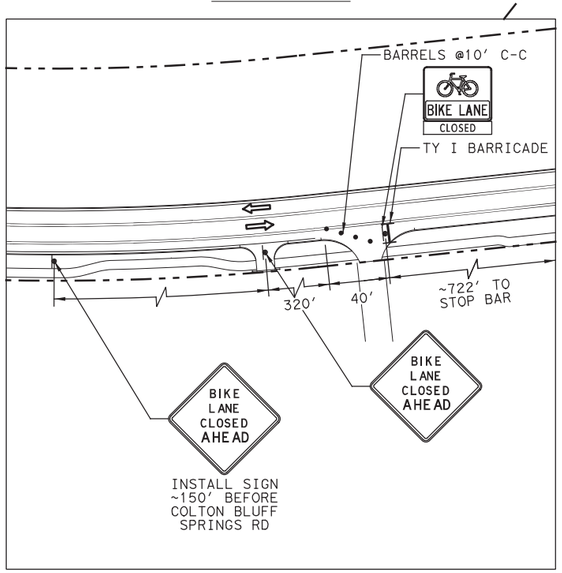
LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- A WK ZN PAV MRK REMOV(W)4"(SLD)
- B WK ZN PAV MRK REMOV(W)8"(SLD)
- C WK ZN PAV MRK REMOV(W)24"(SLD)
- D WK ZN PAV MRK REMOV(W)(ARROW)
- E WK ZN PAV MRK REMOV(W)(WORD)
- F WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. BORE NEW CULVERTS UNDER ROADWAY AND EXTEND EXISTING CULVERTS.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

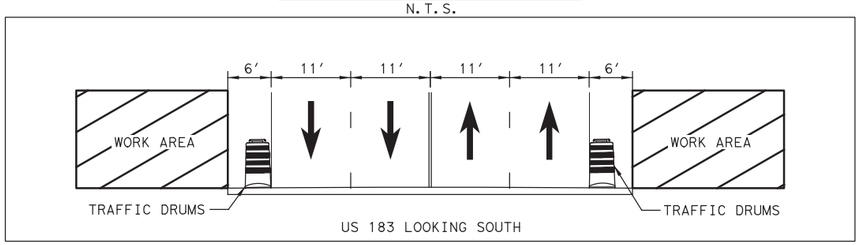
DETAIL A



INSTALL SIGN ~150′ BEFORE COLTON BLUFF SPRINGS RD

TYPICAL SECTION A

N.T.S.



US 183 LOOKING SOUTH

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 1 (CULVERT INSTALLATION)

SHEET 1 OF 2

HDR Engineering, Inc.
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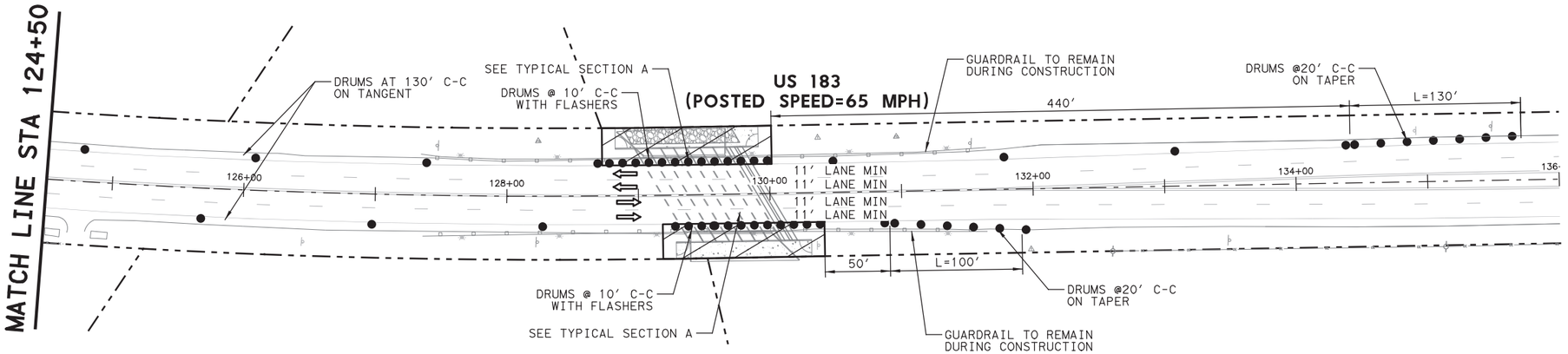
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			24

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



0 50 100
SCALE IN FEET

LEGEND

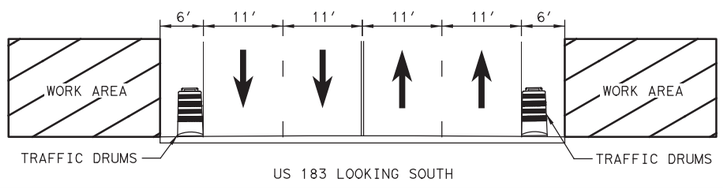
WORK ZONE
TRAFFIC CONTROL SIGN
TYPE III BARRICADE
TRAFFIC DRUMS
TRAVEL DIRECTION
EXIST ROW
TEMPORARY PAVEMENT
A WK ZN PAV MRK REMOV(W)4"(SLD)
B WK ZN PAV MRK REMOV(W)8"(SLD)
C WK ZN PAV MRK REMOV(W)24"(SLD)
D WK ZN PAV MRK REMOV(W)(ARROW)
E WK ZN PAV MRK REMOV(W)(WORD)
F WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. BORE NEW CULVERTS UNDER ROADWAY AND EXTEND EXISTING CULVERTS.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

N.T.S.



US 183 LOOKING SOUTH

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Jessie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 1

(CULVERT INSTALLATION)

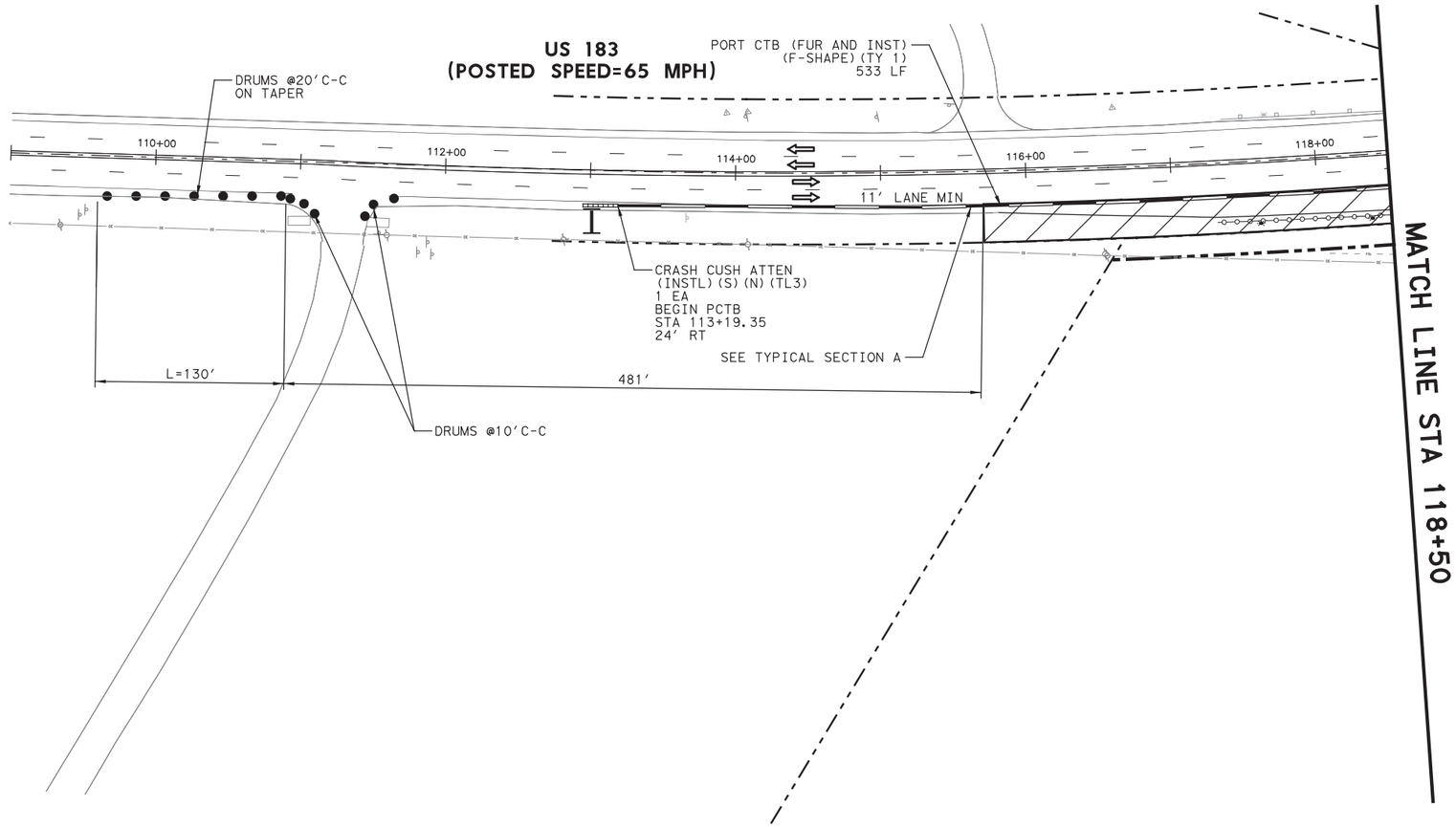
SHEET 2 OF 2

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

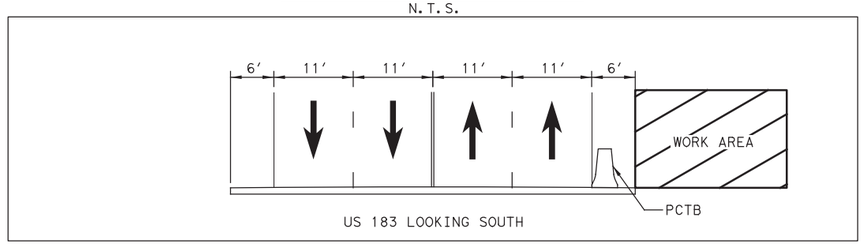
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			25

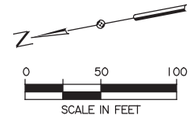
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



TYPICAL SECTION A

N.T.S.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- A WK ZN PAV MRK REMOV(W)4"(SLD)
- B WK ZN PAV MRK REMOV(W)8"(SLD)
- C WK ZN PAV MRK REMOV(W)24"(SLD)
- D WK ZN PAV MRK REMOV(W)(ARROW)
- E WK ZN PAV MRK REMOV(W)(WORD)
- F WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN
PHASE 2
(SB ROADWAY WIDENING)

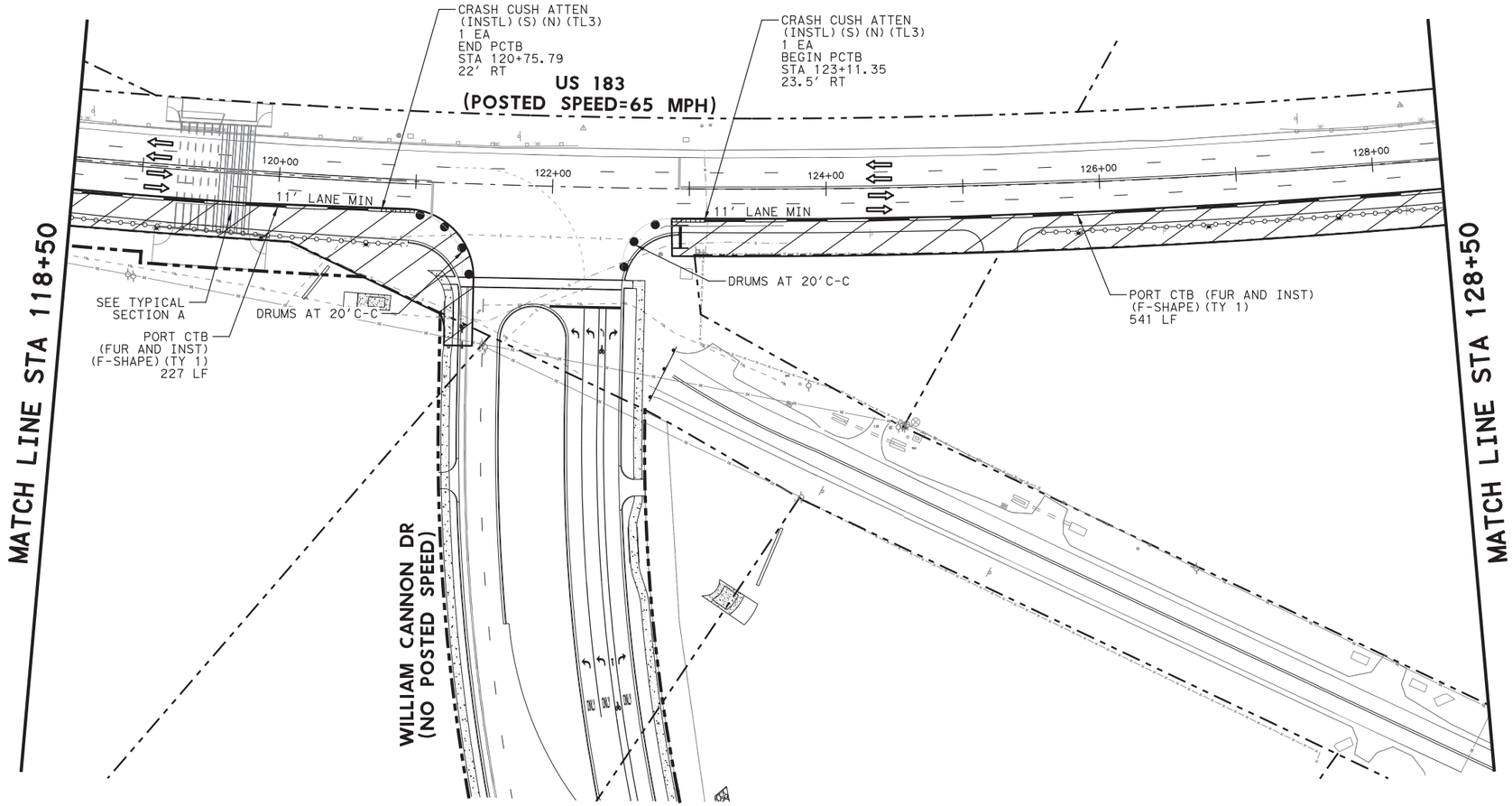
SHEET 1 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

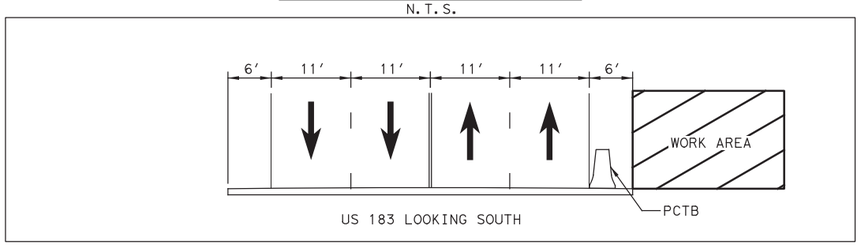
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			26

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



TYPICAL SECTION A

N.T.S.



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SCALE IN FEET

LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- A WK ZN PAV MRK REMOV(W)4"(SLD)
- B WK ZN PAV MRK REMOV(W)8"(SLD)
- C WK ZN PAV MRK REMOV(W)24"(SLD)
- D WK ZN PAV MRK REMOV(W)(ARROW)
- E WK ZN PAV MRK REMOV(W)(WORD)
- F WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
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4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 2

(SB ROADWAY WIDENING)

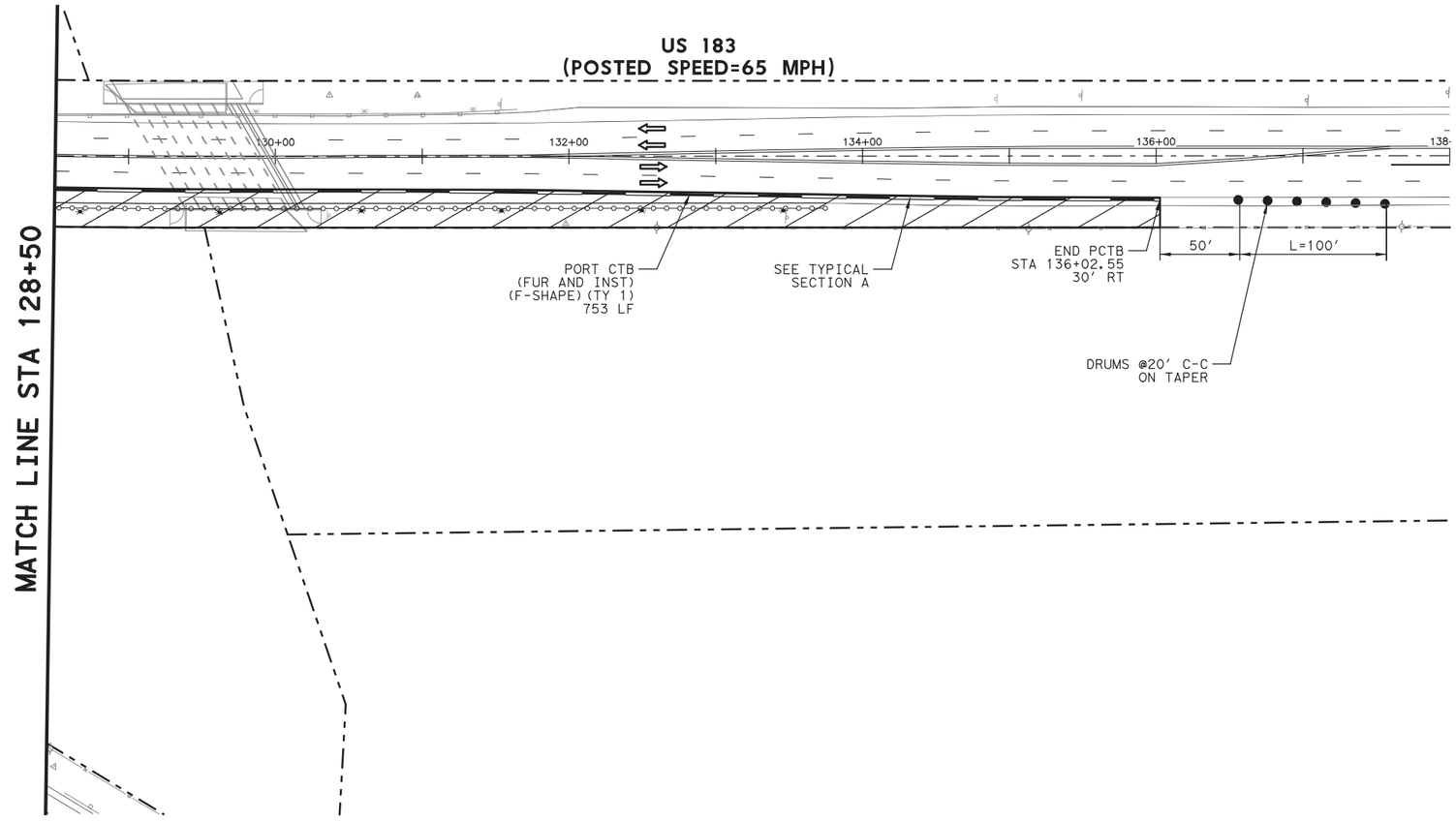
SHEET 2 OF 3

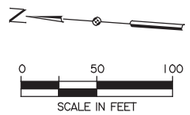
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			27

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- [A] WK ZN PAV MRK REMOV(W)4"(SLD)
- [B] WK ZN PAV MRK REMOV(W)8"(SLD)
- [C] WK ZN PAV MRK REMOV(W)24"(SLD)
- [D] WK ZN PAV MRK REMOV(W)(ARROW)
- [E] WK ZN PAV MRK REMOV(W)(WORD)
- [F] WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

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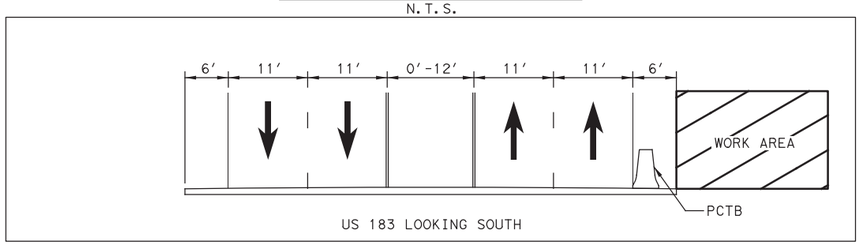
4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

N.T.S.



01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 2

(SB ROADWAY WIDENING)

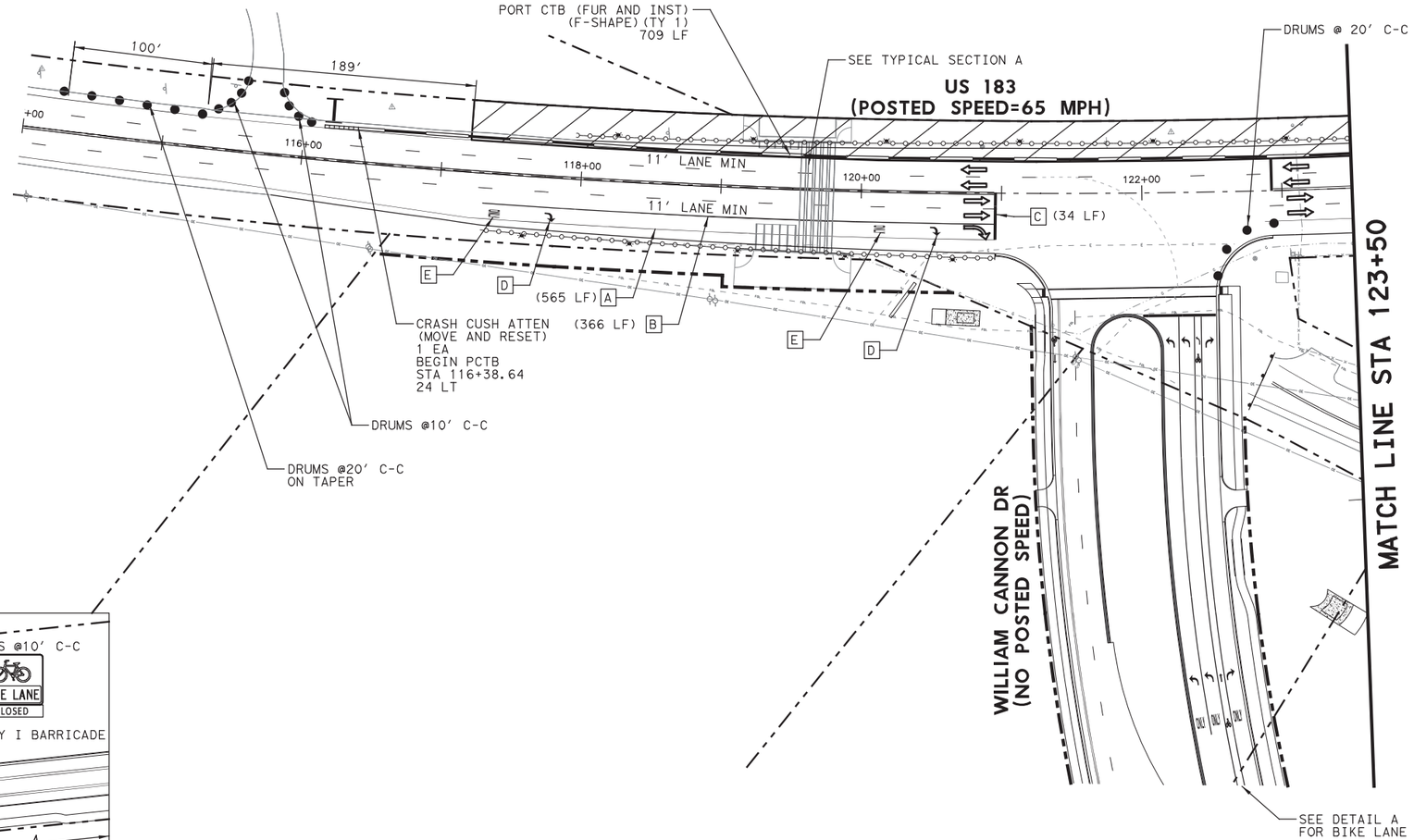
SHEET 3 OF 3

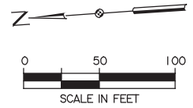
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		28

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- A WK ZN PAV MRK REMOV(W)4"(SLD)
- B WK ZN PAV MRK REMOV(W)8"(SLD)
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- D WK ZN PAV MRK REMOV(W)(ARROW)
- E WK ZN PAV MRK REMOV(W)(WORD)
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NOTES:

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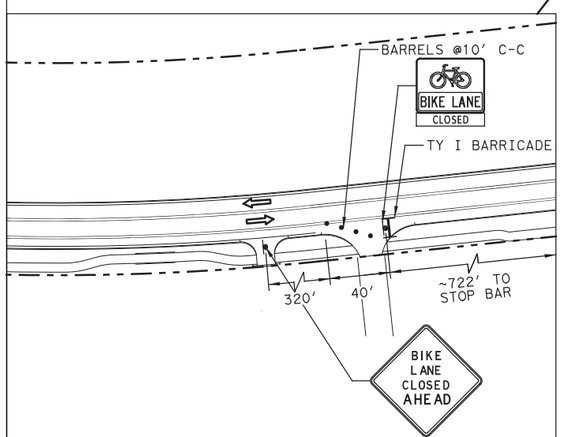
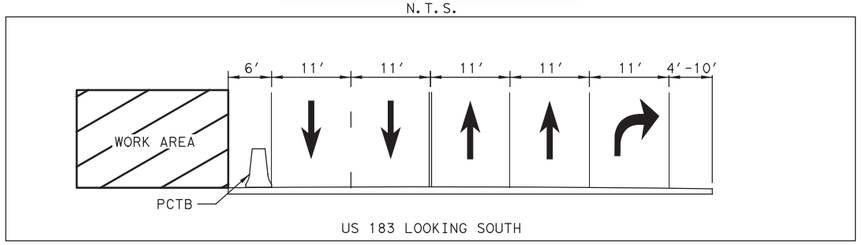
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

DETAIL A



TYPICAL SECTION A

N.T.S.



01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 3

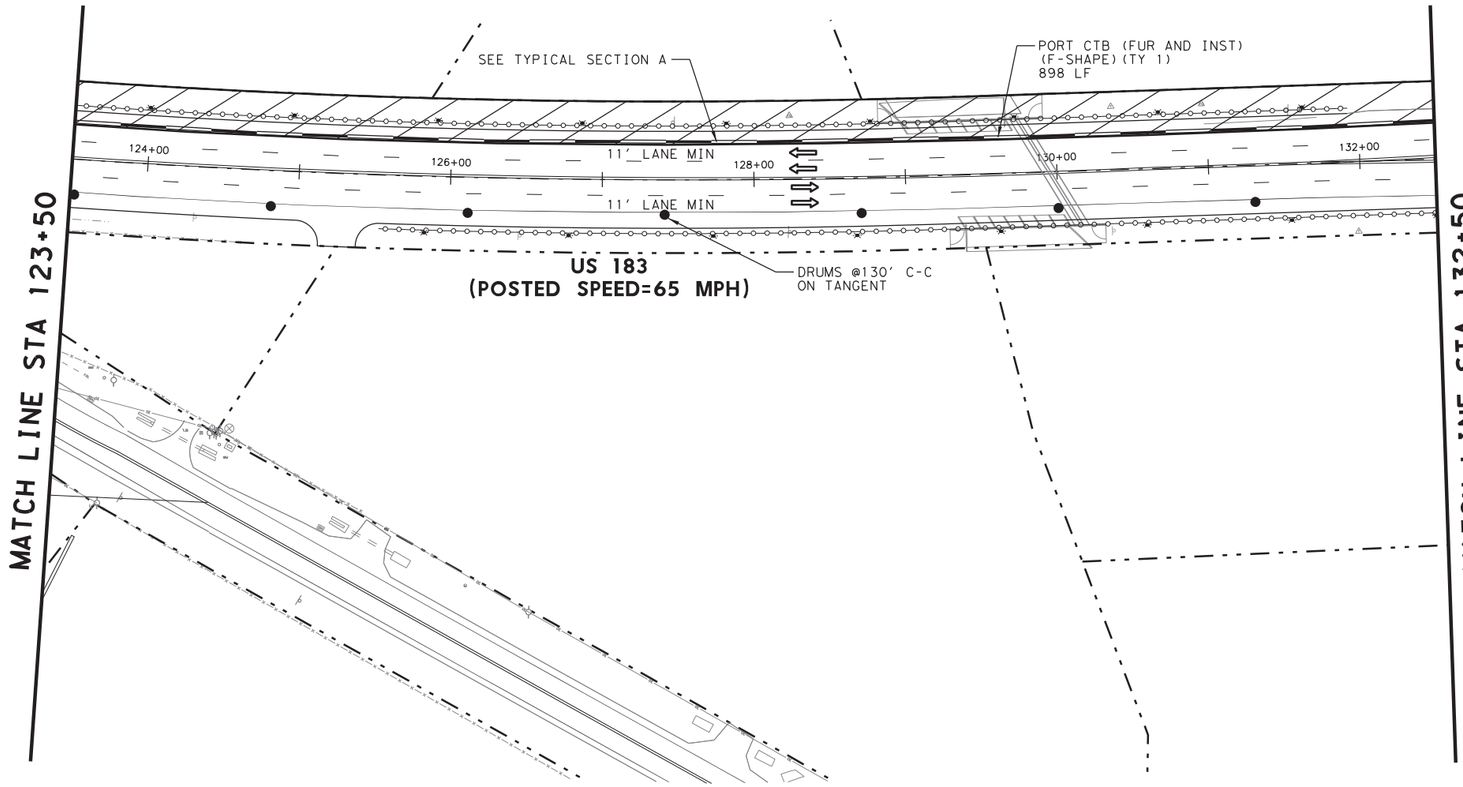
(NB ROADWAY WIDENING)

SHEET 1 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

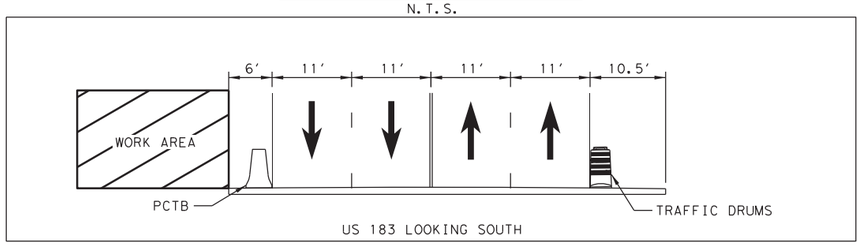
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			29

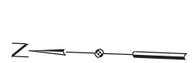
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



TYPICAL SECTION A

N. T. S.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
- [A] WK ZN PAV MRK REMOV(W)4"(SLD)
- [B] WK ZN PAV MRK REMOV(W)8"(SLD)
- [C] WK ZN PAV MRK REMOV(W)24"(SLD)
- [D] WK ZN PAV MRK REMOV(W)(ARROW)
- [E] WK ZN PAV MRK REMOV(W)(WORD)
- [F] WK ZN PAV MRK REMOV(Y)4"(SLD)

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4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

TRAFFIC CONTROL PLAN PHASE 3

(NB ROADWAY WIDENING)

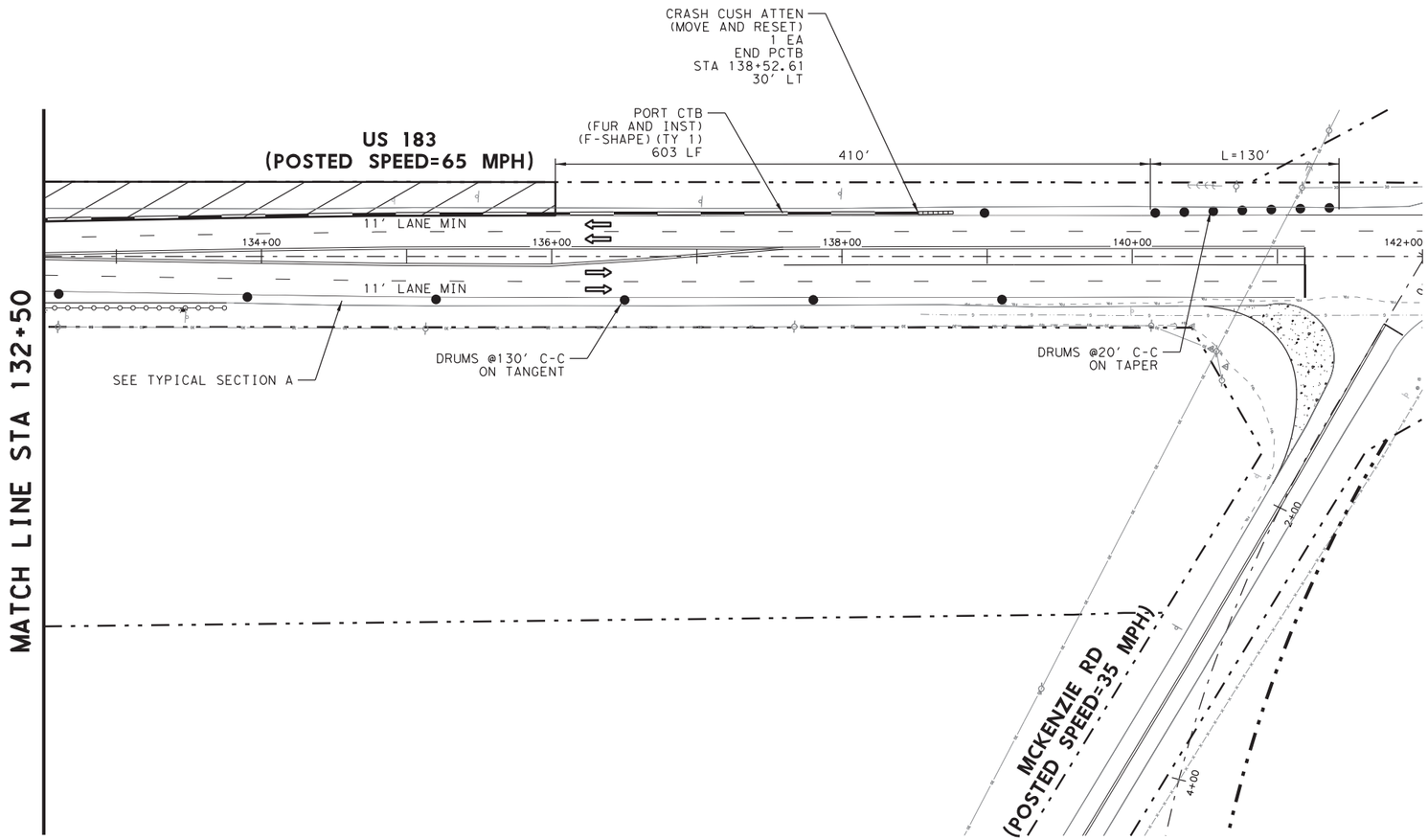
SHEET 2 OF 3

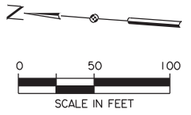
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			30

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- PORTABLE CONCRETE TRAFFIC BARRIER
- ATTENUATOR
- TRAVEL DIRECTION
- EXIST ROW
- TEMPORARY PAVEMENT
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- [B] WK ZN PAV MRK REMOV(W)8"(SLD)
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- [E] WK ZN PAV MRK REMOV(W)(WORD)
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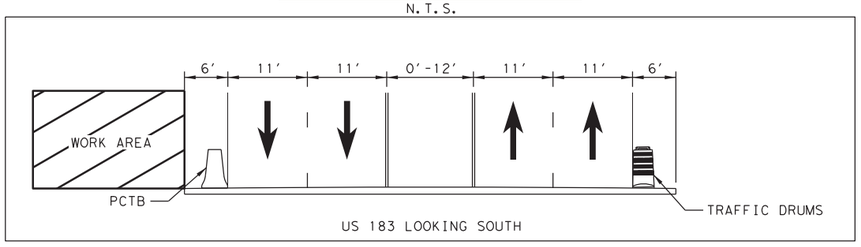
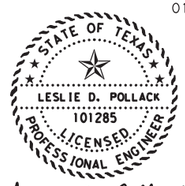
4. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

N.T.S.



01/22/2020



US 183

TRAFFIC CONTROL PLAN PHASE 3

(NB ROADWAY WIDENING)

SHEET 3 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			31

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR, PEDESTRIAN, AND BICYCLE TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER. ALL TRAFFIC HANDLING SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. TRAFFIC CONTROL PHASING MUST BE COMPLETED IN THE SEQUENCE OF CONSTRUCTION AS SHOWN ON THE PLAN SET UNLESS DIRECTED OTHERWISE BY THE ENGINEER AND APPROVED BY THE COUNTY.
3. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THE PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
4. BEFORE THE COMMENCEMENT OF ANY PHASE, STAGE OR STEP OF CONSTRUCTION, INSTALL ADVANCE WARNING SIGNS, MODIFY EXISTING/PROPOSED SIGNS, INSTALL EROSION CONTROL MEASURES FOLLOWING THE REQUIREMENTS OF THE STORM WATER POLLUTION PREVENTION PLANS AND INSTALL TEMPORARY SIGNING AND BARRICADES, AND WORK ZONE PAVEMENT MARKINGS AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
5. DURING VARIOUS PHASES OF WORK, COVER EXISTING AND/OR NEWLY ERECTED SIGNS THAT MAY BE IN CONFLICT WITH APPLICABLE TRAFFIC CONTROL DEVICES DURING THAT PHASE.
6. AT NO TIME SHALL TWO CONSECUTIVE INTERSECTING ROADWAYS BE CLOSED AT ONE TIME DURING CONSTRUCTION, UNLESS APPROVED BY THE ENGINEER.
7. THE CONTRACTOR WILL NOTIFY THE ENGINEER IN WRITING OF IMPENDING/UPCOMING LANE CLOSURES FIVE WORKING DAYS IN ADVANCE OF LANE CLOSURES.
8. PROVIDE UNIFORMED OFF DUTY POLICE OFFICERS FOR LANE CLOSURES AS DIRECTED BY THE ENGINEER.
9. A TOTAL OF FOUR PORTABLE CHANGEABLE MESSAGE DEVICES (PCMS) WILL BE REQUIRED FOR THIS PROJECT. RELOCATION OF PCMS IN ADVANCE OF EACH PHASE IS INCIDENTAL AND NOT PAID FOR SEPARATELY.
10. WORK HOURS ARE FROM 9AM TO 4PM MONDAY TO FRIDAY AND 7AM TO 7PM ON WEEKENDS.
11. CONTRACTOR WILL USE TAPE AND/OR BUTTONS FOR WORK ZONE PAVEMENT MARKINGS TO MINIMIZE PAVEMENT SCARRING OF PAVEMENT OUTSIDE THE LIMITS OF MILL AND OVERLAY. CONTRACTOR WILL MAINTAIN WORK ZONE PAVEMENT MARKINGS IN PROPER CONDITION THROUGHOUT THE DURATION OF CONSTRUCTION.

SAFETY

1. THE CONTRACTOR WILL PROVIDE, CONSTRUCT, AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC(1-12)-14. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARDS SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS."
2. BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS REQUIRED BY FIELD CONDITIONS, TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES.
3. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL.
4. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.
5. 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.
6. 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 RE- COMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

GENERAL

1. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES AND SW3P ITEMS AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. PROVIDE 7 DAY ADVANCE NOTICE OF ANY WORK THROUGH THE USE OF PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS). THE ENGINEER MUST APPROVE ANY MODIFICATIONS TO THE PCMS.
2. CONTRACTOR TO STAKE ALL DRILLED SHAFT LOCATIONS TO FACILITATE COORDINATION WITH UTILITIES.
3. CONTRACTOR TO POTHOLE ALL DRILLED SHAFT LOCATIONS PRIOR TO DRILLING.
4. CONTRACTOR TO USE ASPHALT TO MINIMIZE DURATION OF ROAD CLOSURES ON FM 1625.
5. THIS PLAN SET ASSUMES WILLIAM CANNON DRIVE CONSTRUCTION BETWEEN COLTON BLUFF SPRINGS ROAD AND US 183 IS COMPLETE. PLANS REQUIRE ADJUSTMENTS IF WILLIAM CANNON IS NOT COMPLETE. CONTACT ENGINEER FOR UPDATE.

PHASE 1 (FM 1625 CONSTRUCTION)

1. US 183 WIDENING (CSJ 0152-01-080) SHALL BE COMPLETE BEFORE BEGINNING FM 1625 PHASE 1 OF CONSTRUCTION.
2. INSTALL PERMANENT TRAFFIC SIGNALS PRIOR TO PHASE 1 OF CONSTRUCTION.
3. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.
4. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, AND APPLICABLE TCP STANDARDS.
5. US 183 AND FM 1625/ MCKENZIE ROAD PROPOSED SIGNAL SHOULD BE COMPLETE PRIOR TO INITIATION OF THIS PHASE.
6. CLOSE SOUTHBOUND SHOULDER ALONG US 183.
7. INSTALL PHASE 1 DETOUR SIGNS.
8. SHIFT TRAFFIC NORTH ON MCKENZIE RD.
9. SHIFT TRAFFIC WEST ON FM 1625.
10. CONSTRUCT NEW ALIGNMENT FOR FM 1625 OUTSIDE OF THE EXISTING ROADWAY.
11. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

PHASE 2 (MCKENZIE RD REMOVAL)

1. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.
2. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. INSTALL PHASE 2 DETOUR SIGNS.
4. CLOSE MCKENZIE RD BETWEEN FM 1625 AND US 183.
5. BARRICADE NEW FM 1625 ALIGNMENT TO PREVENT TRAFFIC ON NEW ROADWAY.
6. DEMOLISH MCKENZIE ROAD BETWEEN FM 1625 AND US 183.
7. CONSTRUCT NEW TIE IN FOR FM 1625 AT US 183.
8. INSTALL PERMANENT PAVEMENT MARKINGS ON FM 1625.
9. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

PHASE 3 (FM 1625 TIE-IN CONSTRUCTION)

1. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.
2. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. INSTALL PHASE 3 DETOUR SIGNS.
4. CLOSE FM 1625 BETWEEN COLTON BLUFF SPRINGS RD AND NEW ALIGNMENT FOR FM 1625. SHIFT TRAFFIC ON TO NEW FM 1625 ALIGNMENT.
5. CONSTRUCT NEW TIE IN FROM NEW FM 1625 ALIGNMENT TO OLD FM 1625 ALIGNMENT.
6. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

PHASE 4 (FM 1625 TIE-IN CONSTRUCTION)

1. INSTALL SW3P ITEMS, SIGNS, AND BARRICADES AS SHOWN IN THE PLANS.
2. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TCP TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. INSTALL PHASE 4 DETOUR SIGNS.
4. CLOSE FM 1625 TO COMPLETE CONSTRUCTION OF NEW ALIGNMENT.
5. CONSTRUCT FINAL TIE IN FOR THE NEW FM 1625 ALIGNMENT.
6. UPON COMPLETION OF CONSTRUCTION IN THIS PHASE INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNS ALONG FM 1625.
7. SHIFT TRAFFIC ON TO NEW FM 1625 ALIGNMENT.
8. REMOVE AND RELOCATE SW3P ITEMS, SIGNS, AND BARRICADES.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

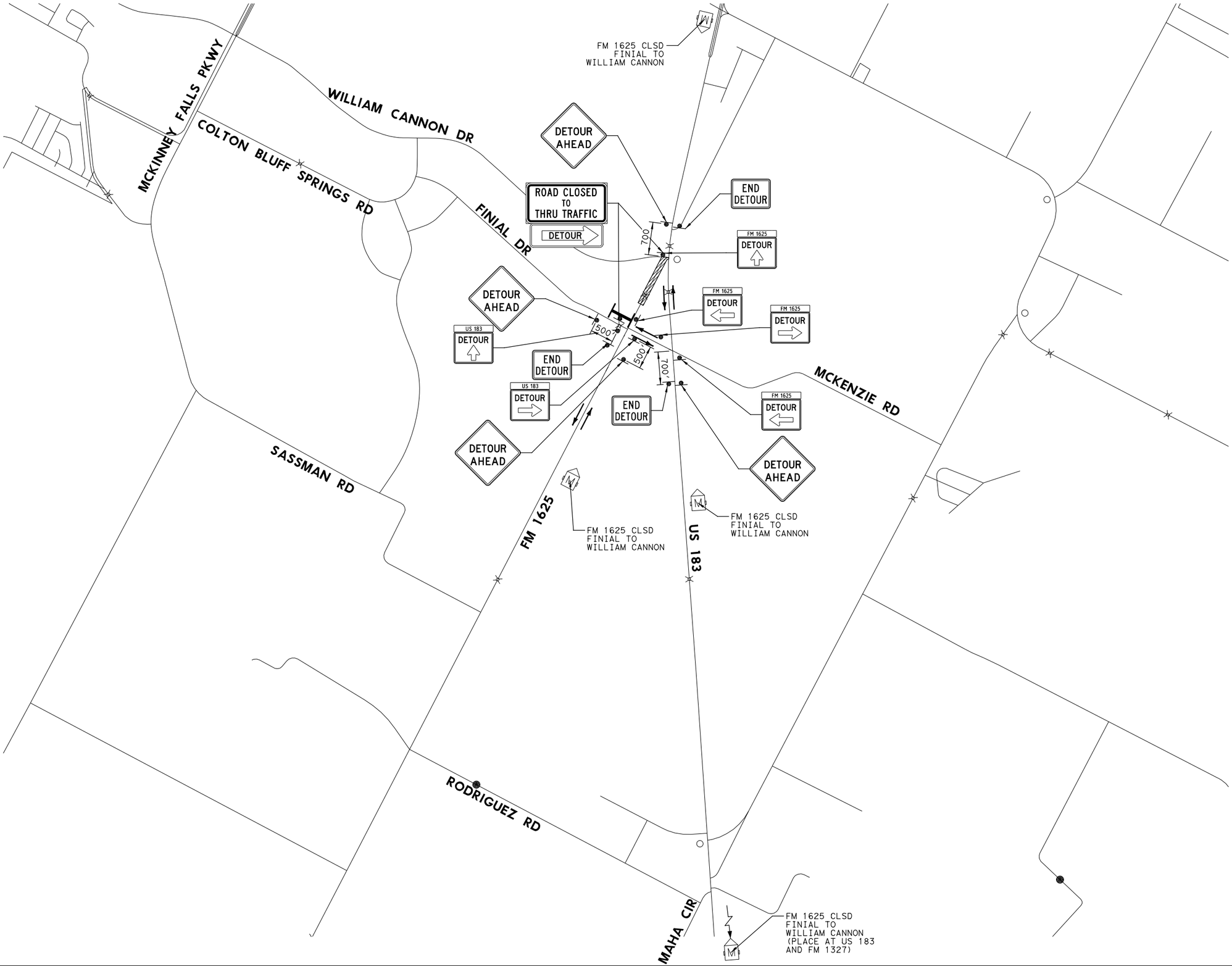
TRAFFIC CONTROL SEQUENCE OF WORK

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			32

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- TRAFFIC CONTROL SIGN
- FLAG MOUNTED ON SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- ROAD CLOSURE
- EXIST. BRIDGE

NOTE

1. FM 1625 PERMANENTLY CLOSED TO THROUGH TRAFFIC NORTH OF MCKENZIE ROAD DUE TO WILLIAM CANNON CONSTRUCTION.

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DETOUR MAP PHASE 1

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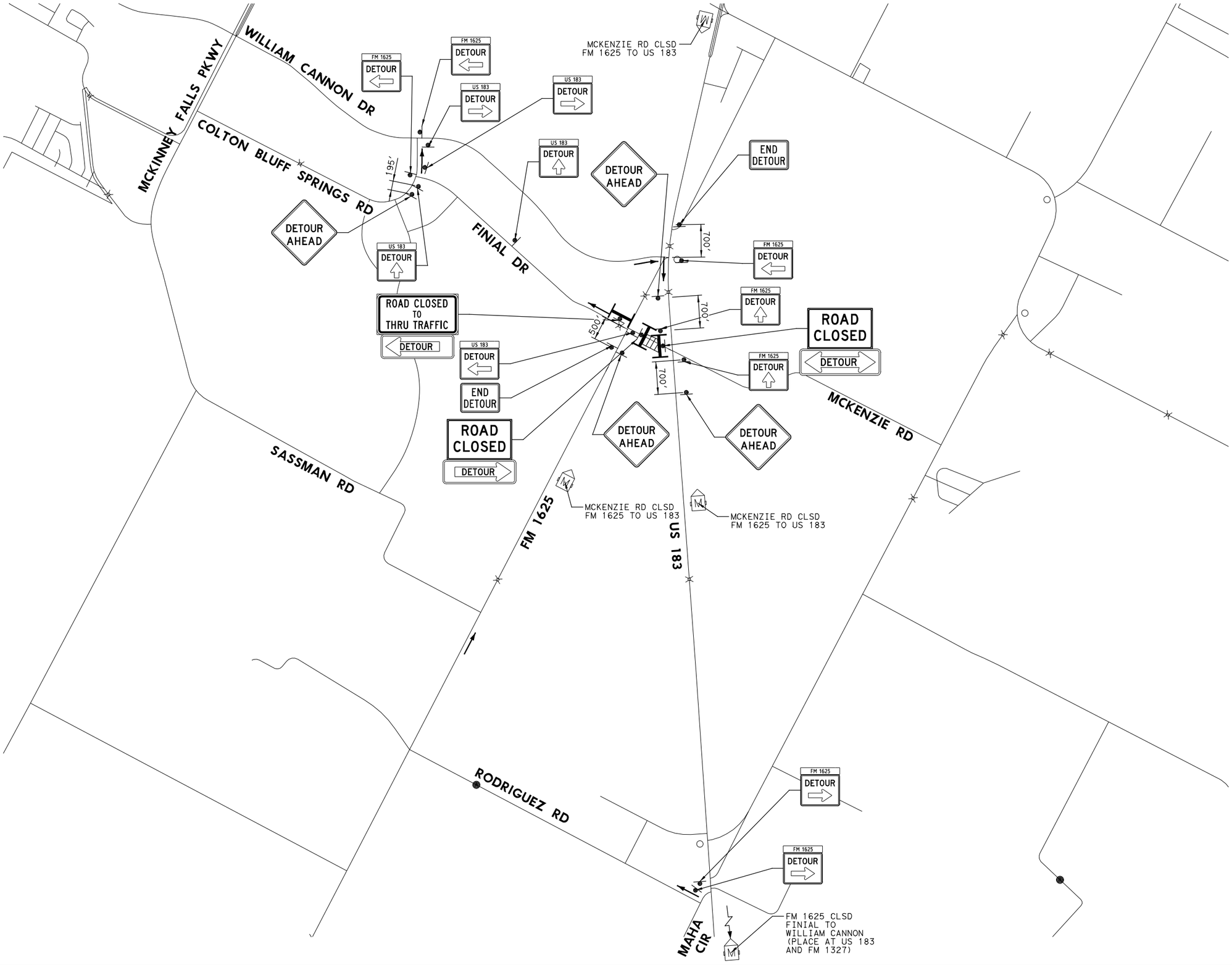
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			33

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- TRAFFIC CONTROL SIGN
- FLAG MOUNTED ON SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- ROAD CLOSURE

NOTE

1. FM 1625 PERMANENTLY CLOSED TO THROUGH TRAFFIC NORTH OF MCKENZIE ROAD DUE TO WILLIAM CANNON CONSTRUCTION.

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STATE OF TEXAS
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FM 1625

DETOUR MAP PHASE 2

HDR Engineering, Inc.
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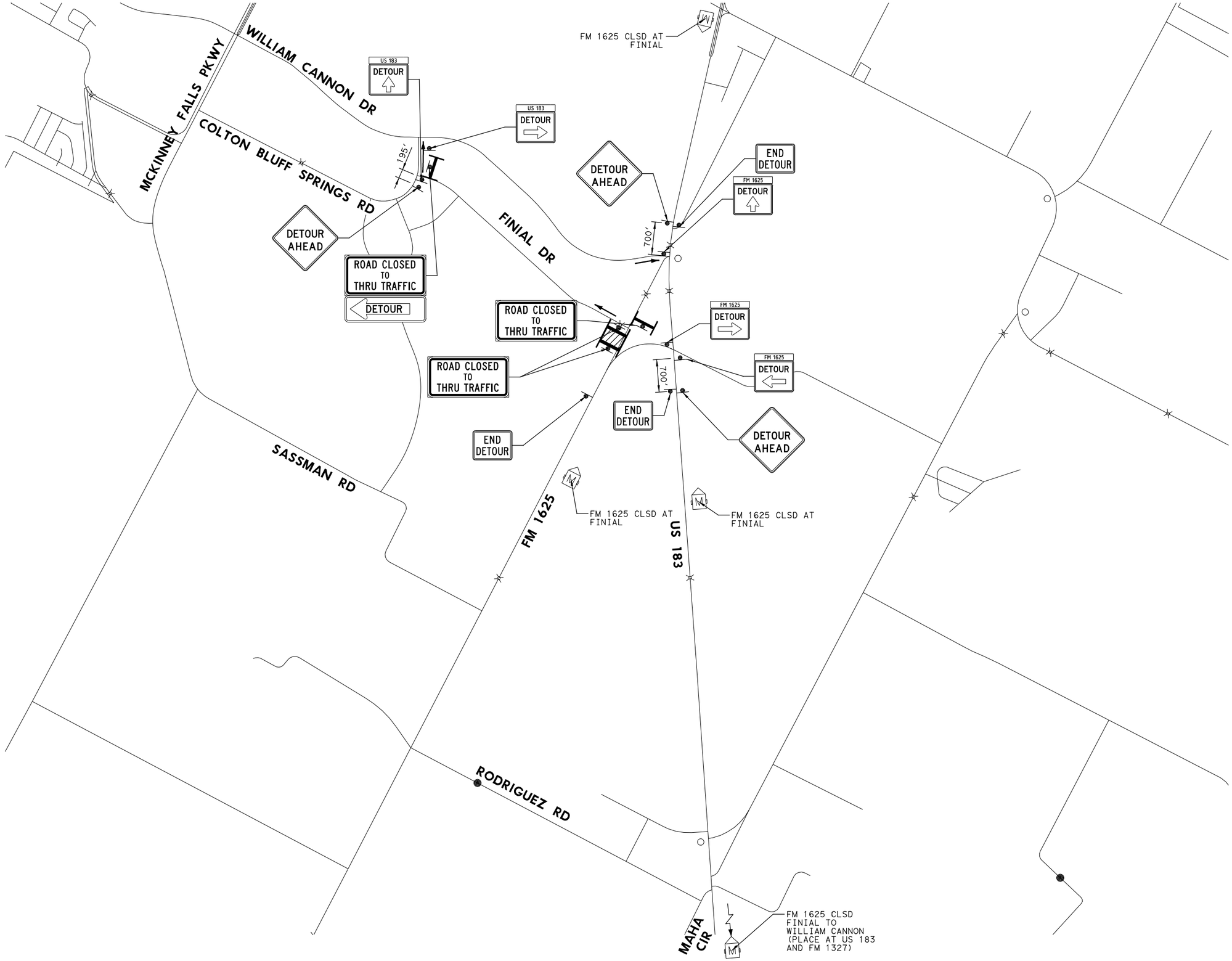
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			34

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



N

0 1000' 2000'

SCALE IN FEET

LEGEND

- TRAFFIC CONTROL SIGN
- FLAG MOUNTED ON SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- ROAD CLOSURE

NOTE

1. FM 1625 PERMANENTLY CLOSED TO THROUGH TRAFFIC NORTH OF MCKENZIE ROAD DUE TO WILLIAM CANNON CONSTRUCTION.

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STATE OF TEXAS
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FM 1625

DETOUR MAP PHASE 3

HDR Engineering, Inc.
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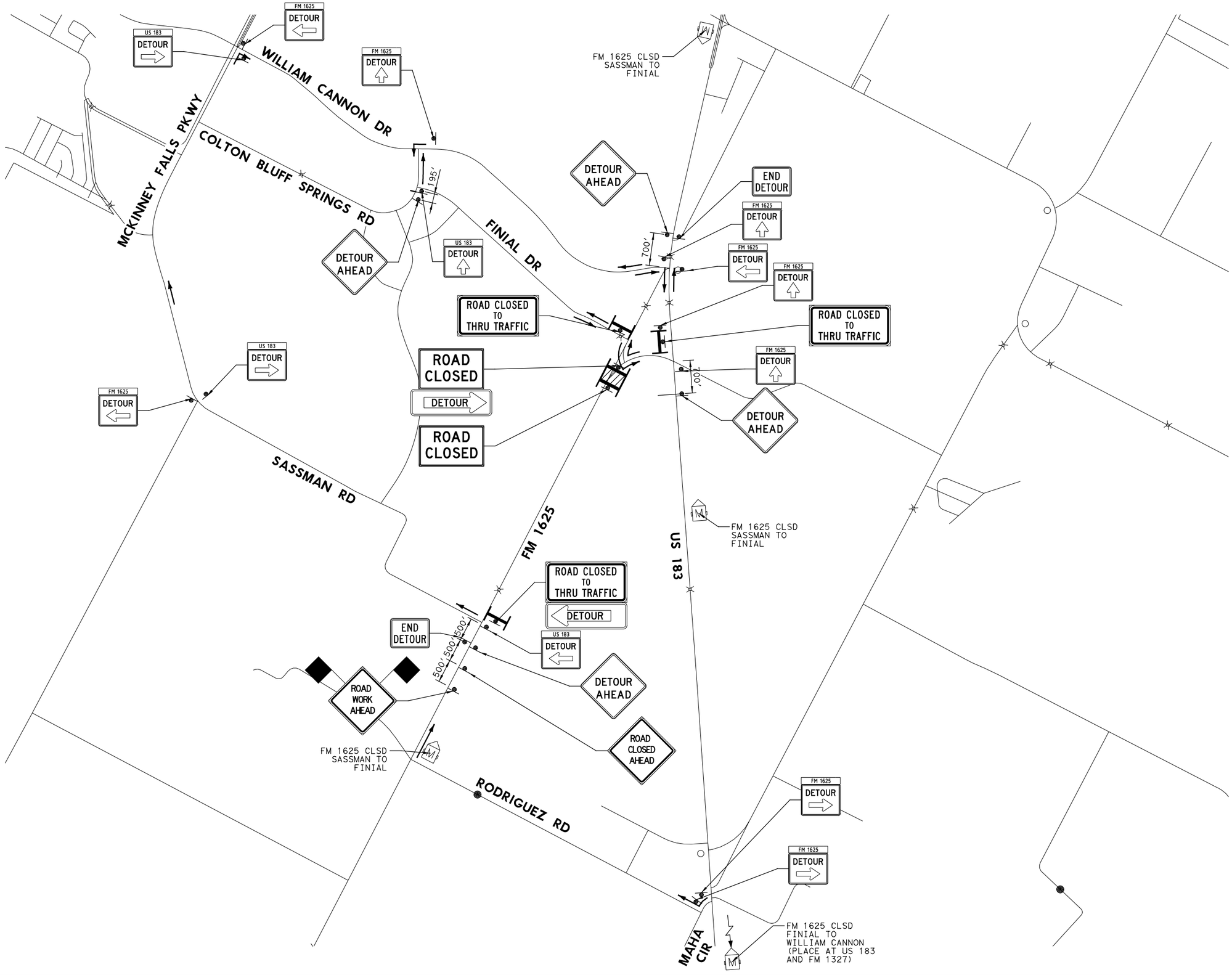
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			35

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



N

0 1000' 2000'

SCALE IN FEET

LEGEND

- TRAFFIC CONTROL SIGN
- FLAG MOUNTED ON SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- ROAD CLOSURE

NOTE

1. FM 1625 PERMANENTLY CLOSED TO THROUGH TRAFFIC NORTH OF MCKENZIE ROAD DUE TO WILLIAM CANNON CONSTRUCTION.

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STATE OF TEXAS
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FM 1625

DETOUR MAP PHASE 4

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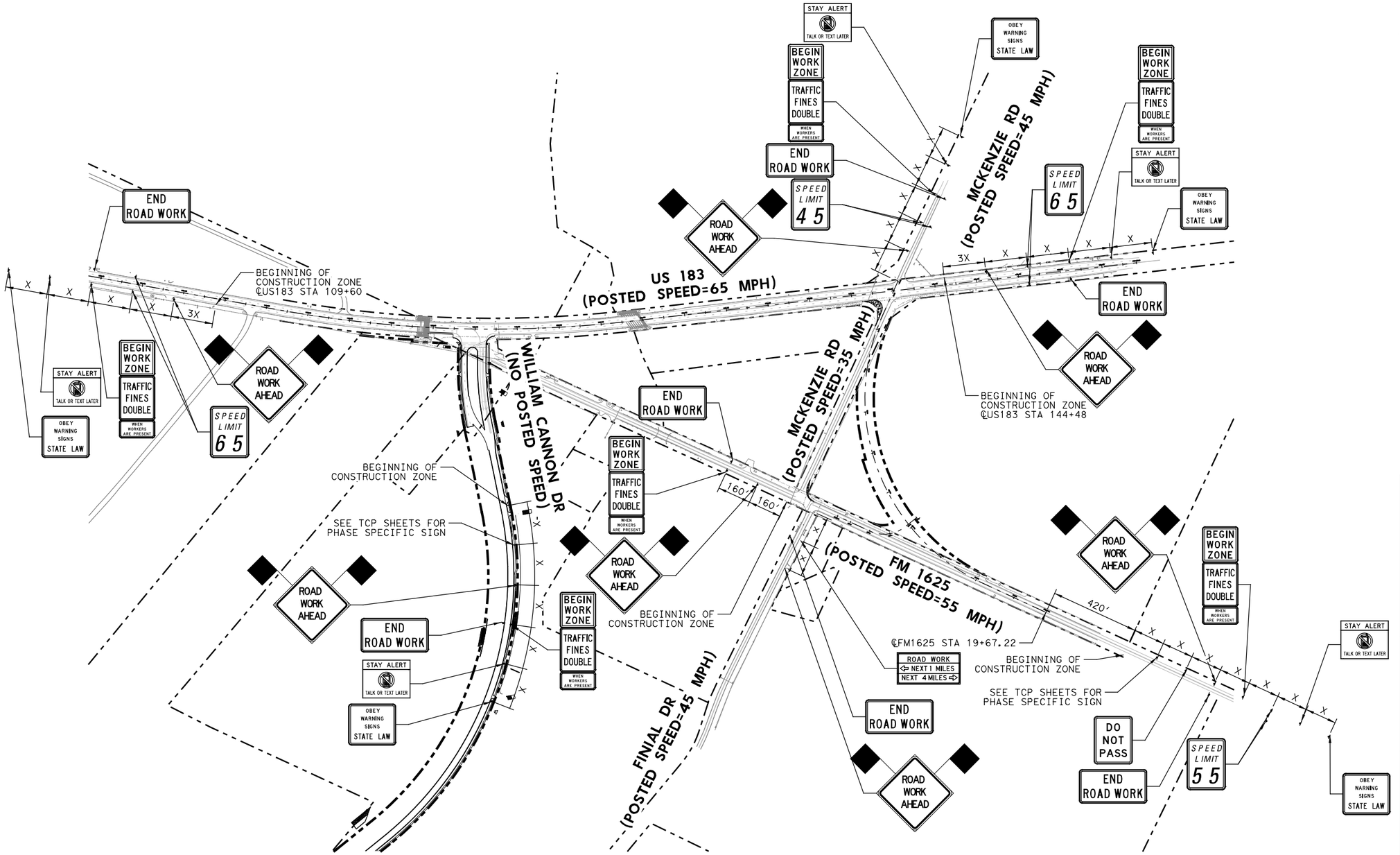
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			36

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



NOTES

1. ALL ADVANCED WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION.
2. REFER TO BC(2)-14 AND TCP STANDARDS FOR X, DISTANCE BETWEEN SIGNS AND ALL RELATED DETAILS.
3. FM 1625 NORTH OF MCKENZIE RD IS PERMANENTLY CLOSED DUE TO CONSTRUCTION OF WILLIAM CANNON DR. THIS SECTION OF ROADWAY IS TO PROVIDE ACCESS FOR PROPERTY OWNERS. ADVANCE WARNING SIGNS ARE PLACED AT 160' SPACING FROM CONSTRUCTION ZONE DUE TO FUTURE DEMOLITION OF BRIDGE NORTH OF MCKENZIE RD.
4. REFER TO TCP PLANS FOR SIGNS WITHIN WORK ZONE.

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ADVANCED WARNING SIGN PLACEMENT

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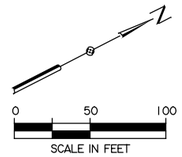
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			37

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

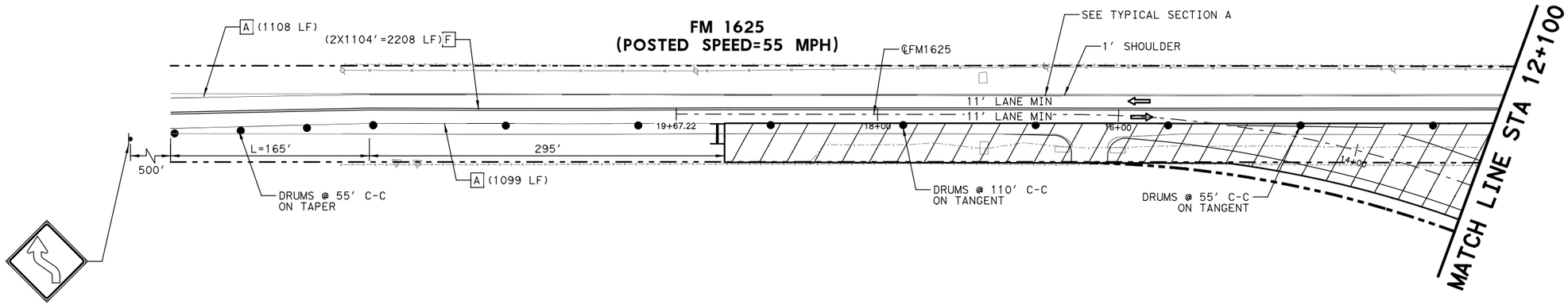


LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

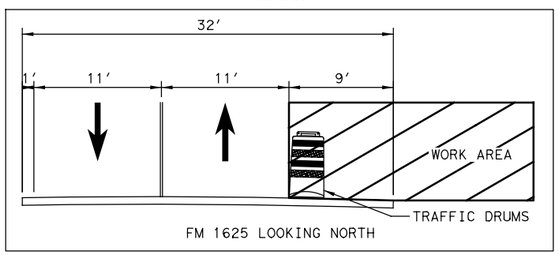
NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 1 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.



TYPICAL SECTION A

N.T.S.



03/25/2021

STATE OF TEXAS
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Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 1

(FM 1625 CONSTRUCTION)

SHEET 1 OF 3

HDR Engineering, Inc.
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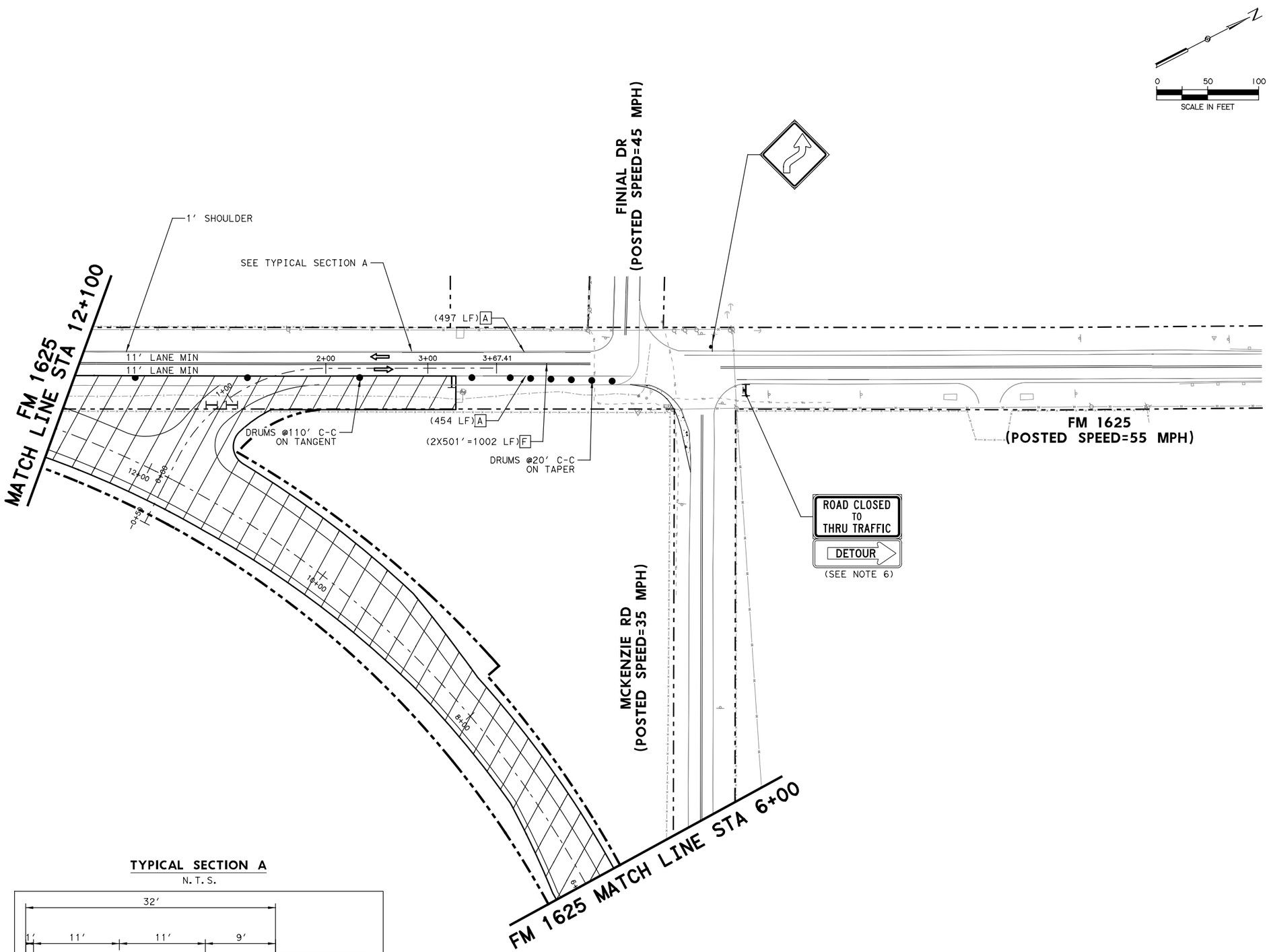
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			38

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

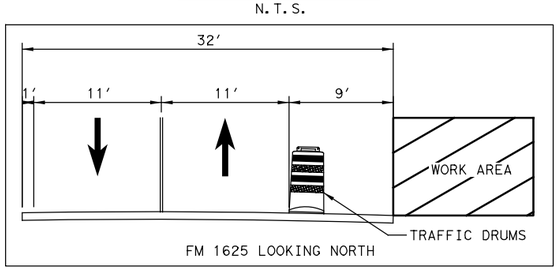
- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 1 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.
6. FM 1625 PERMANENTLY CLOSED AT WILLIAM CANNON DURING WILLIAM CANNON CONSTRUCTION. INSTALL BARRICADE AND SIGNAGE IF NOT IN PLACE; DO NOT DUPLICATE SIGNAGE.

TYPICAL SECTION A

N. T. S.



03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 1

(FM 1625 CONTRUCTION)

SHEET 2 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

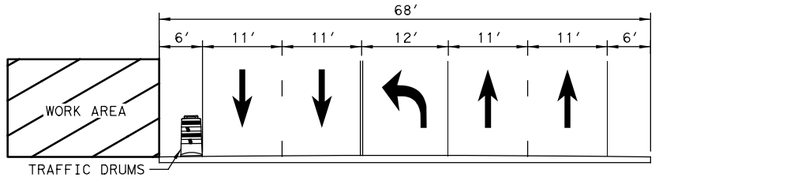
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			39

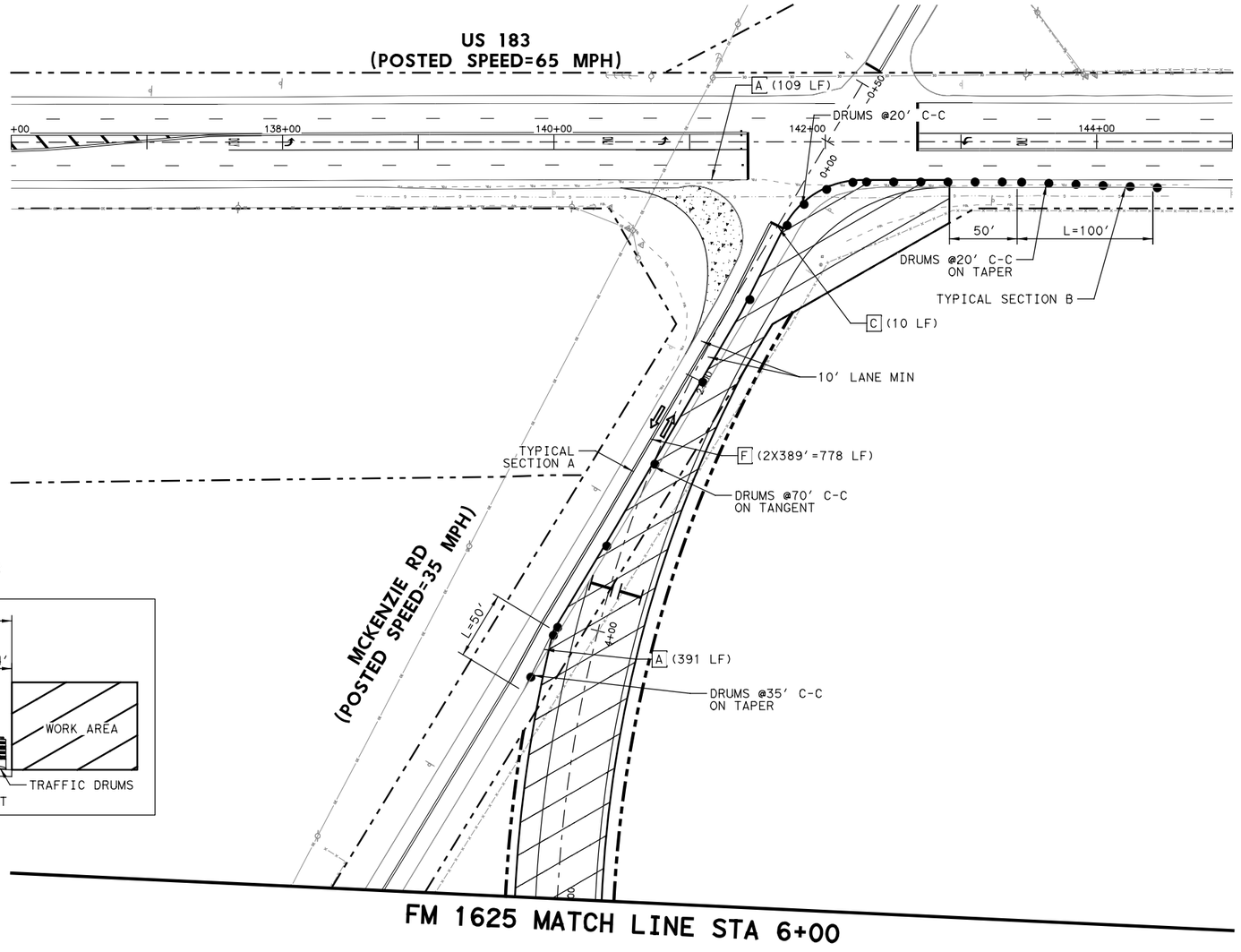
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

TYPICAL SECTION B

N.T.S.

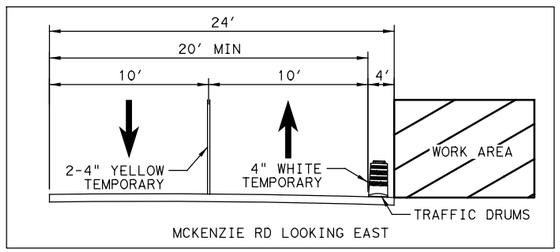


US 183 LOOKING NORTH

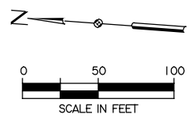


TYPICAL SECTION A

N.T.S.



MCKENZIE RD LOOKING EAST



LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (W) 8" (SLD)
- C WK ZN PAV MRK REMOV (W) 24" (SLD)
- D WK ZN PAV MRK REMOV (W) (ARROW)
- E WK ZN PAV MRK REMOV (W) (WORD)
- F WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 1 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

03/25/2021

STATE OF TEXAS
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Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 1

(FM 1625 CONSTRUCTION)

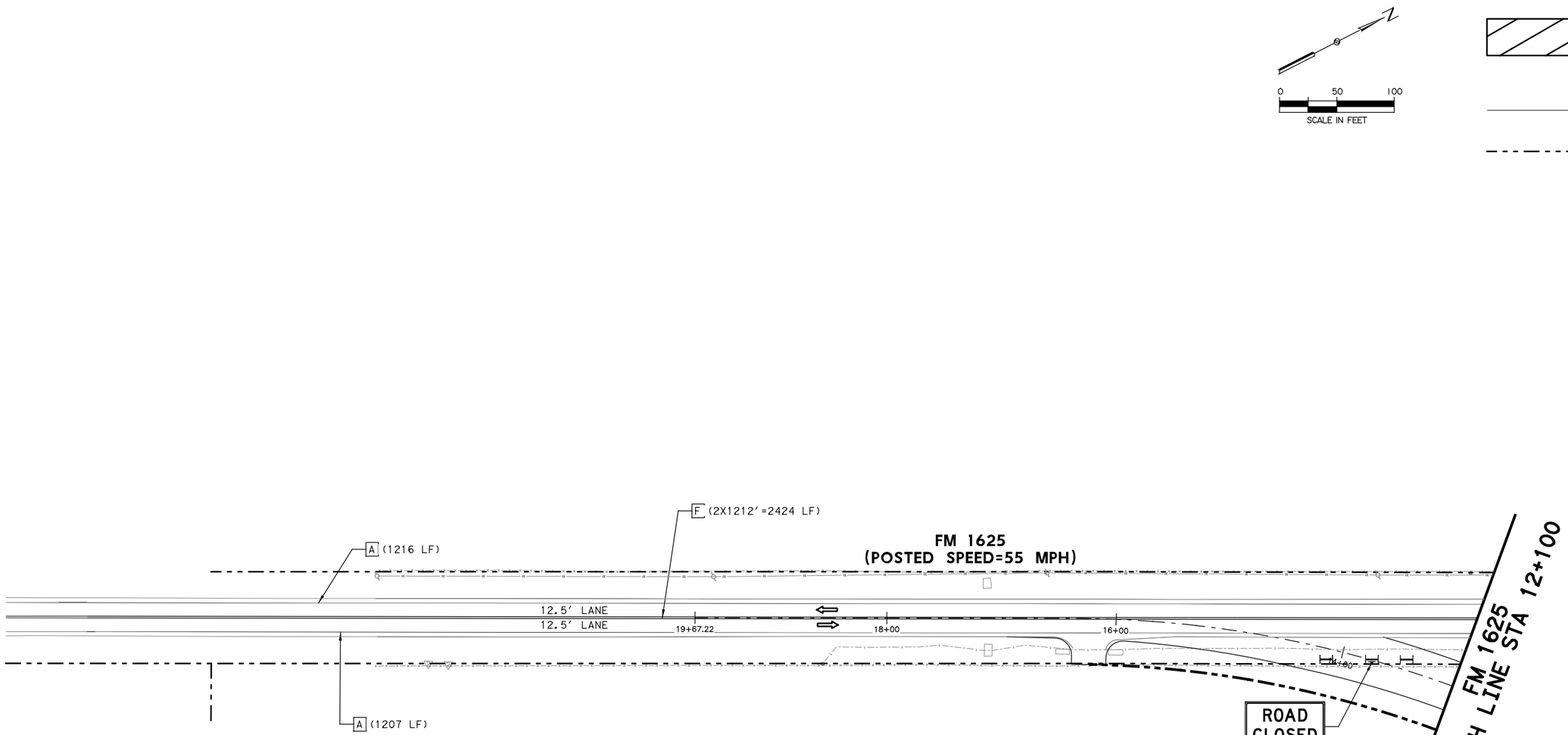
SHEET 3 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			40

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 2 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN
PHASE 2
(MCKENZIE RD REMOVAL)

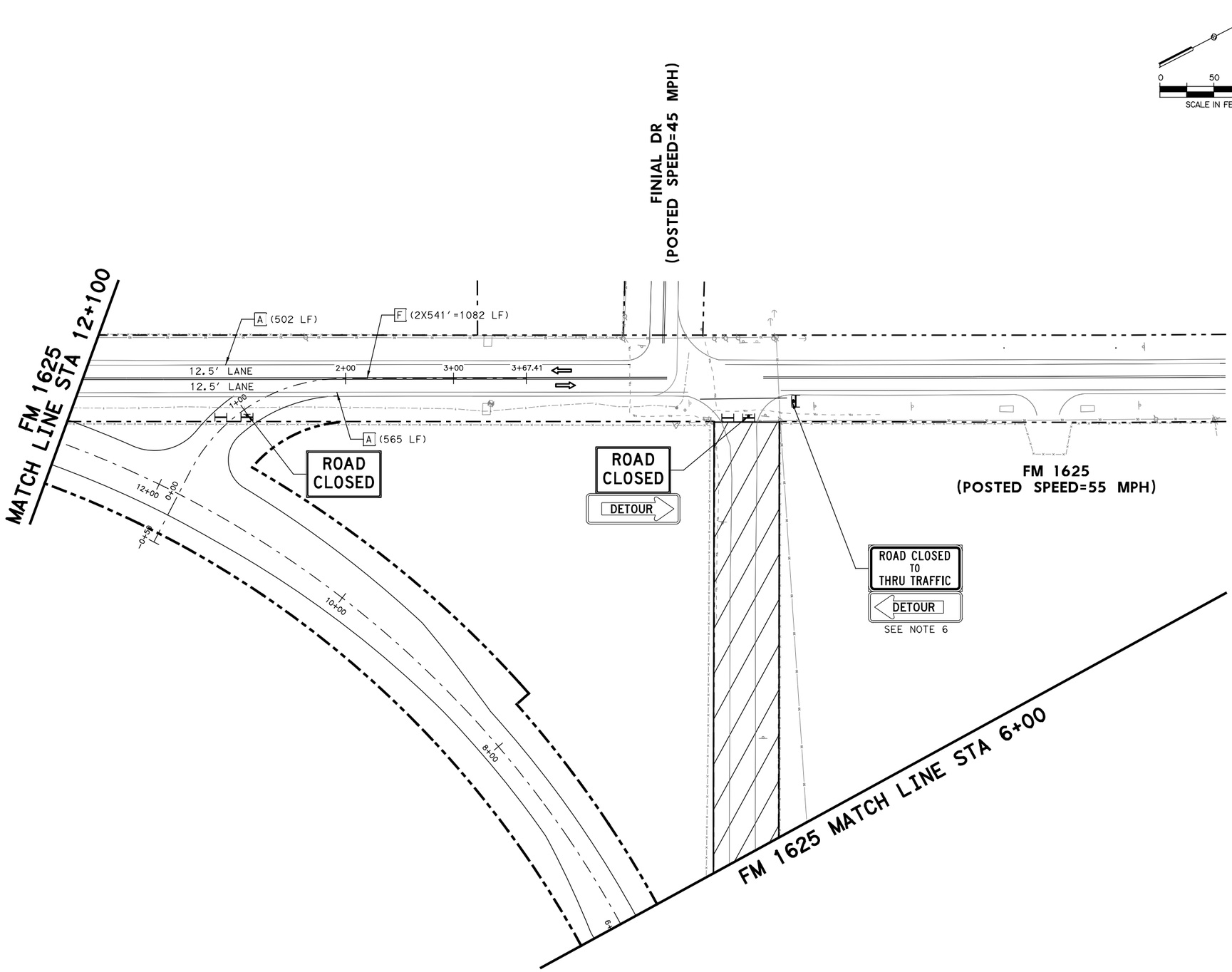
SHEET 1 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			41

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



0 50 100
SCALE IN FEET

LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 2 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.
6. FM 1625 PERMANENTLY CLOSED AT WILLIAM CANNON DURING WILLIAM CANNON CONSTRUCTION. INSTALL BARRICADE AND SIGNAGE IF NOT IN PLACE; DO NOT DUPLICATE SIGNAGE.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 2

(MCKENZIE RD REMOVAL)

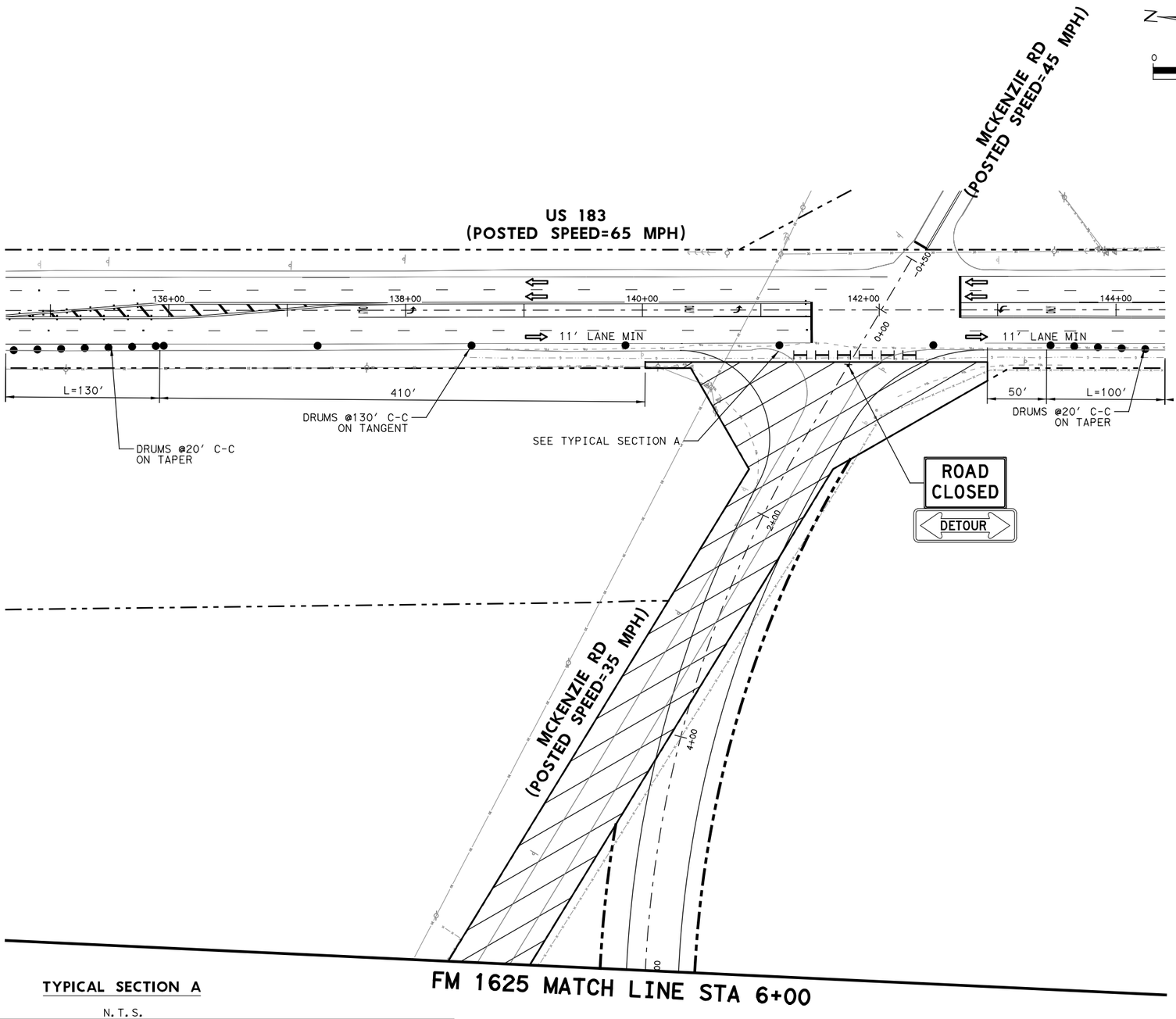
SHEET 2 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			42

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

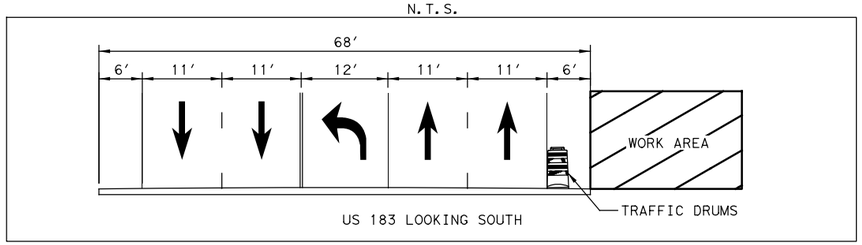
- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV(W)4"(SLD)
- [B] WK ZN PAV MRK REMOV(W)8"(SLD)
- [C] WK ZN PAV MRK REMOV(W)24"(SLD)
- [D] WK ZN PAV MRK REMOV(W)(ARROW)
- [E] WK ZN PAV MRK REMOV(W)(WORD)
- [F] WK ZN PAV MRK REMOV(Y)4"(SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 2 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

N.T.S.



03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 2

(MCKENZIE RD REMVOAL)

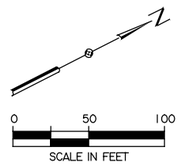
SHEET 3 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			43

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

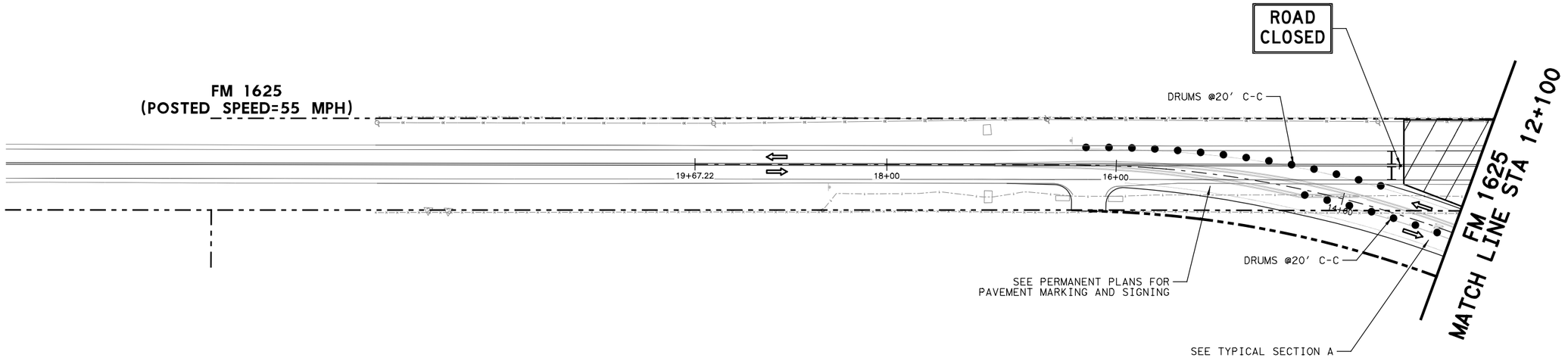


LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

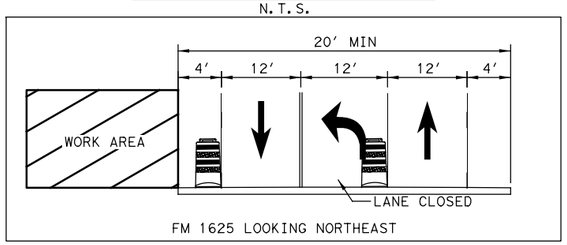
NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 3 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.



TYPICAL SECTION A

N. T. S.



FM 1625 LOOKING NORTHEAST

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 3

(FM 1625 TIE-IN CONSTRUCTION)

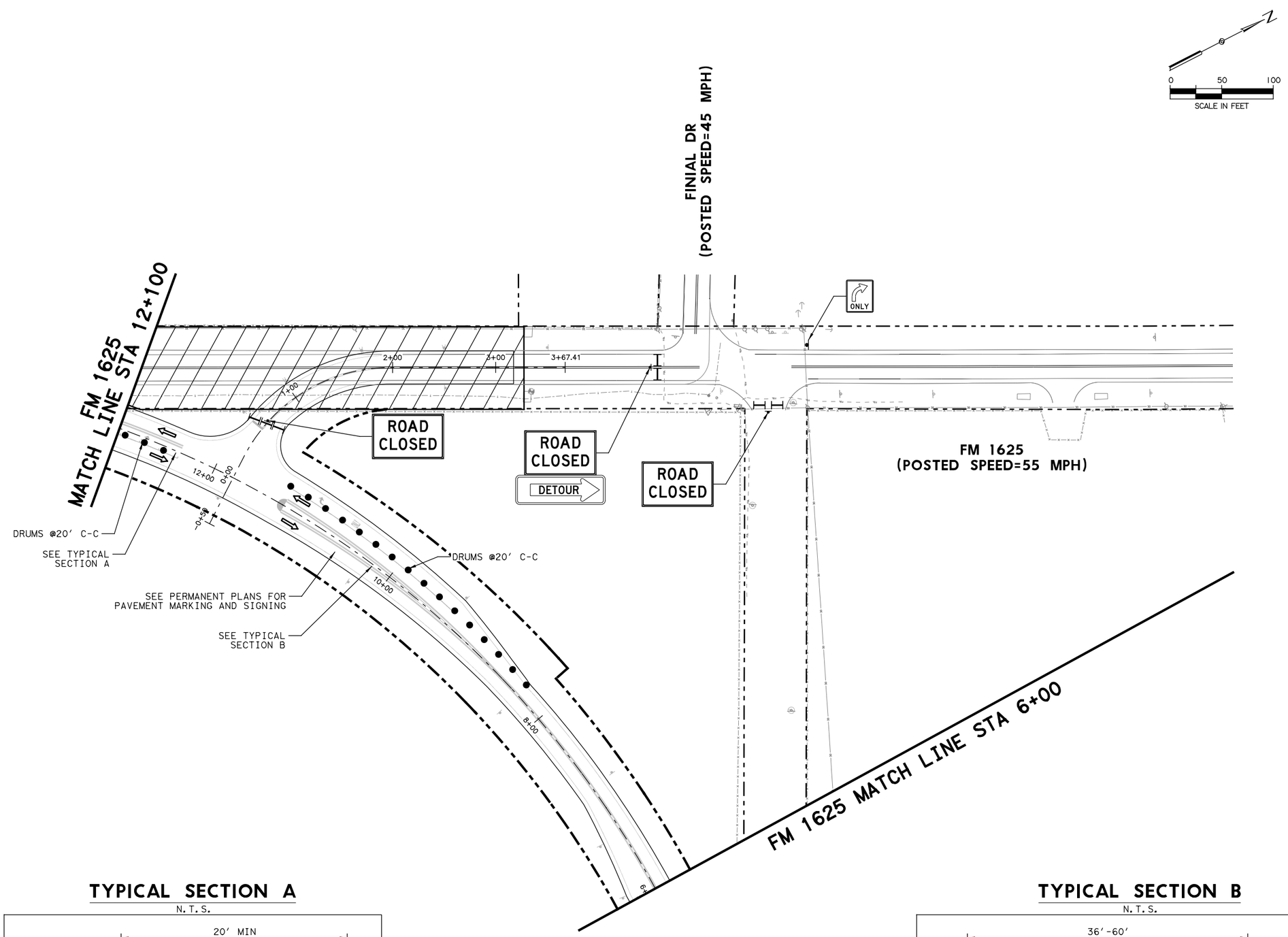
SHEET 1 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			44

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



0 50 100
SCALE IN FEET

LEGEND

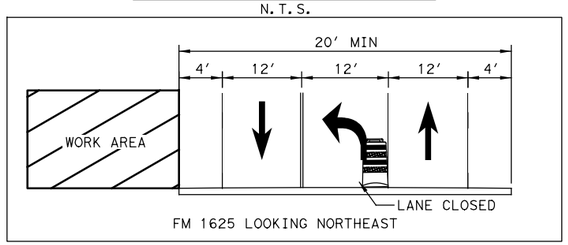
- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 3 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

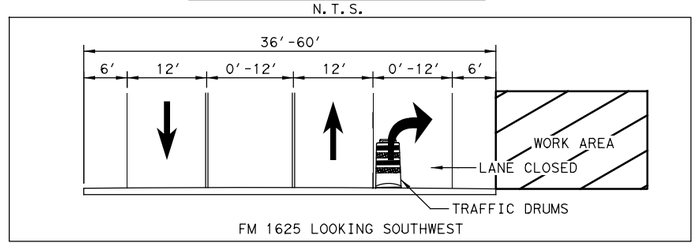
N.T.S.



FM 1625 LOOKING NORTHEAST

TYPICAL SECTION B

N.T.S.



FM 1625 LOOKING SOUTHWEST

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 3

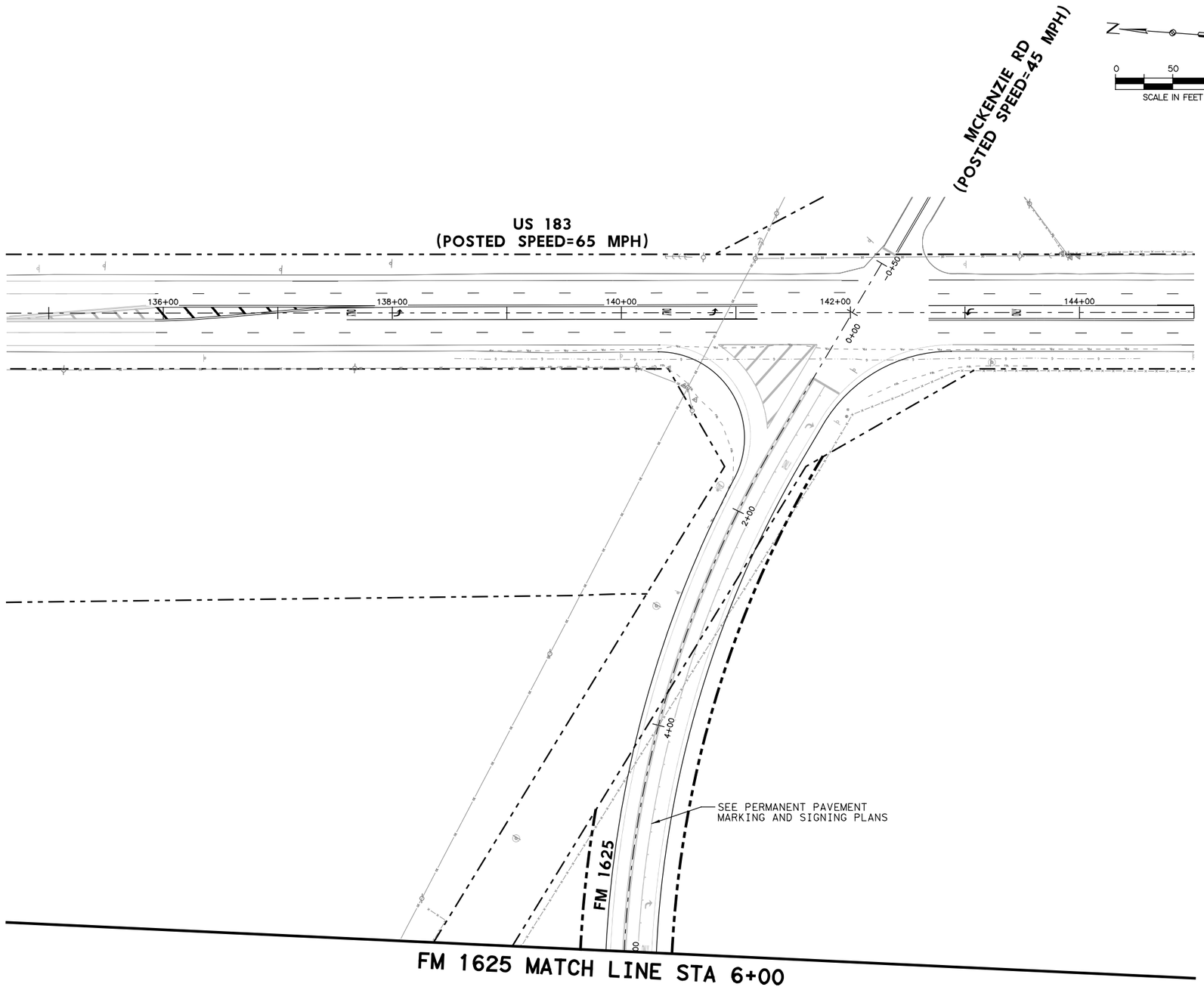
(FM 1625 TIE-IN CONSTRUCTION)

SHEET 2 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			45
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 3 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 3

(FM 1625 TIE-IN CONSTRUCTION)

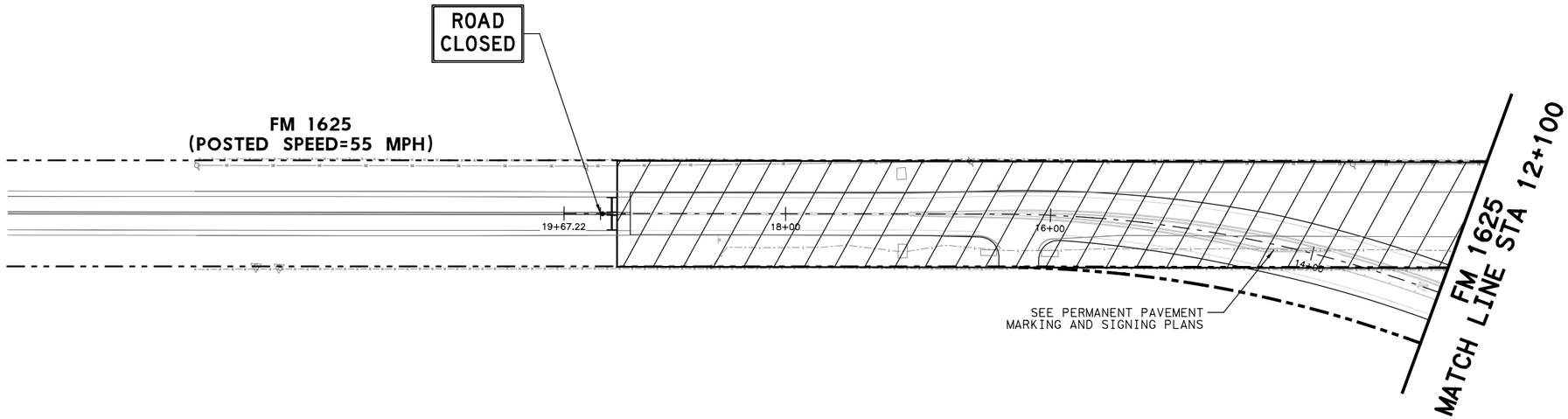
SHEET 3 OF 3

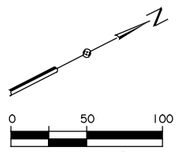
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			46

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.





LEGEND

- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 4 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 4

(FM 1625 TIE-IN CONSTRUCTION)

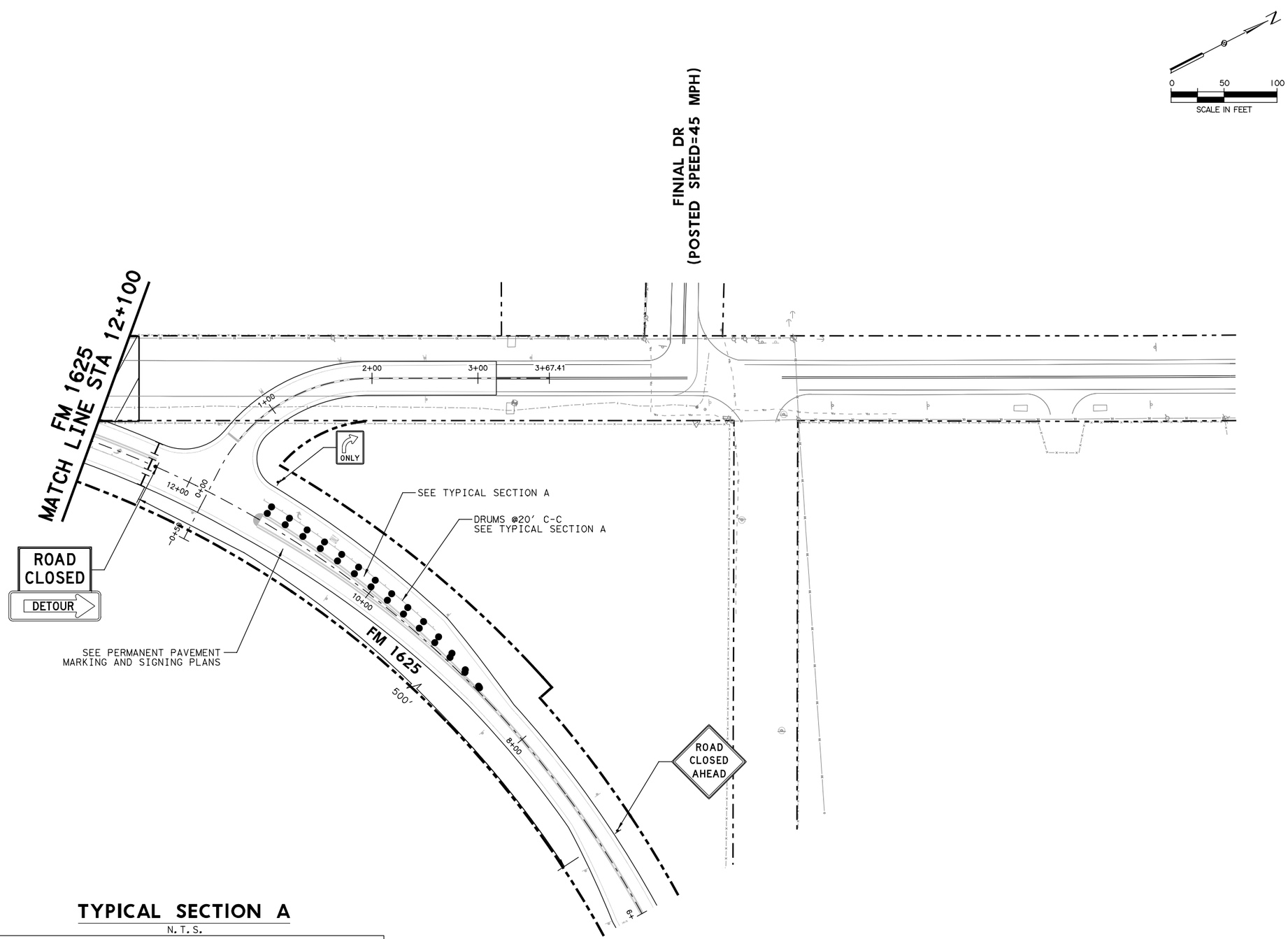
SHEET 1 OF 2

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			47

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

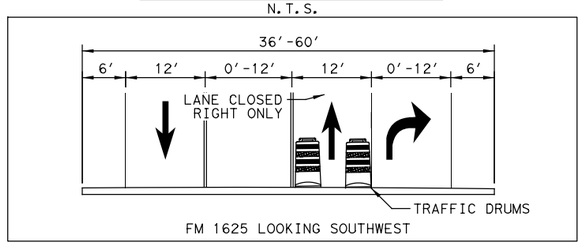
- WORK ZONE
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE
- TRAFFIC DRUMS
- TRAVEL DIRECTION
- EXIST ROW
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (W) 8" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 24" (SLD)
- [D] WK ZN PAV MRK REMOV (W) (ARROW)
- [E] WK ZN PAV MRK REMOV (W) (WORD)
- [F] WK ZN PAV MRK REMOV (Y) 4" (SLD)

NOTES:

1. REFER TO TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN AND SIZE OF TEMPORARY TRAFFIC CONTROL SIGNS.
2. REFER TO TXDOT STANDARD DETAILS FOR APPROACH SIGNING ON TRAFFIC CONTROL LAYOUTS.
3. REMOVAL OF EXISTING PAVEMENT MARKINGS AND INSTALLATION OF TEMPORARY PAVEMENT MARKINGS WILL BE REQUIRED BETWEEN TRAFFIC CONTROL PHASES PRIOR TO INSTALLATION OF PERMANENT STRIPING.
4. INSTALL PHASE 4 DETOUR CONCURRENT WITH THIS PHASE.
5. REFER TO THE ADVANCED WARNING SIGN PLACEMENT SHEET FOR ALL SIGNS OUTSIDE OF THE WORK ZONE.

TYPICAL SECTION A

N. T. S.



FM 1625 LOOKING SOUTHWEST

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Jessie D Pollack

FM 1625

TRAFFIC CONTROL PLAN PHASE 4

(FM 1625 TIE-IN CONSTRUCTION)

SHEET 2 OF 2

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		48

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

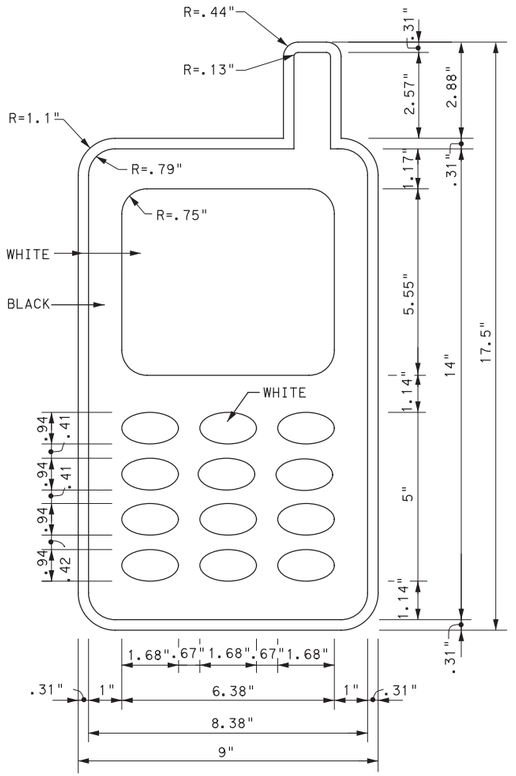
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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 APPAREL 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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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 Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	14	TRAVIS		49

DATE: 1/20/2021 3:51:25 PM
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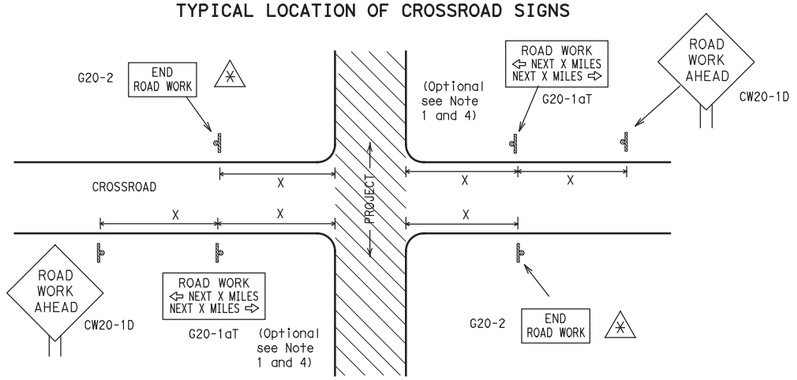
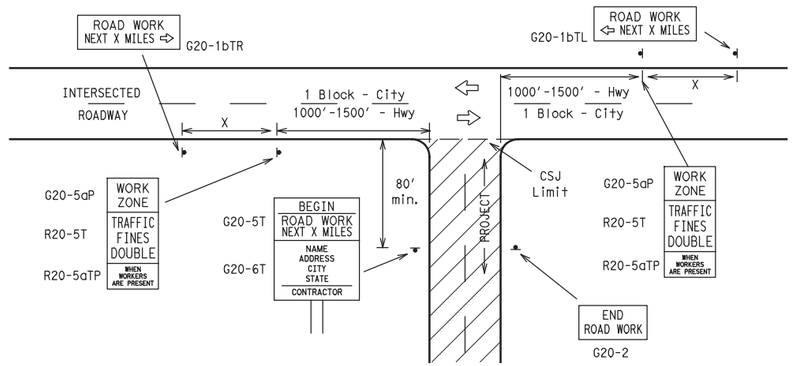
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. 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]

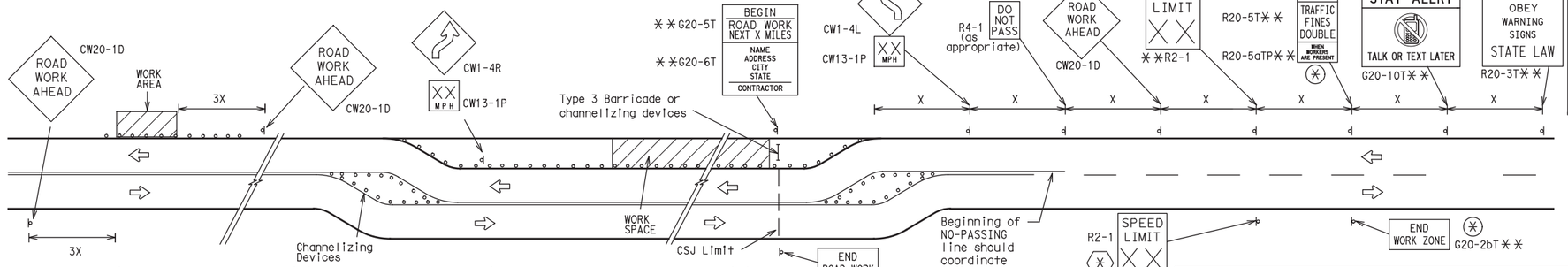
⁂ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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. 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.

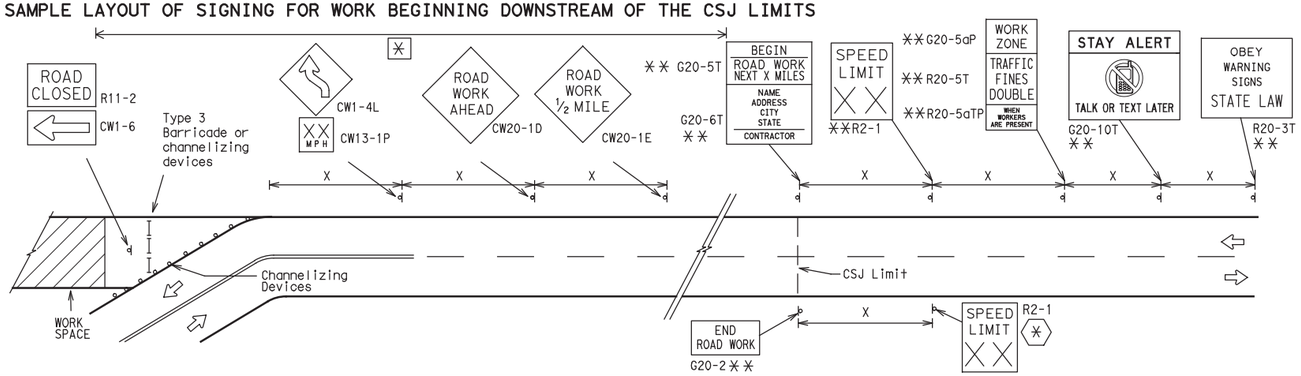
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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.

⁂⁂ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

⁂ 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	14	TRAVIS		50

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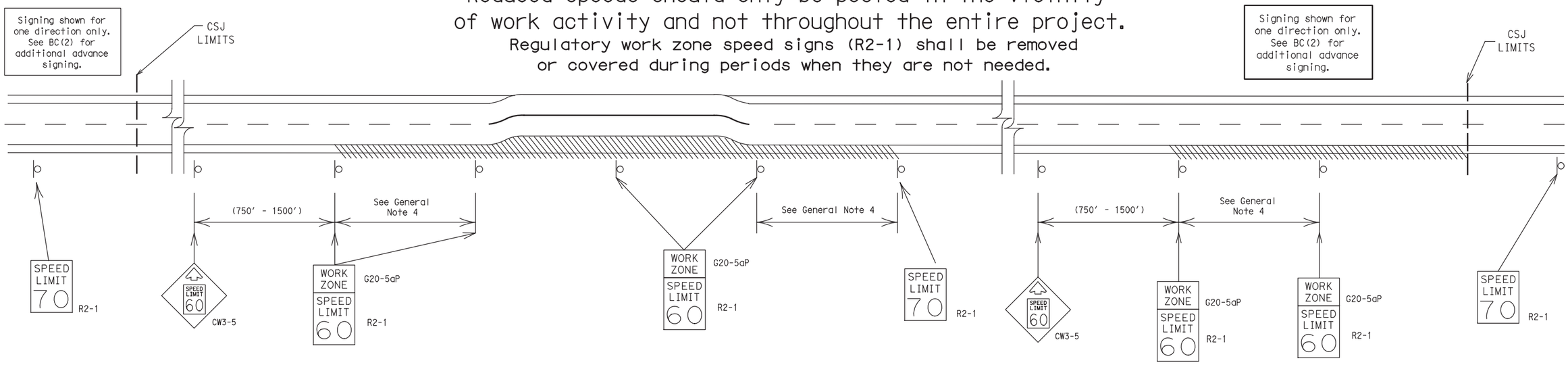
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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SHEET 3 OF 12

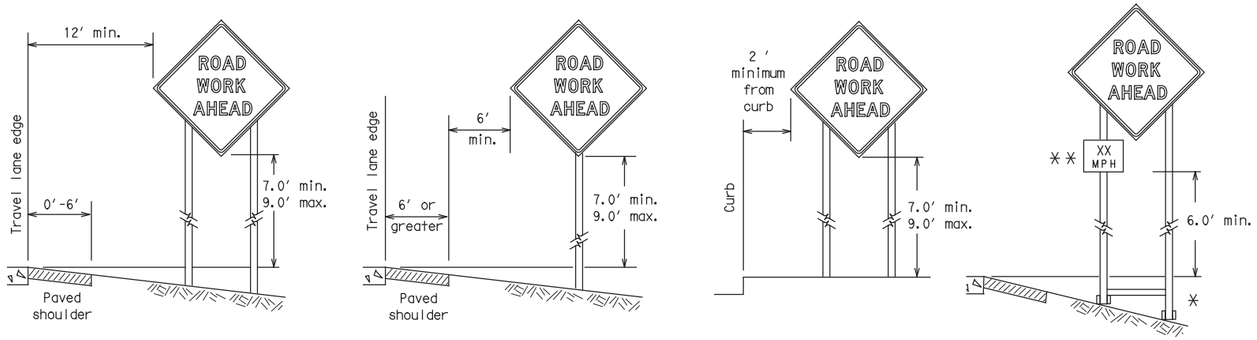
Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		51

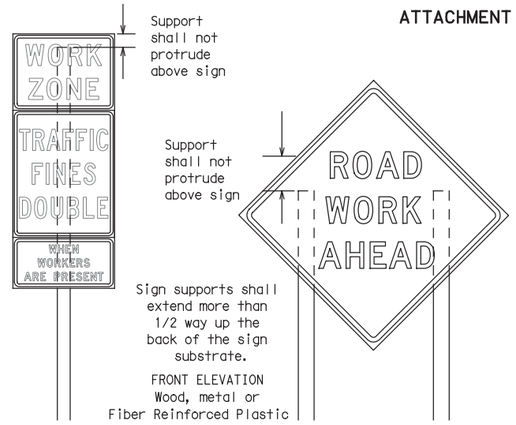
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



⚹ 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.

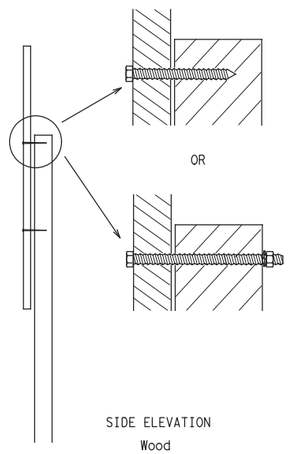
⚹⚹ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic

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.



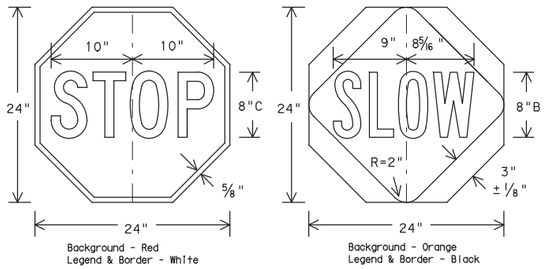
SIDE ELEVATION
Wood

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.

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6′ to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
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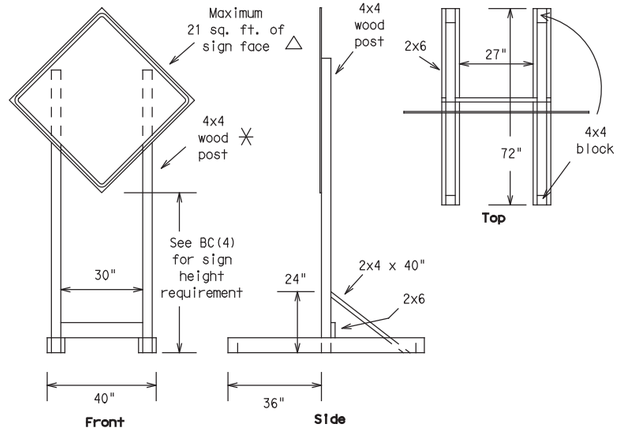
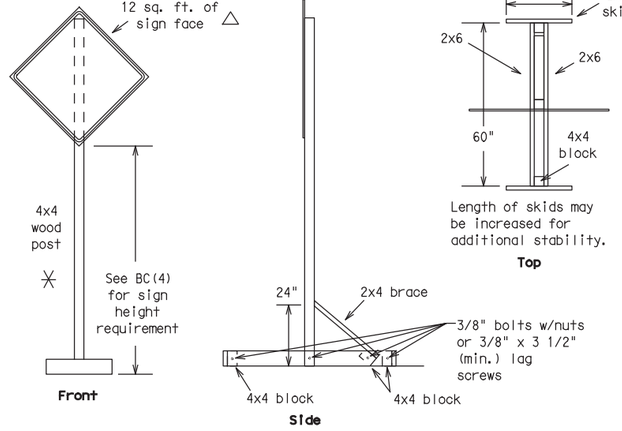
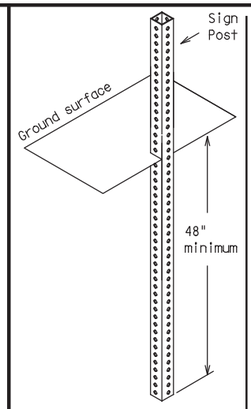
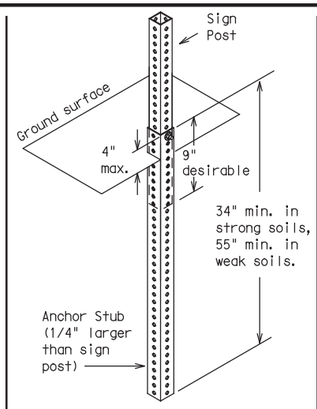


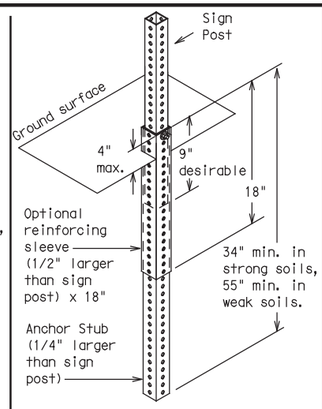


SKID MOUNTED WOOD SIGN SUPPORTS

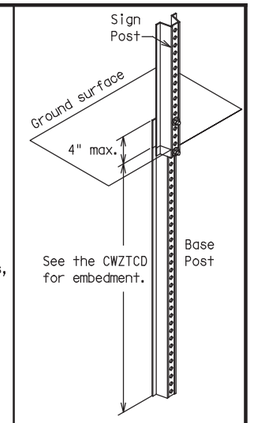
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □







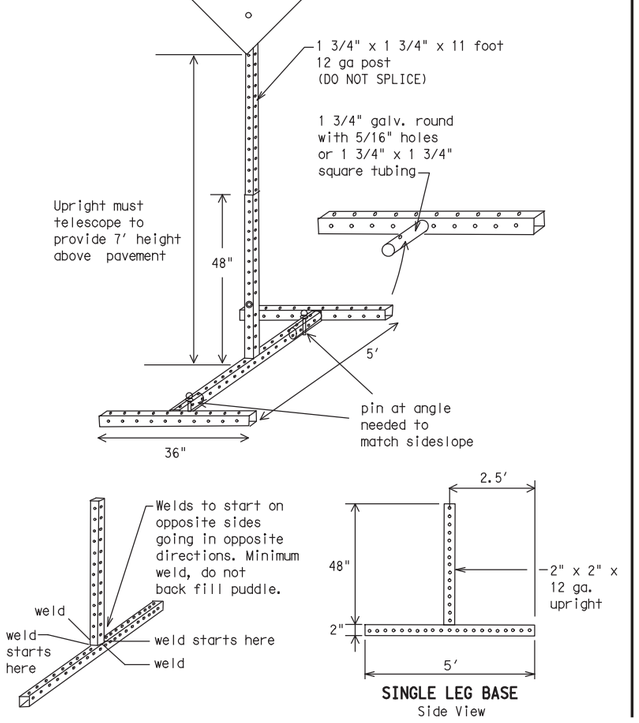
PERFORATED SQUARE METAL TUBING

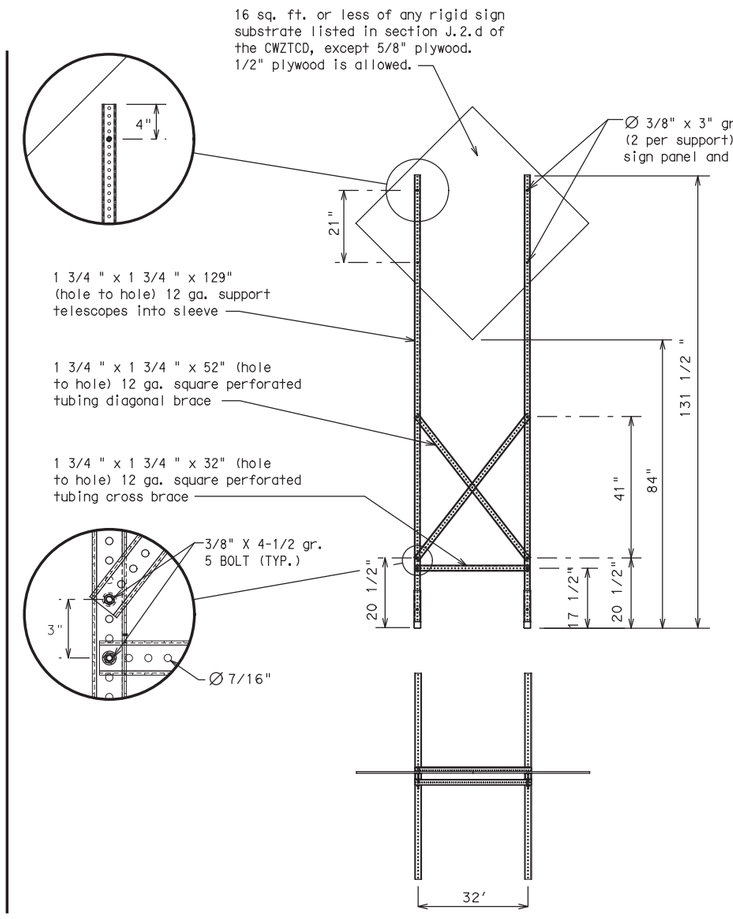


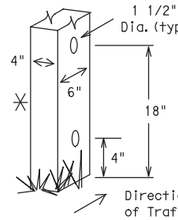
WING CHANNEL
Lap-splice/base bolted anchor

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.

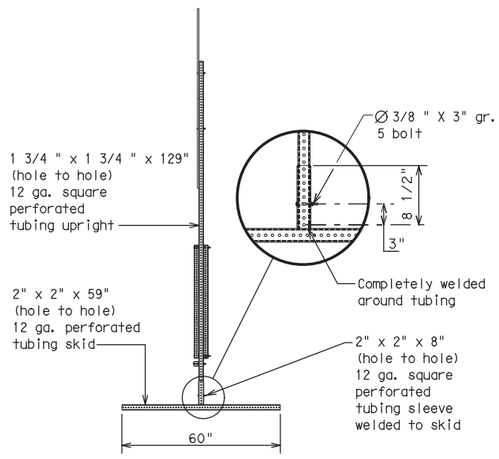






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	14	TRAVIS		53

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	14	TRAVIS		54

100

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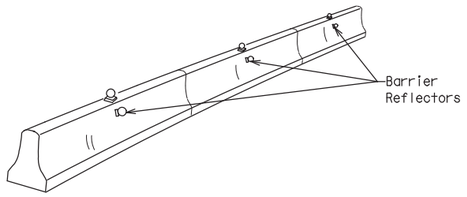
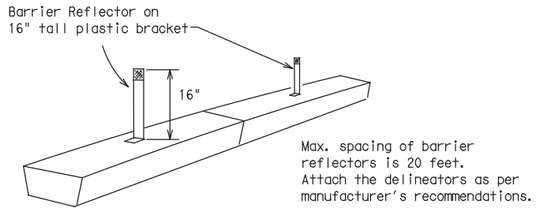
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

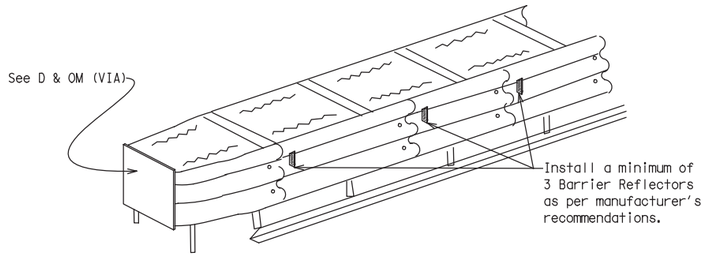


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

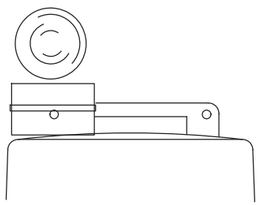


DELINEATION OF END TREATMENTS

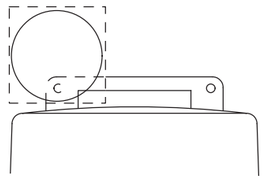
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

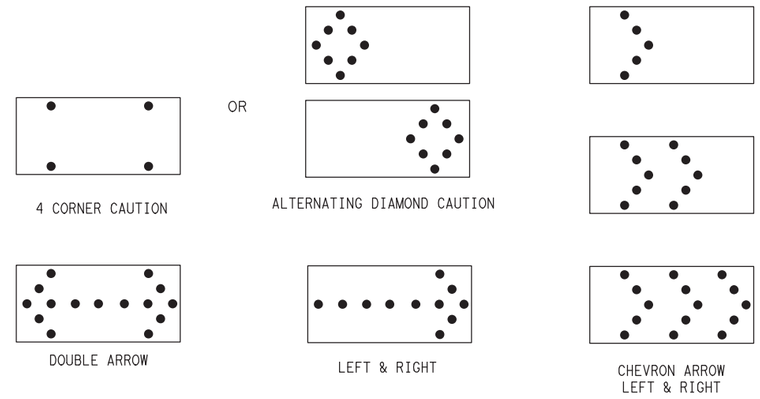
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or 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 Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		55

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:

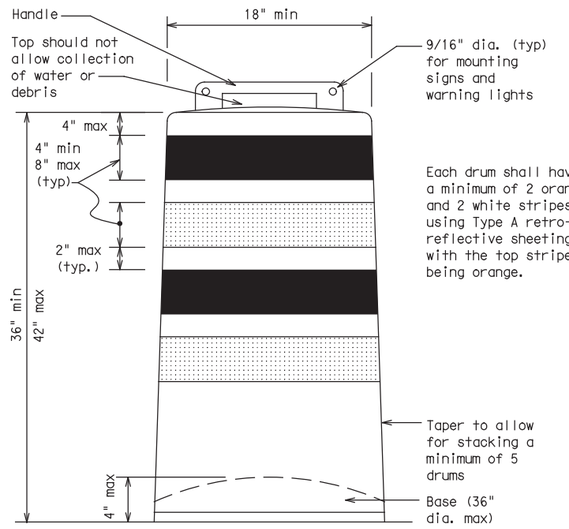
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

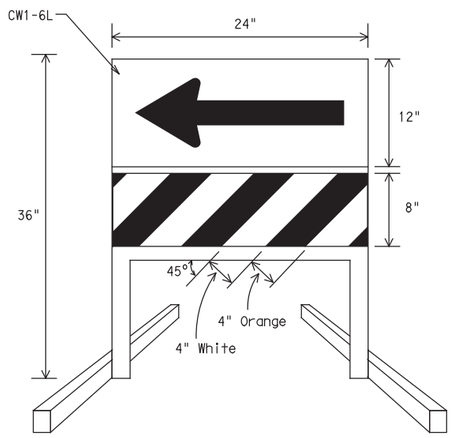
RETROREFLECTIVE SHEETING

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 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.





DIRECTION INDICATOR BARRICADE

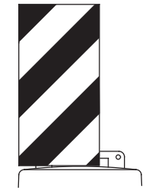
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

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

DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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 Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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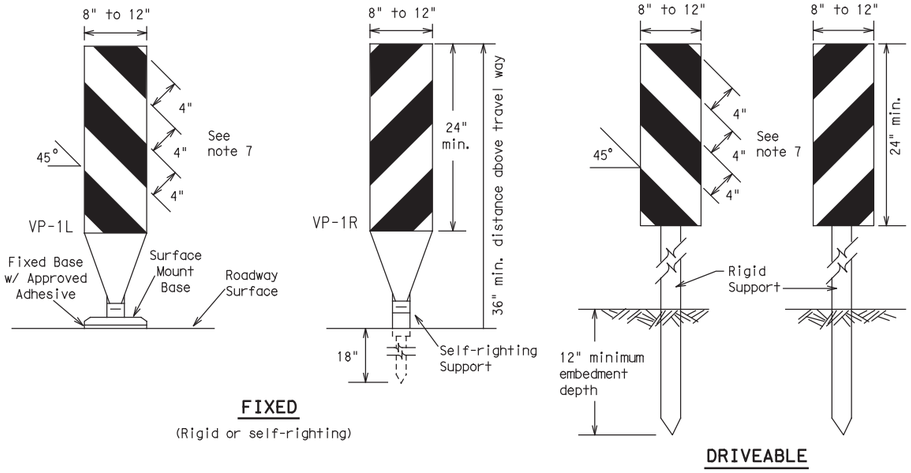
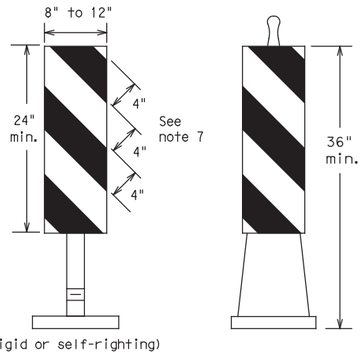


FIXED

(Rigid or self-righting)

DRIVEABLE



(Rigid or self-righting)

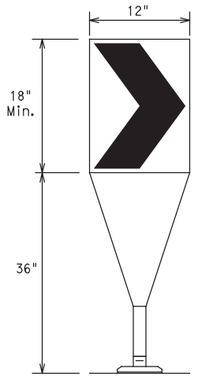
PORTABLE

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 Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 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.

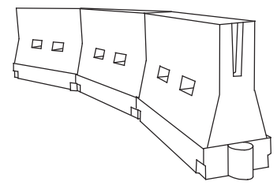
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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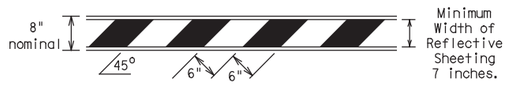
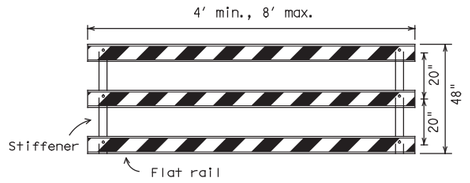
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



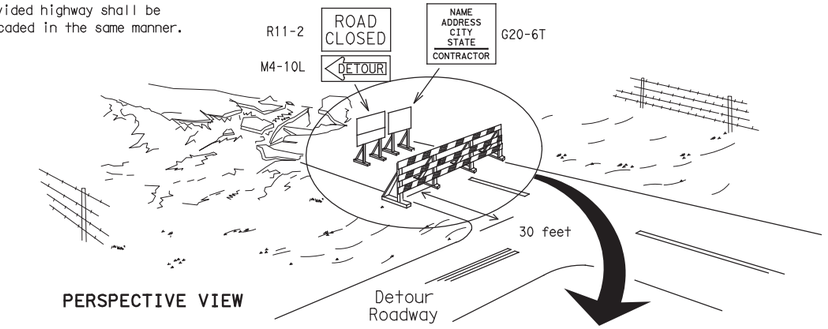
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

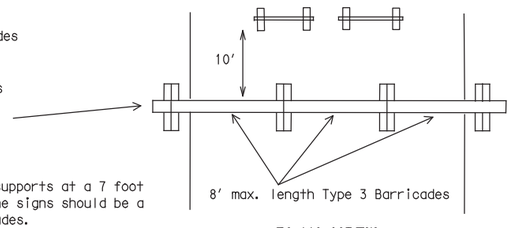
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

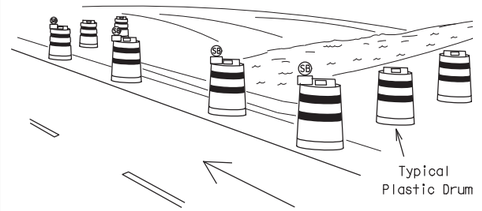
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

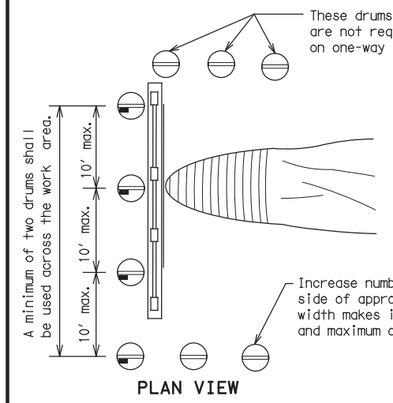
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

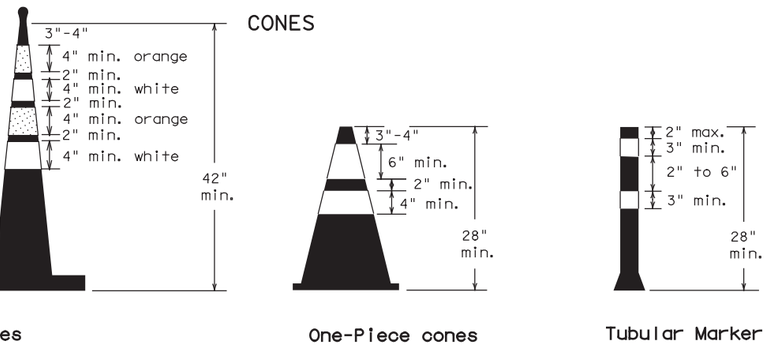
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

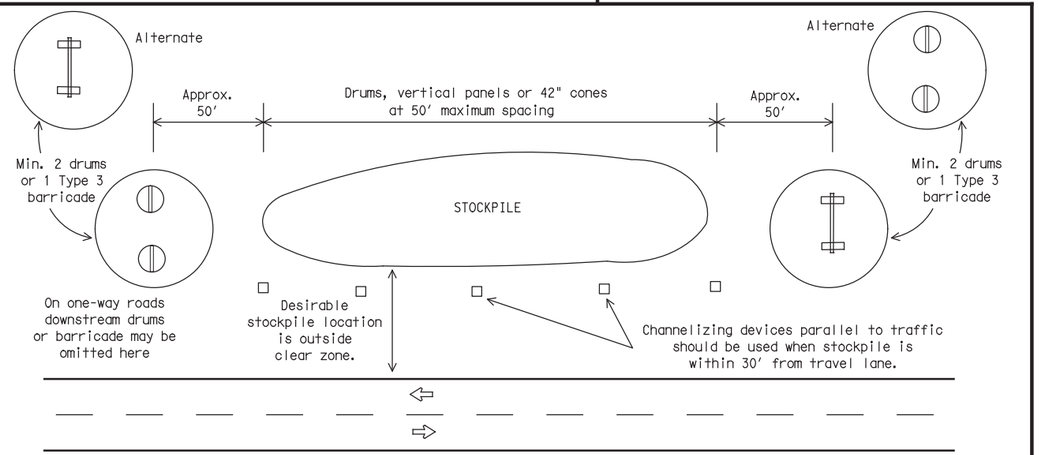
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

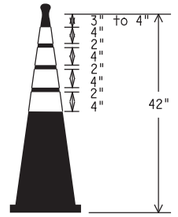
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

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Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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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.

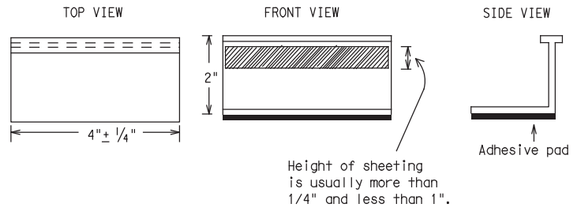
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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1-02 7-13	14	TRAVIS		59
11-02 8-14				

105

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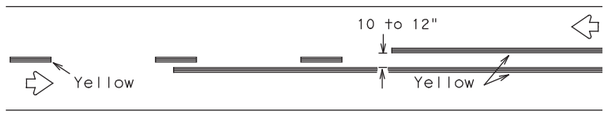
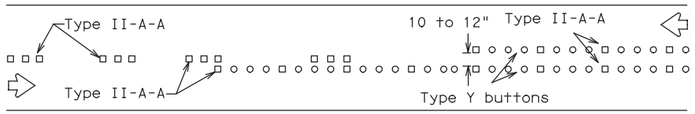
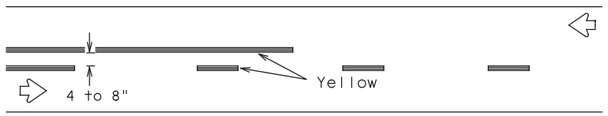
PAVEMENT MARKING PATTERNS



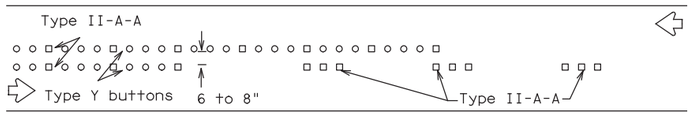
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



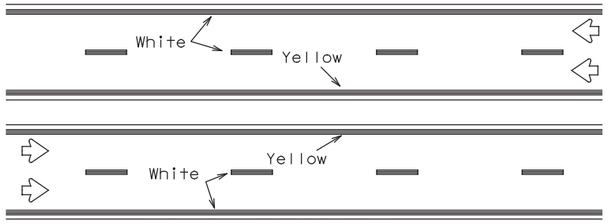
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



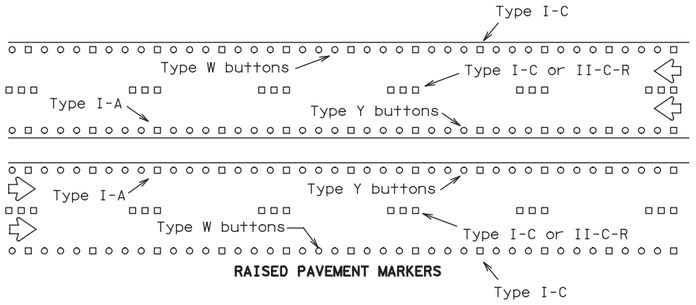
RAISED PAVEMENT MARKERS - PATTERN B

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



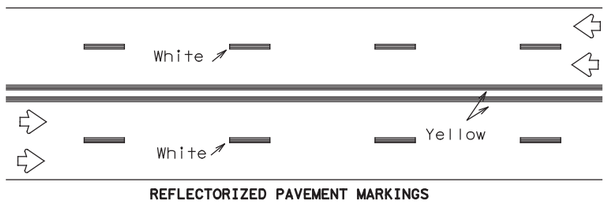
REFLECTORIZED PAVEMENT MARKINGS



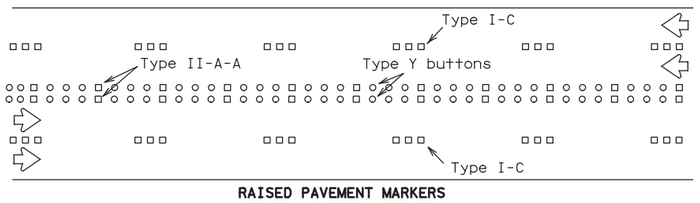
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



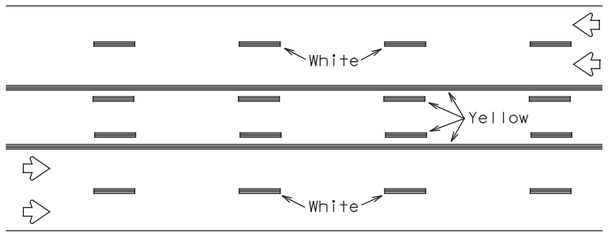
REFLECTORIZED PAVEMENT MARKINGS



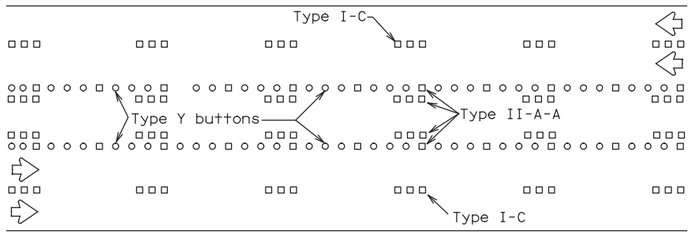
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

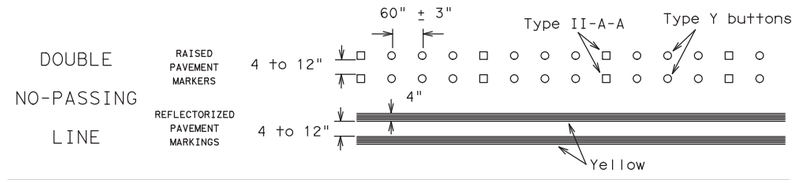
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

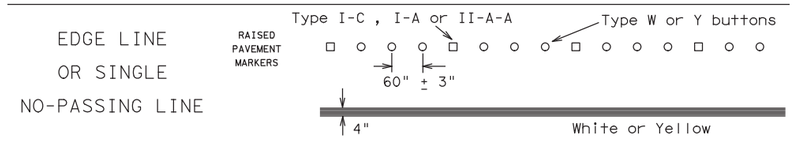
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

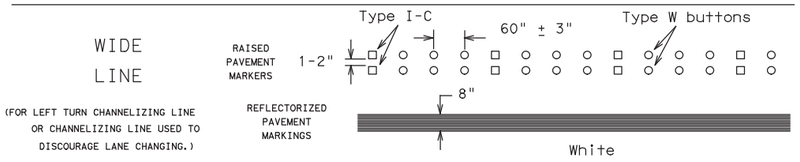


EDGE LINE OR SINGLE NO-PASSING LINE



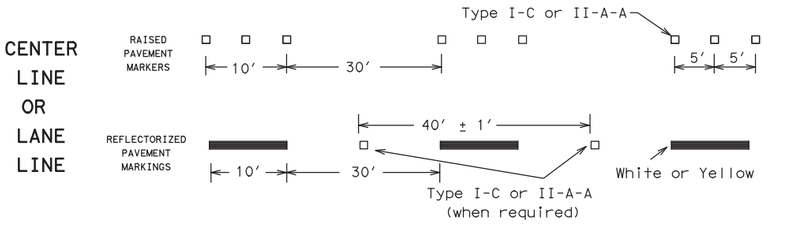
WIDE LINE

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

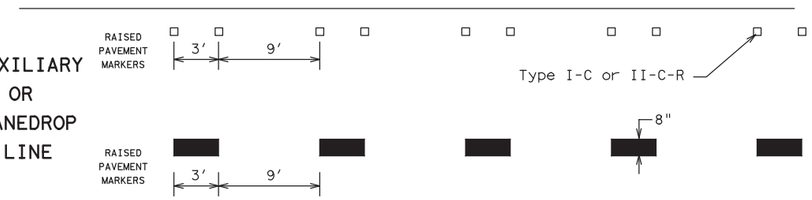


BROKEN LINES

CENTER LINE OR LANE LINE

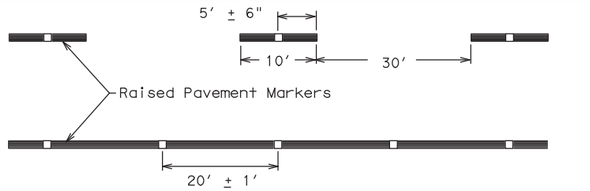


AUXILIARY OR LANEDROP LINE



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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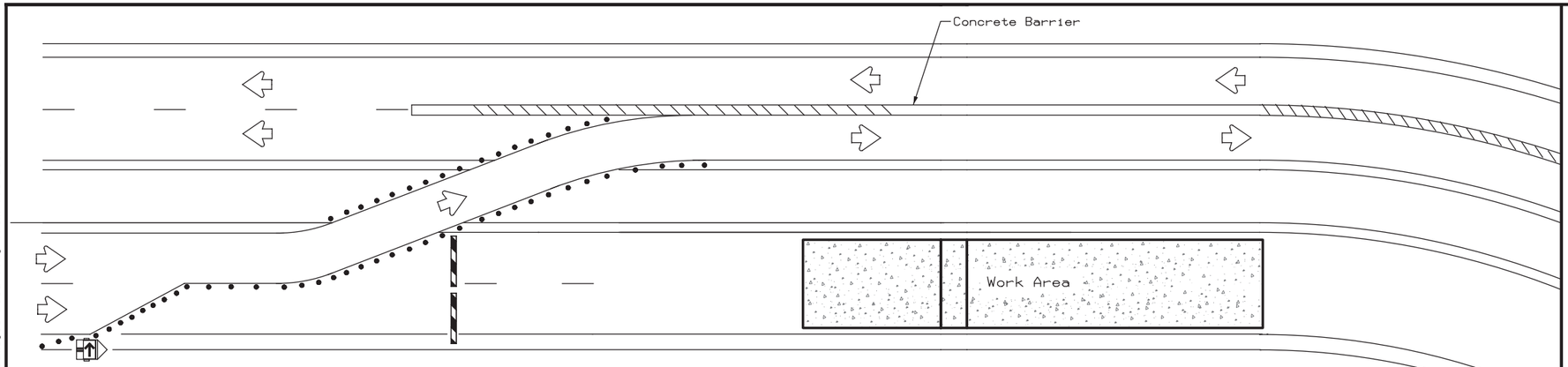


NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

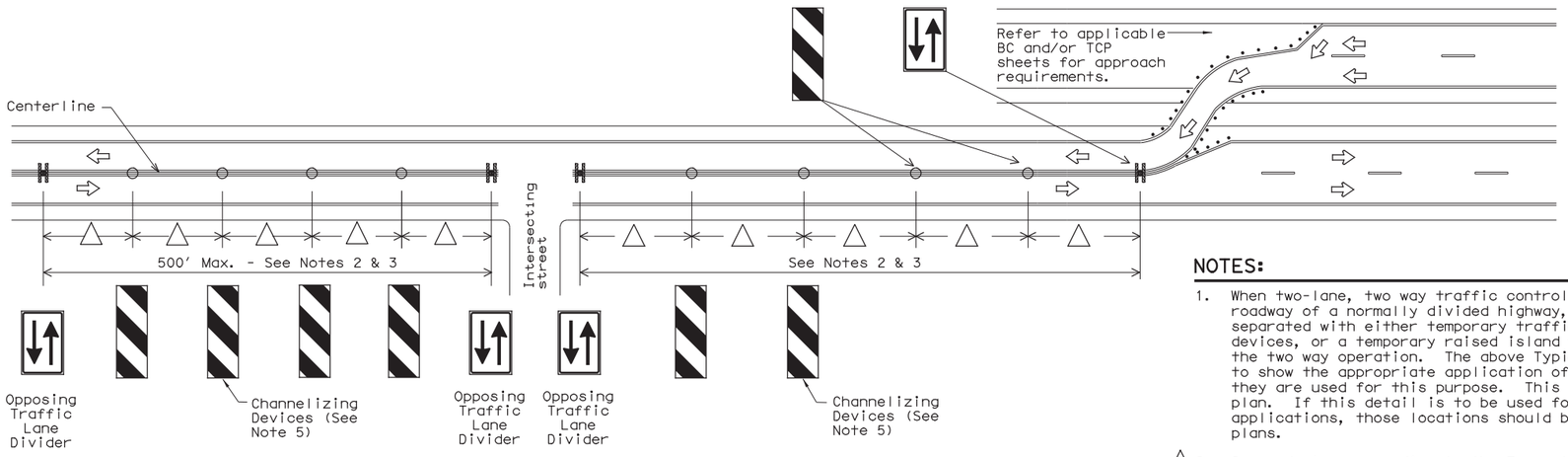
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100′.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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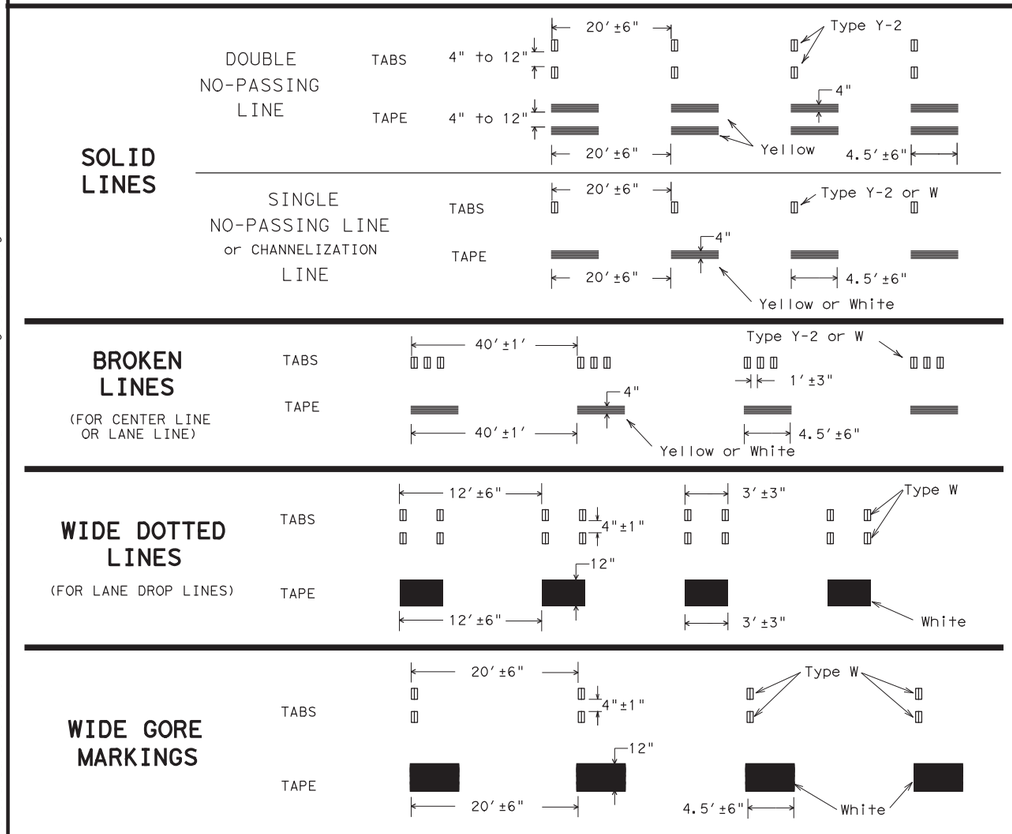
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



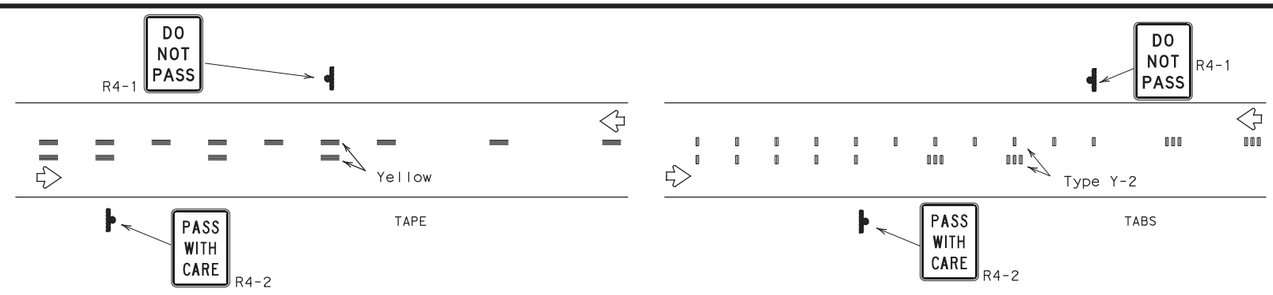
NOTES:

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

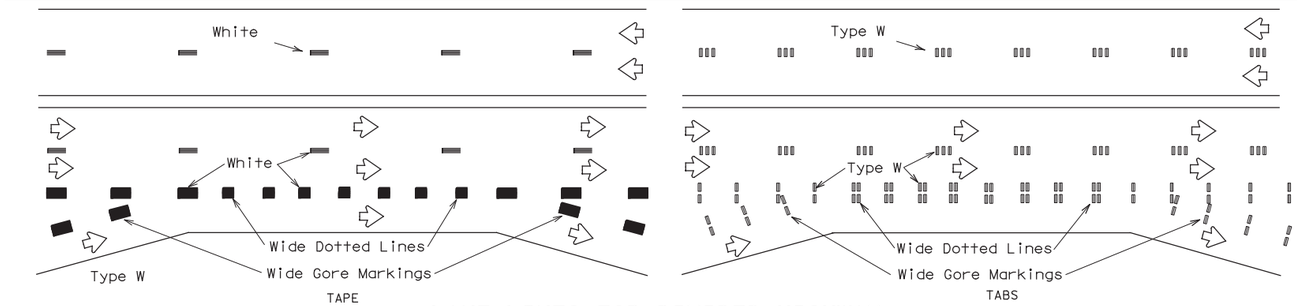
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

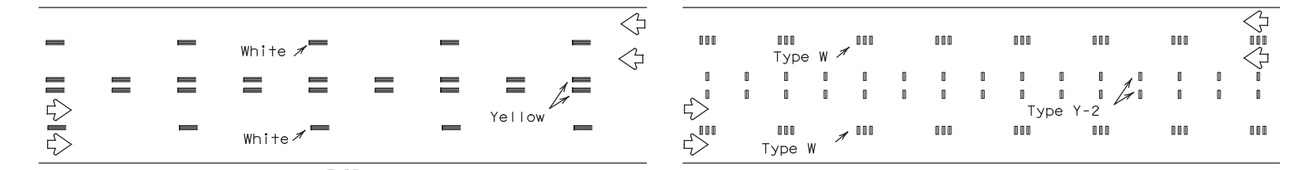
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



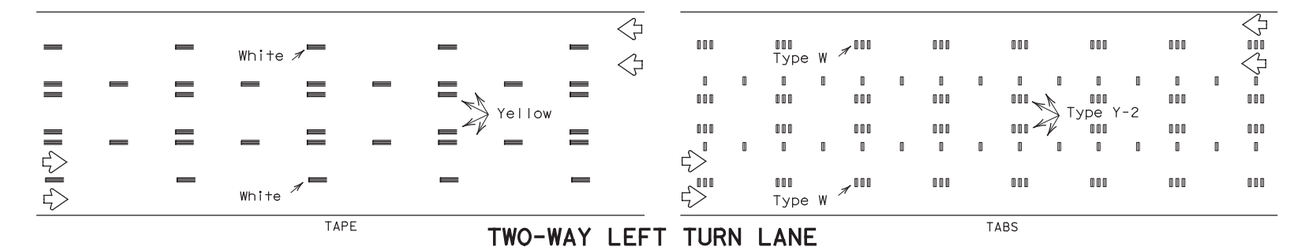
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



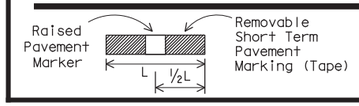
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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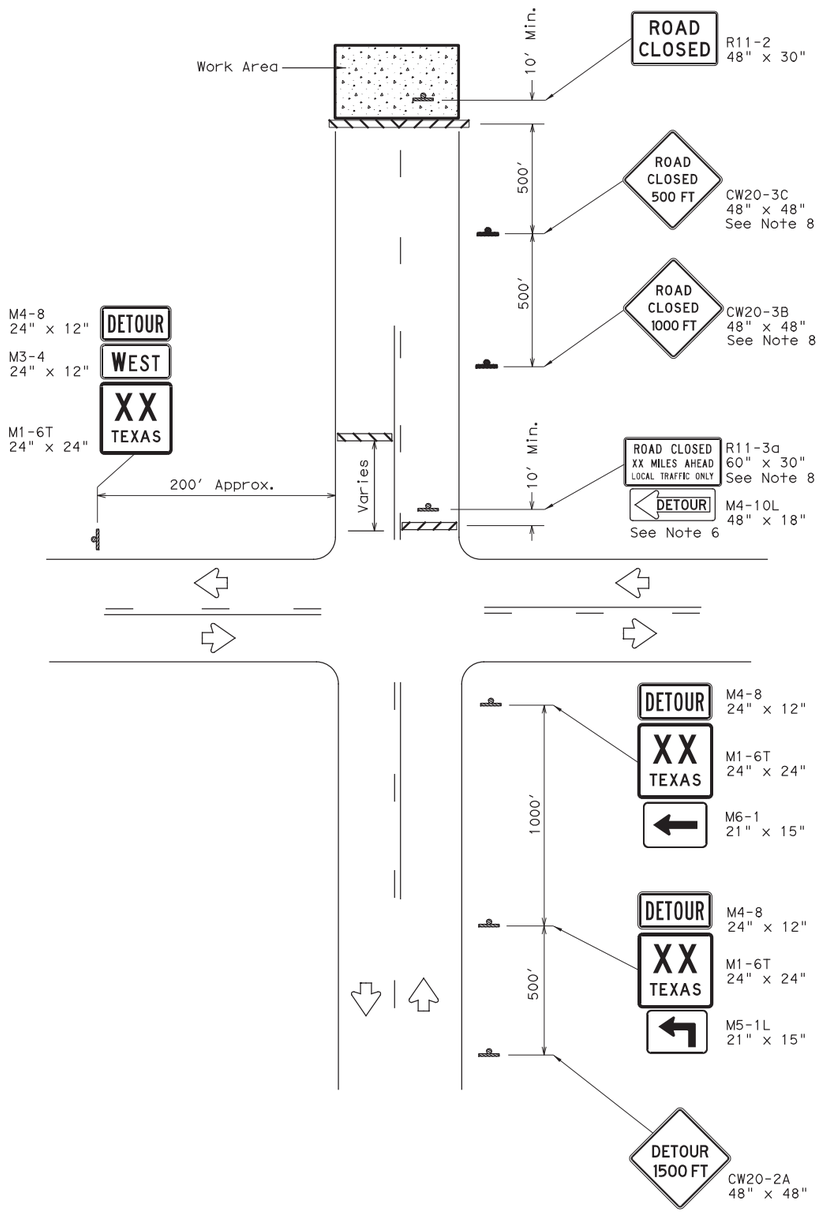
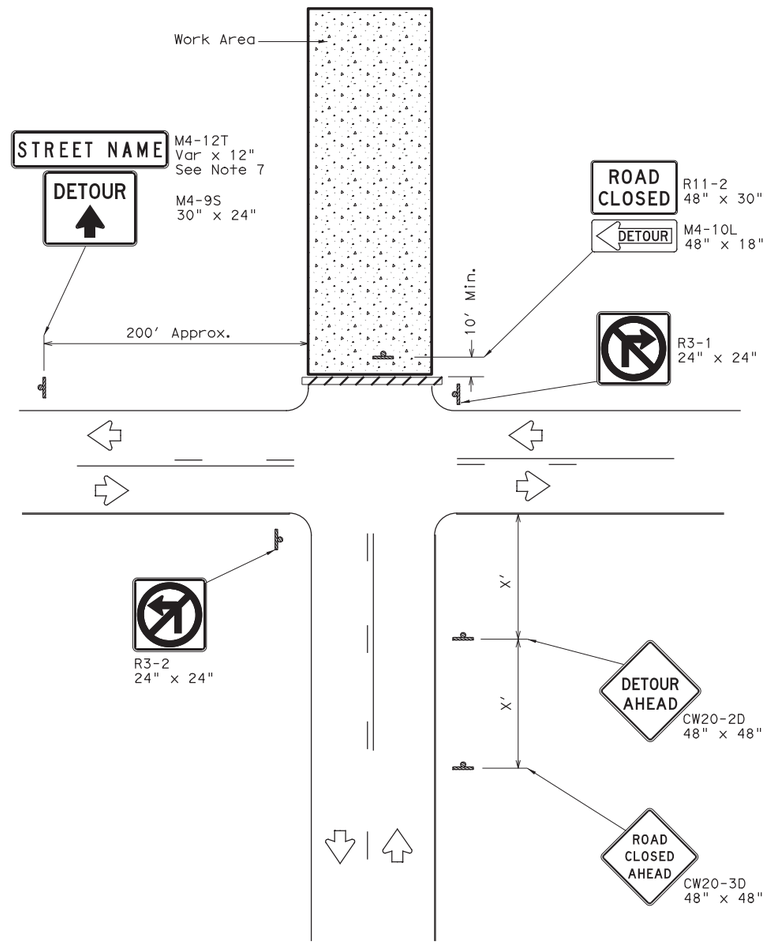


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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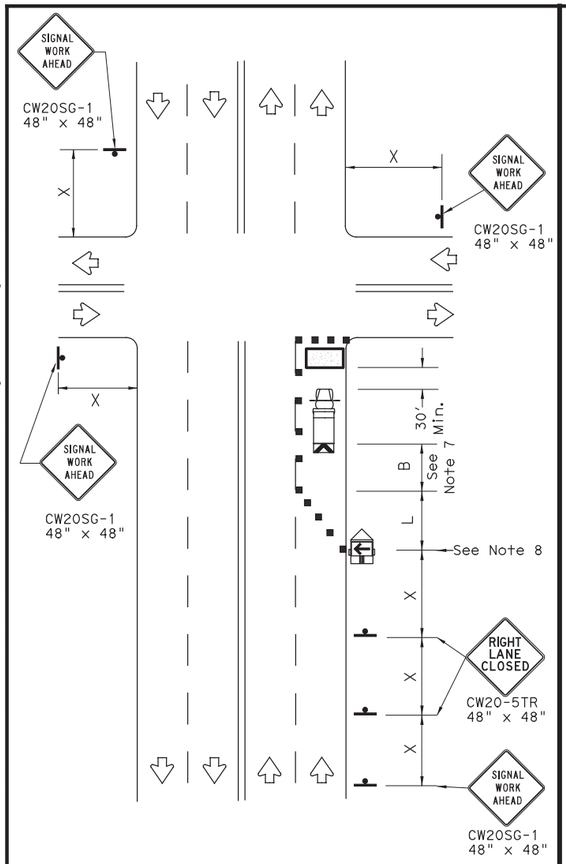
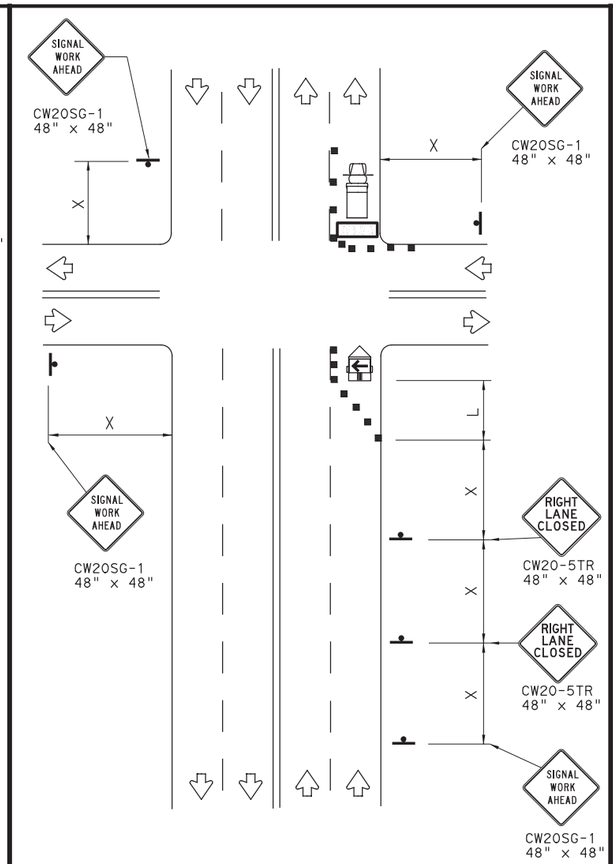
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	14	TRAVIS		63



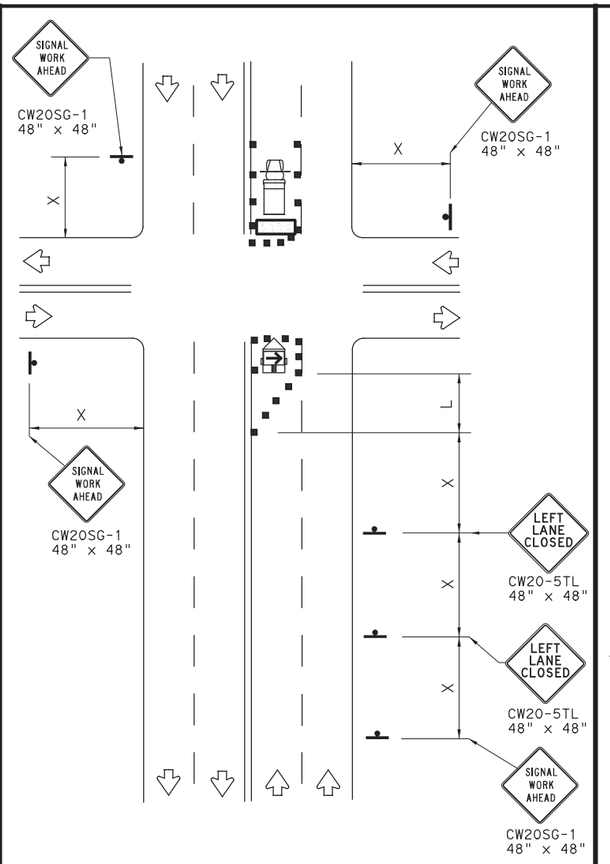
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



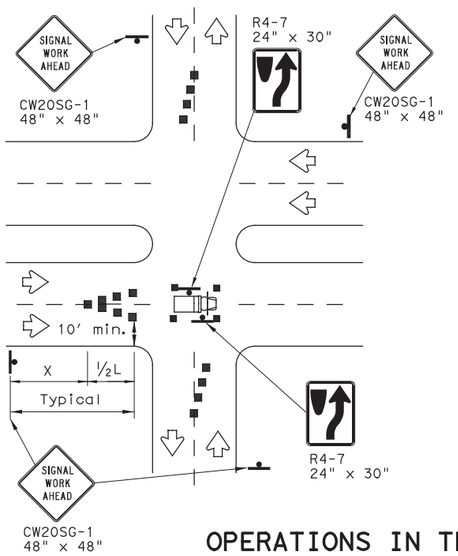
FAR SIDE RIGHT LANE CLOSURE

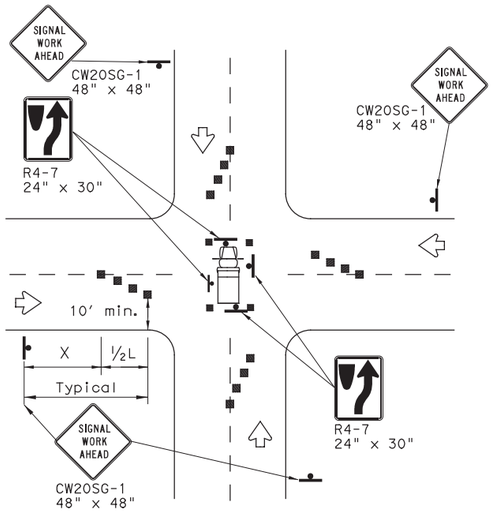
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

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)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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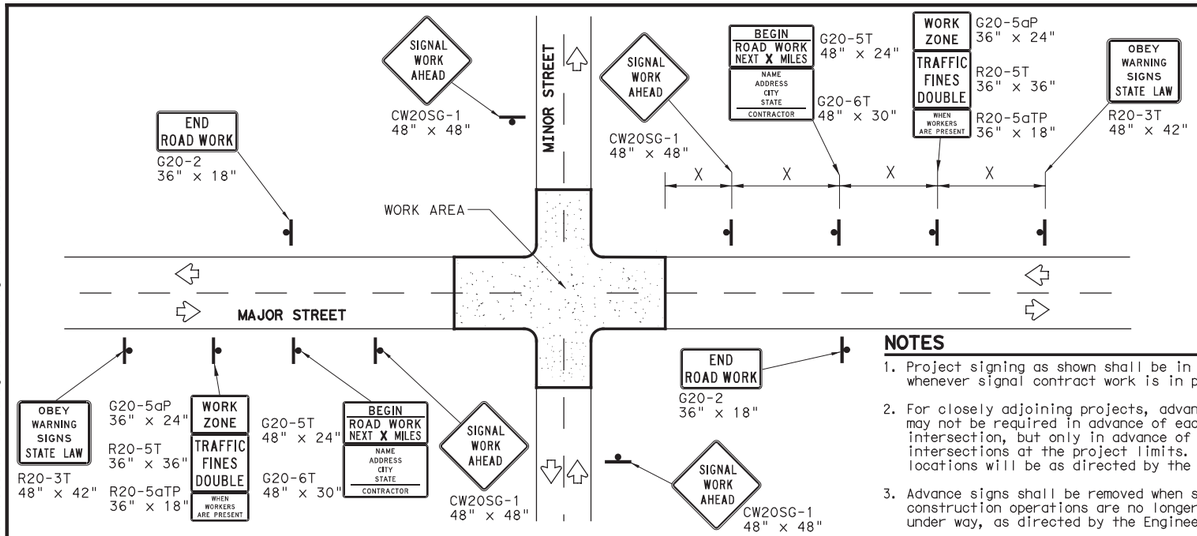


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

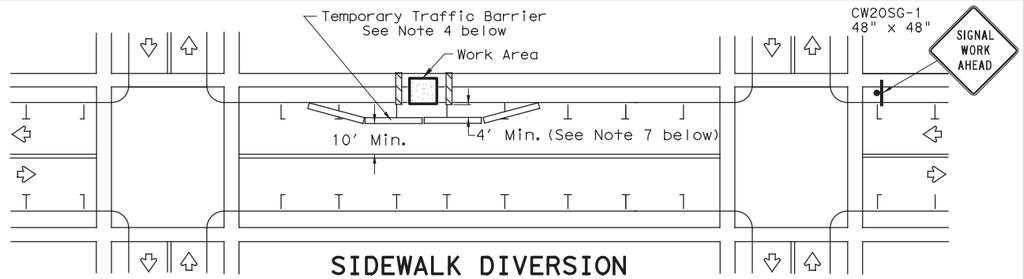
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

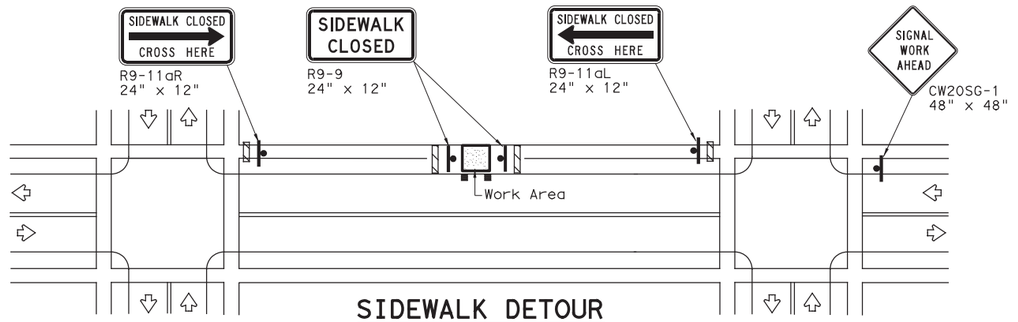
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

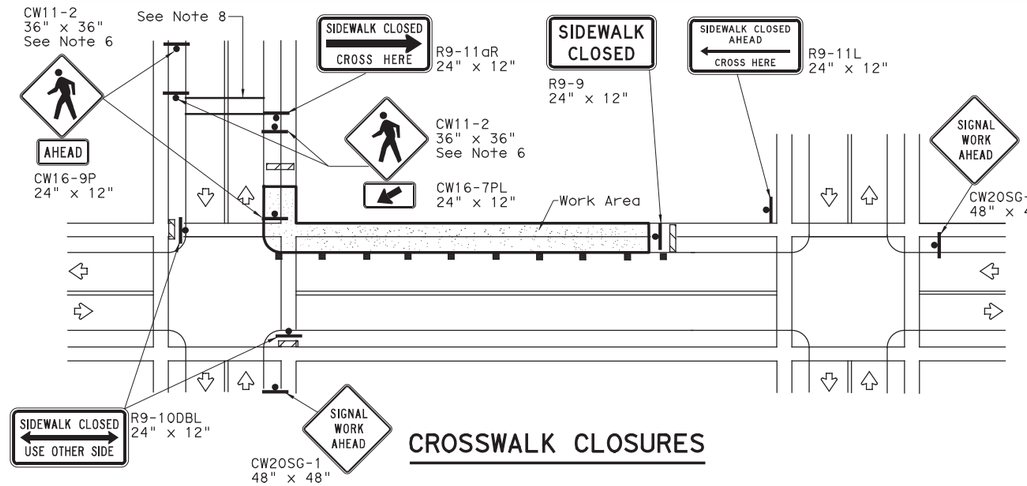
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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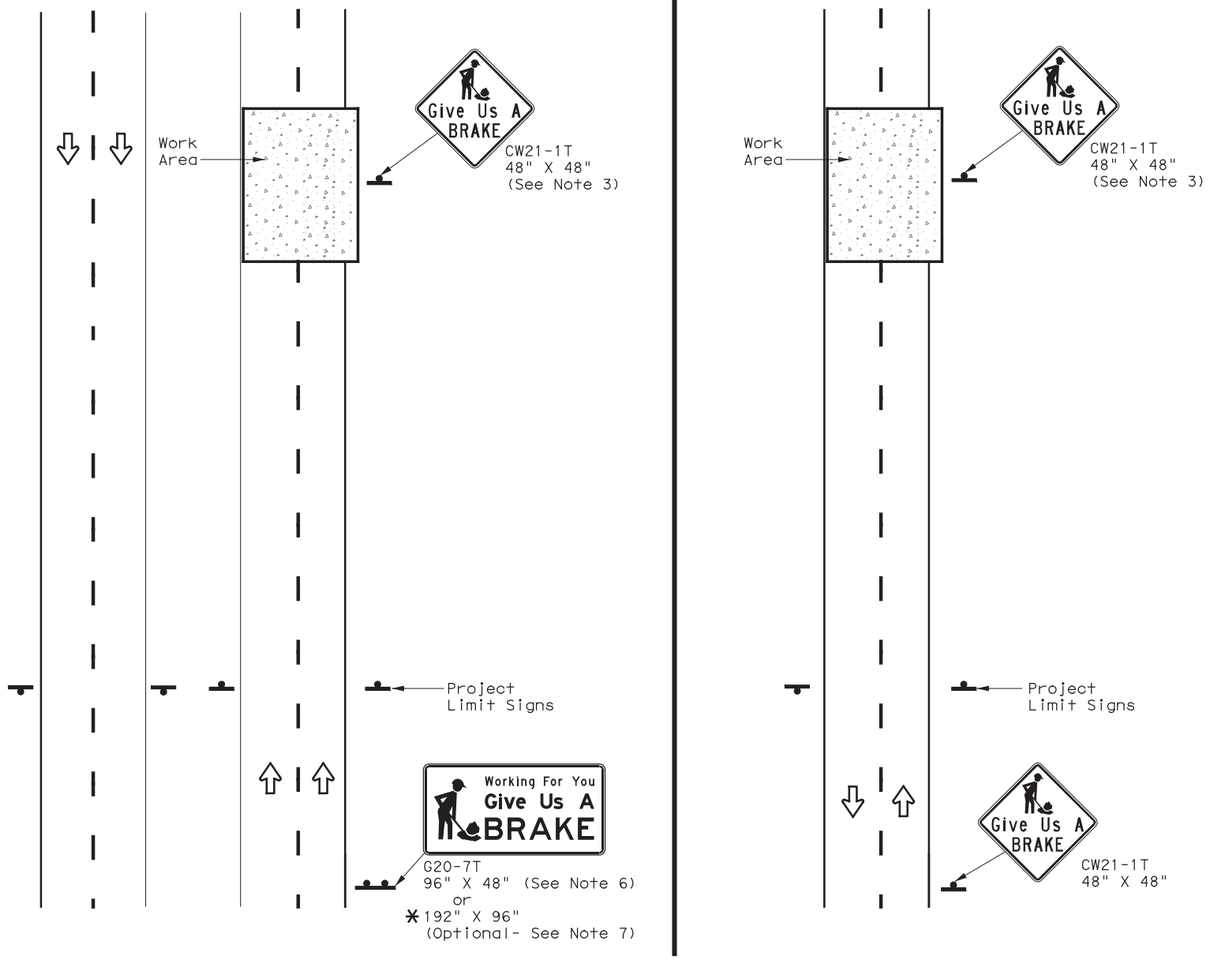

DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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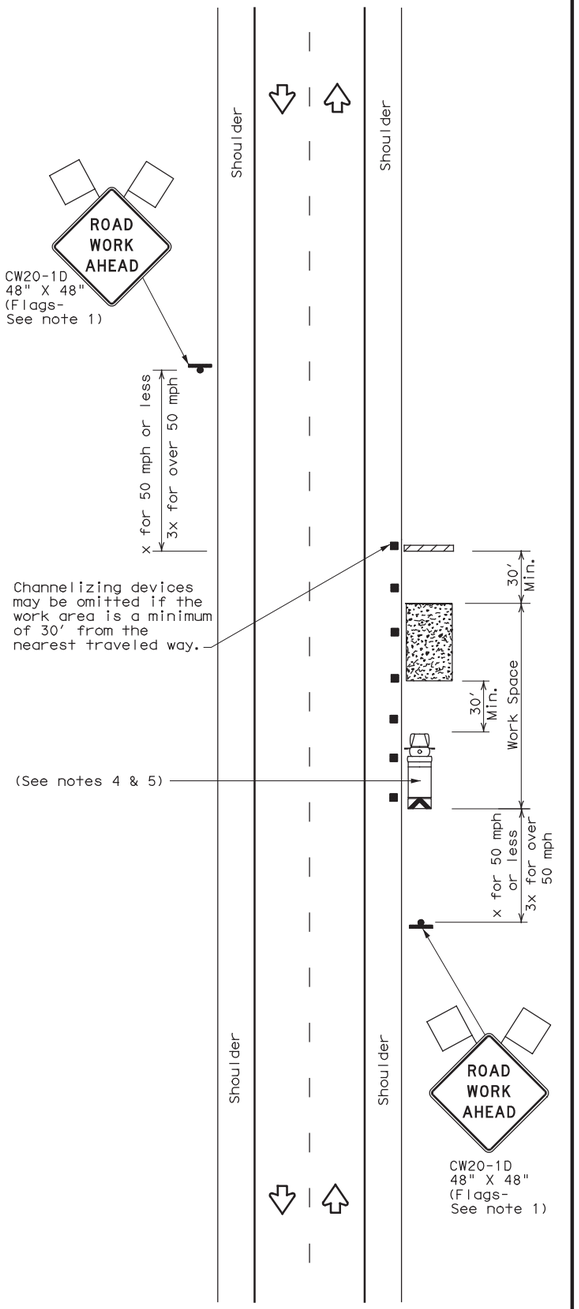
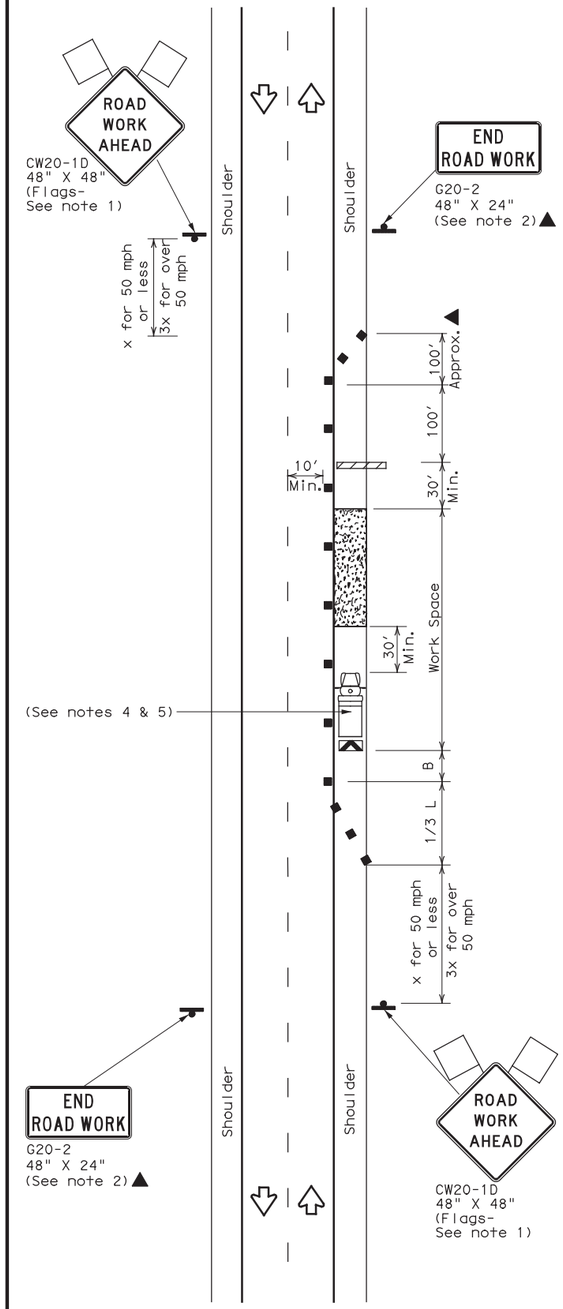


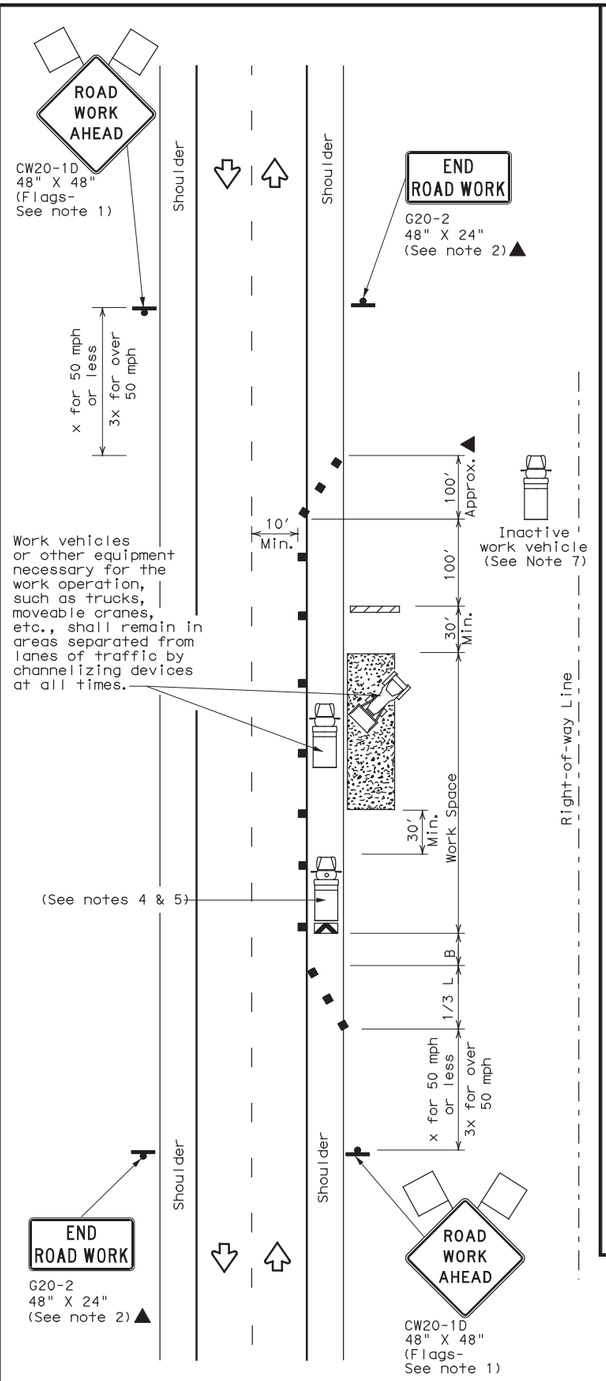
TCP (2-1a)

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 CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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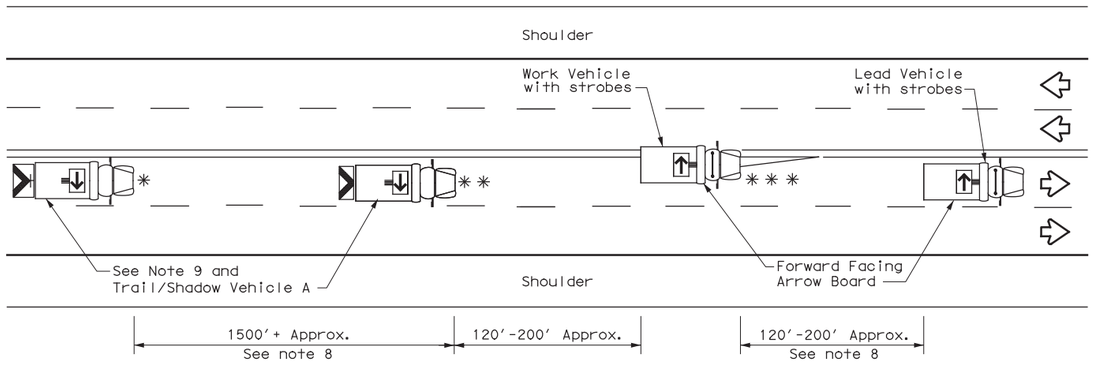
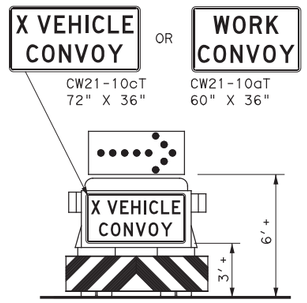


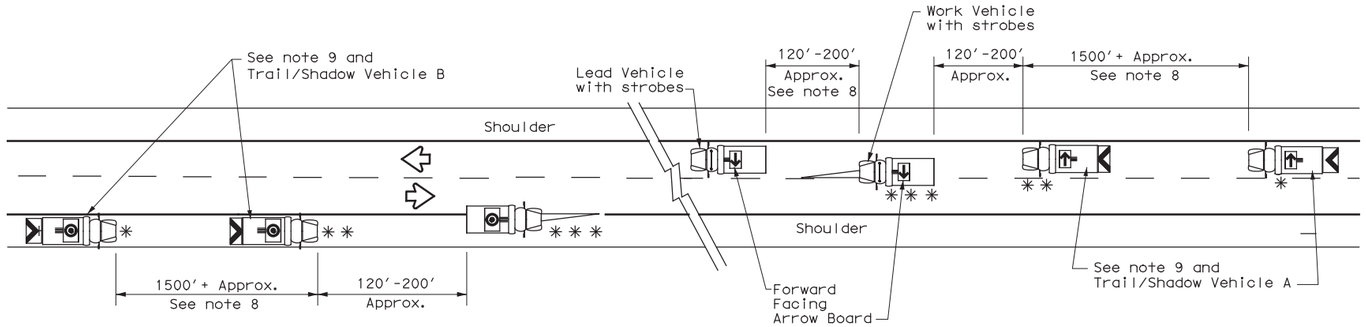
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

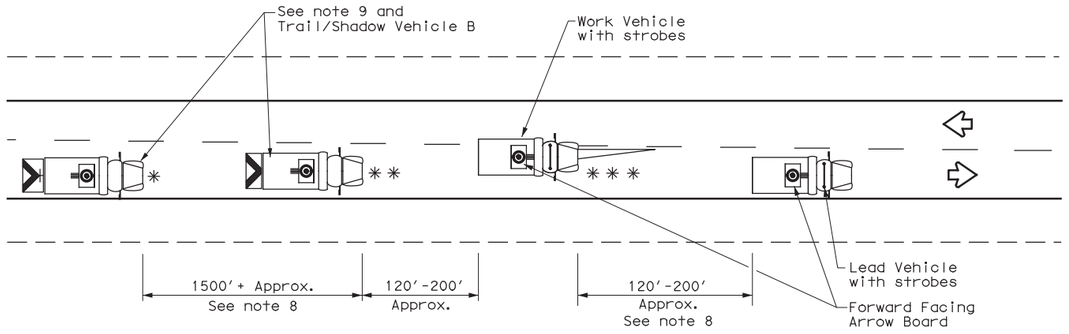


WORK ON SHOULDER

WORK ON TRAVEL LANE

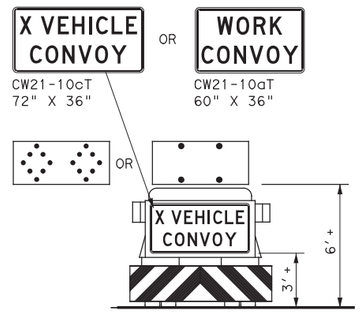
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

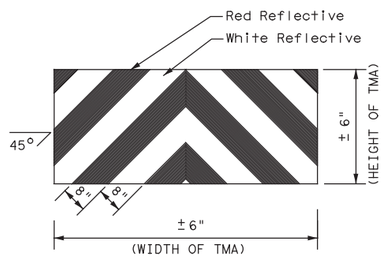
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	14	TRAVIS		68
1-97				

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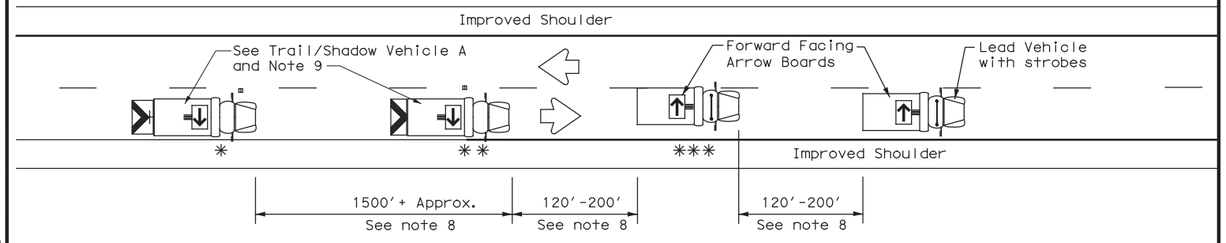
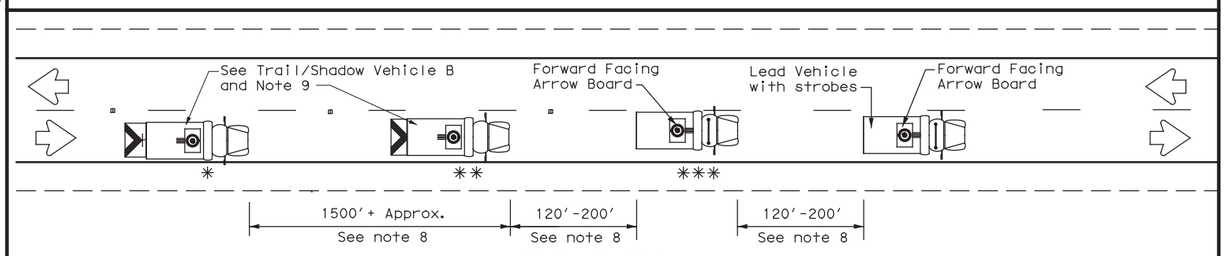


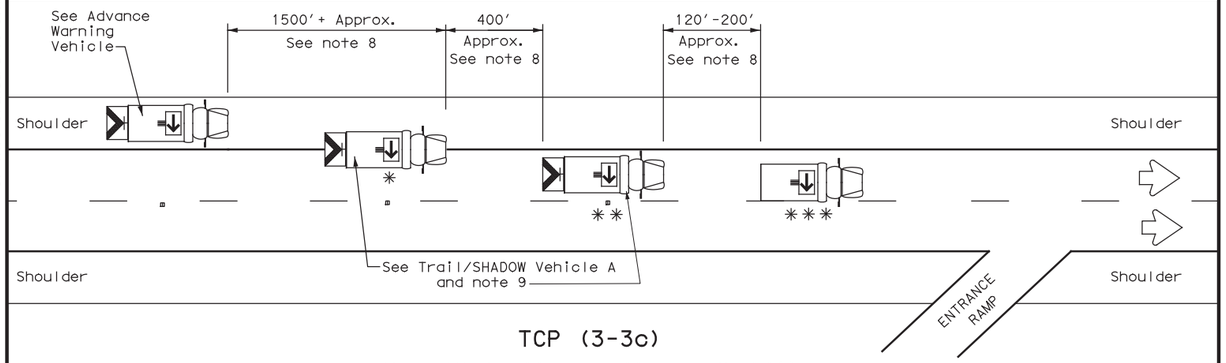
TCP (3-3a)

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



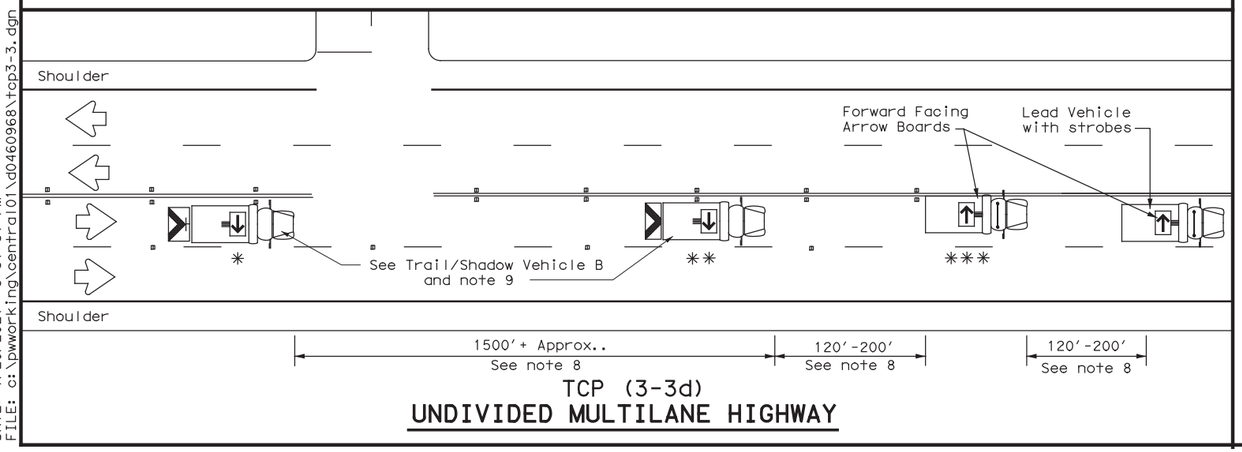
TCP (3-3b)

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



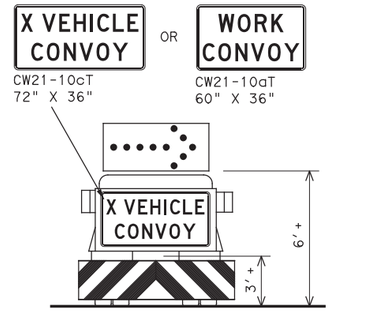
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



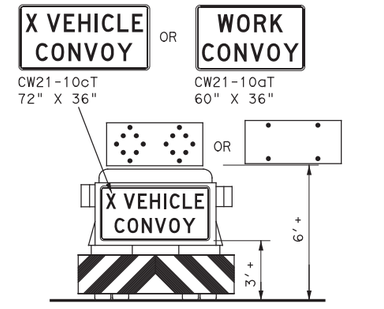
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



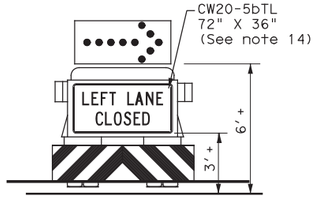
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

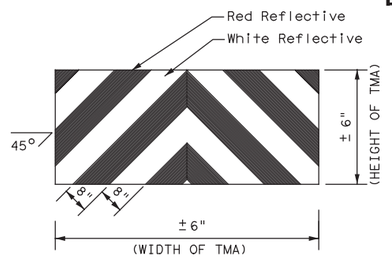


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13				
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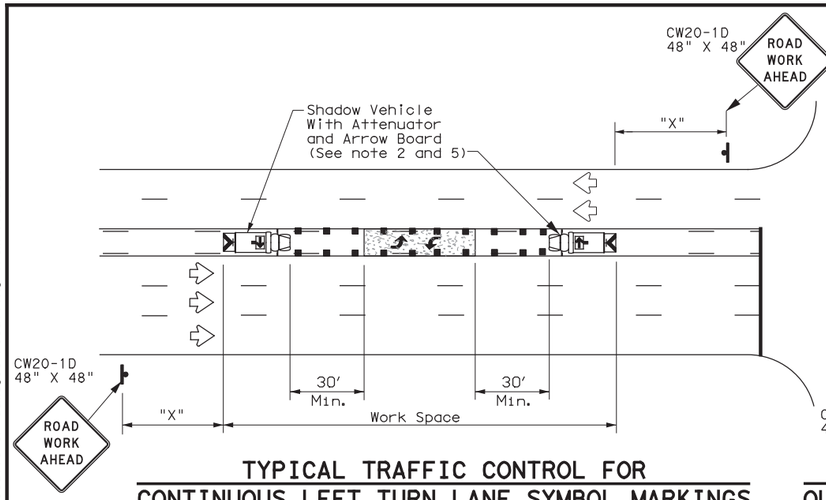
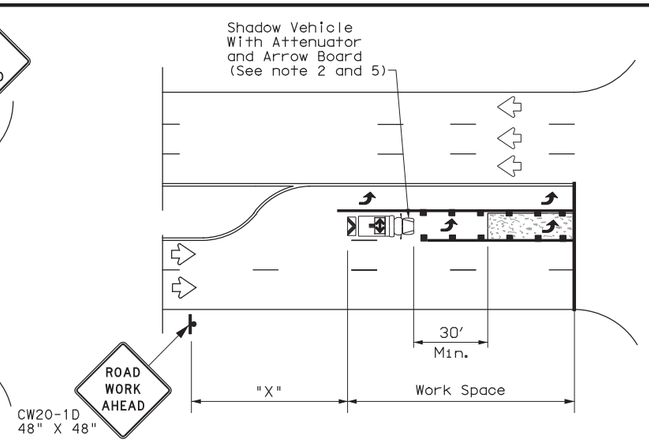
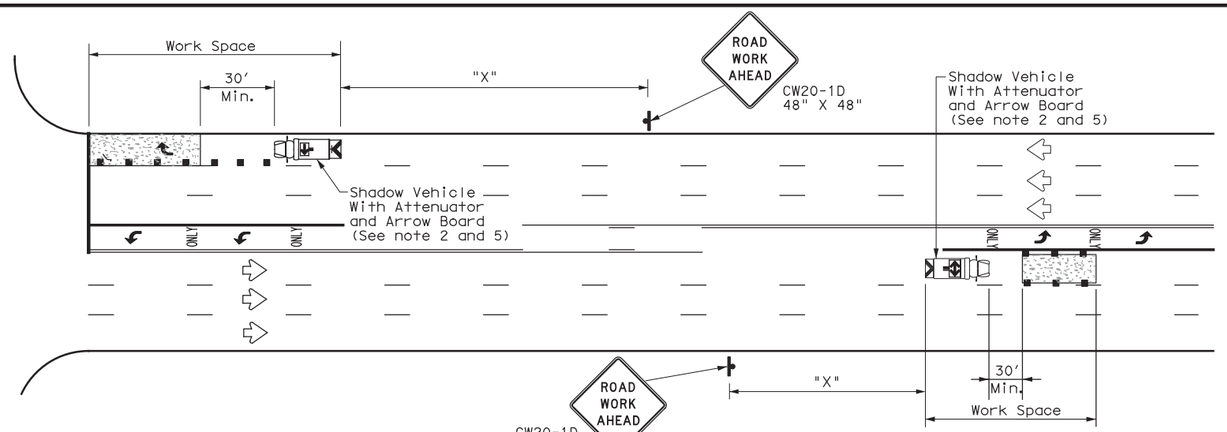


TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

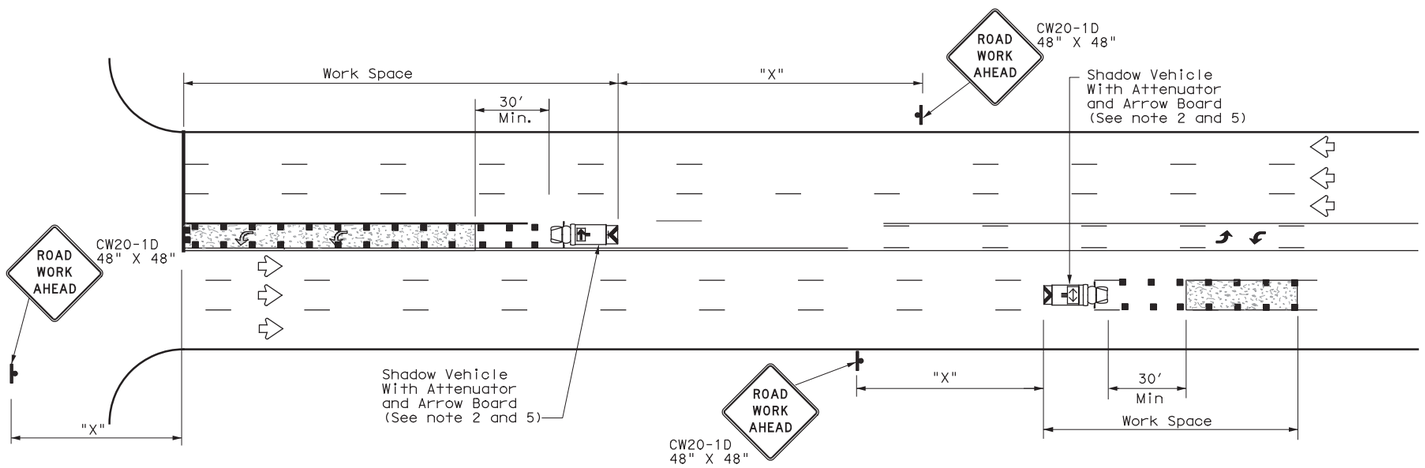


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS

LEGEND			
✳	Trail Vehicle	ARROW BOARD DISPLAY	
✳✳	Shadow Vehicle		
✳✳✳	Work Vehicle	→	RIGHT Directional
	Heavy Work Vehicle	←	LEFT Directional
	Truck Mounted Attenuator (TMA)	↔	Double Arrow
	Traffic Flow	■ ■ ■	Channelizing Devices

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′

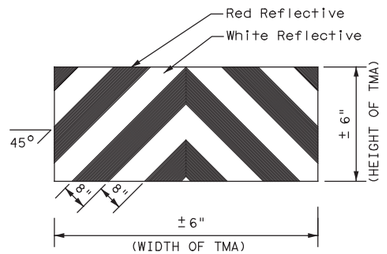
✳ Conventional Roads Only

✳✳ 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. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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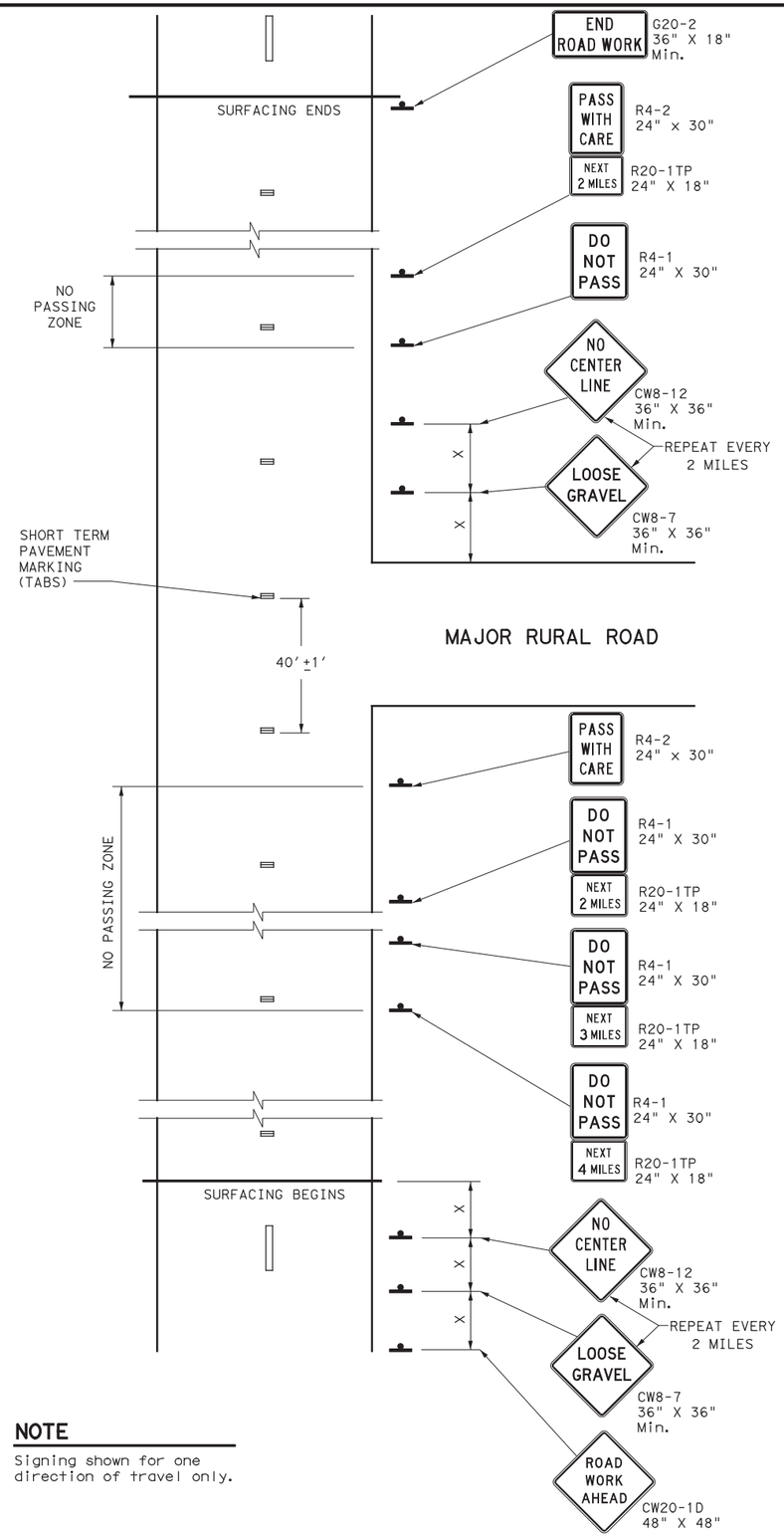
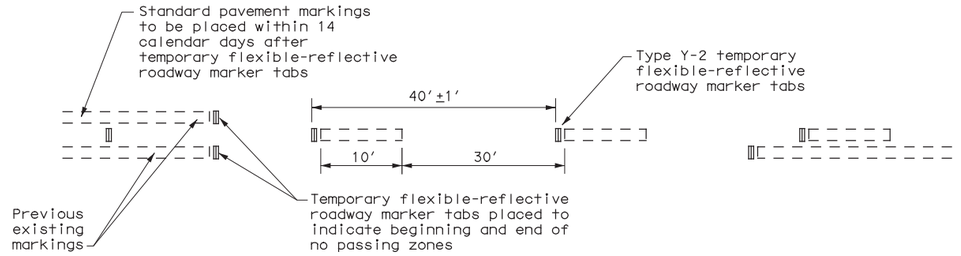


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120′
35	160′
40	240′
45	320′
50	400′
55	500′
60	600′
65	700′
70	800′
75	900′

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

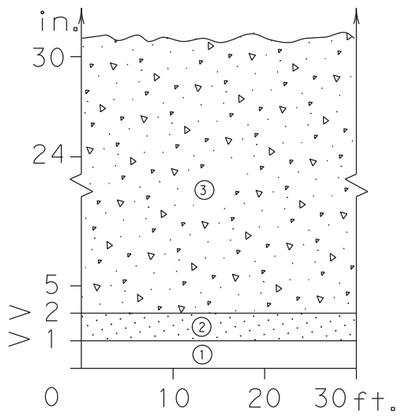
TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

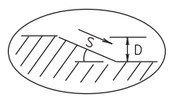
FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 4-98 1-97 7-13	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		71

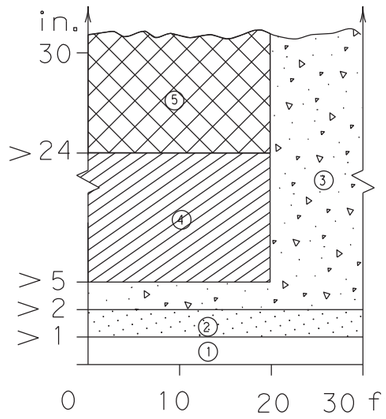
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

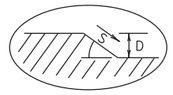


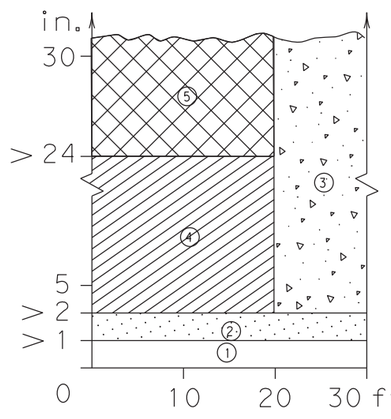
Edge Condition I
S = (3:1) (or flatter)



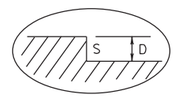


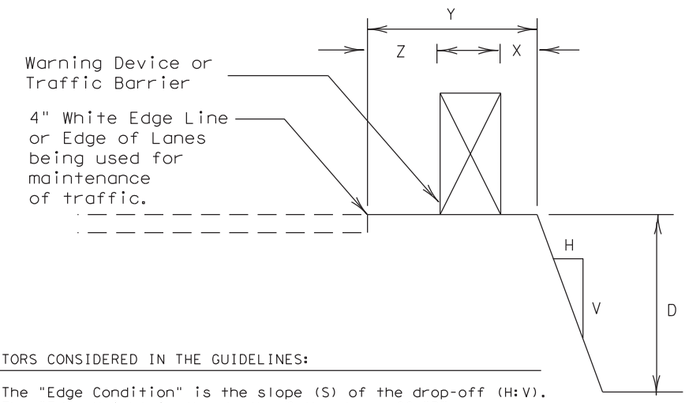
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

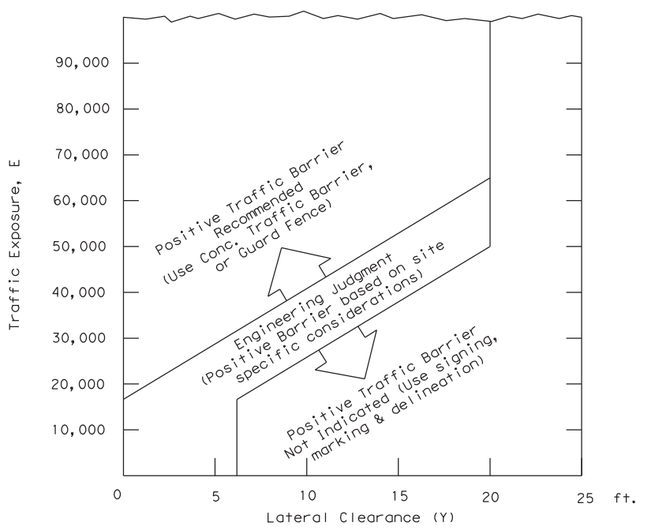
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



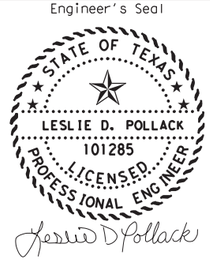
1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

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

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

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

Engineer's Seal



Date 01/22/2020

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
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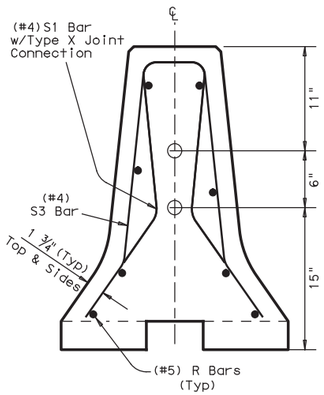
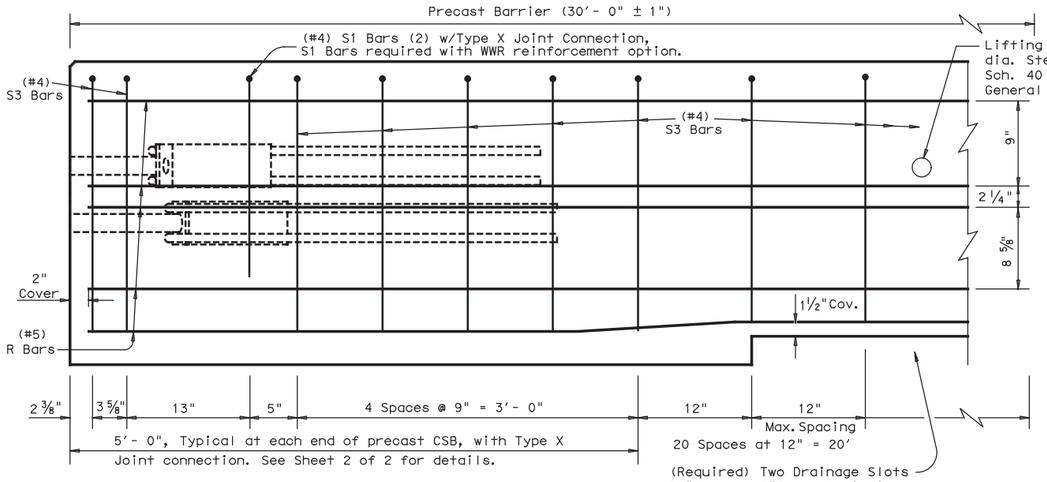


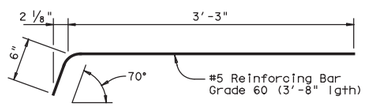
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



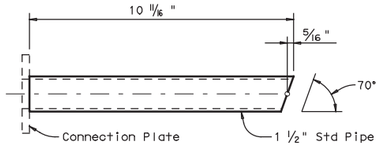
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



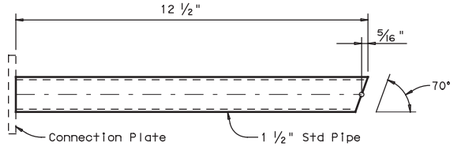
DEFORMED BAR ANCHOR DETAILS

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



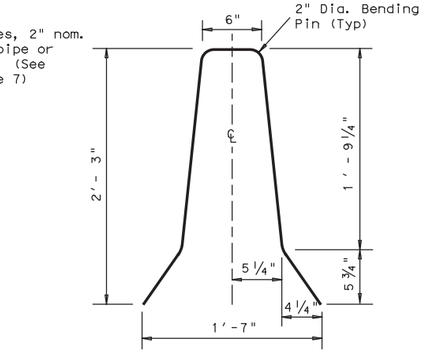
UPPER CONNECTION PIPE DETAILS

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



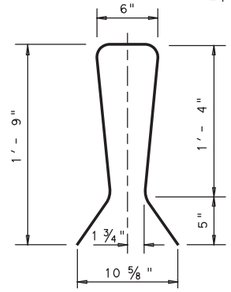
LOWER CONNECTION PIPE DETAILS

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



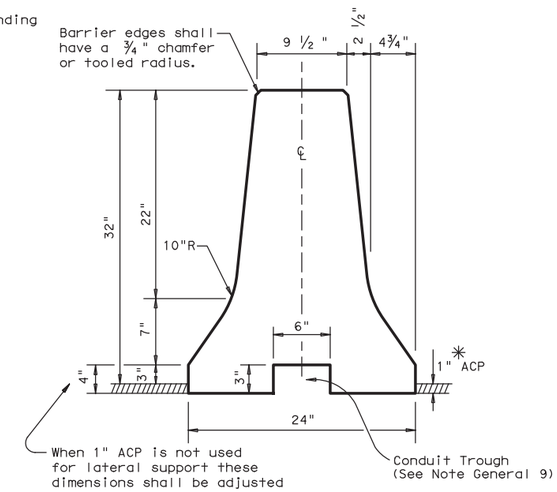
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

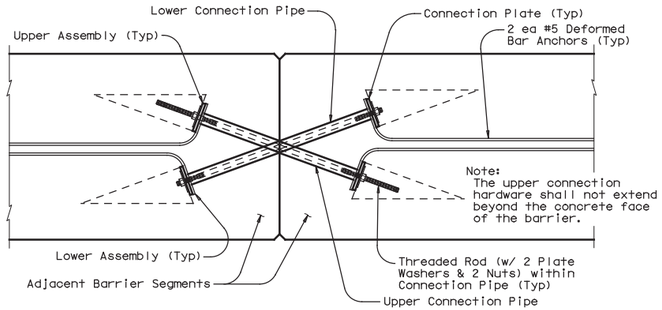


Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

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 3/4" chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
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 involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

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

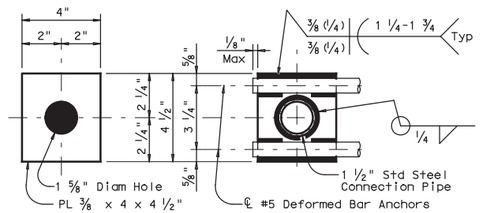
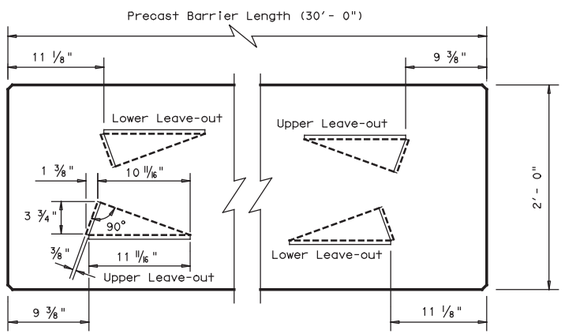


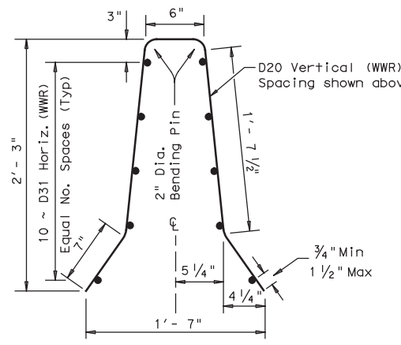
PLATE DIMENSIONS WELDING DETAILS

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.



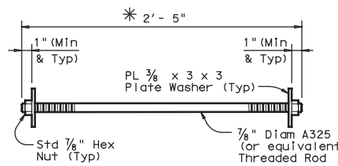
BARRIER PLAN AT END JOINTS



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

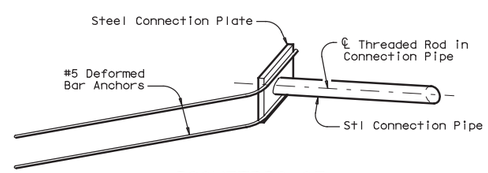
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing 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".



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

✳ 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.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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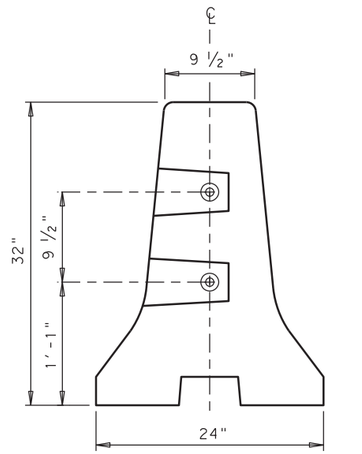
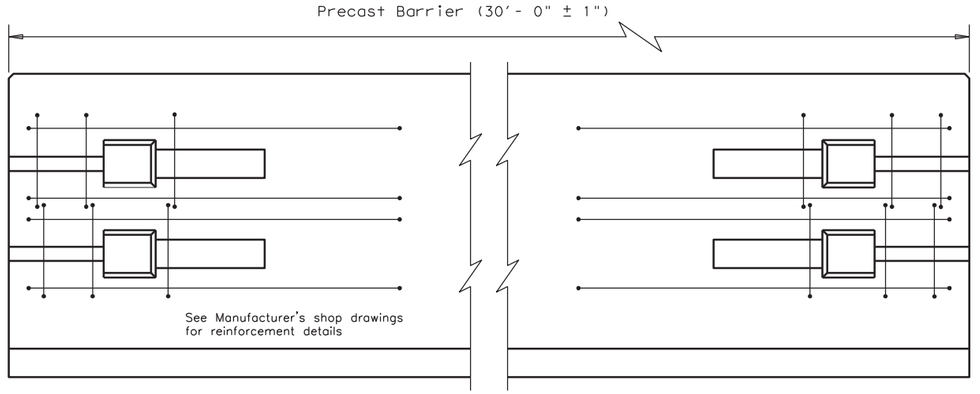
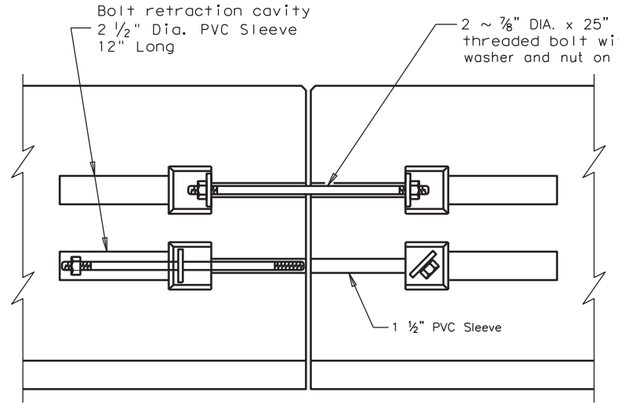


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

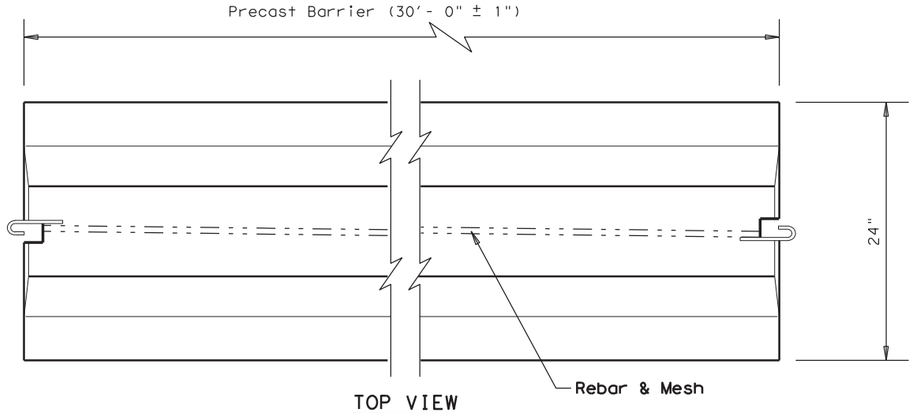


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

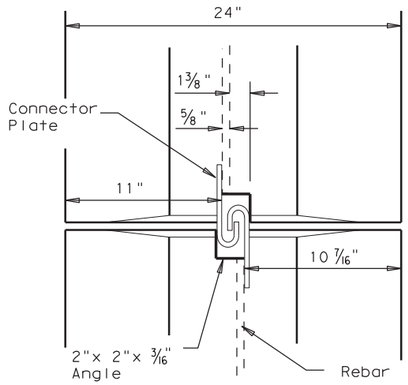


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

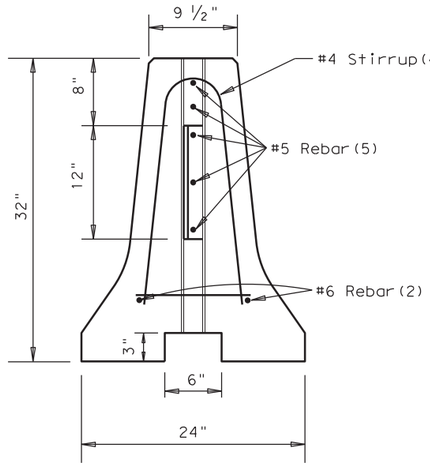
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

Proprietary Joint Connections (CSB)

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.

Texas Department of Transportation
Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	14	TRAVIS		73A

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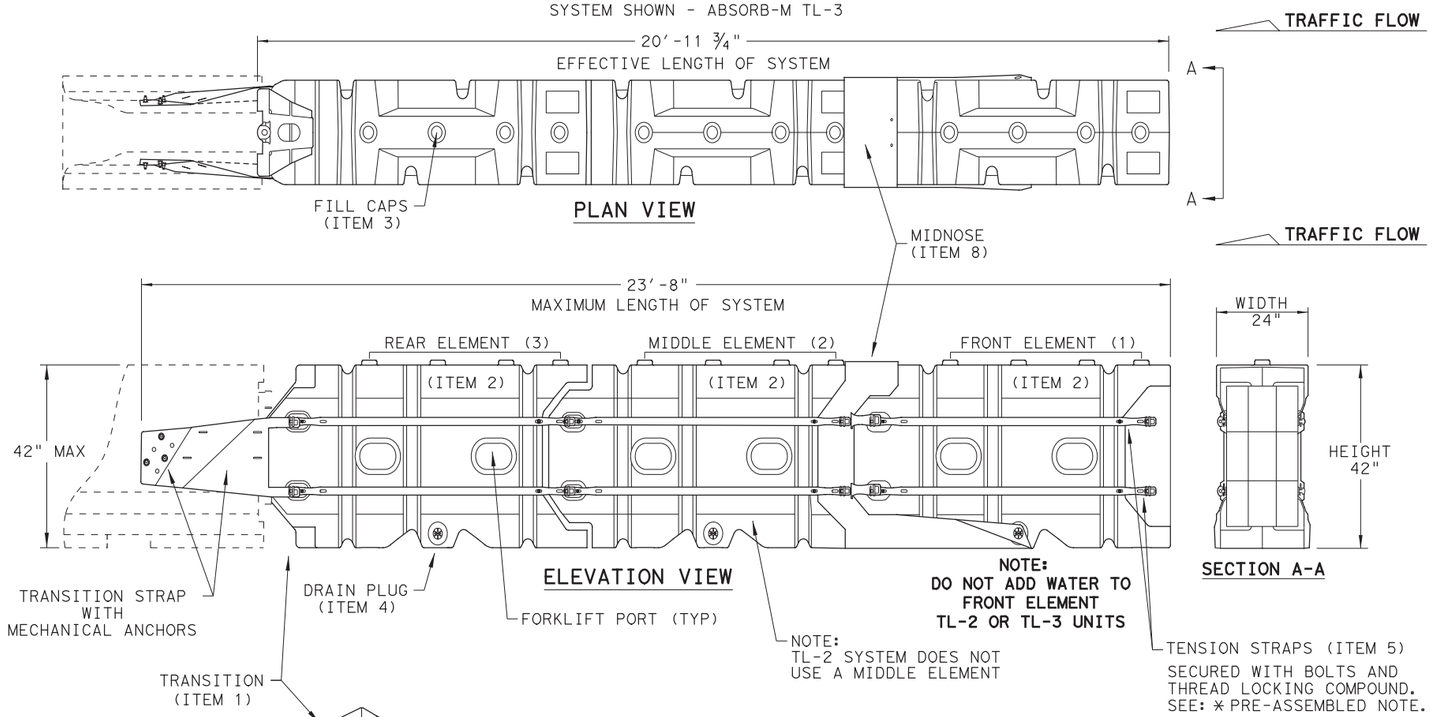
SYSTEM SHOWN - ABSORB-M TL-3



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

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"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

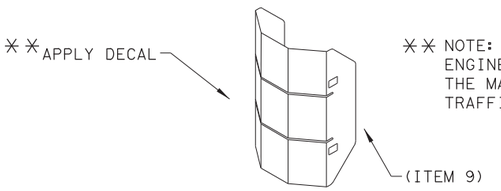
GENERAL NOTES

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



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
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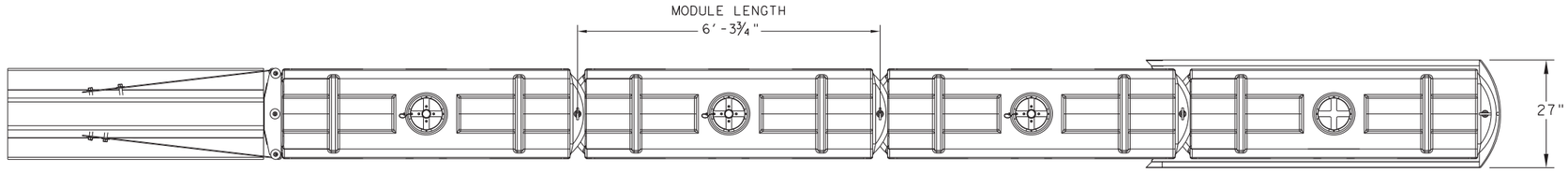
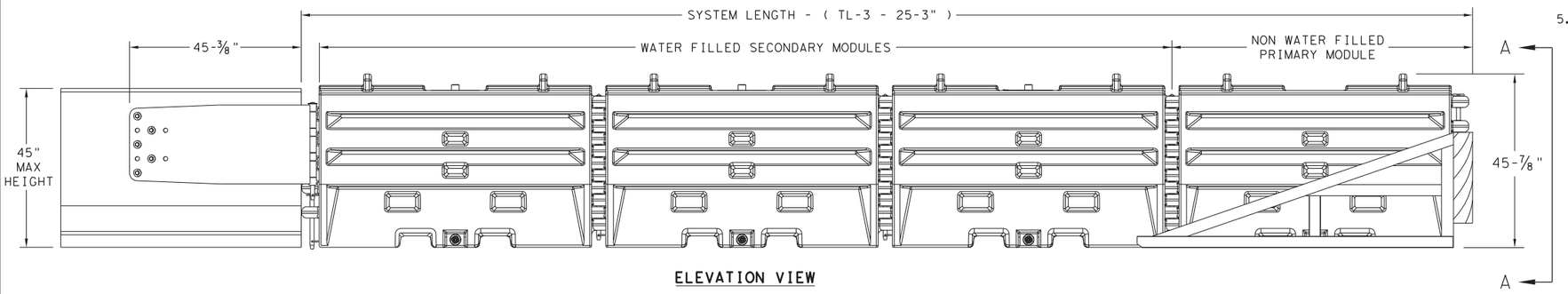
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		74



PLAN VIEW



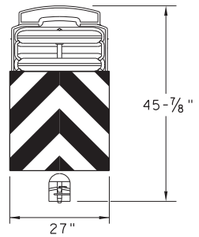
ELEVATION VIEW

GENERAL NOTES

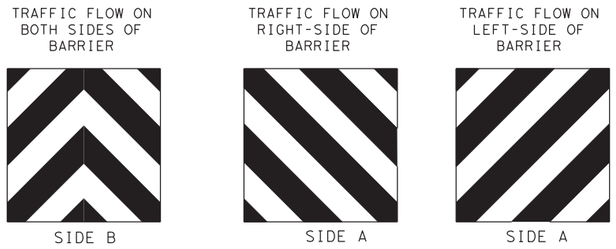
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, 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

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

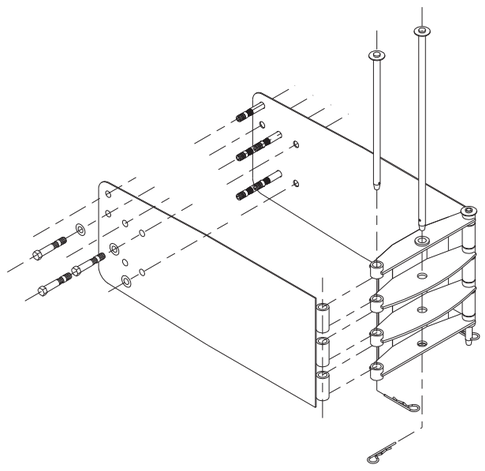


SECTION A-A



NOSE SHEETING PANEL DELINEATION

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



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

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

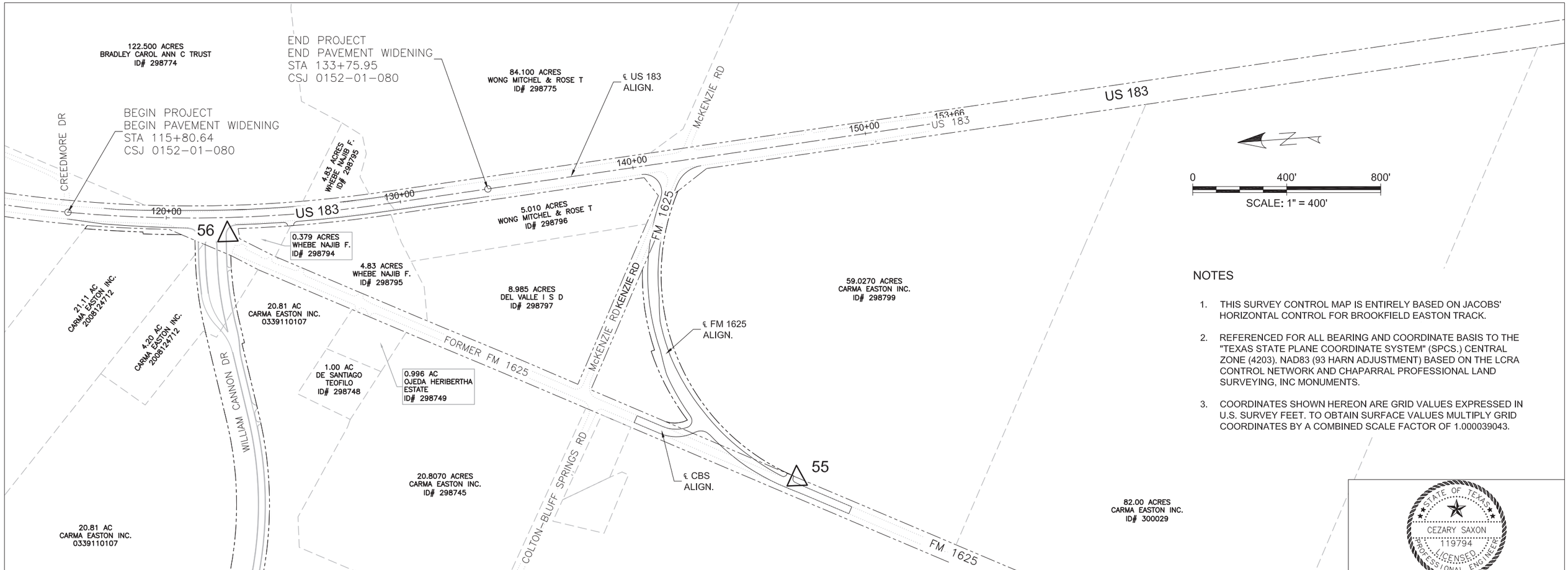
Texas Department of Transportation

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	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		75

DATE: 1/21/2021
FILE: c:\pwworking\central01\d0460968\sled19.dgn



NOTES

1. THIS SURVEY CONTROL MAP IS ENTIRELY BASED ON JACOBS' HORIZONTAL CONTROL FOR BROOKFIELD EASTON TRACK.
2. REFERENCED FOR ALL BEARING AND COORDINATE BASIS TO THE "TEXAS STATE PLANE COORDINATE SYSTEM" (SPCS.) CENTRAL ZONE (4203). NAD83 (93 HARN ADJUSTMENT) BASED ON THE LCRA CONTROL NETWORK AND CHAPARRAL PROFESSIONAL LAND SURVEYING, INC MONUMENTS.
3. COORDINATES SHOWN HEREON ARE GRID VALUES EXPRESSED IN U.S. SURVEY FEET. TO OBTAIN SURFACE VALUES MULTIPLY GRID COORDINATES BY A COMBINED SCALE FACTOR OF 1.000039043.

POINT NO.	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION
55	10025702.5717	3128555.0780	549.63	3-1/4" ALUMINIUM DISC SET IN SOUTHEAST CORNER OF CONCRETE DRIVE CULVERT, EAST SIDE OF F.M. 1625, APPORXIMATELY 0.15 MILES SOUTH OF COLTON-BLUFF SPRINGS
56	10027963.5000	3129751.9000	537.10	3-1/4" ALUMINIUM DISC SET IN NORTHWEST CORNER OF SIGNAL BOX PAD AT SOUTHWEST INTERSECTION OF U.S. HIGHWAY 183 AND F.M. 1625

LEGEND

- EXISTING RIGHT OF WAY
- EXISTING BASE
- LOT LINES

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

09/01/2020

US 183

SURVEY CONTROL MAP

SCALE: 1" : 400' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		76

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Survey Control Map

DESCRIBE CHAIN US183

Chain US183 contains:
100 CUR US183CUR1 101

Beginning chain US183 description
========== ==

Point 100 X 3,133,487.89 Y 10,044,847.58 Sta 114+15.30

Course from 100 to PC US183CUR1 S 12° 26' 32.68" W Dist 15,857.00

Curve Data
*---------- *
Curve US183CUR1
P.I. Station 281+17.21 X 3,129,889.33 Y 10,028,537.94
Delta = 16° 46' 38.38" (LT)
Degree = 1° 00' 00.00"
Tangent = 844.91
Length = 1,677.73
Radius = 5,729.58
External = 61.96
Long Chord = 1,671.75
Mid. Ord. = 61.30
P.C. Station 272+72.30 X 3,130,071.37 Y 10,029,363.01
P.T. Station 289+50.03 X 3,129,953.19 Y 10,027,695.45
C.C. X 3,135,666.38 Y 10,028,128.52
Back = S 12° 26' 32.68" W
Ahead = S 4° 20' 05.70" E
Chord Bear = S 4° 03' 13.49" W

Course from PT US183CUR1 to 101 S 4° 20' 05.70" E Dist 22,240.80

Point 101 X 3,131,634.29 Y 10,005,518.27 Sta 511+90.83

========== ==
Ending chain US183 description

09/01/2020

US 183

HORIZONTAL ALIGNMENT DATA

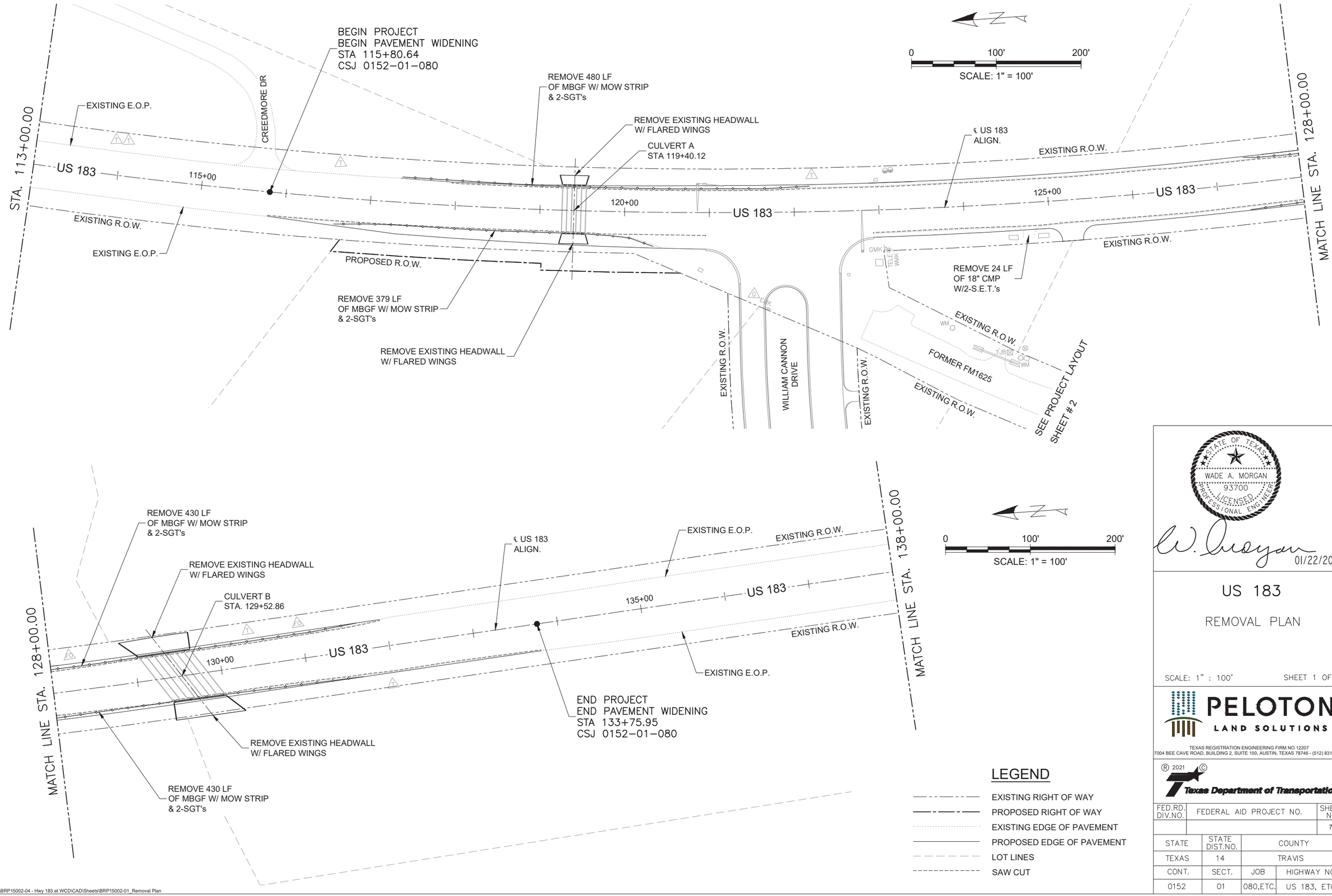
SCALE: N.T.S SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			77

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES
- SAW CUT

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

REMOVAL PLAN

SCALE: 1" : 100'

SHEET 1 OF 2

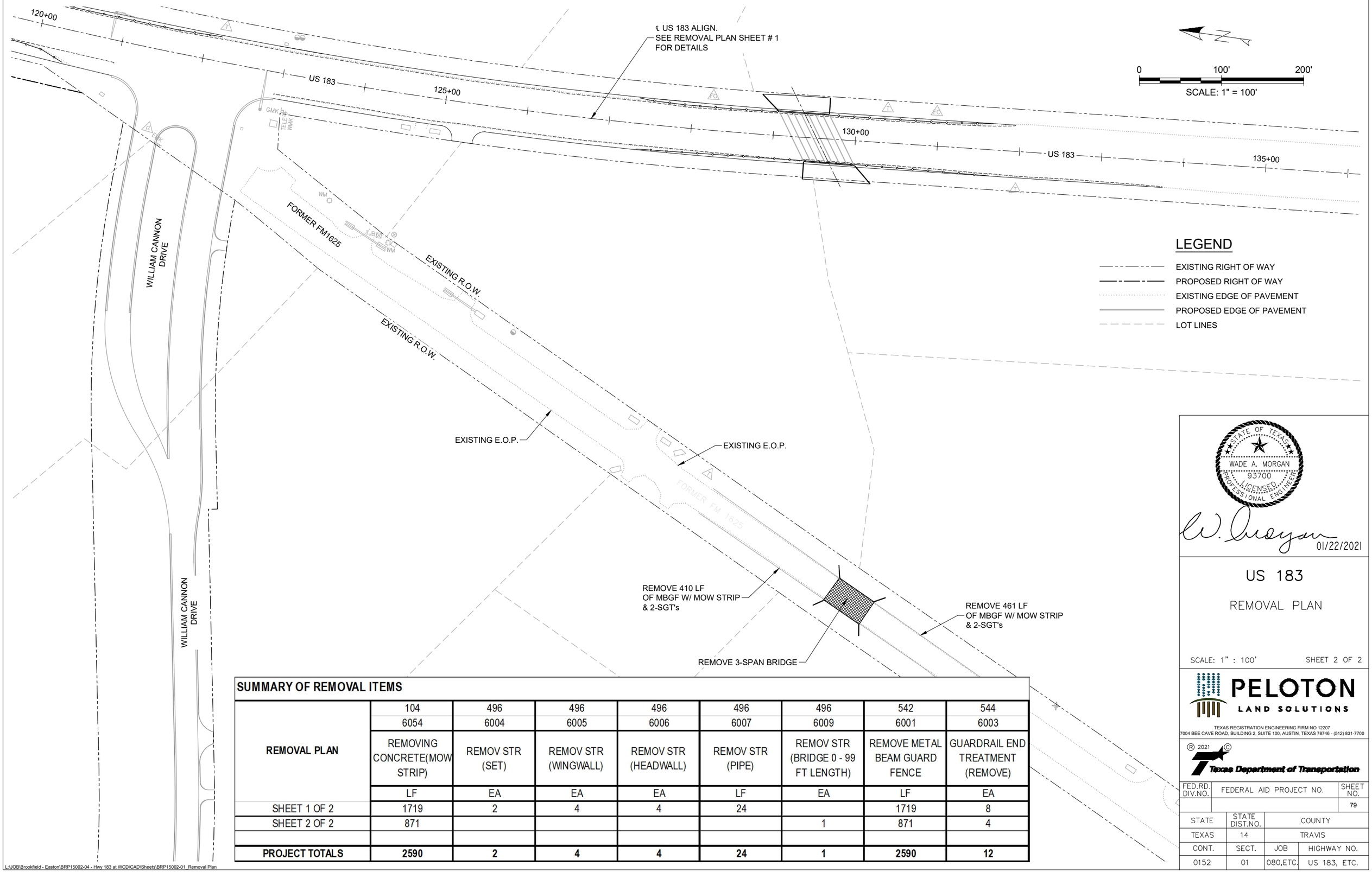
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		78

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Removal Plan



SUMMARY OF REMOVAL ITEMS

REMOVAL PLAN	104 6054	496 6004	496 6005	496 6006	496 6007	496 6009	542 6001	544 6003
	REMOVING CONCRETE(MOW STRIP)	REMOV STR (SET)	REMOV STR (WINGWALL)	REMOV STR (HEADWALL)	REMOV STR (PIPE)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (REMOVE)
	LF	EA	EA	EA	LF	EA	LF	EA
SHEET 1 OF 2	1719	2	4	4	24		1719	8
SHEET 2 OF 2	871					1	871	4
PROJECT TOTALS	**2590**	**2**	**4**	**4**	**24**	**1**	**2590**	**12**

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

REMOVAL PLAN

SCALE: 1" : 100' SHEET 2 OF 2

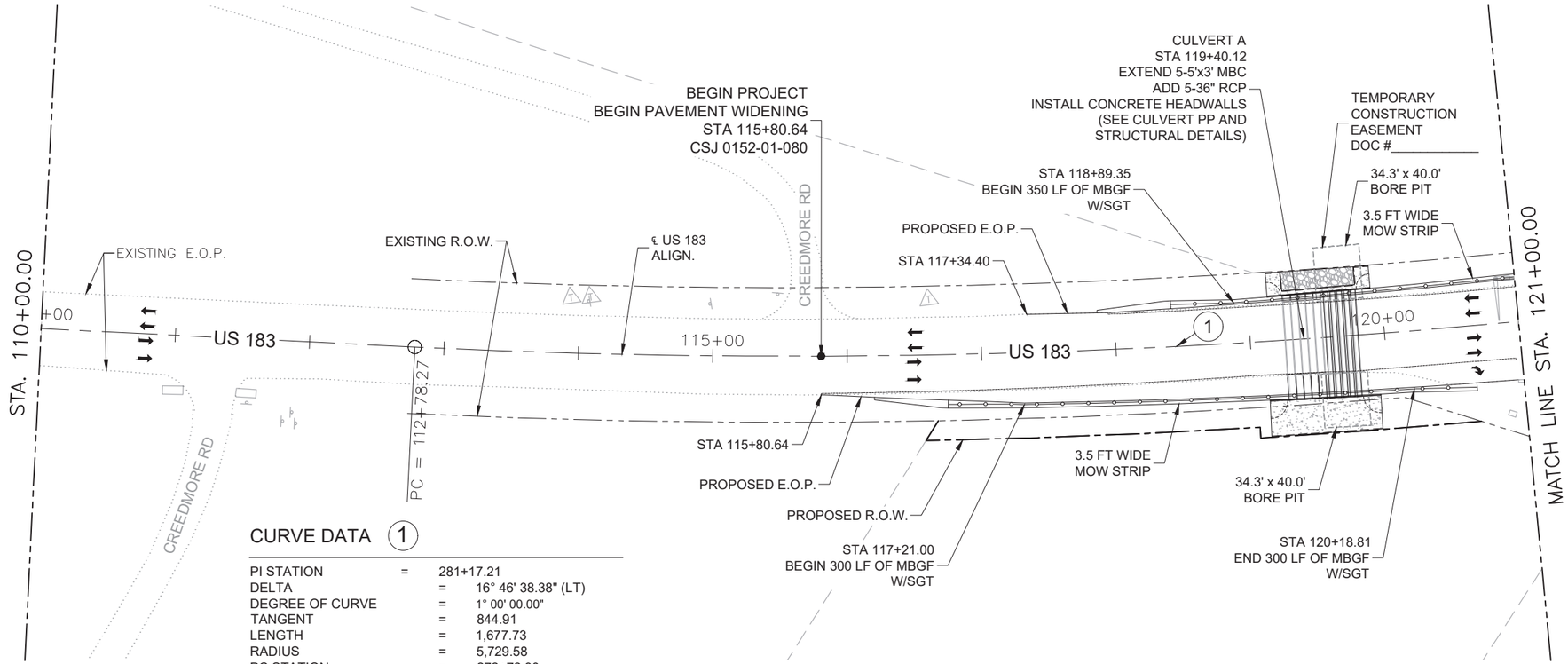
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			79

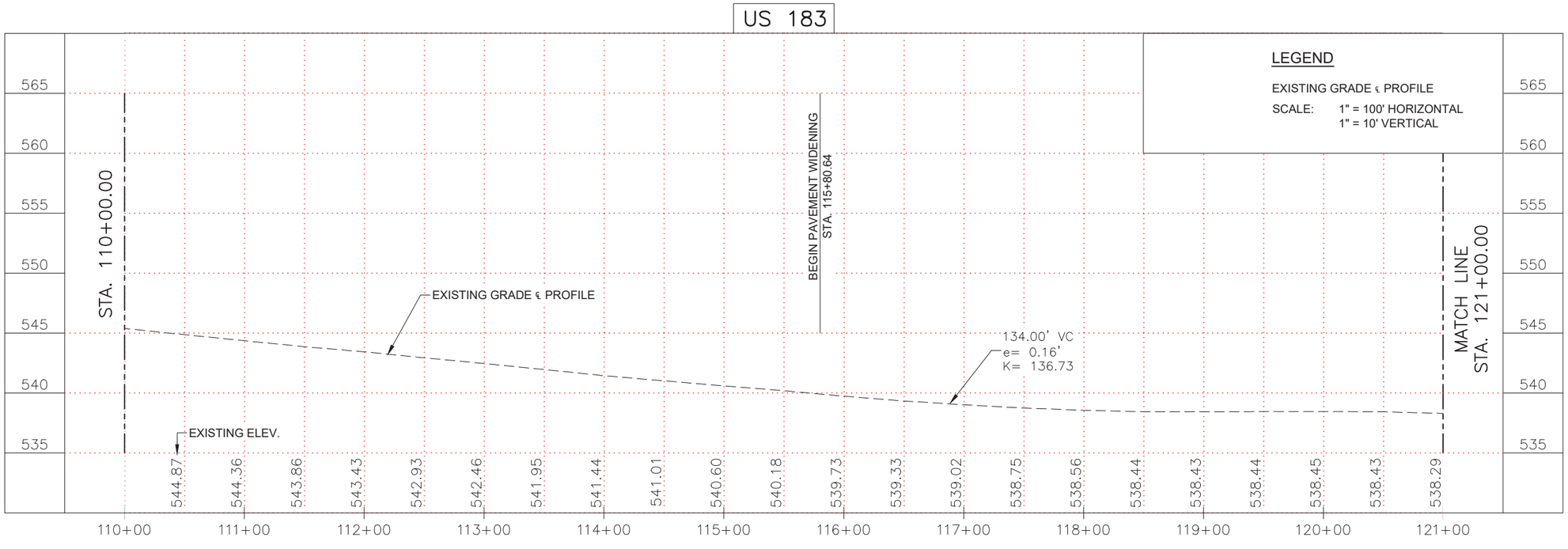
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Removal Plan



CURVE DATA (1)

PI STATION	=	281+17.21
DELTA	=	16° 46' 38.38" (LT)
DEGREE OF CURVE	=	1° 00' 00.00"
TANGENT	=	844.91
LENGTH	=	1,677.73
RADIUS	=	5,729.58
PC STATION	=	272+72.30
PT STATION	=	289+50.03



LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES

NOTES

1. SEE DRAINAGE AND CULVERT PP SHEETS FOR CULVERT HYDRAULIC INFORMATION.

STATE OF TEXAS
WADE A. MORGAN
93700
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PROFESSIONAL ENGINEER

01/22/2021

US 183
PLAN AND PROFILE
FROM STA. 110+00.00
TO STA. 121+00.00

SCALE: 1" : 100'

SHEET 1 OF 3

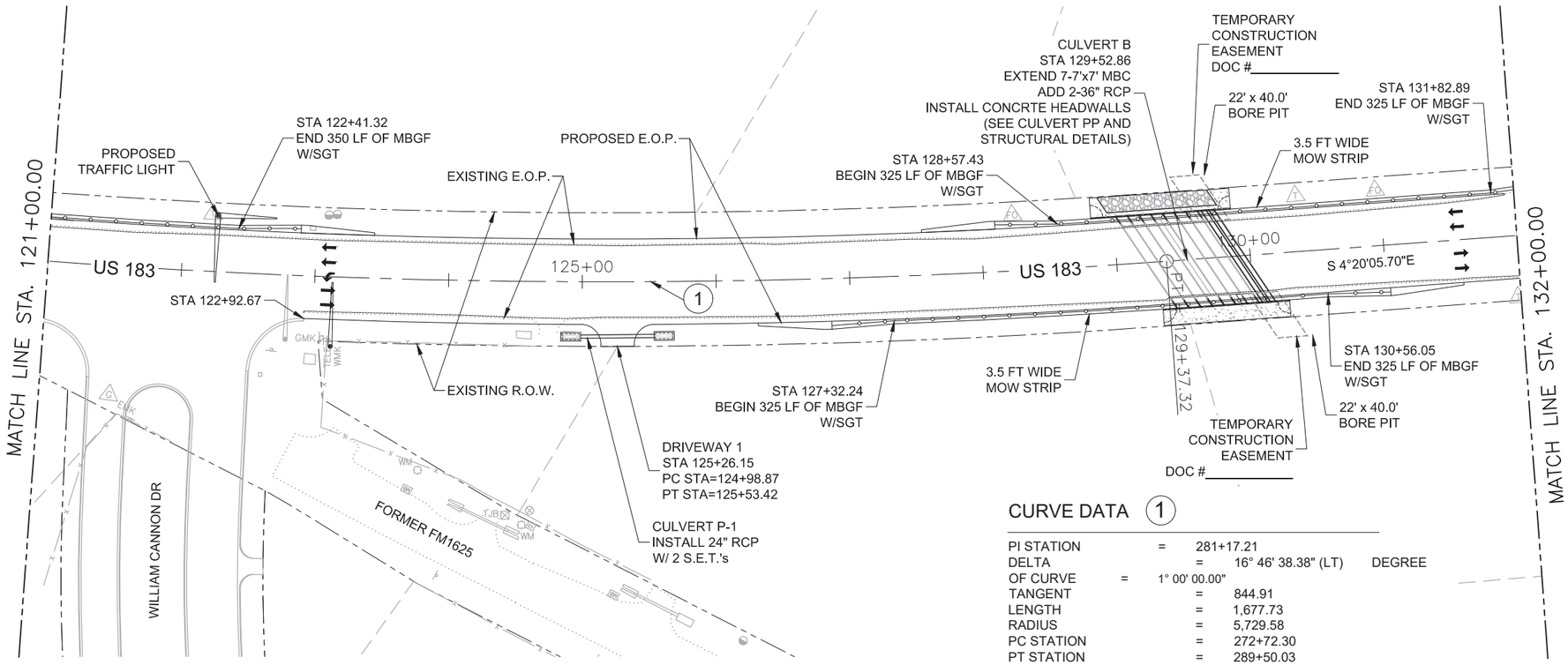
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		80

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Plan and Profile



CURVE DATA (1)

PI STATION	=	281+17.21	
DELTA	=	16° 46' 38.38" (LT)	DEGREE
OF CURVE	=	1° 00' 00.00"	
TANGENT	=	844.91	
LENGTH	=	1,677.73	
RADIUS	=	5,729.58	
PC STATION	=	272+72.30	
PT STATION	=	289+50.03	

0 100' 200'

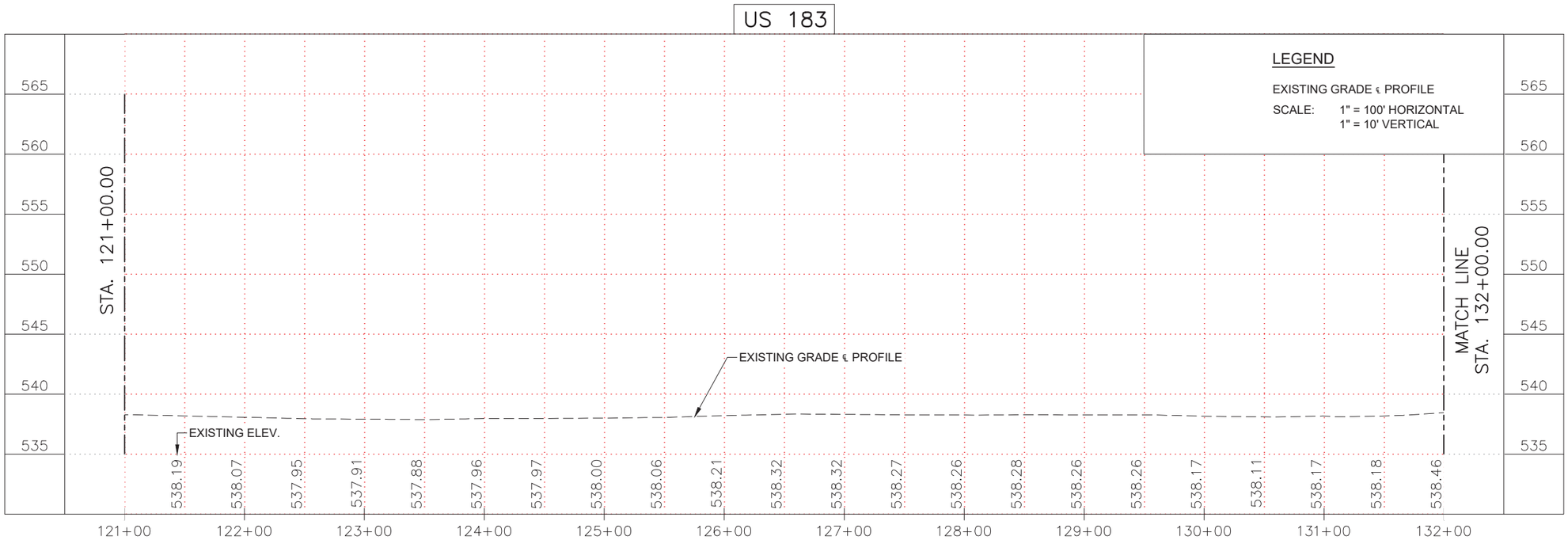
SCALE: 1" = 100'

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES

NOTES

1. SEE DRAINAGE AND CULVERT PP SHEETS FOR CULVERT HYDRAULIC INFORMATION.



WADE A. MORGAN
93700
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PROFESSIONAL ENGINEER
STATE OF TEXAS

01/22/2021

US 183
PLAN AND PROFILE
FROM STA. 121+00.00
TO STA. 132+00.00

SCALE: 1" : 100' SHEET 2 OF 3

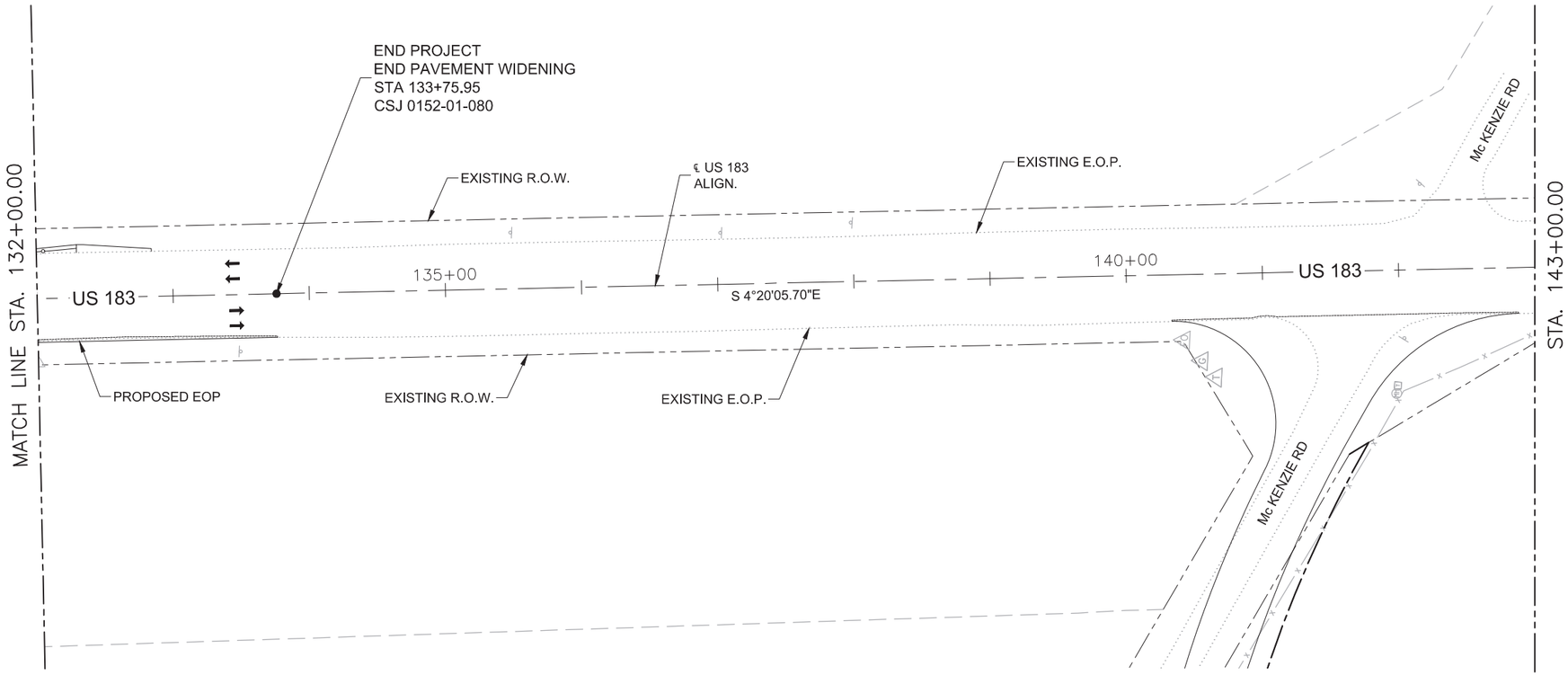
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		81

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Plan and Profile

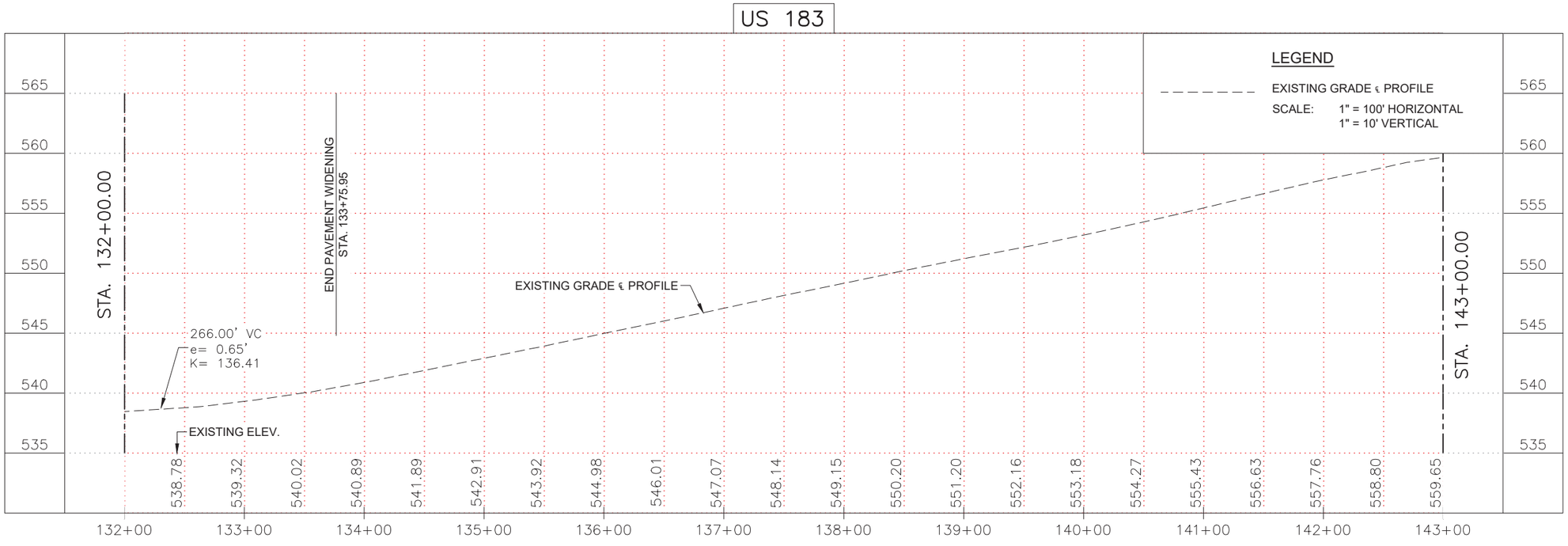


0 100' 200'

SCALE: 1" = 100'

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES



STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

PLAN AND PROFILE
FROM STA. 132+00.00
TO STA. 143+00.00

SCALE: 1" : 100' SHEET 3 OF 3

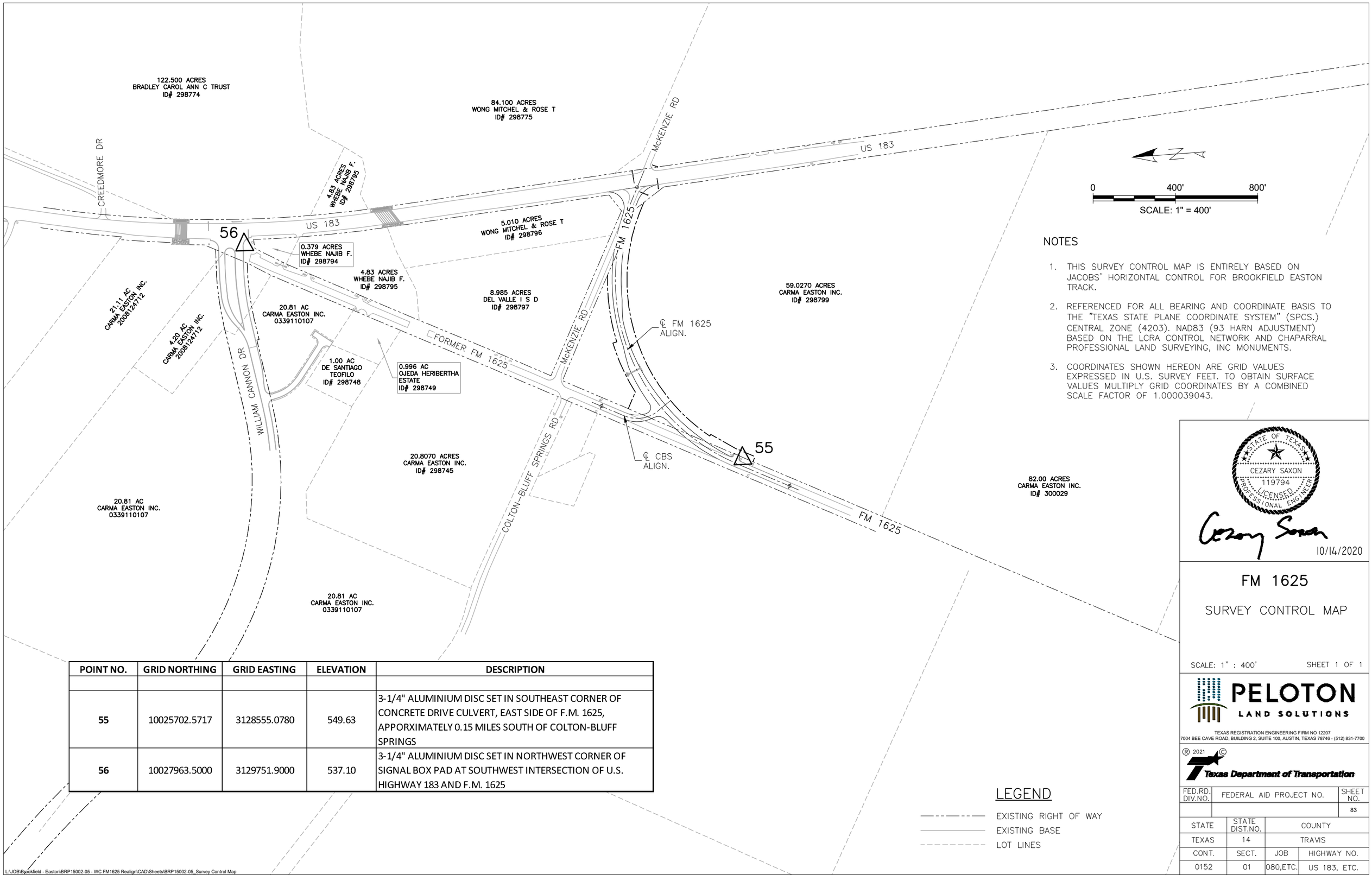
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		82

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Plan and Profile



NOTES

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POINT NO.	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION
55	10025702.5717	3128555.0780	549.63	3-1/4" ALUMINIUM DISC SET IN SOUTHEAST CORNER OF CONCRETE DRIVE CULVERT, EAST SIDE OF F.M. 1625, APPORXIMATELY 0.15 MILES SOUTH OF COLTON-BLUFF SPRINGS
56	10027963.5000	3129751.9000	537.10	3-1/4" ALUMINIUM DISC SET IN NORTHWEST CORNER OF SIGNAL BOX PAD AT SOUTHWEST INTERSECTION OF U.S. HIGHWAY 183 AND F.M. 1625

LEGEND

- EXISTING RIGHT OF WAY
- EXISTING BASE
- LOT LINES

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

FM 1625

SURVEY CONTROL MAP

SCALE: 1" : 400' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			83

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Survey Control Map

DESCRIBE CHAIN FM1625

Chain FM1625 contains:
200 CUR FM1625CUR1 201

Beginning chain FM1625 description

Point 200 X 3,130,044.39 Y 10,026,445.95 Sta 0+00.00

Course from 200 to PC FM1625CUR1 N 63° 25' 23.31" W Dist 127.08

Curve Data

*---------- *
Curve FM1625CUR1
P.I. Station 10+87.74 X 3,129,071.59 Y 10,026,932.60
Delta = 89° 26' 44.43" (LT)
Degree = 5° 54' 24.41"
Tangent = 960.66
Length = 1,514.29
Radius = 970.00
External = 395.20
Long Chord = 1,365.14
Mid. Ord. = 280.80
P.C. Station 1+27.08 X 3,129,930.74 Y 10,026,502.80
P.T. Station 16+41.37 X 3,128,633.50 Y 10,026,077.64
C.C. X 3,129,496.76 Y 10,025,635.29
Back = N 63° 25' 23.31" W
Ahead = S 27° 07' 52.26" W
Chord Bear = S 71° 51' 14.47" W

Course from PT FM1625CUR1 to 201 S 27° 07' 52.26" W Dist 276.07

Point 201 X 3,128,507.60 Y 10,025,831.95 Sta 19+17.44

Ending chain FM1625 description

DESCRIBE CHAIN CBSR

Chain CBSR contains:
300 CUR CBSR1 301

Beginning chain CBSR description

Point 300 X 3,128,953.70 Y 10,026,378.77 Sta 0+00.00

Course from 300 to PC CBSR1 N 26° 21' 16.12" W Dist 103.08

Curve Data

*---------- *
Curve CBSR1
P.I. Station 1+83.71 X 3,128,872.15 Y 10,026,543.38
Delta = 53° 29' 08.38" (RT)
Degree = 35° 48' 35.50"
Tangent = 80.62
Length = 149.36
Radius = 160.00
External = 19.16
Long Chord = 144.00
Mid. Ord. = 17.11
P.C. Station 1+03.08 X 3,128,907.94 Y 10,026,471.14
P.T. Station 2+52.44 X 3,128,908.91 Y 10,026,615.13
C.C. X 3,129,051.31 Y 10,026,542.17
Back = N 26° 21' 16.12" W
Ahead = N 27° 07' 52.26" E
Chord Bear = N 0° 23' 18.07" E

Course from PT CBSR1 to 301 N 27° 07' 52.26" E Dist 112.56

Point 301 X 3,128,960.24 Y 10,026,715.30 Sta 3+65.00

Ending chain CBSR description

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER
10/14/2020

FM 1625

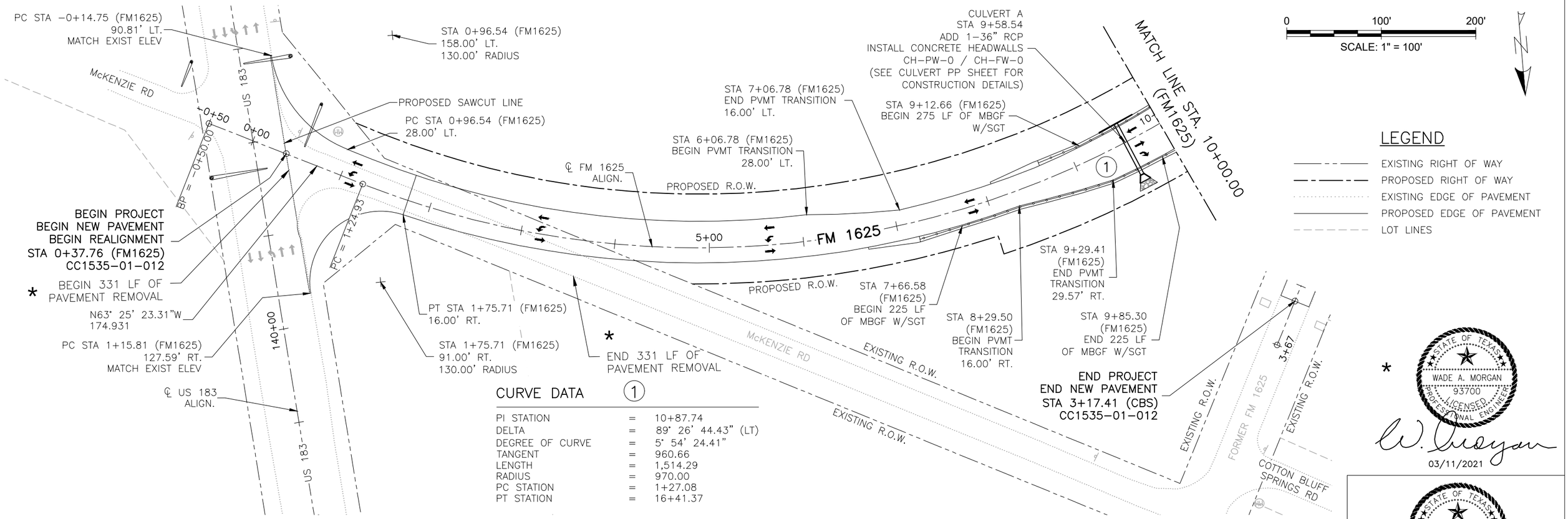
HORIZONTAL ALIGNMENT DATA

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		84

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



CURVE DATA (1)

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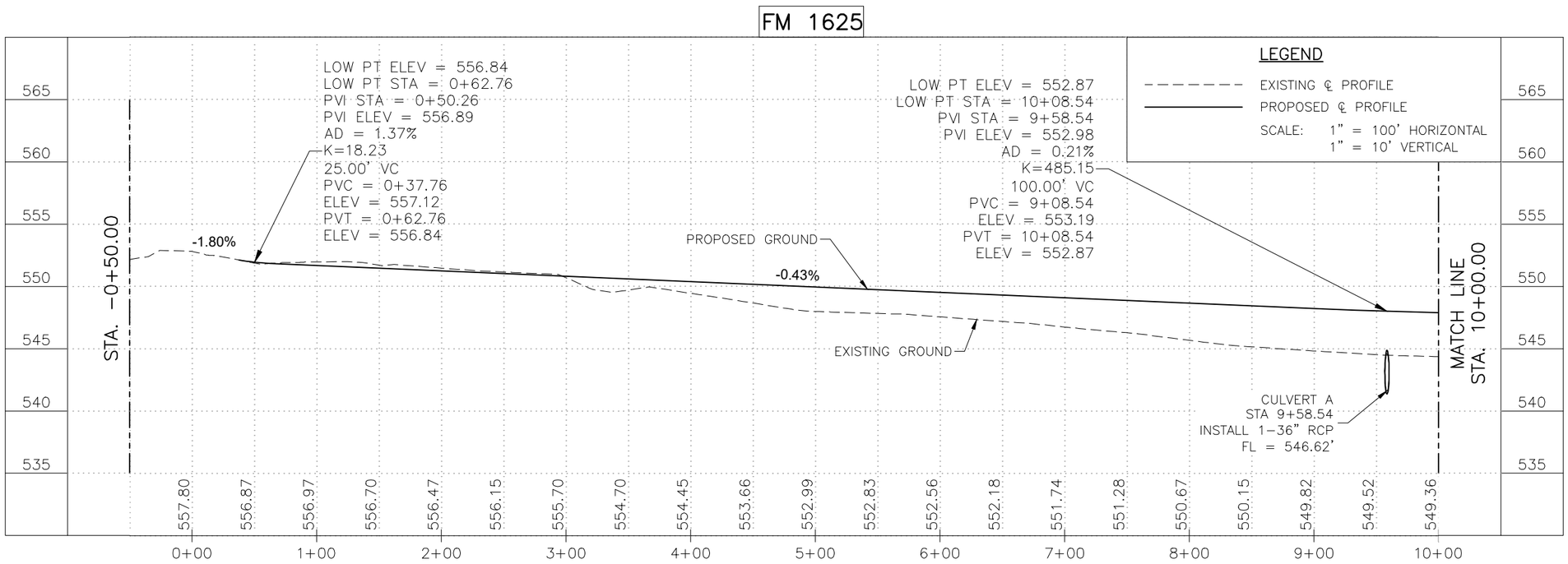
LENGTH	=	1,514.29
RADIUS	=	970.00
PC STATION	=	1+27.08
PT STATION	=	16+41.37



* STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER
03/11/2021

* STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER
10/14/2020

FM 1625

PLAN AND PROFILE

SCALE: 1" : 100' SHEET 1 OF 3

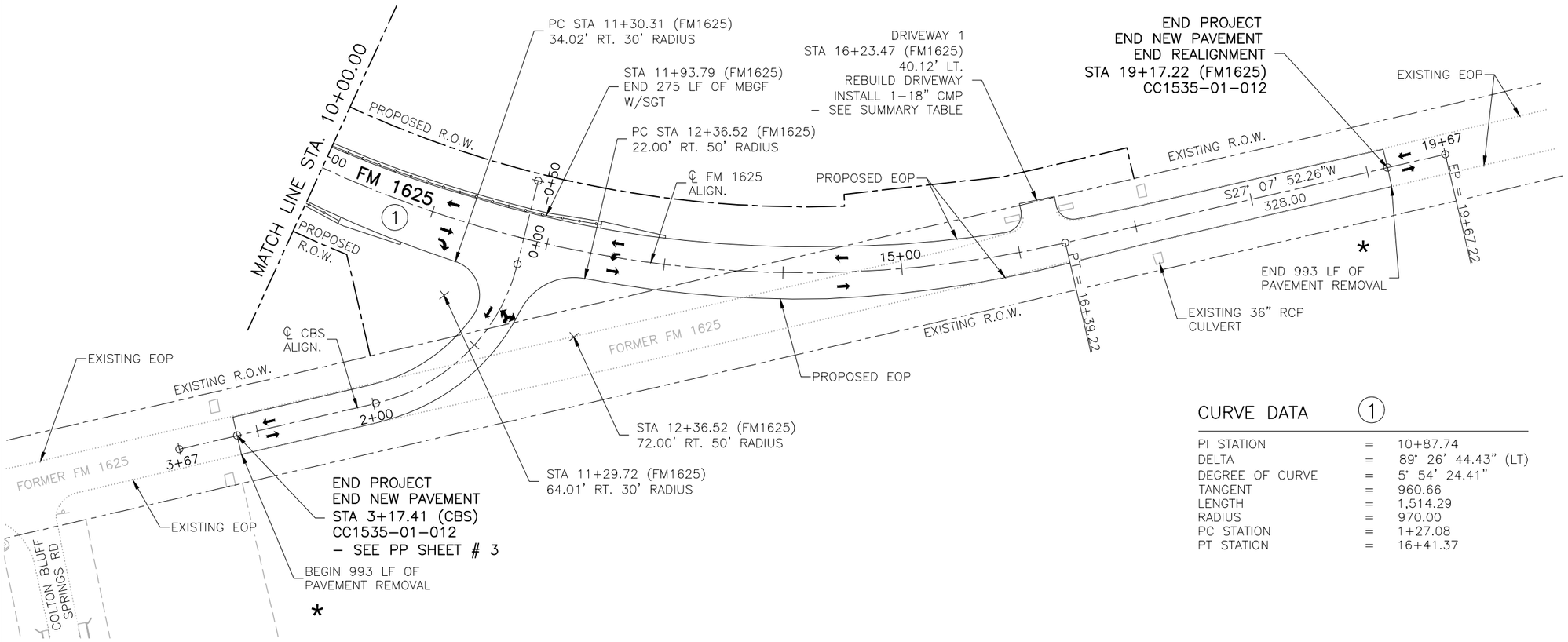
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		85

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Plan and Profile



LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES

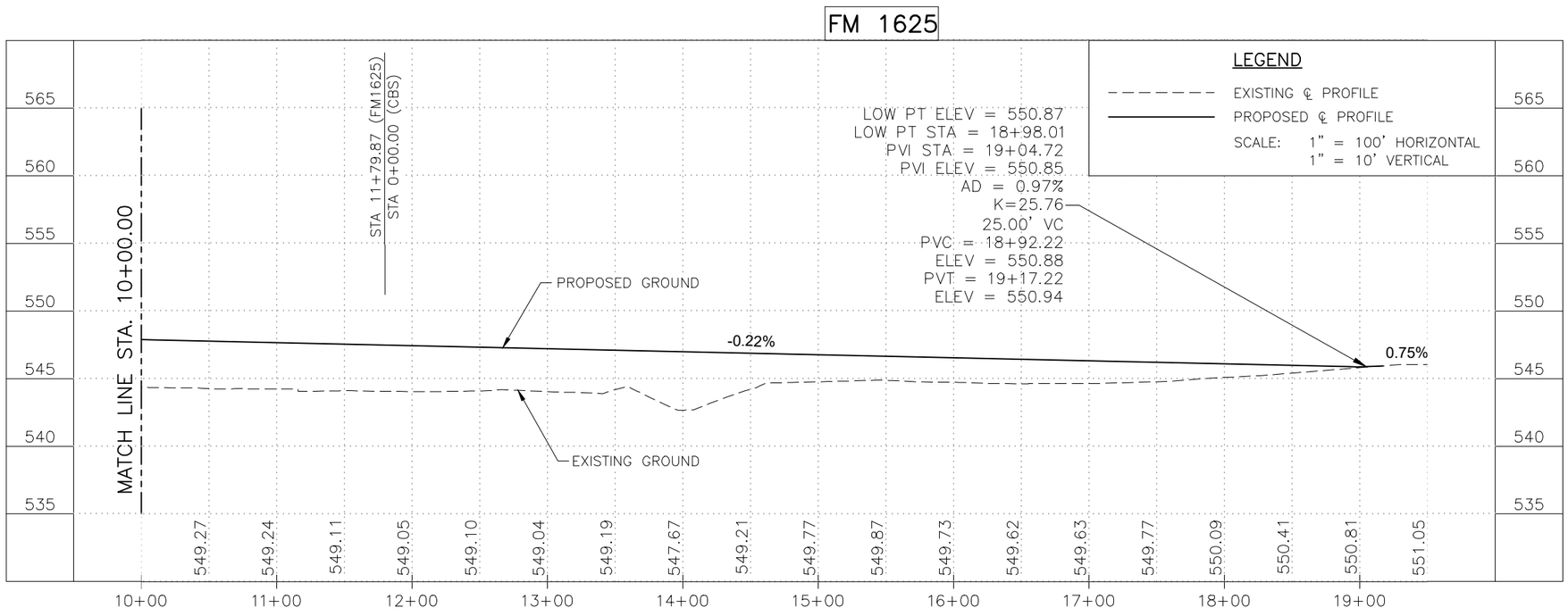
CURVE DATA ①

PI STATION	=	10+87.74
DELTA	=	89° 26' 44.43" (LT)
DEGREE OF CURVE	=	5° 54' 24.41"
TANGENT	=	960.66
LENGTH	=	1,514.29
RADIUS	=	970.00
PC STATION	=	1+27.08
PT STATION	=	16+41.37

*

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

03/11/2021



STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

FM 1625

PLAN AND PROFILE

SCALE: 1" : 100'

SHEET 2 OF 3

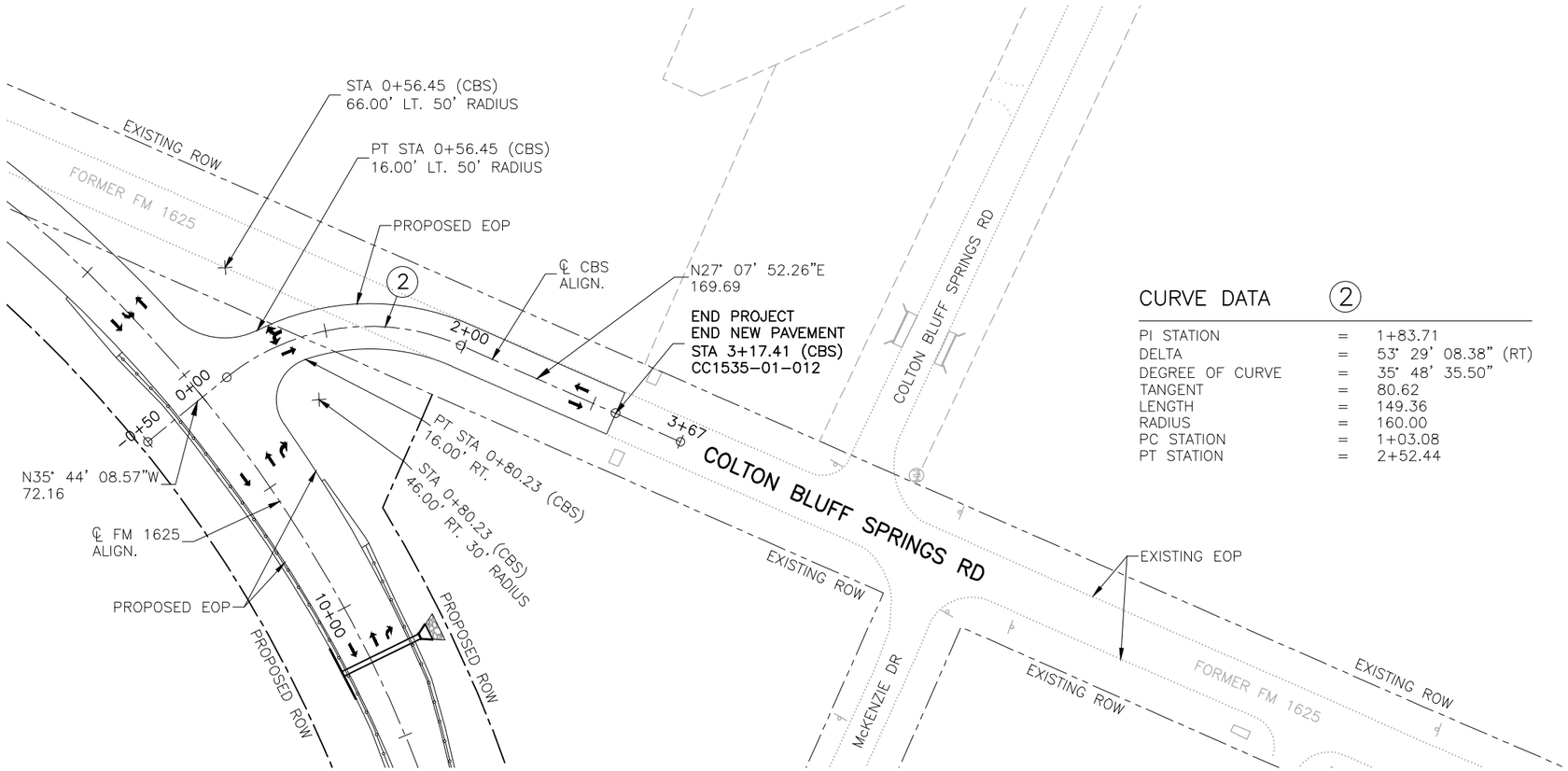
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		86

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Plan and Profile



CURVE DATA ②

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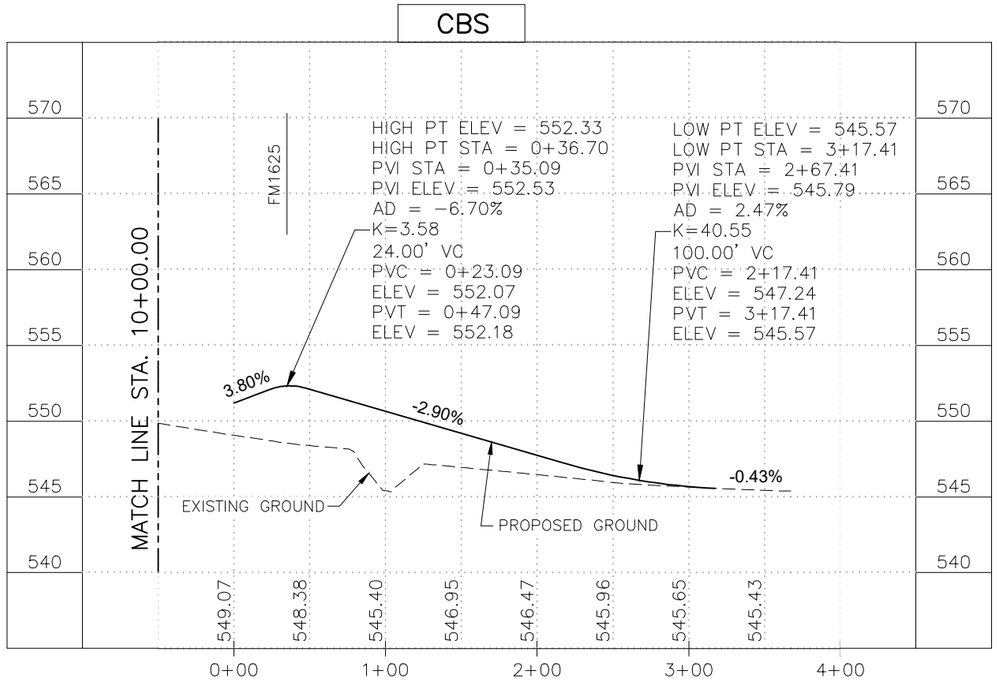
LENGTH	=	149.36
RADIUS	=	160.00
PC STATION	=	1+03.08
PT STATION	=	2+52.44

0 100' 200'

SCALE: 1" = 100'

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- LOT LINES



LEGEND

- EXISTING ℄ PROFILE
- PROPOSED ℄ PROFILE

SCALE: 1" = 100' HORIZONTAL
1" = 10' VERTICAL

STATE OF TEXAS
CEZARY SAXON
119794
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PROFESSIONAL ENGINEER

10/14/2020

FM 1625

PLAN AND PROFILE

SCALE: 1" : 100' SHEET 3 OF 3

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

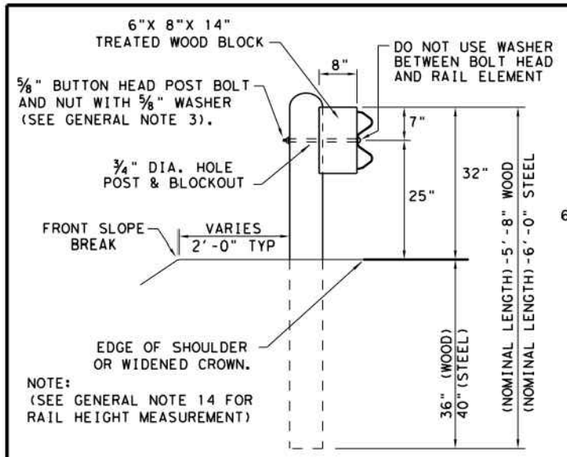
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		87

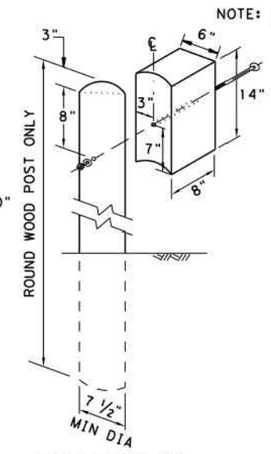
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Plan and Profile

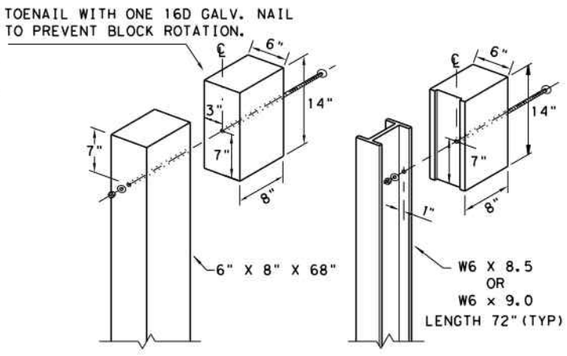
DATE:
FILE:



TYPICAL POST PLACEMENT



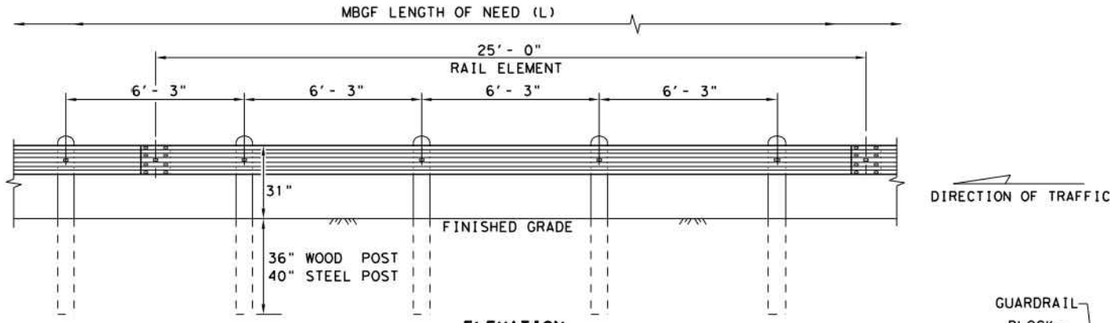
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

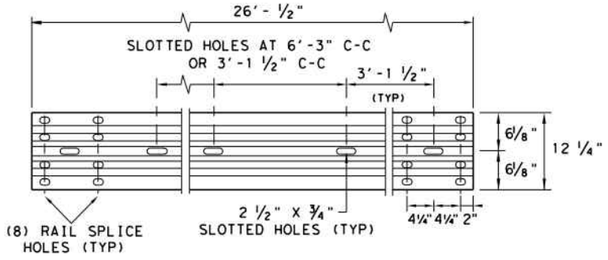
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



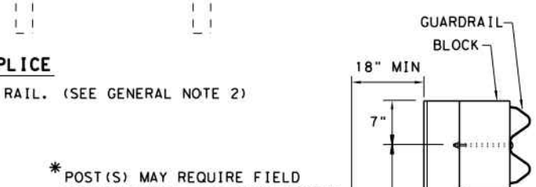
ELEVATION MID-SPAN RAIL SPLICE

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



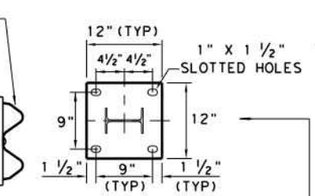
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



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

LOW FILL CULVERT POST



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

NOTE: TWO INSTALLATION OPTIONS.

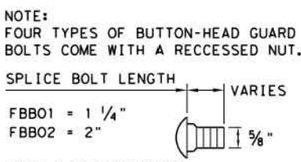
1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

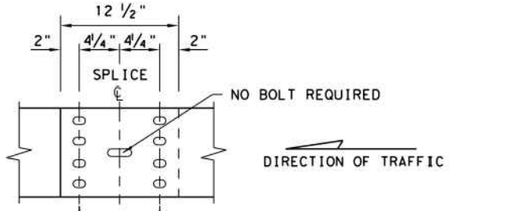
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

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



BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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

GENERAL NOTES

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

Texas Department of Transportation

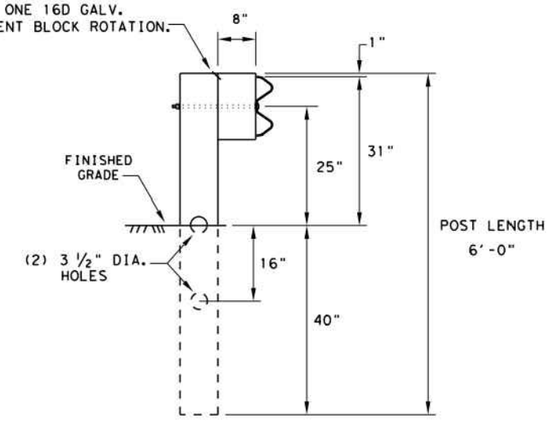
Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0152	1	80, ETC.	183, ETC.	
	DIST	COUNTY		SHEET NO.	
	14	TRAVIS		88	

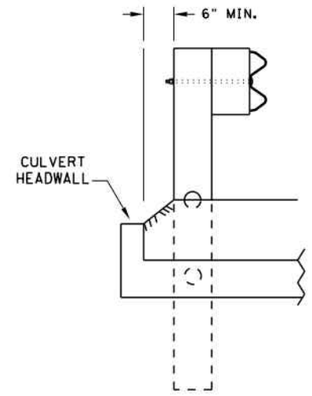
DATE:
FILE:

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



RECTANGULAR CRT POST (6"X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



LATERAL OFFSET BETWEEN THE GUARDRAIL AND THE CULVERT HEADWALL

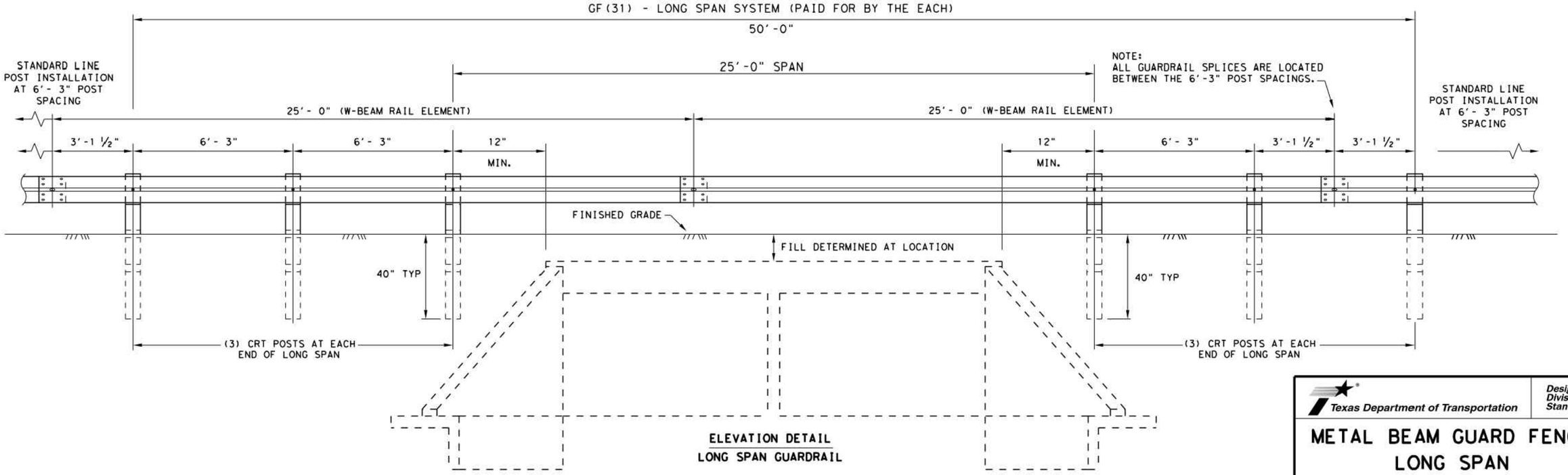
GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12'- 6" OR 25'- 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3'- 1 ½" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

NOTE: SEE GF(31) STANDARD FOR STANDARD LINE POSTS.

DIRECTION OF TRAFFIC

GF(31) - LONG SPAN SYSTEM (PAID FOR BY THE EACH)



ELEVATION DETAIL
LONG SPAN GUARDRAIL

Texas Department of Transportation

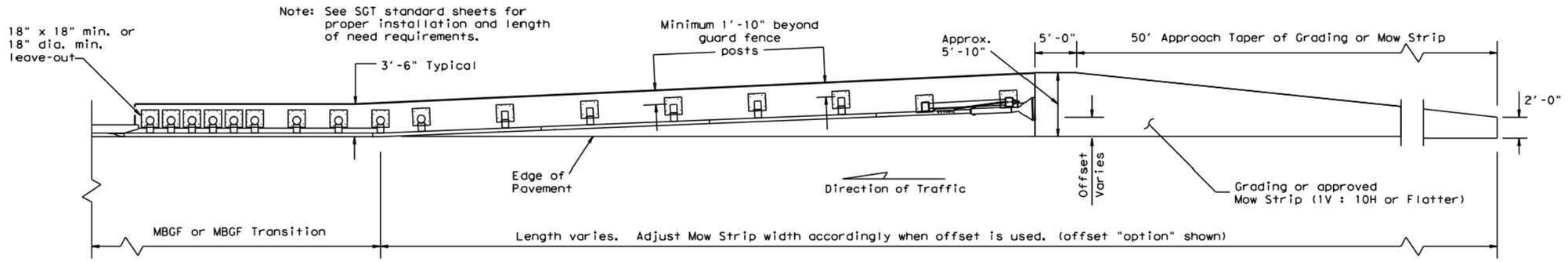
Design Division Standard

METAL BEAM GUARD FENCE LONG SPAN TL-3 MASH COMPLIANT

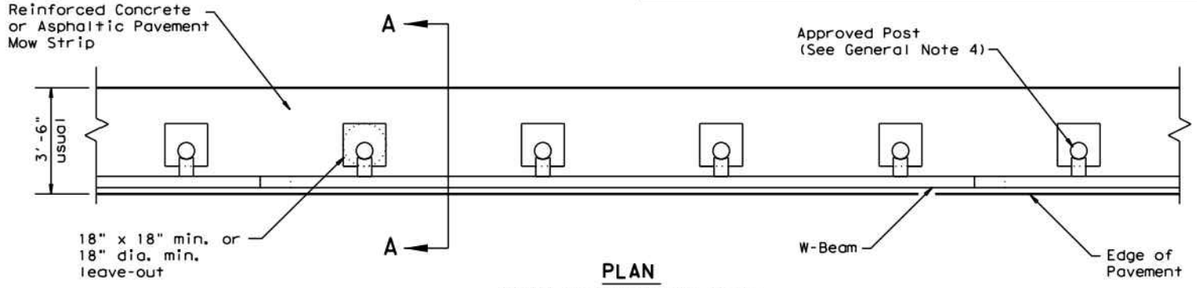
GF(31)LS-19

FILE: gf31ls19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0152	1	80, ETC.		183, ETC.	
	DIST	COUNTY			SHEET NO.	
	14	TRAVIS			89	

DATE:
FILE:

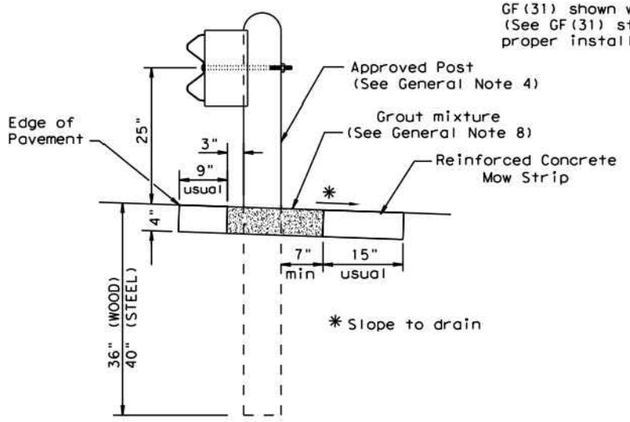


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



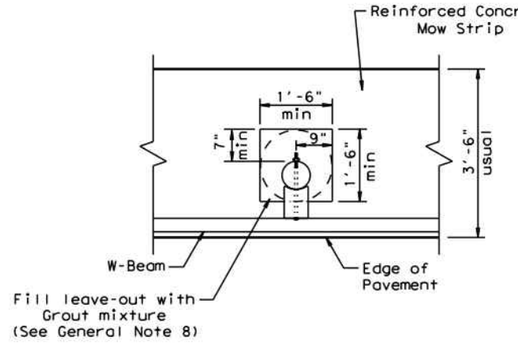
PLAN

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



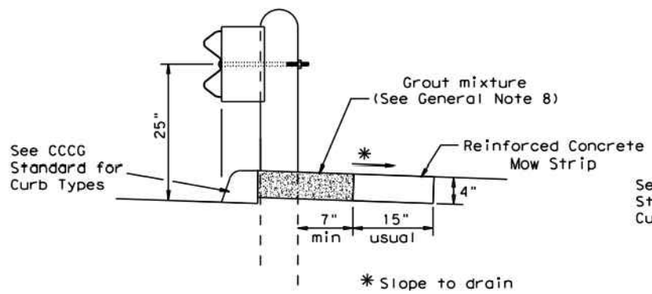
SECTION A-A

Typical



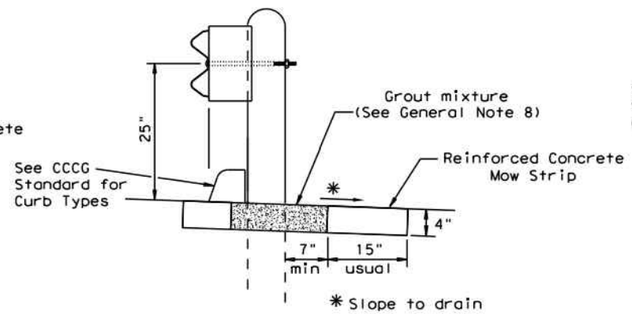
MOW STRIP DETAIL

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



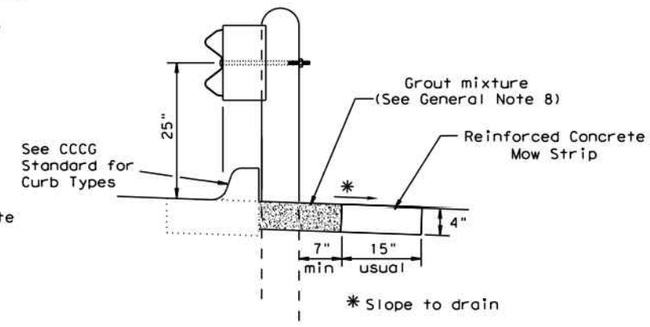
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

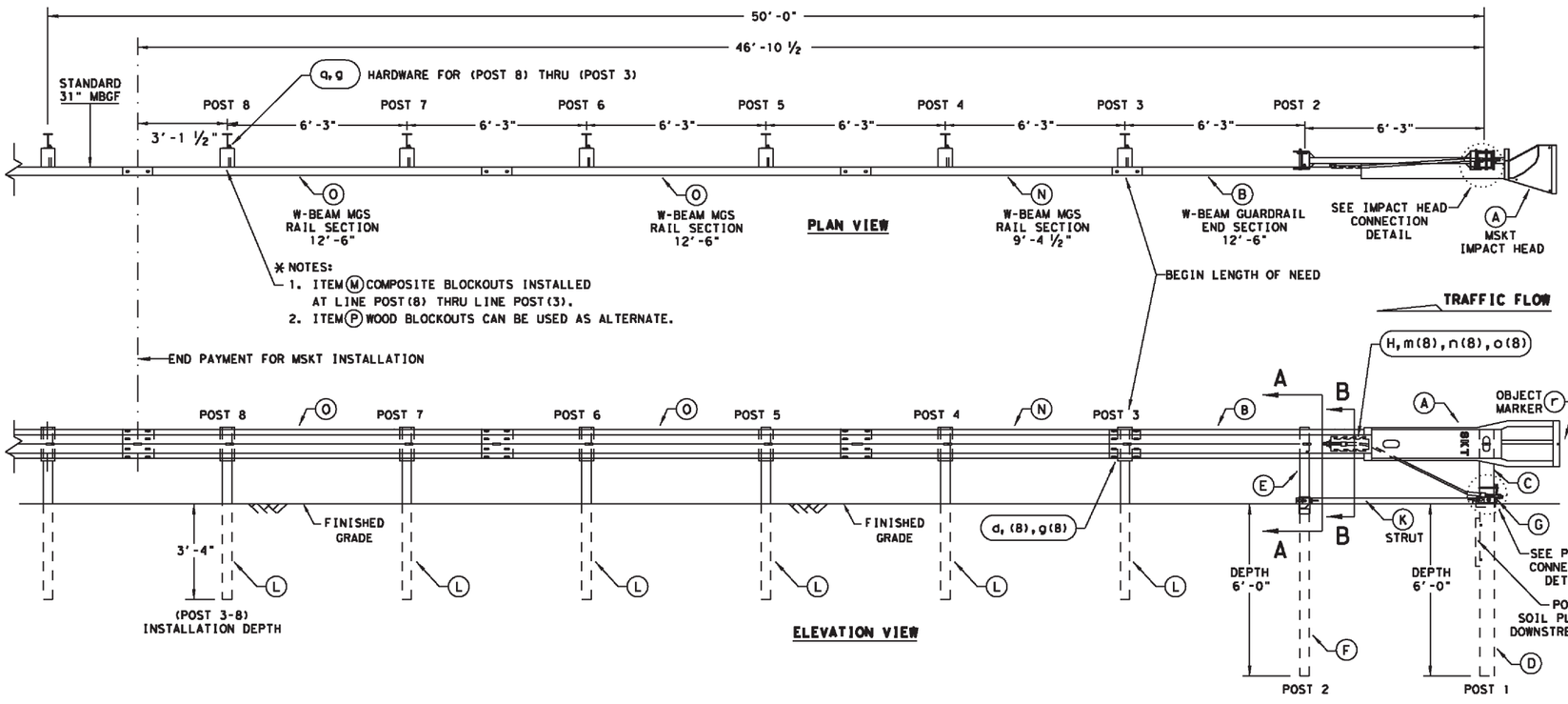
Design Division Standard

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

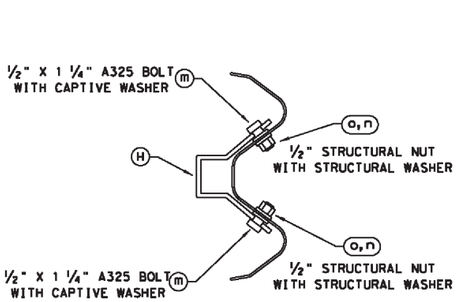
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		90

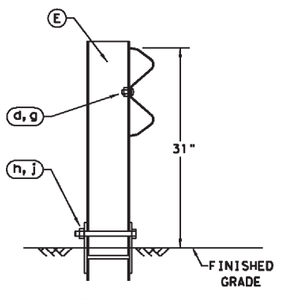
DATE:
FILE:



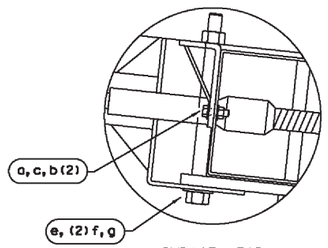
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



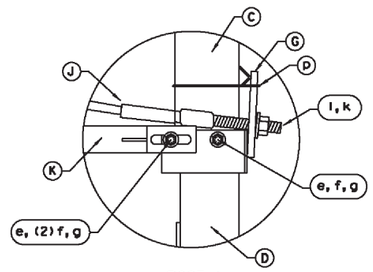
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



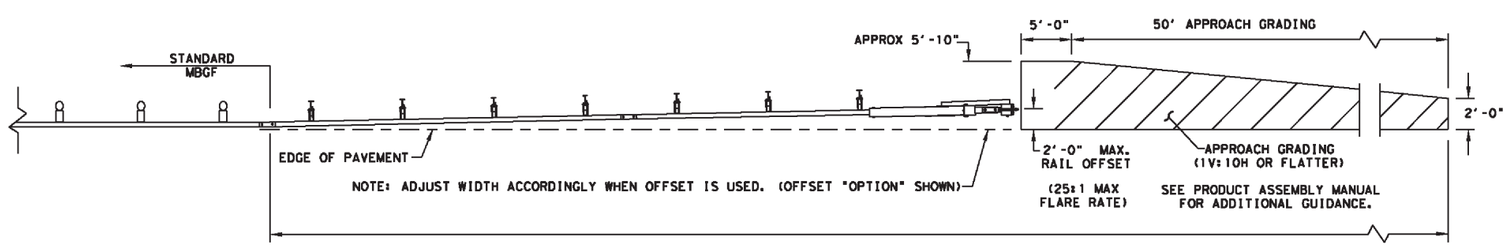
IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

SEE NOTES: *

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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0152	1	80, ETC.	183, ETC.	
	DIST	COUNTY		SHEET NO.	
	14	TRAVIS		91	

DATE:
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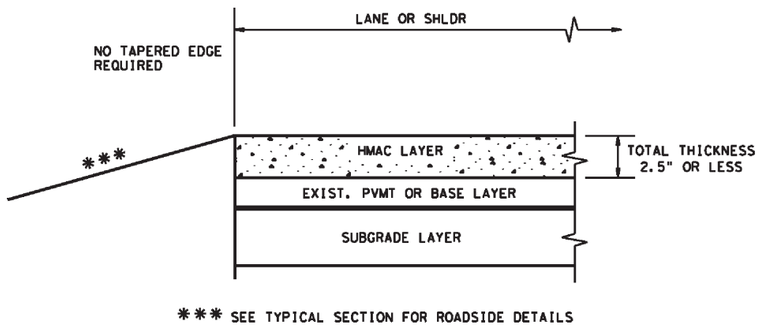
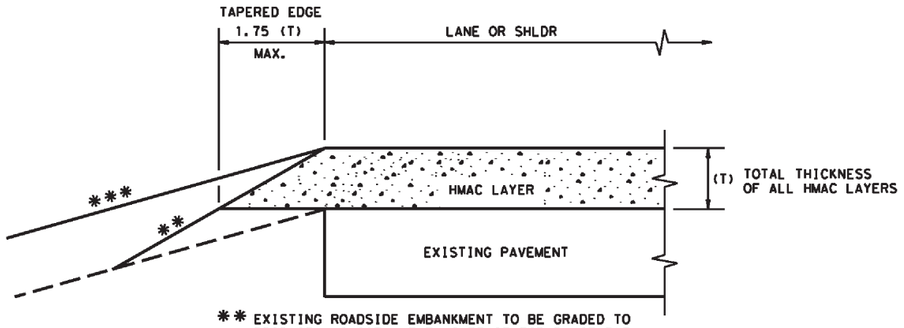


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

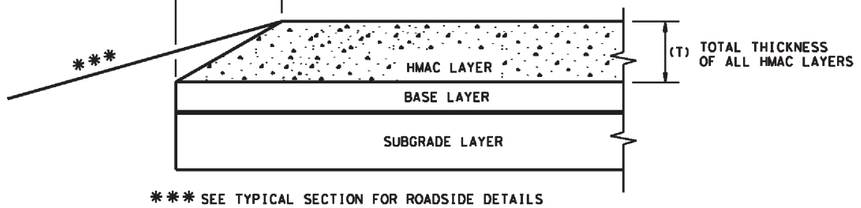
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

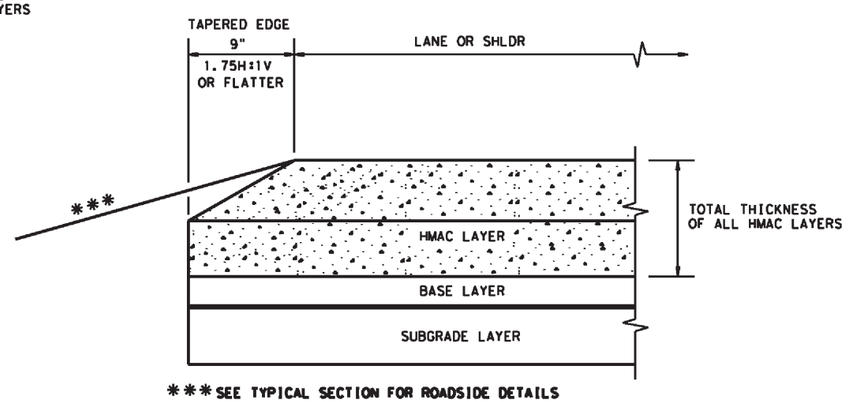
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation | Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		92

DATE:
FILE:

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-5/8" FROM REFERENCE LINE

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

RAIL 4 RAIL 3 RAIL 2 RAIL 1

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NO BLOCKOUT
AT (POST 1)

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

MBGF
RAIL 2

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

INSTALLATION LENGTH 55'- 1/2"

49'-8 5/16"

6'-3" 6'-3" 6'-3" 6'- 3/4" 6'-3" 6'-3" 6'-3" 37 1/2" 5'-3 11/16"

RAIL
HEIGHT

31"

ITEM (13) RAIL 4

ITEM (13) RAIL 3

ARROWS

DETAIL (D)

ITEM (13) RAIL 2

ITEM (13) RAIL 1

RAIL
HEIGHT

31"

HEAD
HEIGHT

DETAIL (B)

32-1/4"

68-1/8"

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

POST 1
ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

SOIL
ANCHOR POST
ITEM (1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE
DETAIL (D)

HEAD
HEIGHT

32-1/4"

TOP OF POST

31-7/8"

FINISHED
GRADE

40-1/8"

68-1/8"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)

SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"

2 1/8"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL 5/8" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)

ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

EDGE OF PAVEMENT

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

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

TRAFFIC FLOW

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS		93

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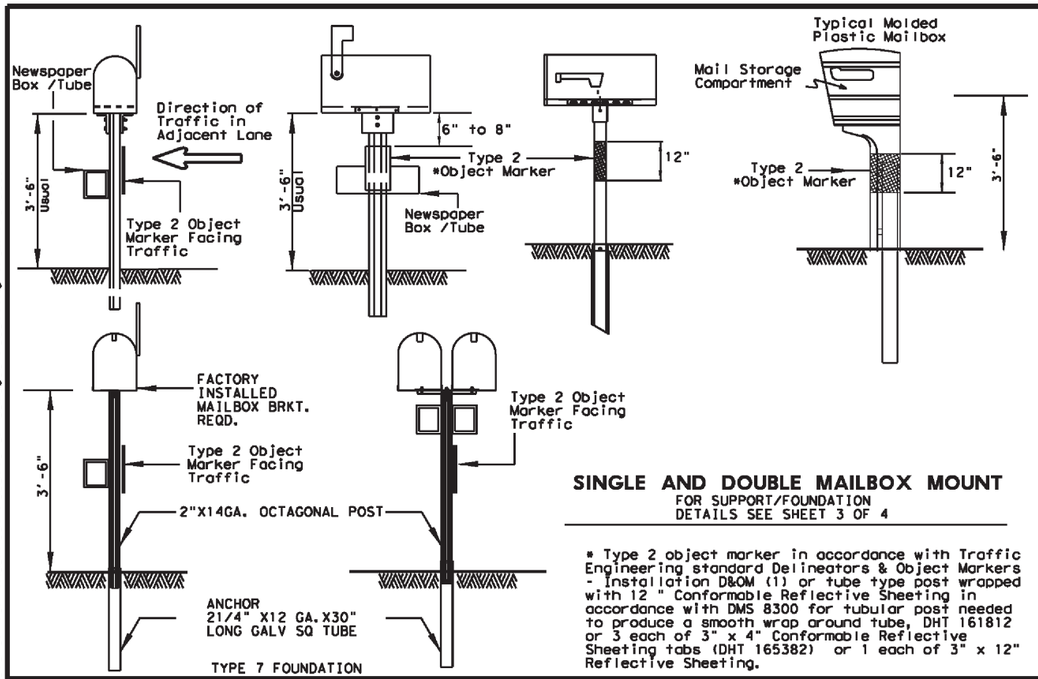


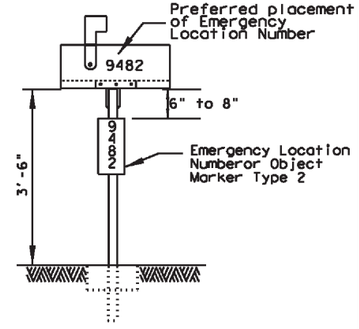
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 ½	6	7	5	5
MEDIUM	22 ½	8	11 ½	7	7
LARGE	23 ½*	11 ½*	13 ½*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

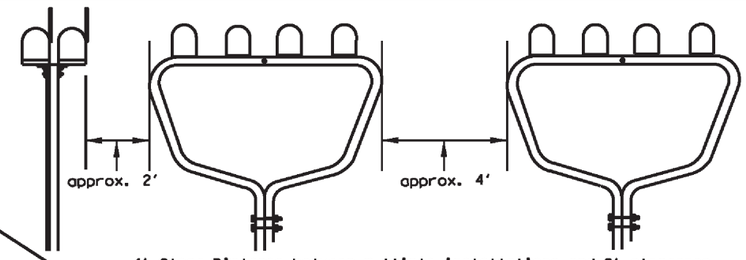
LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	22.4
BACK	11 ½	11 ½		15	

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES

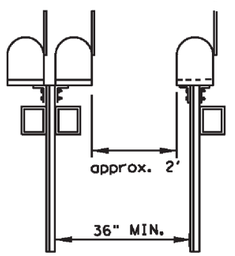
Mailboxes shall be made of light weight sheet metal or light weight plastic.
Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



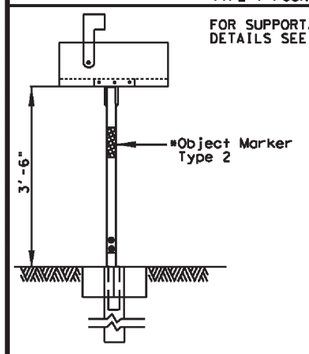
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

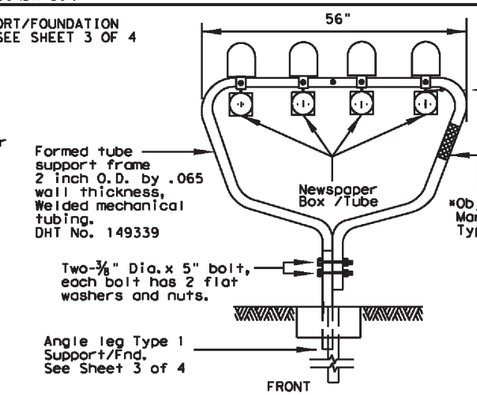
MULTIPLE MAILBOX PLACEMENT

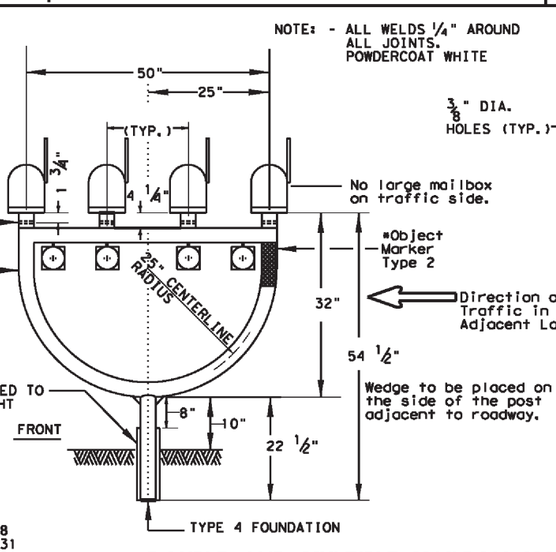


Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

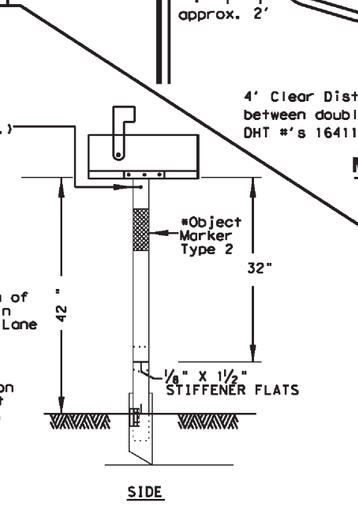
SINGLE & DOUBLE MAILBOX PLACEMENT

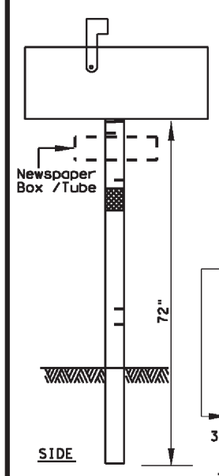


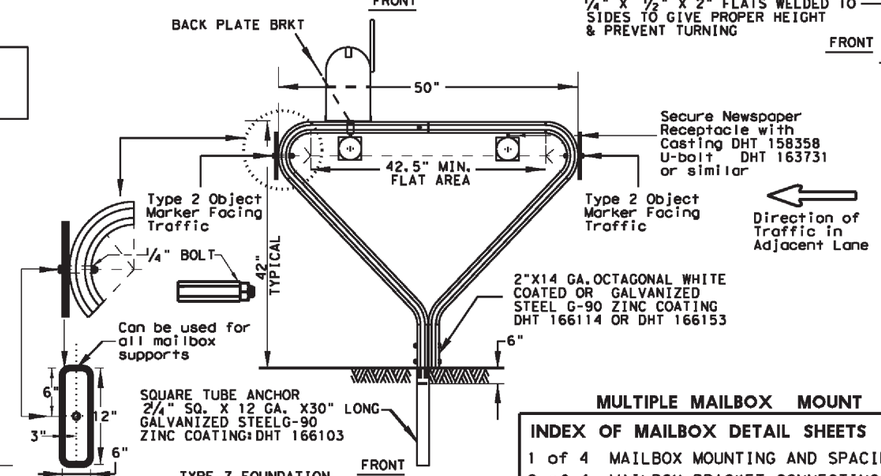




NOTE: - ALL WELDS ¼" AROUND ALL JOINTS.
POWDERCOAT WHITE







DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS SEE SHEET 4 OF 4

NEWSPAPER RECEPTACLE

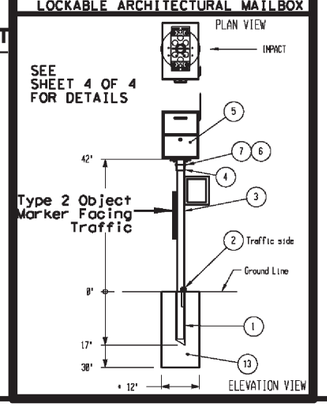
A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

MULTIPLE MAILBOX MOUNT

INDEX OF MAILBOX DETAIL SHEETS

LOCKABLE ARCHITECTURAL MAILBOX



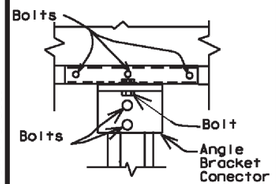
SHEET 1 OF 4

Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

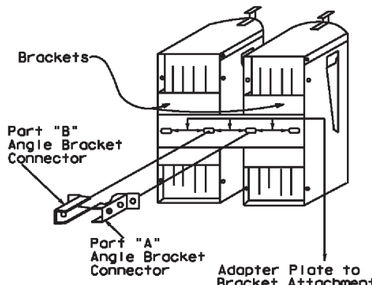
MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK: JEO	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		94



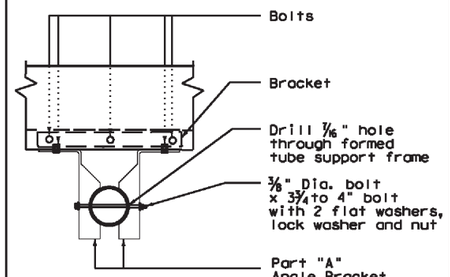
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

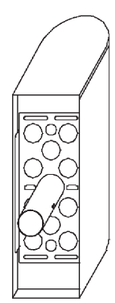


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

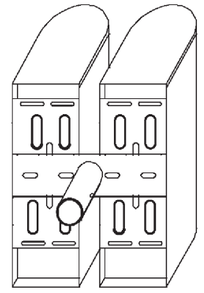


MULTIPLE MAILBOX



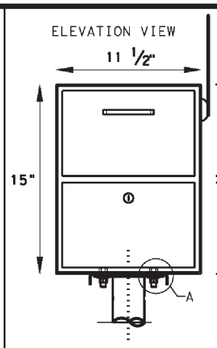
To be used with 2⅜" OD RR or thinwall Steel posts.

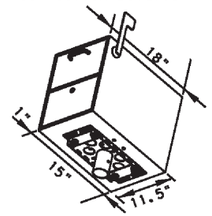
WELDED SINGLE MAILBOXBRACKET

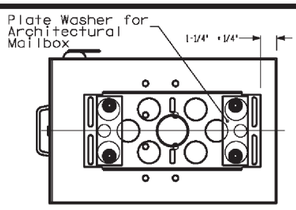


To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

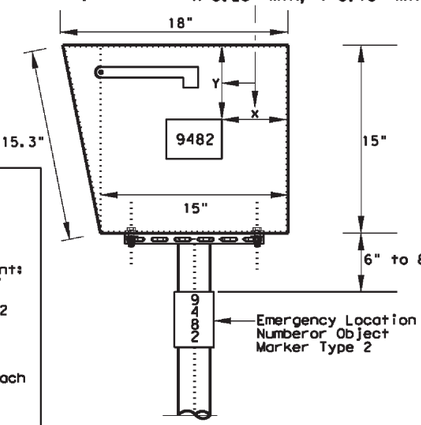


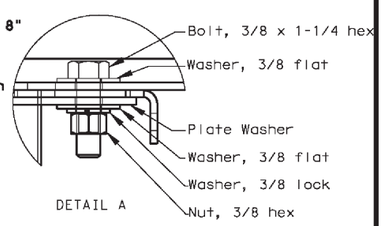




Preferred placement of Emergency Location Number

X~5.25" min; Y~5.75" min





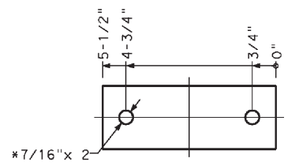
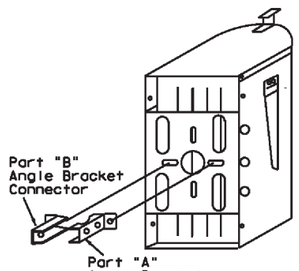
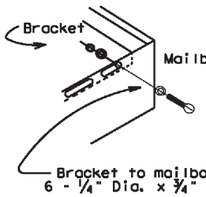


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel

LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



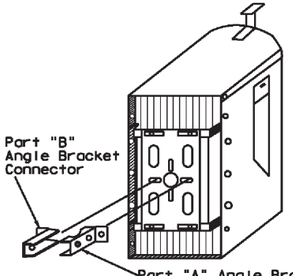


Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/ 2 flat washers and nut per each bolt.

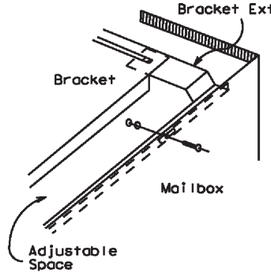
Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - ⅜" Dia. x 2½" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment: 2 - ¼" Dia. x ¾" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt w/2 flat washers, lock washer and nut per each bolt.

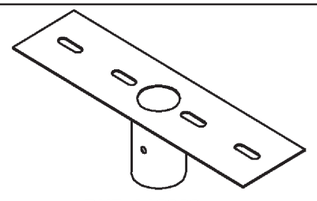
Angle to mailbox support attachment: 2 - ⅜" Dia. x 2½" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



DHT 162323

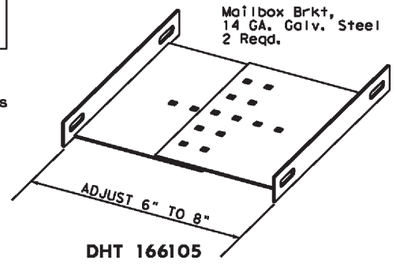
For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.

DHT 161443

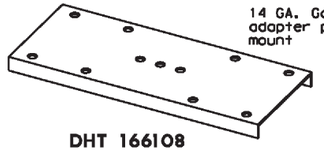
For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

DHT #3789

Used for mounting two Mailboxes on the same post.

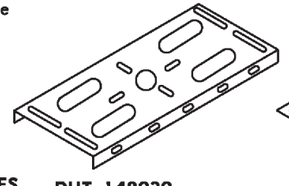


DHT 166105



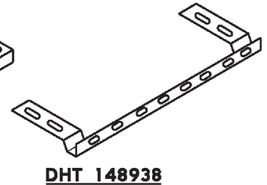
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

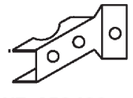
Mailbox Bracket



DHT 148938

Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



DHT 159489

Part "A" Angle Bracket Connector

DHT 159490

Part "B" Angle Bracket Connector

DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

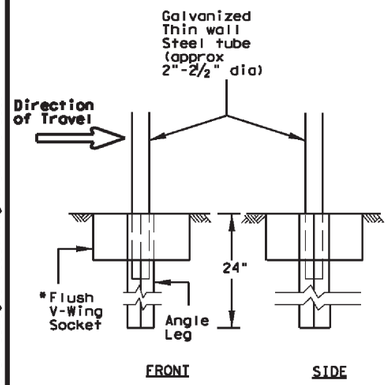
SHEET 2 OF 4

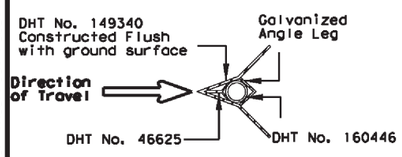
Texas Department of Transportation | Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

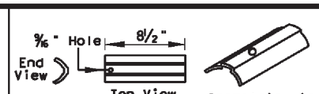
FILE: MB14(1).DGN	DN: JEO		CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB		HIGHWAY
REVISIONS ADDED DHT 163730	0152	1	80, ETC.		183, ETC.
	DIST	COUNTY			SHEET NO.
	14	TRAVIS			95





TYPE 1 SUPPORT/FOUNDATION

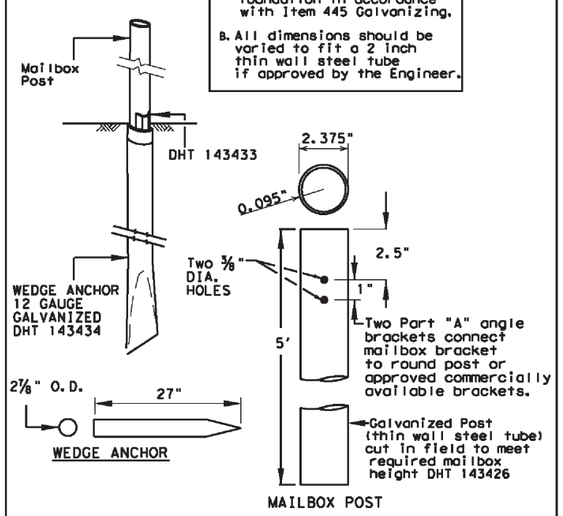
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



NOTES FOR TYPE 2 SUPPORT/FOUNDATION

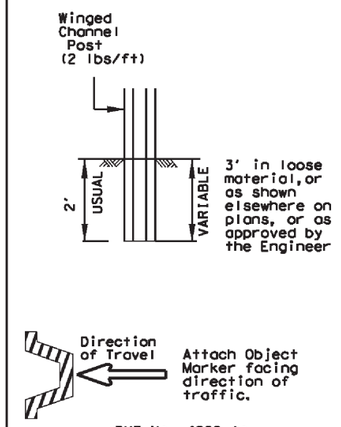
A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.



TYPE 2 SUPPORT/FOUNDATION

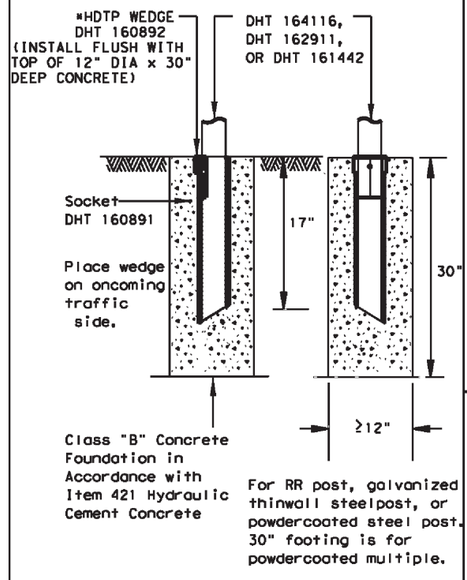
THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



TYPE 3 SUPPORT/FOUNDATION

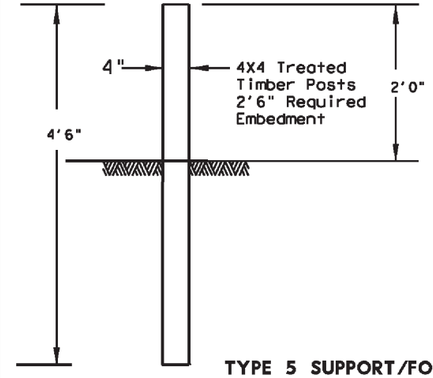
WINGED CHANNEL POST

Note on DHT Number
See Table of Applicable DHT
Numbers on this sheet 4 for
DHT description.



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

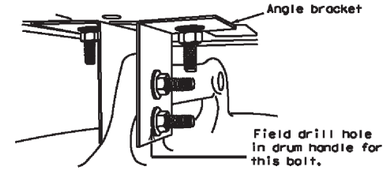


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



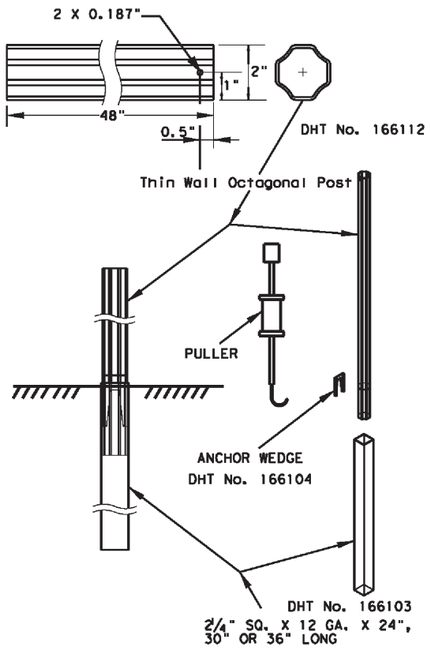
Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB15(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		96

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

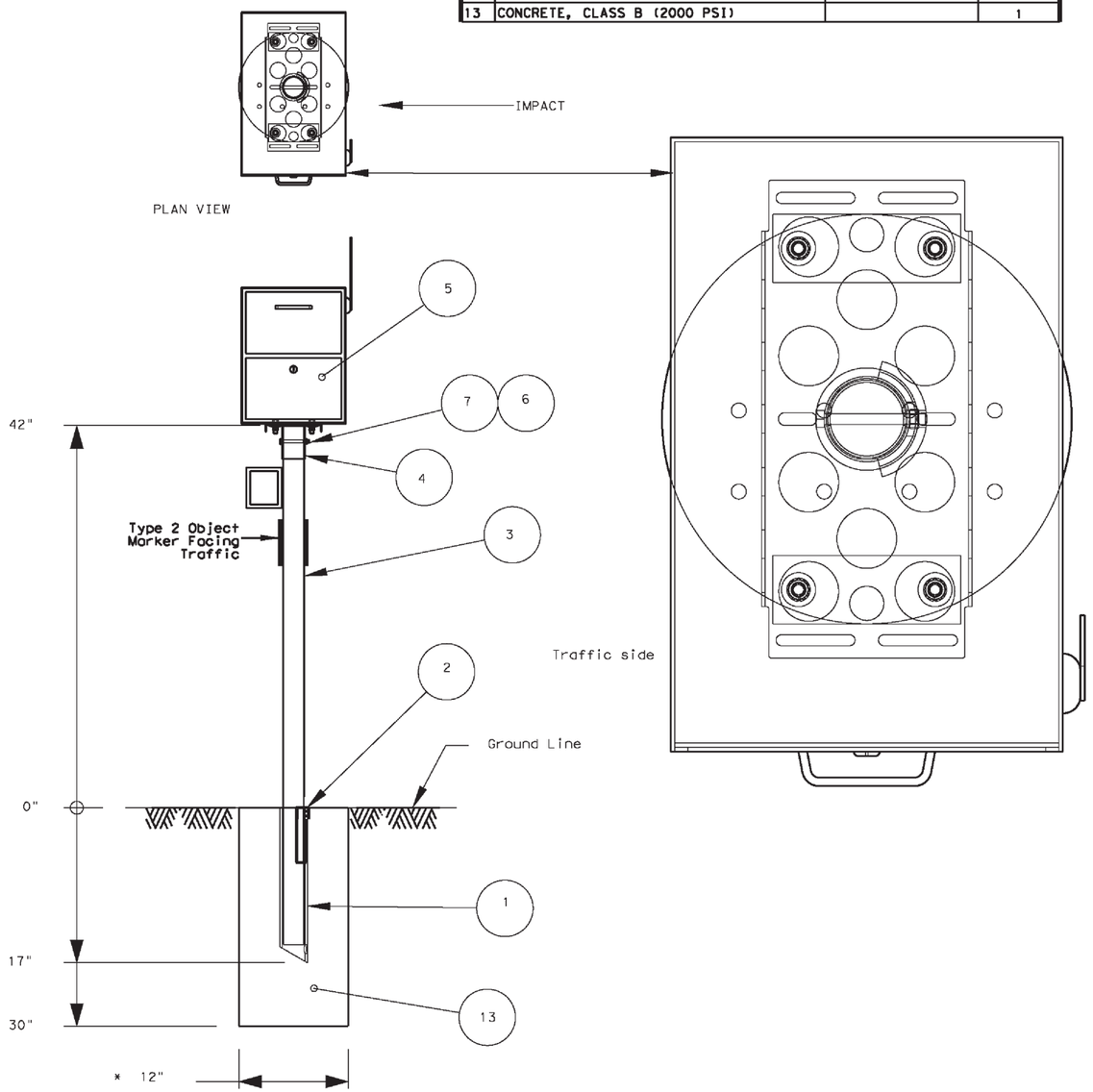


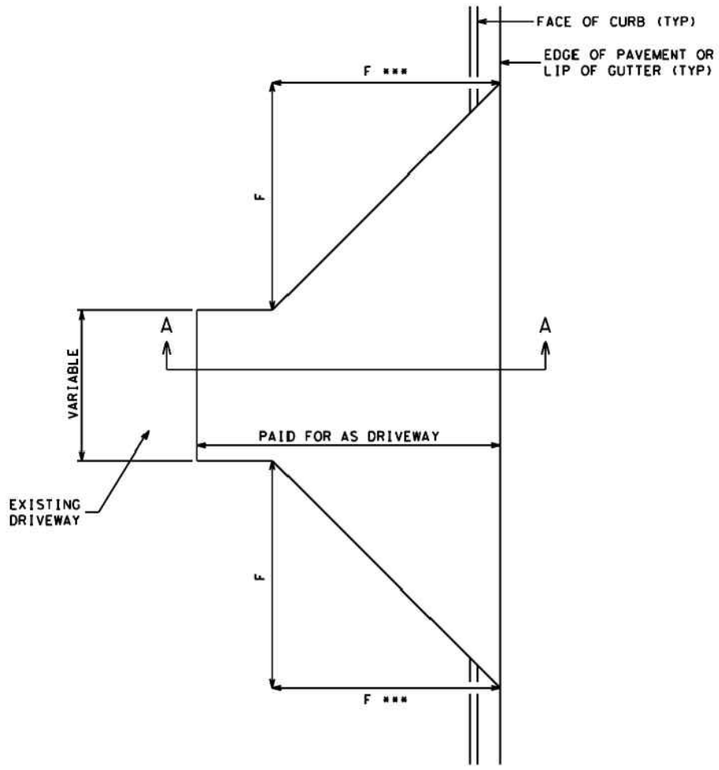
TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

Texas Department of Transportation — Maintenance Division Standard

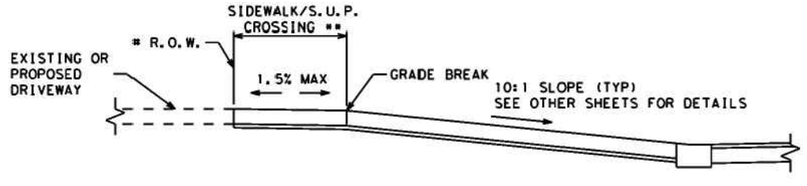
DHT NUMBERS TABLE

MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		97



DRIVEWAY PLAN

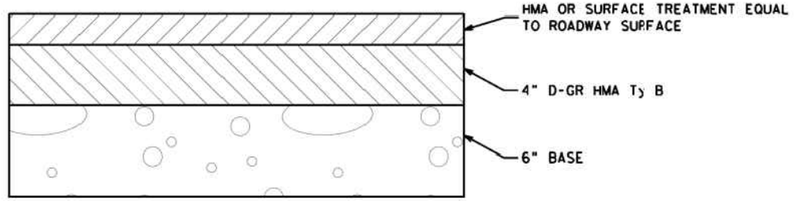


* ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED

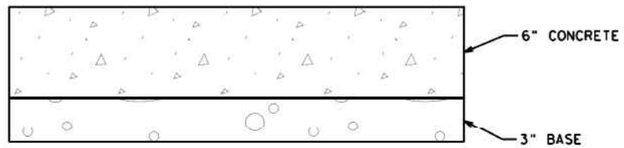
DRIVEWAY WITH GUTTER SECTION A-A

ENSURE GRADE BREAK DOES NOT EXCEED 8% UNLESS OTHERWISE DIRECTED. PROVIDE ABSOLUTE MINIMUM SIDEWALK CROSSING WIDTH OF 4' FOR DRIVEWAYS WIDTH OF 20' OR LESS

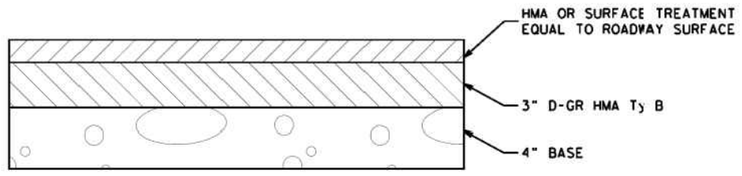
** LOCATE SIDEWALK CROSSING TO ALIGN WITH ADJACENT SIDEWALK; SIDEWALK/S.U.P. WIDTH AND LOCATION SHOWN ELSEWHERE IN PLANS.



HMA OR SURFACE TREATEMENT - COMMERCIAL



CONCRETE - ALL DRIVEWAY TYPES



HMA OR SURFACE TREATMENT - FARM/RANCH/RESIDENTIAL

FLARE	FARM/RANCH	RESIDENTIAL	COMMERCIAL
"F" (FT)	25	15	25

GENERAL NOTES

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

IN LIEU OF PFC OR TOM, SURFACE SHALL BE 1.5" D-GR HMA Ty D. IF SURFACE IS A MULTIPLE COURSE SURFACE TREATEMENT, ALL COURSES MUST BE PLACED ON DRIVEWAY.

BLADE LAY HMA IS ALLOWED.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE IMPACTS TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.

Texas Department of Transportation | Austin District Standard

DRIVEWAYS

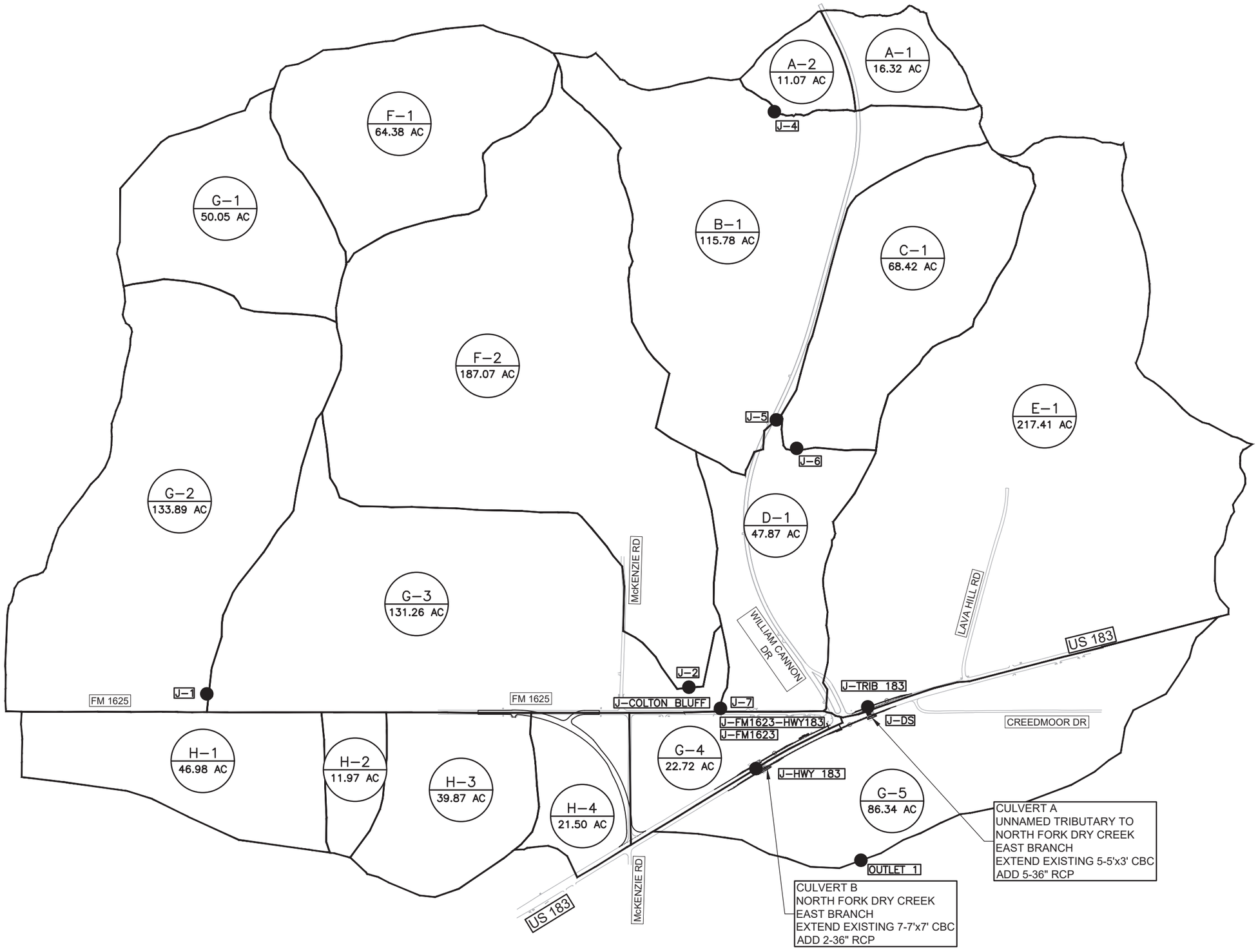
NOT TO SCALE

DW-20 (AUS)

REVISIONS
01/16: SHEET CREATED
04/19: APPROVED
11/20: TABLE REVISED, GN ADDED, PLAN & PROFILE MODIFIED

CONT	SECT	JOB	HIGHWAY
0152	1	80, ETC.	183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		97A

DATE: 11/5/2020 1:16:14 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT4\Documents\14 - AUS_Standards\District Design Standards\Approved\DW-20(AUS).dgn



0 800 1600

SCALE: 1" = 800'

LEGEND

DRAINAGE AREA

NOTES

1. THE OVERALL HYDROLOGY MAP FOR THIS PROJECT IS ENTIRELY BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R DATED JULY 5, 2016.
2. NO HYDRAULIC CALCULATIONS FOR 18" RCP PARALLEL CULVERT UNDER DRIVEWAY "1" WERE PERFORM. THE ENTIRE AREA IS IN THE FEMA FOODPLAIN AND CONTRIBUTING DRAINAGE AREA FOR THIS CULVERT IS NEGLIGIBLE.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

OVERALL DRAINAGE MAP

SCALE: 1" : 800' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		98

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Drainage

SUMMARY OF CROSS CULVERTS

Culvert ID	Existing Centerline Sta.	Drainage Area [AC]	Upstream Extension Length (to face of headwall) [LF]	Downstream Extension Length (to face of headwall) [LF]		Size, Type, Number of Barrels	Upstream and Downstream Extension Slope [%]	Length (to face fo headwall) [LF]	Upstream Flow Line Invert [MSL]	Downstream Flow Line Invert [MSL}	50-Year Q Total [CFS]	50-Year Q Culverts [CFS]	50-Year Q Weir [CFS]	50-Year Headwater Elevation [MSL]	50-Year Tailwater Elevation [MSL]	100-Year Q Total [CFS]	100-Year Q Culverts [CFS]	100-Year Q Weir [CFS]	100-Year Headwater Elevation [MSL]	100-Year Tailwater Elevation [MSL]
Culvert A UNNAMED TRIBUTARY TO NORTH FORK DRY CREEK EAST BRANCH	119+40.12	1186.56	19.1	5.4	existing	5-5'x3' MBC	0.32%	58.2	532.59	532.50										
					proposed	5-5'x3' MBC 5-36" RCP	0.32%	78.9	532.75	532.50	1152	1152.00	0	538.34	534.66	1323	1269.00	54.00	539.21	534.93
Culvert B NORTH FOR DRY CREEK EAST BRANCH	129+52.89	969.15	9.5	9.2	existing	7-7'x7' MBC	0.00%	69.4	528.51	528.50										
					proposed	7-7'x7' MBC 2-36" RCP	0.00%	83.5	528.51	528.50	4069	3884.00	185	538.44	535.90	4639.00	3946.00	693.00	538.86	536.24

PARALLEL CULVERT

Parallel Culvert ID	Centerline Station	Left or Right	Slope %	North End of Culvert: Station at End of SET	North End of Culvert: Elevation at End of SET	North End of Culvert: Offset from FM 150 Centerline at End of SET	South End of Culvert: Station at End of SET	South End of Culvert: Elevation at End of SET	South End of Culvert: Offset from FM 150 Centerline at End of SET	Pipe Pay Length	Size, Type and Number of Proposed Pipes	SET (TYP II): Slope	SET (TYP II): Quant.
Culvert P-01	125+26.15	right	0.2%	124+83.98	534.61	41.17	125+68.31	534.50	40.54	55.1	24" RCP	6:1	2

TABLE B-1 HYDROLOGIC INPUTS

BASIN	AREA	CN	IMPERVIOUS %	LAG TIME
A1	0.0255	76	0	5.4
A2	0.0173	71	0	8.1
B1	0.1809	72	0	19.3
C1	0.1069	73	0	10.8
D1	0.0748	76	0	13.1
E1	0.3397	79	0	18.3
F1	0.1006	77	0	17.9
F2	0.2923	77	0	21.4
G1	0.0782	77	0	21.5
G2	0.2092	76	0	16.7
G3	0.2051	78	0	21.9
G4	0.0355	78	0	11.8
G5	0.1349	79	0	22.3
H1	0.0734	78	0	23.1
H2	0.0187	78	0	14.4
H3	0.0623	78	0	13.9
H4	0.0336	78	0	12.5

TABLE B-2 TIME OF CONCENTRATION CALCULATIONS

Sub Basin ID	Sheet Flow (L < 300')(1): L (ft)	n	s (ft/ft)	P_2 (in)	V (ft/s)	T_t (min)	Shallow Concentrated Flow(2) (L > 300'): Paved/ Unpaved	L (ft)	s (ft/ft)	V (ft/s)	T_t (min)	Channel or Pipe Flow(3): L (ft)	Ave. Velocity (ft/s)	T_t (min)	Total T_c (min)
A1	100	0.15	0.1386	3.44	0.38	4.36	Unpaved	808	0.0582	3.89	3.46	298	4.0	1.24	9.06
A2	100	0.15	0.0311	3.44	0.21	7.92	Unpaved	809	0.0222	2.41	5.61	0	4.0	0.00	13.53
B1	100	0.15	0.0067	3.44	0.11	14.62	Unpaved	700	0.0329	2.92	3.99	3244	4.0	13.52	32.12
C1	100	0.15	0.1330	3.44	0.38	4.43	Unpaved	1450	0.0641	4.09	5.91	1856	4.0	7.73	18.08
D1	100	0.15	0.0334	3.44	0.22	7.70	Unpaved	1298	0.0162	2.05	10.55	843	4.0	3.51	21.76
E1	100	0.15	0.0528	3.44	0.26	6.41	Unpaved	1793	0.0541	3.75	7.96	3880	4.0	16.17	30.54
F1	100	0.15	0.0098	3.44	0.13	12.57	Unpaved	1759	0.0188	2.21	13.26	956	4.0	3.98	29.81
F2	100	0.15	0.0150	3.44	0.16	10.59	Unpaved	1304	0.0284	2.72	8.00	4115	4.0	17.14	35.74
G1	100	0.15	0.0096	3.44	0.13	12.65	Unpaved	1096	0.0037	0.97	18.73	1053	4.0	4.39	35.77
G2	100	0.15	0.0149	3.44	0.16	10.63	Unpaved	756	0.0410	3.27	3.86	3197	4.0	13.32	27.81
G3	100	0.15	0.0201	3.44	0.18	9.43	Unpaved	2055	0.0258	2.59	13.22	3337	4.0	13.90	36.56
G4	100	0.15	0.0345	3.44	0.22	7.59	Unpaved	1031	0.0228	2.44	7.05	1206	4.0	5.03	19.67
G5	100	0.15	0.0300	3.44	0.21	8.04	Unpaved	2784	0.0097	1.59	29.21	0	4.0	0.00	37.24
H1	100	0.15	0.0049	3.44	0.10	16.57	Unpaved	2223	0.0110	1.69	21.87	0	4.0	0.00	38.43
H2	100	0.15	0.0049	3.44	0.10	16.54	Unpaved	1044	0.0211	2.34	7.43	0	4.0	0.00	23.97
H3	100	0.15	0.0148	3.44	0.16	10.66	Unpaved	1540	0.0162	2.06	12.48	0	4.0	0.00	23.14
H4	100	0.15	0.0098	3.44	0.13	12.59	Unpaved	1173	0.0213	2.36	8.30	0	4.0	0.00	20.89
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

1. THE OVERALL HYDROLOGY CALCULATIONS FOR THIS PROJECT ARE BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R, DATED JULY 5, 2016. THE CLOMR HYDROLOGY WAS UPDATED TO USE ATLAS-14 RAINFALL DATA, BUT ALL OTHER PARAMETERS AND CALCULATIONS ARE UNCHANGED.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

DRAINAGE CALCULATIONS

SCALE: 1" : 800'

SHEET 1 OF 2

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		99

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

TABLE B-3 HYDROLOGIC OUTPUT

		Drainage Area	50 yr		
	Basin	mi^2	Discharge (CFS)	Time to Peak	Volume (in.)
	A1	0.0255	57	01Jan2000, 12:07	3.47
	A2	0.0173	30	01Jan2000, 12:10	2.98
	B1	0.1809	237	01Jan2000, 12:23	3.08
	C1	0.1069	183	01Jan2000, 12:13	3.17
	D1	0.0748	130	01Jan2000, 12:15	3.47
	E1	0.3397	559	01Jan2000, 12:21	3.77
	F1	0.1006	158	01Jan2000, 12:21	3.57
	F2	0.2923	425	01Jan2000, 12:25	3.57
	G-G3-H4	0.0336	63	01Jan2000, 12:16	3.67
	G-G5	1.854	2484	01Jan2000, 12:36	3.53
	G1	0.0782	113	01Jan2000, 12:25	3.57
	G2	0.2092	330	01Jan2000, 12:19	3.47
	G3	0.2051	303	01Jan2000, 12:25	3.67
	G4	0.0355	68	01Jan2000, 12:14	3.67
	G5	0.1349	203	01Jan2000, 12:25	3.77
	H1	0.0734	106	01Jan2000, 12:26	3.67
	H2	0.0187	33	01Jan2000, 12:16	3.67
	H3	0.0623	112	01Jan2000, 12:16	3.67
	H4	0.0336	63	01Jan2000, 12:14	3.67
	J-Colton Bluff	0.6805	920	01Jan2000, 12:31	3.59
CULVERT B	J-DS	1.854	2484	01Jan2000, 12:31	3.53
	J-FM1623	1.0734	1462	01Jan2000, 12:30	3.58
	J-FM1623-HWY183	1.4788	1992	01Jan2000, 12:28	3.48
CULVERT A	J-HWY 183	1.5143	2027	01Jan2000, 12:33	3.48
	J-Trib 183	0.3397	559	01Jan2000, 12:21	3.77
	J-1	0.2874	392	01Jan2000, 12:22	3.49
	J-2	0.3929	542	01Jan2000, 12:30	3.57
	J-4	0.0428	88	01Jan2000, 12:10	3.27
	J-5	0.2237	324	01Jan2000, 12:24	3.11
	J-6	0.3306	461	01Jan2000, 12:21	3.13
	J-7	0.4054	567	01Jan2000, 12:23	3.19
	Outlet 1	1.9889	2662	01Jan2000, 12:35	3.55
	R-A2	0.0255	57	01Jan2000, 12:10	3.47
	R-B1	0.0428	88	01Jan2000, 12:24	3.27
	R-D1	0.3306	461	01Jan2000, 12:25	3.13
	R-F2	0.1006	158	01Jan2000, 12:38	3.57
	R-G2	0.0782	113	01Jan2000, 12:38	3.57
	R-G3	0.2874	392	01Jan2000, 12:36	3.49
	R-G3-H1	0.0734	106	01Jan2000, 12:38	3.67
	R-G3-H2	0.0187	33	01Jan2000, 12:26	3.67
	R-G3-H3	0.0623	112	01Jan2000, 12:22	3.67
	R-G4	1.4788	1992	01Jan2000, 12:33	3.48

TABLE B-3 HYDROLOGIC OUTPUT (CONT.)

		Drainage Area	100 yr		
	Basin	mi^2	Discharge (CFS)	Time to Peak	Volume (in.)
	A1	0.0255	57	01Jan2000, 12:07	3.47
	A2	0.0173	30	01Jan2000, 12:10	2.98
	B1	0.1809	237	01Jan2000, 12:23	3.08
	C1	0.1069	183	01Jan2000, 12:13	3.17
	D1	0.0748	130	01Jan2000, 12:15	3.47
	E1	0.3397	559	01Jan2000, 12:21	3.77
	F1	0.1006	158	01Jan2000, 12:21	3.57
	F2	0.2923	425	01Jan2000, 12:25	3.57
	G-G3-H4	0.0336	63	01Jan2000, 12:16	3.67
	G-G5	1.854	2484	01Jan2000, 12:36	3.53
	G1	0.0782	113	01Jan2000, 12:25	3.57
	G2	0.2092	330	01Jan2000, 12:19	3.47
	G3	0.2051	303	01Jan2000, 12:25	3.67
	G4	0.0355	68	01Jan2000, 12:14	3.67
	G5	0.1349	203	01Jan2000, 12:25	3.77
	H1	0.0734	106	01Jan2000, 12:26	3.67
	H2	0.0187	33	01Jan2000, 12:16	3.67
	H3	0.0623	112	01Jan2000, 12:16	3.67
	H4	0.0336	63	01Jan2000, 12:14	3.67
	J-Colton Bluff	0.6805	920	01Jan2000, 12:31	3.59
CULVERT B	J-DS	1.854	2484	01Jan2000, 12:31	3.53
	J-FM1623	1.0734	1462	01Jan2000, 12:30	3.58
	J-FM1623-HWY183	1.4788	1992	01Jan2000, 12:28	3.48
CULVERT A	J-HWY 183	1.5143	2027	01Jan2000, 12:33	3.48
	J-Trib 183	0.3397	559	01Jan2000, 12:21	3.77
	J-1	0.2874	392	01Jan2000, 12:22	3.49
	J-2	0.3929	542	01Jan2000, 12:30	3.57
	J-4	0.0428	88	01Jan2000, 12:10	3.27
	J-5	0.2237	324	01Jan2000, 12:24	3.11
	J-6	0.3306	461	01Jan2000, 12:21	3.13
	J-7	0.4054	567	01Jan2000, 12:23	3.19
	Outlet 1	1.9889	2662	01Jan2000, 12:35	3.55
	R-A2	0.0255	57	01Jan2000, 12:10	3.47
	R-B1	0.0428	88	01Jan2000, 12:24	3.27
	R-D1	0.3306	461	01Jan2000, 12:25	3.13
	R-F2	0.1006	158	01Jan2000, 12:38	3.57
	R-G2	0.0782	113	01Jan2000, 12:38	3.57
	R-G3	0.2874	392	01Jan2000, 12:36	3.49
	R-G3-H1	0.0734	106	01Jan2000, 12:38	3.67
	R-G3-H2	0.0187	33	01Jan2000, 12:26	3.67
	R-G3-H3	0.0623	112	01Jan2000, 12:22	3.67
	R-G4	1.4788	1992	01Jan2000, 12:33	3.48

NOTES

1. THE OVERALL HYDROLOGY CALCULATIONS FOR THIS PROJECT ARE ENTIRELY BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R DATED JULY 5, 2016.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED PROFESSIONAL ENGINEER

01/22/2021

US 183

DRAINAGE CALCULATIONS

SCALE: 1" : 800'

SHEET 2 OF 2

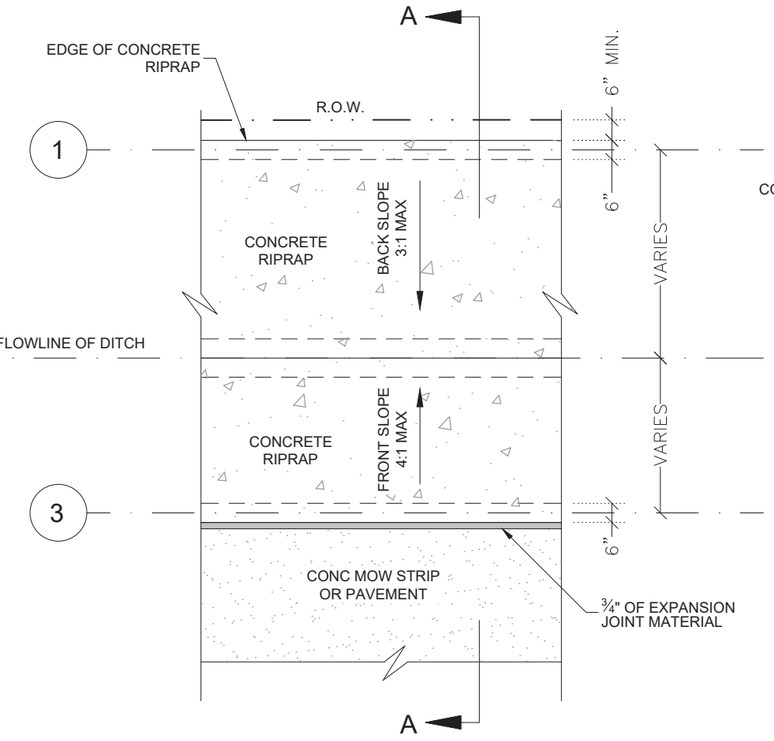
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

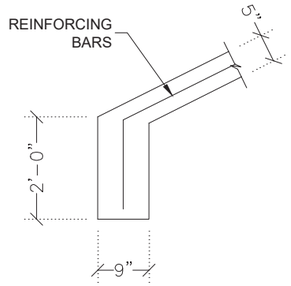
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			100

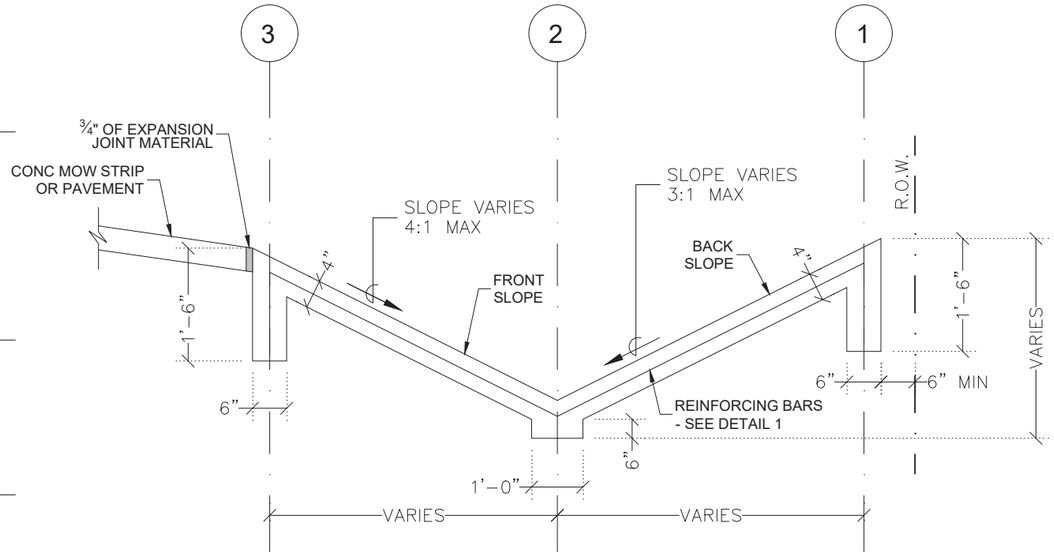
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

PLAN VIEW
CONCRETE RIPRAP AT DITCH
4 IN THICK
N.T.S.

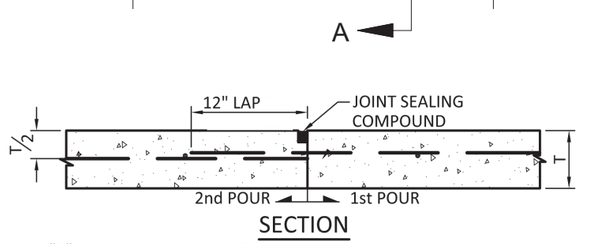




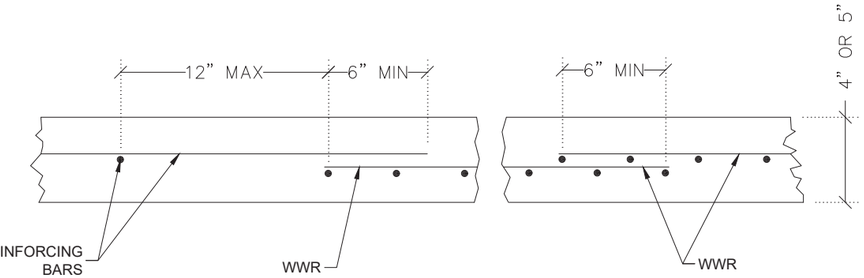
RIPRAP TOEWALL SECTION
5" THICK
N.T.S.



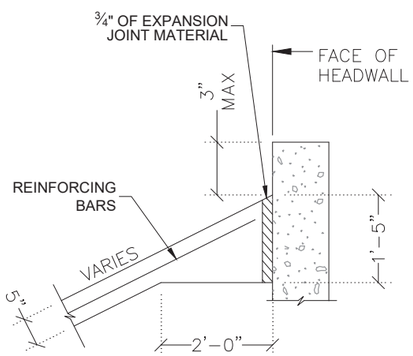
SECTION A-A
N.T.S.



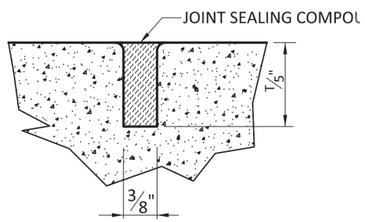
"T"= PAVEMENT THICKNESS
CONSTRUCTION JOINTS
N.T.S.



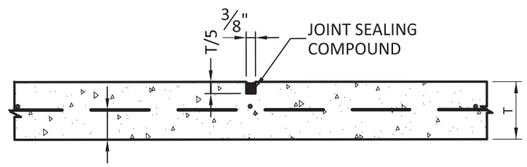
DETAIL 1
RIP-RAP REINFORCEMENT DETAILS
N.T.S.



RIPRAP AT PARALLEL WINGWALL
5" THICK
N.T.S.



"T"= PAVEMENT THICKNESS
GROOVE DETAILS
N.T.S.



"T"= PAVEMENT THICKNESS
SAWED TRANSVERSE

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

GENERAL NOTES:

1. PROVIDE CLASS "B" CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE #3 REINFORCING BARS AT 18" SPA C–C. PROVIDE WELDED WIRE REINFORCEMENT (WWR) AS 6X6–D3XD3. COMBINATIONS OF WWR AND REINFORCING BARS MAY BE USED. USE LAP SPLICES OF A MINIMUM 6 INCHES, MEASURED FROM THE TRANSVERSE WIRE OF WWR, AND THE ENDS OF REINFORCING BARS.
4. INSTALL CONSTRUCTION JOINTS, IF NECESSARY.
5. INSTALL SAWED TRANSVERSE JOINT AT INTERVALS OF APPROXIMATELY 20 FEET
6. USE REINFORCING BARS, DEFORMED WELDED WIRE REINFORCING (WWR), OR ANY SUITABLE COMBINATION OF BOTH TYPES FOR RIPRAP REINFORCING.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER
01/22/2021

US 183

DRAINAGE DETAILS

SHEET 1 OF 1

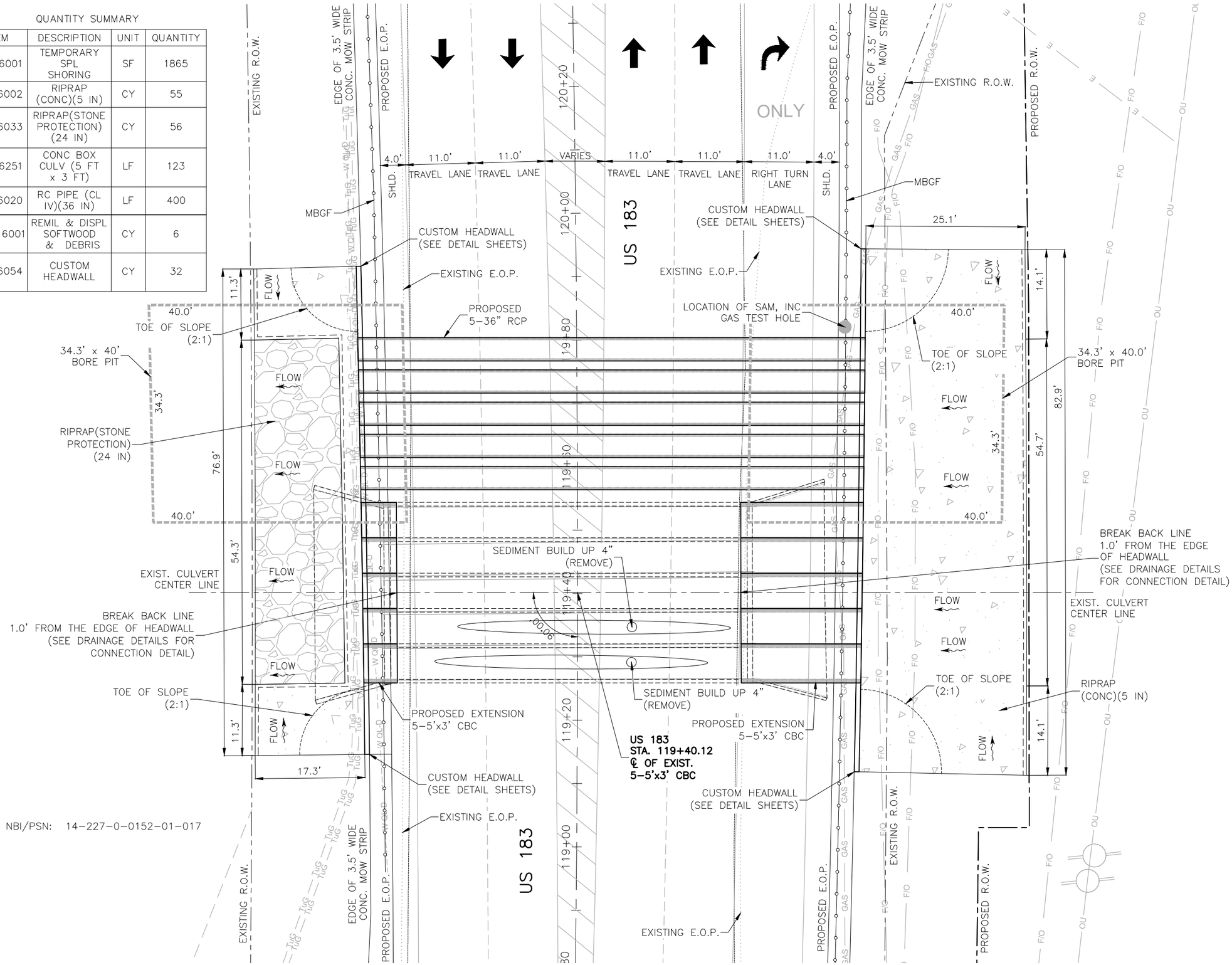
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		101

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

QUANTITY SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
403 6001	TEMPORARY SPL SHORING	SF	1865
432 6002	RIPRAP (CONC)(5 IN)	CY	55
432 6033	RIPRAP(STONE PROTECTION) (24 IN)	CY	56
462 6251	CONC BOX CULV (5 FT x 3 FT)	LF	123
464 6020	RC PIPE (CL IV)(36 IN)	LF	400
7000 6001	REMIL & DISPL SOFTWOOD & DEBRIS	CY	6
420 6054	CUSTOM HEADWALL	CY	32



0 15 30

SCALE: 1" = 15'

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT

NOTES

1. WHERE CULVERT LOCATION PRECLUDES STANDARD SPACING OF MBGF POLES USE LONG SPAN STANDARD GF(31) LS-19. SEE SUMMARY OF ROADWAY FOR QUANTITIES.
2. PRIOR TO EXTENSION OF THE EXISTING CULVERT CONTRACTOR SHALL HAVE ANY SEDIMENT DEPOSITS AND/OR DEBRIS REMOVED.
3. PRIOR TO REMOVAL OF EXISTING CROSS CULVERT HEADWALLS CONTRACTOR SHALL INSTALL TEMPORARY SPECIAL SHORING.
4. SEE PAINTING STRUCTURE NUMBERS SHEET 132B FOR PAINTING NBI NUMBER ON STRUCTURE. NBI PAINTING IS INCIDENTAL TO ITEM 462.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED PROFESSIONAL ENGINEER

01/22/2021

US 183

CULVERT A
STA. 119+40.12

SCALE: 1" : 12' SHEET 1 OF 3

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

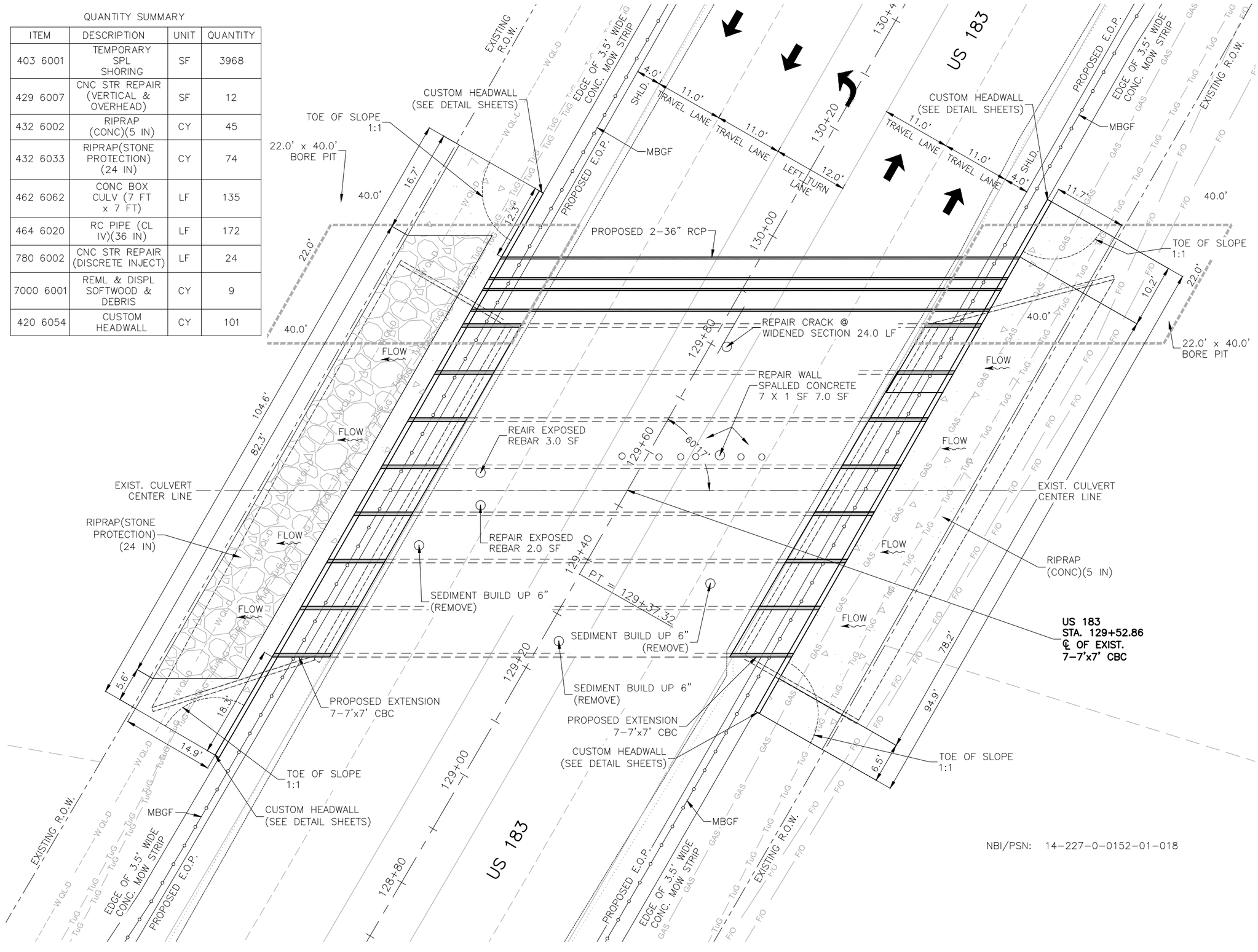
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		102

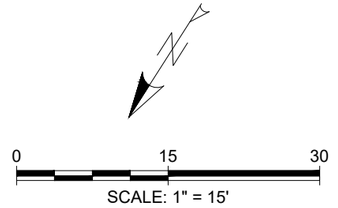
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\UOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Culvert PP

QUANTITY SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
403 6001	TEMPORARY SPL SHORING	SF	3968
429 6007	CNC STR REPAIR (VERTICAL & OVERHEAD)	SF	12
432 6002	RIPRAP (CONC)(5 IN)	CY	45
432 6033	RIPRAP(STONE PROTECTION) (24 IN)	CY	74
462 6062	CONC BOX CULV (7 FT x 7 FT)	LF	135
464 6020	RC PIPE (CL IV)(36 IN)	LF	172
780 6002	CNC STR REPAIR (DISCRETE INJECT)	LF	24
7000 6001	REML & DISPL SOFTWOOD & DEBRIS	CY	9
420 6054	CUSTOM HEADWALL	CY	101





LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT

NOTES

1. WHERE CULVERT LOCATION PRECLUDES STANDARD SPACING OF MBGF POLES USE LONG SPAN STANDARD GF(31) LS-19. SEE SUMMARY OF ROADWAY FOR QUANTITIES.
2. PRIOR TO EXTENSION OF THE EXISTING CULVERT CONTRACTOR SHALL HAVE ANY SEDIMENT DEPOSITS AND/OR DEBRIS REMOVED.
3. PRIOR TO REMOVAL OF EXISTING CROSS CULVERT HEADWALLS CONTRACTOR SHALL INSTALL TEMPORARY SPECIAL SHORING.
4. SEE PAINTING STRUCTURE NUMBERS SHEET 132B FOR PAINTING NBI NUMBER ON STRUCTURE. NBI PAINTING IS INCIDENTAL TO ITEM 462.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED PROFESSIONAL ENGINEER

01/22/2021

US 183

CULVERT B

STA. 129+52.86

SCALE: 1" : 12'

SHEET 2 OF 3

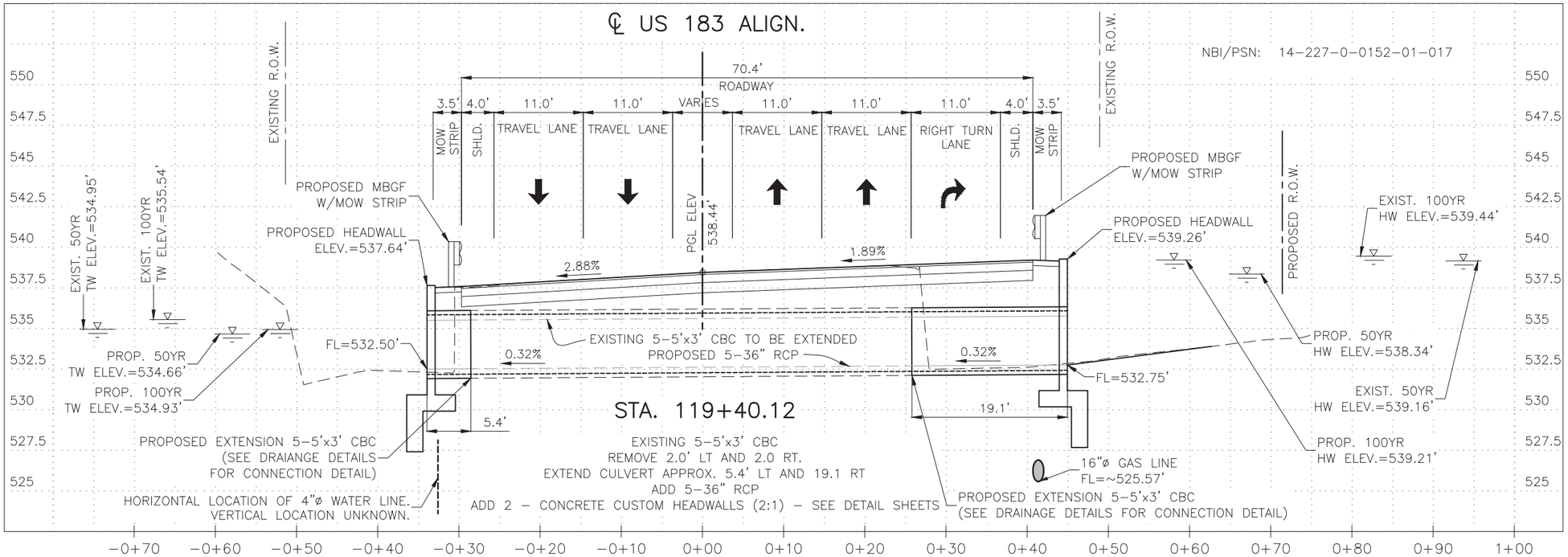
PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		103

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



NOTE

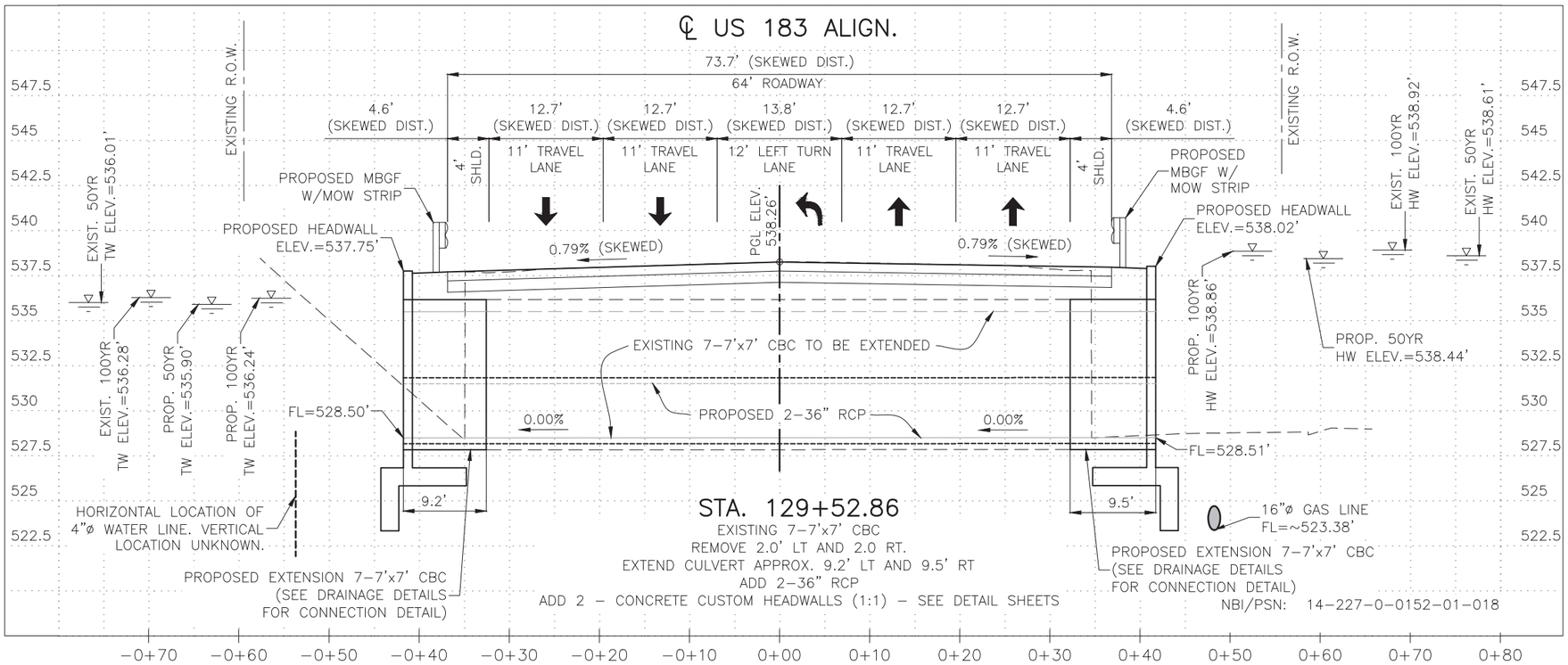
1. THE SUB-SURFACE SURVEY WAS NOT ABLE TO DETERMINE THE LOCATION OF 4" WATER LINE ON THE EAST SIDE OF US183, THEREFORE THERE IS NO ELEVATION AVAILABLE. THE APPROXIMATE HORIZONTAL LOCATION OF THE WATER LINE WAS SHOWN BASED ON THE AS-BUILT INFORMATION PROVIDED BY CREEDMOR MAHA WATER SUPPLY. CONTRACTOR TO LOWER THE 4" WATER LINE IN THE FIELD, AND COORDINATE WITH CREEDMOR MAHA ON VALVE SHUT DOWN.

2. GAS LINE HORIZONTAL AND VERTICAL LOCATIONS ARE APPROXIMATE. GAS LINE VERTICAL LOCATION AT CULVERT B COULD NOT BE DETERMINED. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF GAS LINE PRIOR TO CONSTRUCTION.

LEGEND

EXISTING GRADE ℄ PROFILE

SCALE: 1" = 15' HORIZONTAL
1" = 7.5' VERTICAL



STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183
CULVERT PROFILE
STA. 119+40.12
STA. 129+52.86

SCALE: 1" : 12'

SHEET 3 OF 3

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			104

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Culvert PP

STRUCTURAL GENERAL NOTES AND SPECIFICATIONS

FOUNDATION NOTES

1 DESIGN LOADS

HYDROSTATIC PRESSURE – WALLS ARE DESIGNED WITH WATER TABLE UP TO TWO-THIRD OF THE WALL HEIGHT AT HEEL SIDE.

ACTIVE LATERAL EARTH PRESSURE – EQUIVALENT FLUID PRESSURE OF 45 PCF

SURCHARGE PRESSURE – 250 PSF ON HEEL SIDE OF CULVERT WINGWALLS

2 DESIGN ALLOWABLE SOIL BEARING PRESSURE IS 2,000 PSF ON PROOF-ROLLED NATURAL SUBGRADE.

3 THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS PREPARED BY MLA LABS, INC., 2800 LONGHORN BLVD., SUITE 104, AUSTIN, TX 78758, PHONE (512) 873-8899, FAX (512) 835-5114, MLA LABS PROJECT NO. 1104000.269, REPORT DATED SEPTEMBER 2012. THE CONTRACTOR SHALL OBTAIN A COPY OF THIS REPORT AND REVIEW ITS CONTENTS TO BECOME FAMILIAR WITH THE GEOTECHNICAL CONDITIONS THAT EXIST AT THIS SITE AND THE RECOMMENDATIONS PRESENTED IN THE GEOTECHNICAL INVESTIGATION.

4 ALL BACKFILL BEHIND THE CULVERT WINGWALLS SHALL CONSIST OF SELECT FILL MATERIAL AS SPECIFIED BELOW.

5 ALL SELECT FILL MATERIAL SHALL CONSIST OF IMPORTED SELECT FILL APPROVED BY THE GEOTECHNICAL ENGINEER.

IMPORTED SELECT FILL – IMPORTED SELECT FILL SHALL CONSIST OF CRUSHED LIMESTONE BASE MATERIAL MEETING THE REQUIREMENTS OF TXDOT ITEM 247, TYPE A, GRADE 4 OR A LOW PLASTICITY CLAYEY SOIL WITH A PLASTICITY INDEX BETWEEN 7 AND 20 PERCENT, A MAXIMUM GRAVEL CONTENT (PERCENT RETAINED ON THE NO. 4 SIEVE) OF 40 PERCENT, AND PARTICLES NO LARGER THAN FOUR INCHES IN THEIR LARGEST DIMENSION.

ALL SELECT FILL MATERIAL SHALL BE PLACED IN UNIFORM LOOSE LIFT THICKNESS OF 8 INCHES MAXIMUM AND COMPACTED TO UNIFORM LIFTS NOT EXCEEDING 6 INCHES IN THICKNESS. SELECT FILL SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE STANDARD PROCTOR (ASTM D 698) MAXIMUM DRY DENSITY AT +/- 3% OF OPTIMUM MOISTURE CONTENT.

THE TOP 12 INCHES OF BACKFILL AT NON PAVED AREAS SHALL CONSIST OF A CLAY MATERIAL WITH A MINIMUM PI OF 32. THE CLAY MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

REINFORCED CONCRETE NOTES

1 ALL CONCRETE SHALL BE CLASS C (3600 PSI) NORMAL WEIGHT CONCRETE WITH A WATER/CEMENT RATIO OF NOT MORE THAN 0.45 AND A SLUMP IN THE RANGE OF 6 TO 8 INCHES. WATER CONTENT SHALL BE CLOSELY MONITORED DURING BATCHING. UNDER NO CIRCUMSTANCES SHALL THE WATER/CEMENT RATIO BE PERMITTED TO EXCEED THE SPECIFIED MAXIMUM. THE USE OF A MID RANGE WATER REDUCING ADMIXTURE IS RECOMMENDED TO IMPROVE WORKABILITY DURING PLACING OPERATIONS.

2 THE USE OF FLY ASH IS REQUIRED. ALL CONCRETE SHALL CONTAIN A MINIMUM FLY ASH CONTENT EQUAL TO 25 PERCENT OF THE TOTAL WEIGHT OF THE CEMENT PLUS FLY ASH BY WEIGHT. FLY ASH SHALL BE CLASS F OR C, BUT CONCRETE MIXED WITH CLASS C FLY ASH SHALL BE SUBJECT TO THE FOLLOWING RESTRICTIONS:

A COARSE AGGREGATE SHALL CONSIST OF CRUSHED LIMESTONE. THE USE OF ROCK GRAVEL AGGREGATE WILL NOT BE PERMITTED.

B CEMENT SHALL BE TYPE II LA (LOW ALKALI) OR TYPE I/II LA. ALKALI CONTENT OF THE CEMENT SHALL BE LESS THAN 0.6%.

3 REINFORCING STEEL SHALL BE ASTM/ANSI A615, GRADE 60. DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES," ACI 315.

4 CONCRETE CONSTRUCTION, INCLUDING MINIMUM REINFORCING STEEL COVERAGE BY CONCRETE, SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE," ACI 318, UNLESS OTHERWISE NOTED.

WATERSTOPS

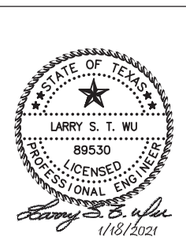
1 ALL WATERSTOPS SHALL BE PREFORMED PLASTIC SEALING TYPE WATERSTOP SUCH AS SYNKO-FLEX. PLASTIC SEALING TYPE WATERSTOP SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

SEALANT

1 SEALANT AT JOINTS SHALL CONSIST OF POLYURETHANE BASED NON-SAG ELASTOMERIC SEALANT FOR USE IN WATER IMMERSION APPLICATIONS. SEALANT SHALL BE APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, INCLUDING USE OF A PRIMER AS REQUIRED. AN ACCEPTABLE PRODUCT IS SIKAFLEX 1A SEALANT WITH SIKAFLEX PRIMER 429 AS MANUFACTURED BY SIKA CORPORATION.

INSTALLATION OF REBAR INTO EXISTING CONCRETE

1 REBAR INSTALLED INTO EXISTING CONCRETE SHALL BE DRILLED AND ANCHORED USING HILTI HIT-HY 200 ADHESIVE, USED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EXTRA CARE SHALL BE USED TO PROPERLY CLEAN HOLES PRIOR TO INSTALLATION OF ADHESIVE AND RODS. HOLE CLEANING SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS, BUT SHALL INCLUDE BLOWING THE DRILLED HOLE OUT WITH COMPRESSED AIR FOLLOWED BY CLEANING WITH A BRUSH AND FINAL CLEANING WITH COMPRESSED AIR. COMPRESSED AIR SHALL BE APPLIED TO THE BOTTOM OF THE HOLE USING A NOZZLE EXTENSION FOR HOLE CLEANING. ADHESIVE SHALL COMPLETELY FILL THE HOLE AFTER INSTALLATION OF THE REBAR.



US 183
STRUCTURAL
GENERAL NOTES
& SPECIFICATIONS

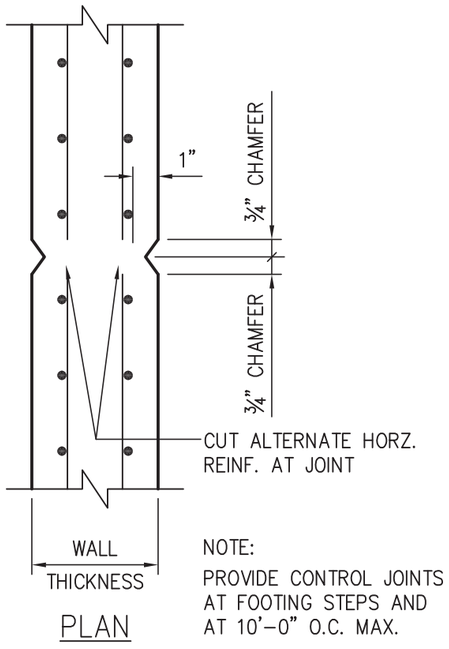
PKA Project No. 011-4834

Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759• Phone 512-345-5538

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			105

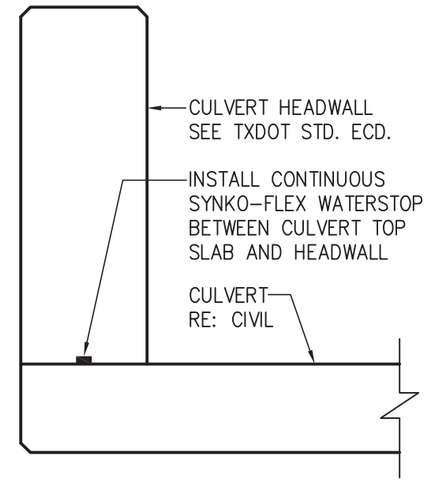
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



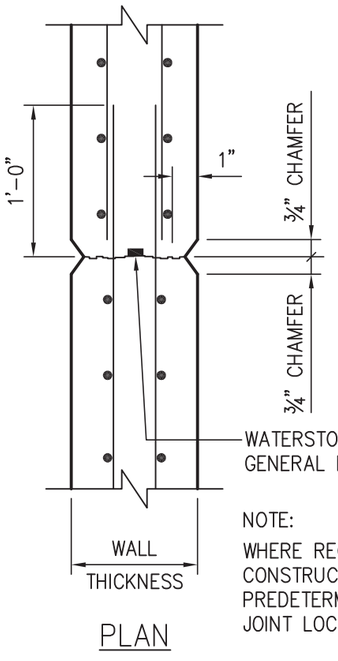
NOTE:
PROVIDE CONTROL JOINTS AT FOOTING STEPS AND AT 10'–0" O.C. MAX.

PLAN

1 RETAINING WALL CONTROL JOINT
TYPICAL DETAIL
N.T.S.



2 CULVERT HEADWALL
TYPICAL DETAIL
N.T.S.



NOTE:
WHERE REQUIRED, PROVIDE CONSTRUCTION JOINTS AT PREDETERMINED CONTROL JOINT LOCATIONS.

PLAN

3 RETAINING WALL CONSTRUCTION JOINT
TYPICAL DETAIL
N.T.S.

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED
PROFESSIONAL ENGINEER
1/18/2021

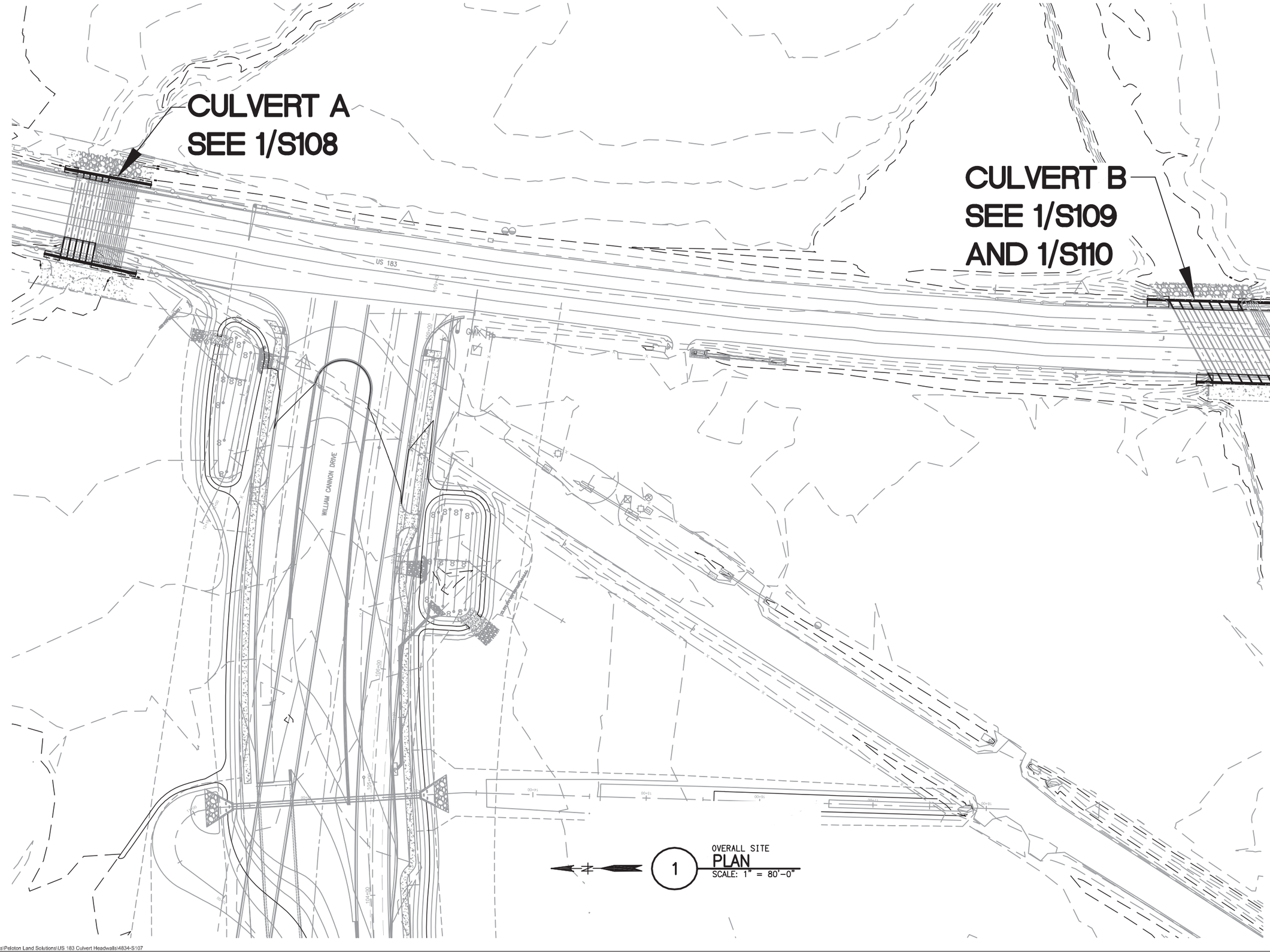
US 183
STRUCTURAL
TYPICAL DETAILS

PKA Project No. 011–4834

Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759• Phone 512-345-5538

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			106
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



1 OVERALL SITE PLAN
SCALE: 1" = 80'-0"

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT IMPROVEMENTS
OVERALL SITE PLAN

PKA Project No. 011-4834

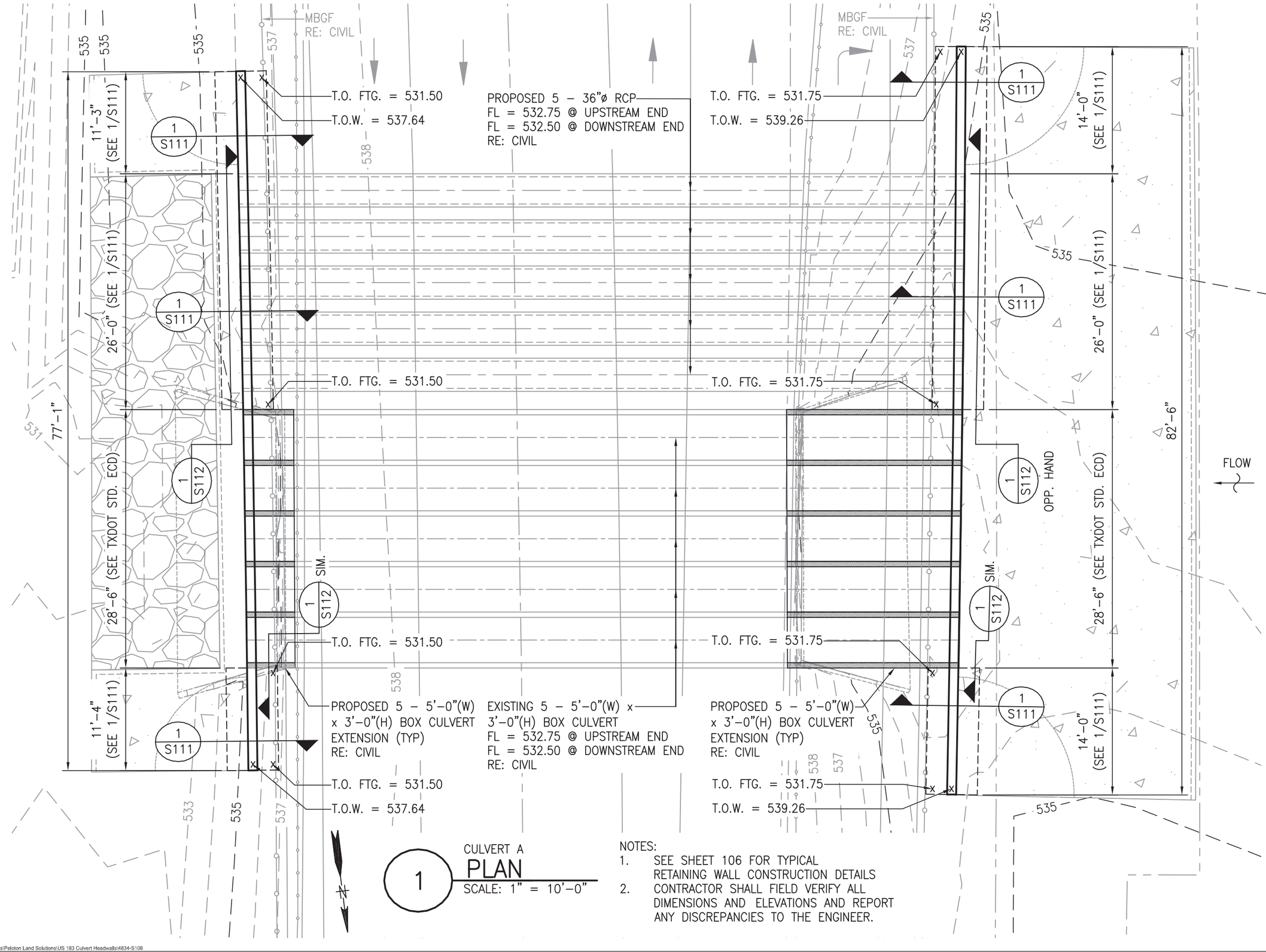
Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759 • Phone 512-345-5538

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			107

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

K:\Projects\Peloton Land Solutions\US 183 Culvert Headwalls\4834-S107



1 CULVERT A PLAN
SCALE: 1" = 10'–0"

NOTES:
1. SEE SHEET 106 FOR TYPICAL RETAINING WALL CONSTRUCTION DETAILS
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER.

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT A
WINGWALL & HEADWALL PLAN

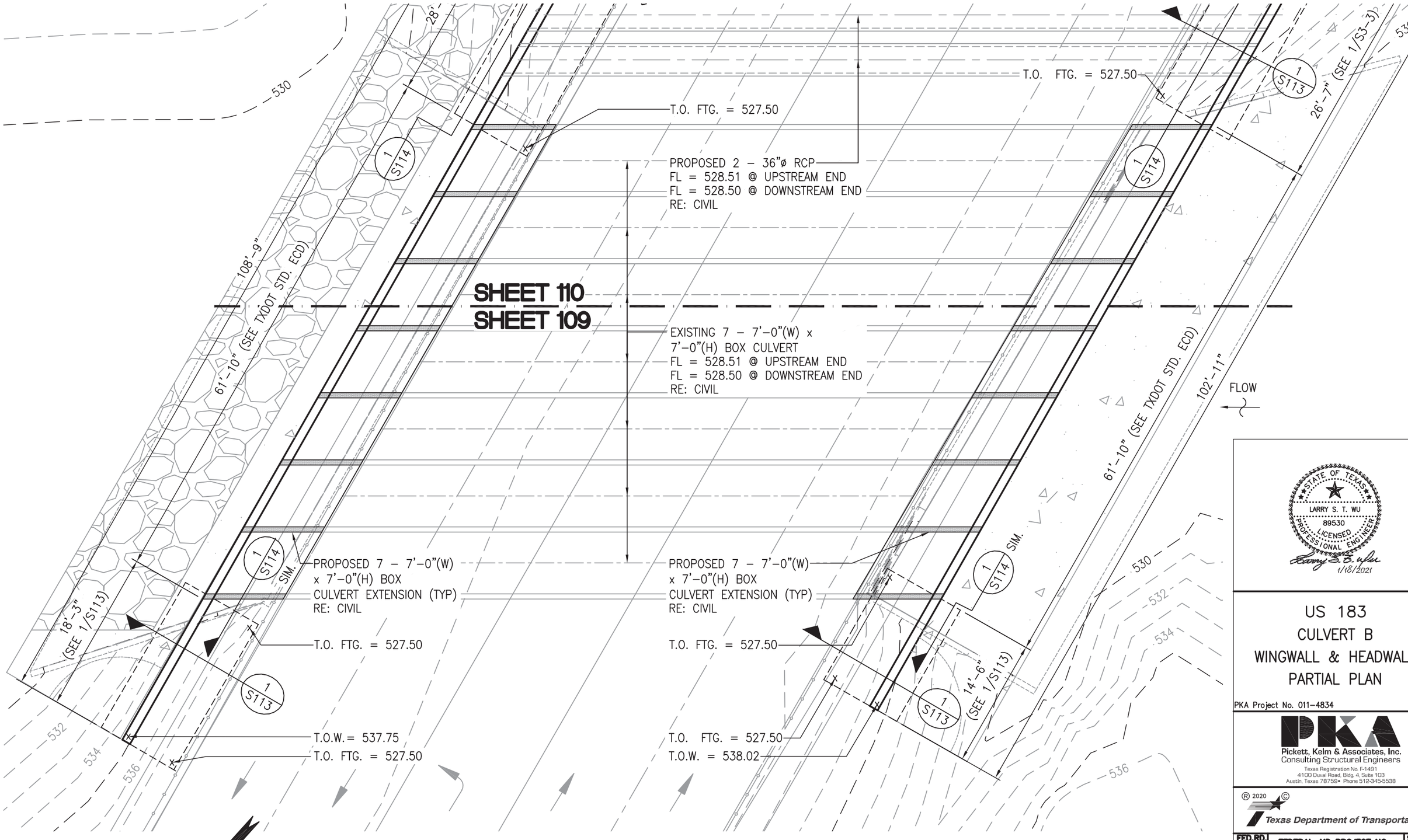
PKA Project No. 011–4834

Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759• Phone 512-345-5538

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		108

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



1 PARTIAL PLAN
SCALE: 1" = 10'-0"

NOTES:

1. SEE SHEET 106 FOR TYPICAL RETAINING WALL CONSTRUCTION DETAILS.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS VERSUS CIVIL DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.

K:\Projects\Peloton Land Solutions\US 183 Culvert Headwalls\4834-S109

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED
PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT B
WINGWALL & HEADWALL
PARTIAL PLAN

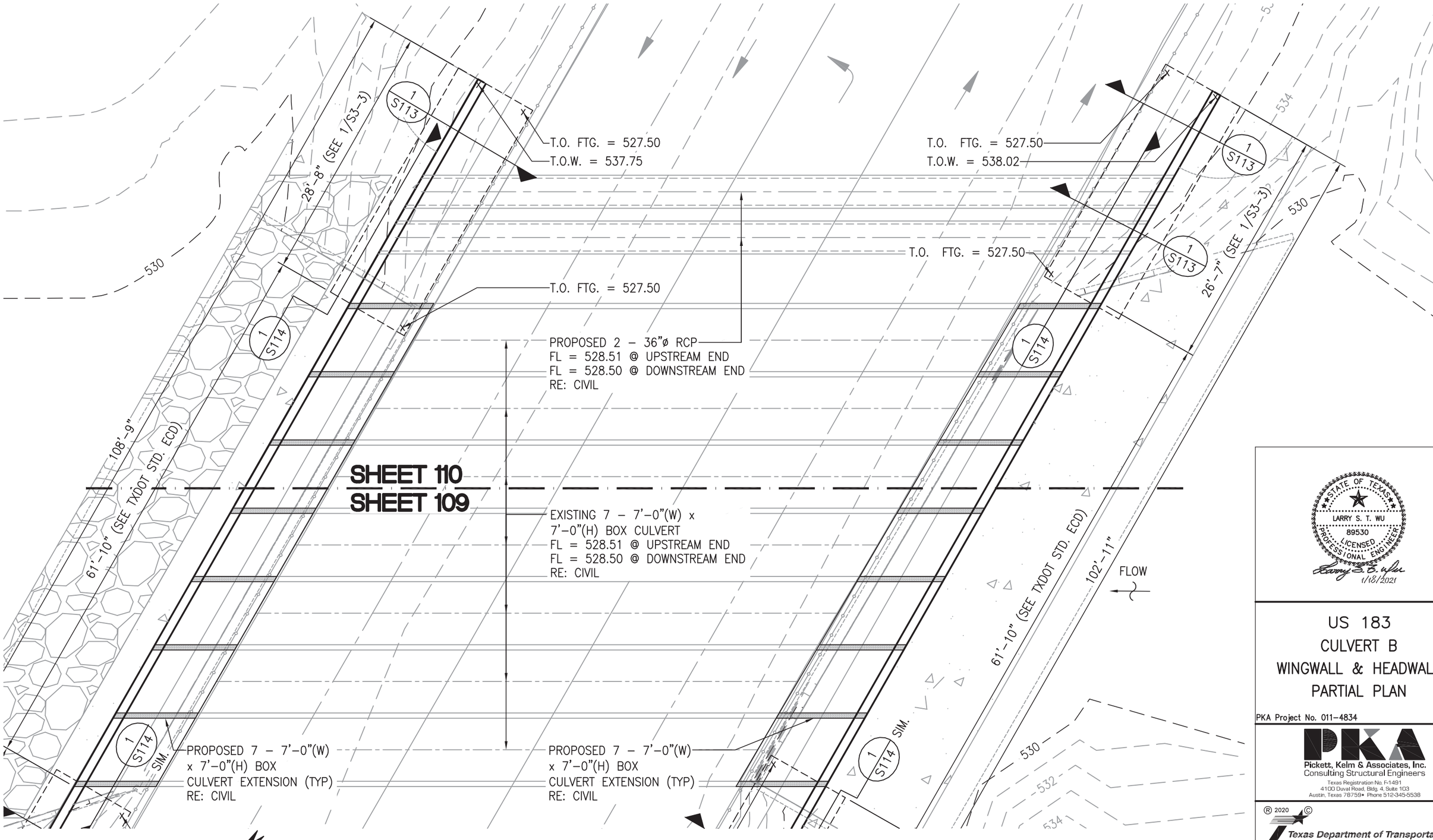
PKA Project No. 011-4834

PKA
Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759• Phone 512-345-5538

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			109

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



1 PARTIAL PLAN
SCALE: 1" = 10'-0"

NOTES:

1. SEE SHEET 106 FOR TYPICAL RETAINING WALL CONSTRUCTION DETAILS.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS VERSUS CIVIL DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.

K:\Projects\Peloton Land Solutions\US 183 Culvert Headwalls\4834-S110

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED
PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT B
WINGWALL & HEADWALL
PARTIAL PLAN

PKA Project No. 011-4834

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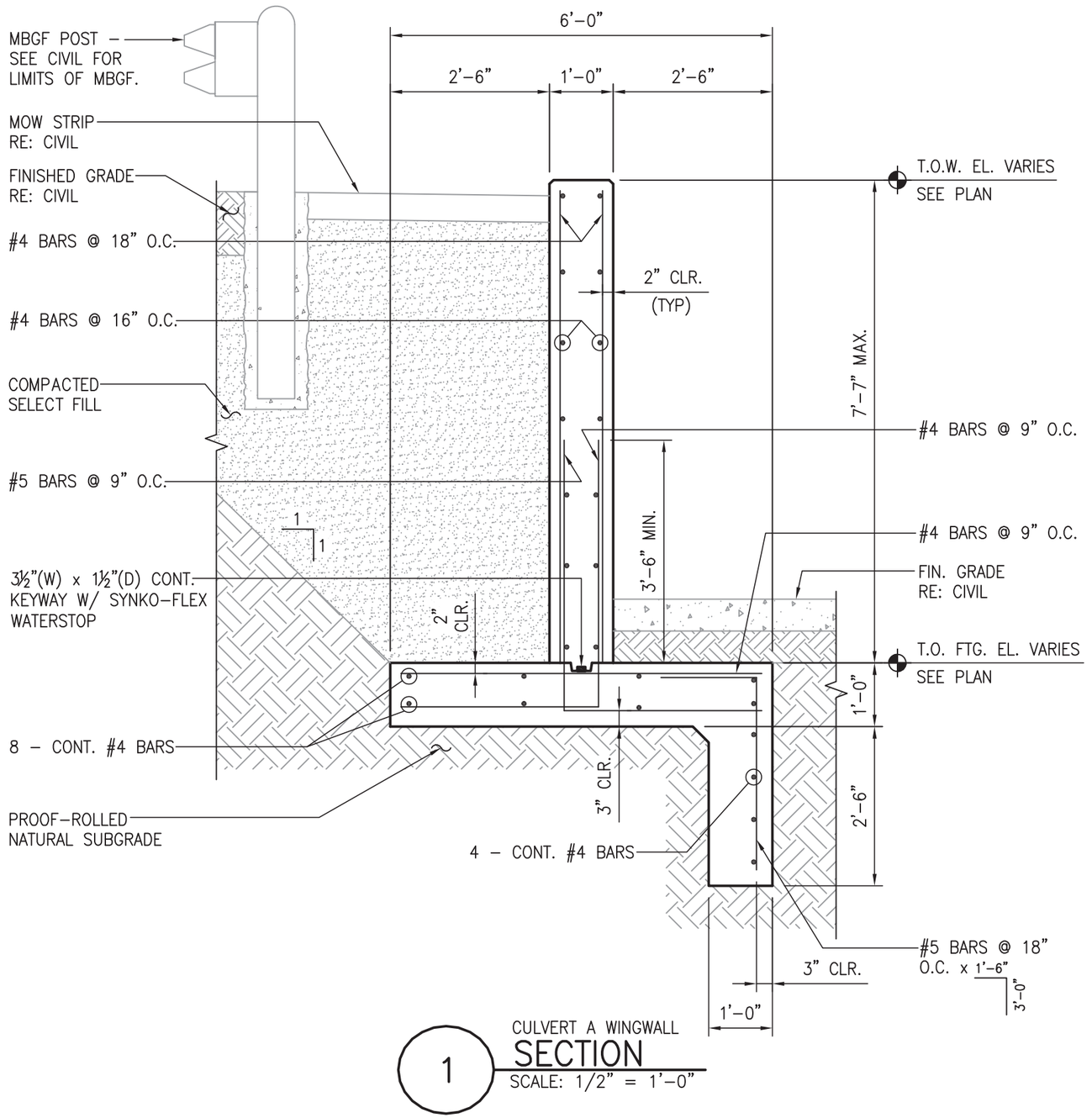
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			110

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



1 CULVERT A WINGWALL SECTION
SCALE: 1/2" = 1'-0"

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

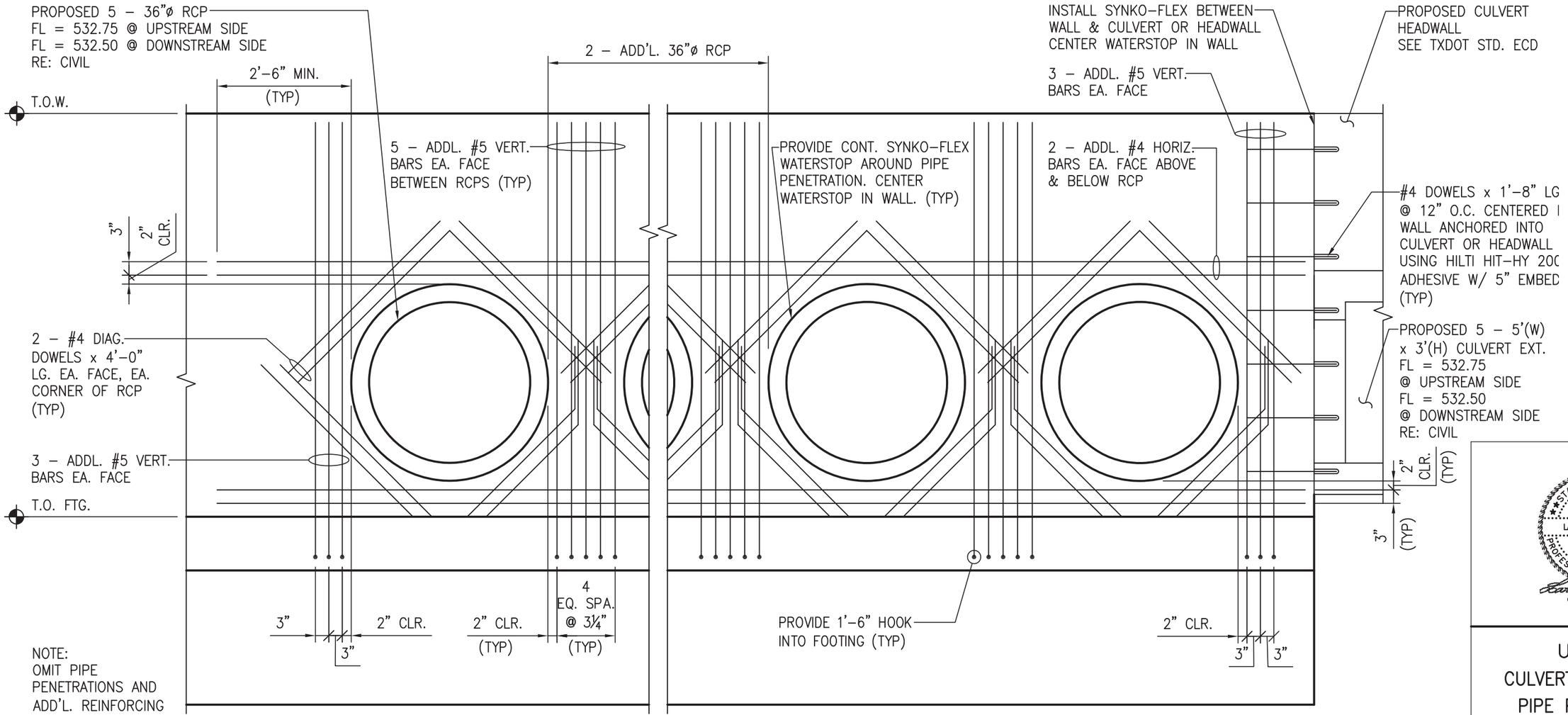
US 183
CULVERT A
WINGWALL SECTION

PKA Project No. 011-4834

Pickett, Kelm & Associates, Inc.
Consulting Structural Engineers
Texas Registration No. F-1491
4100 Duval Road, Bldg. 4, Suite 103
Austin, Texas 78759• Phone 512-345-5538

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		111

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



NOTE:
OMIT PIPE PENETRATIONS AND ADD'L. REINFORCING SURROUNDING PIPES AT SIM. CONDITION

1 CULVERT A WINGWALL PIPE PENETRATION & CULVERT CONNECTION DETAIL
SCALE: 1/2" = 1'–0"

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT A WINGWALL PIPE PENETRATION & CULVERT CONNECTION

PKA Project No. 011–4834

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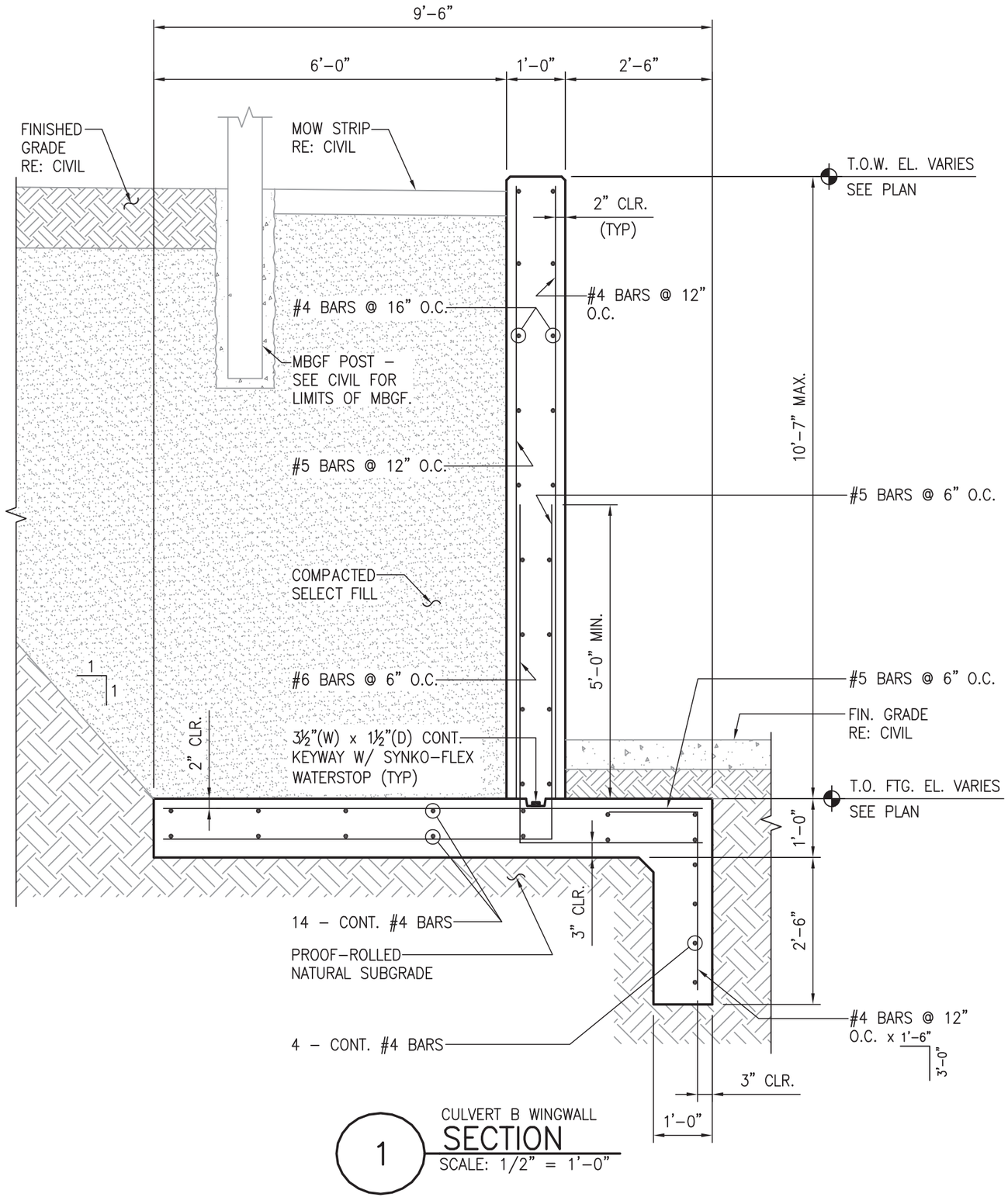
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			112

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



1 CULVERT B WINGWALL SECTION
SCALE: 1/2" = 1'–0"

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT B
WINGWALL SECTION

PKA Project No. 011–4834

Pickett, Kelm & Associates, Inc.
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Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			113

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

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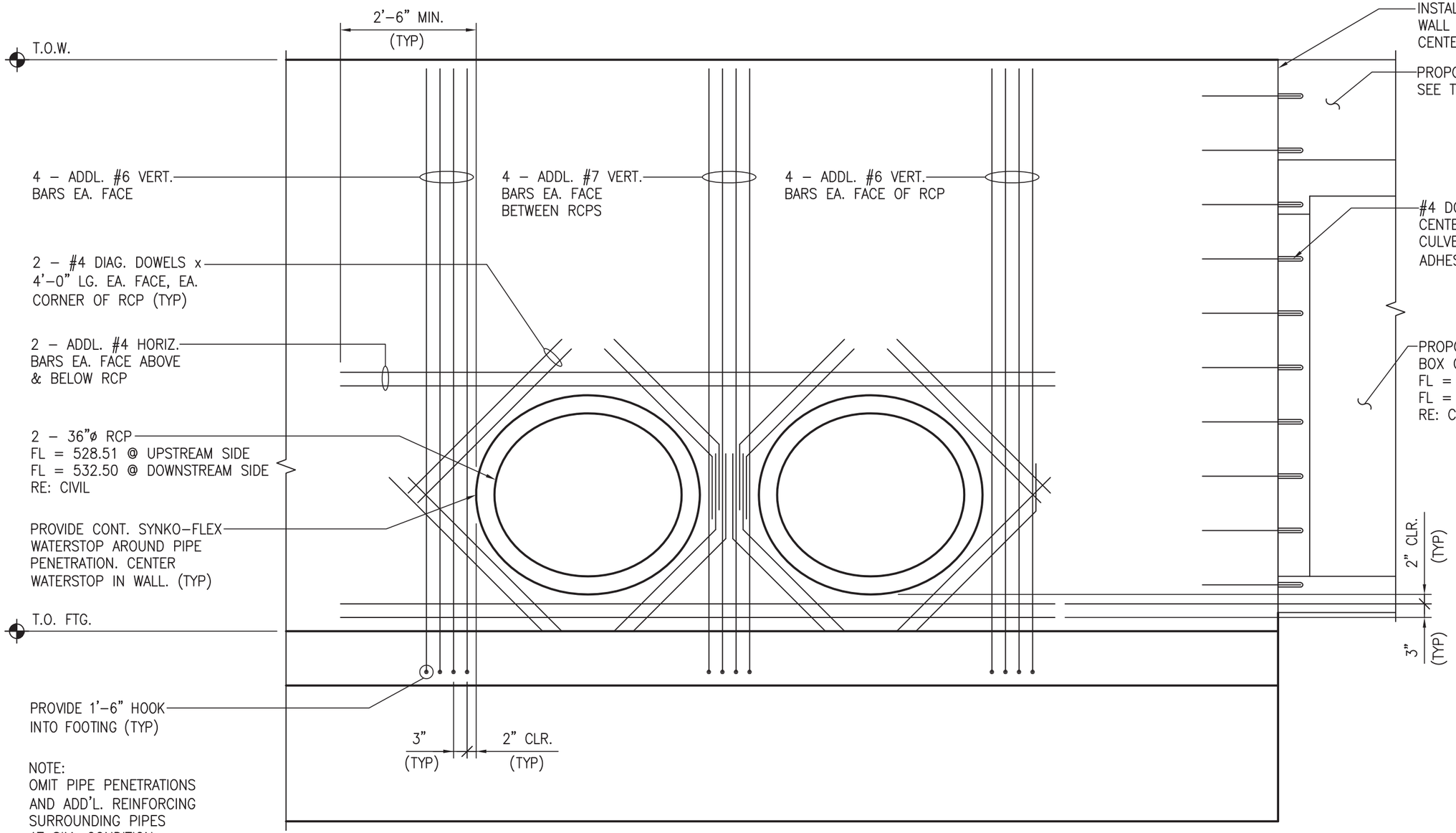

1 CULVERT B WINGWALL PIPE PENETRATION & CULVERT CONNECTION DETAIL
SCALE: 1/2" = 1'–0"

STATE OF TEXAS
LARRY S. T. WU
89530
LICENSED PROFESSIONAL ENGINEER
1/18/2021

US 183
CULVERT B WINGWALL PIPE PENETRATION & CULVERT CONNECTION

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Austin, Texas 78759• Phone 512-345-5538

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			114

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

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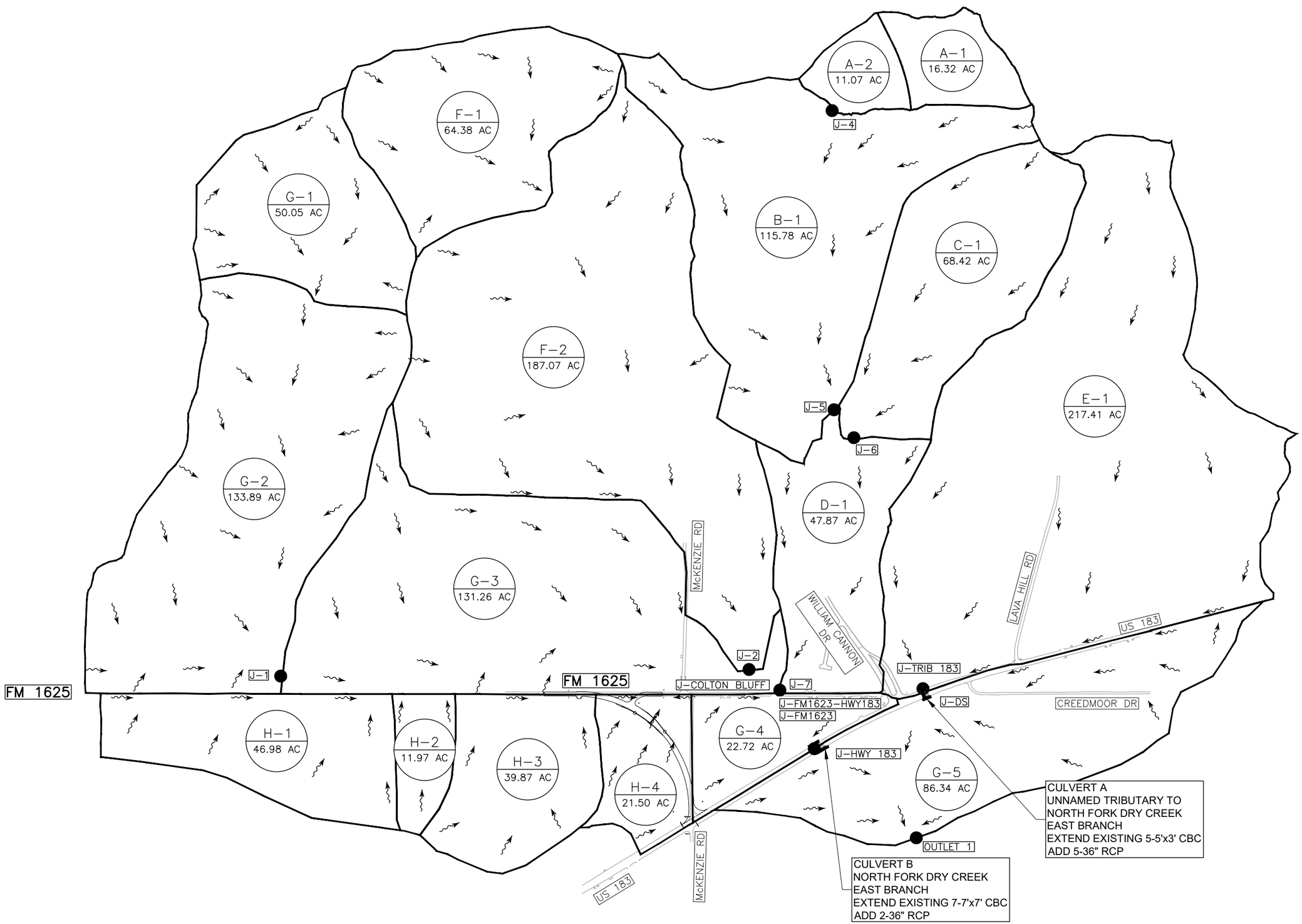


0 800 1600

SCALE: 1" = 800'

LEGEND

DRAINAGE AREA

NOTES

1. THE OVERALL HYDROLOGY MAP FOR THIS PROJECT IS ENTIRELY BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16–06–0714R DATED JULY 5, 2016.
2. NO HYDRAULIC CALCULATIONS FOR 18" RCP PARALLEL CULVERT UNDER DRIVEWAY "1" WERE PERFORM. THE ENTIRE AREA IS IN THE FEMA FOODPLAIN AND CONTRIBUTING DRAINAGE AREA FOR THIS CULVERT IS NEGLIGIBLE.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED PROFESSIONAL ENGINEER

01/22/2021

FM 1625

OVERALL EXISTING DRAINAGE MAP

SCALE: 1" : 800' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		115

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Drainage

SUMMARY OF CROSS CULVERTS

Culvert ID	Existing Centerline Sta.	Drainage Area [AC]	Upstream Extension Length (to face of headwall) [LF]	Downstream Extension Length (to face of headwall) [LF]		Size, Type, Number of Barrels	Upstream and Downstream Extension Slope [%]	Length (to face fo headwall) [LF]	Upstream Flow Line Invert [MSL]	Downstream Flow Line Invert [MSL]	50-Year Q Total [CFS]	50-Year Q Culverts [CFS]	50-Year Q Weir [CFS]	50-Year Headwater Elevation [MSL]	50-Year Tailwater Elevation [MSL]	100-Year Q Total [CFS]	100-Year Q Culverts [CFS]	100-Year Q Weir [CFS]	100-Year Headwater Elevation [MSL]	100-Year Tailwater Elevation [MSL]
Culvert A UNNAMED TRIBUTARY TO NORTH FORK DRY CREEK EAST BRANCH	119+40.12	1186.56	19.1	5.4	existing	5-5'x3' MBC	0.32%	58.2	532.59	532.50										
					proposed	5-5'x3' MBC 5-36" RCP	0.32%	78.9	532.75	532.50	1152	1152.00	0	538.34	534.66	1323	1269.00	54.00	539.21	534.93
Culvert B NORTH FOR DRY CREEK EAST BRANCH	129+52.89	969.15	9.5	9.2	existing	7-7'x7' MBC	0.00%	69.4	528.51	528.50										
					proposed	7-7'x7' MBC 2-36" RCP	0.00%	83.5	528.51	528.50	4069	3884.00	185	538.44	535.90	4639.00	3946.00	693.00	538.86	536.24

PARALLEL CULVERT

Parallel Culvert ID	Centerline Station	Left or Right	Slope %	North End of Culvert: Station at End of SET	North End of Culvert: Elevation at End of SET	North End of Culvert: Offset from FM 150 Centerline at End of SET	South End of Culvert: Station at End of SET	South End of Culvert: Elevation at End of SET	South End of Culvert: Offset from FM 150 Centerline at End of SET	Pipe Pay Length	Size, Type and Number of Proposed Pipes	SET (TYP II): Slope	SET (TYP II): Quant.
Culvert P-01	125+26.15	right	0.2%	124+83.98	534.61	41.17	125+68.31	534.50	40.54	55.1	24" RCP	6:1	2

Existing H-3 - 36" Pipe				
Storm Frequency	Q (cfs)	Vexit (fps)	Headwater (ft)	Tailwater (ft)
2-Year	28.84	12.63	546.47	541.67
10-Year	51.87	14.22	547.79	541.67
25-Year	74.13	15.50	549.99	541.67
100-Year	120.72	18.58	557.22	541.67

TABLE B-1 HYDROLOGIC INPUTS

BASIN	AREA	CN	IMPERVIOUS %	LAG TIME
A1	0.0255	76	0	5.4
A2	0.0173	71	0	8.1
B1	0.1809	72	0	19.3
C1	0.1069	73	0	10.8
D1	0.0748	76	0	13.1
E1	0.3397	79	0	18.3
F1	0.1006	77	0	17.9
F2	0.2923	77	0	21.4
G1	0.0782	77	0	21.5
G2	0.2092	76	0	16.7
G3	0.2051	78	0	21.9
G4	0.0355	78	0	11.8
G5	0.1349	79	0	22.3
H1	0.0734	78	0	23.1
H2	0.0187	78	0	14.4
H3	0.0623	78	0	13.9
H4	0.0336	78	0	12.5

TABLE B-2 TIME OF CONCENTRATION CALCULATIONS

Sub Basin ID	Sheet Flow (L < 300')[1]: L (ft)	n	s (ft/ft)	P_2 (in)	V (ft/s)	T_t (min)	Shallow Concentrated Flow[2] (L > 300'): Paved/ Unpaved	L (ft)	s (ft/ft)	V (ft/s)	T_t (min)	Channel or Pipe Flow[3]: L (ft)	Ave. Velocity (ft/s)	T_t (min)	Total T_c (min)
A1	100	0.15	0.1386	3.44	0.38	4.36	Unpaved	808	0.0582	3.89	3.46	298	4.0	1.24	9.06
A2	100	0.15	0.0311	3.44	0.21	7.92	Unpaved	809	0.0222	2.41	5.61	0	4.0	0.00	13.53
B1	100	0.15	0.0067	3.44	0.11	14.62	Unpaved	700	0.0329	2.92	3.99	3244	4.0	13.52	32.12
C1	100	0.15	0.1330	3.44	0.38	4.43	Unpaved	1450	0.0641	4.09	5.91	1856	4.0	7.73	18.08
D1	100	0.15	0.0334	3.44	0.22	7.70	Unpaved	1298	0.0162	2.05	10.55	843	4.0	3.51	21.76
E1	100	0.15	0.0528	3.44	0.26	6.41	Unpaved	1793	0.0541	3.75	7.96	3880	4.0	16.17	30.54
F1	100	0.15	0.0098	3.44	0.13	12.57	Unpaved	1759	0.0188	2.21	13.26	956	4.0	3.98	29.81
F2	100	0.15	0.0150	3.44	0.16	10.59	Unpaved	1304	0.0284	2.72	8.00	4115	4.0	17.14	35.74
G1	100	0.15	0.0096	3.44	0.13	12.65	Unpaved	1096	0.0037	0.97	18.73	1053	4.0	4.39	35.77
G2	100	0.15	0.0149	3.44	0.16	10.63	Unpaved	756	0.0410	3.27	3.86	3197	4.0	13.32	27.81
G3	100	0.15	0.0201	3.44	0.18	9.43	Unpaved	2055	0.0258	2.59	13.22	3337	4.0	13.90	36.56
G4	100	0.15	0.0345	3.44	0.22	7.59	Unpaved	1031	0.0228	2.44	7.05	1206	4.0	5.03	19.67
G5	100	0.15	0.0300	3.44	0.21	8.04	Unpaved	2784	0.0097	1.59	29.21	0	4.0	0.00	37.24
H1	100	0.15	0.0049	3.44	0.10	16.57	Unpaved	2223	0.0110	1.69	21.87	0	4.0	0.00	38.43
H2	100	0.15	0.0049	3.44	0.10	16.54	Unpaved	1044	0.0211	2.34	7.43	0	4.0	0.00	23.97
H3	100	0.15	0.0148	3.44	0.16	10.66	Unpaved	1540	0.0162	2.06	12.48	0	4.0	0.00	23.14
H4	100	0.15	0.0098	3.44	0.13	12.59	Unpaved	1173	0.0213	2.36	8.30	0	4.0	0.00	20.89
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

1. THE OVERALL HYDROLOGY CALCULATIONS FOR THIS PROJECT ARE BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R, DATED JULY 5, 2016. THE CLOMR HYDROLOGY WAS UPDATED TO USE ATLAS-14 RAINFALL DATA, BUT ALL OTHER PARAMETERS AND CALCULATIONS ARE UNCHANGED.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

FM 1625

DRAINAGE CALCULATIONS

SCALE: 1" : 800'

SHEET 1 OF 2

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			116

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

TABLE B-3 HYDROLOGIC OUTPUT

		Drainage Area	50 yr		
	Basin	mi^2	Discharge (CFS)	Time to Peak	Volume (in.)
	A1	0.0255	57	01Jan2000, 12:07	3.47
	A2	0.0173	30	01Jan2000, 12:10	2.98
	B1	0.1809	237	01Jan2000, 12:23	3.08
	C1	0.1069	183	01Jan2000, 12:13	3.17
	D1	0.0748	130	01Jan2000, 12:15	3.47
	E1	0.3397	559	01Jan2000, 12:21	3.77
	F1	0.1006	158	01Jan2000, 12:21	3.57
	F2	0.2923	425	01Jan2000, 12:25	3.57
	G-G3-H4	0.0336	63	01Jan2000, 12:16	3.67
	G-G5	1.854	2484	01Jan2000, 12:36	3.53
	G1	0.0782	113	01Jan2000, 12:25	3.57
	G2	0.2092	330	01Jan2000, 12:19	3.47
	G3	0.2051	303	01Jan2000, 12:25	3.67
	G4	0.0355	68	01Jan2000, 12:14	3.67
	G5	0.1349	203	01Jan2000, 12:25	3.77
	H1	0.0734	106	01Jan2000, 12:26	3.67
	H2	0.0187	33	01Jan2000, 12:16	3.67
	H3	0.0623	112	01Jan2000, 12:16	3.67
	H4	0.0336	63	01Jan2000, 12:14	3.67
	J-Colton Bluff	0.6805	920	01Jan2000, 12:31	3.59
CULVERT B	J-DS	1.854	2484	01Jan2000, 12:31	3.53
	J-FM1623	1.0734	1462	01Jan2000, 12:30	3.58
	J-FM1623-HWY183	1.4788	1992	01Jan2000, 12:28	3.48
CULVERT A	J-HWY 183	1.5143	2027	01Jan2000, 12:33	3.48
	J-Trib 183	0.3397	559	01Jan2000, 12:21	3.77
	J-1	0.2874	392	01Jan2000, 12:22	3.49
	J-2	0.3929	542	01Jan2000, 12:30	3.57
	J-4	0.0428	88	01Jan2000, 12:10	3.27
	J-5	0.2237	324	01Jan2000, 12:24	3.11
	J-6	0.3306	461	01Jan2000, 12:21	3.13
	J-7	0.4054	567	01Jan2000, 12:23	3.19
	Outlet 1	1.9889	2662	01Jan2000, 12:35	3.55
	R-A2	0.0255	57	01Jan2000, 12:10	3.47
	R-B1	0.0428	88	01Jan2000, 12:24	3.27
	R-D1	0.3306	461	01Jan2000, 12:25	3.13
	R-F2	0.1006	158	01Jan2000, 12:38	3.57
	R-G2	0.0782	113	01Jan2000, 12:38	3.57
	R-G3	0.2874	392	01Jan2000, 12:36	3.49
	R-G3-H1	0.0734	106	01Jan2000, 12:38	3.67
	R-G3-H2	0.0187	33	01Jan2000, 12:26	3.67
	R-G3-H3	0.0623	112	01Jan2000, 12:22	3.67
	R-G4	1.4788	1992	01Jan2000, 12:33	3.48

TABLE B-3 HYDROLOGIC OUTPUT (CONT.)

		Drainage Area	100 yr		
	Basin	mi^2	Discharge (CFS)	Time to Peak	Volume (in.)
	A1	0.0255	57	01Jan2000, 12:07	3.47
	A2	0.0173	30	01Jan2000, 12:10	2.98
	B1	0.1809	237	01Jan2000, 12:23	3.08
	C1	0.1069	183	01Jan2000, 12:13	3.17
	D1	0.0748	130	01Jan2000, 12:15	3.47
	E1	0.3397	559	01Jan2000, 12:21	3.77
	F1	0.1006	158	01Jan2000, 12:21	3.57
	F2	0.2923	425	01Jan2000, 12:25	3.57
	G-G3-H4	0.0336	63	01Jan2000, 12:16	3.67
	G-G5	1.854	2484	01Jan2000, 12:36	3.53
	G1	0.0782	113	01Jan2000, 12:25	3.57
	G2	0.2092	330	01Jan2000, 12:19	3.47
	G3	0.2051	303	01Jan2000, 12:25	3.67
	G4	0.0355	68	01Jan2000, 12:14	3.67
	G5	0.1349	203	01Jan2000, 12:25	3.77
	H1	0.0734	106	01Jan2000, 12:26	3.67
	H2	0.0187	33	01Jan2000, 12:16	3.67
	H3	0.0623	112	01Jan2000, 12:16	3.67
	H4	0.0336	63	01Jan2000, 12:14	3.67
	J-Colton Bluff	0.6805	920	01Jan2000, 12:31	3.59
CULVERT B	J-DS	1.854	2484	01Jan2000, 12:31	3.53
	J-FM1623	1.0734	1462	01Jan2000, 12:30	3.58
	J-FM1623-HWY183	1.4788	1992	01Jan2000, 12:28	3.48
CULVERT A	J-HWY 183	1.5143	2027	01Jan2000, 12:33	3.48
	J-Trib 183	0.3397	559	01Jan2000, 12:21	3.77
	J-1	0.2874	392	01Jan2000, 12:22	3.49
	J-2	0.3929	542	01Jan2000, 12:30	3.57
	J-4	0.0428	88	01Jan2000, 12:10	3.27
	J-5	0.2237	324	01Jan2000, 12:24	3.11
	J-6	0.3306	461	01Jan2000, 12:21	3.13
	J-7	0.4054	567	01Jan2000, 12:23	3.19
	Outlet 1	1.9889	2662	01Jan2000, 12:35	3.55
	R-A2	0.0255	57	01Jan2000, 12:10	3.47
	R-B1	0.0428	88	01Jan2000, 12:24	3.27
	R-D1	0.3306	461	01Jan2000, 12:25	3.13
	R-F2	0.1006	158	01Jan2000, 12:38	3.57
	R-G2	0.0782	113	01Jan2000, 12:38	3.57
	R-G3	0.2874	392	01Jan2000, 12:36	3.49
	R-G3-H1	0.0734	106	01Jan2000, 12:38	3.67
	R-G3-H2	0.0187	33	01Jan2000, 12:26	3.67
	R-G3-H3	0.0623	112	01Jan2000, 12:22	3.67
	R-G4	1.4788	1992	01Jan2000, 12:33	3.48

NOTES

1. THE OVERALL HYDROLOGY CALCULATIONS FOR THIS PROJECT ARE BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R, DATED JULY 5, 2016. THE CLOMR HYDROLOGY WAS UPDATED TO USE ATLAS-14 RAINFALL DATA, BUT ALL OTHER PARAMETERS AND CALCULATIONS ARE UNCHANGED.

NOTES

1. THE OVERALL HYDROLOGY CALCULATIONS FOR THIS PROJECT ARE ENTIRELY BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R DATED JULY 5, 2016.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED PROFESSIONAL ENGINEER

01/22/2021

FM 1625

DRAINAGE CALCULATIONS

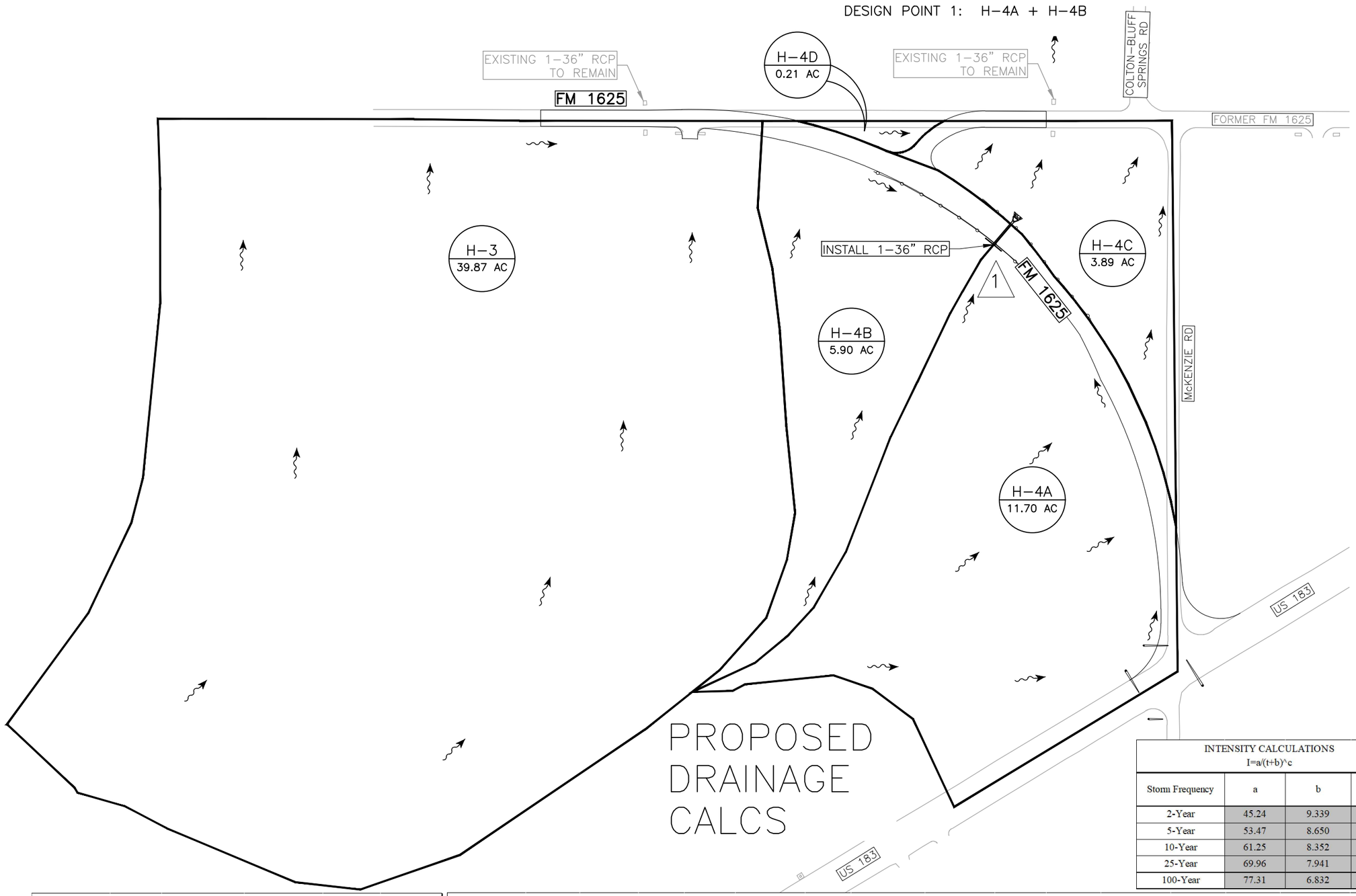
SCALE: 1" : 800' SHEET 2 OF 2

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		117

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.



0 800 1600

SCALE: 1" = 800'

LEGEND

DRAINAGE AREA

NOTES

1. THE OVERALL HYDROLOGY MAP FOR THIS PROJECT IS ENTIRELY BASED ON THE APPROVED FEMA CLOMR, CASE NO. 16-06-0714R DATED JULY 5, 2016.
2. NO HYDRAULIC CALCULATIONS FOR 18" RCP PARALLEL CULVERT UNDER DRIVEWAY "A" WERE PERFORM. THE ENTIRE AREA IS IN THE FEMA FOODPLAIN AND CONTRIBUTING DRAINAGE AREA FOR THIS CULVERT IS NEGLIGIBLE.

STATE OF TEXAS
TIMOTHY WHITEFIELD
103829
LICENSED PROFESSIONAL ENGINEER

01/22/2021

FM 1625

PROPOSED DRAINAGE MAP

SCALE: 1" : 800' SHEET 1 OF 1

PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		118

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

INTENSITY CALCULATIONS $I=a/(t+b)^c$			
Storm Frequency	a	b	c
2-Year	45.24	9.339	0.7399
5-Year	53.47	8.650	0.7228
10-Year	61.25	8.352	0.7147
25-Year	69.96	7.941	0.6954
100-Year	77.31	6.832	0.6524

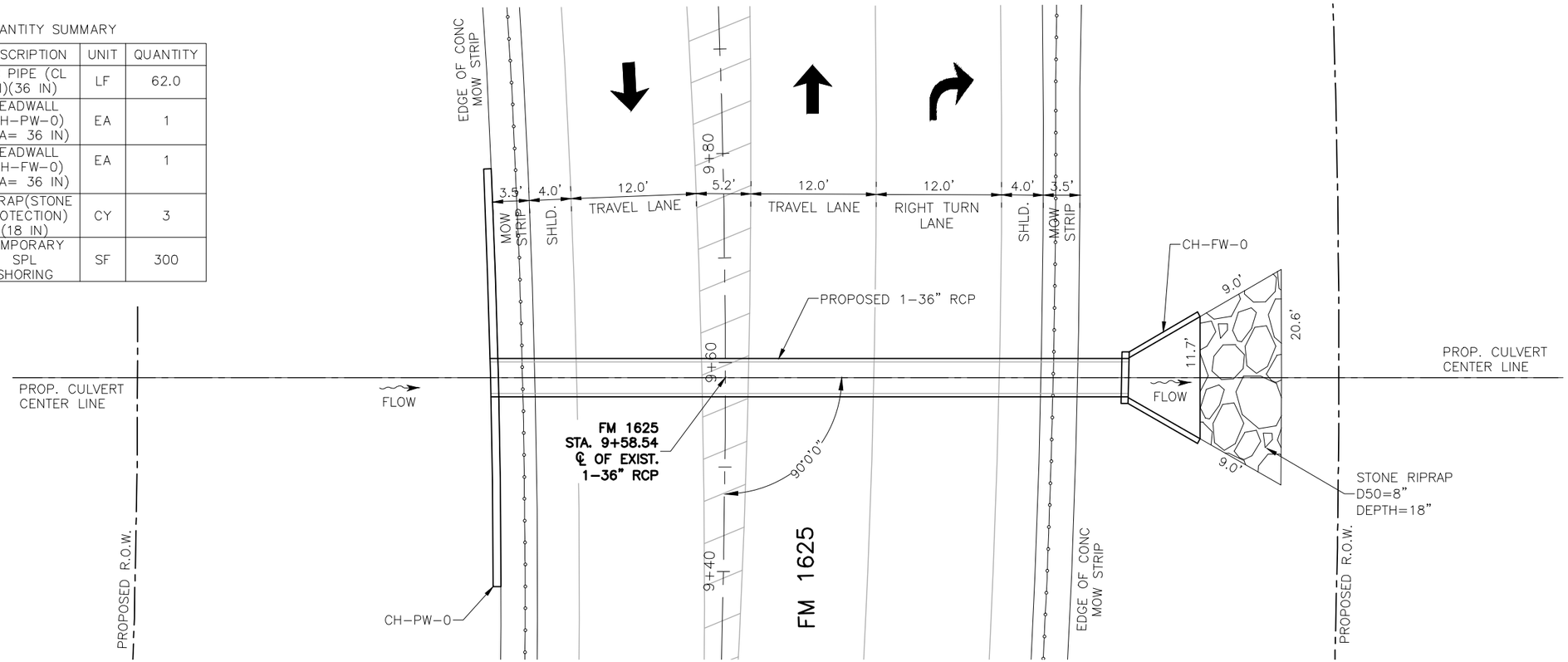
RUNOFF COEFFICIENT		
Storm Frequency	Impervious Cover	Pervious Cover
2- Year	0.75	0.21
5-Year	0.80	0.23
10-Year	0.83	0.25
25-Year	0.88	0.29
100-Year	0.97	0.36

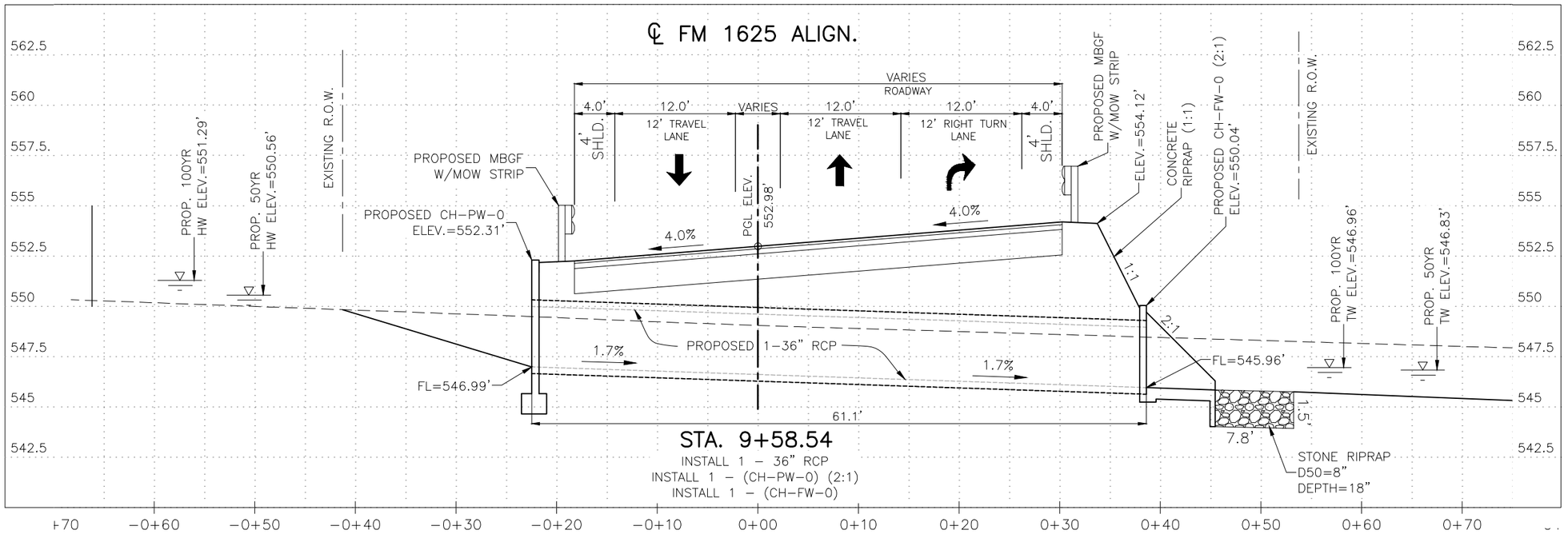
Proposed Drainage Area Calculations

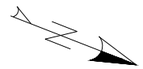
Drainage Basin ID	Drainage Area (acres)	TOTAL I.C. (%)	Tc (min)	Intensity 2-yr (in/hr)	Runoff Coefficient 2-yr	$Q_{2\text{-yr}}$ (cfs)	Intensity 10-yr (in/hr)	Runoff Coefficient 10-yr	$Q_{10\text{-yr}}$ (cfs)	Intensity 25-yr (in/hr)	Runoff Coefficient 25-yr	$Q_{25\text{-yr}}$ (cfs)	Intensity 100-yr (in/hr)	Runoff Coefficient 100-yr	$Q_{100\text{-yr}}$ (cfs)
H-4A	11.70	10.66%	40.31	2.52	0.27	7.95	3.81	0.31	13.83	4.72	0.35	19.34	6.26	0.43	31.49
H-4B	5.90	9.51%	19.87	3.73	0.26	5.71	5.63	0.31	10.29	6.93	0.35	14.30	9.07	0.42	22.47
H-4C	3.69	4.85%	16.33	4.10	0.24	3.63	6.19	0.28	6.40	7.61	0.32	8.99	9.95	0.39	14.32
H-4-D	0.21	0%	17.20	4.00	0.21	0.18	6.04	0.25	0.32	7.43	0.29	0.45	9.71	0.36	0.73
H-3	39.87	0%	23.14	3.44	0.21	28.84	5.20	0.25	51.87	6.41	0.29	74.13	8.41	0.36	120.72
Total Site	61.37	4.28%			0.23			0.27			0.32			0.39	

QUANTITY SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
464 6008	RC PIPE (CL III)(36 IN)	LF	62.0
466 6101	HEADWALL (CH-PW-0) (DIA= 36 IN)	EA	1
466 6009	HEADWALL (CH-FW-0) (DIA= 36 IN)	EA	1
432 6033	RIPRAP(STONE PROTECTION) (18 IN)	CY	3
432 6001	TEMPORARY SPL SHORING	SF	300







0 12 24

SCALE: 1" = 12'

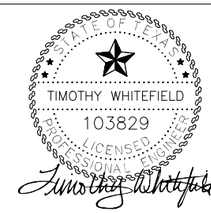
LEGEND

EXISTING RIGHT OF WAY

EXISTING RIGHT OF WAY

NOTES

1. WHERE CULVERT LOCATION PRECLUDES STANDARD SPACING OF MBGF POLES USE LONG SPAN STANDARD GF(31) LS-14. SEE SUMMARY OF ROADWAY FOR QUANTITIES.
2. PRIOR TO EXTENSION OF THE EXISTING CULVERT CONTRACTOR SHALL HAVE ANY SEDIMENT DEPOSITS AND/OR DEBRIS REMOVED.
3. PRIOR TO REMOVAL OF EXISTING CROSS CULVERT HEADWALLS CONTRACTOR SHALL COORDINATE WITH TXDOT INSPECTOR TO ASCERTAIN IF TEMPORARY SHORING OF THE ROADWAY OR MBGF WILL BE REQUIRED.



01/22/2021

FM 1625

CULVERT A
STA. 9+58.54

SCALE: 1" : 12'

SHEET 1 OF 1

PELOTON LAND SOLUTIONS

TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

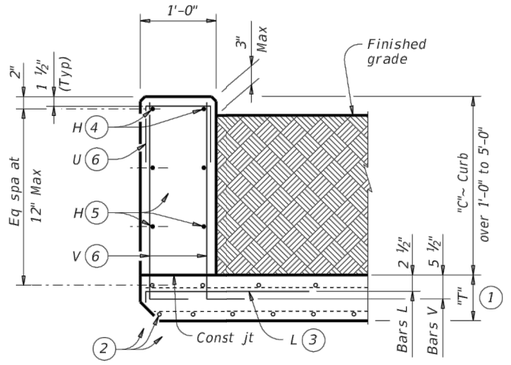
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		119

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

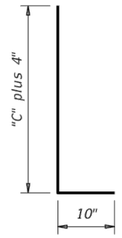
L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Culvert PP

DATE:
FILE:

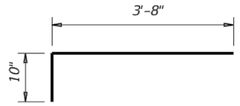


TYPICAL SECTION

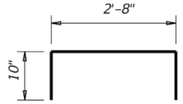
Used for curbs over 1'-0" to 5'-0"



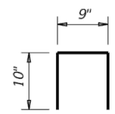
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

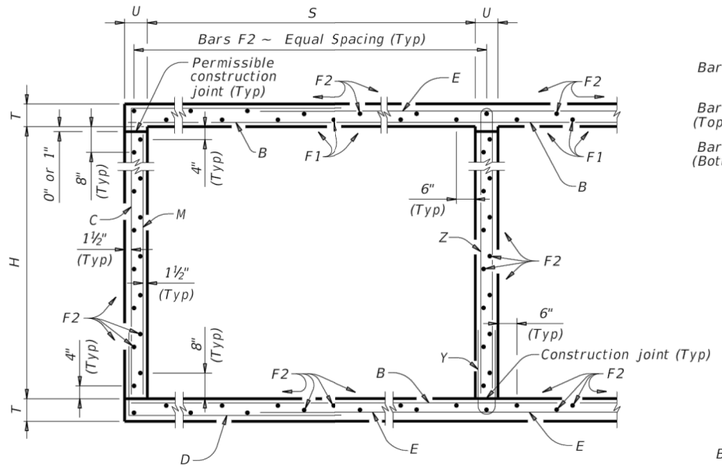
EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

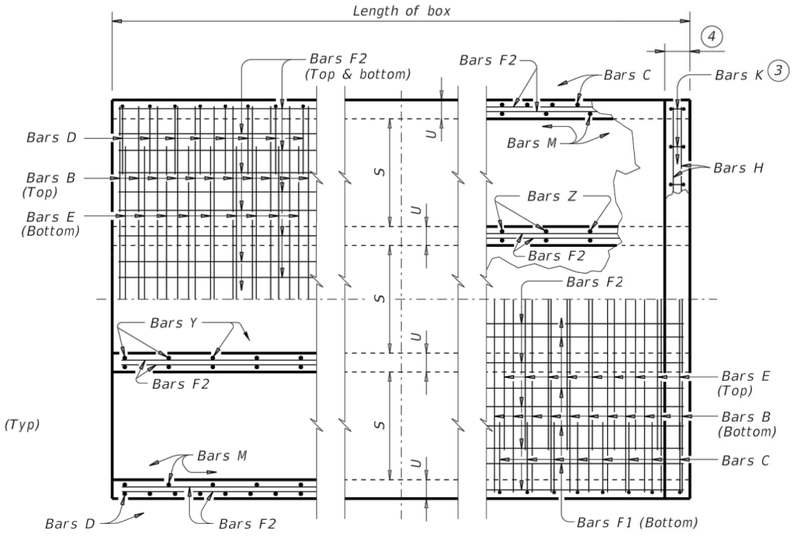
ECD

FILE: ecdstde1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		120

DATE:
FILE:



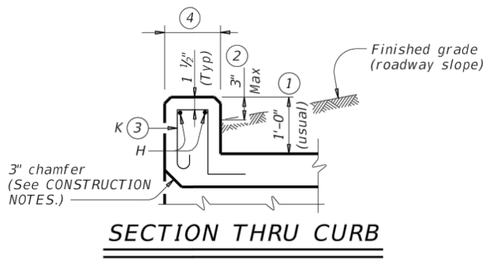
TYPICAL SECTION



BOTTOM SLAB

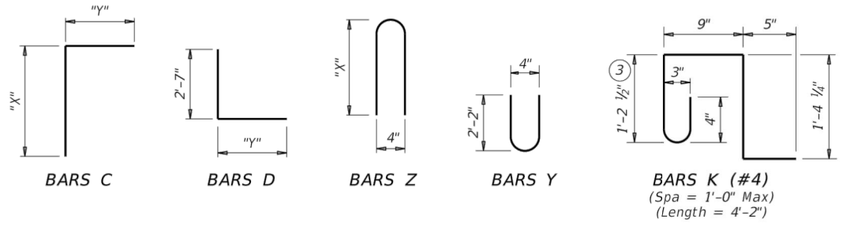
TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 ½"	3'-8 ½"
3'-0"	3'-6 ½"	3'-8 ½"
4'-0"	4'-6 ½"	3'-8 ½"
5'-0"	5'-6 ½"	3'-8 ½"



BARS C

BARS D

BARS Z

BARS Y

BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		121

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DATE:
FILE:

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	5' – 0"	2' – 0"	8"	7"	108	#5	9"	11' – 6"	1,295	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	38	18"	39' – 9"	1,009	108	9"	2' – 0"	144	54	9"	4' – 7"	165	5' – 3"	189	11' – 6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510
3	5' – 0"	2' – 0"	8"	7"	108	#5	9"	17' – 1"	1,924	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	54	18"	39' – 9"	1,434	108	9"	2' – 0"	144	108	9"	4' – 7"	331	5' – 3"	379	17' – 1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705
4	5' – 0"	2' – 0"	8"	7"	108	#5	9"	22' – 8"	2,553	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	70	18"	39' – 9"	1,859	108	9"	2' – 0"	144	162	9"	4' – 7"	496	5' – 3"	568	22' – 8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891
5	5' – 0"	2' – 0"	8"	7"	108	#5	9"	28' – 3"	3,182	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	86	18"	39' – 9"	2,284	108	9"	2' – 0"	144	216	9"	4' – 7"	661	5' – 3"	758	28' – 3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082
6	5' – 0"	2' – 0"	8"	7"	108	#5	9"	33' – 10"	3,811	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	102	18"	39' – 9"	2,708	108	9"	2' – 0"	144	270	9"	4' – 7"	827	5' – 3"	947	33' – 10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268
2	5' – 0"	3' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	11' – 6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497
3	5' – 0"	3' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	17' – 1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093
4	5' – 0"	3' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	22' – 8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682
5	5' – 0"	3' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	28' – 3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274
6	5' – 0"	3' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	33' – 10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863
2	5' – 0"	4' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	11' – 6"	31	26	72	0.840	166.3	0.9	103	34.5	6,754
3	5' – 0"	4' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	17' – 1"	46	38	106	1.202	231.8	1.3	152	49.4	9,422
4	5' – 0"	4' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	22' – 8"	61	48	134	1.564	297.2	1.7	195	64.3	12,083
5	5' – 0"	4' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	28' – 3"	75	60	167	1.926	362.7	2.1	242	79.1	14,748
6	5' – 0"	4' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	33' – 10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408
2	5' – 0"	5' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	50	18"	39' – 9"	1,328	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	11' – 6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171
3	5' – 0"	5' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	70	18"	39' – 9"	1,859	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	17' – 1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965
4	5' – 0"	5' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	90	18"	39' – 9"	2,390	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	22' – 8"	61	48	134	1.672	313.9	1.7	195	68.6	12,750
5	5' – 0"	5' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	28' – 3"	75	60	167	2.056	382.5	2.1	242	84.3	15,540
6	5' – 0"	5' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	130	18"	39' – 9"	3,452	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	33' – 10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326

HL93 LOADING SHEET 2 OF 2

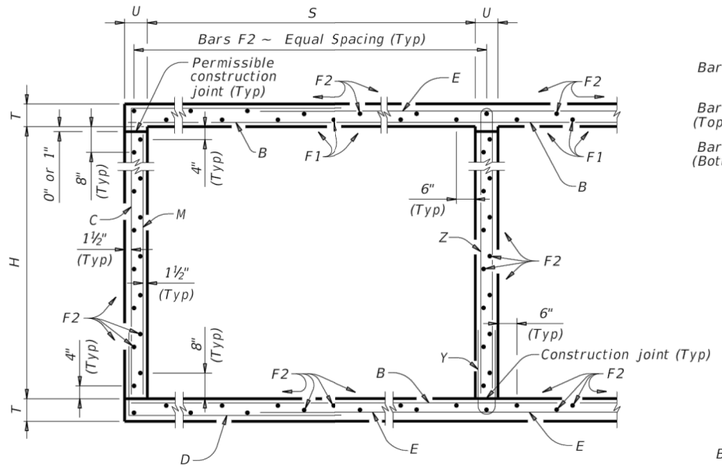
Texas Department of Transportation | Bridge Division Standard

MULTIPLE BOX CULVERTS
CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

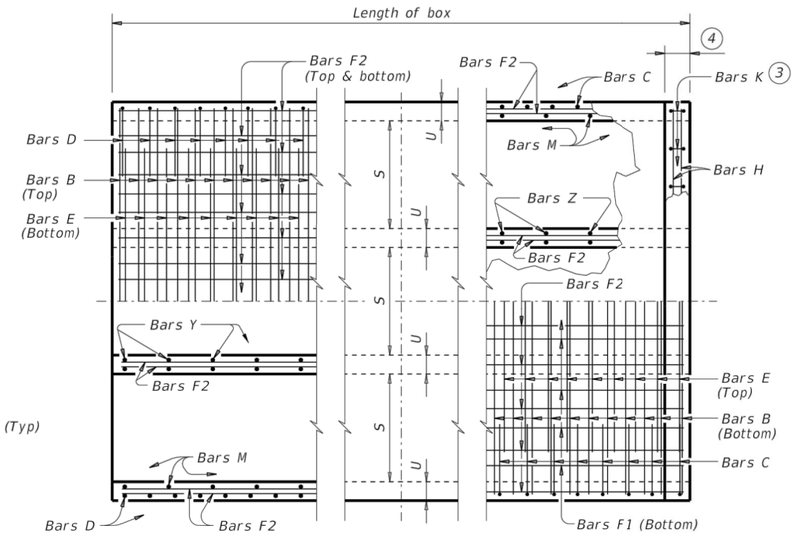
MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		122

DATE:
FILE:



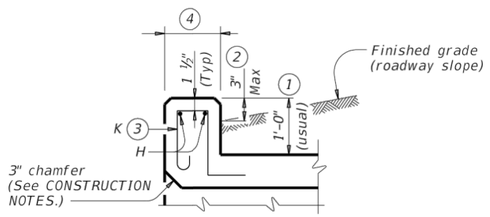
TYPICAL SECTION



BOTTOM SLAB

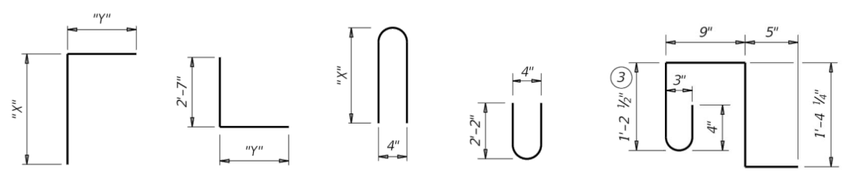
TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
3'–0"	3'–6 ½"	4'–5"
4'–0"	4'–6 ½"	4'–5"
5'–0"	5'–6 ½"	4'–5"
6'–0"	6'–6 ½"	4'–5"
7'–0"	7'–6 ½"	4'–5"



BARS C | BARS D | BARS Z | BARS Y | BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")

1. 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'–0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'–0" typical. 2'–3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'–1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.

Chamfer the bottom edge of the top slab 3" at the entrance.

Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'–8" Min
- Uncoated or galvanized ~ #5 = 2'–1" Min
- Uncoated or galvanized ~ #6 = 2'–6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.

See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 7'-0" SPAN 0' TO 10' FILL

MC-7-10

FILE: mc710ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		123

DATE:
FILE:

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	7' – 0"	3' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	15' – 6"	41	34	95	0.972	230.8	1.2	136	40.0	9,366
3	7' – 0"	3' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	23' – 1"	62	50	139	1.412	321.5	1.7	201	58.2	13,061
4	7' – 0"	3' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	30' – 8"	82	64	178	1.851	412.3	2.3	260	76.3	16,751
5	7' – 0"	3' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	38' – 3"	102	80	223	2.290	503.0	2.8	325	94.4	20,446
6	7' – 0"	3' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	45' – 10"	122	94	262	2.729	593.9	3.4	384	112.6	24,138
2	7' – 0"	4' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	15' – 6"	41	34	95	1.037	238.6	1.2	136	42.6	9,680
3	7' – 0"	4' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	23' – 1"	62	50	139	1.498	331.2	1.7	201	61.6	13,447
4	7' – 0"	4' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	30' – 8"	82	64	178	1.959	423.7	2.3	260	80.6	17,209
5	7' – 0"	4' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	38' – 3"	102	80	223	2.420	516.3	2.8	325	99.6	20,977
6	7' – 0"	4' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	45' – 10"	122	94	262	2.881	608.9	3.4	384	118.6	24,740
2	7' – 0"	5' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	60	18"	39' – 9"	1,593	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	15' – 6"	41	34	95	1.102	250.4	1.2	136	45.2	10,152
3	7' – 0"	5' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	85	18"	39' – 9"	2,257	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	23' – 1"	62	50	139	1.584	346.1	1.7	201	65.1	14,045
4	7' – 0"	5' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	30' – 8"	82	64	178	2.067	441.8	2.3	260	85.0	17,932
5	7' – 0"	5' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	135	18"	39' – 9"	3,585	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	38' – 3"	102	80	223	2.549	537.5	2.8	325	104.8	21,825
6	7' – 0"	5' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	160	18"	39' – 9"	4,248	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	45' – 10"	122	94	262	3.032	633.2	3.4	384	124.7	25,713
2	7' – 0"	6' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	6' – 0"	433	54	9"	4' – 7"	165	13' – 3"	478	15' – 6"	41	34	95	1.167	262.2	1.2	136	47.8	10,624
3	7' – 0"	6' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	6' – 0"	433	108	9"	4' – 7"	331	13' – 3"	956	23' – 1"	62	50	139	1.671	361.0	1.7	201	68.6	14,642
4	7' – 0"	6' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	6' – 0"	433	162	9"	4' – 7"	496	13' – 3"	1,434	30' – 8"	82	64	178	2.175	459.9	2.3	260	89.3	18,655
5	7' – 0"	6' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	6' – 0"	433	216	9"	4' – 7"	661	13' – 3"	1,912	38' – 3"	102	80	223	2.679	558.7	2.8	325	110.0	22,673
6	7' – 0"	6' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	6' – 0"	433	270	9"	4' – 7"	827	13' – 3"	2,390	45' – 10"	122	94	262	3.183	657.6	3.4	384	130.7	26,687
2	7' – 0"	7' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	7' – 0"	505	54	9"	4' – 7"	165	15' – 3"	550	15' – 6"	41	34	95	1.231	270.0	1.2	136	50.4	10,937
3	7' – 0"	7' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	7' – 0"	505	108	9"	4' – 7"	331	15' – 3"	1,100	23' – 1"	62	50	139	1.757	370.7	1.7	201	72.0	15,027
4	7' – 0"	7' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	7' – 0"	505	162	9"	4' – 7"	496	15' – 3"	1,650	30' – 8"	82	64	178	2.283	471.3	2.3	260	93.6	19,112
5	7' – 0"	7' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	7' – 0"	505	216	9"	4' – 7"	661	15' – 3"	2,200	38' – 3"	102	80	223	2.809	571.9	2.8	325	115.2	23,202
6	7' – 0"	7' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	7' – 0"	505	270	9"	4' – 7"	827	15' – 3"	2,750	45' – 10"	122	94	262	3.334	672.6	3.4	384	136.8	27,288

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
7'-0" SPAN
0' TO 10' FILL

MC-7-10

FILE: mc710ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		124

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

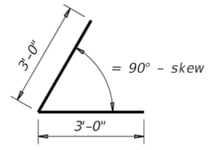
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

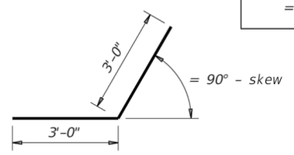
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

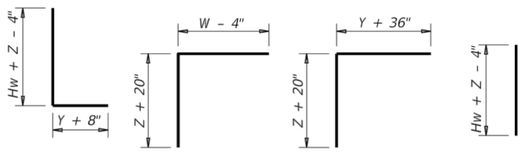
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

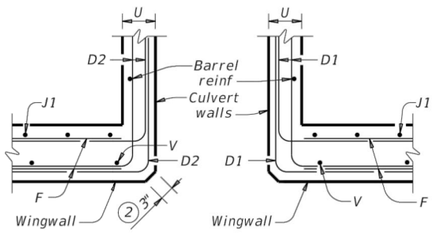
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

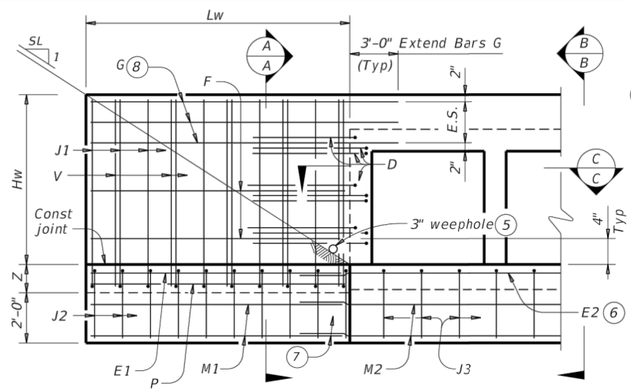
See applicable box culvert standard sheet for S, H, T, and U values.



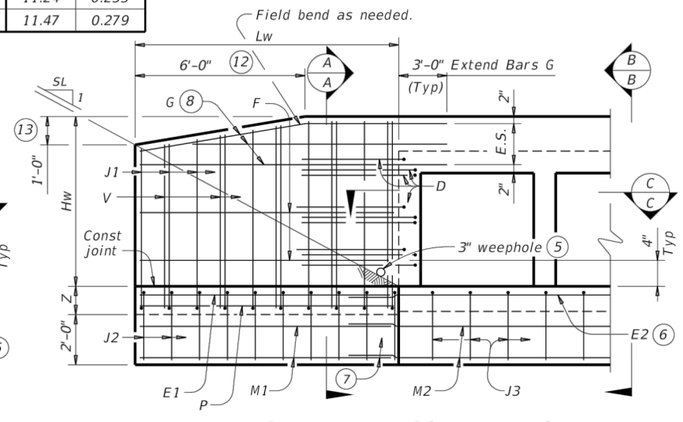
SECTION C-C - PW-1

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

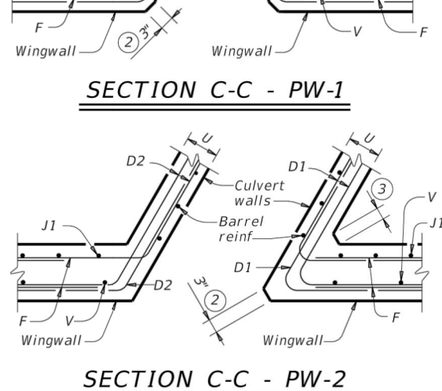
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.



PARTIAL ELEVATION - PW-1



PARTIAL ELEVATION - PW-2



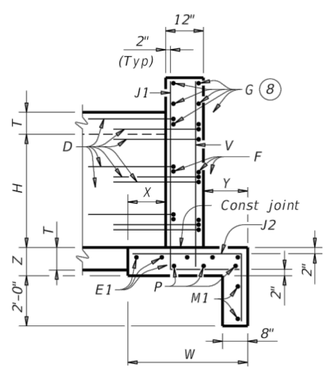
SECTION C-C - PW-2

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

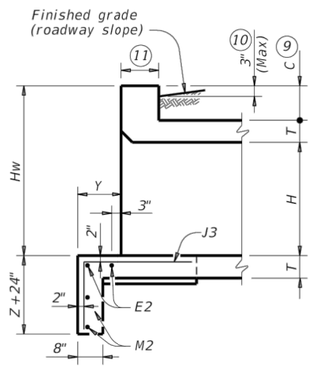
MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

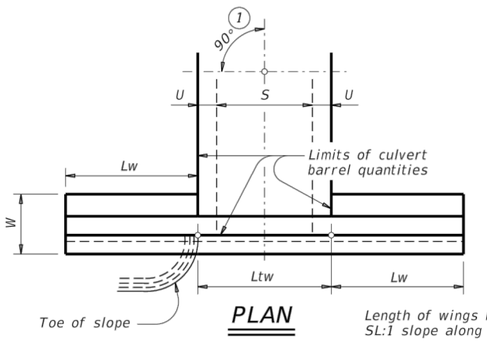
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.



SECTION A-A
(Showing wing reinforcement.)

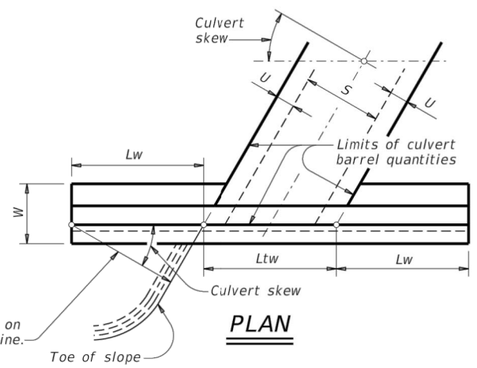


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

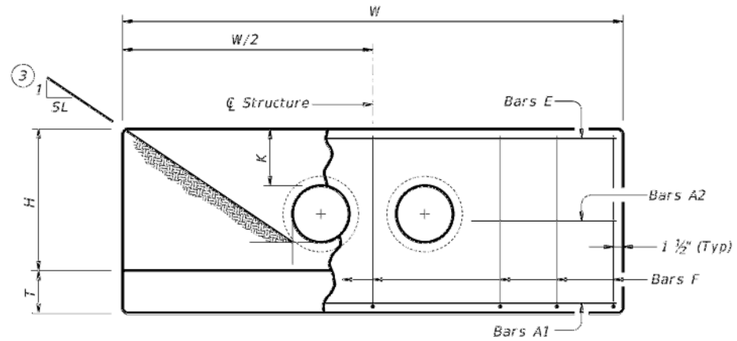
PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		125

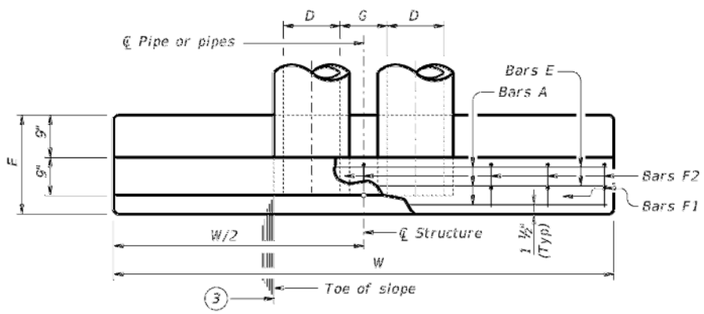
DATE:
FILE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

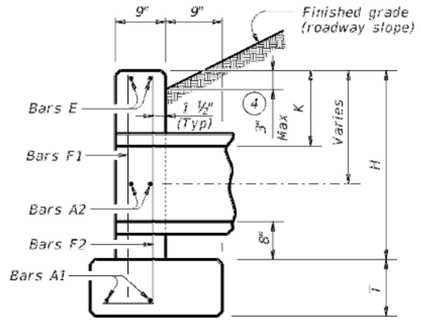
Slope	Dia of Pipe (D)	Values for One Pipe			Values To Be Added for Each Add'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 0"	122	1.1	1' – 9"	15	0.2
	15"	10' – 3"	136	1.3	2' – 2"	16	0.2
	18"	11' – 6"	163	1.5	2' – 8"	19	0.3
	21"	12' – 9"	200	1.8	3' – 1"	31	0.4
	24"	14' – 0"	217	2.1	3' – 7"	34	0.4
	27"	15' – 3"	254	2.4	3' – 11"	37	0.5
	30"	16' – 6"	272	2.7	4' – 4"	40	0.6
	33"	17' – 9"	314	3.1	4' – 8"	43	0.6
	36"	19' – 0"	371	3.9	5' – 1"	46	0.8
	42"	21' – 6"	442	4.9	5' – 10"	52	1.0
	48"	25' – 0"	569	6.4	6' – 7"	59	1.3
	54"	27' – 6"	701	7.5	7' – 6"	82	1.6
	60"	30' – 0"	794	8.8	8' – 3"	90	1.8
	66"	32' – 6"	894	10.2	8' – 9"	96	2.0
	72"	35' – 0"	1,055	11.7	9' – 4"	103	2.3
3:1	12"	13' – 0"	175	1.6	1' – 9"	14	0.2
	15"	14' – 9"	193	1.9	2' – 2"	17	0.2
	18"	16' – 6"	228	2.2	2' – 8"	19	0.3
	21"	18' – 3"	299	2.6	3' – 1"	31	0.4
	24"	20' – 0"	323	3.0	3' – 7"	33	0.4
	27"	21' – 9"	371	3.5	3' – 11"	37	0.5
	30"	23' – 6"	415	4.0	4' – 4"	40	0.5
	33"	25' – 3"	469	4.6	4' – 8"	43	0.6
	36"	27' – 0"	556	5.7	5' – 1"	46	0.8
	42"	30' – 6"	675	7.1	5' – 10"	52	1.0
	48"	35' – 6"	837	9.2	6' – 7"	59	1.3
	54"	39' – 0"	1,015	11.0	7' – 6"	84	1.6
	60"	42' – 6"	1,171	12.9	8' – 3"	91	1.8
	66"	46' – 0"	1,298	14.9	8' – 9"	98	2.0
	72"	49' – 6"	1,561	17.1	9' – 4"	103	2.3
4:1	12"	17' – 0"	229	2.0	1' – 9"	15	0.2
	15"	19' – 3"	266	2.4	2' – 2"	17	0.2
	18"	21' – 6"	308	2.9	2' – 8"	19	0.3
	21"	23' – 9"	382	3.5	3' – 1"	31	0.3
	24"	26' – 0"	430	3.9	3' – 7"	34	0.4
	27"	28' – 3"	486	4.7	3' – 11"	37	0.5
	30"	30' – 6"	539	5.2	4' – 4"	40	0.6
	33"	32' – 9"	603	6.0	4' – 8"	42	0.6
	36"	35' – 0"	738	7.5	5' – 1"	47	0.8
	42"	39' – 6"	881	9.3	5' – 10"	52	1.0
	48"	46' – 0"	1,102	12.1	6' – 7"	61	1.3
	54"	50' – 6"	1,364	14.4	7' – 6"	84	1.6
	60"	55' – 0"	1,547	16.9	8' – 3"	91	1.8
	66"	59' – 6"	1,741	19.5	8' – 9"	98	2.0
	72"	64' – 0"	2,077	22.4	9' – 4"	102	2.3
6:1	12"	25' – 0"	336	3.0	1' – 9"	14	0.2
	15"	28' – 3"	384	3.6	2' – 2"	17	0.2
	18"	31' – 6"	452	4.2	2' – 8"	19	0.3
	21"	34' – 9"	581	5.1	3' – 1"	31	0.4
	24"	38' – 0"	644	5.8	3' – 7"	34	0.4
	27"	41' – 3"	737	6.9	3' – 11"	37	0.5
	30"	44' – 6"	807	7.7	4' – 4"	39	0.6
	33"	47' – 9"	912	8.9	4' – 8"	44	0.6
	36"	51' – 0"	1,108	11.0	5' – 1"	48	0.8
	42"	57' – 6"	1,318	13.7	5' – 10"	54	1.0
	48"	67' – 0"	1,682	17.9	6' – 7"	59	1.3
	54"	73' – 6"	2,072	21.3	7' – 6"	83	1.6
	60"	80' – 0"	2,351	24.9	8' – 3"	89	1.8
	66"	86' – 6"	2,643	28.9	8' – 9"	96	2.0
	72"	93' – 0"	3,121	33.1	9' – 4"	101	2.3



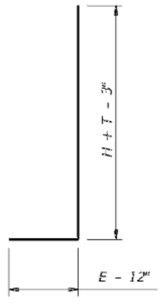
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

(1) Total quantities include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 0"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'_c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

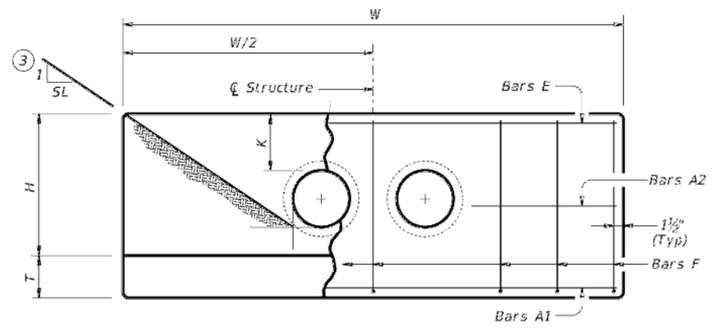
CH-PW-0

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		126

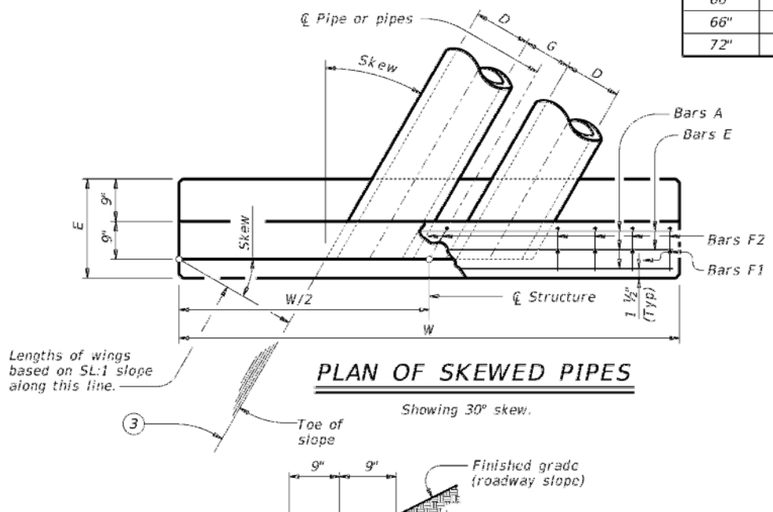
DATE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew					30° Skew					45° Skew				
		Values for One Pipe			Values To Be Added for Each Add'l Pipe		Values for One Pipe			Values To Be Added for Each Add'l Pipe		Values for One Pipe			Values To Be Added for Each Add'l Pipe	
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' - 4"	124	1.1	1' - 9 3/4"	15	0.2	10' - 5"	130	1.2	2' - 0"	16	0.2	12' - 9"	159	1.5	2' - 5 3/8"	17	0.3
	15"	10' - 7"	136	1.3	2' - 3"	17	0.2	11' - 10"	159	1.5	2' - 6"	18	0.2	14' - 6"	191	1.8	3' - 0 3/8"	20	0.3
	18"	11' - 11"	165	1.5	2' - 9"	19	0.3	13' - 3"	174	1.7	3' - 1"	29	0.3	16' - 3"	207	2.1	3' - 9 1/2"	33	0.4
	21"	13' - 2"	203	1.9	3' - 2 1/4"	31	0.4	14' - 9"	233	2.1	3' - 6 3/4"	33	0.4	18' - 0"	276	2.6	4' - 4 1/4"	36	0.5
	24"	14' - 6"	240	2.1	3' - 8 1/4"	34	0.4	16' - 2"	251	2.4	4' - 1 3/4"	36	0.5	19' - 10"	318	2.9	5' - 0 3/4"	39	0.6
	27"	15' - 9"	258	2.5	4' - 0 3/4"	38	0.5	17' - 7"	292	2.8	4' - 6 1/4"	39	0.6	21' - 7"	342	3.4	5' - 6 1/4"	44	0.7
	30"	17' - 1"	297	2.8	4' - 5 3/4"	40	0.6	19' - 1"	311	3.1	5' - 0"	42	0.6	23' - 4"	388	3.8	6' - 1 3/4"	47	0.8
	33"	18' - 5"	320	3.3	4' - 9 3/4"	43	0.6	20' - 6"	358	3.6	5' - 4 3/4"	46	0.7	25' - 1"	439	4.4	6' - 7 1/4"	51	0.9
	36"	19' - 8"	401	4.0	5' - 3"	47	0.9	21' - 11"	422	4.5	5' - 10 3/4"	50	0.9	26' - 10"	517	5.5	7' - 2 1/4"	55	1.2
	42"	22' - 3"	476	5.0	6' - 0 3/4"	53	1.1	24' - 10"	528	5.6	6' - 8 3/4"	56	1.2	30' - 5"	634	6.9	8' - 3"	76	1.4
	48"	25' - 11"	577	6.6	6' - 9 3/4"	60	1.3	28' - 10"	637	7.3	7' - 7 1/4"	79	1.5	35' - 4"	791	9.0	9' - 3 3/4"	88	1.8
	54"	28' - 6"	711	7.8	7' - 9"	83	1.6	31' - 9"	781	8.7	8' - 8"	81	1.8	38' - 11"	958	10.7	10' - 7 1/2"	97	2.2
	60"	31' - 1"	805	9.2	8' - 6 1/2"	91	1.9	34' - 8"	881	10.2	9' - 6 1/2"	97	2.1	42' - 5"	1,113	12.5	11' - 8"	124	2.6
	66"	33' - 8"	907	10.6	9' - 0 3/4"	98	2.1	37' - 6"	1,028	11.8	10' - 1 1/2"	102	2.4	46' - 0"	1,235	14.5	12' - 4 1/2"	132	2.9
	72"	36' - 3"	1,071	12.1	9' - 8"	105	2.4	40' - 5"	1,207	13.5	10' - 9 1/2"	110	2.6	49' - 6"	1,446	16.6	13' - 2 1/4"	141	3.2
3:1	12"	13' - 6"	178	1.6	1' - 9 3/4"	15	0.2	15' - 0"	189	1.8	2' - 0"	15	0.2	18' - 5"	237	2.2	2' - 5 3/4"	17	0.2
	15"	15' - 3"	212	1.9	2' - 3"	17	0.2	17' - 0"	223	2.1	2' - 6"	17	0.3	20' - 10"	276	2.6	3' - 0 3/8"	20	0.3
	18"	17' - 1"	231	2.3	2' - 9"	19	0.3	19' - 1"	259	2.5	3' - 1"	29	0.3	23' - 4"	318	3.1	3' - 9 1/4"	32	0.4
	21"	18' - 11"	306	2.7	3' - 2 1/4"	31	0.4	21' - 1"	339	3.0	3' - 6 3/4"	33	0.4	25' - 10"	413	3.7	4' - 4 1/4"	36	0.5
	24"	20' - 8"	345	3.1	3' - 8 3/4"	35	0.4	23' - 1"	384	3.5	4' - 1 3/4"	36	0.5	28' - 3"	462	4.2	5' - 0 3/4"	40	0.6
	27"	22' - 6"	376	3.7	4' - 0 3/4"	38	0.5	25' - 1"	438	4.1	4' - 6 1/4"	39	0.6	30' - 9"	522	5.0	5' - 6 1/4"	44	0.7
	30"	24' - 4"	422	4.1	4' - 5 3/4"	40	0.6	27' - 2"	466	4.6	5' - 0"	42	0.6	33' - 3"	578	5.6	6' - 1 3/4"	47	0.8
	33"	26' - 2"	476	4.8	4' - 10"	43	0.6	29' - 2"	522	5.3	5' - 4 3/4"	46	0.7	35' - 9"	644	6.5	6' - 7 1/4"	51	0.9
	36"	27' - 11"	590	5.9	5' - 3"	47	0.8	31' - 2"	645	6.6	5' - 10 3/4"	50	0.9	38' - 2"	787	8.0	7' - 2 1/4"	56	1.2
	42"	31' - 7"	684	7.3	6' - 0 1/4"	53	1.1	35' - 3"	776	8.2	6' - 8 3/4"	56	1.2	43' - 2"	933	10.0	8' - 3"	79	1.4
	48"	36' - 9"	880	9.6	6' - 9 3/4"	61	1.3	41' - 0"	953	10.7	7' - 7 1/4"	81	1.5	50' - 2"	1,166	13.1	9' - 3 3/8"	88	1.8
	54"	40' - 5"	1,065	11.4	7' - 9"	85	1.6	45' - 0"	1,185	12.7	8' - 8"	89	1.8	55' - 2"	1,435	15.5	10' - 7 1/2"	97	2.2
	60"	44' - 0"	1,224	13.3	8' - 6 1/2"	93	1.9	49' - 1"	1,356	14.8	9' - 6 1/2"	96	2.1	60' - 1"	1,635	18.2	11' - 8"	124	2.6
	66"	47' - 7"	1,357	15.4	9' - 1"	98	2.1	53' - 1"	1,497	17.2	10' - 1 1/4"	103	2.3	65' - 1"	1,892	21.1	12' - 4 1/4"	130	2.9
	72"	51' - 3"	1,624	17.7	9' - 8"	105	2.3	57' - 2"	1,787	19.7	10' - 9 1/4"	109	2.6	70' - 0"	2,218	24.1	13' - 2 1/2"	139	3.2
4:1	12"	17' - 7"	232	2.1	1' - 9 3/4"	15	0.2	19' - 8"	259	2.4	2' - 0"	16	0.2	24' - 0"	314	2.9	2' - 5 3/8"	18	0.2
	15"	19' - 11"	272	2.5	2' - 3"	17	0.2	22' - 3"	301	2.8	2' - 6"	18	0.3	27' - 3"	361	3.5	3' - 0 3/4"	21	0.3
	18"	22' - 3"	313	3.0	2' - 9"	19	0.3	24' - 10"	344	3.3	3' - 1"	29	0.3	30' - 5"	427	4.0	3' - 9 1/4"	32	0.4
	21"	24' - 7"	407	3.6	3' - 2 1/4"	31	0.4	27' - 5"	446	4.0	3' - 6 3/4"	33	0.4	33' - 7"	549	4.9	4' - 4 1/4"	36	0.5
	24"	26' - 11"	455	4.1	3' - 8 3/4"	35	0.4	30' - 0"	499	4.5	4' - 1 3/4"	36	0.5	36' - 9"	609	5.6	5' - 0 3/4"	40	0.6
	27"	29' - 3"	514	4.8	4' - 0 3/4"	38	0.5	32' - 7"	562	5.4	4' - 6 1/4"	40	0.6	39' - 11"	703	6.6	5' - 6 1/4"	43	0.7
	30"	31' - 7"	568	5.4	4' - 5 3/4"	40	0.6	35' - 3"	620	6.0	5' - 0"	42	0.6	43' - 2"	768	7.4	6' - 1 3/4"	49	0.8
	33"	33' - 11"	634	6.2	4' - 10"	43	0.7	37' - 10"	710	7.0	5' - 4 3/4"	46	0.7	46' - 4"	848	8.5	6' - 7 1/4"	52	0.9
	36"	36' - 3"	776	7.7	5' - 3"	48	0.9	40' - 5"	868	8.6	5' - 10 3/4"	49	0.9	49' - 6"	1,058	10.6	7' - 2 1/4"	56	1.1
	42"	40' - 11"	921	9.6	6' - 0 1/4"	53	1.0	45' - 7"	1,022	10.7	6' - 8 3/4"	57	1.2	55' - 10"	1,262	13.1	8' - 3"	78	1.4
	48"	47' - 7"	1,152	12.6	6' - 10"	61	1.3	53' - 1"	1,268	14.0	7' - 7 1/4"	80	1.5	65' - 1"	1,587	17.2	9' - 3 3/4"	86	1.8
	54"	52' - 3"	1,416	14.9	7' - 9 1/4"	86	1.6	58' - 4"	1,589	16.6	8' - 8"	89	1.8	71' - 5"	1,924	20.4	10' - 7 1/2"	95	2.2
	60"	56' - 11"	1,606	17.5	8' - 6 3/4"	92	1.9	63' - 6"	1,806	19.5	9' - 6 1/4"	95	2.1	77' - 9"	2,192	23.9	11' - 8"	122	2.6
	66"	61' - 7"	1,819	20.2	9' - 0 3/4"	97	2.1	68' - 8"	2,019	22.5	10' - 1 1/2"	101	2.4	84' - 2"	2,472	27.6	12' - 4 1/2"	131	2.9
	72"	66' - 3"	2,150	23.2	9' - 8"	104	2.4	73' - 11"	2,379	25.9	10' - 9 1/4"	108	2.6	90' - 6"	2,937	31.7	13' - 2 1/4"	138	3.2
6:1	12"	25' - 11"	342	3.1	1' - 9 3/4"	15	0.2	28' - 10"	374	3.5	2' - 0"	16	0.2	35' - 4"	456	4.3	2' - 5 3/4"	17	0.2
	15"	29' - 3"	390	3.7	2' - 3"	17	0.2	32' - 7"	442	4.2	2' - 6"	18	0.2	39' - 11"	549	5.1	3' - 0 3/8"	20	0.3
	18"	32' - 7"	459	4.4	2' - 9"	20	0.3	36' - 4"	515	4.9	3' - 1"	29	0.3	44' - 7"	629	6.0	3' - 9 1/4"	33	0.4
	21"	36' - 0"	608	5.3	3' - 2 1/4"	31	0.4	40' - 2"	660	5.9	3' - 6 3/4"	33	0.4	49' - 2"	823	7.2	4' - 4 1/4"	38	0.5
	24"	39' - 4"	672	6.0	3' - 8 3/4"	35	0.4	43' - 11"	748	6.7	4' - 1 3/4"	36	0.5	53' - 9"	920	8.2	5' - 0 3/4"	42	0.6
	27"	42' - 8"	770	7.1	4' - 0 3/4"	38	0.5	47' - 8"	852	8.0	4' - 6 1/4"	41	0.5	58' - 4"	1,039	9.7	5' - 6 1/4"	45	0.7
	30"	46' - 1"	839	8.0	4' - 5 3/4"	40	0.6	51' - 5"	949	8.9	5' - 0"	44	0.6	62' - 11"	1,162	10.9	6' - 1 3/4"	48	0.8
	33"	49' - 5"	947	9.2	4' - 10"	45	0.7	55' - 2"	1,040	10.3	5' - 4 3/4"	48	0.7	67' - 6"	1,292	12.6	6' - 7 1/4"	50	0.9
	36"	52' - 10"	1,151	11.4	5' - 3"	49	0.8	58' - 11"	1,287	12.7	5' - 10 3/4"	51	1.0	72' - 1"	1,583	15.6	7' - 2 1/4"	55	1.1
	42"	59' - 6"	1,365	14.2	6' - 0 1/4"	55	1.0	66' - 5"	1,530	15.8	6' - 8 3/4"	57	1.2	81' - 4"	1,875	19.4	8' - 3"	76	1.4
	48"	69' - 4"	1,737	18.5	6' - 10"	59	1.3	77' - 4"	1,942	20.7	7' - 7 1/4"	79	1.5	94' - 9"	2,368	25.3	9' - 3 3/8"	86	1.8
	54"	76' - 1"	2,138	22.0	7' - 9 1/4"	83	1.6	84' - 10"	2,378	24.6	8' - 8"	87	1.8	103' - 11"	2,912	30.1	10' - 7 1/2"	95	2.2
	60"	82' - 10"	2,426	25.8	8' - 6 3/4"	90	1.9	92' - 5"	2,681	28.8	9' - 6 1/2"	94	2.1	113' - 2"	3,294	35.3	11' - 8"	122	2.6
	66"	89' - 7"	2,730	29.9	9' - 0 3/4"	96	2.1	99' - 11"	3,038	33.3	10' - 1 1/4"	101	2.4	122' - 4"	3,697	40.8	12' - 4 1/4"	130	2.9
	72"	96' - 3"	3,218	34.2	9' - 8"	102	2.4	107' - 5"	3,580	38.2	10' - 9 1/4"	108	2.6	131' - 6"	4,372	46.8	13' - 2 1/2"	139	3.2

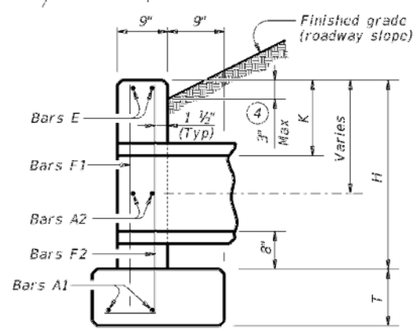


ELEVATION



PLAN OF SKEWED PIPES

Showing 30° skew.



SECTION AT CENTER OF PIPE

(1) Total quantites include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

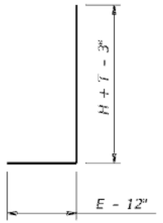
(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF (6) REINFORCING STEEL

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~



BARS F2

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

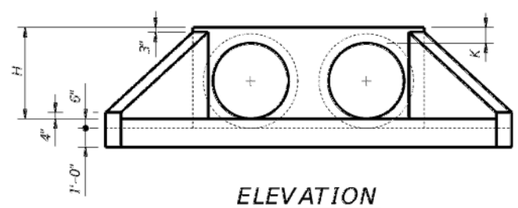
CH-PW-S

FILE: chpwsste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		127

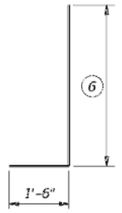
DATE:
FILE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

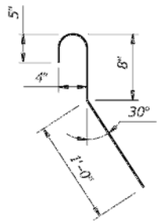
Slope	Dia of Pipe (D)	Values for One Pipe						Values to be Added for Each Add'l Pipe		
		W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4' - 7 1/2"	2' - 6"	2' - 10"	3' - 3 1/4"	88	0.6	1' - 9"	20	0.2
	15"	5' - 5 3/4"	2' - 9 1/2"	3' - 4"	3' - 10 1/2"	103	0.7	2' - 2"	24	0.3
	18"	6' - 4 1/4"	3' - 1"	3' - 10"	4' - 5"	124	0.9	2' - 8"	32	0.3
	21"	7' - 2 3/4"	3' - 4 1/2"	4' - 4"	5' - 0"	143	1.1	3' - 1"	43	0.4
	24"	8' - 2 1/2"	3' - 9 1/2"	4' - 10"	5' - 7"	164	1.3	3' - 7"	50	0.5
	27"	9' - 1"	4' - 1"	5' - 4"	6' - 2"	179	1.5	3' - 11"	56	0.6
	30"	9' - 11 1/2"	4' - 4 1/2"	5' - 10"	6' - 8 3/4"	203	1.7	4' - 4"	65	0.8
	33"	10' - 10"	4' - 8"	6' - 4"	7' - 3 3/4"	224	2.0	4' - 8"	71	0.9
	36"	11' - 8 1/4"	4' - 11 1/2"	6' - 10"	7' - 10 3/4"	249	2.2	5' - 1"	81	1.0
	42"	13' - 5 1/4"	5' - 6 1/2"	7' - 10"	9' - 0 1/2"	298	2.8	5' - 10"	97	1.3
	48"	15' - 9"	6' - 1 1/2"	9' - 4"	10' - 9 1/4"	360	3.8	6' - 7"	117	1.7
	54"	17' - 5 3/4"	6' - 8 1/2"	10' - 4"	11' - 11 1/4"	427	4.5	7' - 6"	151	2.1
	60"	19' - 2 3/4"	7' - 3 1/2"	11' - 4"	13' - 1"	481	5.3	8' - 3"	174	2.5
	66"	20' - 11 1/2"	7' - 10 1/2"	12' - 4"	14' - 3"	544	6.2	8' - 9"	194	2.9
	72"	22' - 8 1/2"	8' - 5 1/2"	13' - 4"	15' - 4 3/4"	601	7.1	9' - 4"	213	3.3
3:1	12"	6' - 3"	2' - 6"	4' - 3"	4' - 11"	118	0.8	1' - 9"	22	0.2
	15"	7' - 5"	2' - 9 1/2"	5' - 0"	5' - 9 1/4"	137	1.1	2' - 2"	28	0.3
	18"	8' - 6 3/4"	3' - 1"	5' - 9"	6' - 7 3/4"	170	1.3	2' - 8"	37	0.5
	21"	9' - 8 3/4"	3' - 4 1/2"	6' - 6"	7' - 6"	195	1.6	3' - 1"	48	0.6
	24"	11' - 0"	3' - 9 1/2"	7' - 3"	8' - 4 1/2"	227	2.0	3' - 7"	58	0.7
	27"	12' - 2"	4' - 1"	8' - 0"	9' - 2 3/4"	251	2.3	3' - 11"	67	0.8
	30"	13' - 4"	4' - 4 1/2"	8' - 9"	10' - 1 1/4"	293	2.7	4' - 4"	77	1.0
	33"	14' - 5 3/4"	4' - 8"	9' - 6"	10' - 11 3/4"	318	3.1	4' - 8"	84	1.2
	36"	15' - 7 3/4"	4' - 11 1/2"	10' - 3"	11' - 10"	351	3.5	5' - 1"	96	1.4
	42"	17' - 11 1/2"	5' - 6 1/2"	11' - 9"	13' - 6 3/4"	432	4.5	5' - 10"	119	1.7
	48"	21' - 1 3/4"	6' - 1 1/2"	14' - 0"	16' - 2"	537	6.1	6' - 7"	146	2.3
	54"	23' - 5 1/2"	6' - 8 1/2"	15' - 6"	17' - 10 3/4"	630	7.3	7' - 6"	186	2.9
	60"	25' - 9 1/4"	7' - 3 1/2"	17' - 0"	19' - 7 1/2"	719	8.7	8' - 3"	219	3.4
	66"	28' - 1"	7' - 10 1/2"	18' - 6"	21' - 4 1/4"	811	10.1	8' - 9"	242	3.9
	72"	30' - 4 3/4"	8' - 5 1/2"	20' - 0"	23' - 1 1/4"	924	11.7	9' - 4"	272	4.4
4:1	12"	7' - 10 3/4"	2' - 6"	5' - 8"	6' - 6 1/2"	148	1.1	1' - 9"	24	0.3
	15"	9' - 4"	2' - 9 1/2"	6' - 8"	7' - 8 1/2"	181	1.5	2' - 2"	32	0.4
	18"	10' - 9 1/2"	3' - 1"	7' - 8"	8' - 10 1/4"	221	1.9	2' - 8"	42	0.5
	21"	12' - 2 3/4"	3' - 4 1/2"	8' - 8"	10' - 0"	260	2.3	3' - 1"	57	0.7
	24"	13' - 9 1/2"	3' - 9 1/2"	9' - 8"	11' - 2"	301	2.8	3' - 7"	67	0.9
	27"	15' - 3"	4' - 1"	10' - 8"	12' - 3 3/4"	334	3.3	3' - 11"	77	1.0
	30"	16' - 8 1/4"	4' - 4 1/2"	11' - 8"	13' - 5 3/4"	385	3.8	4' - 4"	89	1.3
	33"	18' - 1 3/4"	4' - 8"	12' - 8"	14' - 7 1/2"	425	4.5	4' - 8"	101	1.4
	36"	19' - 7"	4' - 11 1/2"	13' - 8"	15' - 9 1/4"	472	5.1	5' - 1"	115	1.7
	42"	22' - 5 3/4"	5' - 6 1/2"	15' - 8"	18' - 1"	583	6.5	5' - 10"	141	2.1
	48"	26' - 6 1/4"	6' - 1 1/2"	18' - 8"	21' - 6 3/4"	730	8.9	6' - 7"	175	2.8
	54"	29' - 5"	6' - 8 1/2"	20' - 8"	23' - 10 1/4"	875	10.7	7' - 6"	226	3.6
	60"	32' - 3 3/4"	7' - 3 1/2"	22' - 8"	26' - 2"	996	12.7	8' - 3"	264	4.3
	66"	35' - 2 1/2"	7' - 10 1/2"	24' - 8"	28' - 5 3/4"	1,140	14.9	8' - 9"	300	4.9
	72"	38' - 1 1/4"	8' - 5 1/2"	26' - 8"	30' - 9 1/2"	1,297	17.3	9' - 4"	334	5.6
6:1	12"	11' - 2"	2' - 6"	8' - 6"	9' - 9 3/4"	224	1.9	1' - 9"	28	0.4
	15"	13' - 2 1/4"	2' - 9 1/2"	10' - 0"	11' - 6 1/2"	268	2.5	2' - 2"	37	0.5
	18"	15' - 2 1/2"	3' - 1"	11' - 6"	13' - 3 1/4"	330	3.2	2' - 8"	50	0.7
	21"	17' - 2 3/4"	3' - 4 1/2"	13' - 0"	15' - 0 1/4"	387	3.9	3' - 1"	69	0.9
	24"	19' - 4 1/2"	3' - 9 1/2"	14' - 6"	16' - 9"	453	4.8	3' - 7"	80	1.2
	27"	21' - 4 3/4"	4' - 1"	16' - 0"	18' - 5 3/4"	512	5.7	3' - 11"	96	1.4
	30"	23' - 5 1/4"	4' - 4 1/2"	17' - 6"	20' - 2 1/2"	593	6.7	4' - 4"	110	1.7
	33"	25' - 5 1/2"	4' - 8"	19' - 0"	21' - 11 1/4"	675	7.8	4' - 8"	127	2.0
	36"	27' - 5 3/4"	4' - 11 1/2"	20' - 6"	23' - 8"	735	9.0	5' - 1"	144	2.3
	42"	31' - 6 1/4"	5' - 6 1/2"	23' - 6"	27' - 1 1/2"	922	11.5	5' - 10"	179	3.0
	48"	37' - 3 1/2"	6' - 1 1/2"	28' - 0"	32' - 4"	1,191	15.9	6' - 7"	231	4.0
	54"	41' - 1 1/4"	6' - 8 1/2"	31' - 0"	35' - 9 1/2"	1,424	19.2	7' - 6"	300	5.0
	60"	45' - 4 3/4"	7' - 3 1/2"	34' - 0"	39' - 3"	1,631	22.9	8' - 3"	353	6.0



ELEVATION
(Showing dimensions.)



BARS V



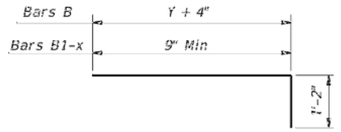
BARS CL
(Length = 2'-5")

TABLE OF (5) REINFORCING STEEL

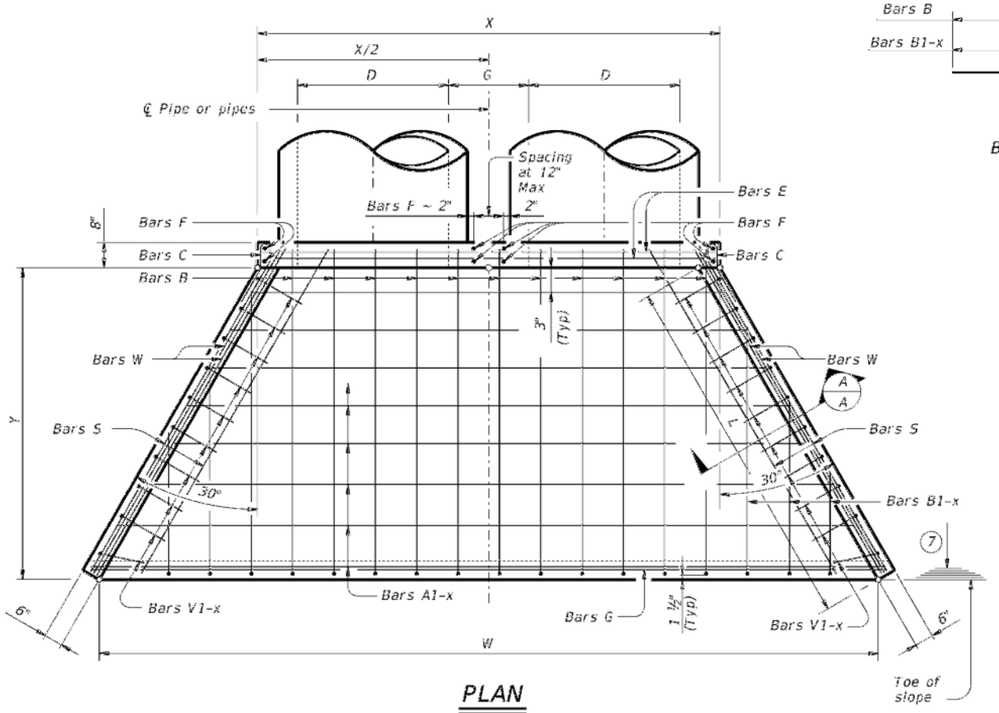
Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
C	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1' - 0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

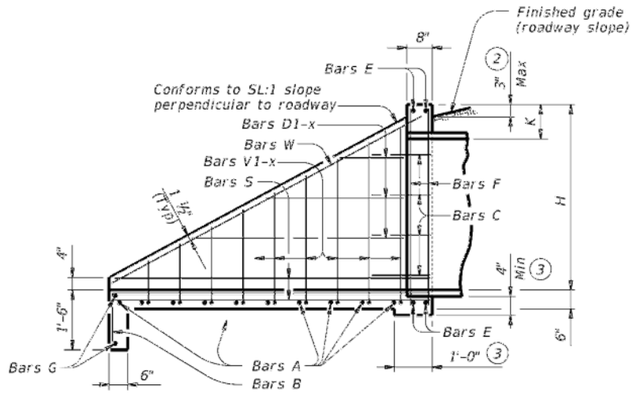
Dia of Pipe (D)	G	K (4)	H
12"	0' - 9"	1' - 0"	2' - 0"
15"	0' - 11"	1' - 0"	2' - 3"
18"	1' - 2"	1' - 0"	2' - 6"
21"	1' - 4"	1' - 0"	2' - 9"
24"	1' - 7"	1' - 0"	3' - 0"
27"	1' - 8"	1' - 0"	3' - 3"
30"	1' - 10"	1' - 0"	3' - 6"
33"	1' - 11"	1' - 0"	3' - 9"
36"	2' - 1"	1' - 0"	4' - 0"
42"	2' - 4"	1' - 0"	4' - 6"
48"	2' - 7"	1' - 3"	5' - 3"
54"	3' - 0"	1' - 3"	5' - 9"
60"	3' - 3"	1' - 3"	6' - 3"
66"	3' - 3"	1' - 3"	6' - 9"
72"	3' - 4"	1' - 3"	7' - 3"



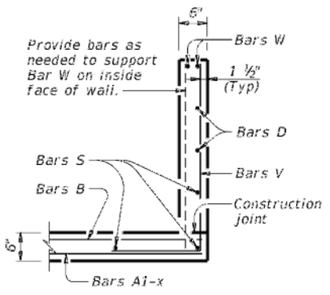
BARS B and B1-x



PLAN



TYPICAL WING ELEVATION



SECTION A-A

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.

(4) Dimensions shown are usual and maximum.

(5) Quantities shown are for one structure end only (one headwall).

(6) Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$

(7) Lengths of wings based on SL:1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation

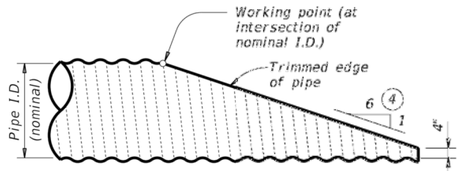
Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: chfw00se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		128

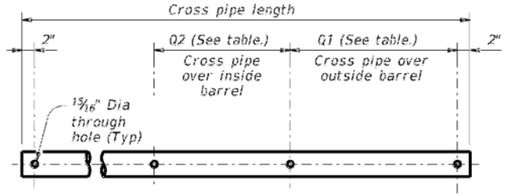
DATE:
FILE:



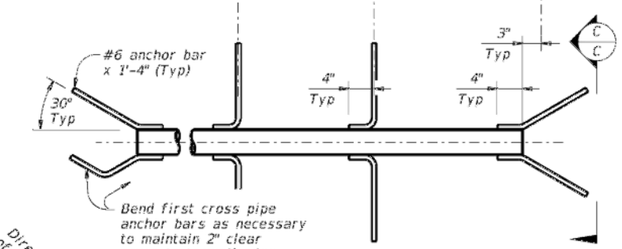
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

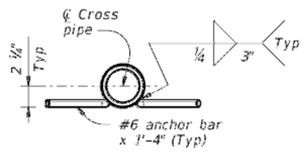
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

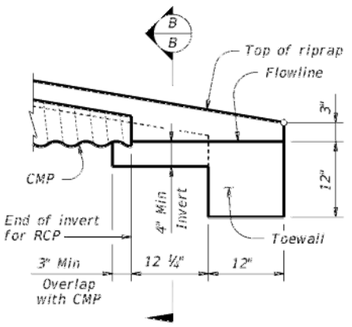


PIPE WITH ANCHOR BARS



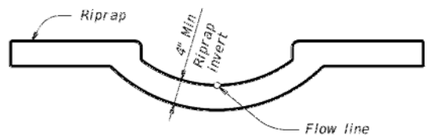
SECTION C-C

CROSS PIPE DETAILS



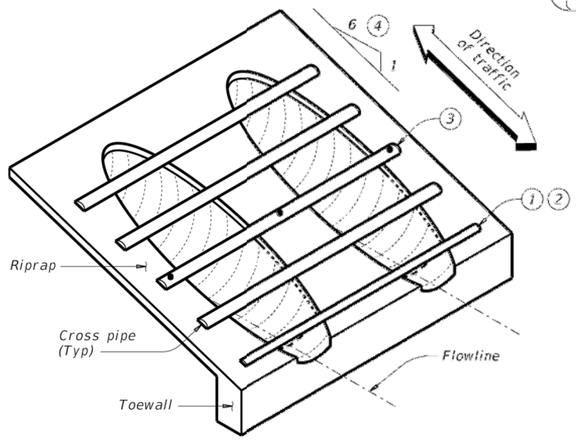
DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

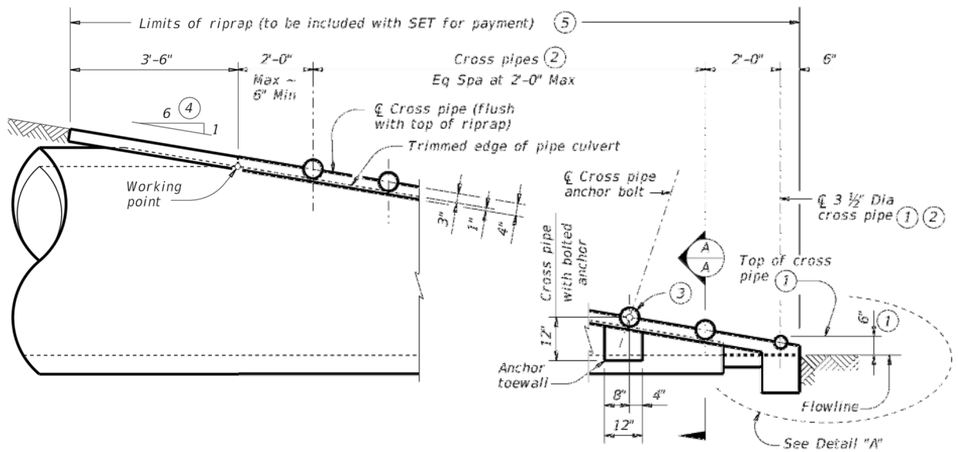
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

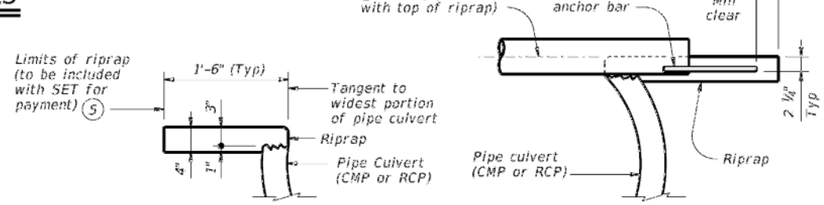
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



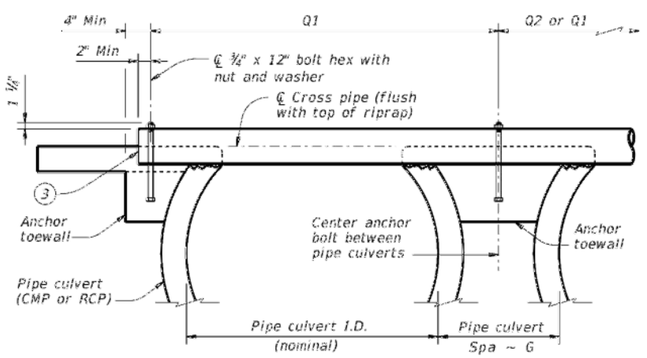
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

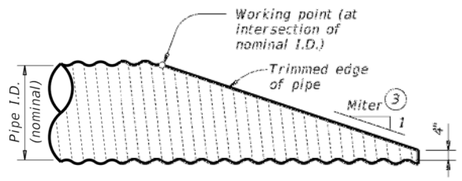
SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		129

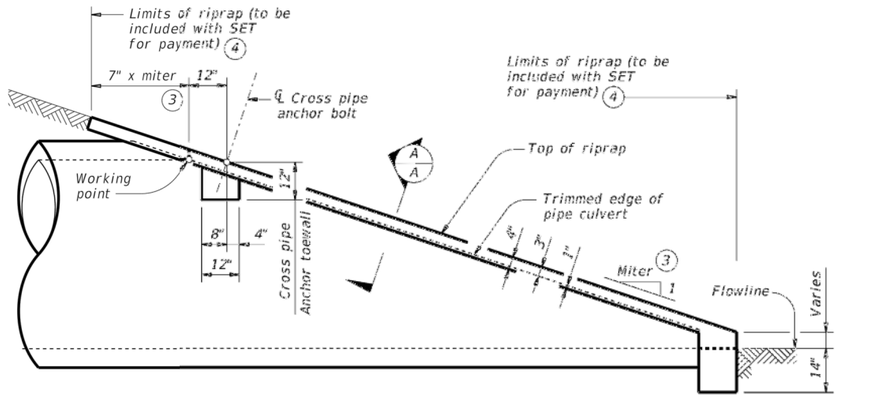
DATE:
FILE:



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

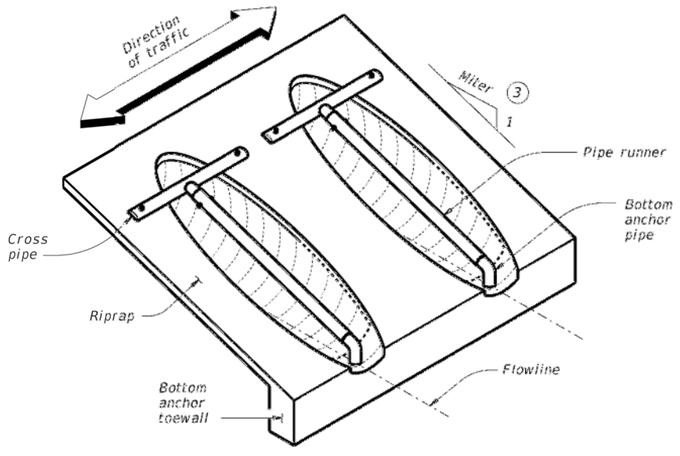
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Span ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Singie Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

Texas Department of Transportation

Bridge Division Standard

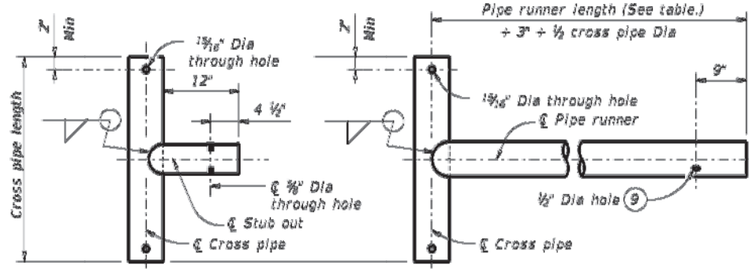
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

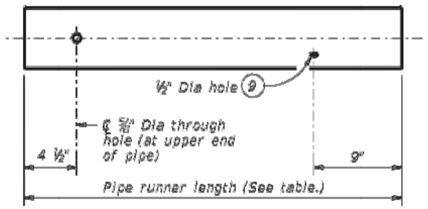
FILE:	setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0152	1	80, ETC.	183, ETC.
		DIST	COUNTY		SHEET NO.
		14	TRAVIS		130

DATE:
FILE:



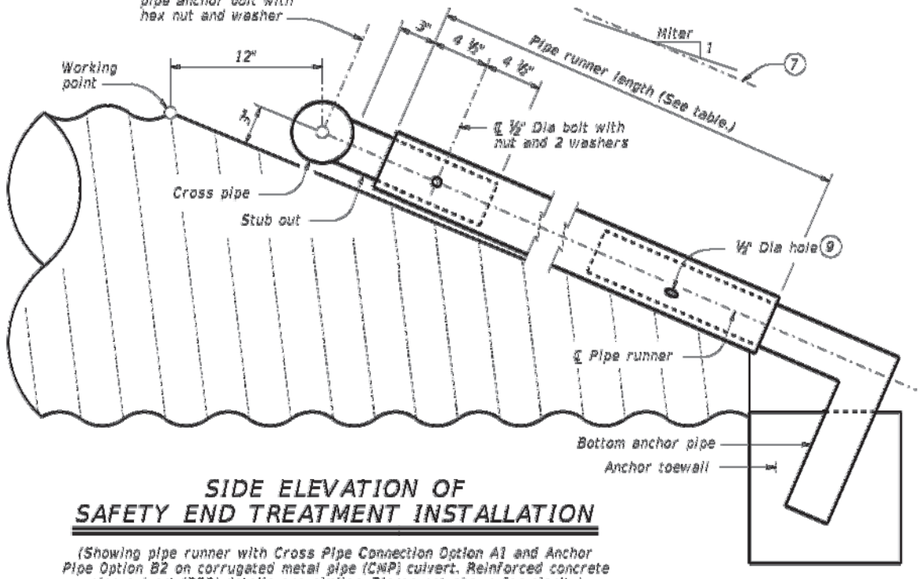
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



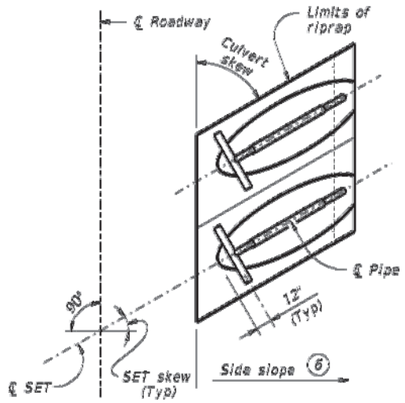
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

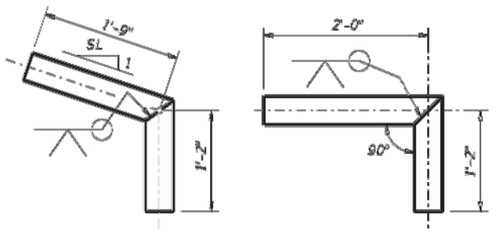


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

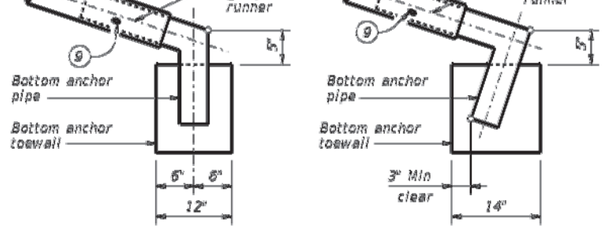


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

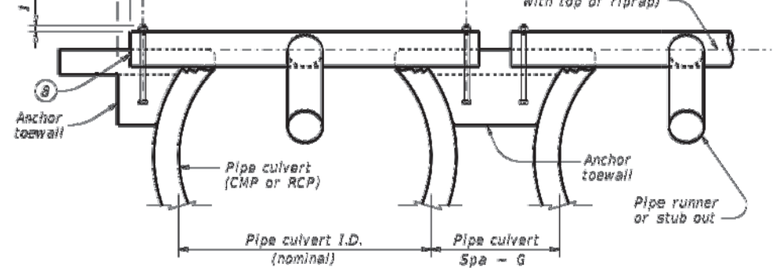
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

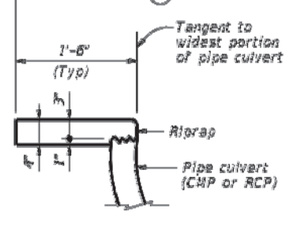
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL

SECTION A-A



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the ½" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE:	setpcdse-20.dgn	DN: BAF	CK: CAT	DW: JRP	CK: BAF		
©TxDOT	February 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS		0152	01	080, ETC.		US 183, ETC.	
		DIST	COUNTY			SHEET NO.	
		14	TRAVIS			131	

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (C.Y.)	Class "C" Conc (Curb) (2) (C.Y.)	Class "C" Conc (Wingwall) (3) (C.Y.)	Total Wingwall Area (S.F.)
UNNAMED TRIBUTARY, STA: 119.40.12	5 - 5'x3'	3	MC-5-20	PW-1	0	4:1	8	7	0	7	N/A	N/A	40	28.5	N/A	0	0	79.2	1120
NORTH FORK DRY CREEK, STA: 129+52.86	7 - 7'x7'	3	MC-7-10	PW-1	30	4:1	8	7	0	10	N/A	N/A	28.7	61.8	N/A	0	0	85.2	1148

NOTES:

Skew Angle = 0° for SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standards.
30° Maximum for Safety End Treatment

SL:1 = Horizontal:1 Vertical
Side Slope at culvert for Flared or Straight Wingwalls. Channel Slope for Parallel Wingwalls.
Slope shall be 3:1 or flatter for Safety End Treatments.

T = Box Culvert Top Slab Thickness. Dimension can be found on the applicable Box Culvert Standard.

U = Box Culvert Wall Thickness. Dimension can be found on the applicable Box Culvert Standard.

C = Curb Height.

See applicable wing or end treatment standards for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.
Hw = Height of Wingwall.
A = Distance from Face of Curb to End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
B = Offset of End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
Lw = Length of Longest Wingwall.
Ltw = Length of Culvert Toewall (Not applicable when using Riprap Apron).
Atw = Length of Anchor Toewall (Applicable to Safety End Treatment only).
Total Wingwall Area = Wingwall area in S.F. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) The wall heights shown will be rounded to the nearest Foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the RAC standard, quantities shown must be increased by a factor of 2. If Class "S" concrete is required for the top slab of the culvert, the curb concrete shall also be Class "S". Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wing, footing, culvert toewall (if any), anchor toewall (if any) and wingwall toewall. Riprap apron, culvert and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor shall have the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it shall be the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the Box Culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the Box Culvert Wingwalls and Safety End Treatments.

An Excel 97 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet shall be signed, sealed, and dated by a licensed Professional Engineer.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

W. Morgan

01/28/2021

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

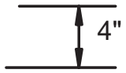
BCS

FILE: bcsstde1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		132

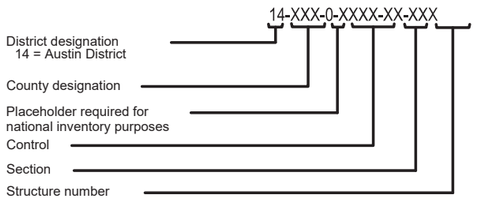
DATE:
FILE:

14-XXX-0-XXXX-XX-XXX

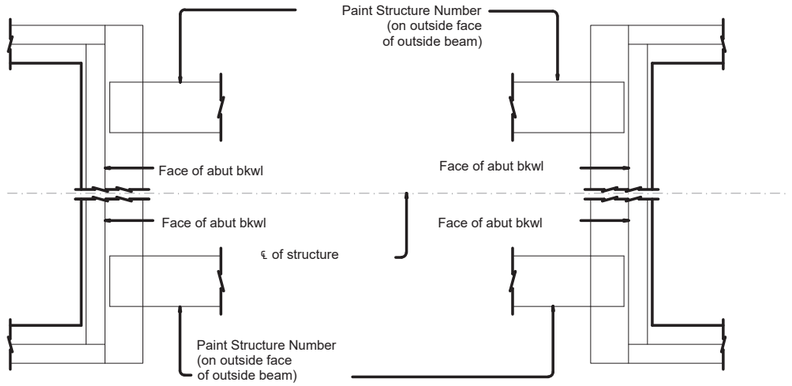
District designation | County designation | Placeholder | Control | Section | Structure number



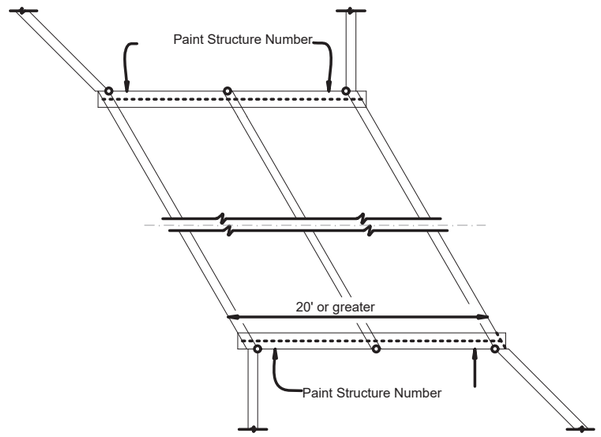
PAINTED STRUCTURE NUMBER LEGEND



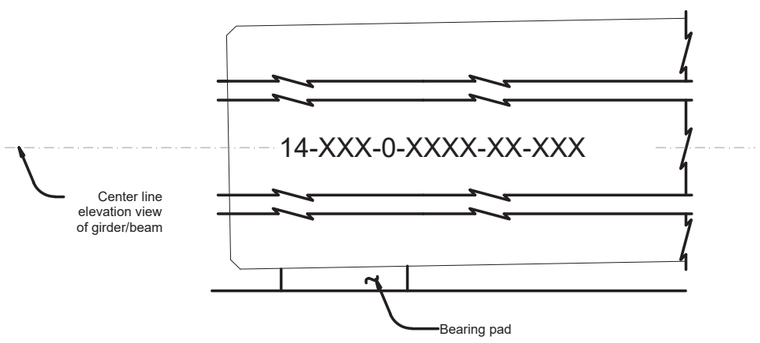
011 = Bastrop
016 = Blanco
027 = Burnet
028 = Caldwell
087 = Gillespie
106 = Hays
144 = Lee
150 = Llano
157 = Mason
227 = Travis
246 = Williamson



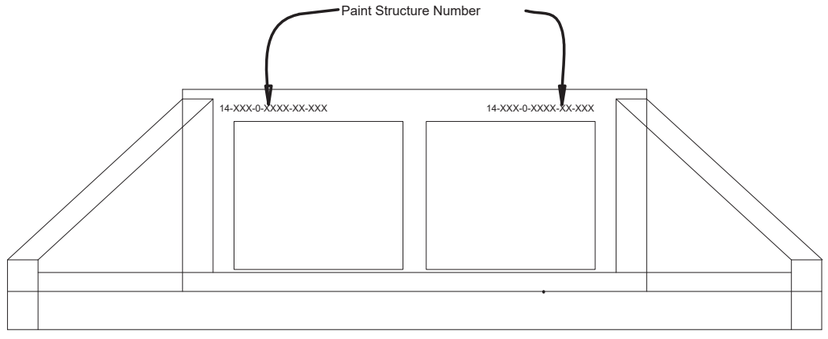
AT BRIDGE LOCATIONS



AT CULVERT LOCATIONS



ELEVATION VIEW DETAIL



ELEVATION VIEW DETAIL

GENERAL NOTES:

Permanently mark each structure with the painted structure number in accordance with the plans.
Each Structure shall have 4 (four) Structure numbers painted per structure.
Painting structure number work will not be measured or paid for directly but will be considered subsidiary to other pertinent items.

MATERIAL:

Provide black, lead free, CFC free, and CFHC free paint that is water proof, weather resistant, and dries instantly on all surfaces without smearing, smudging, or rippling

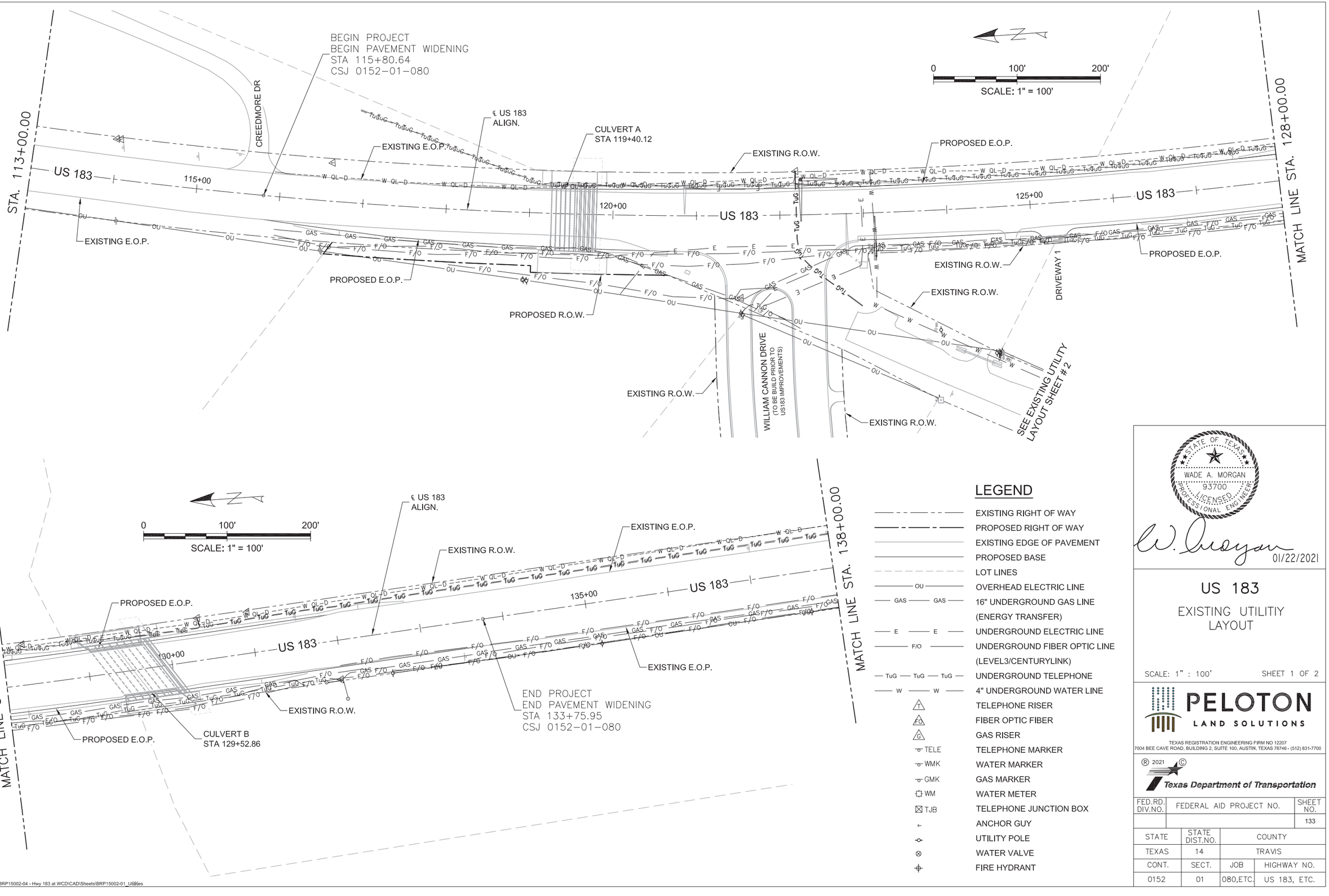
Texas Department of Transportation

Austin District Standard

PAINTING STRUCTURE NUMBERS

PSN–19 (AUS)

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		132A



LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED BASE
- LOT LINES
- OU — OVERHEAD ELECTRIC LINE
- GAS — 16" UNDERGROUND GAS LINE (ENERGY TRANSFER)
- E — UNDERGROUND ELECTRIC LINE
- F/O — UNDERGROUND FIBER OPTIC LINE (LEVEL3/CENTURYLINK)
- TuG — UNDERGROUND TELEPHONE
- W — 4" UNDERGROUND WATER LINE
- T — TELEPHONE RISER
- FO — FIBER OPTIC FIBER
- G — GAS RISER
- TELE — TELEPHONE MARKER
- WMK — WATER MARKER
- GMK — GAS MARKER
- WM — WATER METER
- TJB — TELEPHONE JUNCTION BOX
- ANCHOR GUY
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

EXISTING UTILITIY LAYOUT

SCALE: 1" : 100'

SHEET 1 OF 2

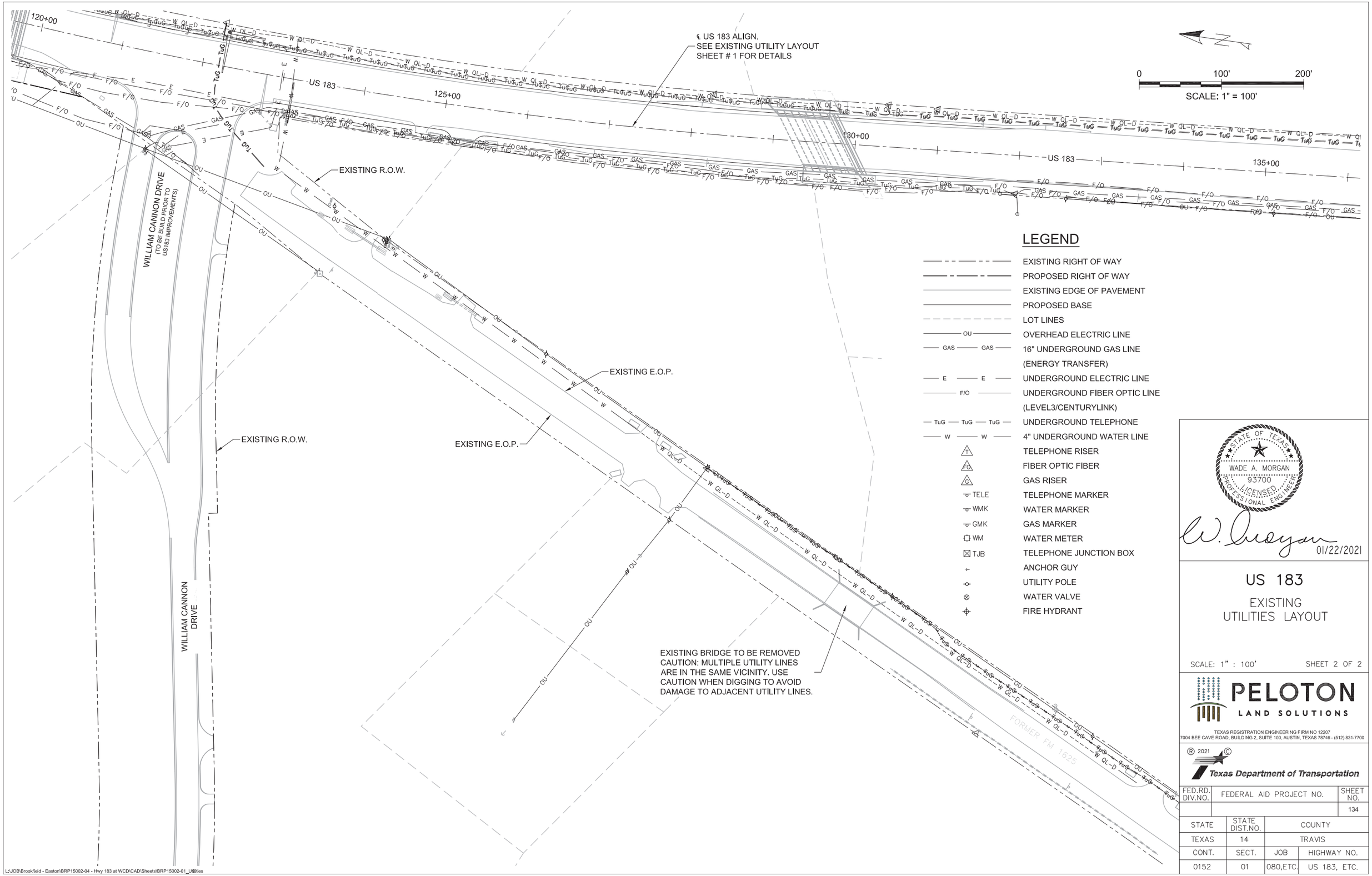
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			133

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Utilities



LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- PROPOSED BASE
- LOT LINES
- OU — OVERHEAD ELECTRIC LINE
- GAS GAS — 16" UNDERGROUND GAS LINE (ENERGY TRANSFER)
- E E — UNDERGROUND ELECTRIC LINE
- F/O — UNDERGROUND FIBER OPTIC LINE (LEVEL3/CENTURYLINK)
- TuG TuG TuG — UNDERGROUND TELEPHONE
- W W — 4" UNDERGROUND WATER LINE
- T — TELEPHONE RISER
- FO — FIBER OPTIC FIBER
- G — GAS RISER
- TELE — TELEPHONE MARKER
- WMK — WATER MARKER
- GMK — GAS MARKER
- WM — WATER METER
- TJB — TELEPHONE JUNCTION BOX
- ANCHOR GUY
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

01/22/2021

US 183

EXISTING UTILITIES LAYOUT

SCALE: 1" : 100' SHEET 2 OF 2

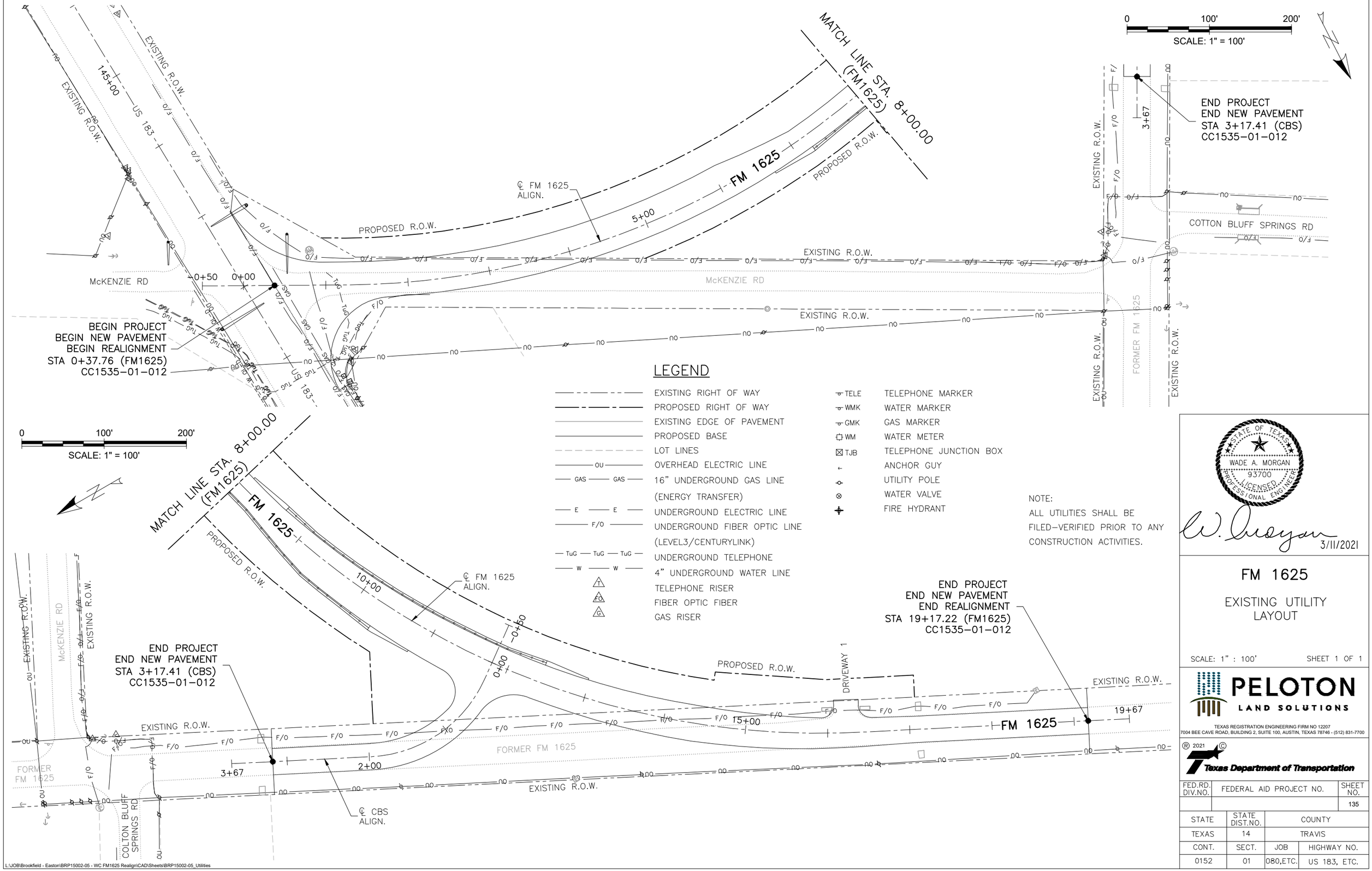
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		134

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Utilities



LEGEND

EXISTING RIGHT OF WAY	TELE TELEPHONE MARKER
PROPOSED RIGHT OF WAY	WMK WATER MARKER
EXISTING EDGE OF PAVEMENT	GMK GAS MARKER
PROPOSED BASE	WM WATER METER
LOT LINES	TJB TELEPHONE JUNCTION BOX
OU OVERHEAD ELECTRIC LINE	ANCHOR GUY
GAS 16" UNDERGROUND GAS LINE (ENERGY TRANSFER)	UTILITY POLE
E UNDERGROUND ELECTRIC LINE	WATER VALVE
F/O UNDERGROUND FIBER OPTIC LINE (LEVEL3/CENTURYLINK)	FIRE HYDRANT
TuG UNDERGROUND TELEPHONE	
W 4" UNDERGROUND WATER LINE	
T TELEPHONE RISER	
FO FIBER OPTIC FIBER	
G GAS RISER	

NOTE:
ALL UTILITIES SHALL BE FILED-VERIFIED PRIOR TO ANY CONSTRUCTION ACTIVITIES.

STATE OF TEXAS
WADE A. MORGAN
93700
LICENSED
PROFESSIONAL ENGINEER

3/11/2021

FM 1625

EXISTING UTILITY LAYOUT

SCALE: 1" : 100' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		135

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Utilities

SITE DESCRIPTION

PROJECT LIMITS: US 183 : FROM 0.08 MI. SOUTH OF LAVAL HILL RD TO 0.11 MI. NORTH OF McKENZIE DR, TRAVIS COUNTY, TEXAS

PROJECT DESCRIPTION: FOR THE CONSTRUCTION OF THE NEW INTERSECTION, LEFT TURN LANE, RIGHT TURN LANE AND SHOULDERS CONSISTING OF GRADING, LIME TREATED SUBGRADE, FLEX BASE, ASPHALT, MBGF, SIGNING, PAVEMENT MARKINGS AND CULVERTS.

MAJOR SOIL DISTURBING ACTIVITIES:
SOIL DISTRUBING ACTIVITIES WILL INCLUDE ROW PREPARATION, DITCH GRADING, ROADWAY EXCAVATION, EMBANKMENT, SUBGRADE PREPARATION, PLACEMENT OF FLEXBASE, AND ADDITION OF TOPSOIL.

TOTAL PROJECT AREA: 4.21 ACRES

TOTAL AREA TO BE DISTURBED: 4.21 ACRES

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): 0.82 = 100 YR. 0.65 = 5 YR.

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

NAME OF RECEIVING WATERS: NORTH FORK DRY CREEK

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [X] MULCHING
- [X] HYDROMULCH BLANKET
- [ ] BUFFER ZONES
- [ ] PRESERVATION OF NATURAL RESOURCES

OTHER: DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 21 DAYS.

STRUCTURAL PRACTICES:

- [X] SEDIMENT CONTROL FENCES (TEMPORARY)
- [ ] HAY BALES
- [X] ROCK FILTER DAMS (TEMPORARY)
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [X] ROCK BEDDING AT CONSTRUCTION EXIT (TEMPORARY)
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

NARRATIVE – SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

1. INSTALL SEDIMENT CONTROL FENCE AND ROCK BERMS.

2. GRADE DITCHES, INSTALL TOPSOIL, EXTEND CULVERTS, ADJUST DRIVEWAY CULVERTS, HYDROMULCH EXPOSED AREAS AFTER FINAL GRADING AND TOPSOIL IS INSTALLED

STORM WATER MANAGEMENT:
EROSION CONTROL MEASURES FOR STORMWATER MANAGEMENT:
IMMEDIATELY UPON COMMENCEMENT OF CONSTRUCTION, SILT FENCE WILL BE PLACED ON THE DOWN–GRADIENT SIDE OF THE ROADWAY AND ROCK FILTER DAMS WILL BE PLACED IN THE EXISTING ROADSIDE DITCH CHANNELS AND AT CULVERT OUTFALLS AS REQUIRED IN THE CONSTRUCTION PLANS. INITIAL CONSTRUCTION ACTIVITIES WILL CONSIST OF DITCH GRADING, ROADWAY EMBANKMENT CONSTRUCTION, CULVERT EXTENSION, AND DRIVEWAY CULVERT ADJUSTMENT FOR ROADWAY SECTIONS NO GREATER THAN WILL ALLOW FINAL GRADING AND TOPSOIL PLACEMENT TO BE COMPLETED THAT DAY. EACH DAY, ALL FINAL GRADED AND TOPSOIL PLACED SURFACES WILL BE LINED WITH CELLULOUS FIBER EROSION CONTROL MATTING AND APPROPRIATE SEEDING MATERIALS. AS NEWLY ALIGNED ROADSIDE DITCHES ARE CONSTRUCTED, ROCK FILTER DAMS WILL BE RELOCATED APPROPRIATELY TO THE NEWLY GRADED DITCH AND CULVERT LOCATIONS

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE:
ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER. WHEN IT IS DETERMINED BY THE ENGINEER THAT REPAIRS ARE NEEDED, IT SHALL BE DONE AT THE EARLIEST DATE POSSIBLE BUT NO LATER THAN SEVEN CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT. THE AREAS ADJACENT TO CREEKS AND DRAINAGEWAYS SHALL HAVE PRIORITY FOLLOWED BY DEVICES PROTECTING CULVERTS.

INSPECTION:
AN INSPECTION WILL BE PERFORMED BY A TxDOT INSPECTOR EACH WEEK ON THE SAME DESIGNATED DAY AS WELL AS AFTER A 0.5" OR GREATER RAINFALL EVENT. RAINFALL SHALL BE MEASURED USING A FREEZE PROOF GAUGE LOCATED ON THE PROJECT SITE. AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE BY THE ENGINEER FOLLOWING EACH INSPECTION WITH THE FINDINGS OF THE INSPECTION.THE CONTROLS SHALL BE REPAIRED OR REVISED BY THE CONTRACTOR BASED ON THE FINDINGS OF THE INSPECTION.

WASTE MATERIALS:
ANY TRASH OR DEBRIS SHALL BE COLLECTED, SHREDDED AND HAULED TO A SANITARY LANDFILL OR SITE AS APPROVED BY THE ENGINEER. OTHER WASTE MATERIAL WHICH WILL PROVIDE A STABLE EMBANKMENT MAY BE UTILIZED IN THE ROADWAY EMBANKMENT OR SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER. OPEN BURNING WILL NOT BE PERMITTED.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE TxDOT SPILL COORDINATOR SHALL BE CONTACTED IMMEDIATELY AT 512–832–7067 AND TCEQ AT (512)339–2929 –– (8 TO 5 M THRU F) OR THE 24 HR SPILL RESPONSE HOTLINE 1–800–832–8224.
REPORTABLE QUANTITIES (RQ):
(RQ) FOR PETROLEUM/HYDROCARBON LIQUIDS: 25 GAL – ON LAND
(RQ) FOR PETROLEUM/HYDROCARBON LIQUIDS: "CREATING A SHEEN" – ON WATER

SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATIONS BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR AND IN ACCORDANCE WITH ALL LOCAL,STATE, AND FEDERAL REGULATIONS.

OFFSITE VEHICLE TRACKING:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] STABILIZED CONSTRUCTION ENTRANCE

OTHER: EXCESS DIRT ON THE ROAD SHALL BE BROOMED AS NEEDED OR AS DIRECTED.

REMARKS:
DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED.
CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS, INCLUDING PLACEMENT OF SILT FENCE DOWNGRADIENT OF. STAGING AND VEHICLE MAINTENANCE AREAS.

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

09/01/2020

TXDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			136

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

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.

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1. AUSTIN DISTRICT (AUSTIN_NOI@TXDOT.GOV

2. ENVIRONMENTAL AFFAIRS DIVISION 125 EAST 11TH STREET AUSTIN, TX 78701 (ATTN.: AUSTIN DISTRICT)

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

☐ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☒ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1. Tributary of North Fork Dry Creek Sta. 119+40.12
2. North Fork Dry Creek Sta. 129+52.86
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

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. Implement Terrestrial Reptile BMP's outlined under Item 7 of the General Notes.
2. Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between
3. September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to
4. TxDOT 30 business days prior to begin work. This work is subsidiary.

   If active nests are encountered on-site during construction, all construction activity within 50 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☒ Yes ☐ No

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

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

☐ Yes ☐ No

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

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

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

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

☐ No Action Required ☒ Required Action

Action No.

1. Ensure bridge to be removed does not have asbestos and/or lead based paint If found to have asbestos and/or lead based paint, document and address how it will be handled as applicable.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Notify the local FEMA Floodplain Administrator
2.
3.

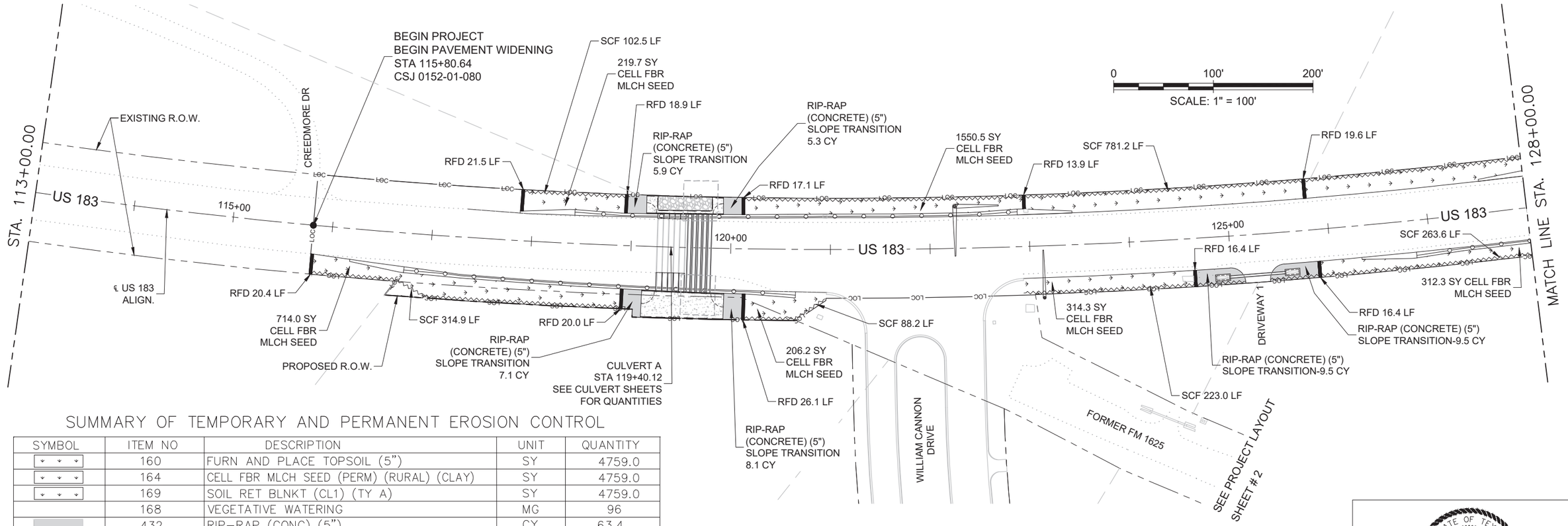
Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

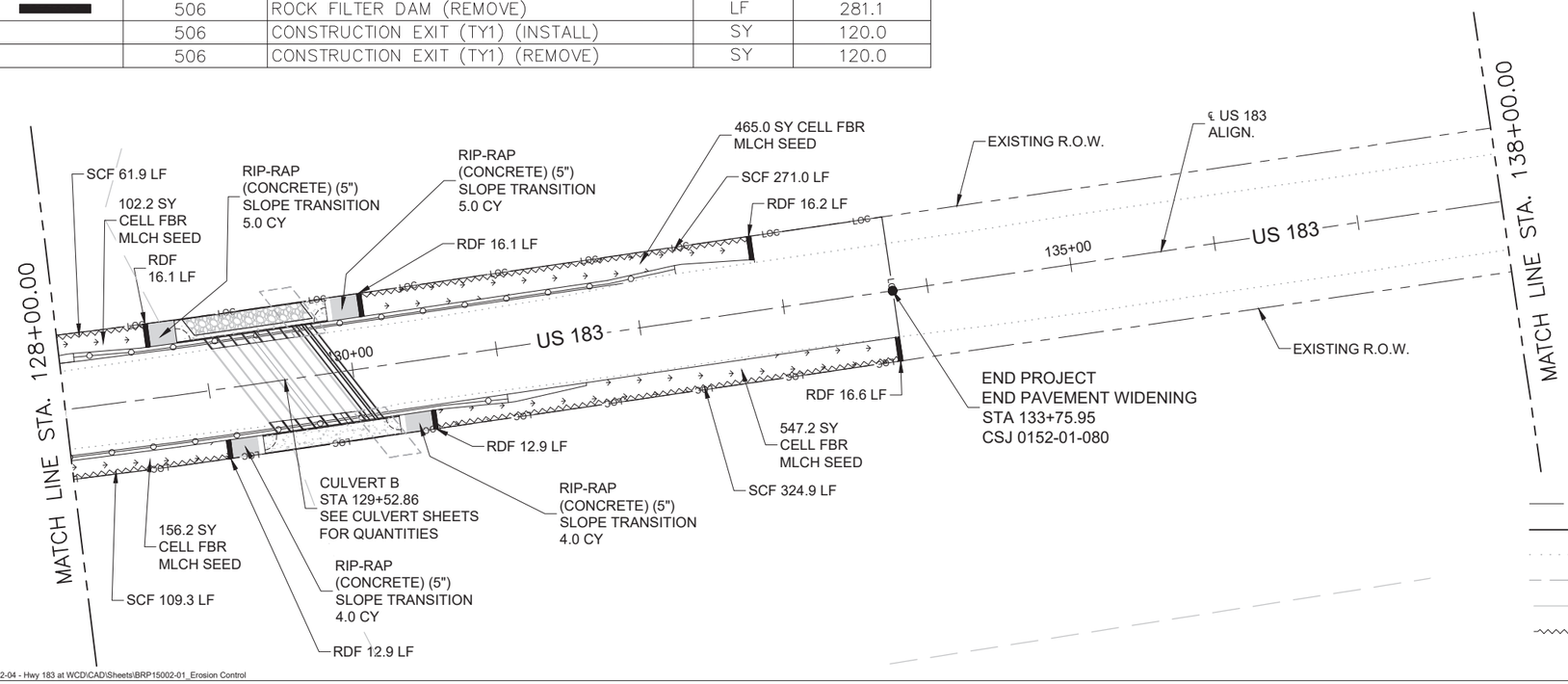
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS		137



SUMMARY OF TEMPORARY AND PERMANENT EROSION CONTROL

SYMBOL	ITEM NO	DESCRIPTION	UNIT	QUANTITY
	160	FURN AND PLACE TOPSOIL (5")	SY	4759.0
	164	CELL FBR MLCH SEED (PERM) (RURAL) (CLAY)	SY	4759.0
	169	SOIL RET BLNKT (CL1) (TY A)	SY	4759.0
	168	VEGETATIVE WATERING	MG	96
	432	RIP-RAP (CONC) (5")	CY	63.4
	506	SEDIMENT CONTROL FENCE (INSTALL)	LF	2340.5
	506	SEDIMENT CONTROL FENCE (REMOVE)	LF	2340.5
	506	ROCK FILTER DAM (INSTALL)	LF	281.1
	506	ROCK FILTER DAM (REMOVE)	LF	281.1
	506	CONSTRUCTION EXIT (TY1) (INSTALL)	SY	120.0
	506	CONSTRUCTION EXIT (TY1) (REMOVE)	SY	120.0



NOTES

1. CONTRACTOR TO DETERMINE LOCATION OF CONSTRUCTION EXITS. LOCATION SHALL BE APPROVED BY THE ENGINEER.
2. PERMANENT EROSION CONTROL QUANTITIES FOR CULVERT "A" AND CULVERT "B" ARE NOT INCLUDED ON THIS SHEET - SEE CULVERT SHEETS.

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- LOT LINES
- LOC — LIMITS OF CONSTRUCTION
- SILT FENCE

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

US 183

TEMPORARY/PERMANENT EROSION & SEDIMENTATION CONTROL PLAN

SCALE: 1" : 100' SHEET 1 OF 1

PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		138

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

L:\JOB\Brookfield - Easton\BRP15002-04 - Hwy 183 at WCD\CAD\Sheets\BRP15002-01_Erosion Control

SITE DESCRIPTION

PROJECT LIMITS: FROM 0.231 MI. SOUTH OF COLTON BLUF SPRINGS RD TO US 183, TRAVIS COUNTY, TEXAS

PROJECT DESCRIPTION: FOR THE CONSTRUCTION OF THE ROAD RE-ALIGNMENT, LEFT TURN LANE, RIGHT TURN LANE AND SHOULDERS CONSISTING OF GRADING, LIME TREATED SUBGRADE, FLEX BASE, ASPHALT, MBGF, SIGNING, PAVEMENT MARKINGS AND CULVERTS.

MAJOR SOIL DISTURBING ACTIVITIES: SOIL DISTRUBING ACTIVITIES WILL INCLUDE ROW PREPARATION, DITCH GRADING, ROADWAY EXCAVATION, EMBANKMENT, SUBGRADE PREPARATION, PLACEMENT OF FLEXBASE, AND ADDITION OF TOPSOIL.

TOTAL PROJECT AREA: 5.43 ACRES

TOTAL AREA TO BE DISTURBED: 5.43 ACRES

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): 0.39 = 100 YR. 0.25 = 5 YR.

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: ACCORDING TO TRAVIS COUNTY SOIL SURVEY, THE EXISTING SOIL COMPLEX IN THE PROJECT AREA IS HOUSTON BLACK CLAY, 1 TO 3 PERCENT SLOPES. THE HOUSTON BLACK SERIES ARE SUMMARIZED AS DEEP, MODERATELY WELL DRAINED, GENTLY SLOPING. APPROXIMATELY 80% OF THE PROJECT AREA IS CURRENTLY COVERED WITH VEGETATION. THE MAJORITY OF THE VEGETATION IS NATIVE GRASSES.

NAME OF RECEIVING WATERS: NORTH FORK DRY CREEK WATERSHED.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [X] MULCHING
- [X] HYDROMULCH BLANKET
- [ ] BUFFER ZONES
- [ ] PRESERVATION OF NATURAL RESOURCES

OTHER: DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 21 DAYS.

STRUCTURAL PRACTICES:

- [X] SEDIMENT CONTROL FENCES (TEMPORARY)
- [ ] HAY BALES
- [X] ROCK FILTER DAMS (TEMPORARY)
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [X] ROCK BEDDING AT CONSTRUCTION EXIT (TEMPORARY)
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

NARRATIVE – SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

1. INSTALL SEDIMENT CONTROL FENCE AND ROCK BERMS.

2. GRADE DITCHES, INSTALL TOPSOIL, EXTEND CULVERTS, ADJUST DRIVEWAY CULVERTS, HYDROMULCH EXPOSED AREAS AFTER FINAL GRADING AND TOPSOIL IS INSTALLED

STORM WATER MANAGEMENT: EROSION CONTROL MEASURES FOR STORMWATER MANAGEMENT: IMMEDIATELY UPON COMMENCEMENT OF CONSTRUCTION, SILT FENCE WILL BE PLACED ON THE DOWN-GRADIENT SIDE OF THE ROADWAY AND ROCK FILTER DAMS WILL BE PLACED IN THE EXISTING ROADSIDE DITCH CHANNELS AND AT CULVERT OUTFALLS AS REQUIRED IN THE CONSTRUCTION PLANS. INITIAL CONSTRUCTION ACTIVITIES WILL CONSIST OF DITCH GRADING, ROADWAY EMBANKMENT CONSTRUCTION, CULVERT EXTENSION, AND DRIVEWAY CULVERT ADJUSTMENT FOR ROADWAY SECTIONS NO GREATER THAN WILL ALLOW FINAL GRADING AND TOPSOIL PLACEMENT TO BE COMPLETED THAT DAY. EACH DAY, ALL FINAL GRADED AND TOPSOIL PLACED SURFACES WILL BE LINED WITH CELLULOUS FIBER EROSION CONTROL MATTING AND APPROPRIATE SEEDING MATERIALS. AS NEWLY ALIGNED ROADSIDE DITCHES ARE CONSTRUCTED, ROCK FILTER DAMS WILL BE RELOCATED APPROPRIATELY TO THE NEWLY GRADED DITCH AND CULVERT LOCATIONS

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER. WHEN IT IS DETERMINED BY THE ENGINEER THAT REPAIRS ARE NEEDED, IT SHALL BE DONE AT THE EARLIEST DATE POSSIBLE BUT NO LATER THAN SEVEN CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT. THE AREAS ADJACENT TO CREEKS AND DRAINAGEWAYS SHALL HAVE PRIORITY FOLLOWED BY DEVICES PROTECTING CULVERTS.

INSPECTION: AN INSPECTION WILL BE PERFORMED BY A TxDOT INSPECTOR EACH WEEK ON THE SAME DESIGNATED DAY AS WELL AS AFTER A 0.5" OR GREATER RAINFALL EVENT. RAINFALL SHALL BE MEASURED USING A FREEZE PROOF GAUGE LOCATED ON THE PROJECT SITE. AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE BY THE ENGINEER FOLLOWING EACH INSPECTION WITH THE FINDINGS OF THE INSPECTION. THE CONTROLS SHALL BE REPAIRED OR REVISED BY THE CONTRACTOR BASED ON THE FINDINGS OF THE INSPECTION.

WASTE MATERIALS: ANY TRASH OR DEBRIS SHALL BE COLLECTED, SHREDDED AND HAULED TO A SANITARY LANDFILL OR SITE AS APPROVED BY THE ENGINEER. OTHER WASTE MATERIAL WHICH WILL PROVIDE A STABLE EMBANKMENT MAY BE UTILIZED IN THE ROADWAY EMBANKMENT OR SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER. OPEN BURNING WILL NOT BE PERMITTED.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE TxDOT SPILL COORDINATOR SHALL BE CONTACTED IMMEDIATELY AT 512-832-7067 AND TCEQ AT (512)339-2929 -- (8 TO 5 M THRU F) OR THE 24 HR SPILL RESPONSE HOTLINE 1-800-832-8224.
REPORTABLE QUANTITIES (RQ):
(RQ) FOR PETROLEUM/HYDROCARBON LIQUIDS: 25 GAL – ON LAND
(RQ) FOR PETROLEUM/HYDROCARBON LIQUIDS: "CREATING A SHEEN" – ON WATER

SANITARY WASTE: ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATIONS BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR AND IN ACCORDANCE WITH ALL LOCAL,STATE, AND FEDERAL REGULATIONS.

OFFSITE VEHICLE TRACKING:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] STABILIZED CONSTRUCTION ENTRANCE

OTHER: EXCESS DIRT ON THE ROAD SHALL BE BROOMED AS NEEDED OR AS DIRECTED.

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED. CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS, INCLUDING PLACEMENT OF SILT FENCE DOWNGRADIENT OF. STAGING AND VEHICLE MAINTENANCE AREAS.

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

TXDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			139

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	80, ETC	US 183, ETC

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1. AUSTIN DISTRICT (AUSTIN_NOI@TXDOT.GOV
2. ENVIRONMENTAL AFFAIRS DIVISION 125 EAST 11TH STREET AUSTIN, TX 78701 (ATTN.: AUSTIN DISTRICT)

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

☐ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☒ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1. North Fork Dry Creek (30.147342, -97.698694)
2.
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

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. Implement Terrestrial Reptile BMP's outlined under Item 7 of the General Notes.
2. Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between
3. September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to
4. TxDOT 30 business days prior to begin work. This work is subsidiary.

   If active nests are encountered on-site during construction, all construction activity within 50 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Notify the local FEMA Floodplain Administrator
2.
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

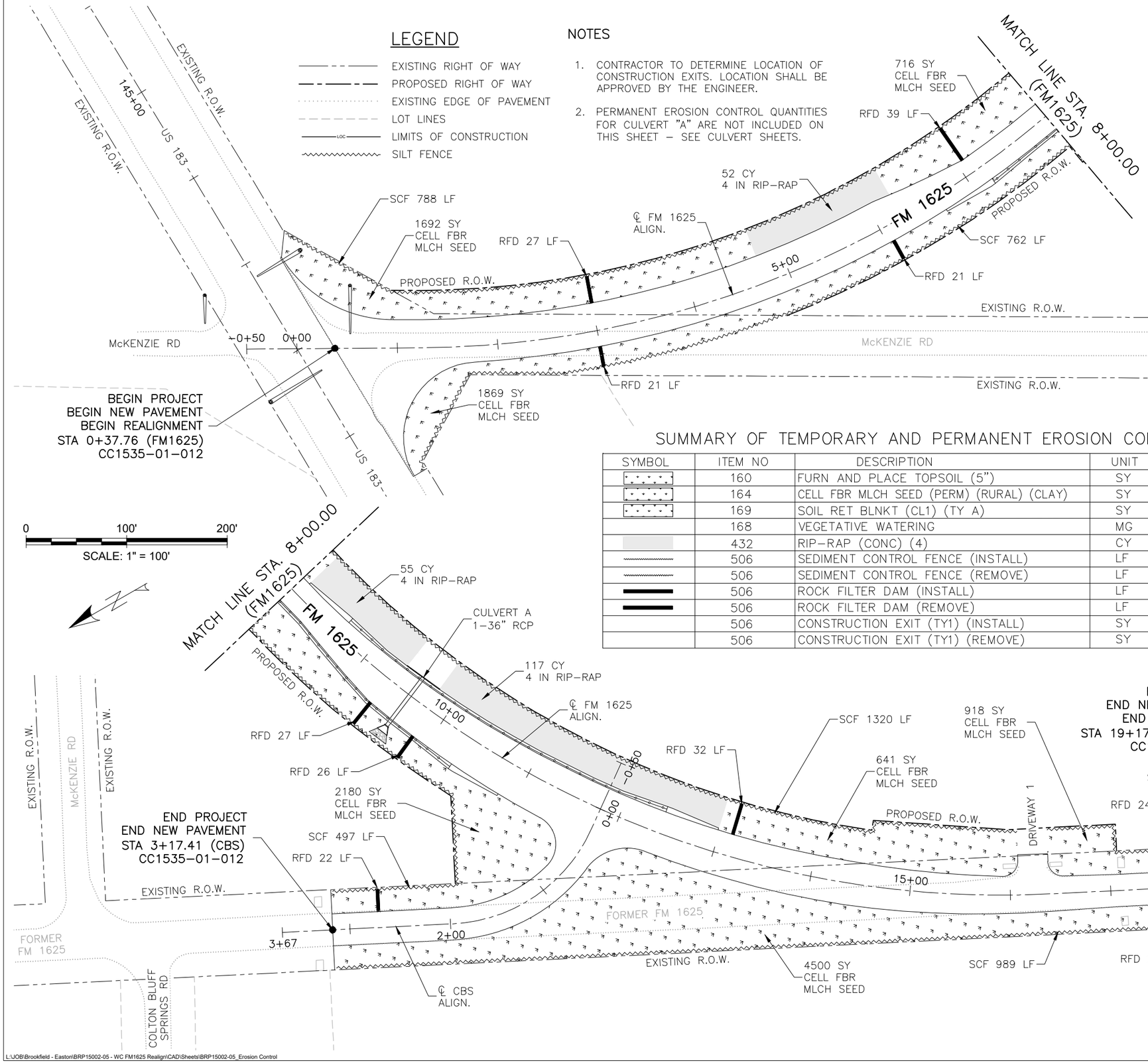
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0152	01	012	FM 1625
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		140

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- LOT LINES
- LIMITS OF CONSTRUCTION
- SILT FENCE

NOTES

1. CONTRACTOR TO DETERMINE LOCATION OF CONSTRUCTION EXITS. LOCATION SHALL BE APPROVED BY THE ENGINEER.
2. PERMANENT EROSION CONTROL QUANTITIES FOR CULVERT "A" ARE NOT INCLUDED ON THIS SHEET – SEE CULVERT SHEETS.



SUMMARY OF TEMPORARY AND PERMANENT EROSION CONTROL

SYMBOL	ITEM NO	DESCRIPTION	UNIT	QUANTITY
	160	FURN AND PLACE TOPSOIL (5")	SY	12,516
	164	CELL FBR MLCH SEED (PERM) (RURAL) (CLAY)	SY	12,516
	169	SOIL RET BLNKT (CL1) (TY A)	SY	12,516
	168	VEGETATIVE WATERING	MG	250
	432	RIP–RAP (CONC) (4)	CY	224
	506	SEDIMENT CONTROL FENCE (INSTALL)	LF	4,658
	506	SEDIMENT CONTROL FENCE (REMOVE)	LF	4,658
	506	ROCK FILTER DAM (INSTALL)	LF	263
	506	ROCK FILTER DAM (REMOVE)	LF	263
	506	CONSTRUCTION EXIT (TY1) (INSTALL)	SY	120
	506	CONSTRUCTION EXIT (TY1) (REMOVE)	SY	120

STATE OF TEXAS
CEZARY SAXON
119794
LICENSED
PROFESSIONAL ENGINEER

10/14/2020

FM 1625

TEMPORARY/PERMANENT EROSION & SEDIMENTATION CONTROL

SCALE: 1" : 100' SHEET 1 OF 1

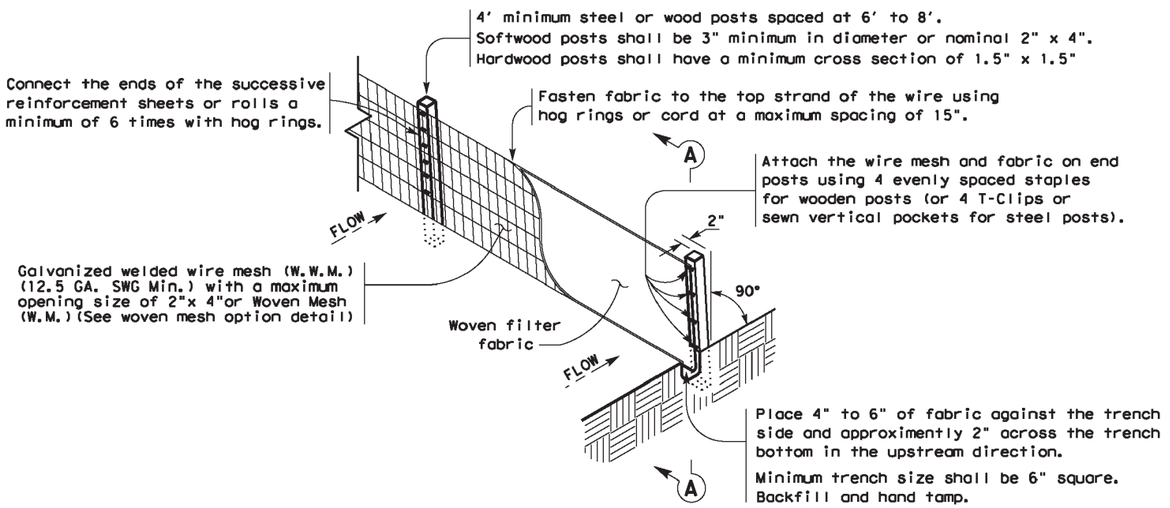
PELOTON LAND SOLUTIONS
TEXAS REGISTRATION ENGINEERING FIRM NO 12207
7004 BEE CAVE ROAD, BUILDING 2, SUITE 100, AUSTIN, TEXAS 78746 - (512) 831-7700

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			141

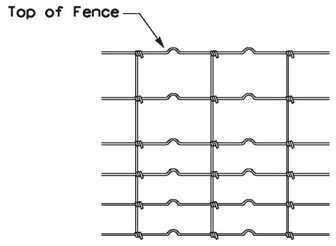
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080,ETC.	US 183, ETC.

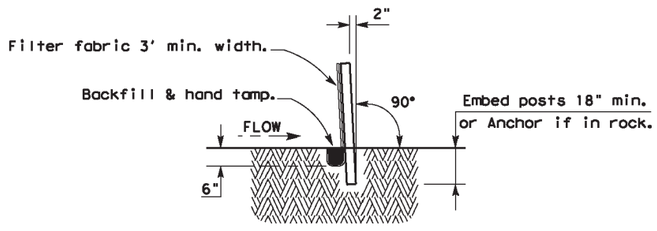
L:\JOB\Brookfield - Easton\BRP15002-05 - WC FM1625 Realign\CAD\Sheets\BRP15002-05_Erosion Control



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.

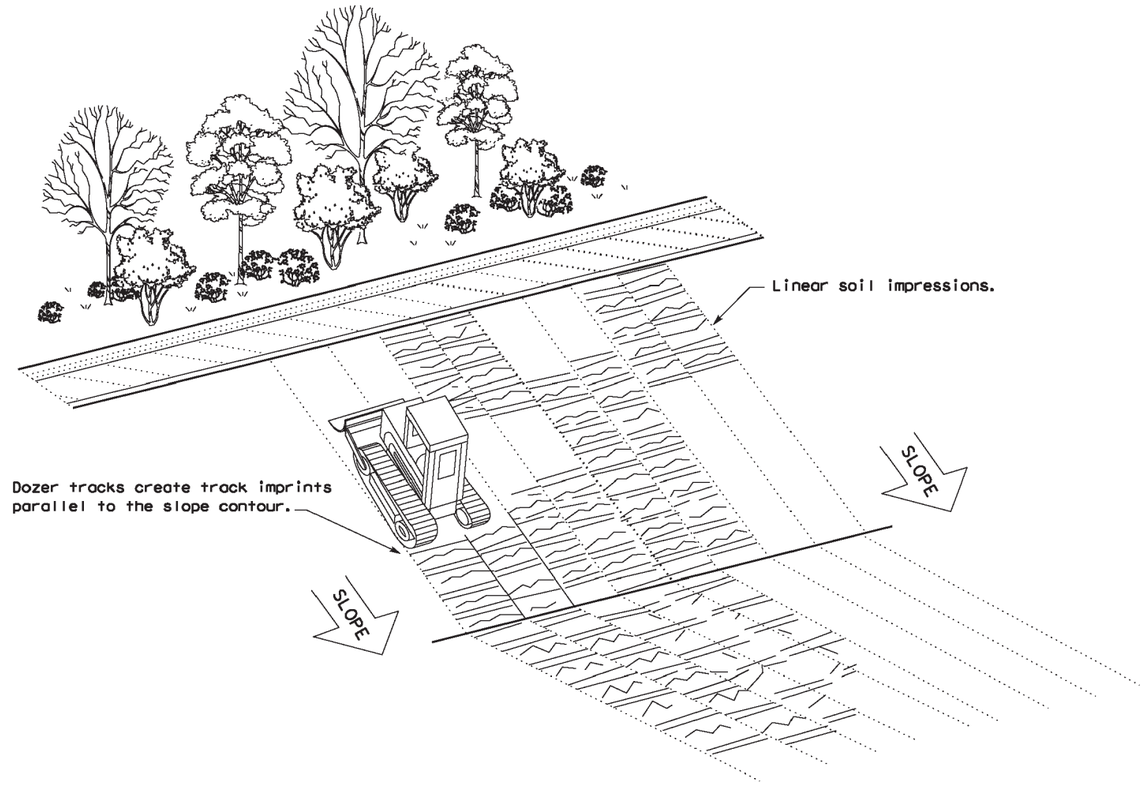
LEGEND

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

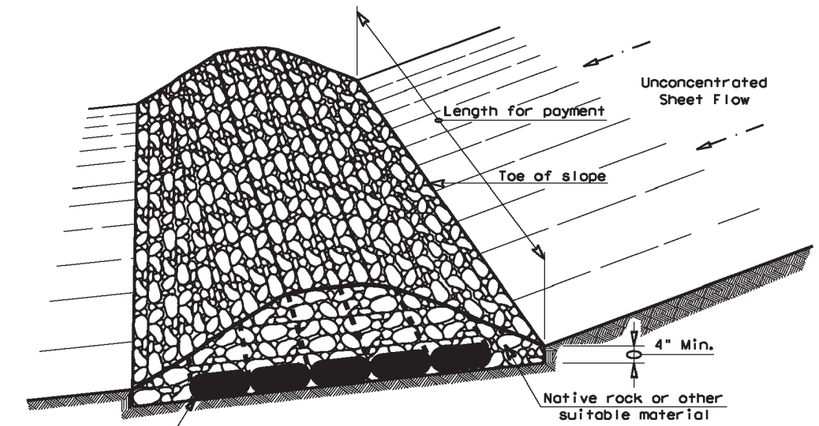
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0152	01	080, ETC.		US 183, ETC.	
	DIST	COUNTY			SHEET NO.	
	14	TRAVIS			142	

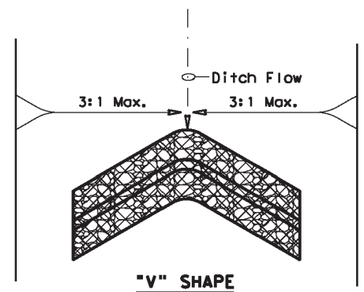
DATE
FILE

DATE:
FILE:

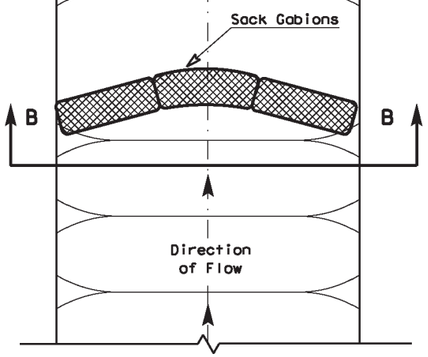


FILTER DAM AT TOE OF SLOPE

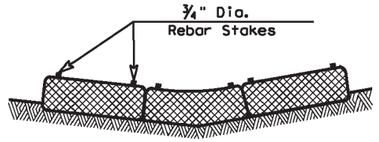
RFD1



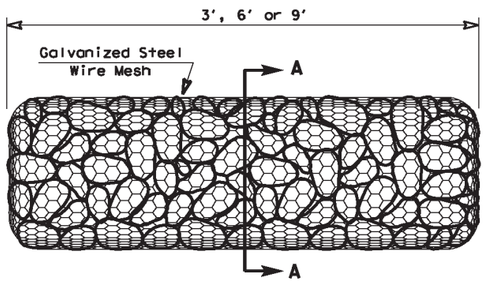
"V" SHAPE PLAN VIEW



PLAN VIEW

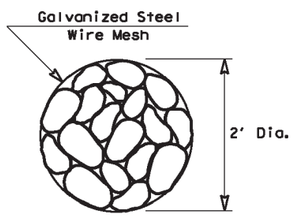


SECTION B-B

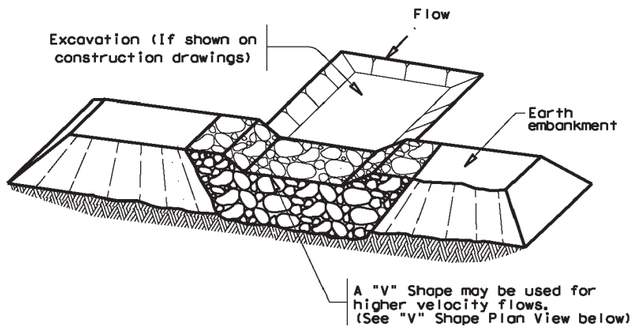


TYPE 4 (SACK GABIONS)

RFD4

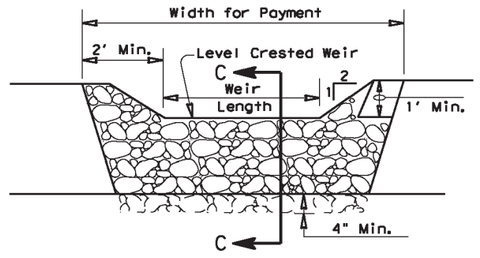


SECTION A-A

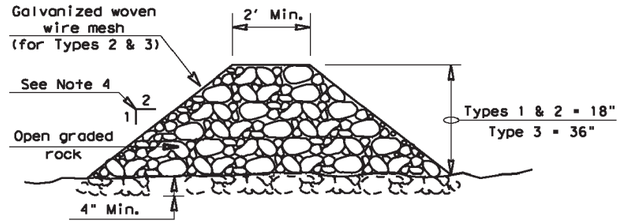


FILTER DAM AT SEDIMENT TRAP

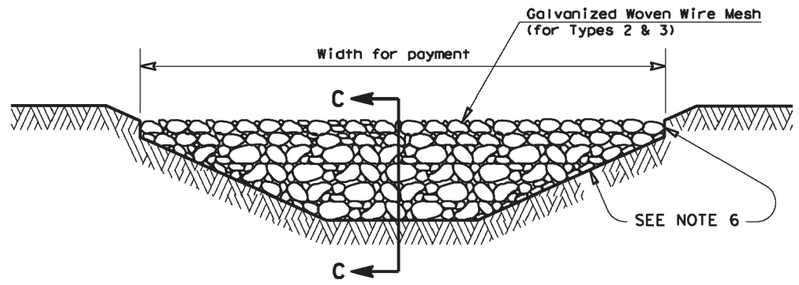
RFD1 — OR — RFD2



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

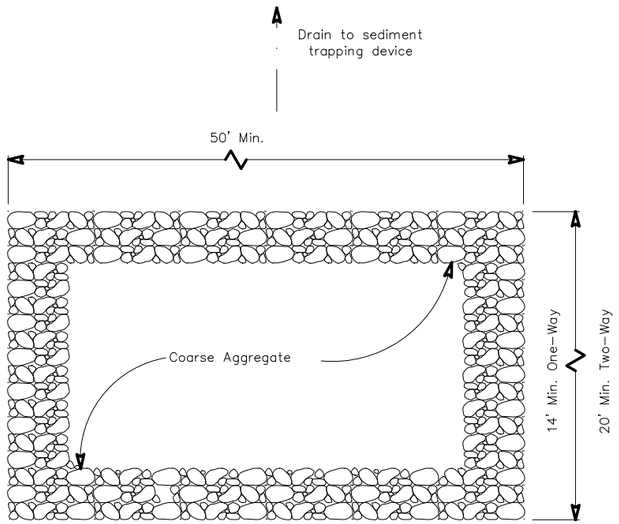
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

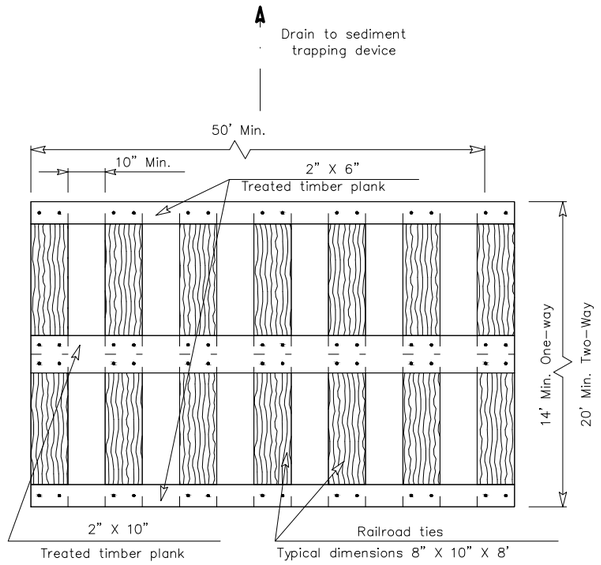
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0152	01	080, ETC.	US 183, ETC.	
	DIST	COUNTY		SHEET NO.	
	14	TRAVIS		143	

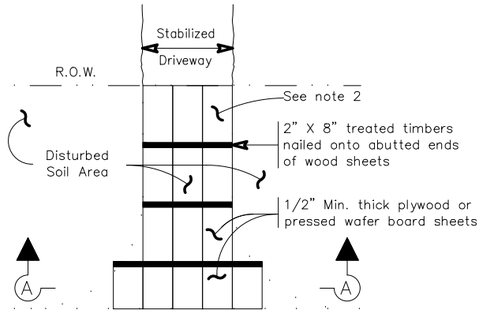
DATE:
FILE:



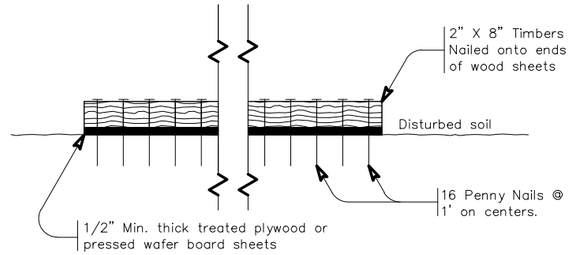
PLAN VIEW



PLAN VIEW



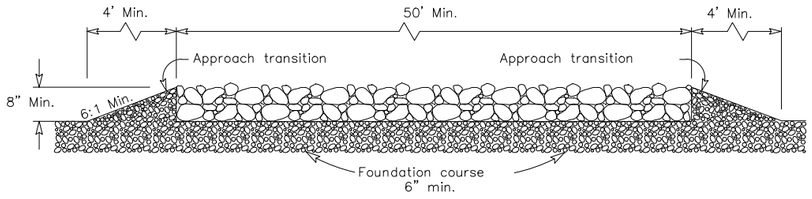
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



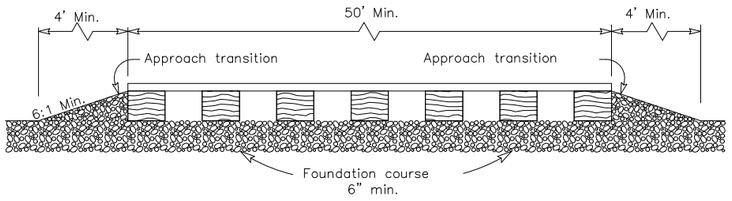
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

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

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

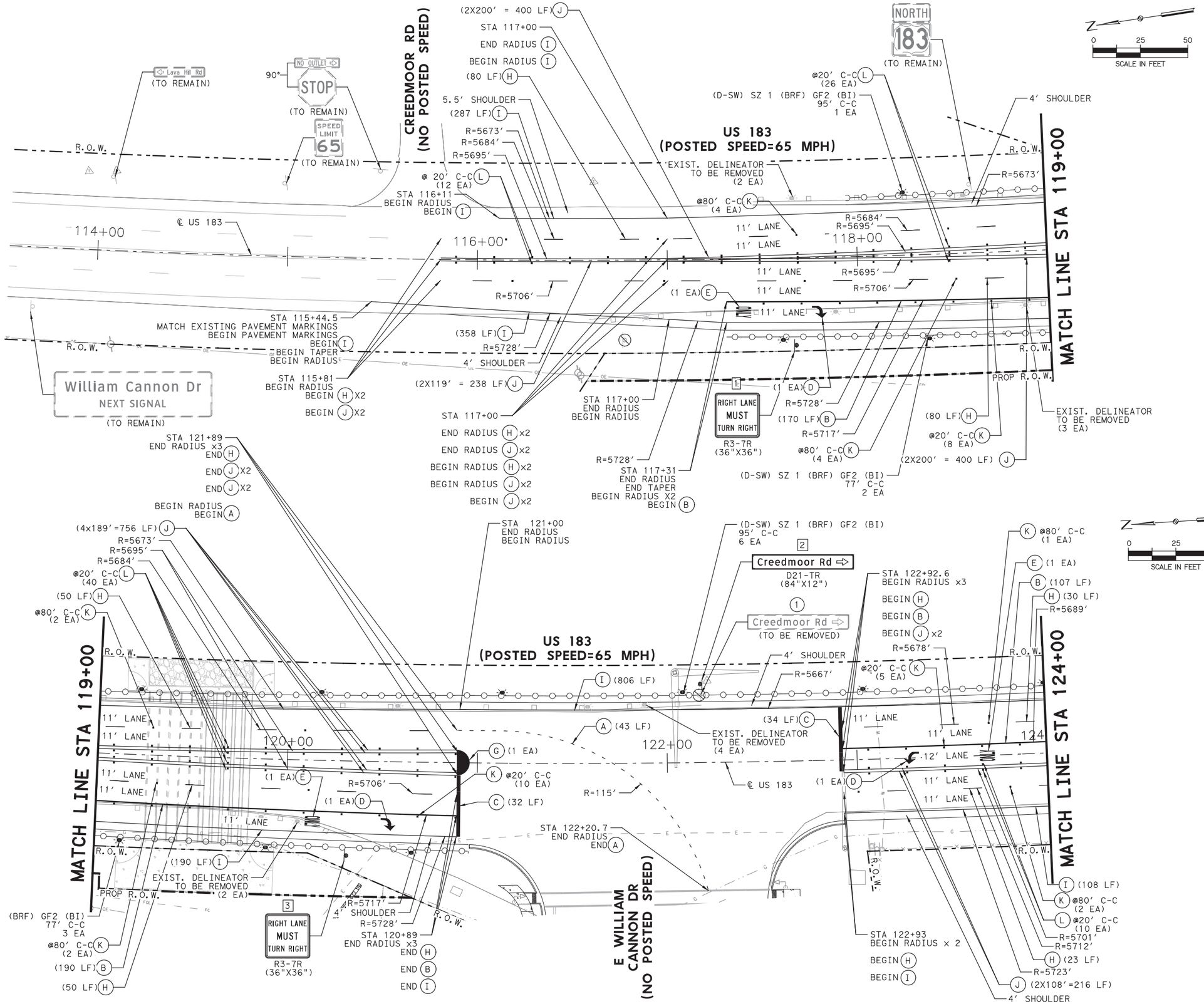
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		144



LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

PAVEMENT MARKINGS AND SIGNING

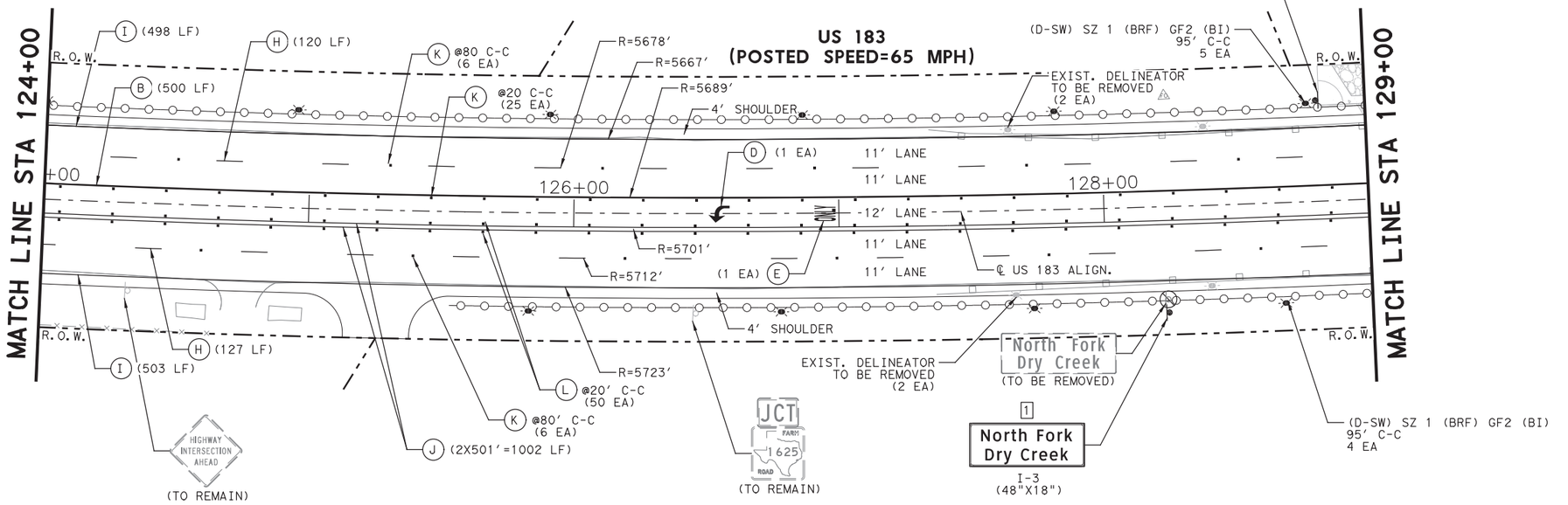
(STA 114+00 TO STA 124+00)

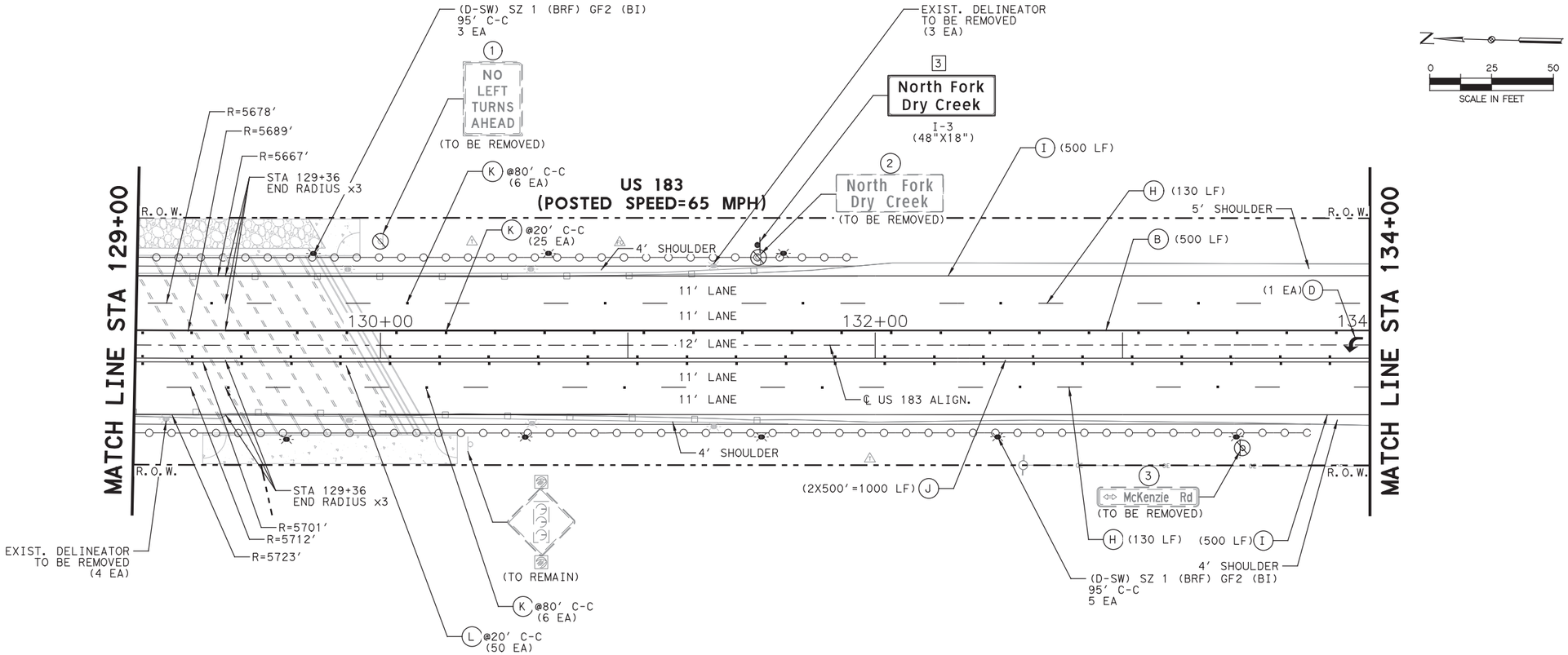
SHEET 1 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			145
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.





LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

PAVEMENT MARKINGS AND SIGNING

(STA 124+00 TO STA 134+00

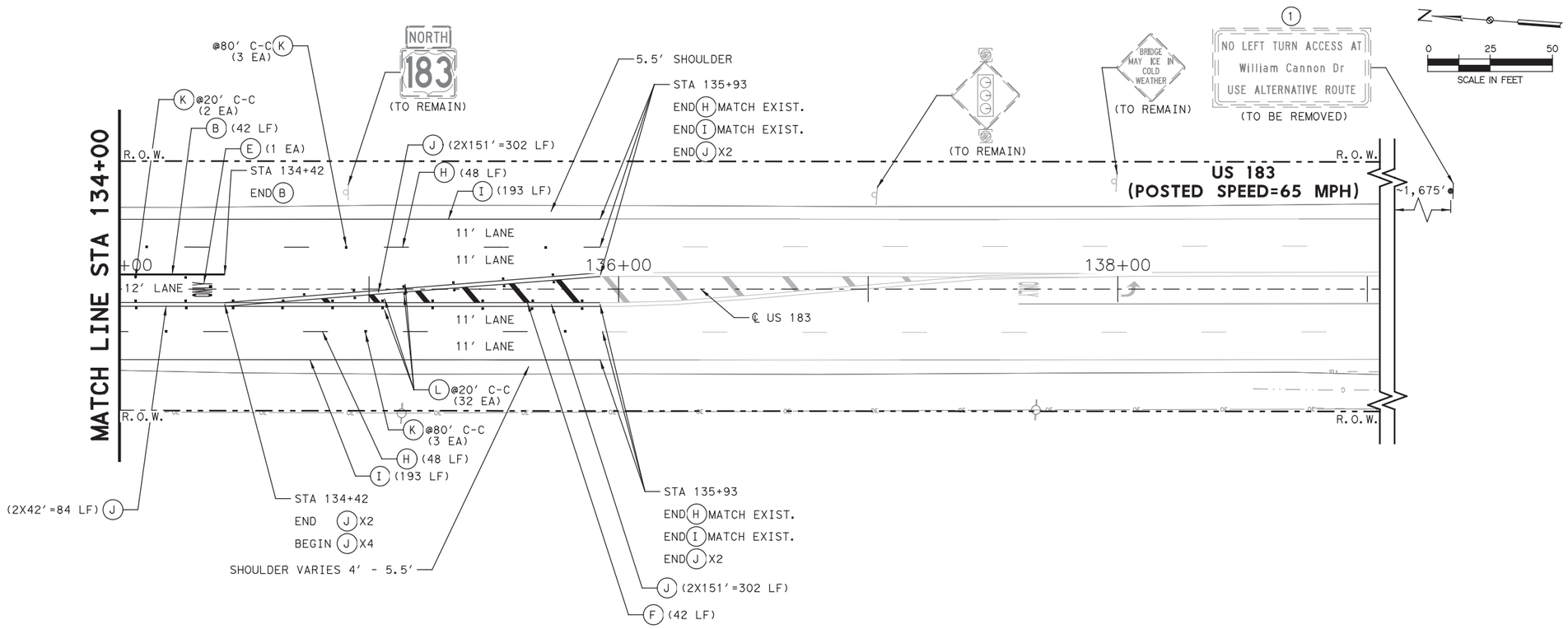
SHEET 2 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			146

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- (N) EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

01/22/2020

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183

PAVEMENT MARKINGS AND SIGNING

(STA 134+00 TO STA 144+00)

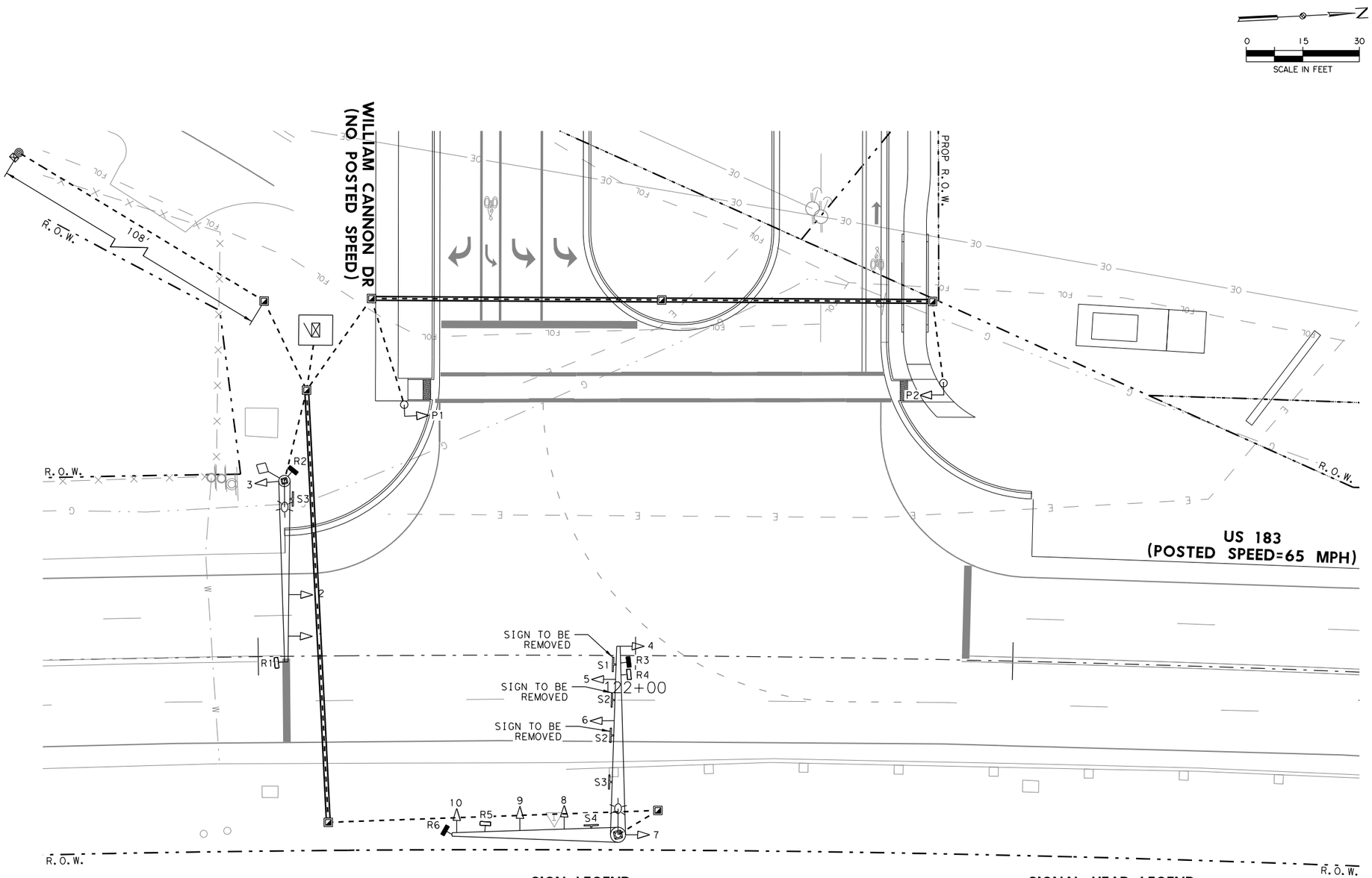
SHEET 3 OF 3

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		147

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

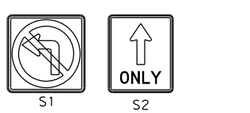


0 15 30
SCALE IN FEET

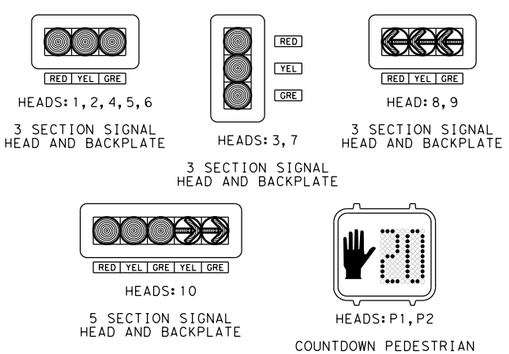
LEGEND

- EXIST. SIGNAL POLE AND MAST ARM
- EXIST. PEDESTAL POLE
- EXIST. SIGNAL HEAD
- EXIST. PEDESTRIAN SIGNAL HEAD
- EXIST. RADAR (PRESENCE)
- EXIST. RADAR (ADVANCE)
- EXIST. SIGN ON MAST ARM
- EXIST. LUMINAIRE
- EXIST. BROADBAND ANTENNA
- EXIST. GROUND BOX
- EXIST. CONDUIT(TRENCH)
- EXIST. CONDUIT(BORED)
- EXIST. CONTROLLER W/ BBU
- EXIST. SERVICE METER
- EXIST. SIGNAL POLE
- EXIST. GAS MARKER
- EXIST. GUY
- EXIST. MAIL BOX
- EXIST. TELEPHONE MARKER
- EXIST. UTILITY POLE
- EXIST. UTILITY BOX
- EXIST. WATER METER
- EXIST. FENCE
- EXIST. GUARDRAIL
- EXIST. ELECTRICAL LINE
- EXIST. FIBER OPTIC LINE
- EXIST. GAS LINE
- EXIST. WATER LINE
- EXIST. OVERHEAD ELECTRIC
- EXIST. RIGHT OF WAY

SIGN LEGEND



SIGNAL HEAD LEGEND



NOTES

1. EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. EXISTING SIGNAL SHALL BE FUNCTIONAL AT ALL TIMES DURING MODIFICATION OF SIGNAL.
3. THIS PLAN ASSUMES SIGNAL AT WILLIAM CANNON DR AND US 183 WAS INSTALLED PER WILLIAM CANNON DR PHASE 2 PLAN SET (PROJECT BRP15002-03). REFER TO WILLIAM CANNON DR PHASE 2 PLAN SET FOR DESIGN DETAILS.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

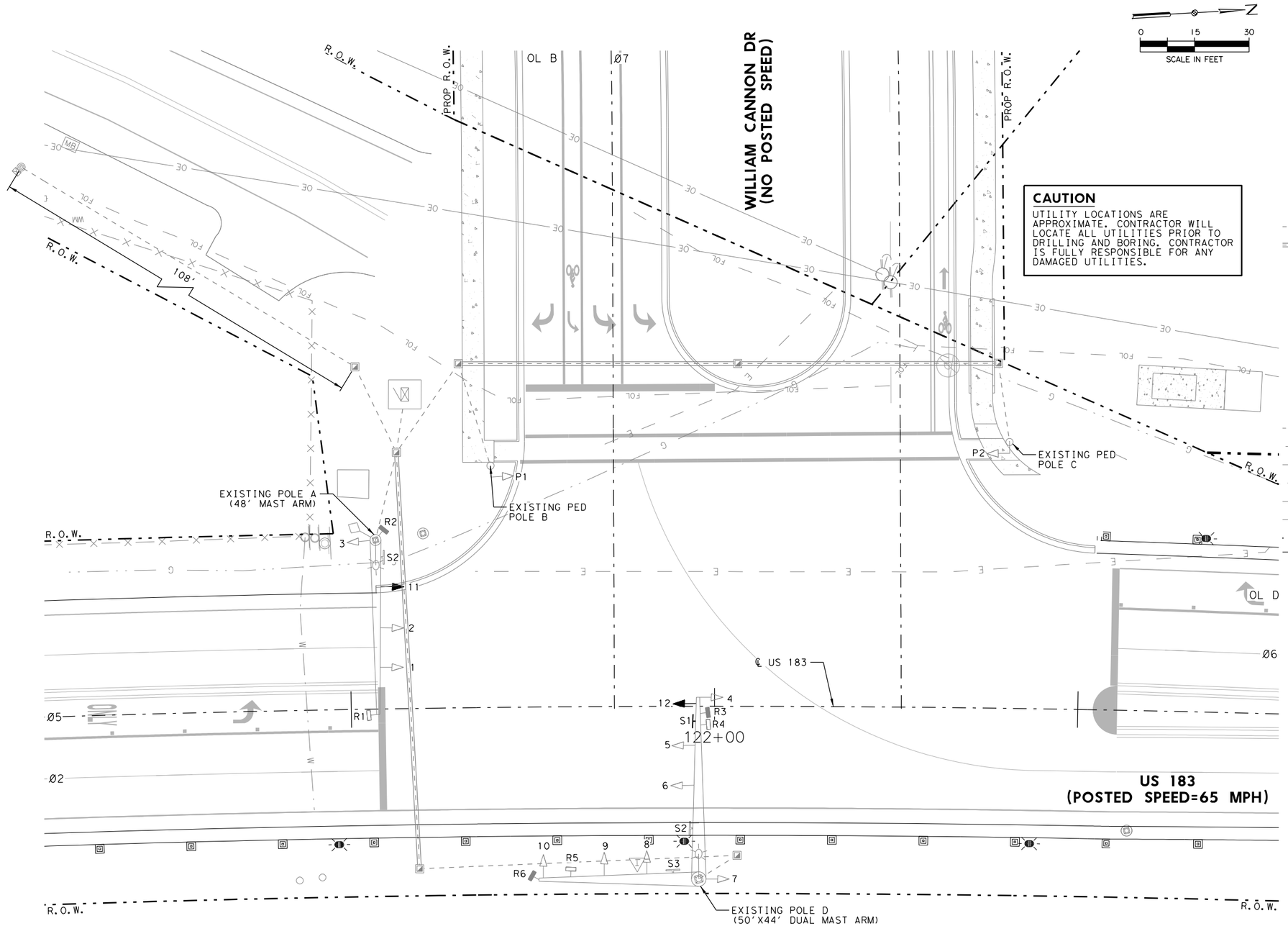
EXISTING SIGNAL LAYOUT

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			148

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



CAUTION

UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR WILL LOCATE ALL UTILITIES PRIOR TO DRILLING AND BORING. CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGED UTILITIES.

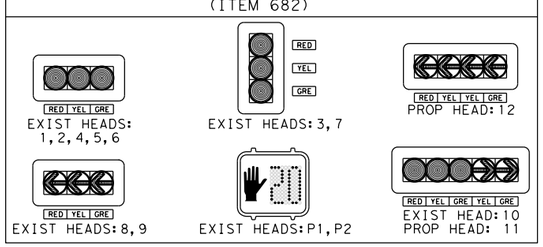
LEGEND

- PROP. SIGNAL HEAD
- PROP. SIGN ON MAST ARM
- EXIST. SIGNAL POLE AND MAST ARM
- EXIST. PEDESTAL POLE
- EXIST. SIGNAL HEAD
- EXIST. PEDESTRIAN SIGNAL HEAD
- EXIST. RADAR (PRESENCE)
- EXIST. RADAR (ADVANCE)
- EXIST. SIGN ON MAST ARM
- EXIST. LUMINAIRE
- EXIST. BROADBAND ANTENNA
- EXIST. GROUND BOX
- EXIST. CONDUIT(TRENCHED)
- EXIST. CONDUIT(BORED)
- EXIST. CONTROLLER W/ BBU
- EXIST. GAS MARKER
- EXIST. GUY
- EXIST. MAIL BOX
- EXIST. TELEPHONE MARKER
- EXIST. UTILITY POLE
- EXIST. UTILITY BOX
- EXIST. WATER METER
- EXIST. FENCE
- EXIST. ELECTRICAL LINE
- EXIST. FIBER OPTIC LINE
- EXIST. GAS LINE
- EXIST. WATER LINE
- EXIST. OVERHEAD ELECTRIC
- EXIST. RIGHT OF WAY
- PROP. GUARDRAIL

NOTES

1. EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. NOTIFY THE DISTRICT SIGNAL MAINTENANCE OFFICE (ROBERT GUYDOSH AT (512) 832-7012), AND AREA OFFICE ONE WEEK BEFORE BEGINNING ANY WORK INVOLVING TRAFFIC SIGNALS.
3. ALL CONSTRUCTION SIGNS AND BARRICADES MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND BE CONSISTENT WITH TXDOT BARRICADE, CONSTRUCTION, AND TRAFFIC CONTROL PLAN STANDARDS.
4. THIS PLAN ASSUMES SIGNAL AT WILLIAM CANNON DR AND US 183 WAS INSTALLED PER WILLIAM CANNON DR PHASE 2 PLAN SET (PROJECT BRP15002-03). REFER TO THE WILLIAM CANNON DR PHASE 2 PLAN SET FOR DESIGN DETAILS.

PROPOSED SIGNAL HEADS
(ITEM 682)



03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

PROPOSED SIGNAL LAYOUT

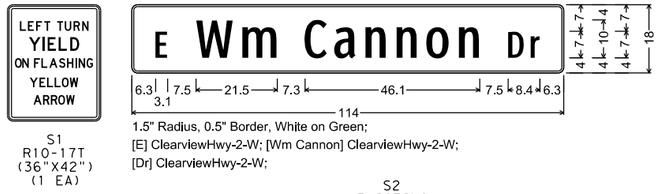
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		149

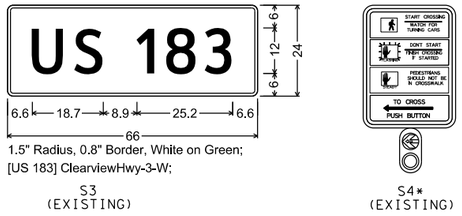
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

SIGN LEGEND



S1
R10-17T
(36"X42")
(1 EA)

S2
(EXISTING)

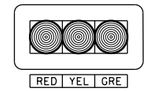


S3
(EXISTING)

S4*
(EXISTING)

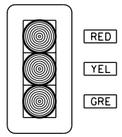
(* SHOWN ON ELEVATION SHEETS ONLY)

SIGNAL HEAD LEGEND



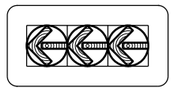
EXIST HEADS: 1, 2, 4, 5, 6

3 SECTION SIGNAL
HEAD AND BACKPLATE



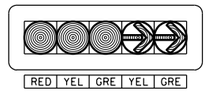
EXIST HEADS: 3, 7

3 SECTION SIGNAL
HEAD AND BACKPLATE



EXIST HEADS: 8, 9

3 SECTION SIGNAL
HEAD AND BACKPLATE

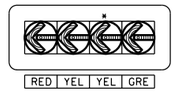


EXIST HEAD: 10
PROP HEAD: 11

5 SECTION SIGNAL
HEAD AND BACKPLATE

EXIST HEADS: P1, P2

COUNTDOWN PEDESTRIAN
SIGNAL HEADS

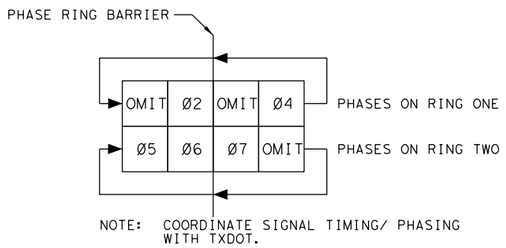


PROP HEAD: 12

4 SECTION SIGNAL
HEAD AND BACKPLATE

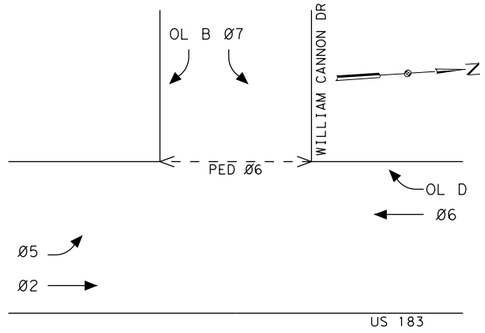
* FLASHING YELLOW ARROW

PHASE RING DIAGRAM



NOTE: COORDINATE SIGNAL TIMING/ PHASING
WITH TXDOT.

PHASING DIAGRAM



LS 11 - OL O = Ø6(FYA)
LS 13 - OL A = Ø2 (HEAD 3)
LS 14 - OL B = Ø4 + Ø5
LS 15 - OL C = Ø6(HEAD 4 AND 7)
LS 16 - OL D = Ø6 + Ø7

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

SIGNING AND PHASING

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			150

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

CONDUIT AND CONDUCTOR SCHEDULE

SIGNAL CABLE IN PLACE. SEE WILLIAM CANNON PHASE 2 PLANS FOR CONDUIT AND CONDUCTOR SCHEDULE.

POLE DETAILS & WIRING INSIDE POLE AND ARMS

SIGNAL CABLE IN PLACE. SEE WILLIAM CANNON PHASE 2 PLANS POLE DETAILS AND WIRING INSIDE POLE AND ARMS.

INSIDE CABINET CHART

SIGNAL CABLE IN PLACE. SEE WILLIAM CANNON PHASE 2 PLANS FOR INSIDE CABINET CHART.

CABLE TERMINATION CHART

CONDUCTOR CABLE	CABLE (E) POLE A 5/C 14 AWG	CABLE 2(E) POLE A 7/C 14 AWG	CABLE 3(E) POLE A 5/C 14 AWG	CABLE 4(E) POLE B 5/C 14 AWG	CABLE 5(E) POLE C 5/C 14 AWG	CABLE 6(E)* POLE D 7/C 14 AWG	CABLE 7(E) POLE D 5/C 14 AWG	CABLE 8(E) POLE D 5/C 14 AWG	CABLE 9(E) POLE D 5/C 14 AWG	CABLE 10(E) POLE D 7/C 14 AWG	CABLE 11(E) POLE D 7/C 14 AWG
BLACK	SH 1,2 Y PH 6	SH 11 Y PH 4	SH 3 Y OL A	PED P1 DNW PED PH 6	PED P2 DNW PED PH 6	SH 12 Y ARW PH 5	SH 5,6 Y PH 2	SH 4 Y OL C	SH 7 Y OL C	SH 8,9 Y ARW PH 7	SH 10 Y PH 4
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1,2 R PH 6	SH 11 R PH 4	SH 3 R OL A	SPARE	SPARE	SH 12 R ARW PH 5	SH 5,6 R PH 2	SH 4 R OL C	SH 7 R OL C	SH 8,9 R ARW PH 7	SH 10 R PH 4
GREEN	SH 1,2 G PH 6	SH 11 G PH 4	SH 3 G OL A	SPARE	SPARE	SH 12 G ARW PH 5	SH 5,6 G PH 2	SH 4 G OL C	SH 7 G OL C	SH 8,9 G ARW PH 7	SH 10 G PH 4
ORANGE	SPARE	SH 11 Y ARW OL D	SPARE	PED P1 W PED PH 6	PED P2 W PED PH 6	SH 12 FY ARW OL O	SPARE	SPARE	SPARE	SPARE	SH 10 Y ARW OL B
BLUE		SH 11 G ARW OL D				SPARE				SPARE	SH 10 G ARW OL B
WHITE/BLACK		SPARE				SPARE				SPARE	SPARE

NOTE
* EXISTING SPARE CABLE. SEE WILLIAM CANNON CANNON PHASE 2 PLANS.
(E) - EXISTING CABLE INSTALLED DURING WILLIAM CANNON PHASE 2 PROJECT.
1. SH 3 = OL A = LS 13
2. SH 4 & 7 = OL C = LS 15

CABLE TERMINATION CHART

PROTECTED TURN CHANNELS (R ARW, Y ARW, G ARW)	OPPOSING THROUGH CHANNEL	PERMISSIVE TURN CHANNEL (FYA)	FLASHING ARROW SIGNAL DRIVER SOURCE
5	6	11 YELLOW(PED 6)	11 YELLOW(PED 6)

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

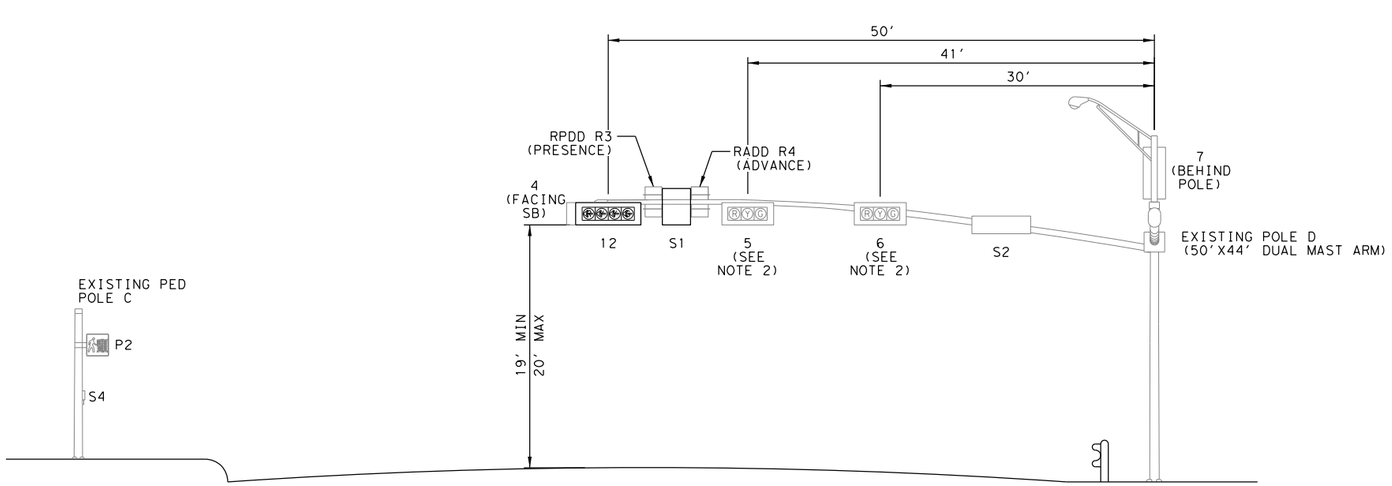
CONDUIT AND CONDUCTOR SCHEDULES

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

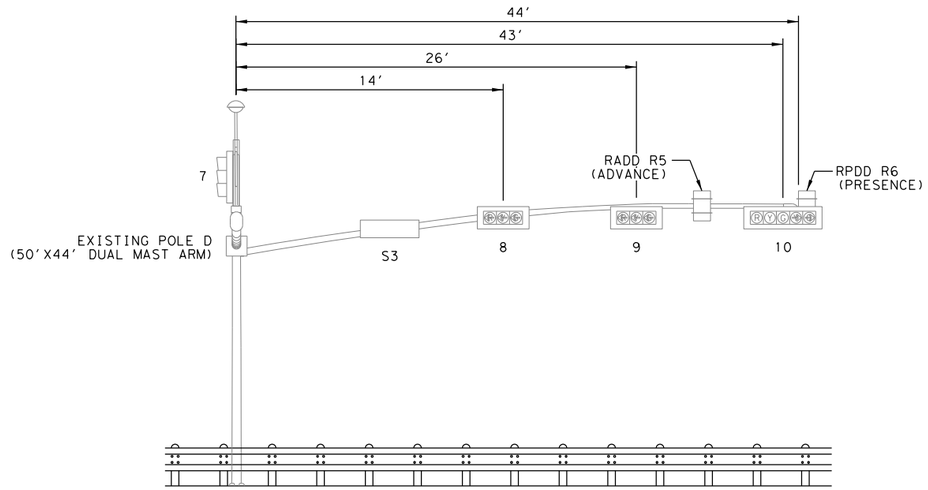
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		151

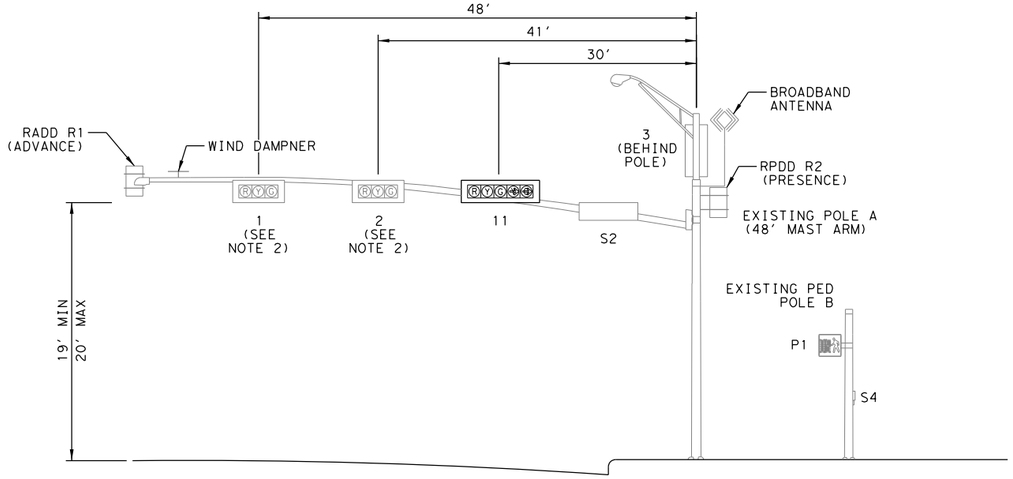
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LOOKING NORTH ON US 183 AT WILLIAM CANNON DR



LOOKING EAST ON WILLIAM CANNON DR AT US 183



LOOKING SOUTH ON US 183 AT WILLIAM CANNON DR

NOTES:

1. CENTER HEADS OVER THE LANES, OR AS DIRECTED BY THE ENGINEER. DISTANCES SHOWN ALONG MAST ARMS ARE APPROXIMATE AND MUST BE ADJUSTED IN THE FIELD IN ORDER TO MEET CLEARANCE.
2. SHIFT SIGNAL HEADS 1, 2, 5, AND 6 TO BE CENTERED ON NEW LANE CONFIGURATION.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

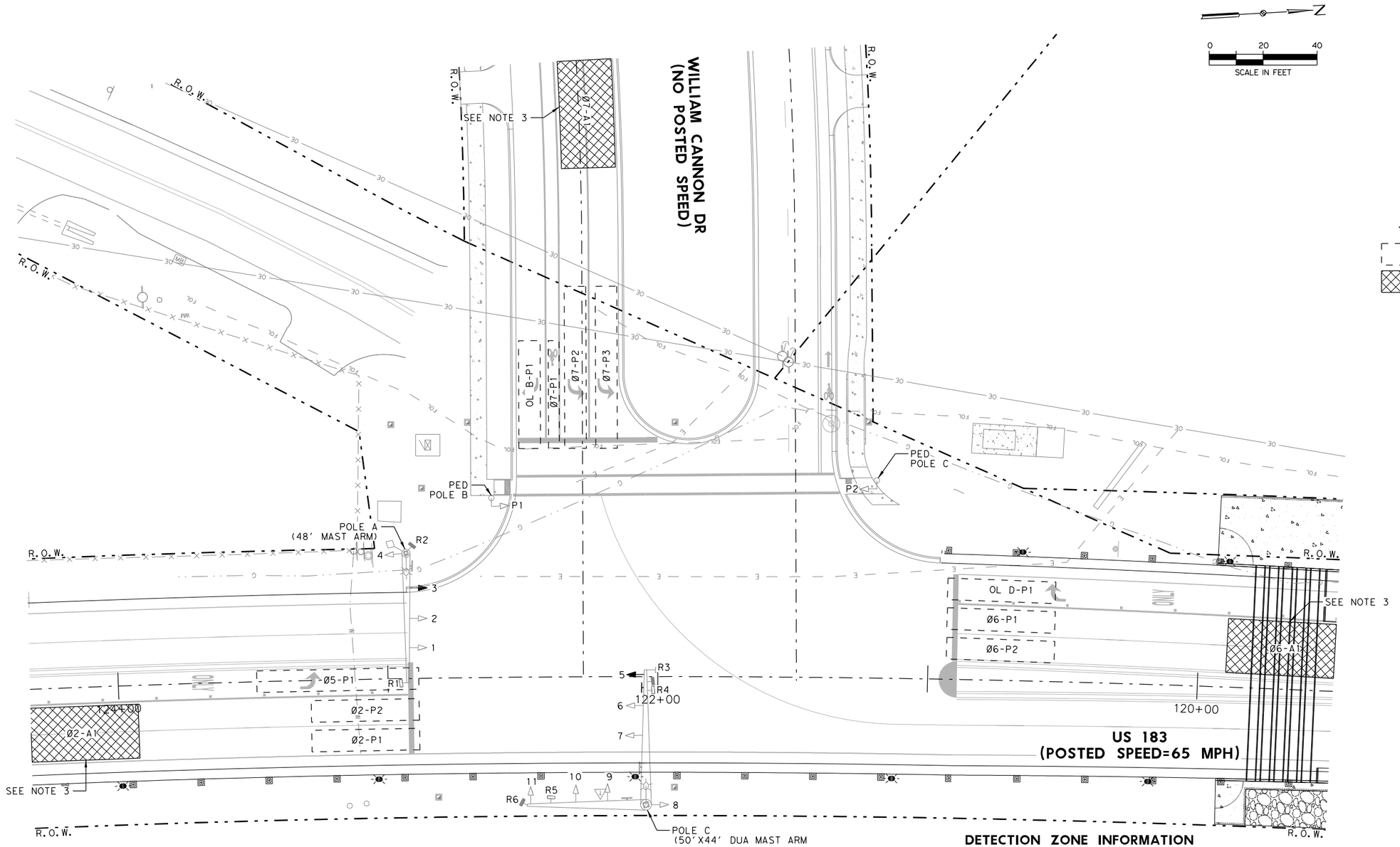
ELEVATIONS

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			152

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- PROP. SIGNAL HEAD
- PROP. SIGN ON MAST ARM
- EXIST. SIGNAL POLE AND MAST ARM
- EXIST. PEDESTAL POLE
- EXIST. SIGNAL HEAD
- EXIST. PEDESTRIAN SIGNAL HEAD
- EXIST. RADAR (PRESENCE)
- EXIST. RADAR (ADVANCE)
- EXIST. SIGN ON MAST ARM
- EXIST. LUMINAIRE
- EXIST. BROADBAND ANTENNA
- EXIST. CONTROLLER W/ BBU
- EXIST. RIGHT OF WAY
- PROP. PRESENCE DETECTION ZONE
- PROP. ADVANCE DETECTION ZONE

DETECTION ZONE INFORMATION

ZONE	UNIT	SIZE
Ø2-A1	R1	20'X300'
OL B-P1	R2	8'X40'
Ø7-P1	R2	4'X40'
Ø7-P2	R2	8'X60'
Ø7-P3	R2	8'X60'
OL D-P1	R3	8'X40'
Ø6-P1	R3	8'X40'
Ø6-P2	R3	8'X40'
Ø6-A1	R4	20'X300'
Ø7-A1	R5	20'X300'
Ø2-P1	R6	8'X40'
Ø2-P2	R6	8'X40'
Ø5-P1	R6	8'X60'

NOTES

1. PRESENCE DETECTION TO BE ACCOMPLISHED BY RADAR UNIT AS SHOWN.
2. ADVANCE DETECTION TO BE ACCOMPLISHED BY RADAR UNIT AS SHOWN.
3. ADVANCE DETECTION ZONE BEGINS 100 FEET FROM STOP BAR AND EXTENDS TO 400 FEET TO PROVIDE 300 FOOT LONG DETECTION ZONE.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 & WILLIAM CANNON DR

VEHICLE DETECTION DETAIL

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

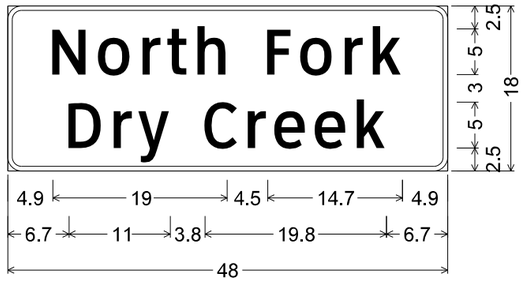
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			153

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

2 SHEET 1 OF 3

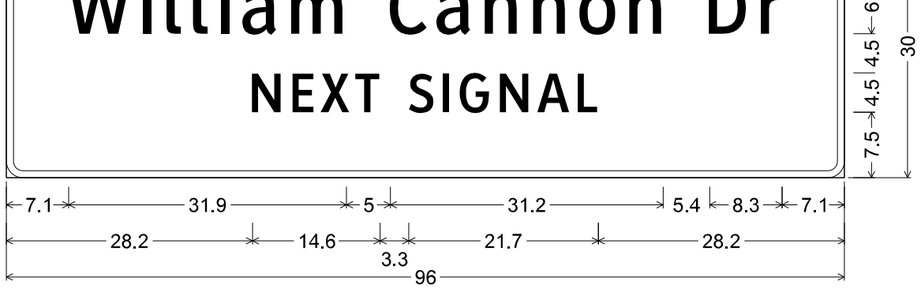
1.5" Radius, 0.5" Border, White on, Green;
"Creedmoor Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.4" X 5.4" 0°;

1 SHEET 2 OF 3
3 SHEET 2 OF 3



1.5" Radius, 0.5" Border, White on, Green;
"North Fork", ClearviewHwy-3-W;
"Dry Creek", ClearviewHwy-3-W;

2 SHEET 2 OF 3



1.9" Radius, 0.8" Border, White on, Green;
"William Cannon Dr", ClearviewHwy-3-W; "NEXT SIGNAL", ClearviewHwy-3-W;

03/25/2021

US 183

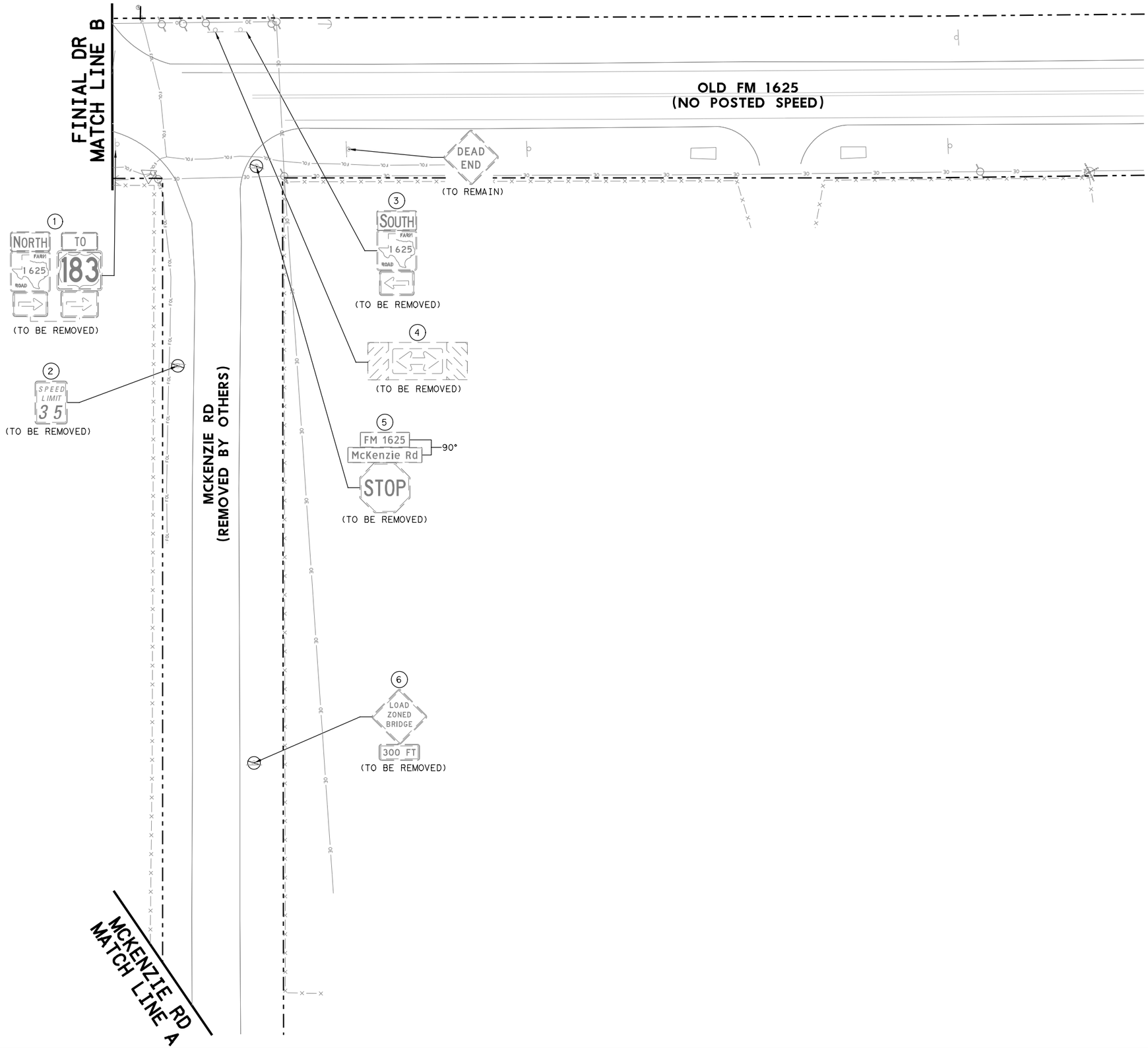
SIGNING DETAILS

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			154

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

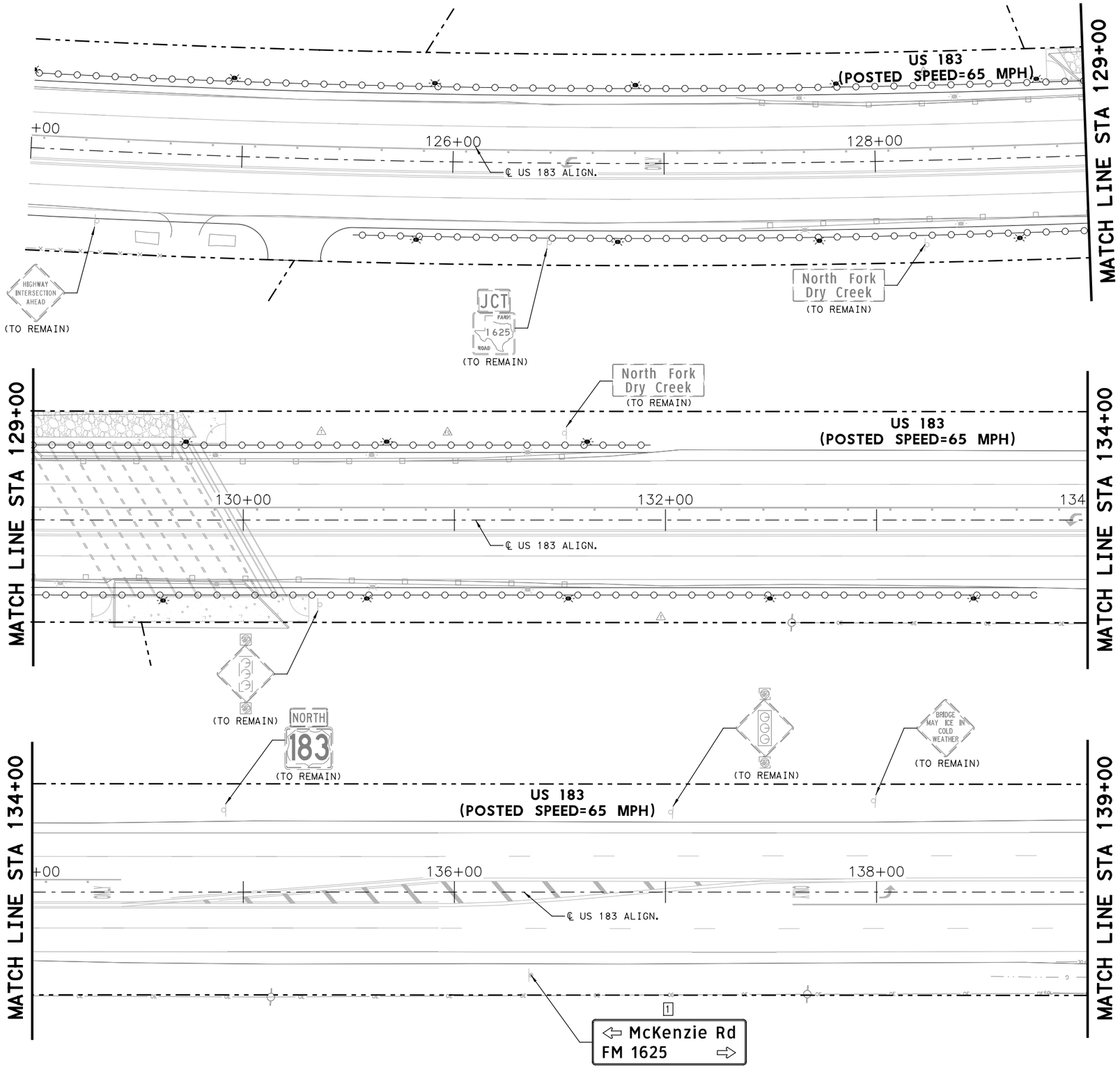
SIGNING REMOVALS
(MCKENZIE RD AND FM 1625)

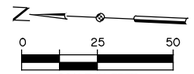
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

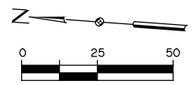
Texas Department of Transportation

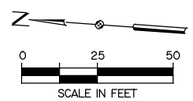
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			155

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.









LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Jessie D Pollack

FM 1625

PAVEMENT MARKINGS AND SIGNING

(STA 129+00 TO STA 139+00)

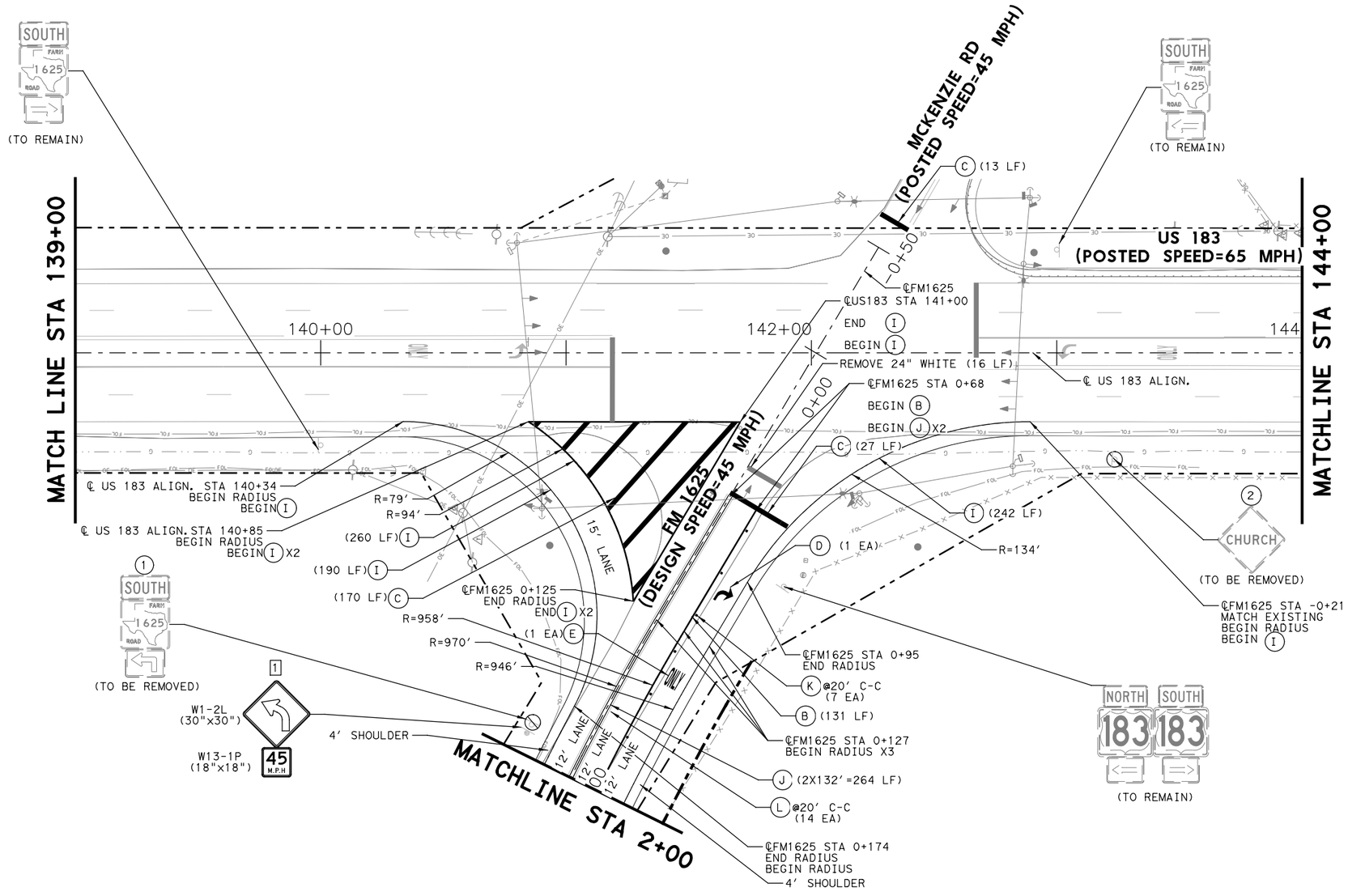
SHEET 1 OF 5

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			156

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



0 25 50
SCALE IN FEET

LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

PAVEMENT MARKINGS AND SIGNING

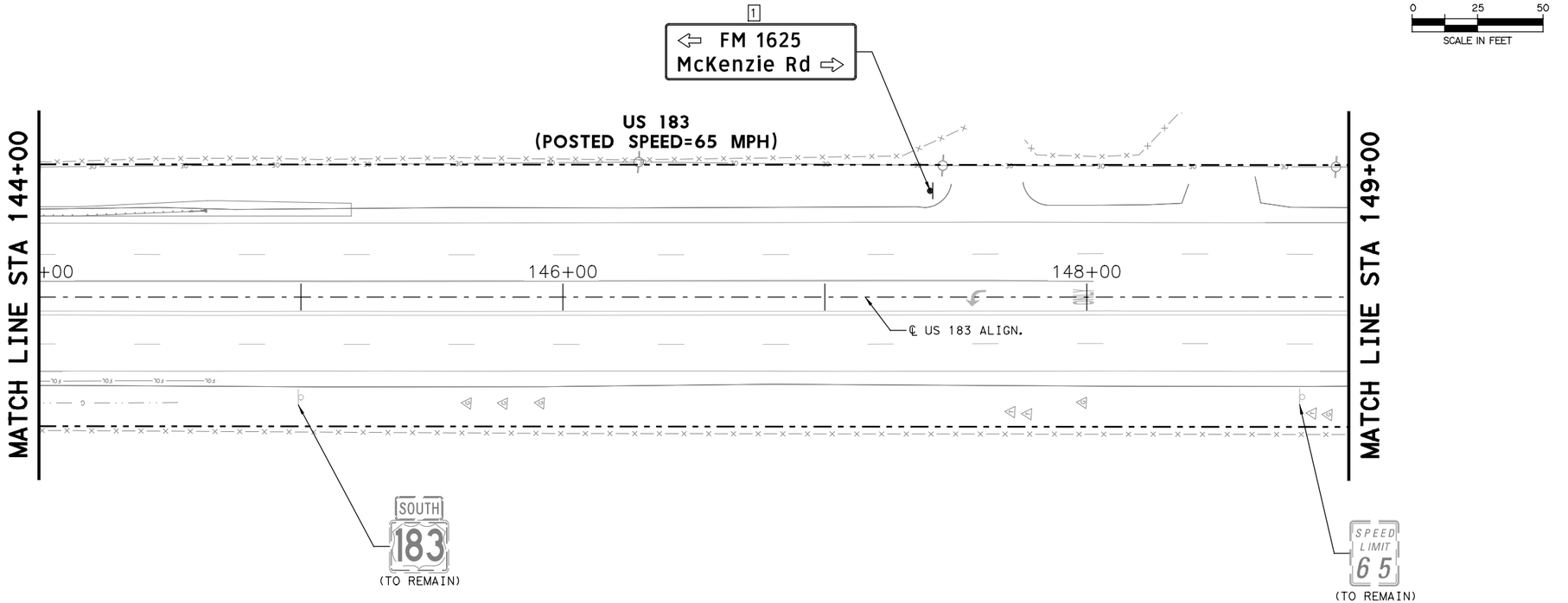
(STA 139+00 TO STA 144+00)

SHEET 2 OF 5

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			157
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

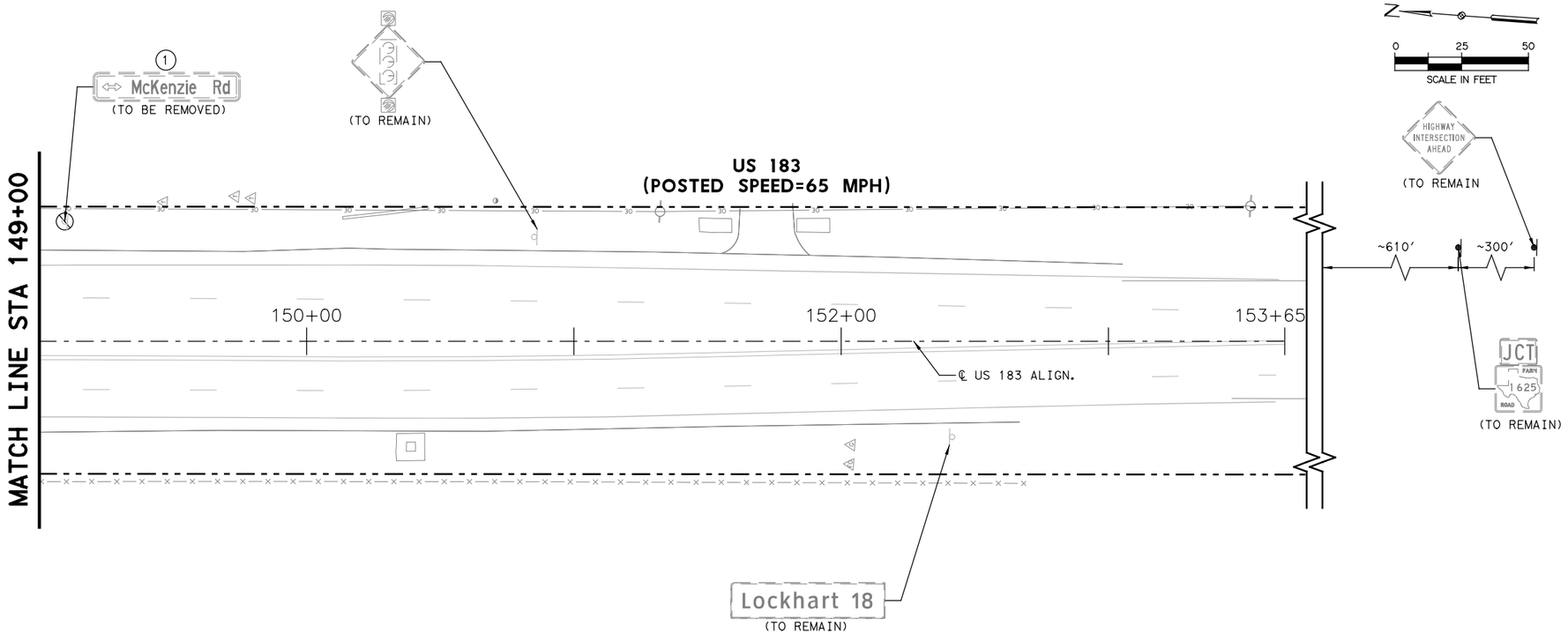


LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
- (C) REFL PAV MRK TY I&II (W)24"(SLD)(90MIL)
- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
- (G) REFL PAV MRK TY I&II (Y)(MED NOSE)(90MIL)
- (H) RE PM W/RET REQ TY I&II (W)4"(BRK)(90MIL)
- (I) RE PM W/RET REQ TY I&II (W)4"(SLD)(90MIL)
- (J) RE PM W/RET REQ TY I&II (Y)4"(SLD)(90MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- [X] PROP. SIGN NUMBER
- (X) EXIST. SIGN REMOVAL NUMBER
- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.



03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

PAVEMENT MARKINGS AND SIGNING

(STA 144+00 TO STA 153+65.93)

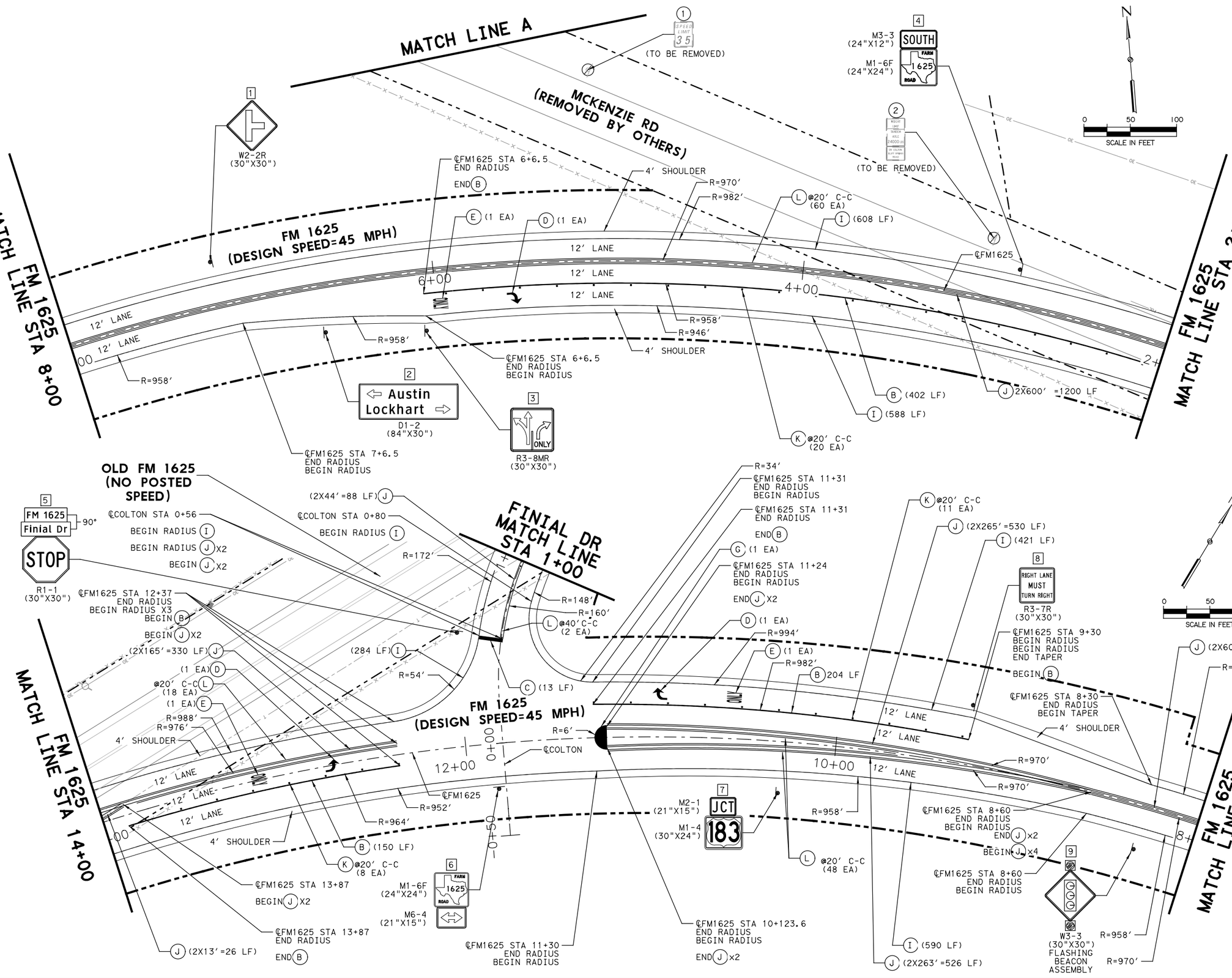
SHEET 3 OF 5

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			158

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
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- (E) REFL PAV MRK TY I&II (W)(WORD)(90MIL)
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- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

PAVEMENT MARKINGS AND SIGNING

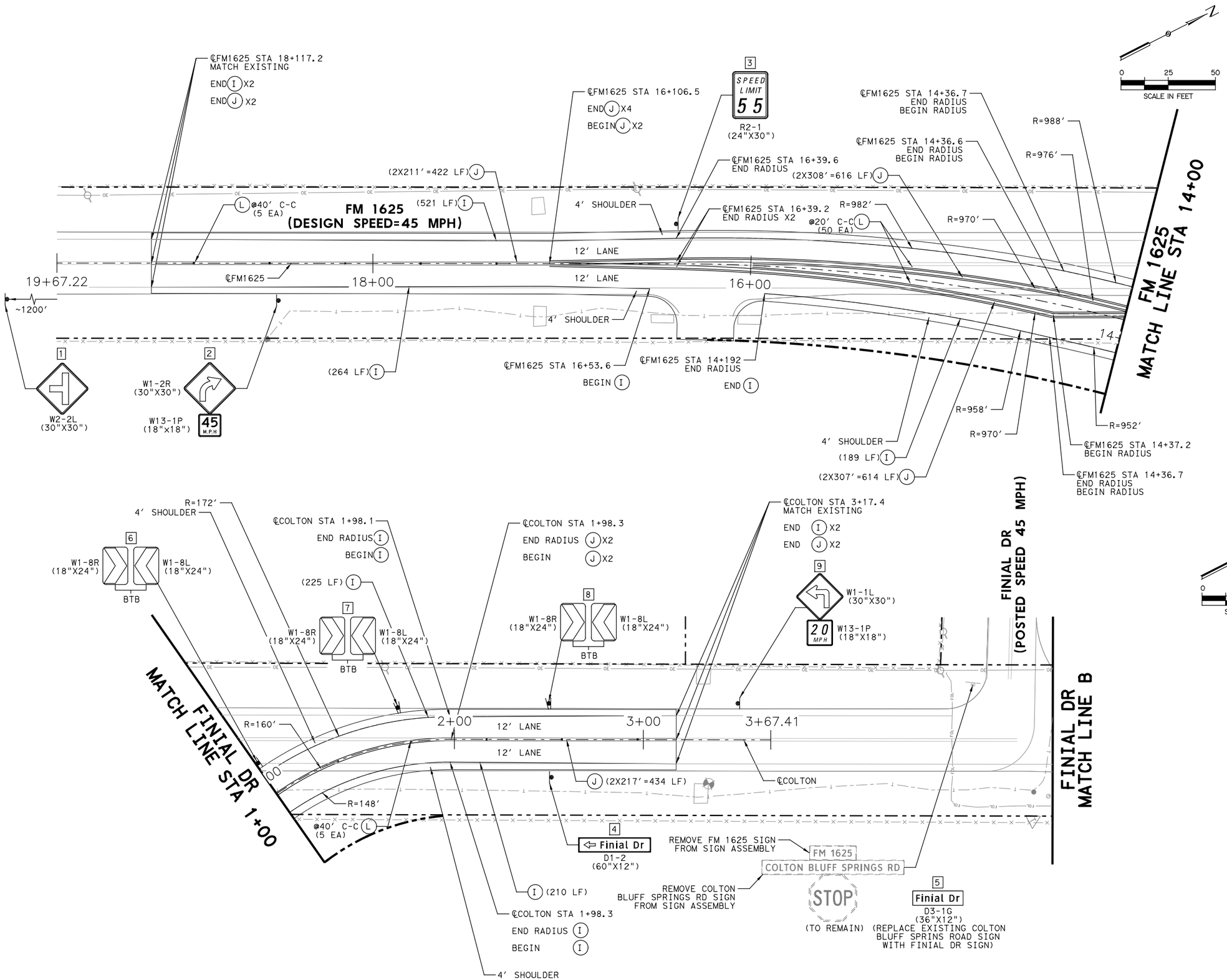
(STA 2+00 TO STA 14+00)

SHEET 4 OF 5

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			159

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



LEGEND

- (A) REFL PAV MRK TY I&II(W)4"(DOT)(90MIL)
- (B) REFL PAV MRK TY I&II (W)8"(SLD)(90MIL)
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- (D) REFL PAV MRK TY I&II (W)(ARROW)(90MIL)
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- (F) REFL PAV MRK TY I&II (Y)24"(SLD)(90MIL)
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- EXIST. SIGN TO REMAIN
- EXIST. SIGN TO BE REMOVED
- PROP. SIGN
- EXIST. DELINEATOR TO BE REMOVED
- PROP. DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)

NOTE

JCT 1625 SIGNS TO BE REINSTALLED WITH FM 1625 PLAN (1535-012-060) AFTER COMPLETION OF THE WORK IN THIS PLAN SET.

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

FM 1625

PAVEMENT MARKINGS AND SIGNING

(STA 14+00 TO END)

SHEET 5 OF 5

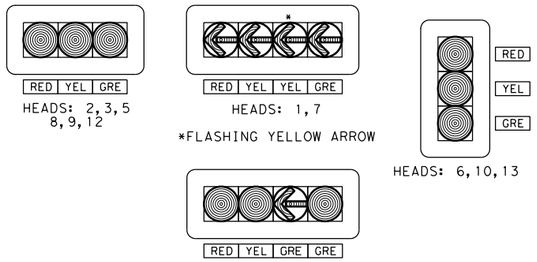
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			160

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

EXISTING SIGNAL HEAD LEGEND



EXISTING SIGN LEGEND

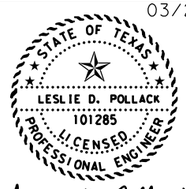
LEGEND

- EXIST. TIMBER POLE
- EXIST. SPAN WIRE
- EXIST. SIGNAL HEAD
- EXIST. RADAR (PRESENCE)
- EXIST. RADAR (ADVANCE)
- EXIST. SIGN ON SPAN WIRE
- EXIST. LUMINAIRE
- EXIST. GROUND BOX
- EXIST. CONDUIT(TRENCH)
- EXIST. CONTROLLER
- EXIST. SERVICE METER
- EXIST. GUY WIRE
- EXIST. MBGF
- EXIST. GROUND MOUNTED SIGN
- EXIST. FIBER OPTIC MARKER
- EXIST. GROUND MOUNTED SIGN
- EXIST. GAS MARKER
- EXIST. GUY
- EXIST. MANHOLE
- EXIST. TELEPHONE MARKER
- EXIST. TELEPHONE PEDESTAL
- EXIST. UTILITY POLE
- EXIST. FENCE
- EXIST. FIBER OPTIC LINE
- EXIST. GAS LINE
- EXIST. OVERHEAD ELECTRIC
- EXIST. RIGHT OF WAY

NOTES

1. EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. EXISTING SIGNAL SHALL REMAIN FUNCTIONAL AT ALL TIMES DURING CONSTRUCTION OF NEW SIGNAL.
3. REMOVE EXISTING SIGNAL AFTER NEW SIGNAL IS TURNED ON AND RUNNING. SALVAGE SIGNAL CONTROLLER UNIT, RADAR UNITS, AND SIGNAL HEADS AND DELIVER TO TXDOT. CONTACT ROBERT GUYDOSH AT (512)832-7012 WITH 48 HOURS NOTICE. DISPOSE THE REMAINDER OF THE SIGNAL EQUIPMENT AS PER TXDOT SPECIFICATIONS.

03/25/2021



US 183 AND MCKENZIE RD

EXISTING INTERSECTION LAYOUT

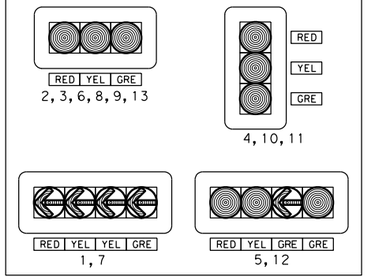
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
		161

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

PROPOSED SIGNAL HEADS (ITEM 682)



PROPOSED POLE NOTES

A	INS TRF SIG PL AM(S)1 ARM(60') (686-6061)
B	INS TRF SIG PL AM(S)1 ARM(28') LUM (686-6031)
C	INS TRF SIG PL AM(S)1 ARM(50') LUM (686-6055)
D	INS TRF SIG PL AM(S)1 ARM(48') LUM (686-6051)

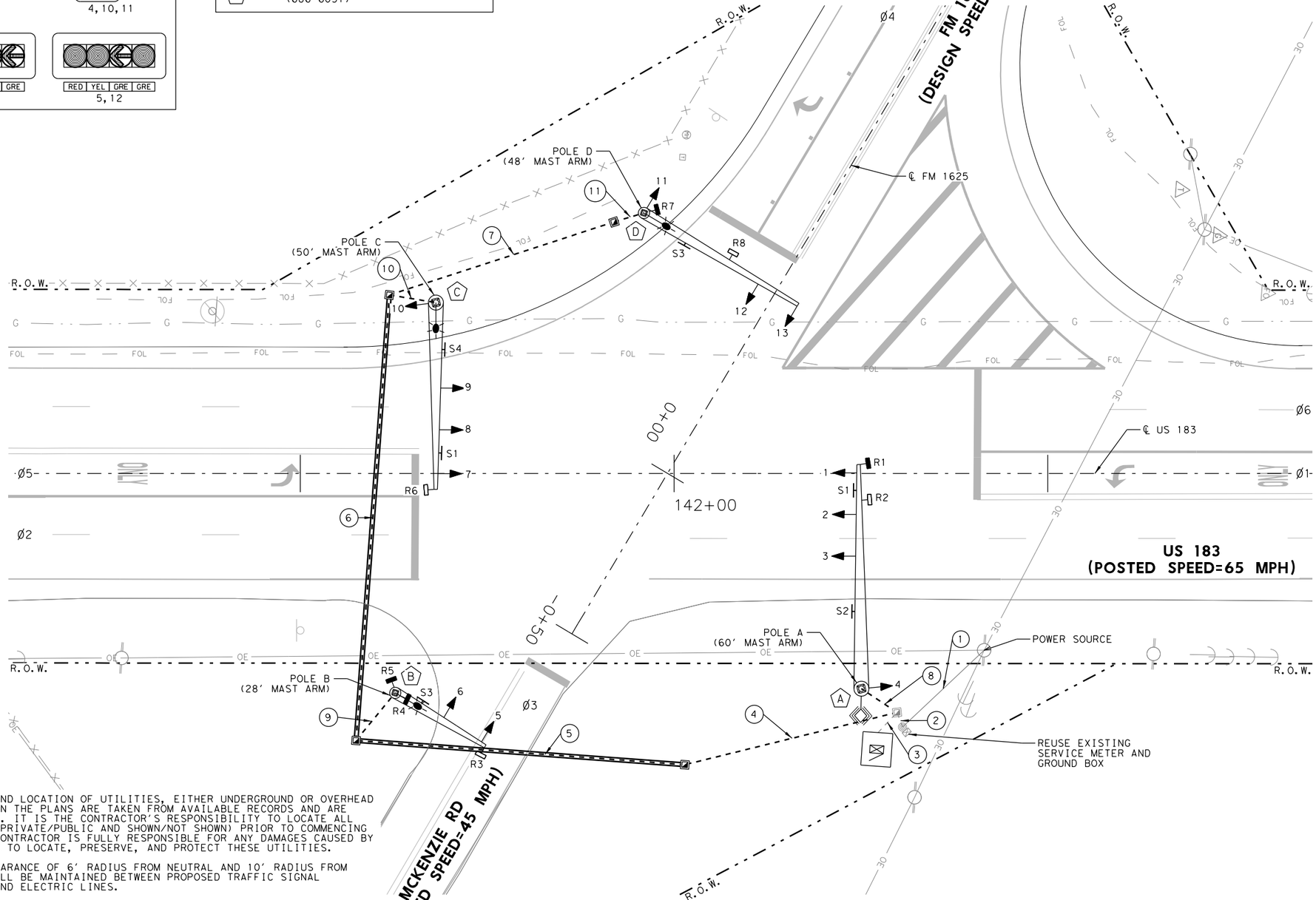
LEGEND

- PROP. SIGNAL POLE AND MAST ARM
- PROP. SIGNAL HEAD
- PROP. RADAR (PRESENCE)
- PROP. RADAR (ADVANCE)
- PROP. SIGN ON MAST ARM
- PROP. LUMINAIRE
- PROP. BROADBAND ANTENNA
- PROP. GROUND BOX
- PROP. CONDUIT(TRENCH)
- PROP. CONDUIT(BORED)
- PROP. CONTROLLER
- EXIST. SERVICE METER
- EXIST. FIBER OPTIC MARKER
- EXIST. GROUND MOUNTED SIGN
- EXIST. GAS MARKER
- EXIST. GUY
- EXIST. MANHOLE
- EXIST. TELEPHONE MARKER
- EXIST. TELEPHONE PEDESTAL
- EXIST. UTILITY POLE
- EXIST. GROUND BOX
- EXIST. CONDUIT (TRENCH)
- EXIST. FENCE
- EXIST. FIBER OPTIC LINE
- EXIST. GAS LINE
- EXIST. OVERHEAD ELECTRIC
- EXIST. RIGHT OF WAY
- PROP. RIGHT OF WAY

N

0 15 30

SCALE IN FEET



NOTES

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2. MINIMUM CLEARANCE OF 6' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND ELECTRIC LINES.
3. NOTIFY THE DISTRICT SIGNAL MAINTENANCE OFFICE (ROBERT GUYDOSH AT (512) 832-7012), AND AREA OFFICE ONE WEEK BEFORE BEGINNING ANY WORK INVOLVING TRAFFIC SIGNALS.
4. ALL CONSTRUCTION SIGNS AND BARRICADES MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND BE CONSISTENT WITH TXDOT BARRICADE, CONSTRUCTION, AND TRAFFIC CONTROL PLAN STANDARDS.
5. INSTALL NEW TRAFFIC SIGNAL CONTROLLER. REUSE EXISTING CABINET AND FOUNDATION.

PROPOSED POLE OFFSETS			
POLE	ALIGNMENT	STATION	OFFSET
A	℄ US 183	141+49.9	57.6 LT
B	℄ US 183	142+74.6	58.7 LT
C	℄ US 183	142+63.7	45.7' RT
D	℄ US 183	142+08.1	69.7' RT

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Jessie D Pollack

US 183 AND MCKENZIE RD

PROPOSED SIGNAL LAYOUT

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

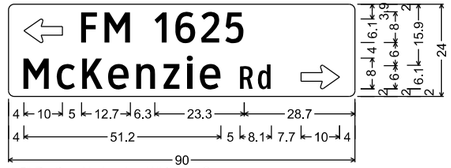
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			162

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

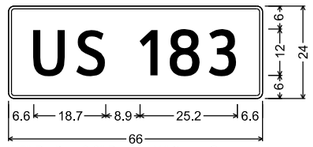
PROPOSED SIGN LEGEND

S1
R10-17T
(36"X42")
(2 EA)



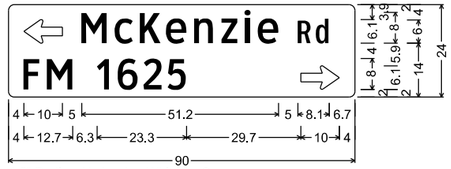
1.5" Radius, No border, White on Green;
Standard Arrow Custom 10.0" X 6.1" 180°;
[FM 1625] ClearviewHwy-3-W;
[McKenzie] ClearviewHwy-3-W;
[Rd] ClearviewHwy-2-W;
Standard Arrow Custom 10.0" X 6.1" 0°;

S2
(1 EA)



1.5" Radius, 0.8" Border, White on Green;
[US 183] ClearviewHwy-3-W;

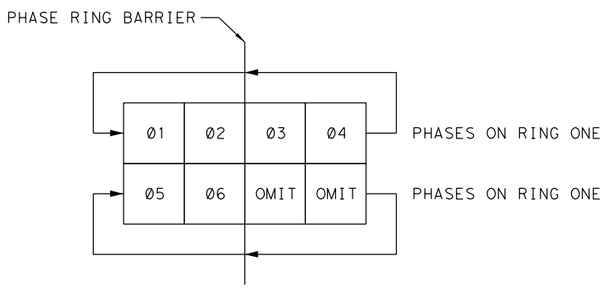
S3
(2 EA)



1.5" Radius, No border, White on Green;
Standard Arrow Custom 10.0" X 6.1" 180°;
[McKenzie] ClearviewHwy-3-W;
[Rd] ClearviewHwy-2-W;
[FM 1625] ClearviewHwy-3-W;
Standard Arrow Custom 10.0" X 6.1" 0°;

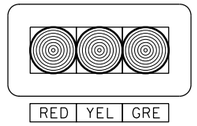
S4
(1 EA)

PHASE RING DIAGRAM



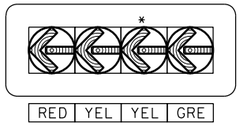
NOTE: COORDINATE SIGNAL TIMING/PHASING WITH TXDOT.

PROPOSED SIGNAL HEAD LEGEND



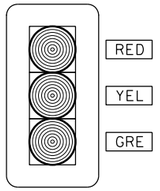
HEADS: 2, 3, 6
8, 9, 13

3 SECTION SIGNAL
HEAD AND BACKPLATE



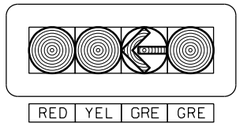
HEADS: 1, 7

4 SECTION SIGNAL
HEAD AND BACKPLATE



HEADS: 4, 10, 11

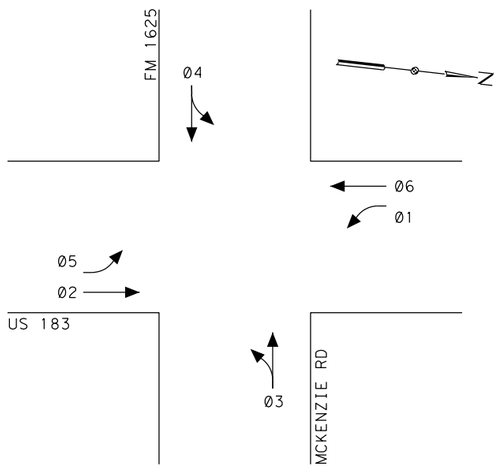
3 SECTION SIGNAL
HEAD AND BACKPLATE



HEADS: 5, 12

4 SECTION SIGNAL
HEAD AND BACKPLATE

PHASING DIAGRAM



LS 9 - OL M = Ø6(FYA)(HEAD 7)
LS 11 - OL O = Ø2(FYA)(HEAD 1)
LS 13 - OL A = Ø2(HEAD 10)
LS 14 - OL B = Ø4(HEAD 11)
LS 15 - OL C = Ø6(HEAD 4)

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 AND MCKENZIE RD

SIGNING AND PHASING

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			163

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

CONDUIT AND CONDUCTOR SCHEDULE

RUN	LENGTH	CONDUITS				NO. 8 BARE	NO. 6 BARE	NO. 6 INSULATED	NO. 8 XHHW (LUM'S)	TY A 14 AWG		6/C (RADAR)	CAT 5E ETHERNET CABLE (RADIO)
		2" PVC	2" PVC (LUM'S)	3" PVC	3" PVC (BORED)					5/C SIGNAL CABLE	7/C SIGNAL CABLE		
NO.	FT	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1*	30												
2	5	1**	1**			1	1	2	6				
3	10	1**		3**		3	1	2		7	4	8	1
4	60	1		2		3			6	5	3	6	
5	90				3	3			6	5	3	6	
6	120				3	3			4	4	2	3	
7	65		1	2		3			2	2	1	2	
8	15	1		2		3				2	1	2	1
9	20		1	2		3			2	1	1	3	
10	15		1	2		3			2	2	1	1	
11	10		1	2		3			2	2	1	2	
TOTAL (LF)		75	110	370	630	1220	15	30	1630	1530	855	1595	25

NOTES:
1. *RUN 1 IS A OVERHEAD DROP TO ELECTRIC SERVICE METER. REUSE EXISTING DROP. COORDINATE WITH ELECTRIC UTILITY PROVIDER IN ADVANCE FOR ESTABLISHING ELECTRIC SERVICE.
2. **REUSE EXISTING CONDUIT
3. RUN POWER AND LUMINAIRE WIRES IN SEPARATE CONDUITS AS SHOWN IN THE ABOVE SCHEDULE.

POLE DETAILS & WIRING INSIDE POLE AND ARMS

POLE	TYPE	CONDUCTORS/CABLE IN POLES (LF)				
		NO. 8 XHHW (LUM'S)	5/C (SIGNAL)	7/C (SIGNAL)	6/C (RADAR)	CAT 5E ETHERNET CABLE (RADIO)
A	STEEL POLE WITH 60' LMA (30' TALL)		153	80	151	30
B	STEEL POLE WITH 28' MA & LUM (30' TALL)	40	35	47	88	
C	STEEL POLE WITH 50' LMA & LUM (30' TALL)	40	127	66	70	
D	STEEL POLE WITH 48' MA & LUM (30' TALL)	40	98	56	67	
TOTALS (LF)		120	413	249	376	30

INSIDE CABINET CHART

CONDUCTORS/CABLE IN CABINET (LF)					
NO. 6 BARE	NO. 6 INSULATED	5/C (SIGNAL)	7/C (SIGNAL)	6/C (RADAR)	CAT5E CABLE (RADIO)
LF	LF	LF	LF	LF	LF
5	10	35	20	40	5

CABLE TERMINATION CHART

CONDUCTOR CABLE	CABLE 1 POLE A 7/C 14 AWG	CABLE 2 POLE A 5/C 14 AWG	CABLE 3 POLE A 5/C 14 AWG	CABLE 4 POLE B 7/C 14 AWG	CABLE 5 POLE B 5/C 14 AWG	CABLE 6 POLE C 7/C 14 AWG	CABLE 7 POLE C 5/C 14 AWG	CABLE 8 POLE C 5/C 14 AWG	CABLE 9 POLE D 5/C 14 AWG	CABLE 10 POLE D 7/C 14 AWG	CABLE 11 POLE D 5/C 14 AWG
BLACK	SH 1 Y ARW PH 5	SH 2,3 Y PH 2	SH 4 Y OL C	SH 5 Y PH 4	SH 6 Y PH 4	SH 7 Y ARW PH 1	SH 8,9 Y PH 6	SH 10 Y OL A	SH 11 Y OL B	SH 12 Y PH 3	SH 13 Y PH 3
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1 R ARW PH 5	SH 2,3 R PH 2	SH 4 R OL C	SH 5 R PH 4	SH 6 R PH 4	SH 7 R ARW PH 1	SH 8,9 R PH 6	SH 10 R OL A	SH 11 R OL B	SH 12 R PH 3	SH 13 R PH 3
GREEN	SH 1 Y ARW PH 5	SH 2,3 G PH 2	SH 4 G OL C	SH 5 G PH 4	SH 6 G PH 4	SH 7 G ARW PH 1	SH 8,9 G PH 6	SH 10 G OL A	SH 11 G OL B	SH 12 G PH 3	SH 13 G PH 3
ORANGE	SH 1 FY ARW OL O			SPARE		SH 7 FY ARW OL M				SPARE	
BLUE	SPARE			SH 5 G ARW PH 4		SPARE				SH 12 G ARW PH 3	
WHITE/BLACK	SPARE			SPARE		SPARE				SPARE	

FLASHING YELLOW ARROW CHANNEL CONFIGURATION

PROTECTED TURN CHANNELS (R ARW, Y ARW, G ARW)	OPPOSING THROUGH CHANNEL	PERMISSIVE TURN CHANNEL (FYA)	FLASHING ARROW SIGNAL DRIVER SOURCE
1	2	9 YELLOW	9 YELLOW
5	6	11 YELLOW	11 YELLOW

ELECTRIC SERVICE DATA

ELECTRICAL SERVICE DATA											
SERVICE POLE NO.	SERVICE POLE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO/SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBOARD/ LOAD CENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	CIRCUIT AMP LOAD	SERVICE KVA LOAD
1	ELC SRV TY D 120/240 070 (NS)AL(E)SP(O)	2"	3/#6	N/A	2P/70	30	100	SIGNAL	1P/50	40	5.8
								LUMS	2P/15	4	

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

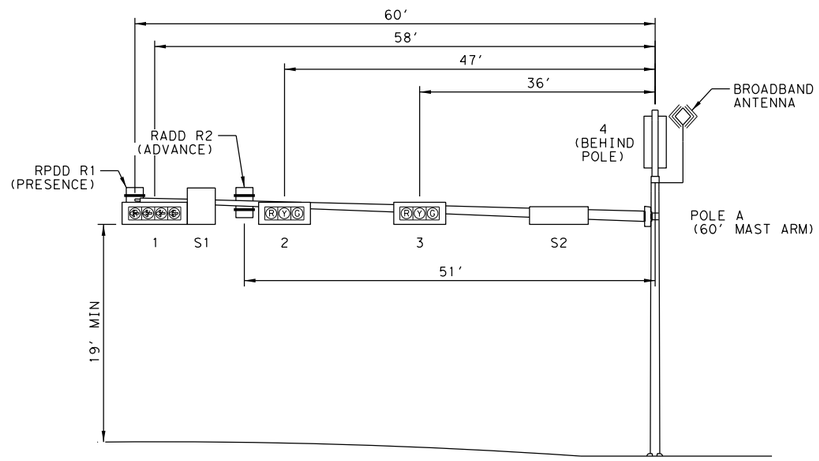
US 183 AND MCKENZIE RD

CONDUIT AND CONDUCTORS SCHEDULES

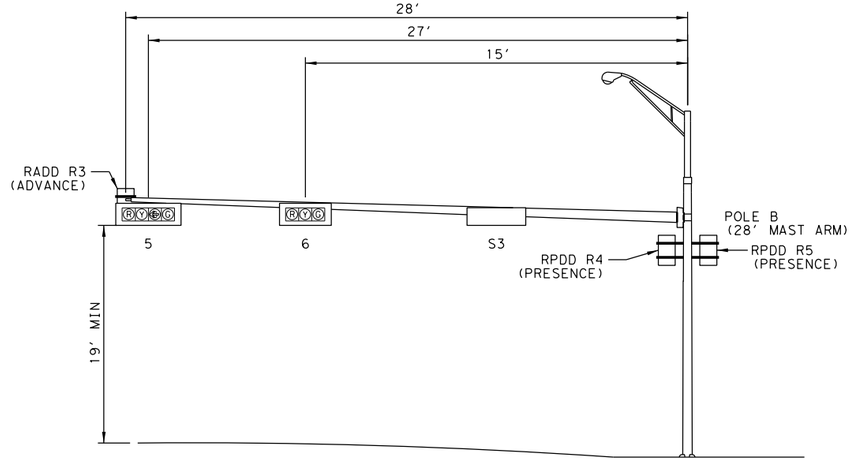
HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			164

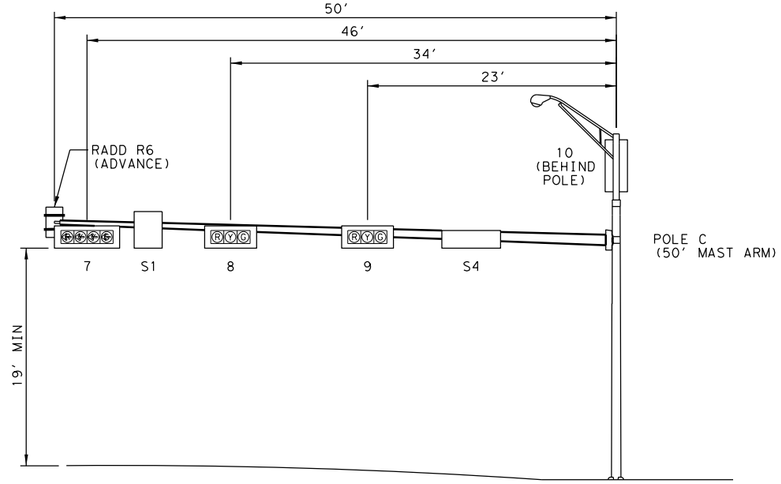
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.



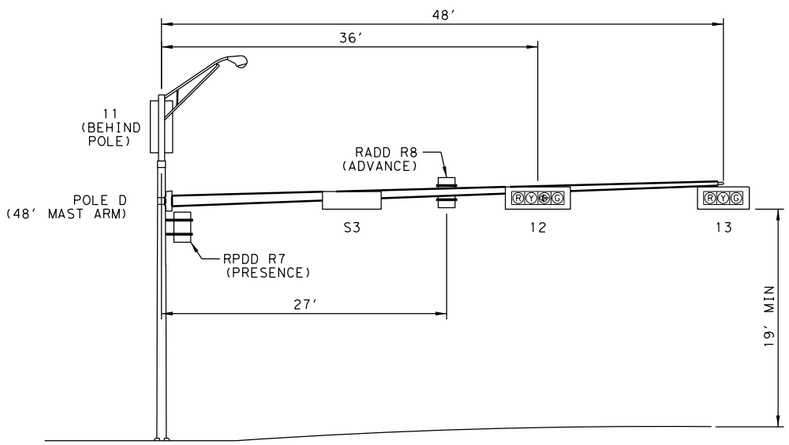
LOOKING NORTH ON US 183 AT MCKENZIE RD



LOOKING EAST ON FM 1625 AT US 183



LOOKING SOUTH ON US 183 AT MCKENZIE RD



LOOKING WEST ON MCKENZIE RD AT US 183

NOTES:

1. CENTER HEADS OVER THE LANES, OR AS DIRECTED BY THE ENGINEER. DISTANCES SHOWN ALONG MAST ARMS ARE APPROXIMATE AND MUST BE ADJUSTED IN THE FIELD IN ORDER TO MEET CLEARANCE.
2. ADJUST FOUNDATIONS IN THE FIELD IN ORDER TO MEET CLEARANCE.
3. LOCATIONS OF MAST ARMS ARE APPROXIMATE. ANY CHANGES MUST BE APPROVED BY ENGINEER.
4. CALCULATE MAST ARM ATTACHMENT HEIGHT IN THE FIELD FOR APPROVAL BY THE ENGINEER.
5. INSTALL RADAR LOCATIONS AS DIRECTED BY THE ENGINEER TO OBTAIN OPTIMAL DETECTION IN FIELD.
6. INSTALL WIND DAMPERS ON SMA POLES 40′ OR LONGER.

NOT TO SCALE

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 AND MCKENZIE RD

ELEVATIONS

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			165

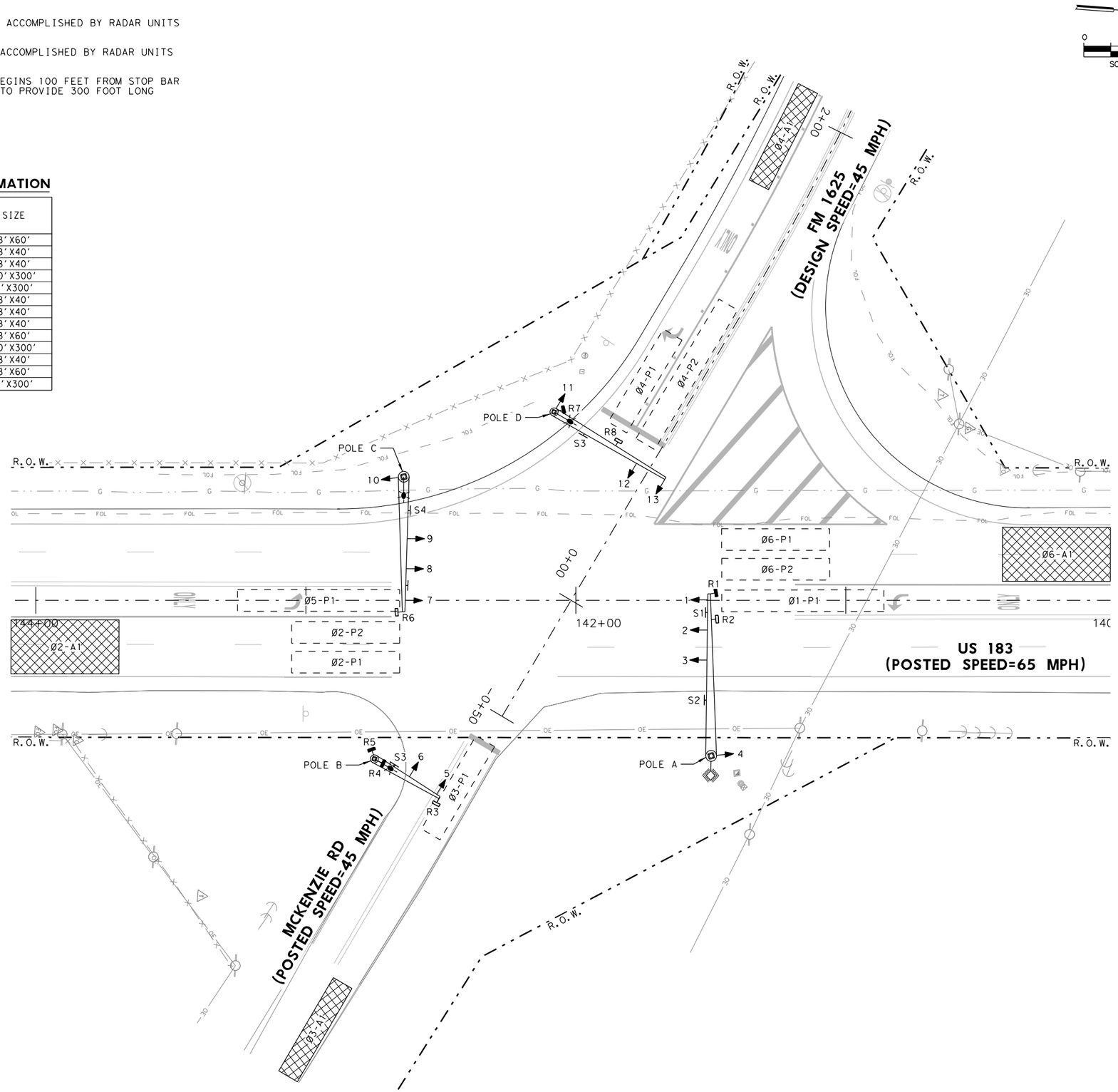
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

NOTES

1. PRESENCE DETECTION TO BE ACCOMPLISHED BY RADAR UNITS AS SHOWN.
2. ADVANCE DETECTION TO BE ACCOMPLISHED BY RADAR UNITS AS SHOWN.
3. ADVANCE DETECTION ZONE BEGINS 100 FEET FROM STOP BAR AND EXTENDS TO 400 FEET TO PROVIDE 300 FOOT LONG DETECTION ZONE.

DETECTION ZONE INFORMATION

ZONE	UNIT	SIZE
Ø1-P1	R1	8'X60'
Ø6-P1	R1	8'X40'
Ø6-P2	R1	8'X40'
Ø6-A1	R2	20'X300'
Ø3-A1	R3	8'X300'
Ø3-P1	R4	8'X40'
Ø2-P1	R5	8'X40'
Ø2-P2	R5	8'X40'
Ø5-P1	R5	8'X60'
Ø2-A1	R6	20'X300'
Ø4-P1	R7	8'X40'
Ø4-P2	R7	8'X60'
Ø4-A1	R8	8'X300'



LEGEND

- PROP. SIGNAL POLE AND MAST ARM
- PROP. PEDESTAL POLE
- PROP. SIGNAL HEAD
- PROP. RADAR (PRESENCE)
- PROP. RADAR (ADVANCE)
- PROP. SIGN ON MAST ARM
- PROP. LUMINAIRE
- PROP. BROADBAND ANTENNA
- PROP. CONTROLLER
- PROP. SERVICE METER
- EXIST. RIGHT OF WAY
- PROP. RIGHT OF WAY
- PROP. PRESENCE DETECTION ZONE
- PROP. ADVANCE DETECTION ZONE

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

US 183 AND MCKENZIE RD

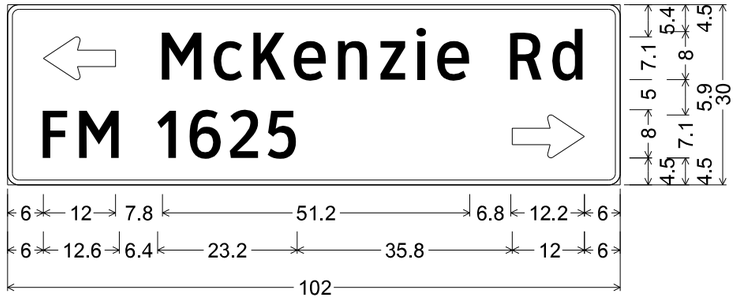
VEHICLE DETECTION ZONE

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			166

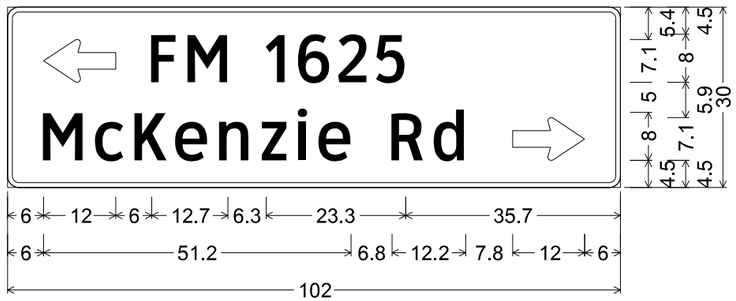
STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

1 SHEET 1 OF 5



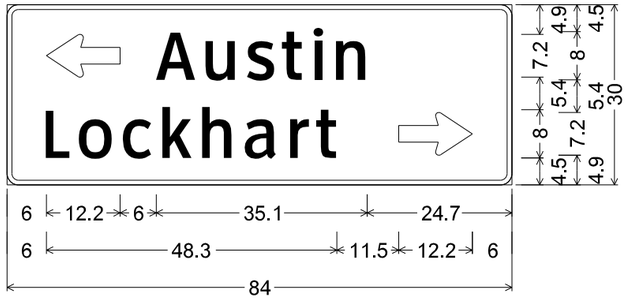
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180° ;
"McKenzie Rd", ClearviewHwy-3-W;
"FM 1625", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0° ;

1 SHEET 3 OF 5



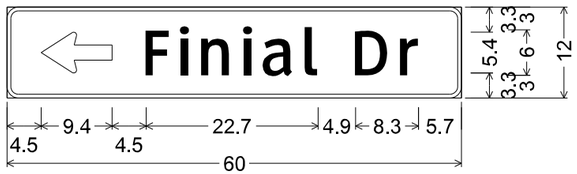
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180° ;
"FM 1625", ClearviewHwy-3-W;
"McKenzie Rd", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0° ;

2 SHEET 4 OF 5



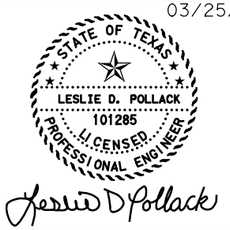
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.3" X 7.1" 180° ;
"Austin", ClearviewHwy-3-W;
"Lockhart", ClearviewHwy-3-W;
Standard Arrow Custom 12.3" X 7.1" 0° ;

4 SHEET 5 OF 5



1.5" Radius, 0.5" Border, White on, Green;
Standard Arrow Custom 9.4" X 5.4" 180';
"Finial Dr", ClearviewHwy-3-W;

03/25/2021



FM 1625

SIGNING DETAILS

HDR Engineering, Inc.
504 Lavaca St, Suite 900
Austin, Texas 78701
(Texas Registered Engineering Firm No. F-754)

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			167

STATE	STATE DIST.NO.	COUNTY	
TEXAS	14	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0152	01	080, ETC.	US 183, ETC.

DATE: 3/24/2021 5:42:38 PM
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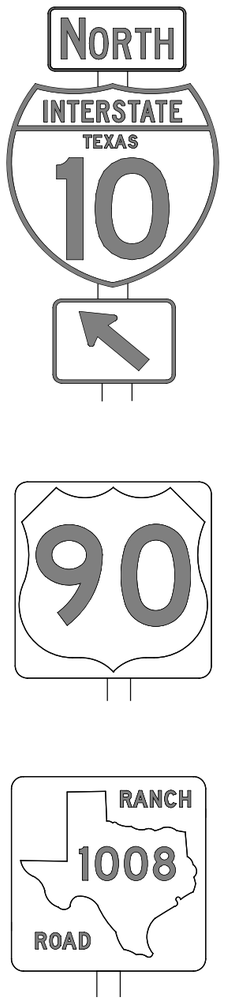
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

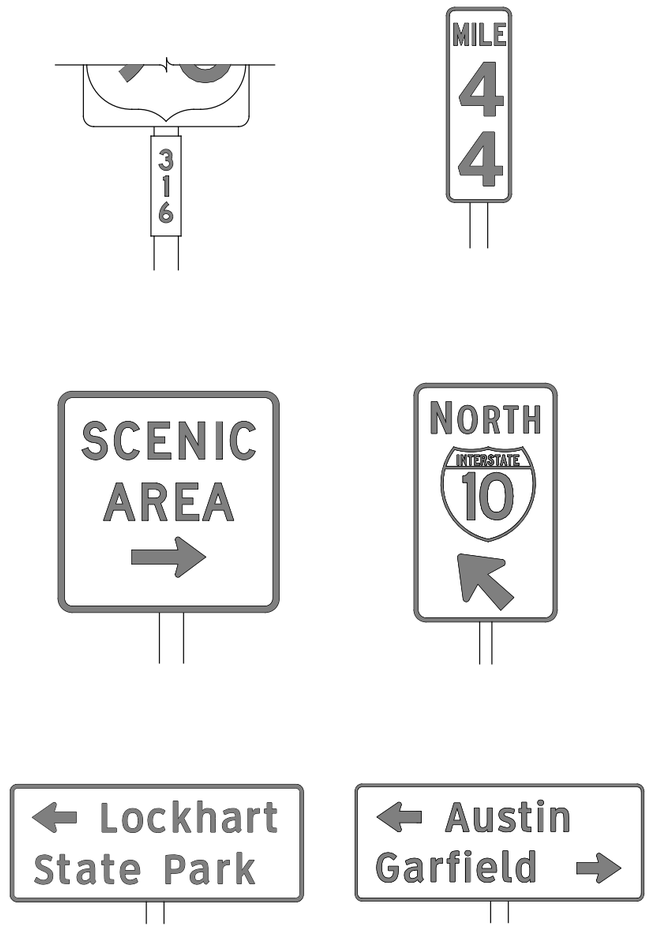
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

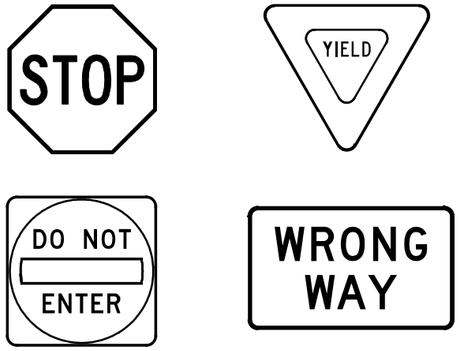
TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	14	TRAVIS		168

DATE: 3/24/2021 5:42:41 PM
FILE: c:\pwworking\central01\d0460970\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

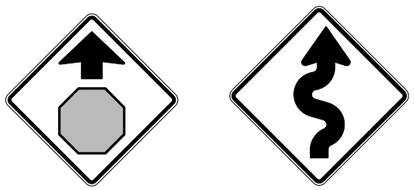
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

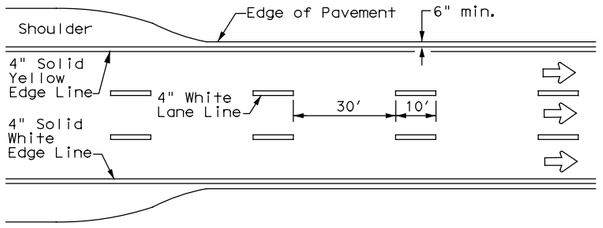
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

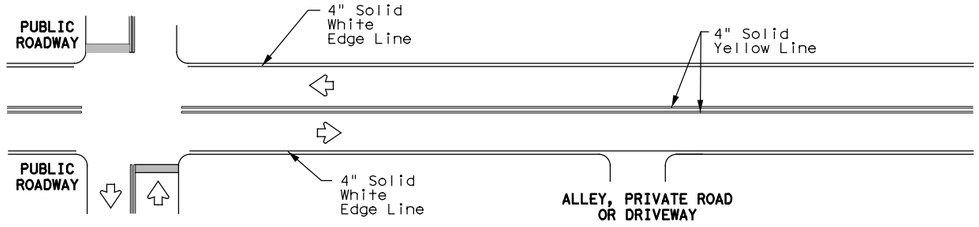
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		169

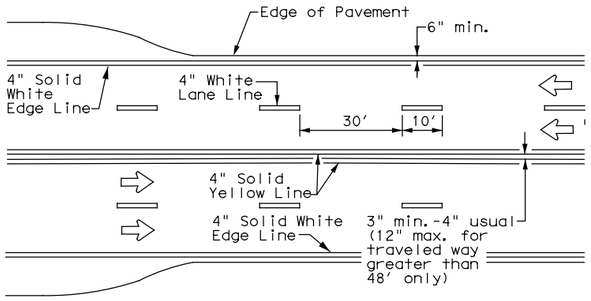
4



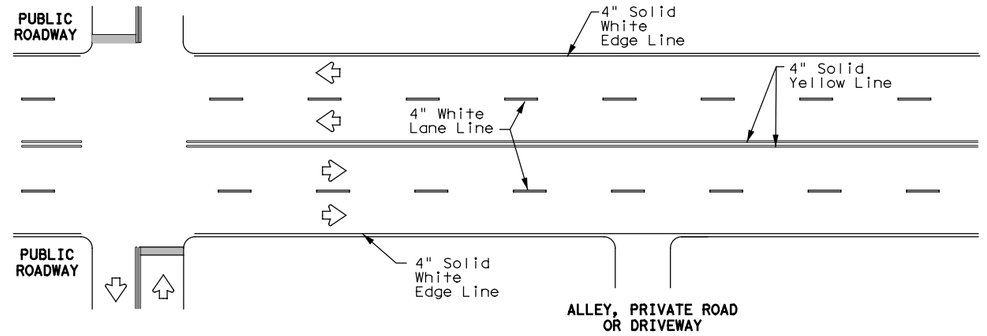
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



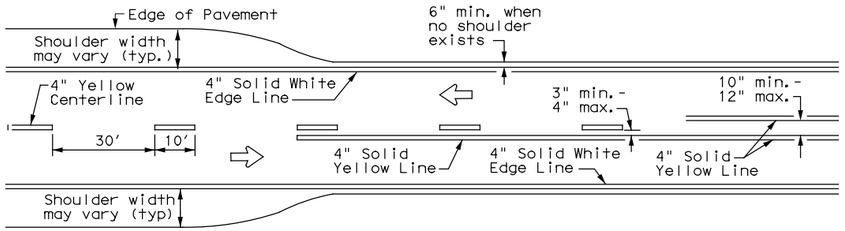
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



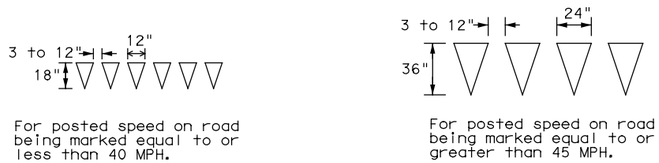
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



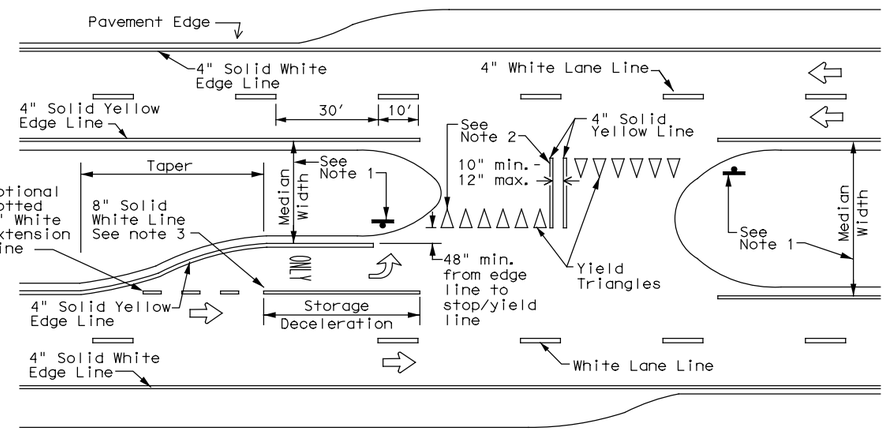
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

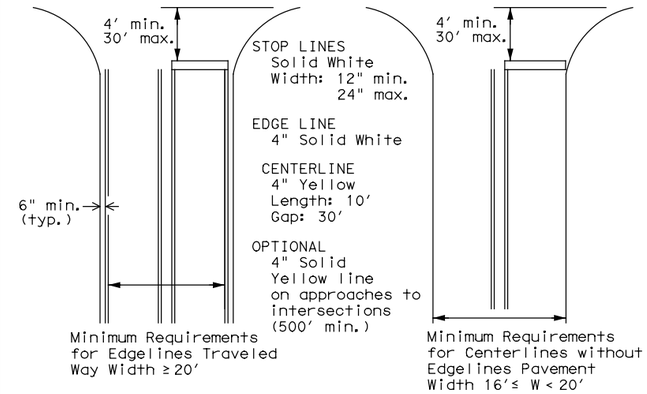
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0152	01	080, ETC.	US 183, ETC.
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	14	TRAVIS		170

22B

DATE: 3/24/2021 5:42:47 PM
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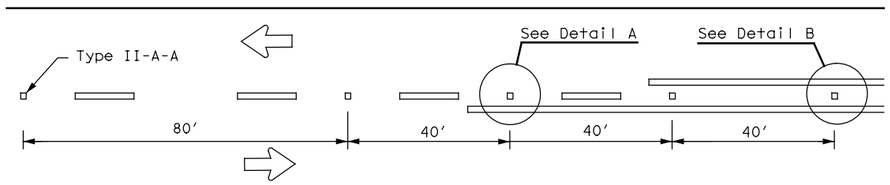
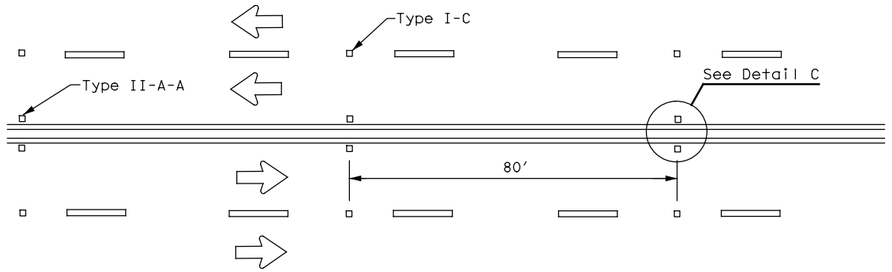
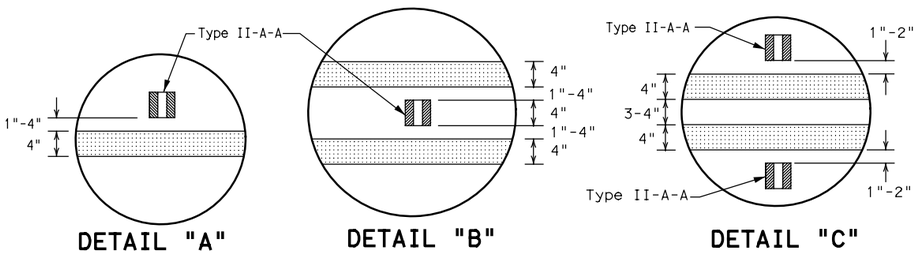
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



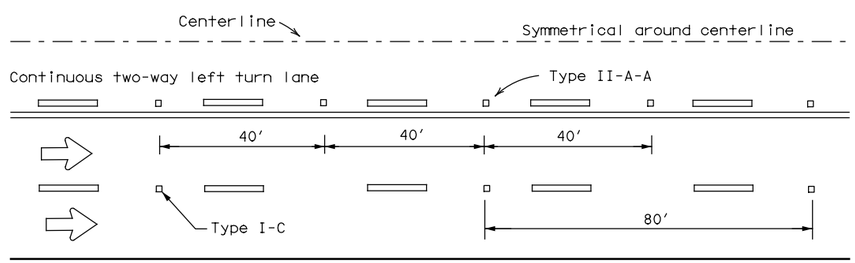
CENTERLINE FOR ALL TWO LANE ROADWAYS



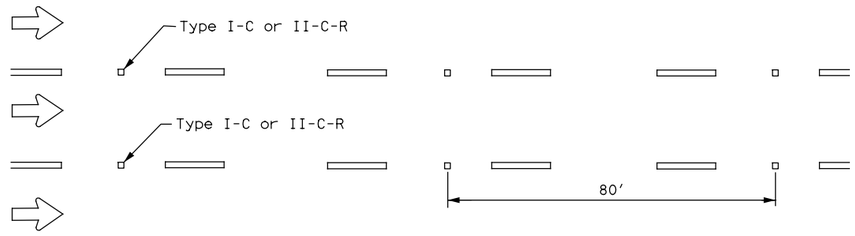
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

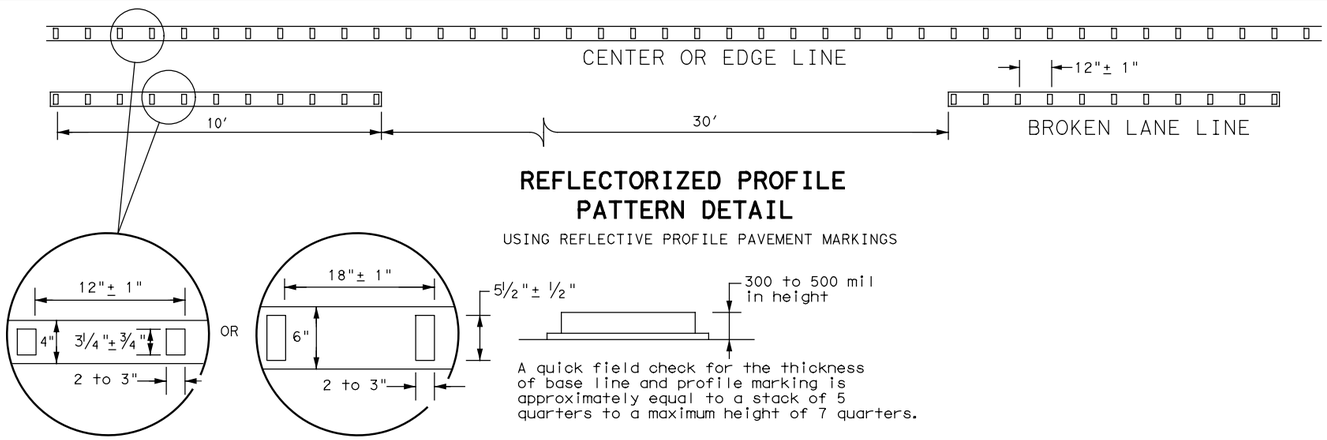


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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

NOTE

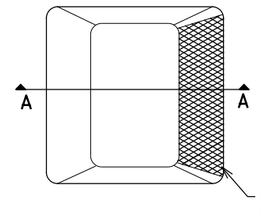
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

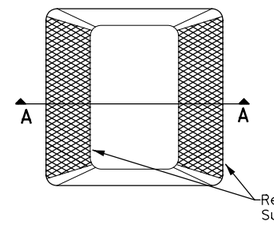
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

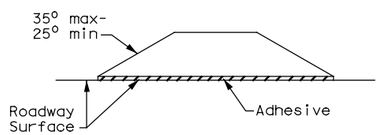
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

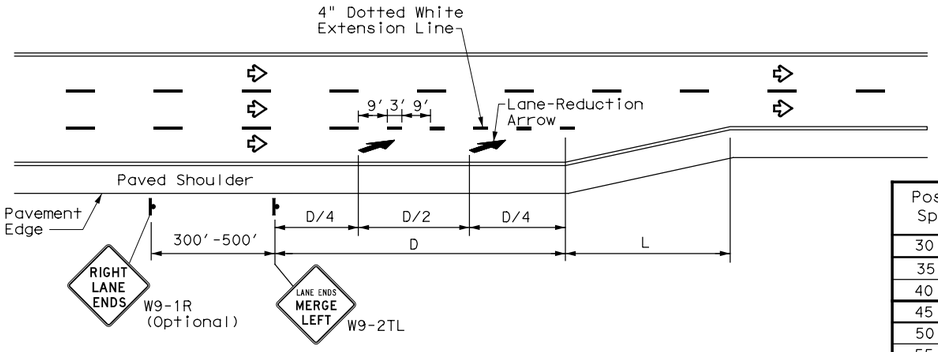
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0152	01	080, ETC.	US 183, ETC.
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	14	TRAVIS		171

22B

DATE: 3/24/2021 5:42:49 PM
FILE: c:\pwworking\central01\d0460970\pm2-20.dgn

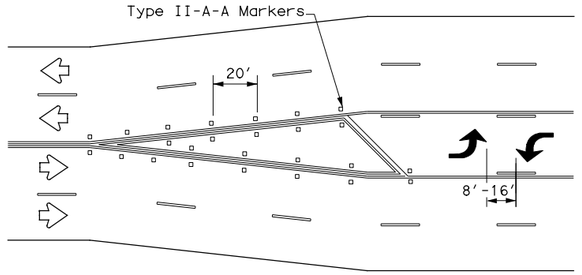


LANE REDUCTION

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

NOTES

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



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

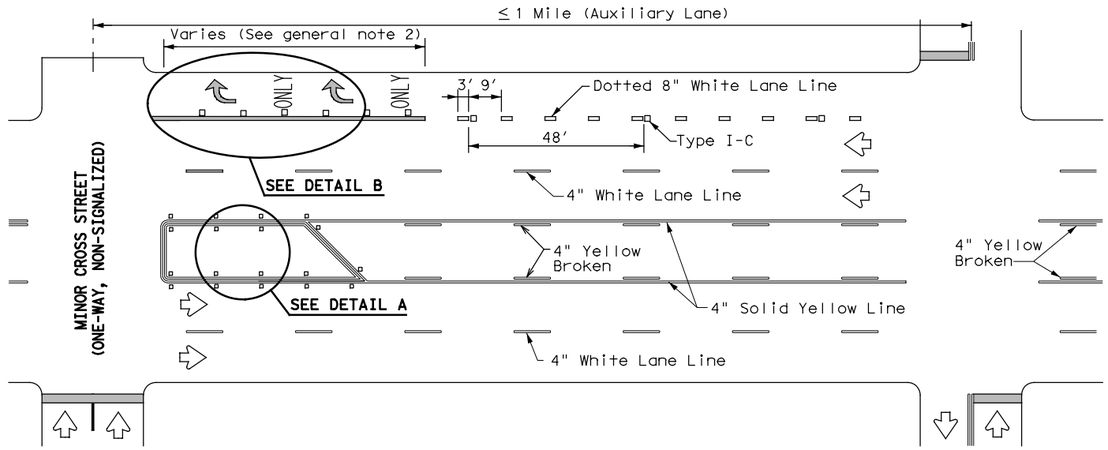
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

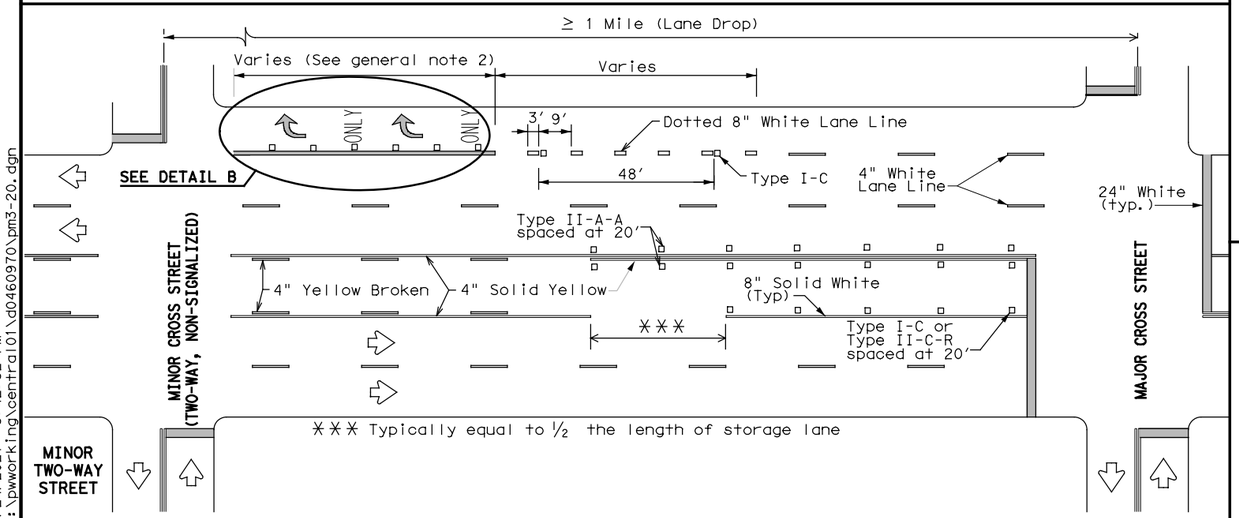
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

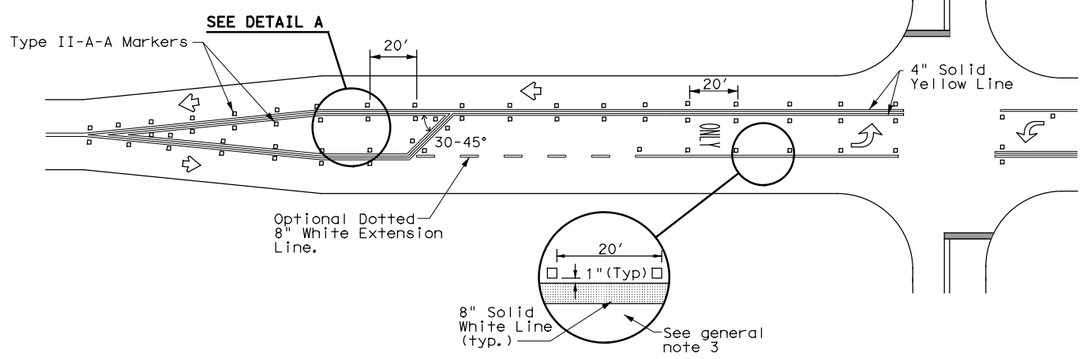
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



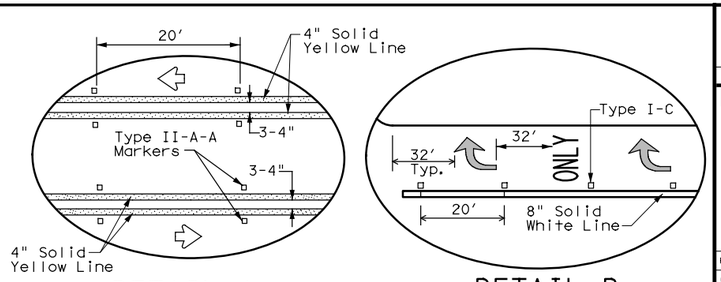
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	14	TRAVIS		172
3-03 6-20				

22D

DATE: 3/24/2021 5:42:52 PM
FILE: c:\pwworking\central01\d0460970\pm3-20.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

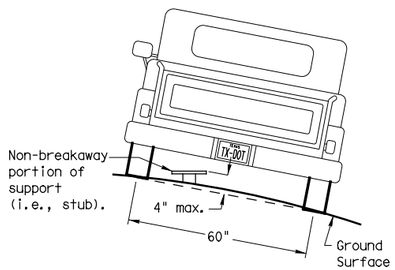
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

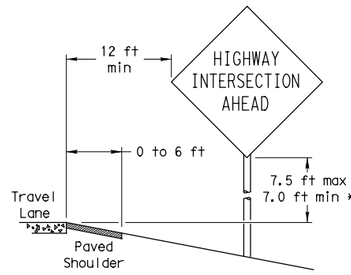
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

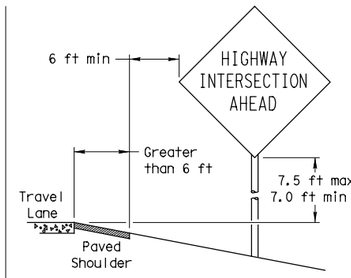
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

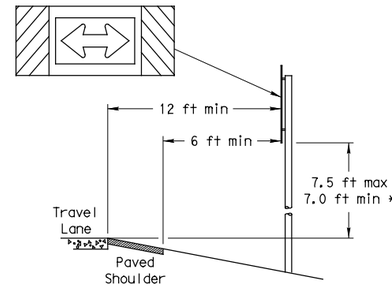
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



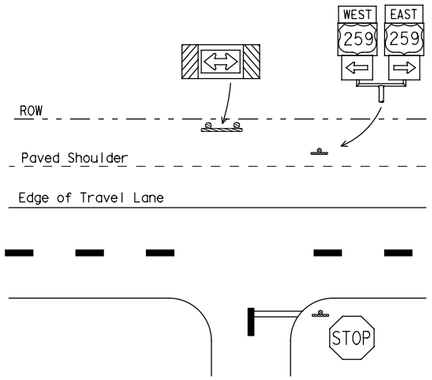
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

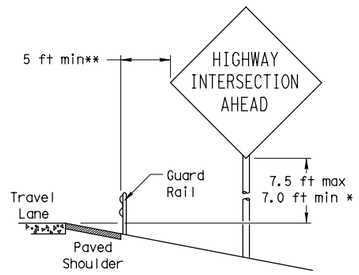
T-INTERSECTION



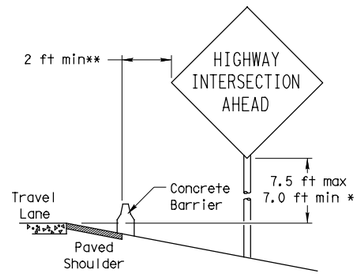
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

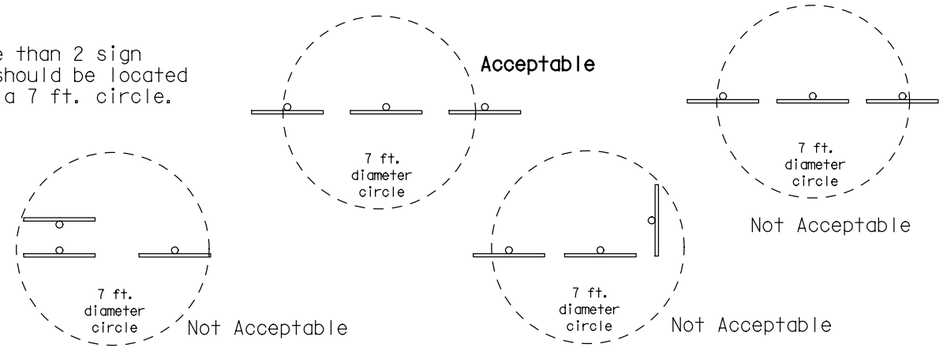
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

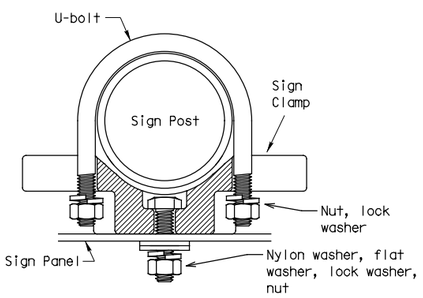
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.

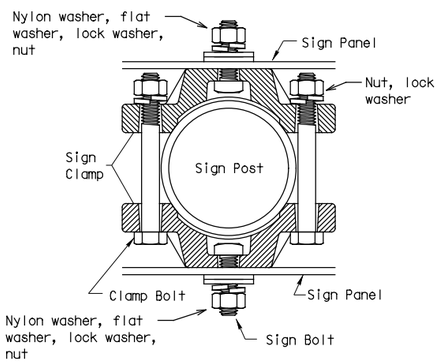


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



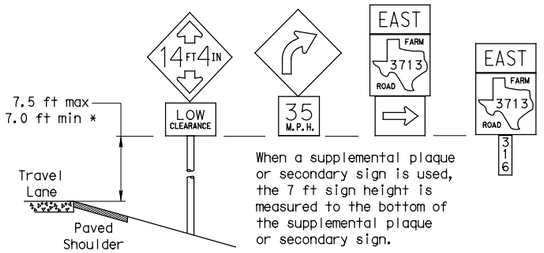
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

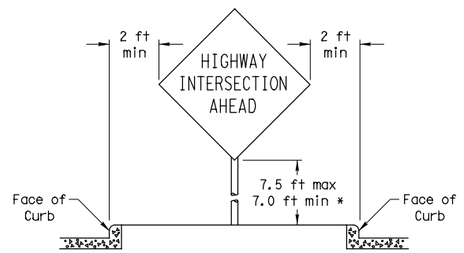
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



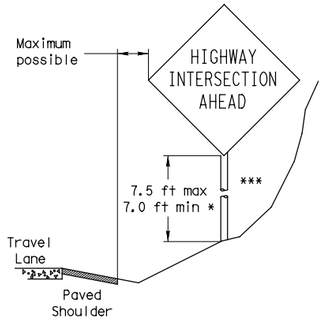
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		173

26A

DATE: 3/24/2021 5:42:55 PM
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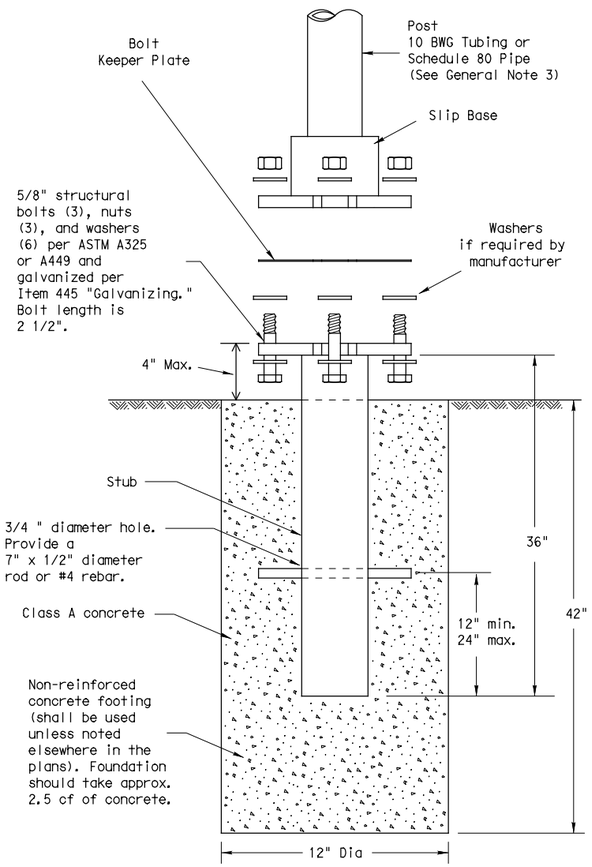
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

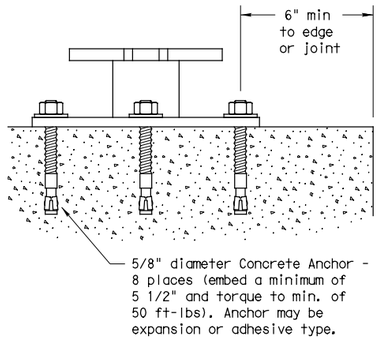
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

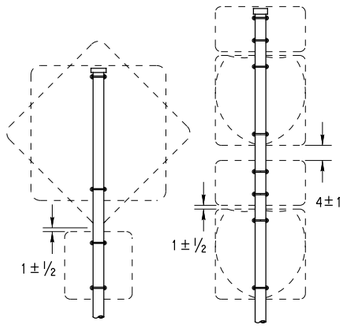
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

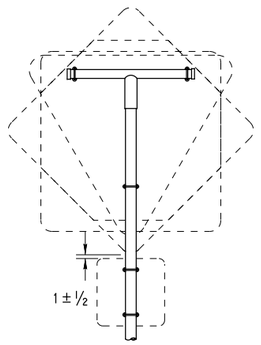
SMD(SLIP-1)-08

© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		174

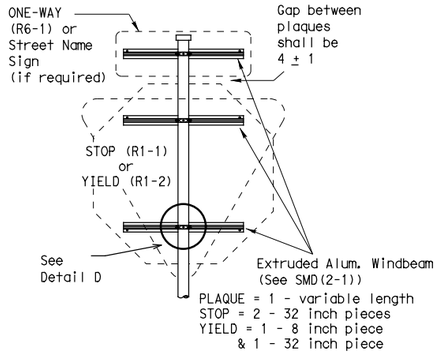
DATE: 3/24/2021 5:42:58 PM
FILE: c:\pwworking\central01\d0460970\smds1.dgn



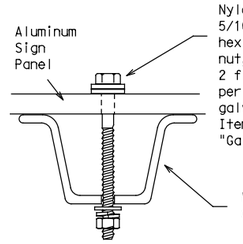
SM RD SGN ASSM TY XXXXX(1)XX(P)



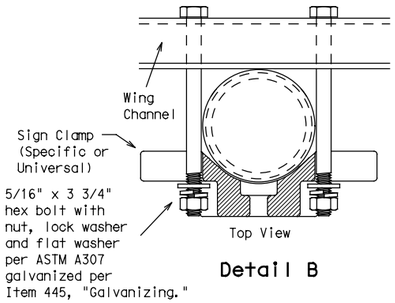
SM RD SGN ASSM TY XXXXX(1)XX(T)



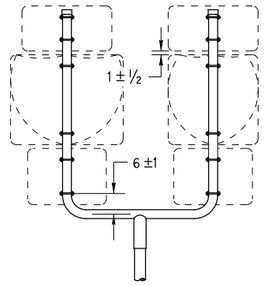
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



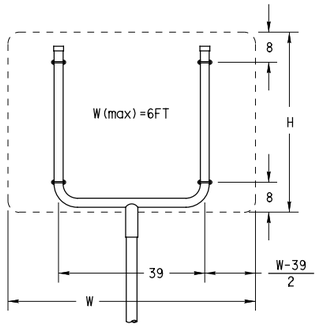
Detail A



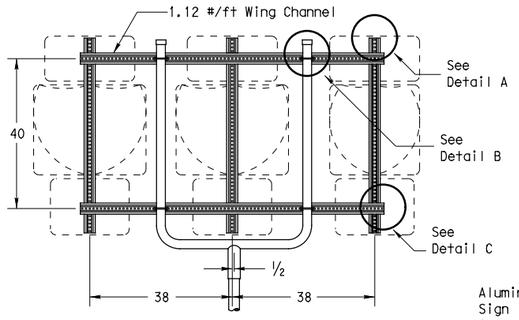
Detail B



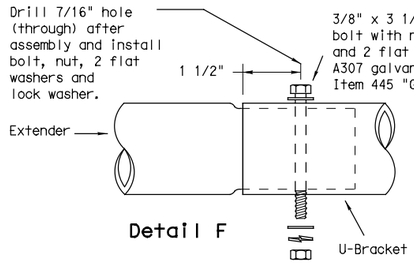
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

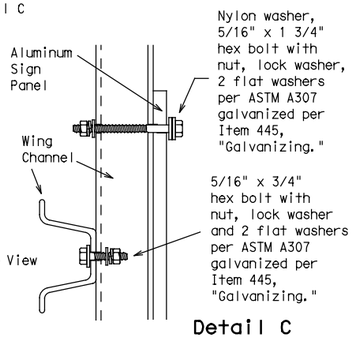


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

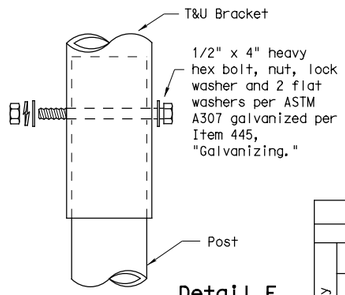


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



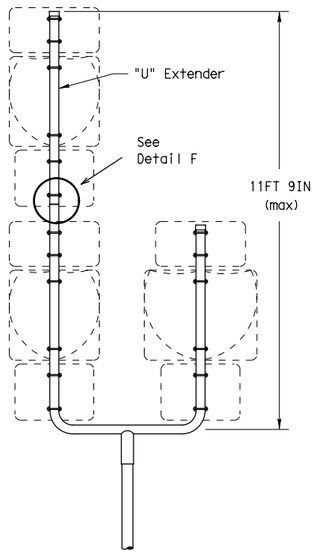
Detail E

GENERAL NOTES:

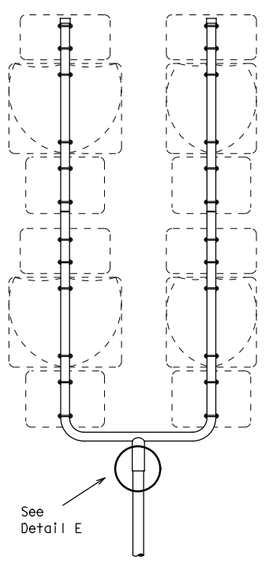
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

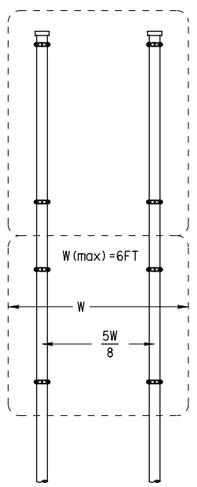
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

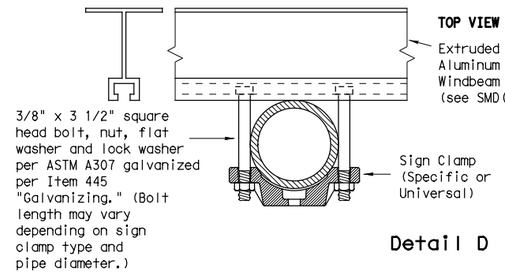


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

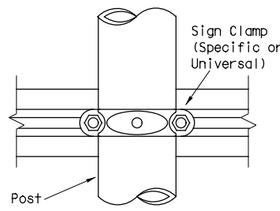


SM RD SGN ASSYM TY XXXXX(2)XX(P)

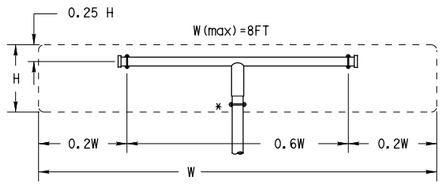
SIDE VIEW



Detail D



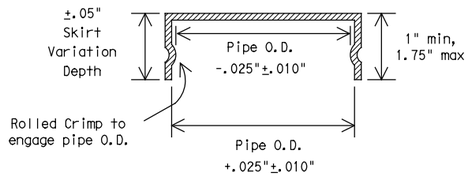
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		175

26C

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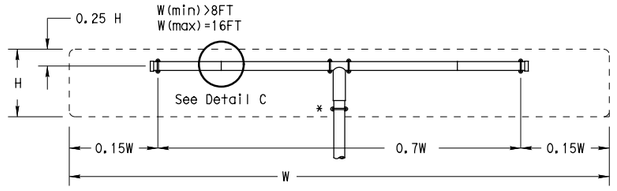
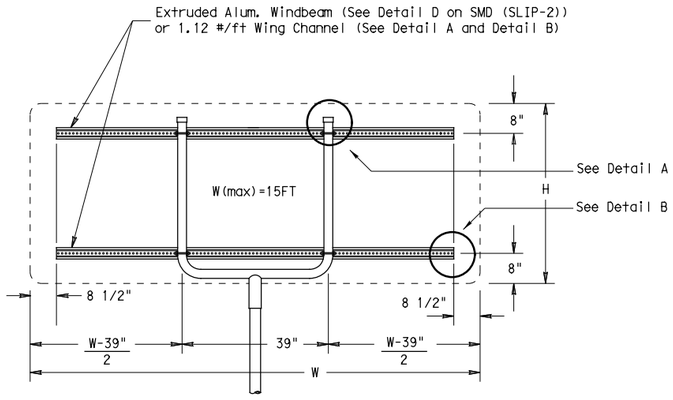
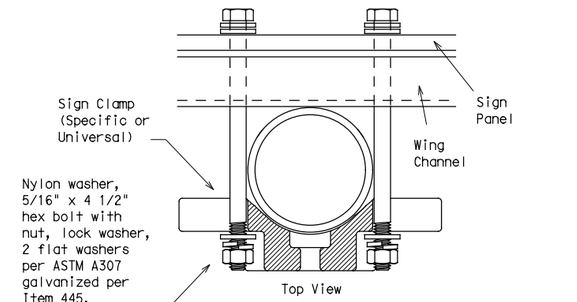


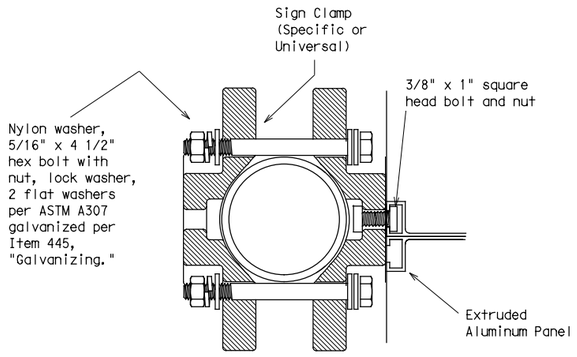
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



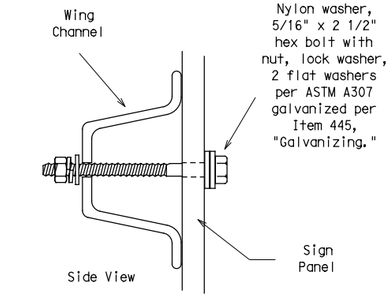
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



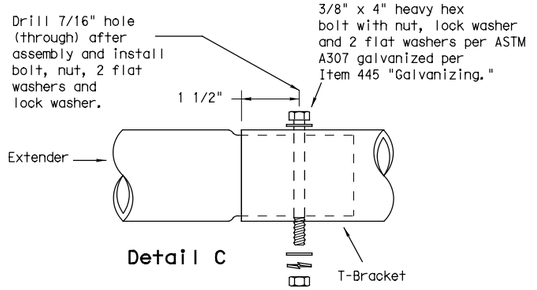
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

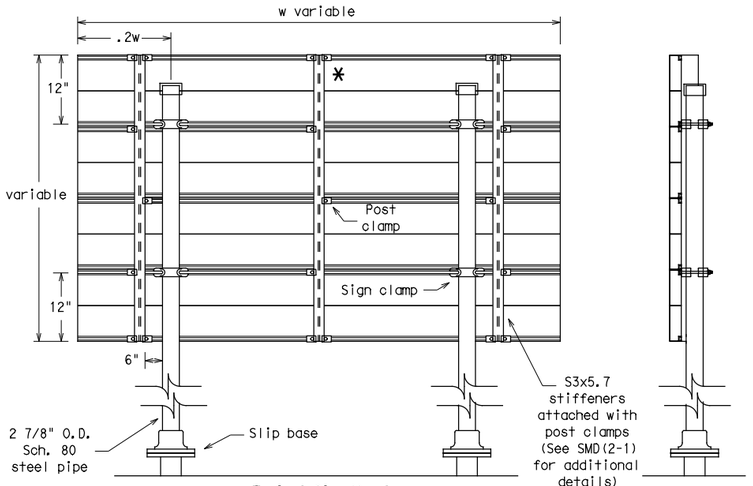


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

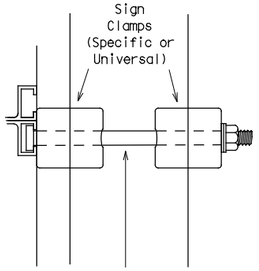


Typical Sign Mount

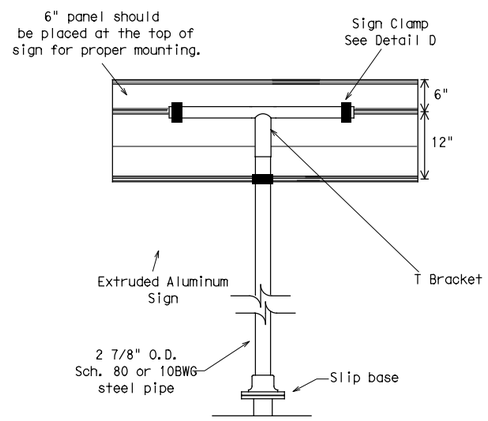
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

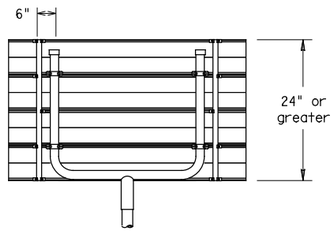
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		176

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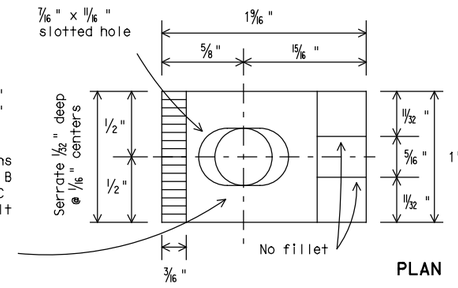
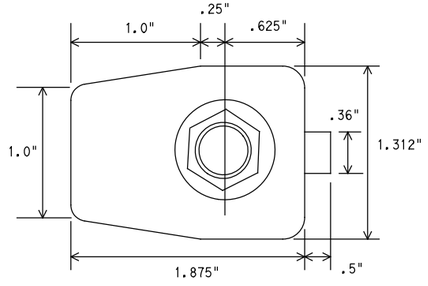
DATE: 3/24/2021 5:43:06 PM
FILE: c:\pwworking\central01\d0460970\smd21-08.dgn

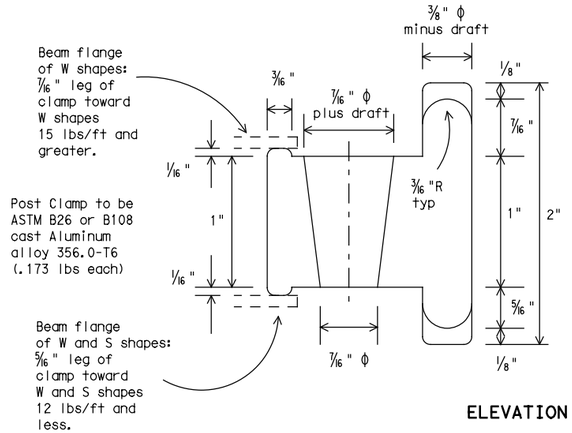
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

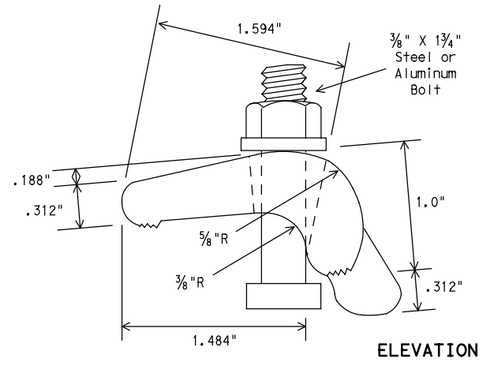


PLAN



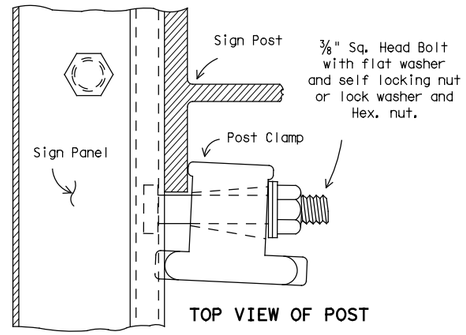
ELEVATION

POST CLAMP DETAIL

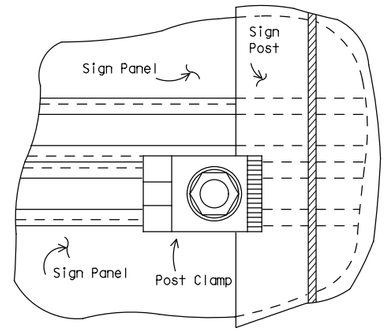


ELEVATION

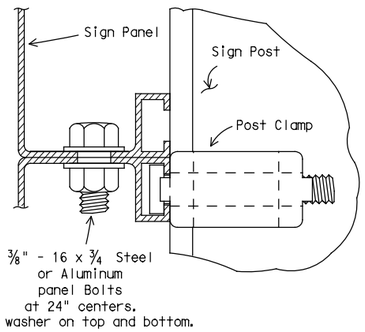
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST

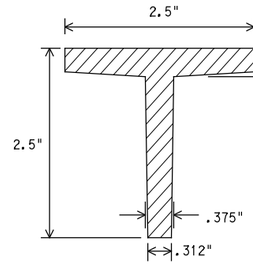


TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

CONNECTION DETAILS

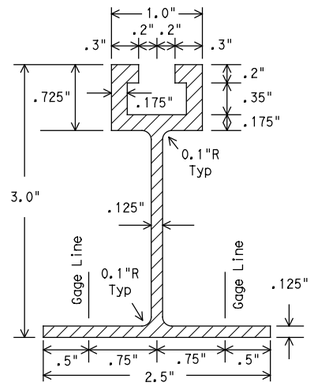


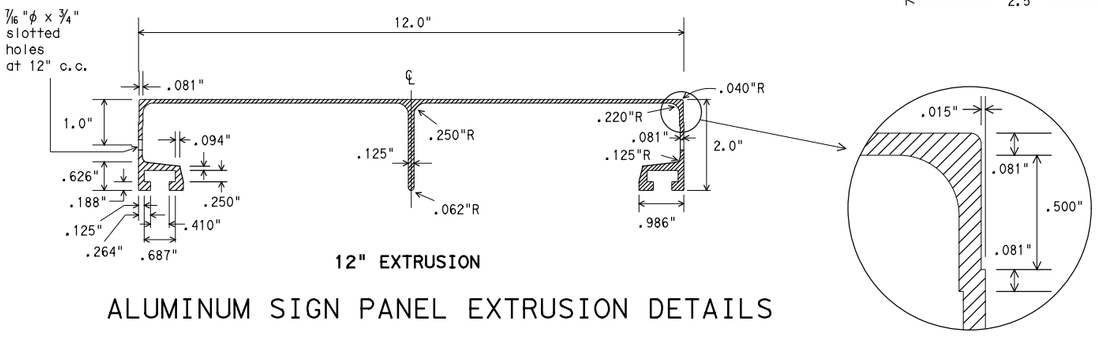
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

WINDBEAM CROSS SECTION

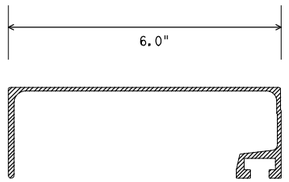
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative



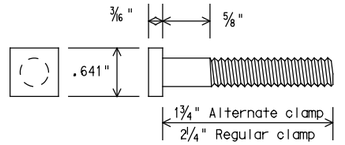


12" EXTRUSION

ALUMINUM SIGN PANEL EXTRUSION DETAILS



6" EXTRUSION



POST CLAMP BOLT DETAIL

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

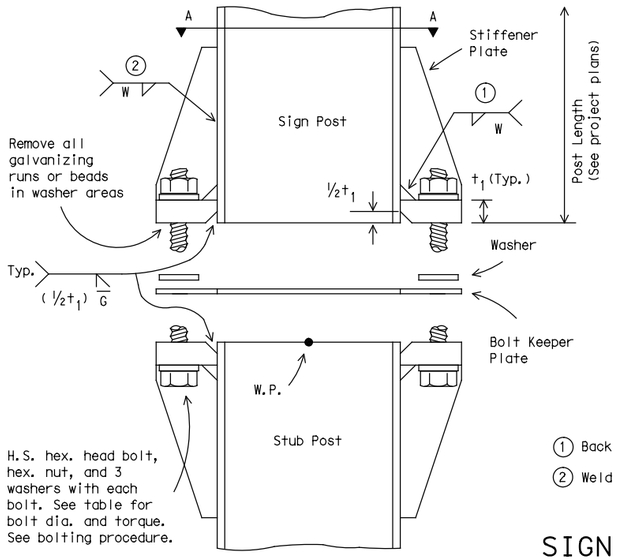
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

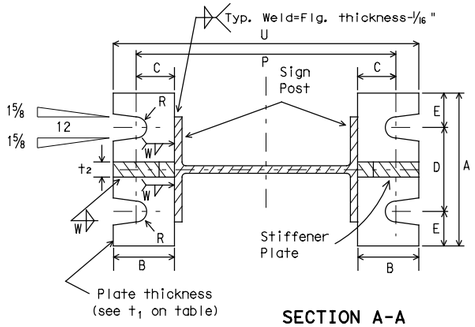
SMD(2-1)-08

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

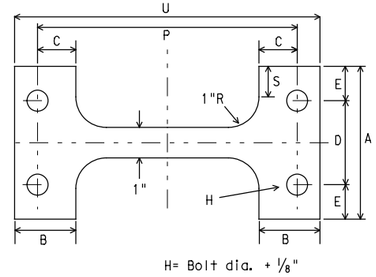
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		177



ELEVATION

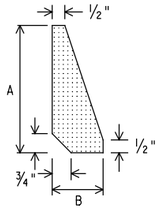


SECTION A-A



H= Bolt dia. + 1/8"

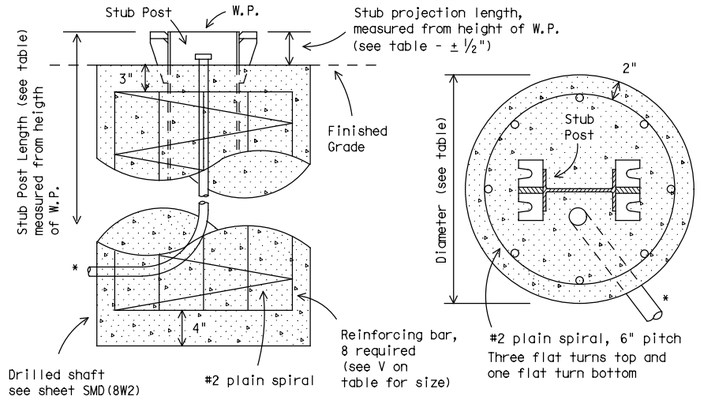
BOLT KEEPER PLATE
30 Ga galv. sheet steel



STIFFENER PLATE DETAIL

Steel Plate (thickness = t_2)

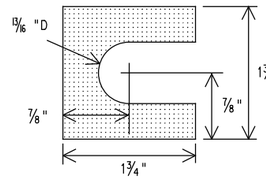
(See table for dimensions)



ELEVATION PLAN

FOUNDATION DETAIL

*Note: For signs with electrical apparatus, see ED(10) for conduit required in founation.



SHIM DETAIL

Furnish two .012"+ thick and two .032"+ thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt as shown.
2. Shim as required to plumb post.
3. Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

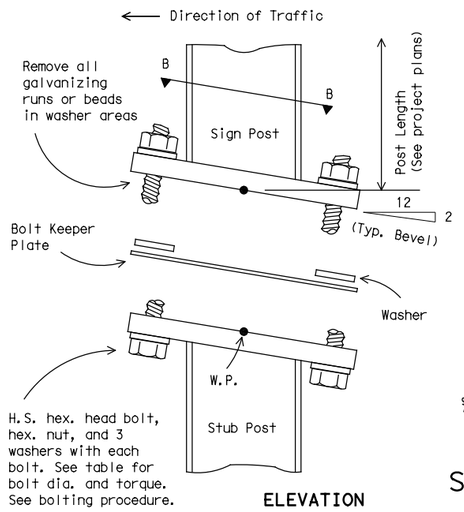
Dimensions / Post Size	Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R
W6x9	5/8"ϕ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W6x12										
W6x15										
W8x18										
W8x21	¾"ϕ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"
W10x22										
W10x26										
W12x26										
S3x5.7	½"ϕ x 2½" 440-450 inch pounds 36-38 foot pounds	See Detail Below								
S4x7.7										

Perforated Fuse Plate Data Table												Bolt Keeper Data			Foundation Data			
F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length	P	S	U	Stub length	Stub projection	Dr. Shaft diameter	Bar V Size
4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"	8⅜"	1"	9⅞"	2'-0"	3"	24"	#5
											8½"		10"				#5
5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"	8½"		10"	2'-6"	3"		#6
5"	2½"	5¼"	2¾"	1¼"	11/16"	1 1/16"	⅜"	⅝"	2.26	2¼"	10⅝"		12⅛"	2'-6"	3"		#7
5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"	11"	1½"	12¾"	3'-0"	2½"		#8
6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"	12⅞"		14⅝"	3'-0"	2½"		#9
											13⅜"		14⅞"	3'-0"	2½"		#10
6"	3"	6½"	3½"	1⅝"	13/16"	1 5/16"	½"	¾"	4.47	2¼"	15"		16¾"	3'-0"	2½"		#11
3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"	See Detail Below			3'-3½"	3½"	12"	Non-reinforced ③

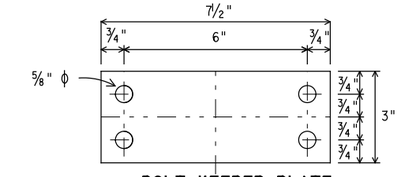
PERFORATED FUSE PLATE DETAIL

Use H.S. hex head bolts, hex head nut and bevel or flat washer (where req'd) under nut. All holes shall be drilled, sub-punched and reamed. All plate cuts shall preferably be saw cuts. However, flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be permitted. Steel fuse plates shall conform to the requirements of ASTM A36. ASTM A572 Grade 50 or ASTM A588 may be substituted for A36 at the option of the fabricator. Mill test reports shall be submitted for Fuse Plates. Steel used shall have an ultimate tensile strength not to exceed 80 KSI. For alternative Fuse Plate contact Traffic Operations Division.

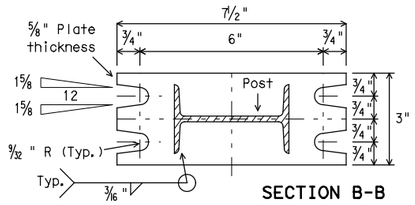
③ Foundation design shall be Type G Mount, see SMD (TY G).



ELEVATION



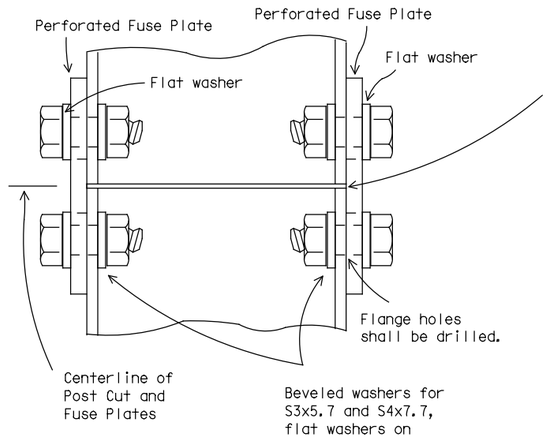
BOLT KEEPER PLATE
30 Ga galv. sheet steel



SECTION B-B

SIGN POST AND STUB POST

(For S4x7.7 and S3x5.7)



Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing."

DETAIL "A"

① Back up weld to be made before installing stiffener plate

② Weld W may be continued across clips to seal joint

SIGN POST AND STUB POST

(For W Shapes)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
4-98	CONT	SECT	JOB	HIGHWAY
9-08	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		178

DATE: 3/24/2021 5:43:09 PM
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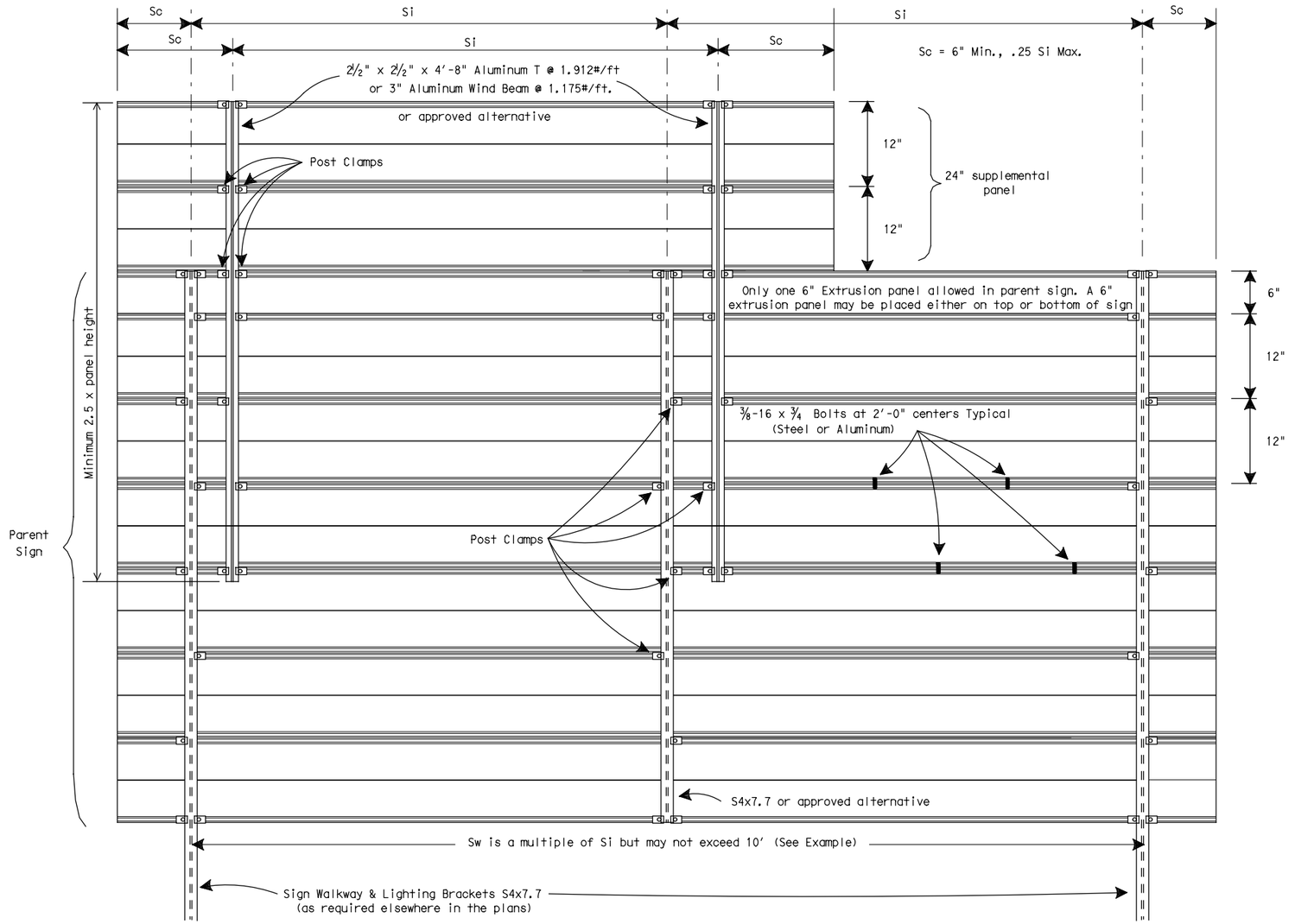
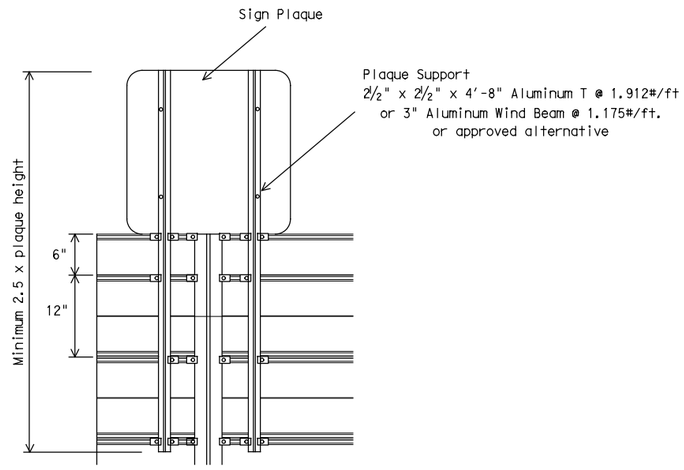


REAR VIEW

EXAMPLES (FOR DETERMINING Si and Sw)

NO.	ZONE	"d"	EXIT PANEL	WALKWAY	Si	Sw	COMMENT
1	1	15.0	YES	YES	4.5	9.0	Sw=2x(Si)
2	2	14.0	YES	NO	7.5	7.5	Sw = Si
3	1	15.0	NO	NO	8.5	8.5	Sw = Si
4	3	14.0	NO	YES	10.0	10.0	Sw = Si

Values shown for Si are maximum values. Si may be varied for different sign lengths and Truss mounting conditions. Sw should not exceed two times Si(Max.) or 10 feet.



SIGN PLAQUE MOUNTING DETAIL

MAXIMUM SIGN SUPPORT SPACING "Si" (FEET)

"d" Deepest Sign in Group (Ft.)	EXTRUDED ALUMINUM SIGN PANELS															
	WITH EXIT NUMBER PANELS								WITHOUT EXIT NUMBER PANELS							
	WITH WALKWAYS				WITHOUT WALKWAYS				WITH WALKWAYS				WITHOUT WALKWAYS			
	WIND ZONE				WIND ZONE				WIND ZONE				WIND ZONE			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
15	4.5	7	8	10	5	7	8	10	7	8	9	10	8.5	10	10	10
14	6	7.5	9.5	10	6	7.5	9.5	10	8	9	10	10	10	10	10	10
13	7.5	9	10	10	7.5	9	10	10	9	10	10	10	10	10	10	10
12	8.5	10	10	10	8.5	10	10	10	10	10	10	10	10	10	10	10
11 or less	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

For fiberglass sign installations, see manufacturer's recommendations.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS-OVERHEAD SIGNS EXTRUDED ALUMINUM

SMD(2-4)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.

DIST	COUNTY	SHEET NO.
14	TRAVIS	179

27D

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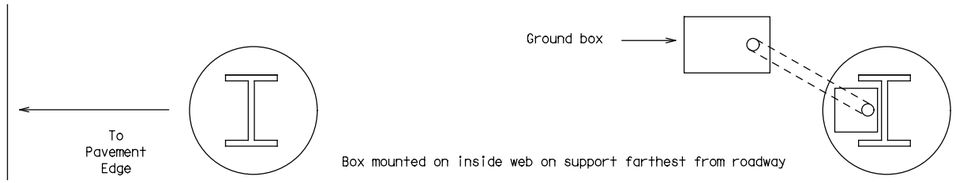
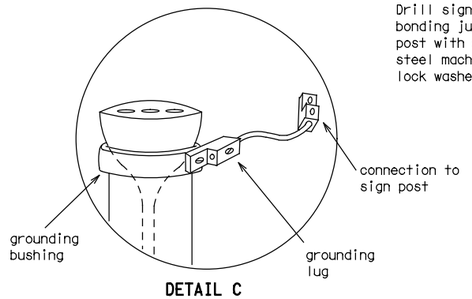


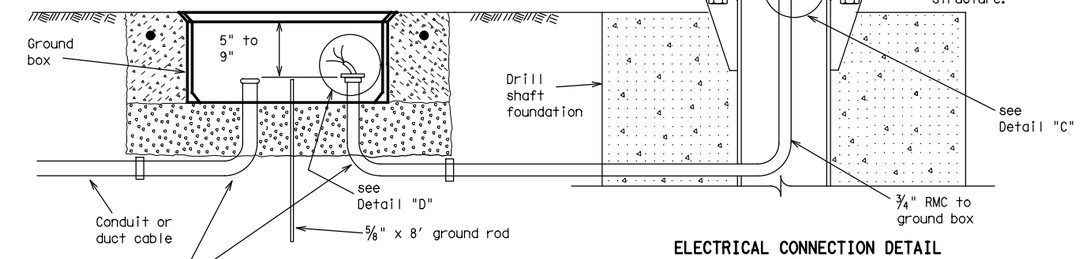
PLAN VIEW



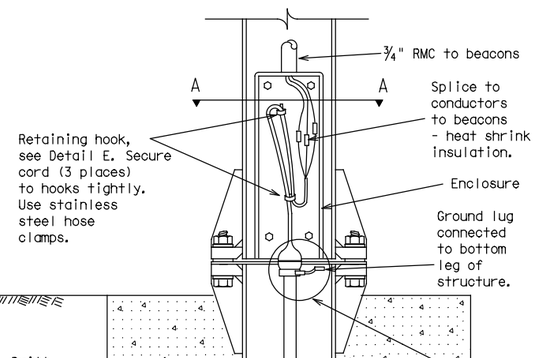
DETAIL C

Drill sign post - structure leg, terminate bonding jumper with listed connector to post with a 10-24 (3/16") min. stainless steel machine screw, nut, flat washer and lock washer made wrench tight.

2 Pull connector down tight against conduit then clamp in ground box. See Detail "D"

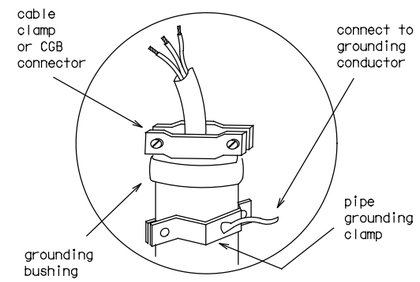


Use RMC Ells, provide grounding bushings. Terminate bonding jumper to ground rod and equipment grounding conductors.



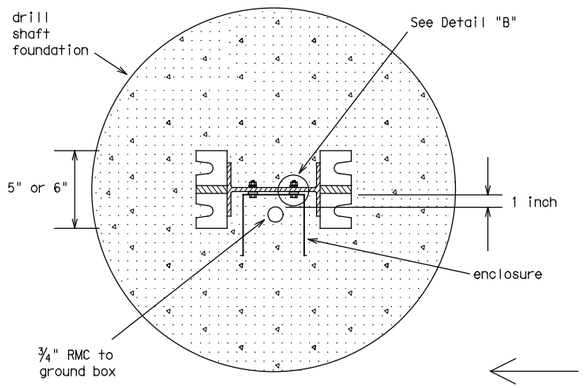
ELECTRICAL CONNECTION DETAIL

Enclosure cover not shown for clarity
Detail shows channel greater than 4 inches.
Less than 4 inches similar, see Detail A.



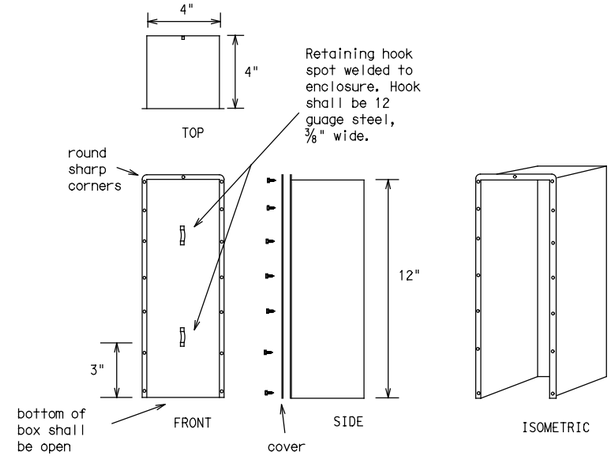
DETAIL D

Pull cable so opposite end connector is tight against conduit end, clamp cable at top of conduit as shown.



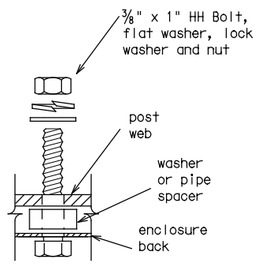
SECTION A-A

Stub-post connection
conduit, bolts and enclosure
(cover not shown)



ENCLOSURE

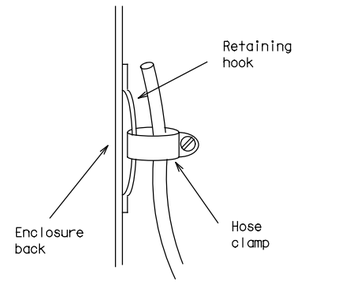
make from 12 gauge
galvanized sheet metal



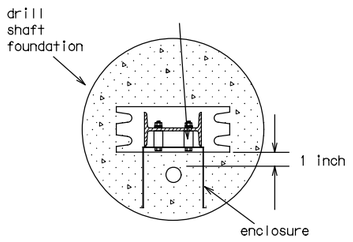
DETAIL B

enclosure connection
(4 places)

(use 2 inch bolt for
3 and 4 inch channels)



DETAIL E



DETAIL A

Stub-post connection
conduit, bolts and enclosure
for 3 and 4 inch channel
(cover not shown)

direction of
traffic

NOTES:

1. Breakaway connector shall be rated for 300 VAC, 30 amps and shall be waterproof. Connector shall be a three pole (two line conductors and neutral) polarized elastomer connector made from thermosetting synthetic polymer which remains fexible over the temperature range of -40 degrees C to 90 degrees C. The pins on the connector shall be overmolded 1 ¼" from the face of the connector toward the tips of the pins with the same material used in the construction of the connector body. This overmolding of the pins shall provide a non-conductive double taper which prevents the intrusion of water into the connection when the connectors are fully engaged. The pin receptors shall have current carrying barrels recessed 1 ½" from the face of the connector and surrounded by beryllium copper spring sleeves. The plug/receptacle combination shall be listed by an approved testing facility (UL or Factory Mutual) as suitable for outdoor use and shall have passed a rain test and a watertight (immersion) test as approved by the Engineer.
2. The female connector shall be integrally molded to a 13' length of type SO cord containing three number 10 or number 8 AWG conductors. The male connector shall be integrally molded to a 20" length of Type SO cord containing three number 10 or number 8 AWG conductors. Cord conductors shall have colored insulation, two black and one white, or shall be taped or painted to be two black and one white. Tape or paint marking shall cover entire exposed length. The contractor shall make a brochure submittal on cord connectors. Breakaway connector and cord shall not be paid for separately, but shall be subsidiary to the various items.
3. The contractor shall install in-line waterproof fuseholders for each line conductor in the ground box. Fuses shall be fast-acting 5 amp (Bussman KTK5, Gould ATM5, Littlefuse KLK5 or equal).
1 4. Conduit shall convert to ¾" liquidtight flexible metalic conduit below the fuse plate or knee joint and shall revert to ¾" RMC above the fuse plate or knee joint. The length of liquidtight flexible metal conduit shall not exceed 6".
5. Ground rod clamp shall be Blackburn GG 5/8H, Weaver W5.8 or equal.
6. Ground rod to be driven to a depth to leave between 2 to 4 inches of rod above the gravel placed under the ground box. See ED(2) standard sheet for ground box details.

11-01 Revision

1 Liquidtight conduit size corrected.
2 Editing of minor notes.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS-LARGE ROADSIDE SIGNS ELECTRICAL CONNECTION

SMD(2-6)-01

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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11-01	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		180

DATE: 3/24/2021 5:43:15 PM
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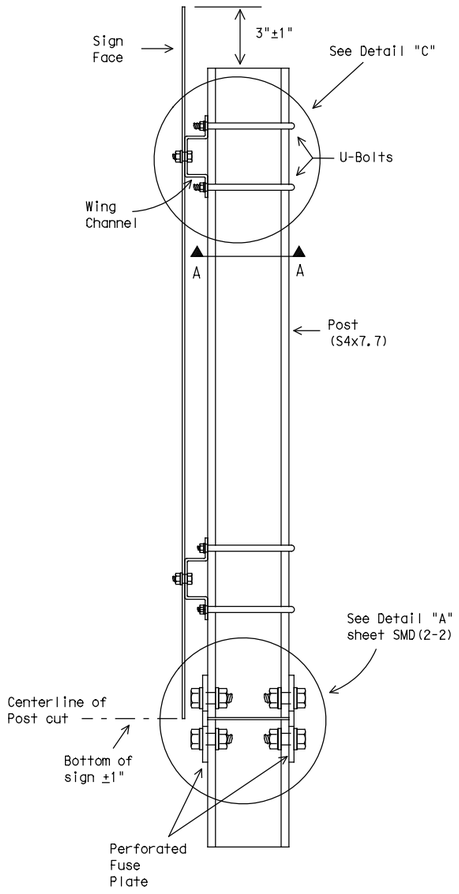
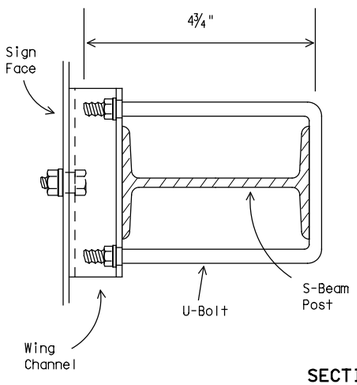
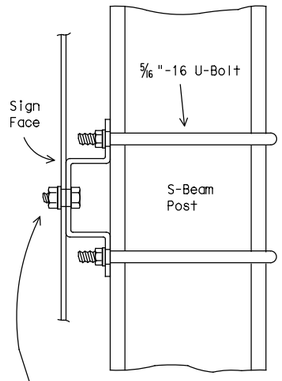
WING CHANNEL CLAMP DETAIL FOR TYPE G MOUNT



SIDE VIEW

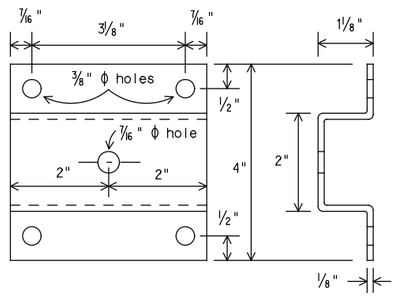


SECTION A-A



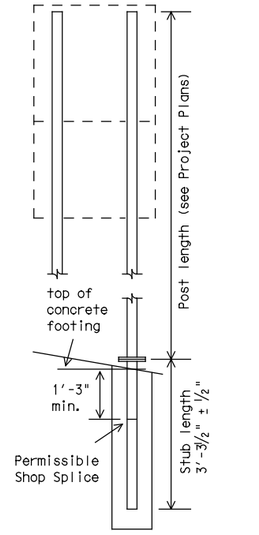
Galvanized steel or aluminum self-locking hex. head nut. 3/8 " - 16 x 3/4 " hex. head bolt for sheet metal. 3/8 " - 16 x 1 1/4 " hex. head bolt for plywood. 3/8 " galvanized medium washer.

DETAIL "C"

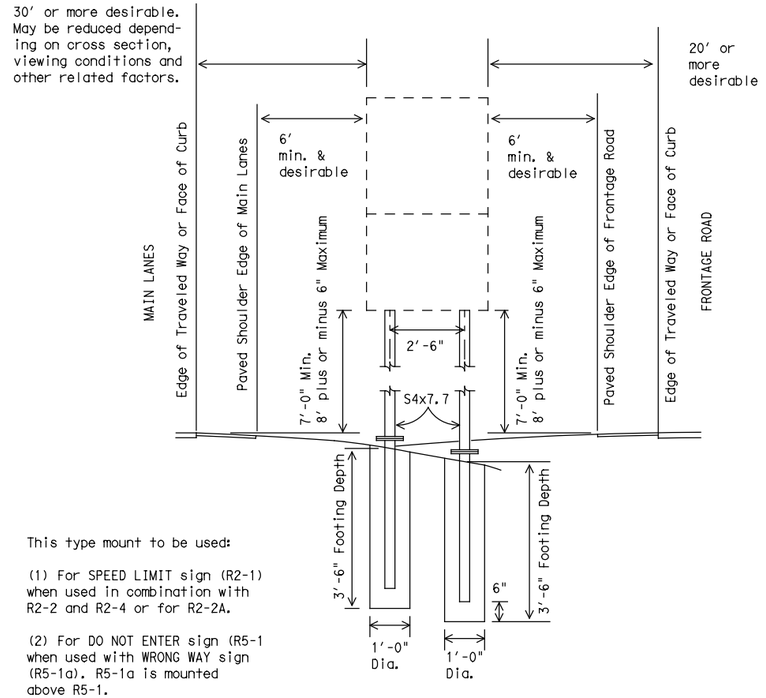


WING CHANNEL

Wing channel, 4" width x 1⅛" depth x ⅛" thickness, shall be aluminum (ASTM B221 6061-T6 or B308 6061-T6), galvanized steel (ASTM A36) or stainless steel (ASTM A167 type 304, No. 2B finish).



The weight of one S4x7.7 post is equal to 112.2 lbs. plus 7.7 lbs./ft x (post length in feet minus 10 ft). The weight of 112.2 lbs. includes 10 feet of post length, post foundation stub, related connection plates, friction fuse plate, and all high strength bolts, nuts and washers.



This type mount to be used:

(1) For SPEED LIMIT sign (R2-1) when used in combination with R2-2 and R2-4 or for R2-2A.

(2) For DO NOT ENTER sign (R5-1 when used with WRONG WAY sign (R5-1a). R5-1a is mounted above R5-1.

DEPARTMENTAL MATERIAL SPECIFICATIONS
SIGN HARDWARE DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures."
4. Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing." (Cut surface will not be treated until plate is installed and all bolts fully tightened.)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS, TYPE G SUPPORT

SMD(TY G)-08

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

REVISIONS
1-97
9-08

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		181

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

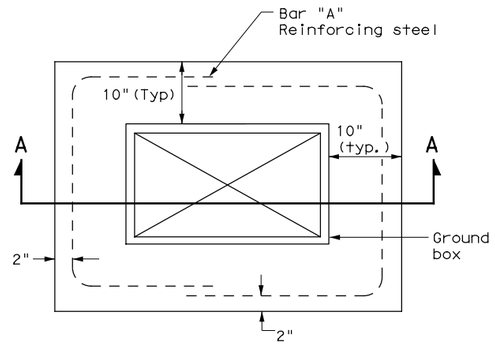
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

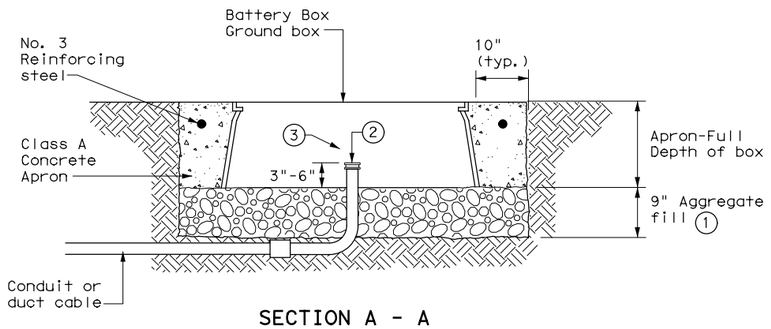
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



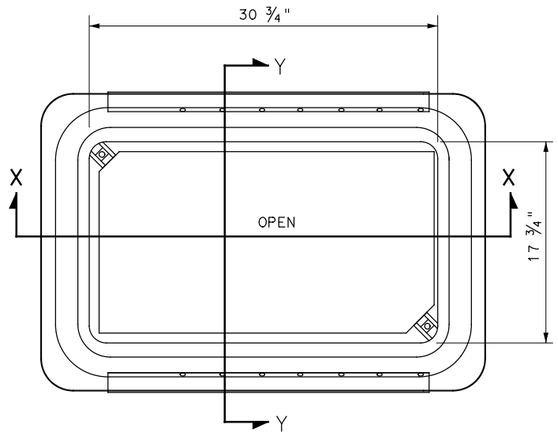
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

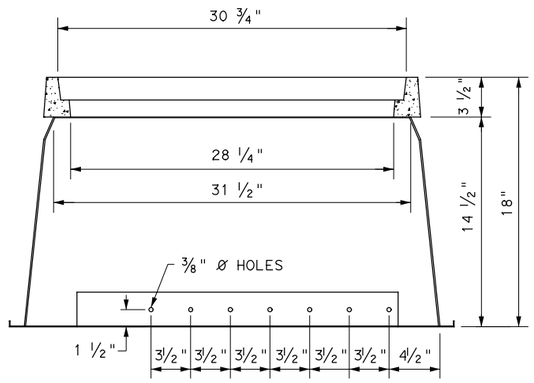
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

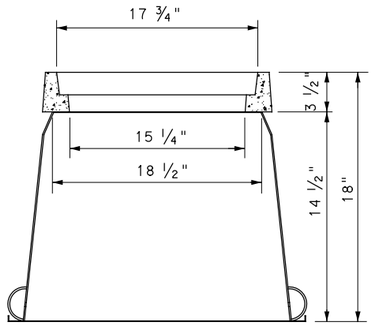
(3) Install all conduits in a neat and workmanlike manner.



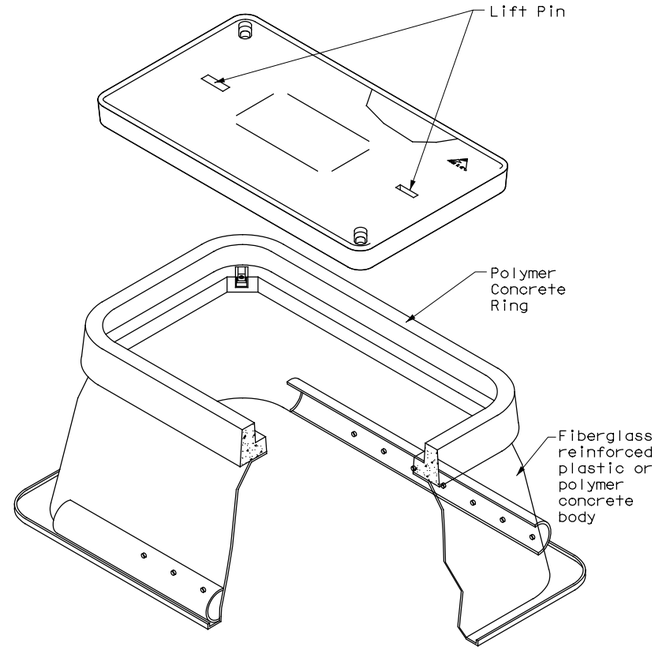
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT			
©TxDOT October 2014	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0152	01	080, ETC.		US 183, ETC.		
	DIST	COUNTY			SHEET NO.		
	14	TRAVIS			182		

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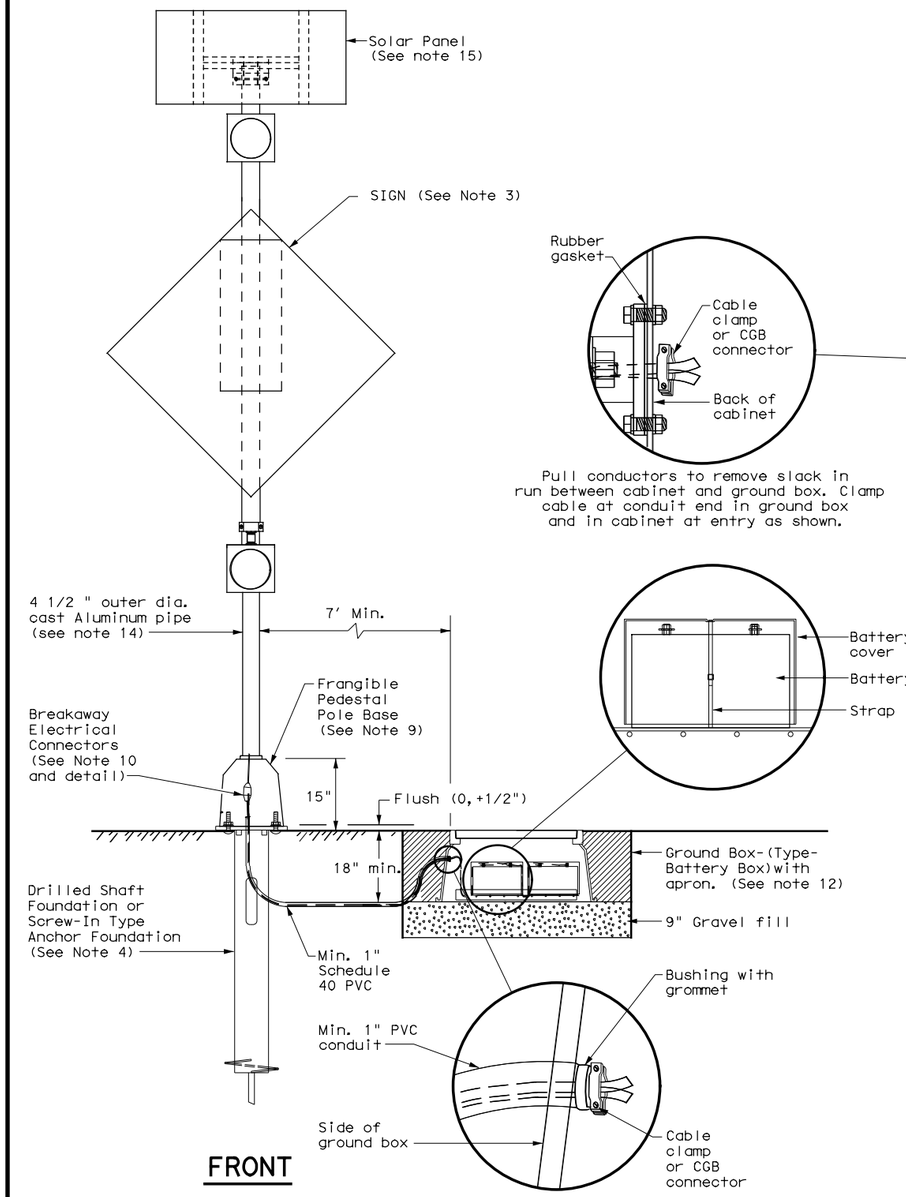
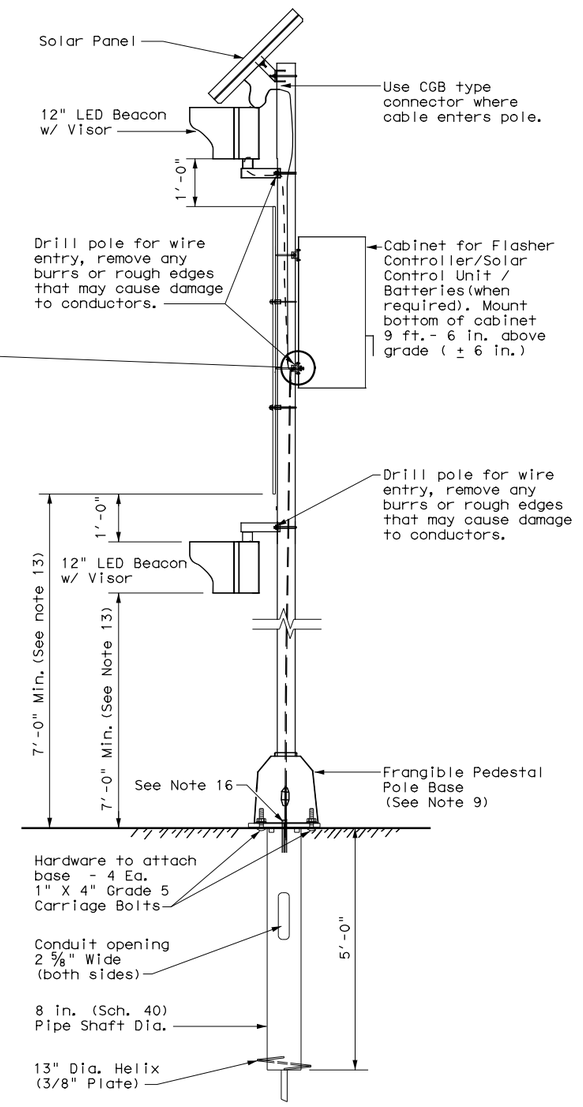
GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
7. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
11. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16" plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
12. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
13. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
14. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
15. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
16. Ensure height of conduit is below top of anchor bolts.

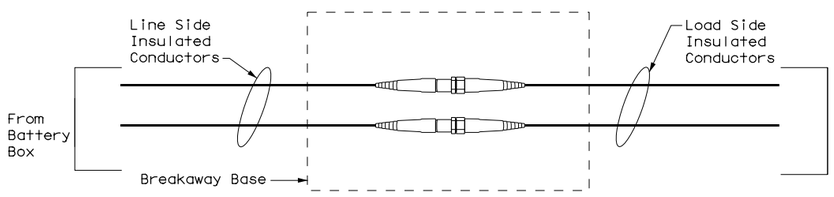


FRONT

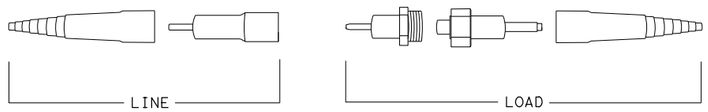
Pull conductors to remove slack in run between cabinet and ground box. Clamp cable at conduit end in ground box and in cabinet at entry as shown.



SIDE



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS

SPRFBA(1)-13

FILE: spb1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
12-04 3-13	DIST	COUNTY		SHEET NO.
	14	TRAVIS		183

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FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

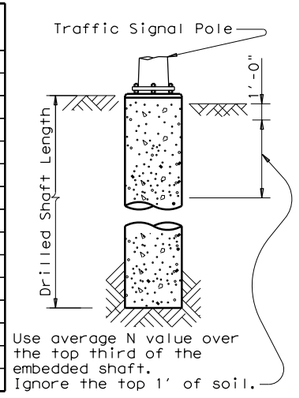
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
POLE B	10	30-A	1		11			
POLE D	10	36-A	1			13		
US 183 AND MCKENZIE RD								
TOTAL DRILLED SHAFT LENGTHS					11	13		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

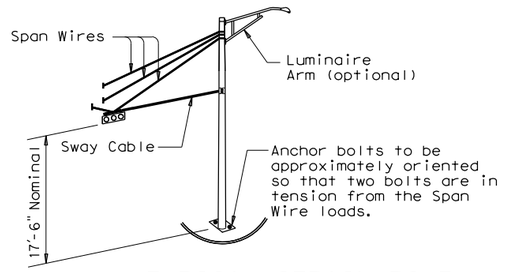


ANCHOR BOLT & TEMPLATE SIZES

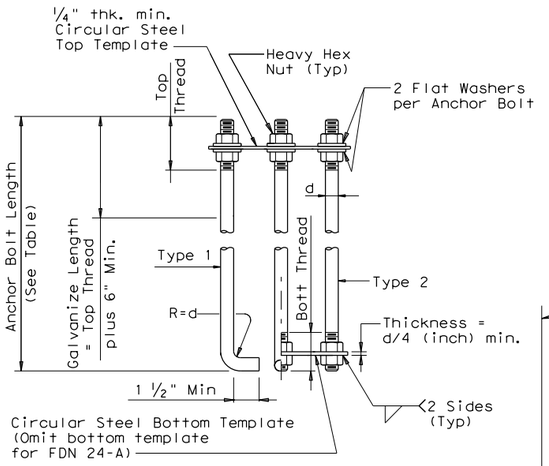
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

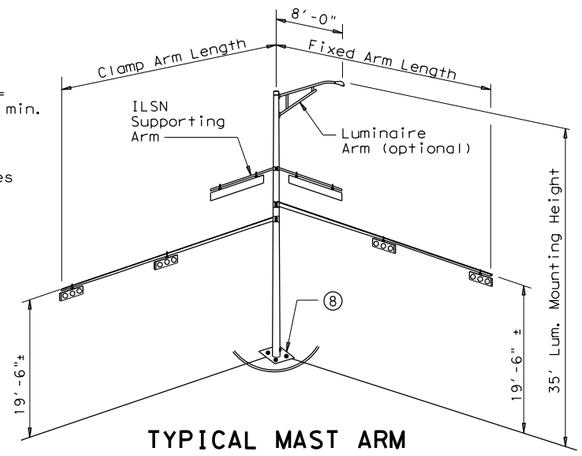


TYPICAL STRAIN POLE ASSEMBLY



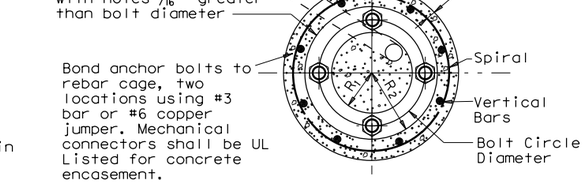
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

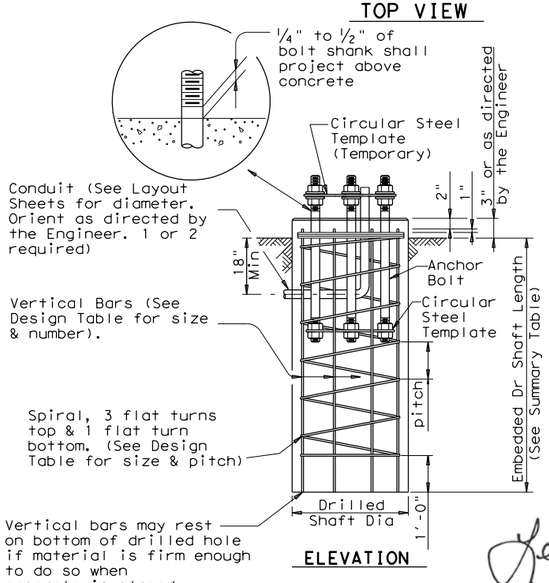


⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

Texas Department of Transportation
Traffic Operations Division

US 183 & MCKENZIE RD TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS
5-96
11-99
1-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.

DIST	COUNTY	SHEET NO.
14	TRAVIS	184

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Shipping Parts List						
Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table.						
Nominal Arm Length	30' Poles with Luminaire See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		24' Poles with ILSN See note above plus one small hand hole		19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN See note above	
Single Mast Arm						
Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L	1	50S		50	
55	55L		55S		55	
60	60L		60S		60	1
65	65L		65S		65	
Dual Mast Arm						
Lf ft. / Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50 / 20	5020L		5020S		5020	
50 / 24	5024L		5024S		5024	
50 / 28	5028L		5028S		5028	
50 / 32	5032L		5032S		5032	
50 / 36	5036L		5036S		5036	
50 / 40	5040L		5040S		5040	
50 / 44	5044L		5044S		5044	
55 / 20	5520L		5520S		5520	
55 / 24	5524L		5524S		5524	
55 / 28	5528L		5528S		5528	
55 / 32	5532L		5532S		5532	
55 / 36	5536L		5536S		5536	
55 / 40	5540L		5540S		5540	
55 / 44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
60 / 24	6024L		6024S		6024	
60 / 28	6028L		6028S		6028	
60 / 32	6032L		6032S		6032	
60 / 36	6036L		6036S		6036	
60 / 40	6040L		6040S		6040	
60 / 44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
65 / 24	6524L		6524S		6524	
65 / 28	6528L		6528S		6528	
65 / 32	6532L		6532S		6532	
65 / 36	6536L		6536S		6536	
65 / 40	6540L		6540S		6540	
65 / 44	6544L		6544S		6544	

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
POLE A	10	1	22
POLE C	10	1	22
US 183 AND MCKENZIE RD			
Total Drill Shaft Length			44

Notes

** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

*** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Shipping Parts List		
Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm with listed equipment attached		
Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	1
55	55IV	
60	60IV	1
65	65IV	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	1

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	2

Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

03/25/2021

STATE OF TEXAS
LESLIE D. POLLACK
101285
LICENSED
PROFESSIONAL ENGINEER

Leslie D Pollack

Texas Department of Transportation
Traffic Operations Division

US 183 & MCKENZIE RD
LONG MAST ARM ASSEMBLY
PARTS LIST
LMA(5)-12

Sheet 5 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		185

131E

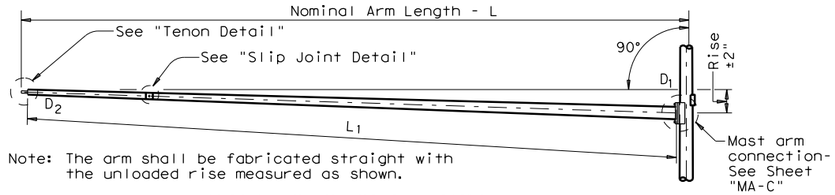
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

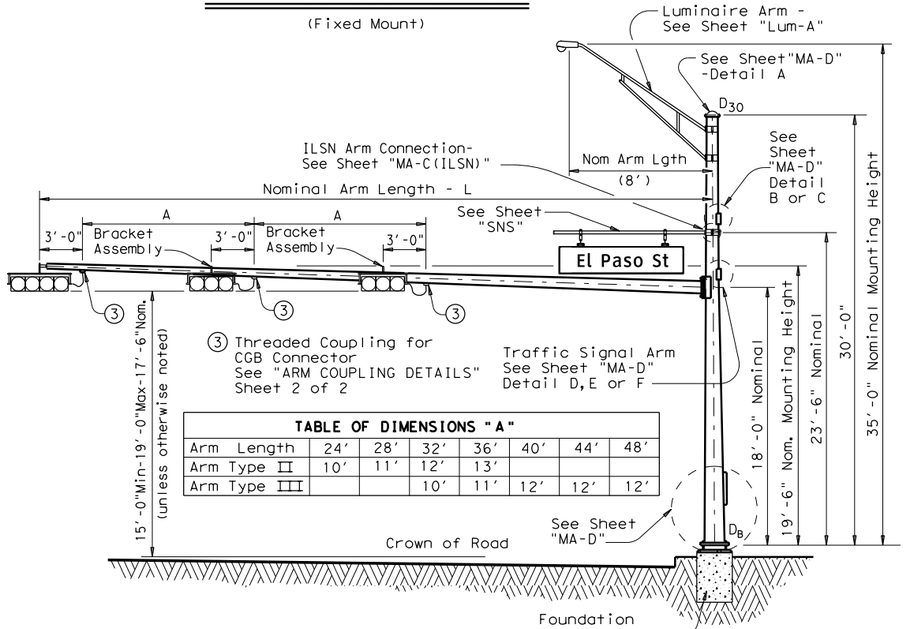


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80	1	28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80	1	48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	
48					48III-80	1

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3′-4"	1
1 ¾"	3′-10"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

STATE OF TEXAS
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03/25/2021
Leslie D Pollack

Texas Department of Transportation
Traffic Operations Division

US 183 & MCKENZIE RD

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)

SMA-80(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		186

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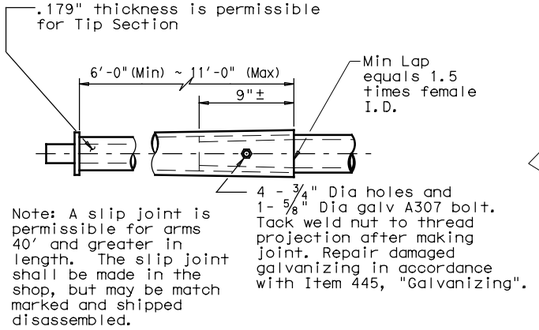
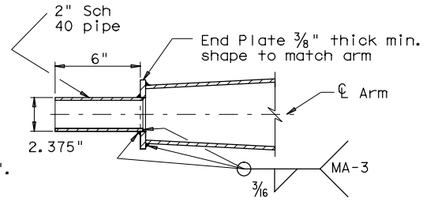


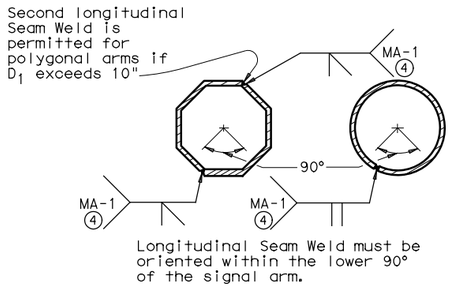
SLIP JOINT DETAIL



TENON DETAIL

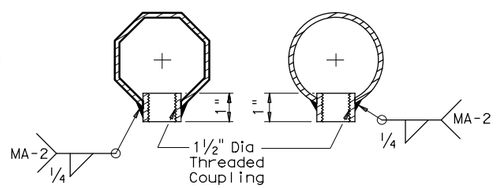
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		187

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0152	01	080, ETC.	US 183, ETC.
		DIST	COUNTY		SHEET NO.
		14	TRAVIS		188

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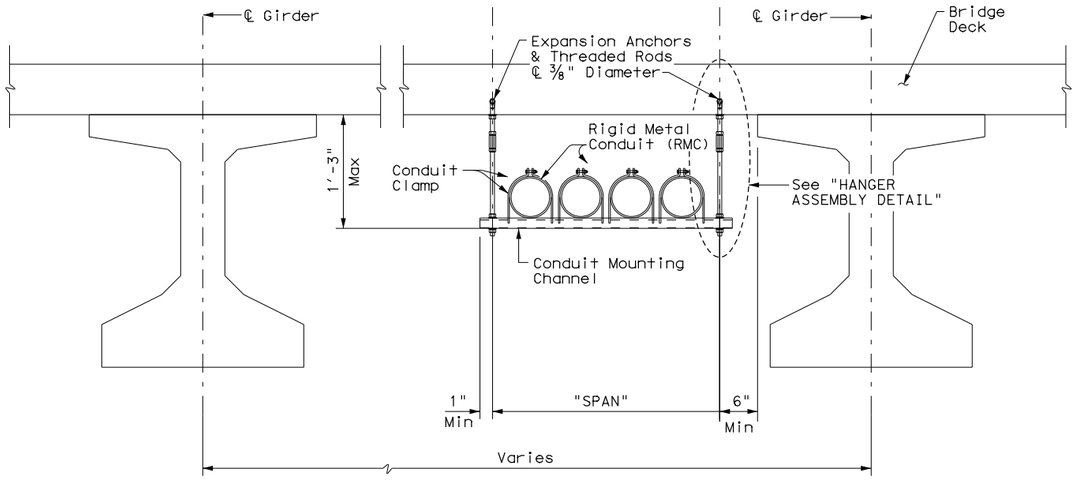
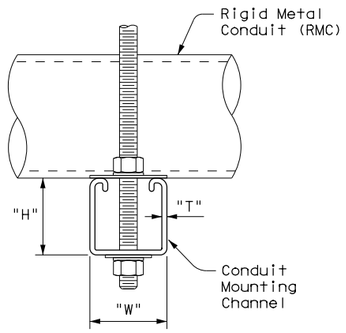
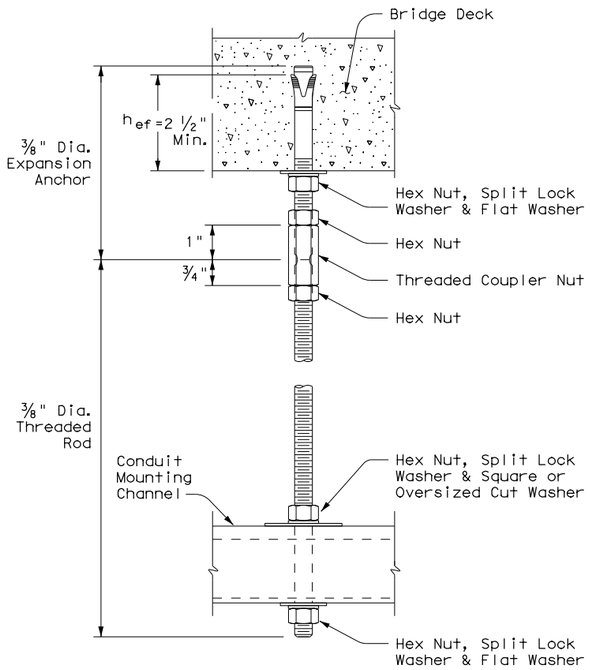


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

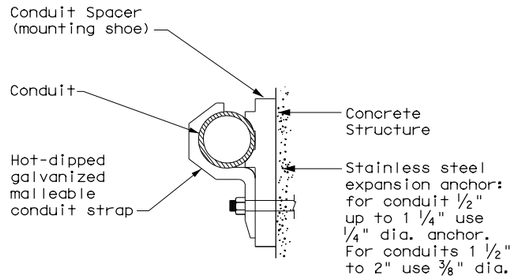
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

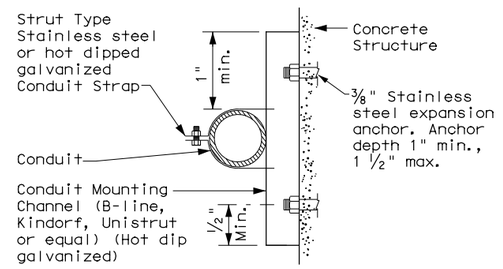




HANGER ASSEMBLY DETAIL

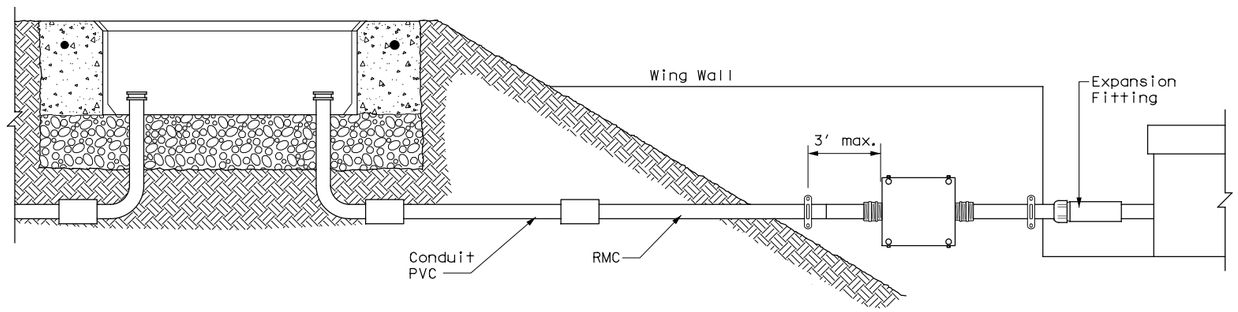
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.

4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.

5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef})as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.

6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUIT SUPPORTS

ED(2)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

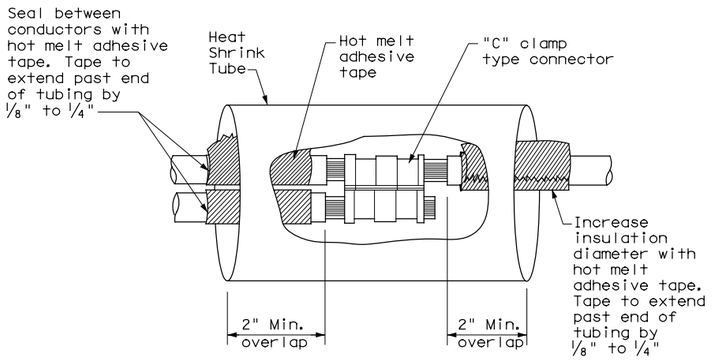
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

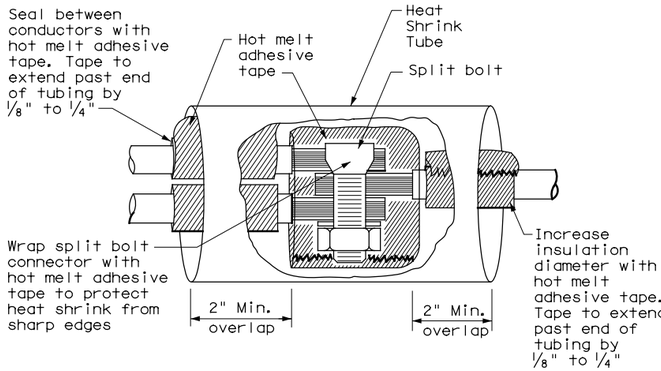
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

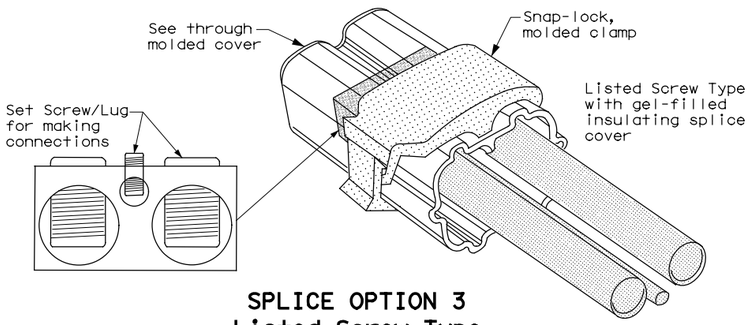
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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ELECTRICAL DETAILS CONDUCTORS

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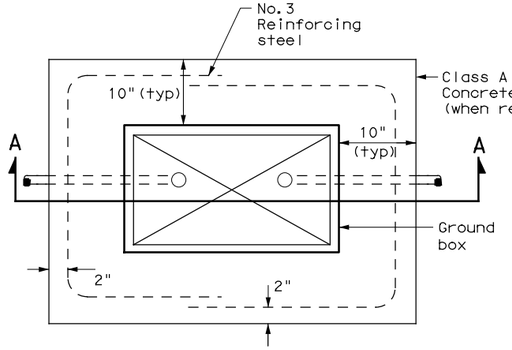
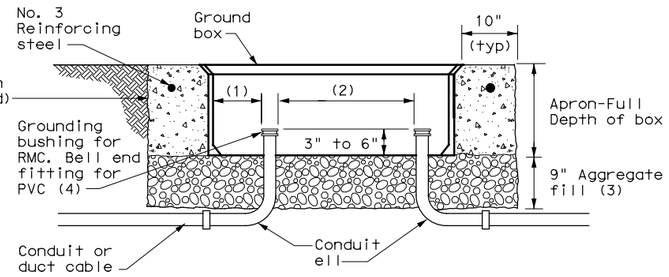


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

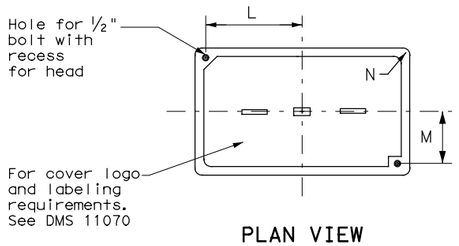
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

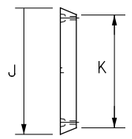
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

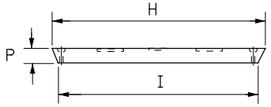
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

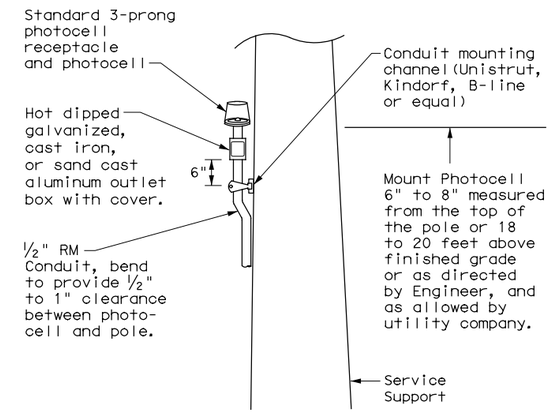
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
  (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS= Galvanized steel("off the shelf")
  SS= Stainless steel(Custom Enclosure)See MPL
  AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  (E)= Inside Service/Enclosure Mounted
  (T)= Top of pole
  (L)= Luminaire mounted
  (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Service on traffic signal pole
  PS= Pedestal Service
- O= Overhead Service Feed from Utility
  U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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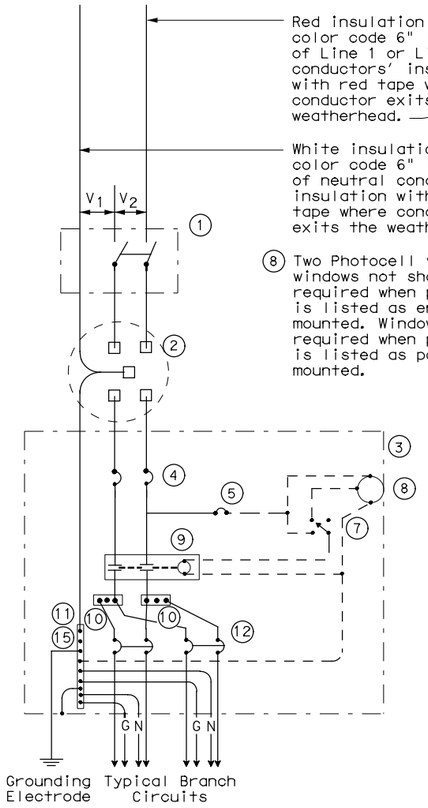
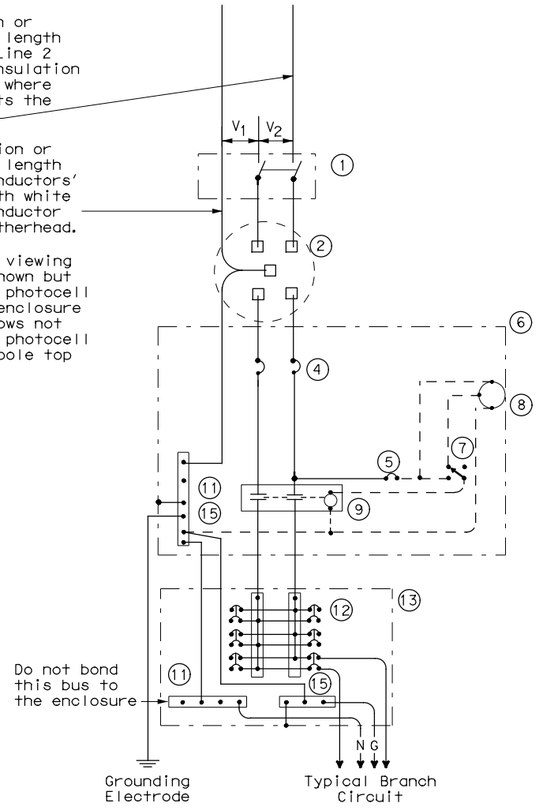
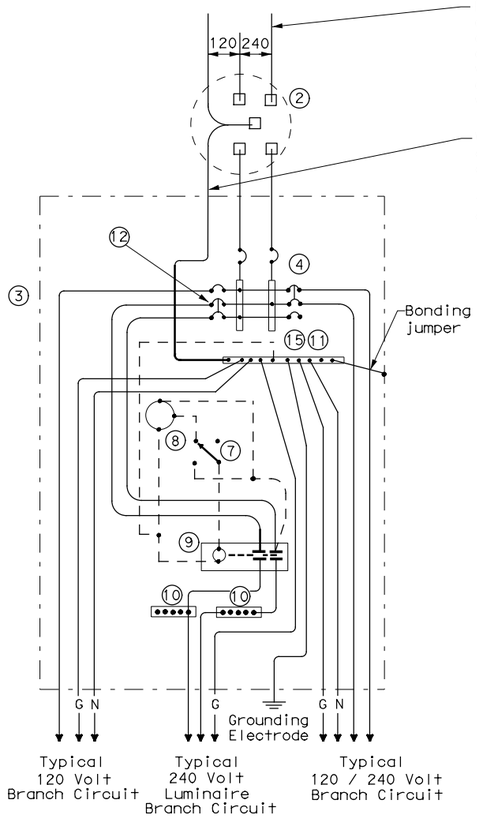


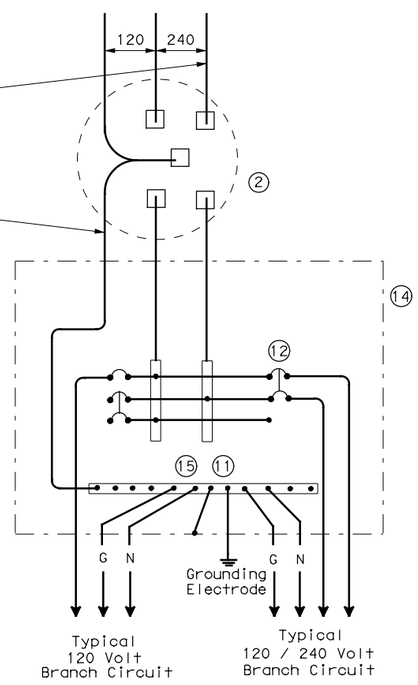
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	14	TRAVIS		193

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

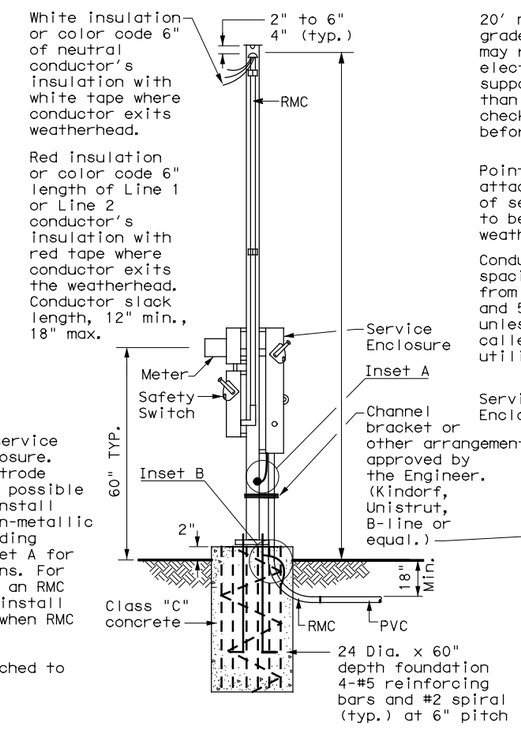
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

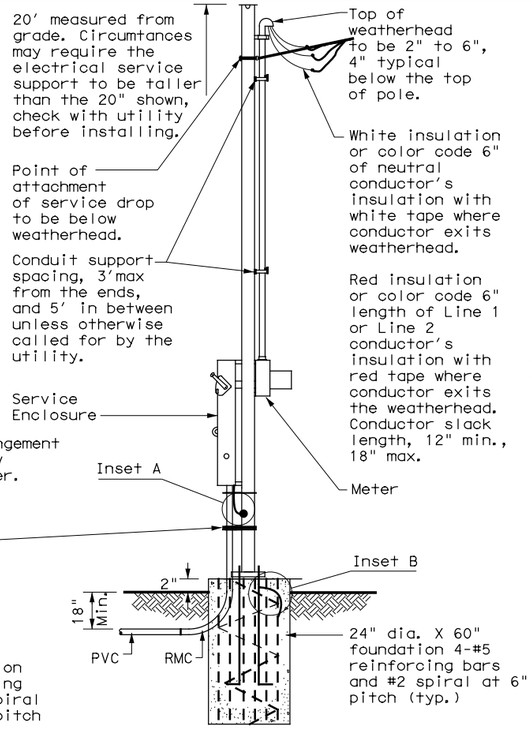
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

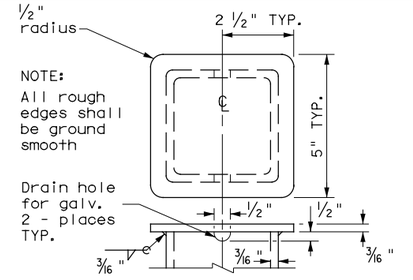


WITH SAFETY SWITCH

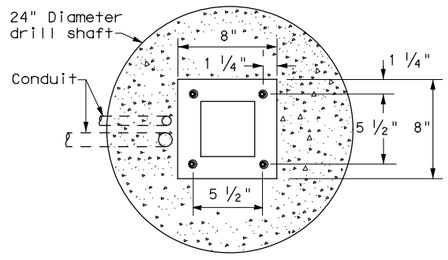


WITHOUT SAFETY SWITCH

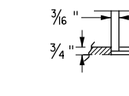
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

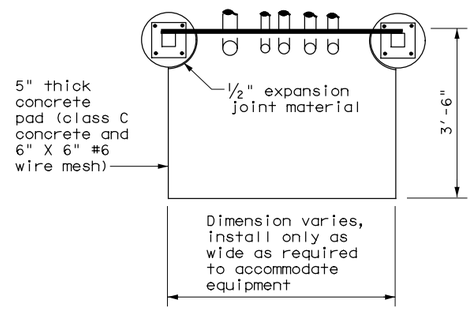


BASE PLATE DETAIL



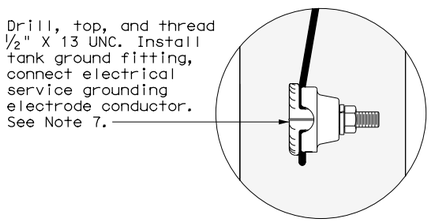
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



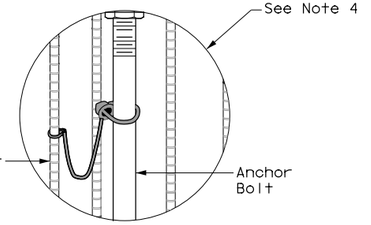
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

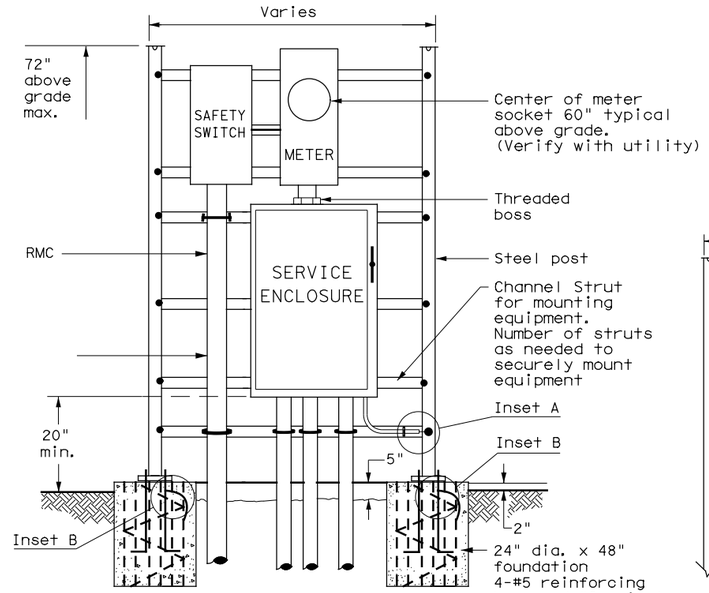


FRONT VIEW

INSET A

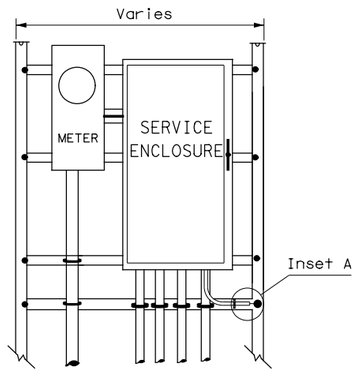


INSET B



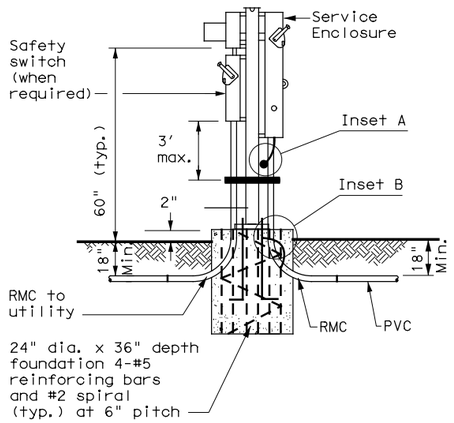
WITH SAFETY SWITCH

FRONT VIEW

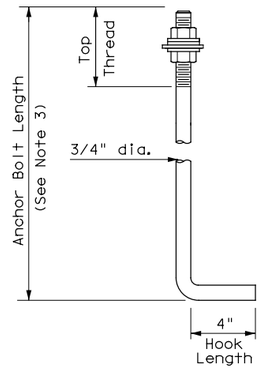


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		194

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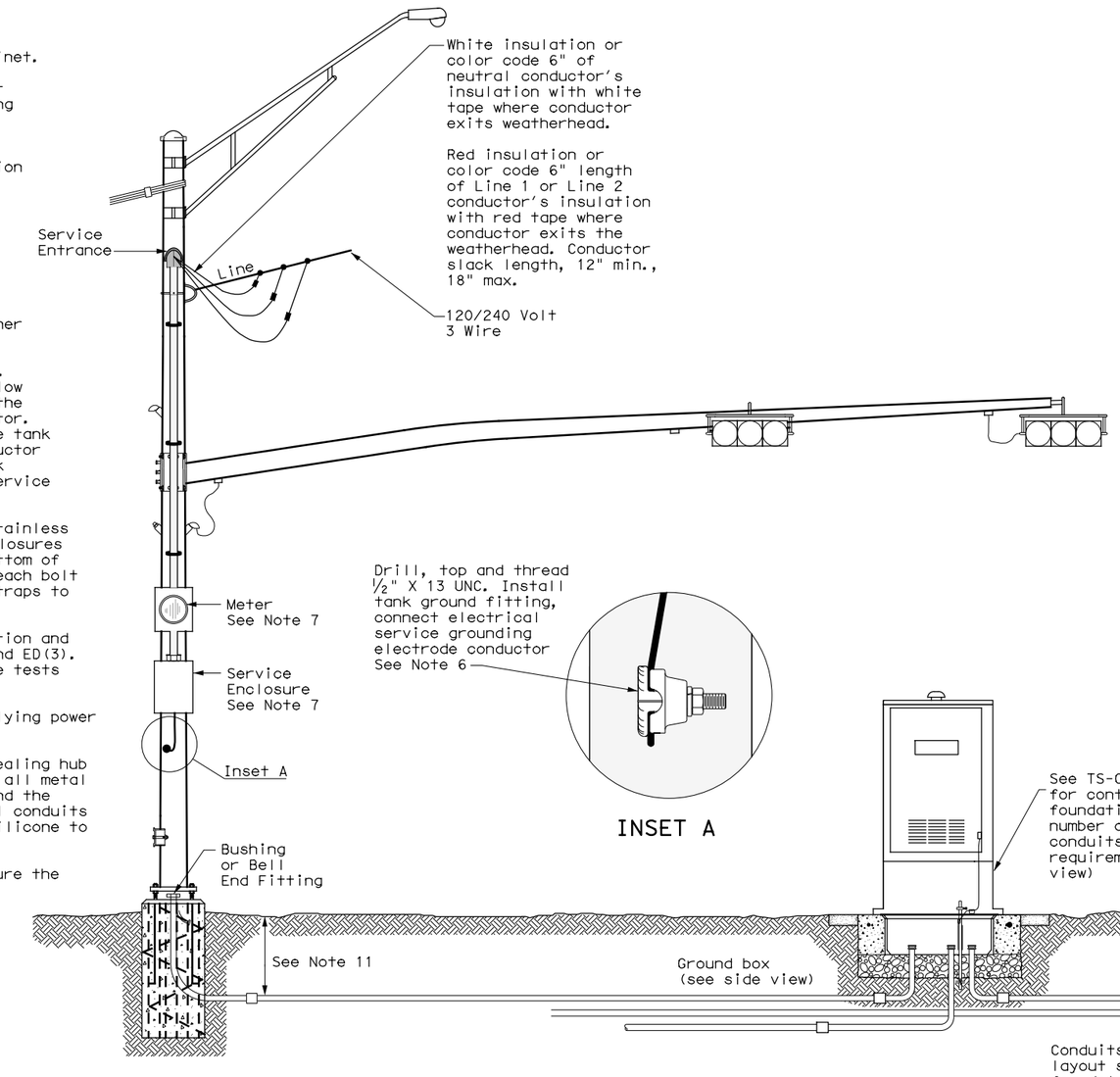
TRAFFIC SIGNAL NOTES

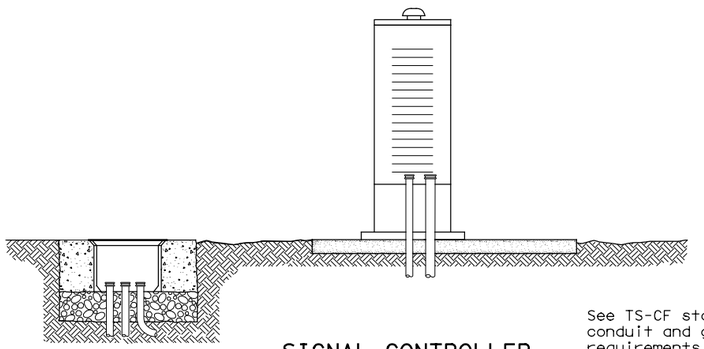
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

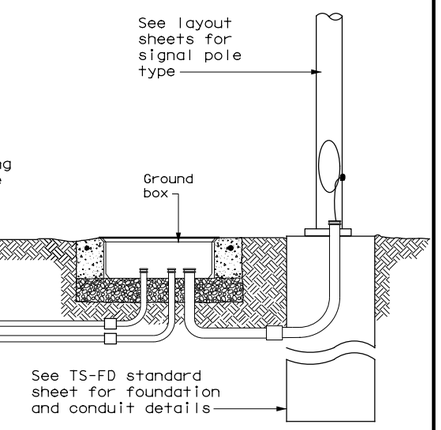
INSET A



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
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	14	TRAVIS		195

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

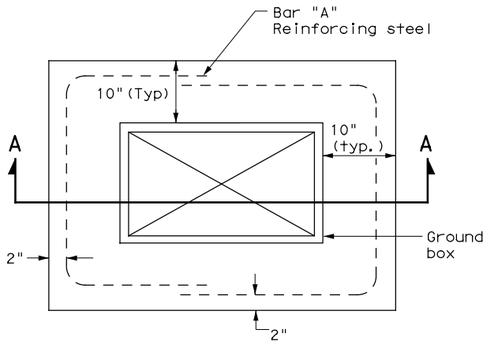
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

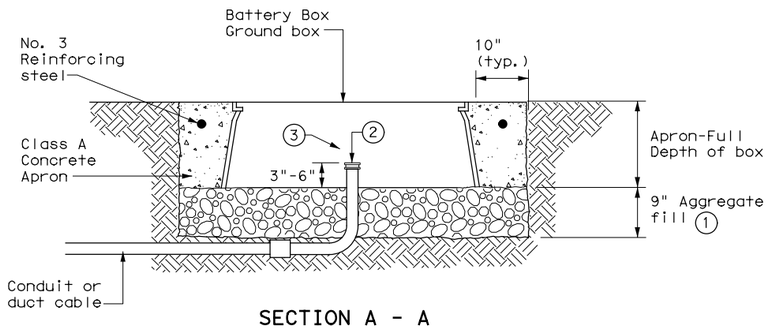
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



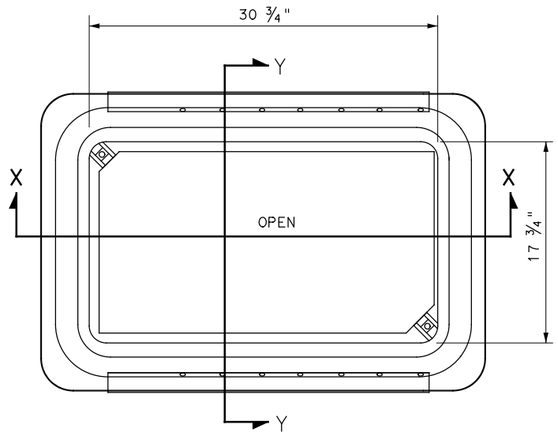
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

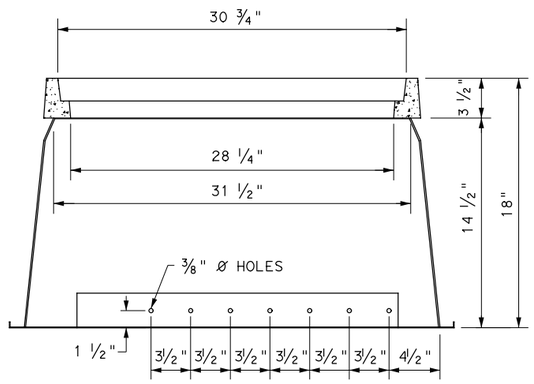
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

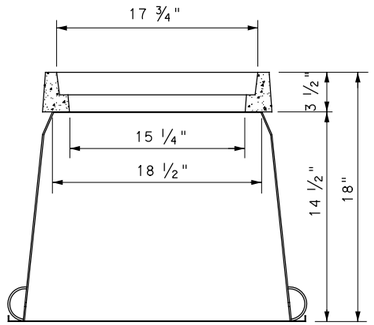
(3) Install all conduits in a neat and workmanlike manner.



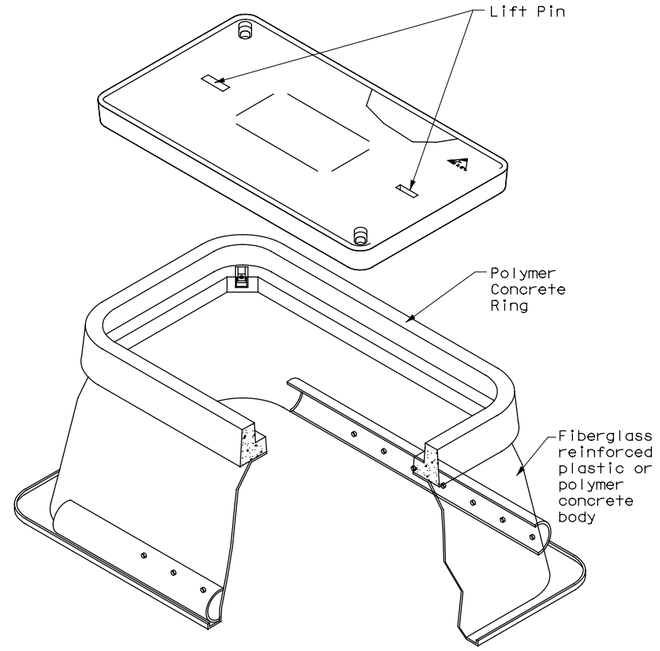
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS BATTERY BOX GROUND BOXES

ED(12)-14

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©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

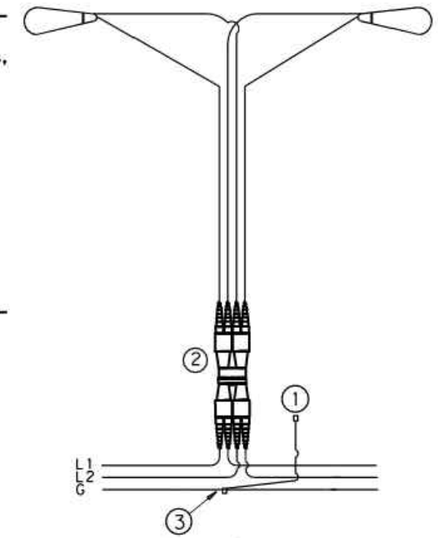
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

① Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

③ Split Bolt or other connector.



L1, L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

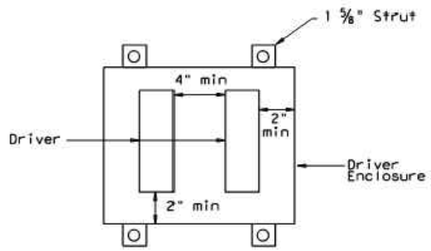
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation — Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-20

FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	1	80, ETC.	183, ETC.
7-17	DIST	COUNTY		SHEET NO.
12-20	14	TRAVIS		196

T2A

DATE:
FILE:

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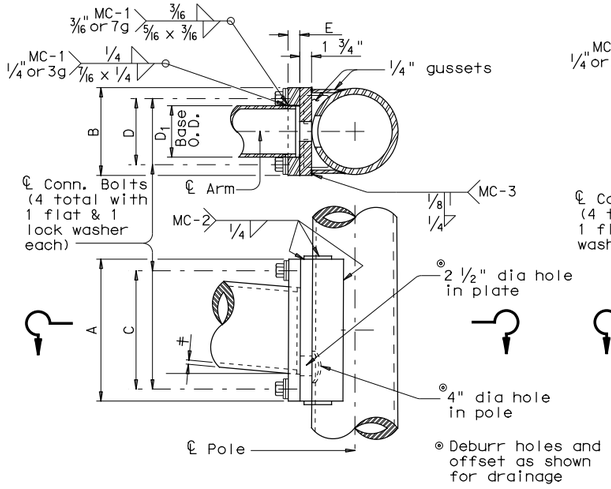
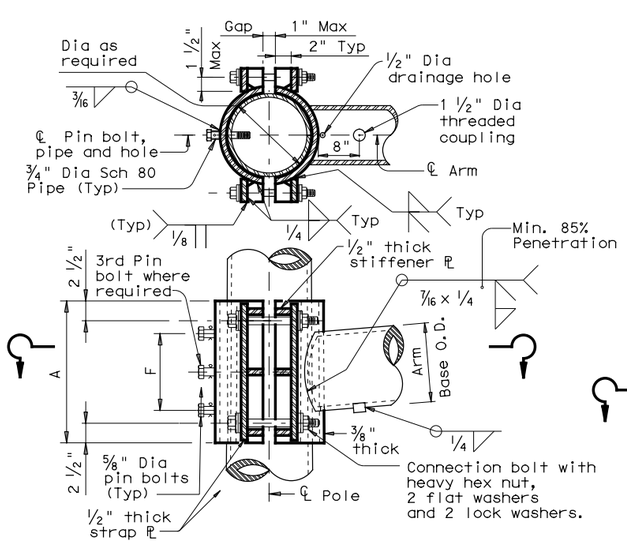
DATE: 3/24/2021 5:16:17 PM
FILE: c:\pwworking\central01\d0461046\mac.dgn

ARM SIZE D_1	ARM SIZE ∓	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



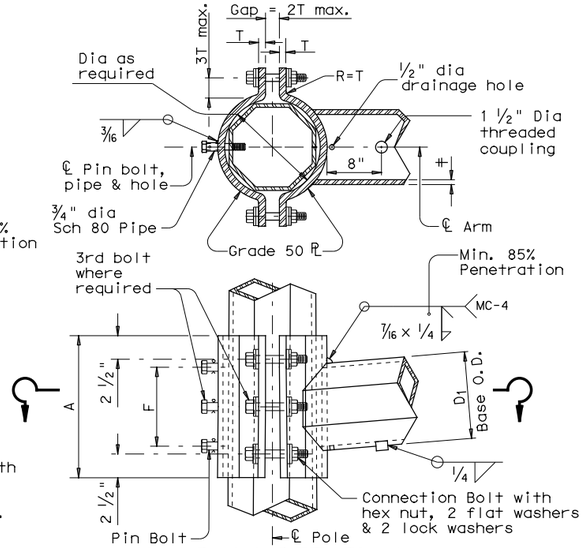
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



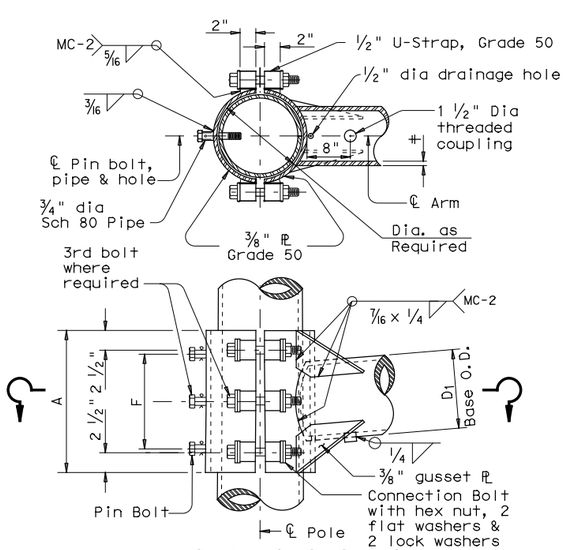
CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE ∓	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

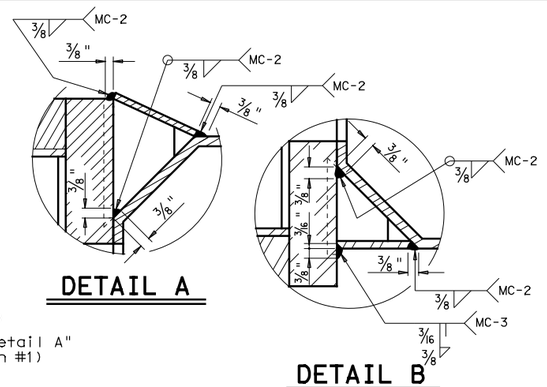


CLAMP-ON DETAIL 2

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

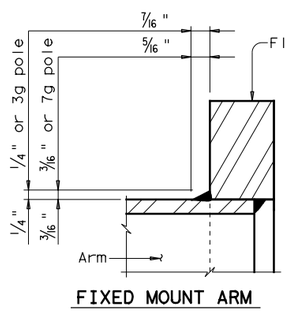


CLAMP-ON DETAIL 3

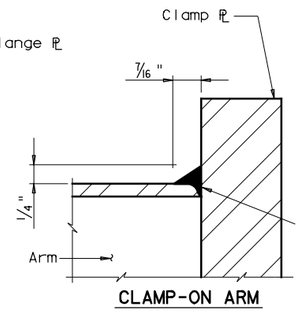


DETAIL A

DETAIL B



FIXED MOUNT ARM



CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 5/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
5-09
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		197

126A

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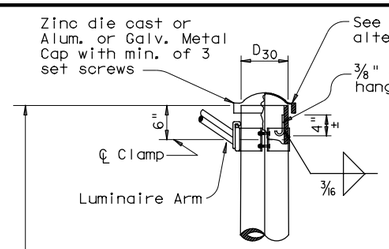
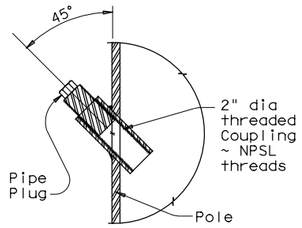
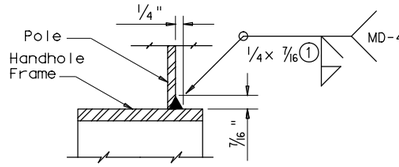


DETAIL A

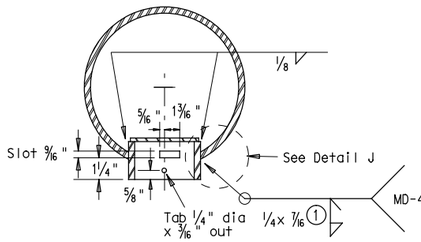
(for pole with luminaire)



POLE COUPLING DETAIL

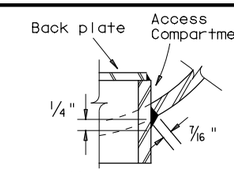


DETAIL G

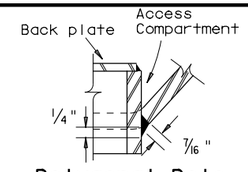


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

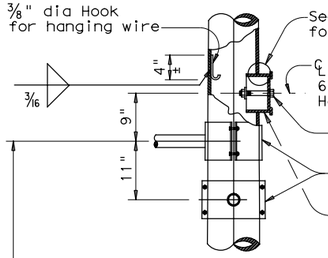


Round Pole

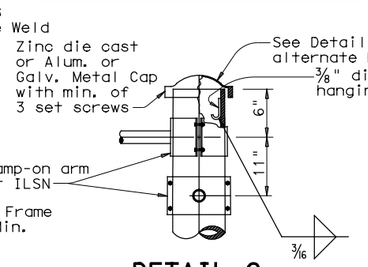


Polygonal Pole

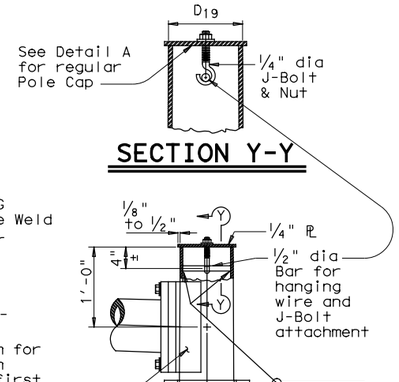
DETAIL J



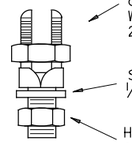
DETAIL B



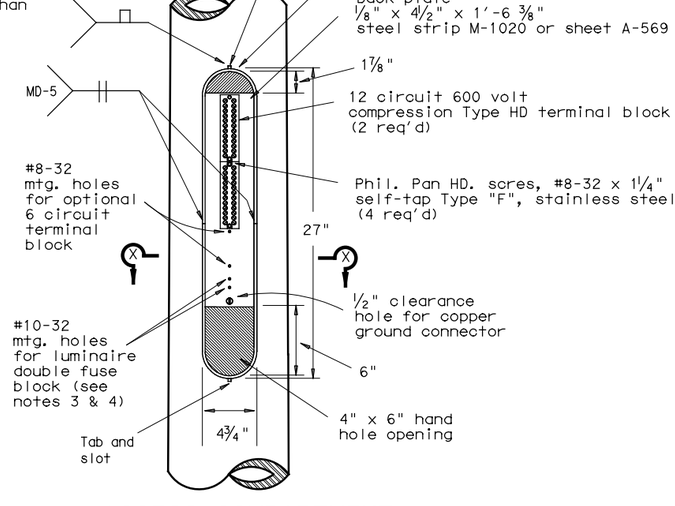
DETAIL C



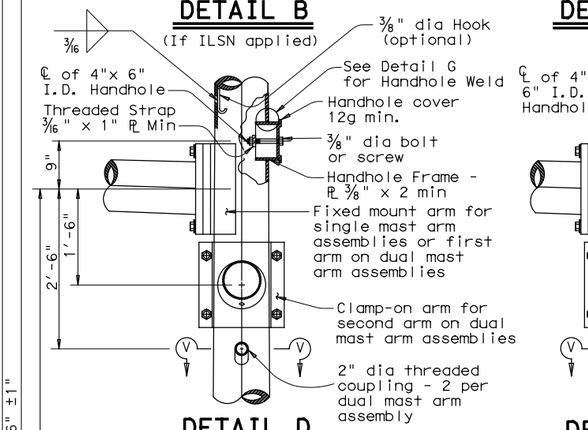
SECTION Y-Y



COPPER GROUND CONNECTOR

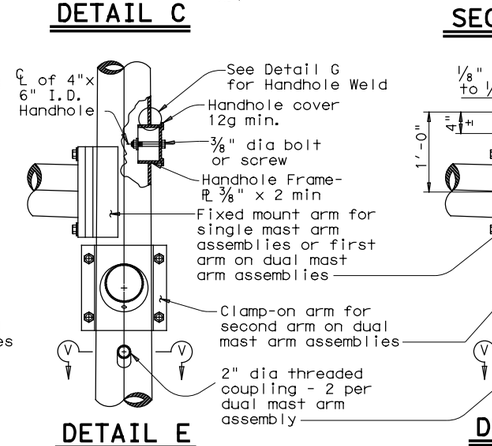


ACCESS COMPARTMENT



DETAIL D

(for 30' pole with luminaire and ILSN sign)

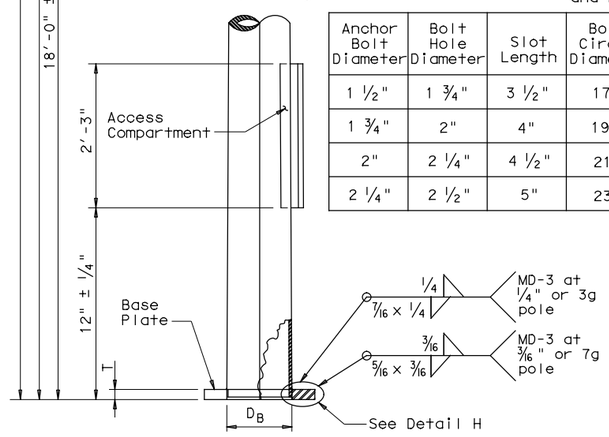


DETAIL E

(for 24' pole with ILSN sign and no luminaire)

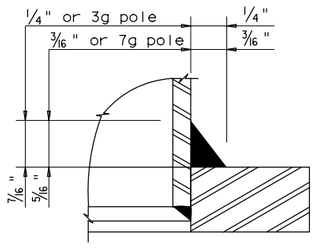
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

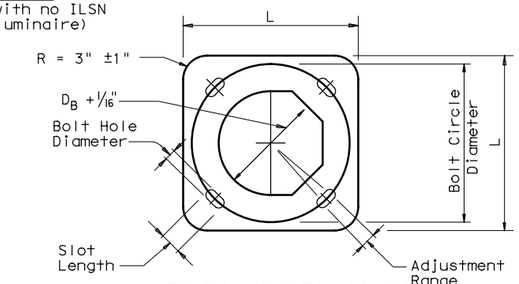


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base PL Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		198

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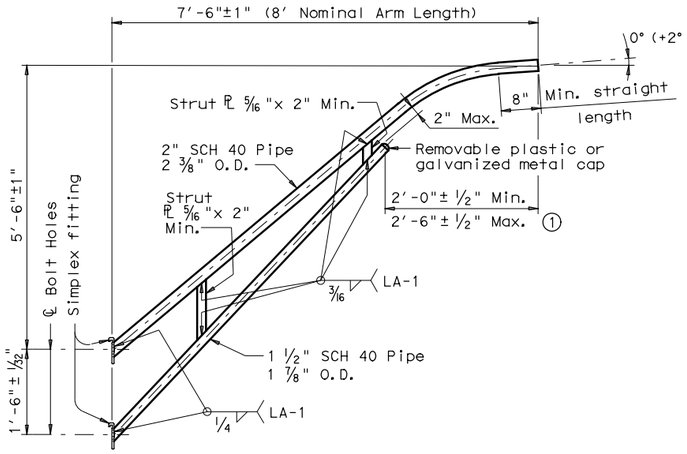
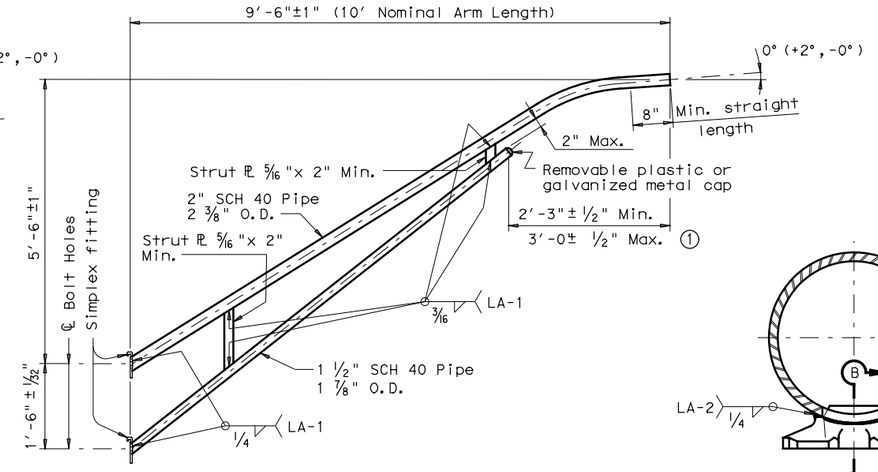


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

DIRECT ATTACHMENT DETAIL

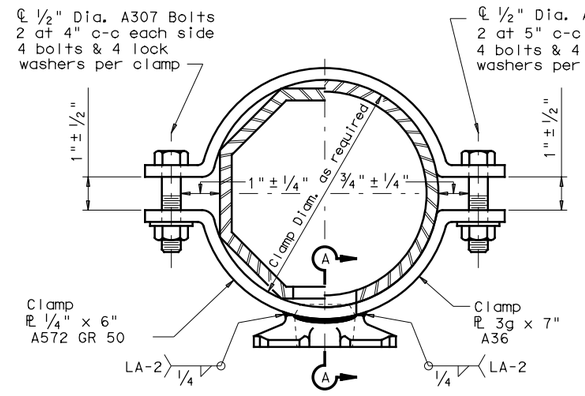
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

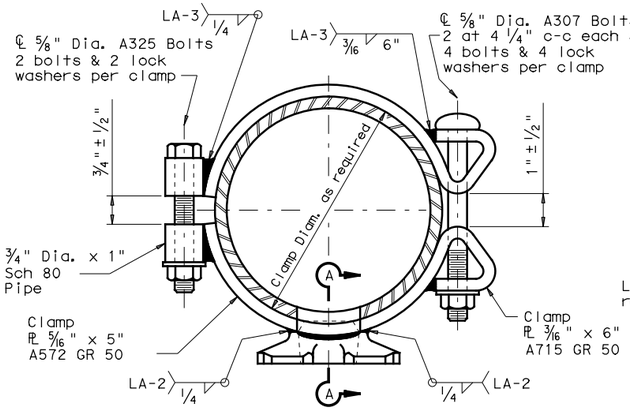
(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.



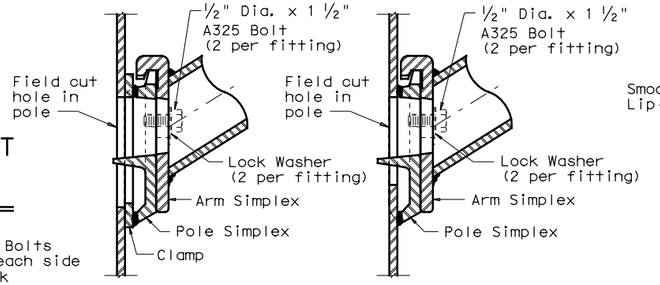
CLAMP ATTACHMENT DETAIL NO.1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.2 (HALF SECTION)



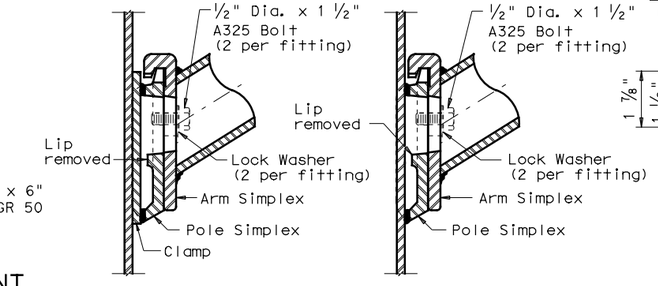
CLAMP ATTACHMENT DETAIL NO.3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO.4 (HALF SECTION)



UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

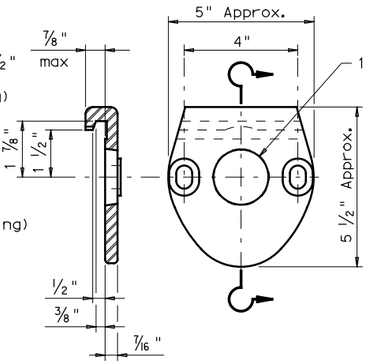


LOWER SIMPLEX FITTING

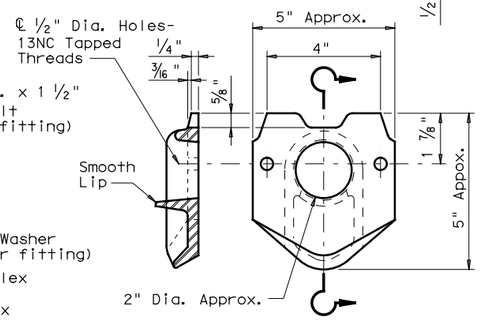
SECTON A-A

LOWER SIMPLEX FITTING

SECTON B-B



ARM SIMPLEX DETAIL



POLE SIMPLEX DETAIL

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

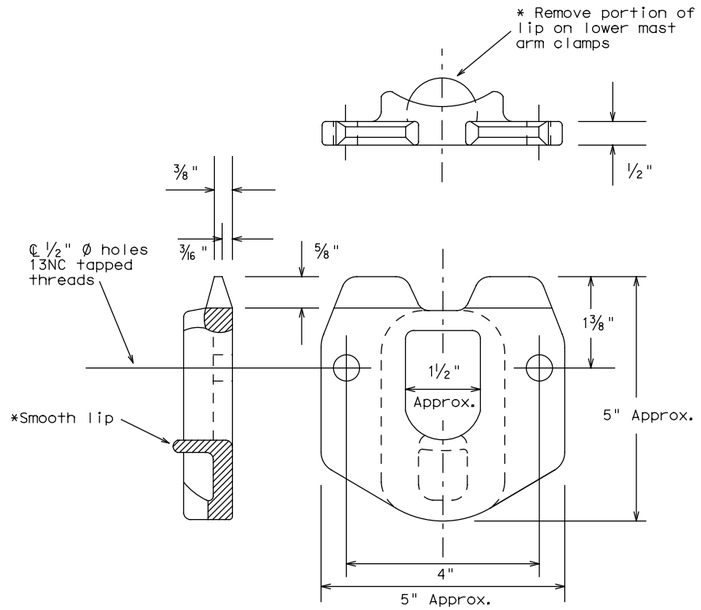
ARM DETAILS

LUM-A-12

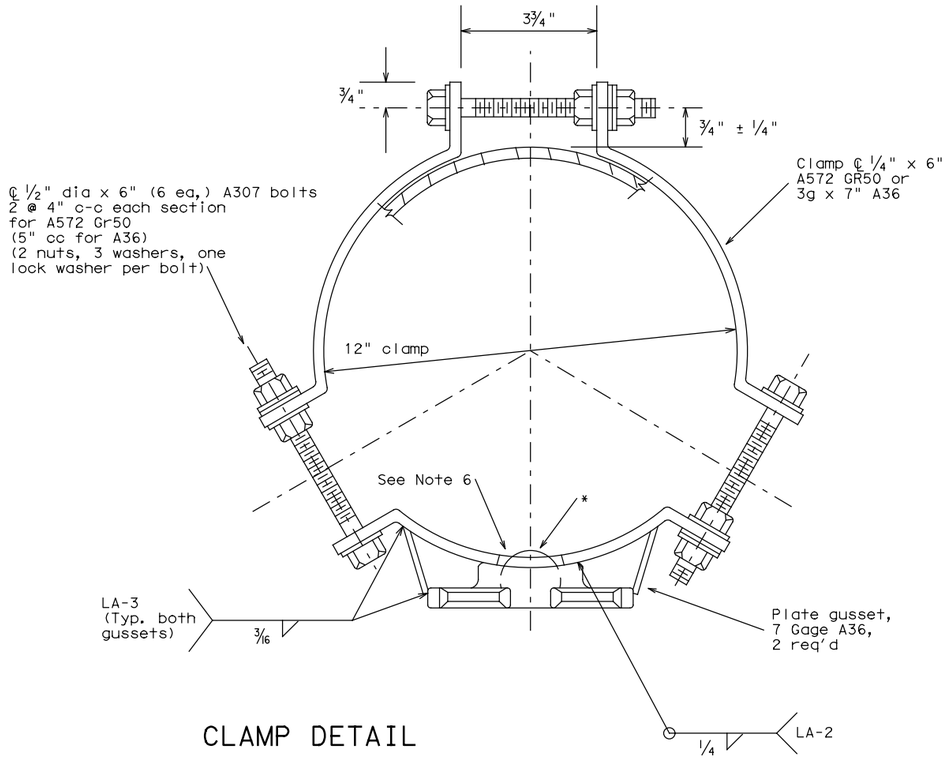
DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS
5-96
1-99
1-12

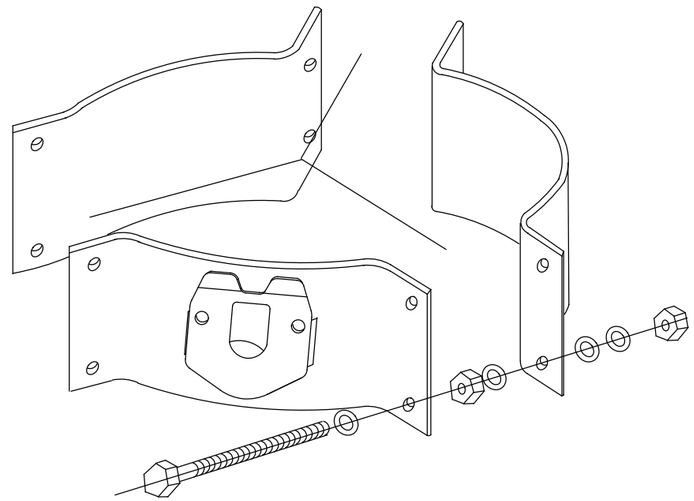
CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		199



POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, ½in. X 1½in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

© TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99 1-12	0152	01	080, ETC.	US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		200

DATE: 3/24/2021 5:16:25 PM
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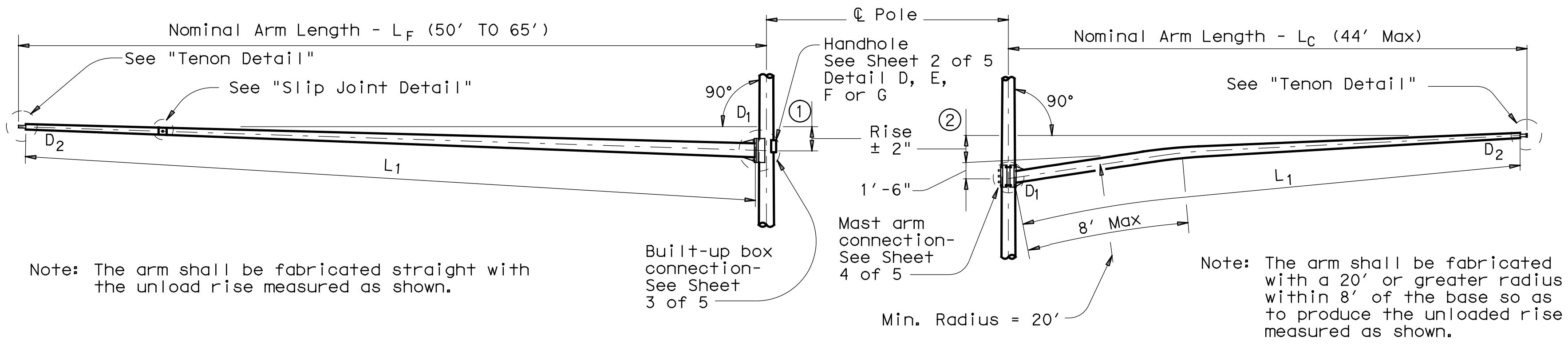
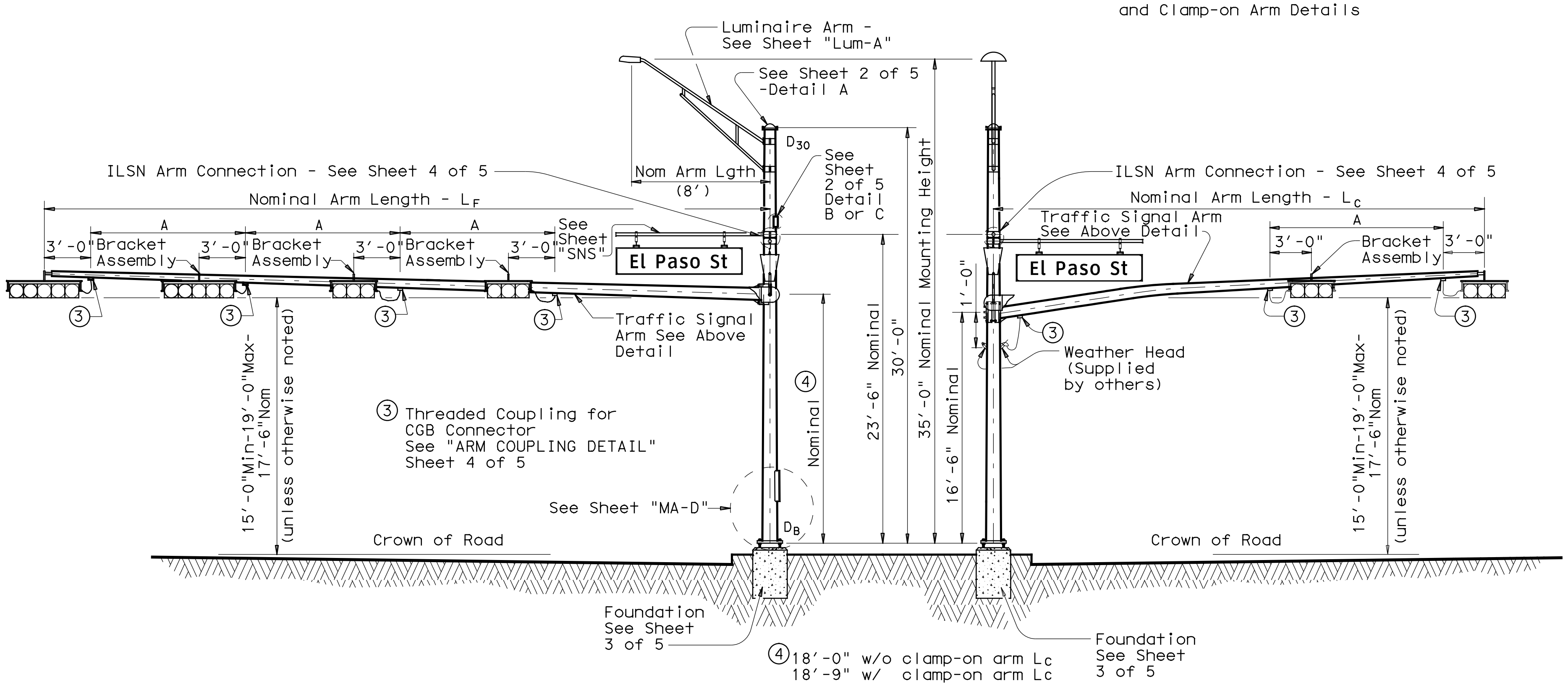


FIXED MOUNT TRAFFIC SIGNAL ARM

① See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION

(Showing fixed mount arm)

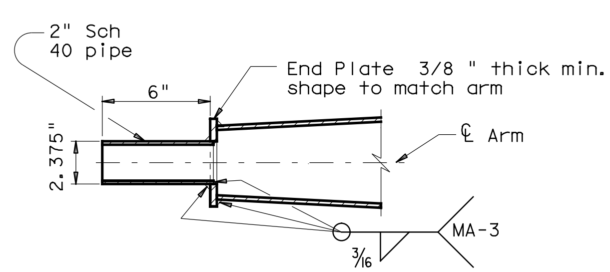
STRUCTURE ASSEMBLY

ELEVATION

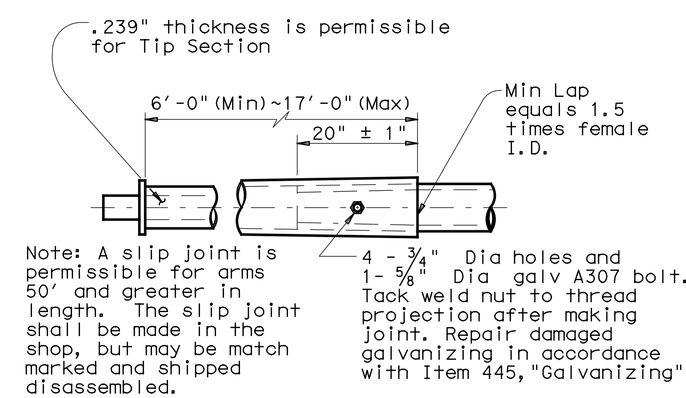
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL ⑤	WL EPA ⑤⑥
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

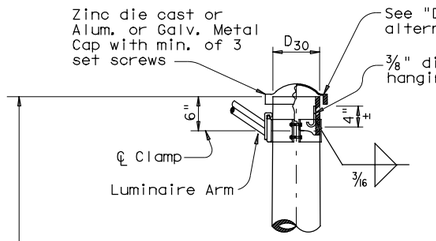
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

LMA(1)-12

Sheet 1 of 5

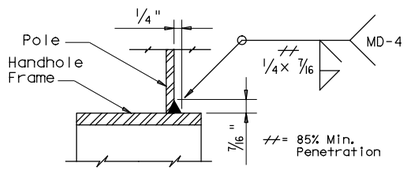
©TxDOT July 2000	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12	0152	01080, ETC.		US 183, ETC.
	DIST	COUNTY		SHEET NO.
	14	TRAVIS		201

131A

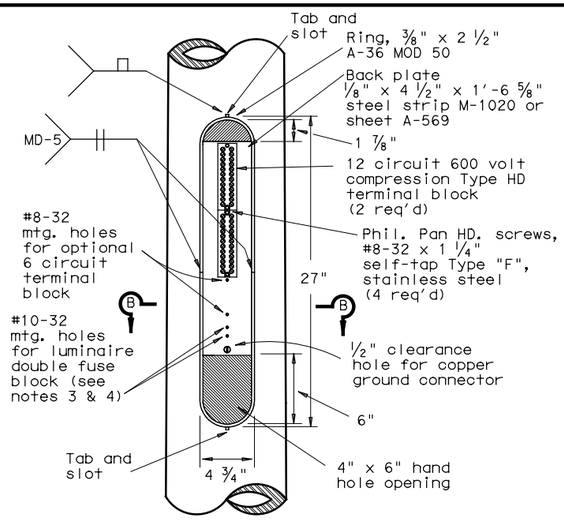


DETAIL A

(for pole with luminaire)



DETAIL H

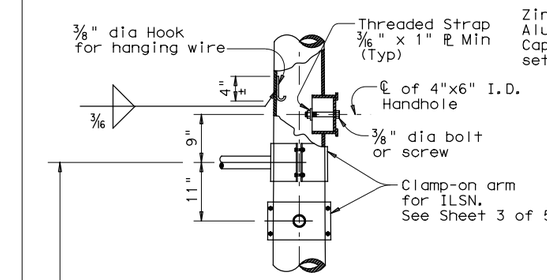


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

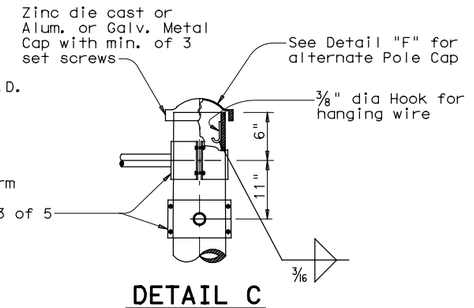
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

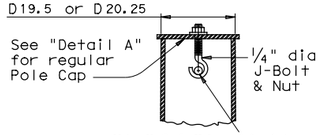


DETAIL B

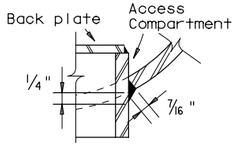
(If ILSN applied)



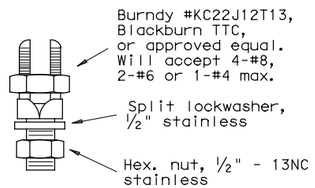
DETAIL C



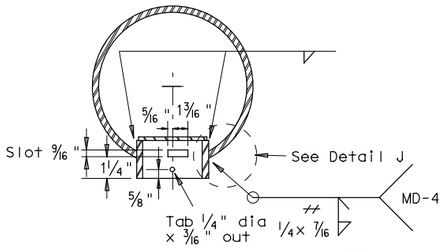
SECTION Y-Y



DETAIL J

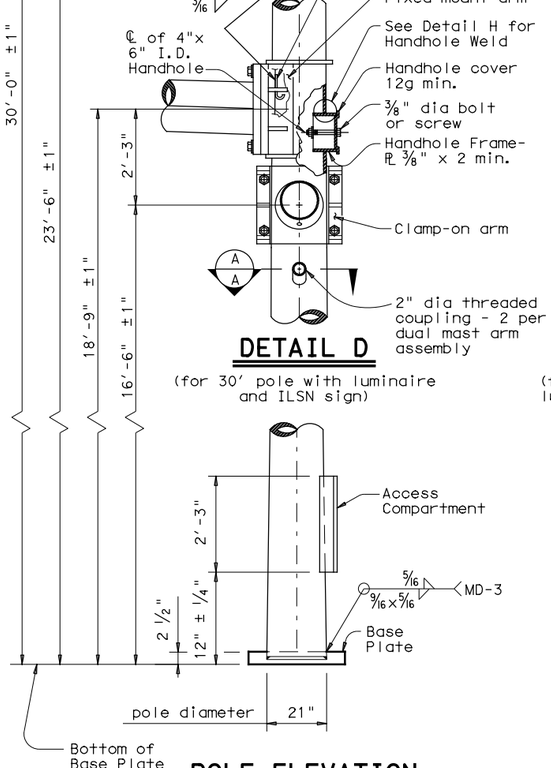


COPPER GROUND CONNECTOR



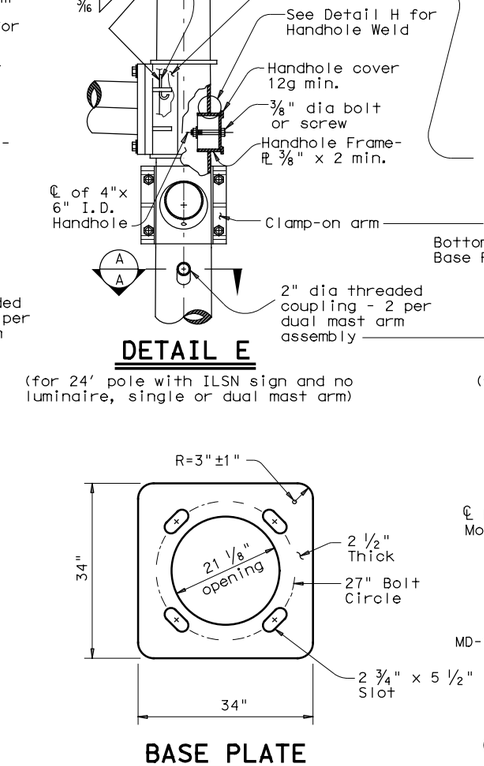
SECTION B-B

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



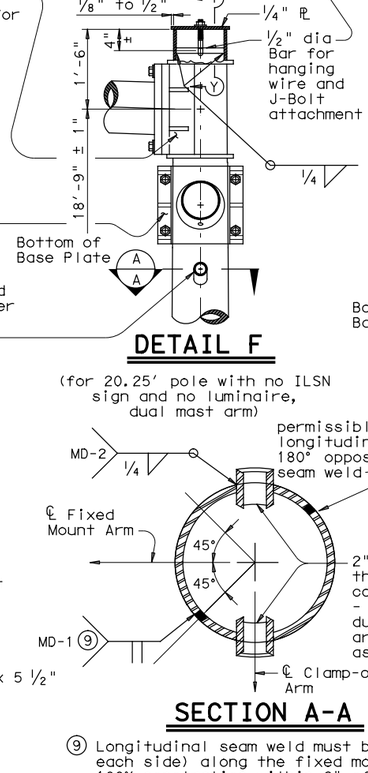
DETAIL D

(for 30' pole with luminaire and ILSN sign)



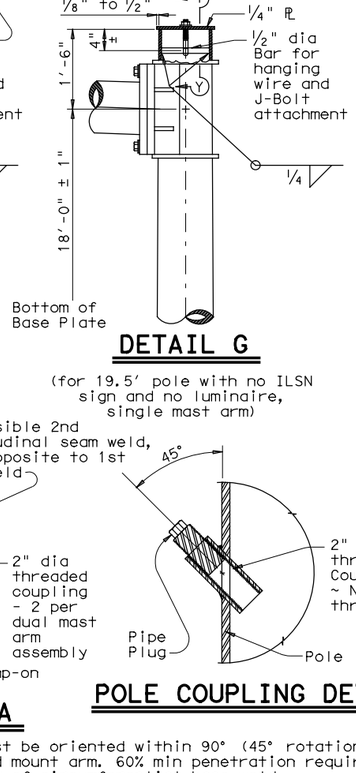
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)



DETAIL G

(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

POLE ELEVATION

BASE PLATE

SECTION A-A

POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

ACCESS COMPARTMENT NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 2 of 5

LMA(2)-12

DN: JSY	CK: ARC	DW: TGG	CK: JSY

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		202

131B

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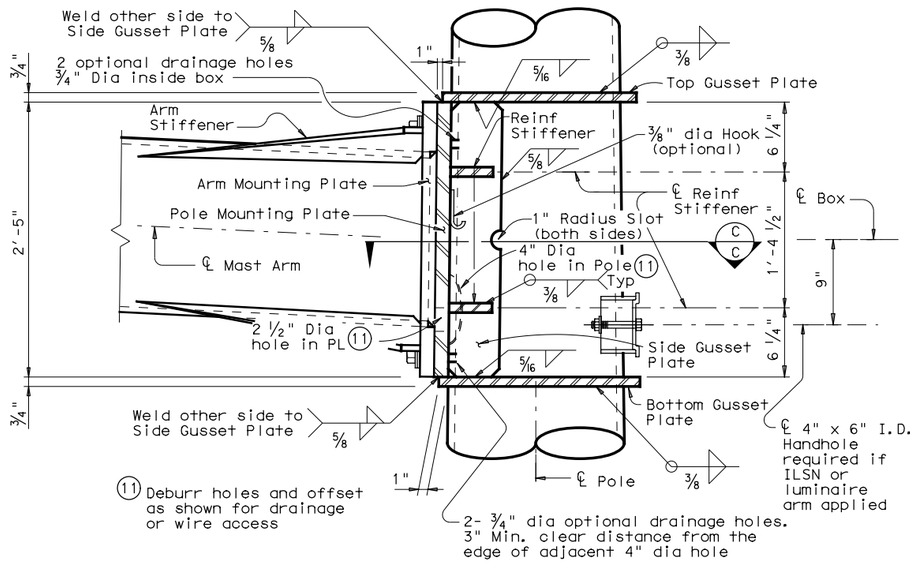
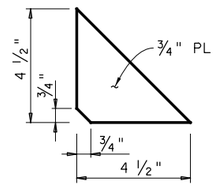
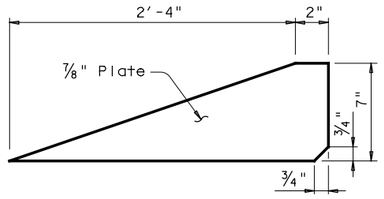


BUILT-UP BOX CONNECTION

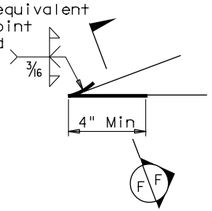


REINFORCING STIFFENER



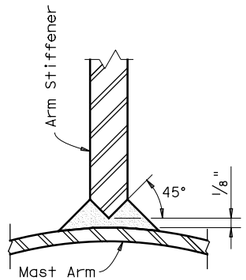
ARM STIFFENER
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.



Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

DETAIL "K"



SECTION F-F

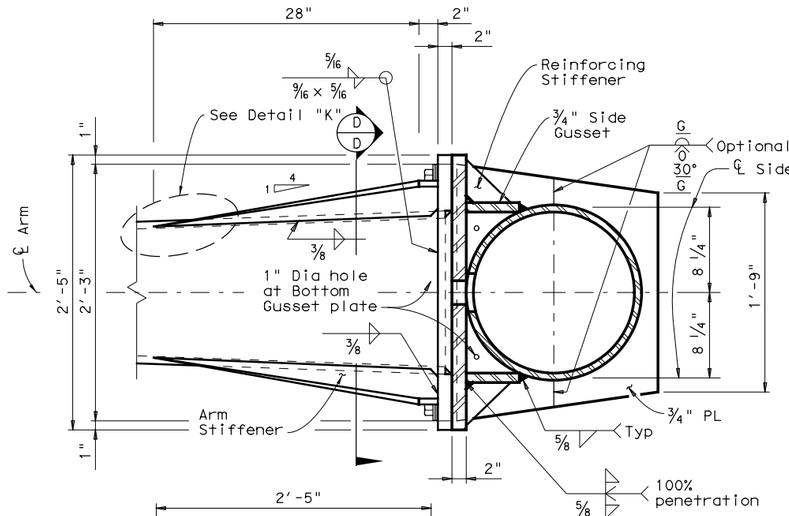
Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

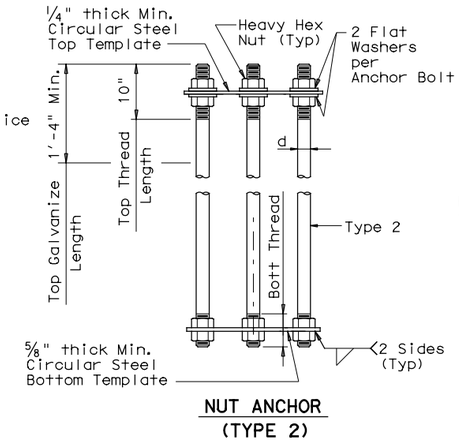
D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

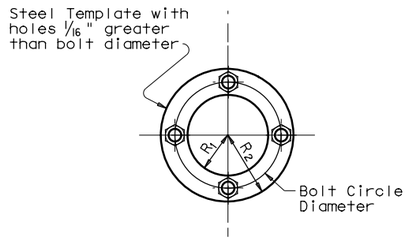


SECTION C-C

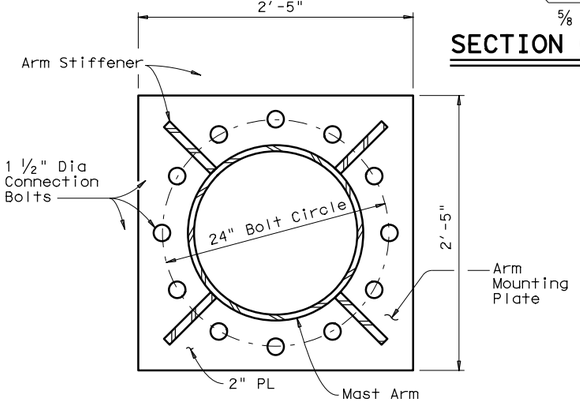


NUT ANCHOR
(TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL



SECTION D-D

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Laods.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 3/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 3 of 5 LMA(3)-12

DN: JSY	CK: ARC	DW: TGG	CK: JSY

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		203

131C

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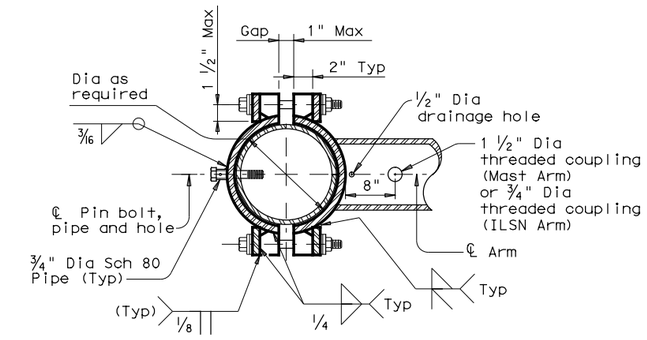
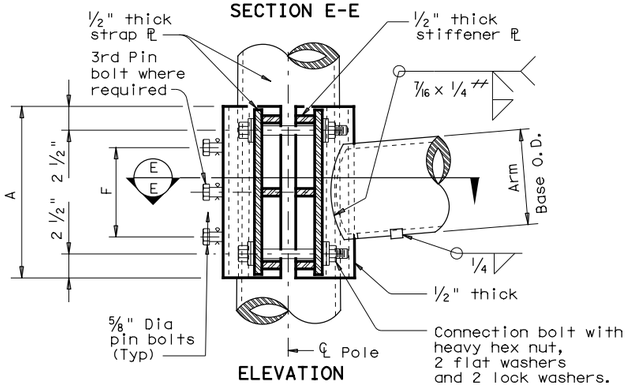


SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

= 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

100 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

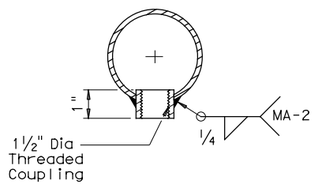
D1 = Arm Base O.D.
D2 = Arm End O.D.
L1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

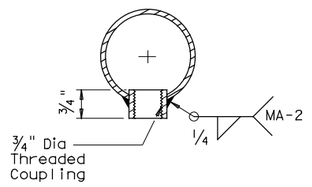
CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

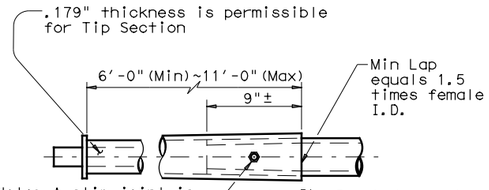
Mast Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



ILSN ARM COUPLING DETAIL

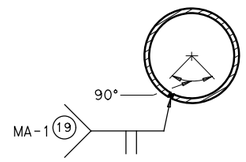


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
60% Min penetration
100% penetration within 6" of circumferential base welds.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a ⅛" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An 11/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 — LMA(4)-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.

DIST	COUNTY	SHEET NO.
14	TRAVIS	204

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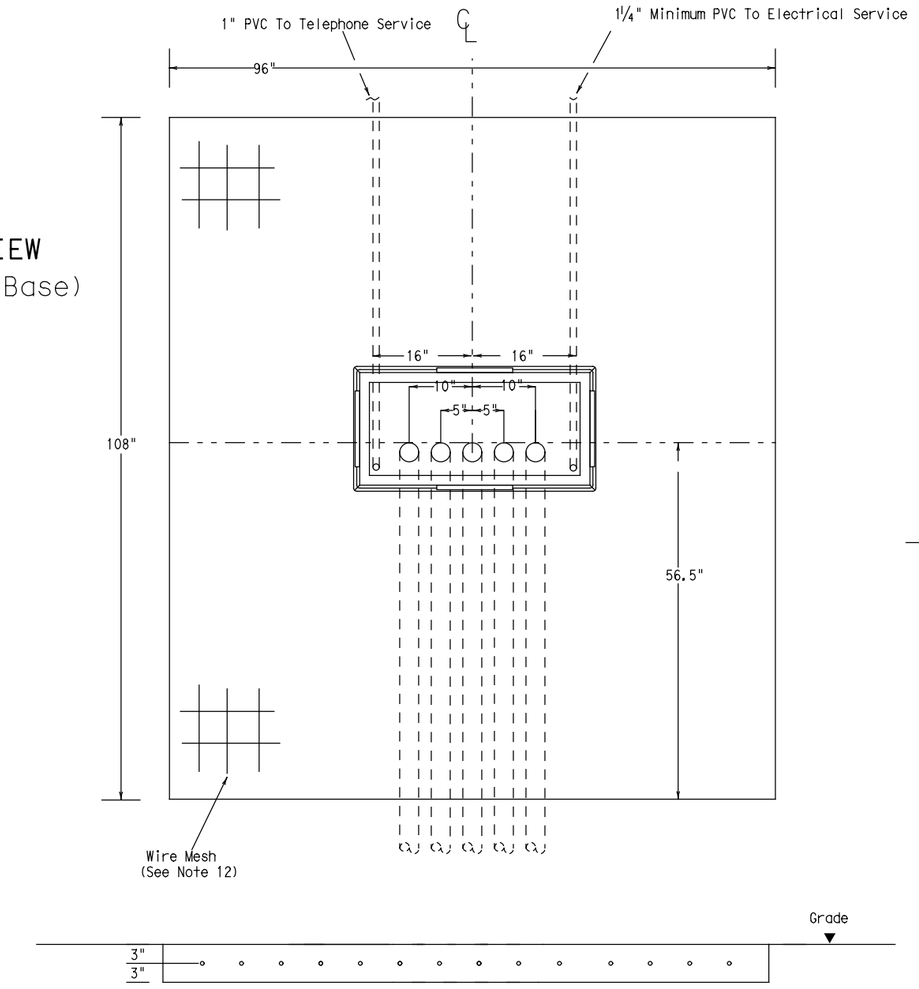
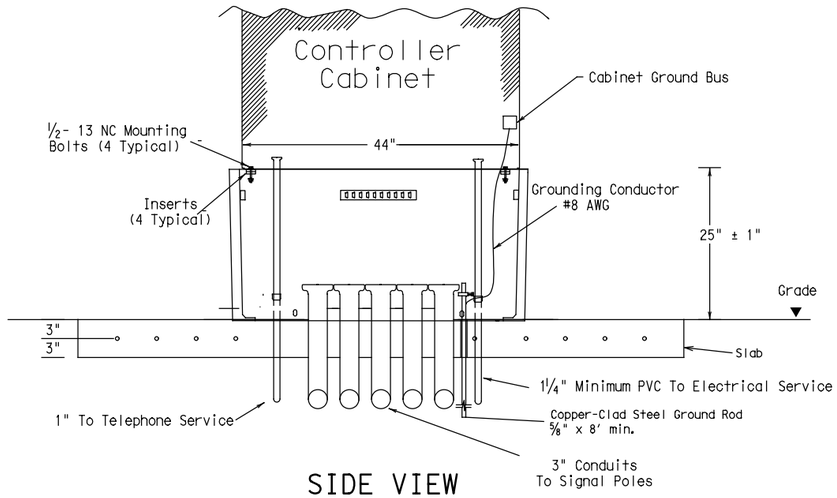
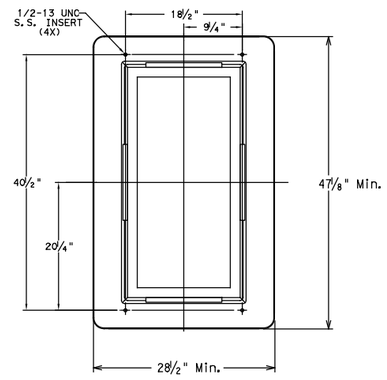
TOP VIEW
(Slab & Base)





SIDE VIEW
(Slab & Base)



CABINET BASE

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four ½"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x ⅝ x ⅜ inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using ½"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

20. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-04

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
12-04	0152	01	080, ETC.	US 183, ETC.

DIST	COUNTY	SHEET NO.
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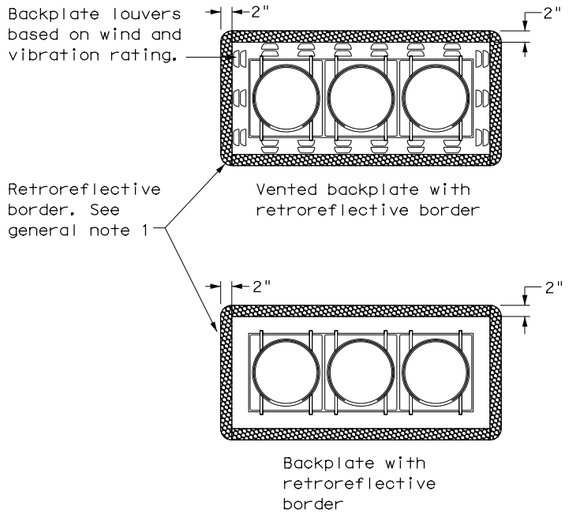
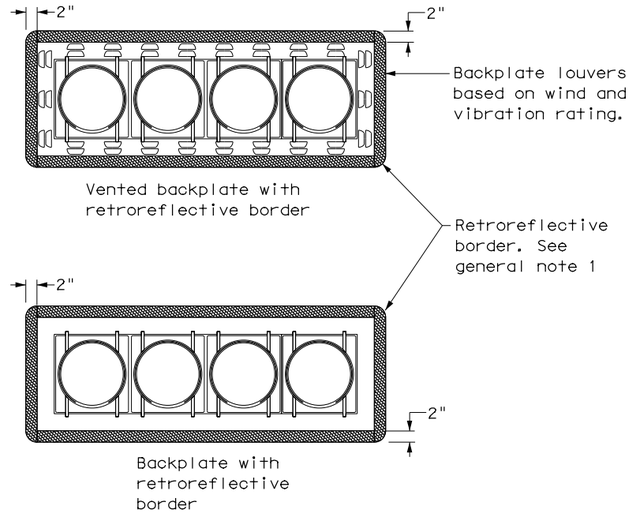
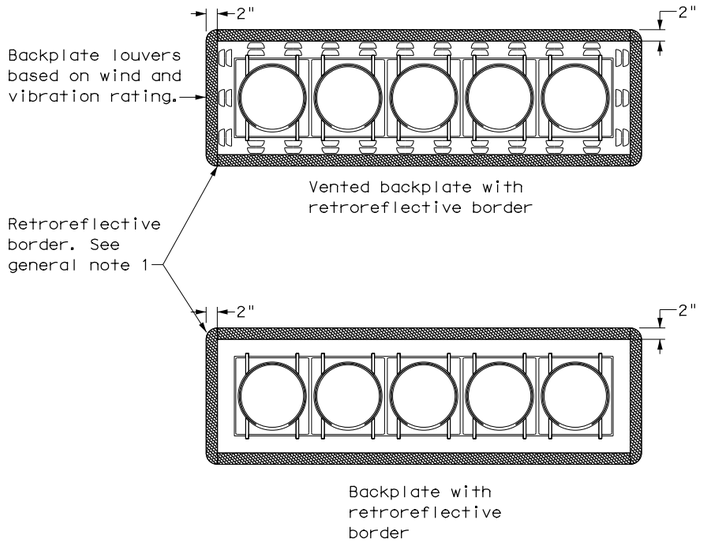


THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
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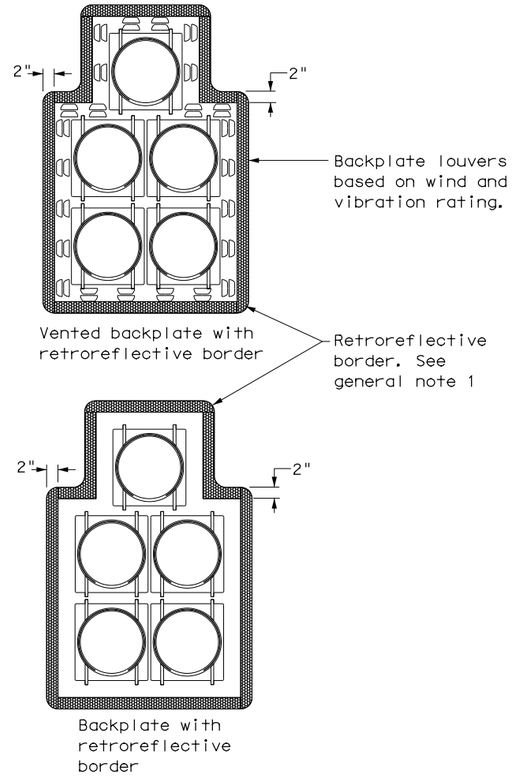
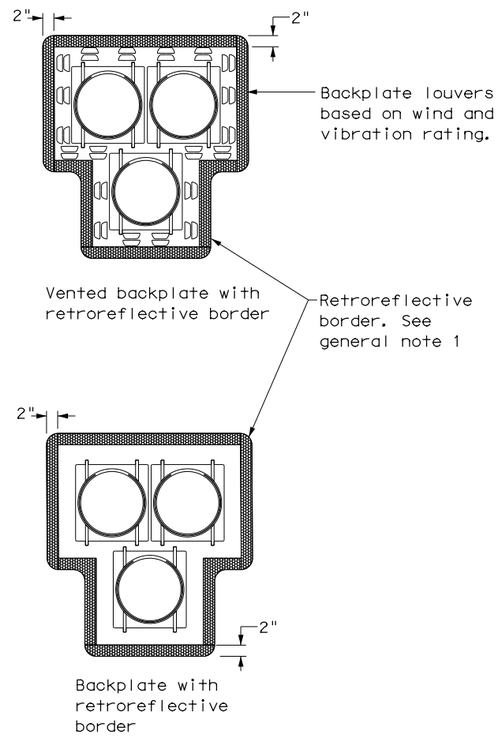


FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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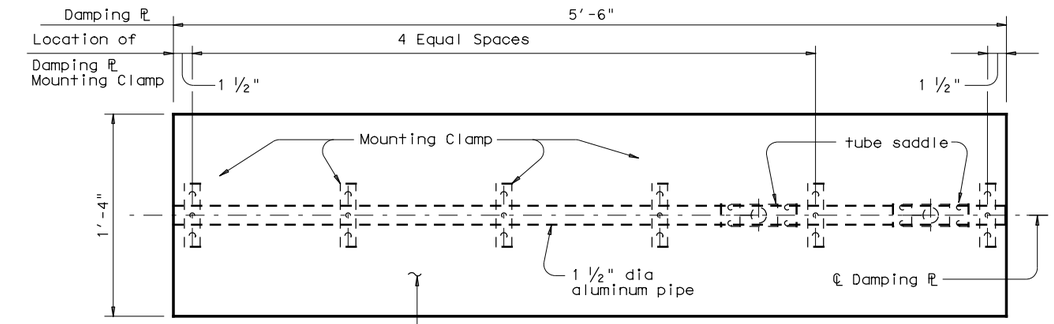
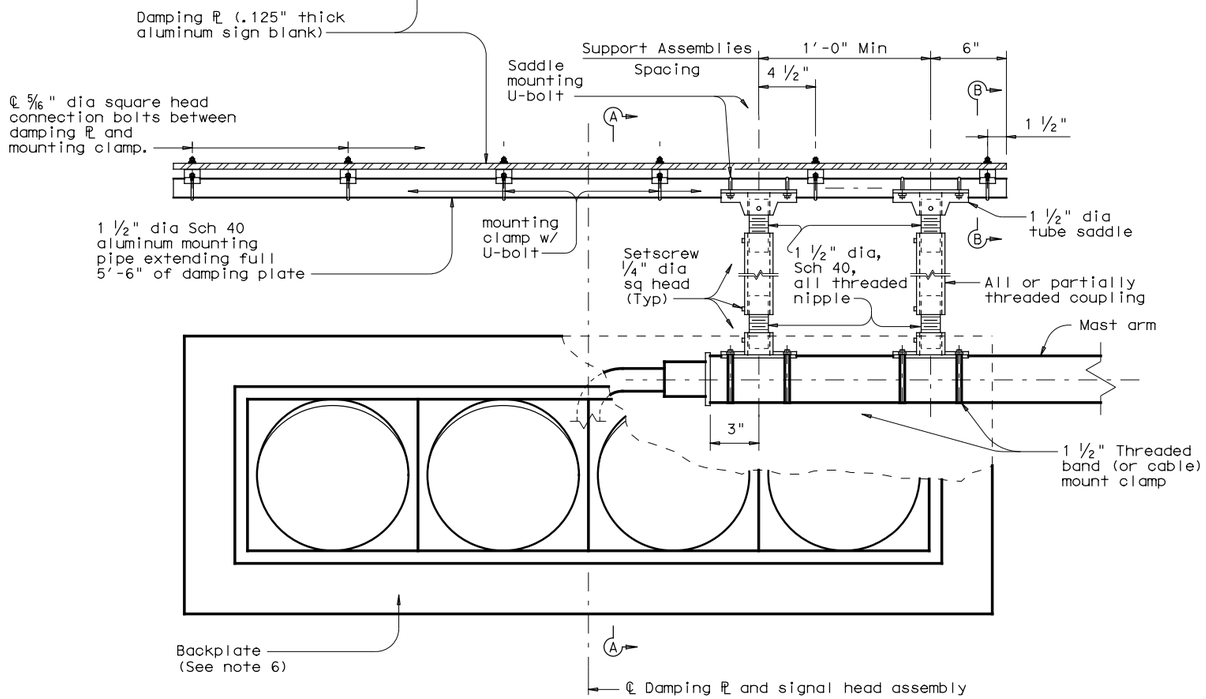


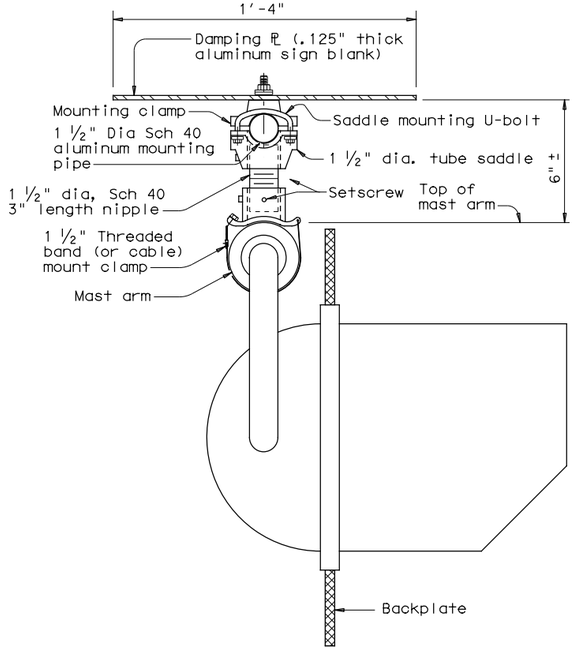
PLAN



ELEVATION

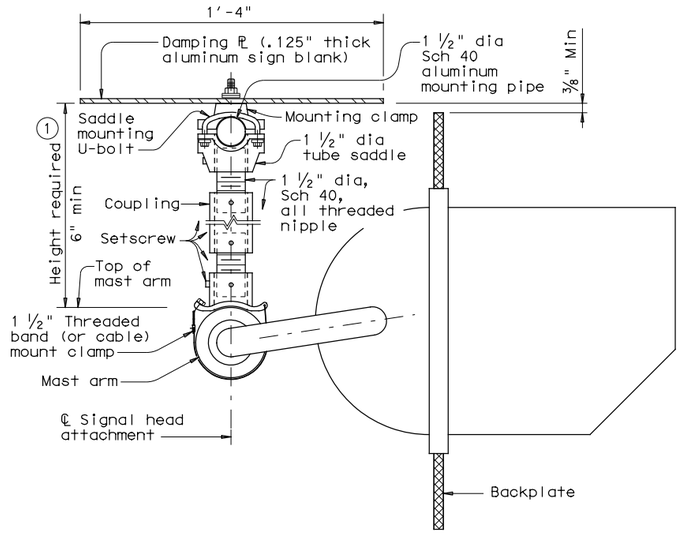
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

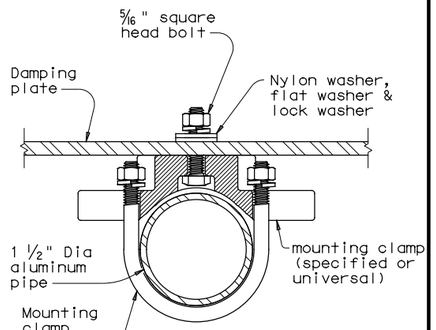
(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"



SECTION B-B

(Showing damping plate attachment)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
6-20	DIST	COUNTY		SHEET NO.
	14	TRAVIS		207

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NOTE: Structures north of ice line to be designed for ice.

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

ZONE 4
(70 MPH WIND)

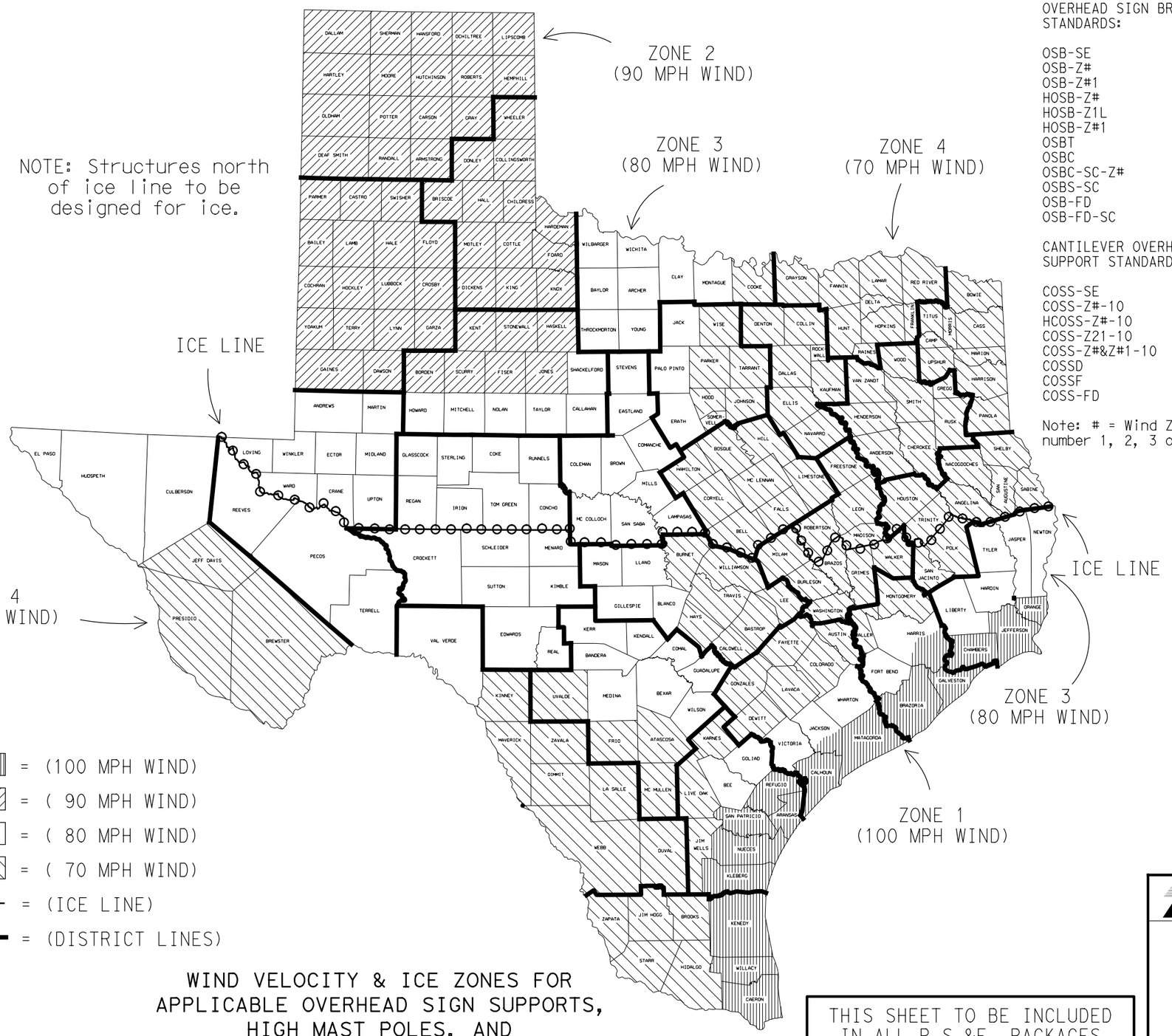
ICE LINE

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 3
(80 MPH WIND)

ZONE 1
(100 MPH WIND)



LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

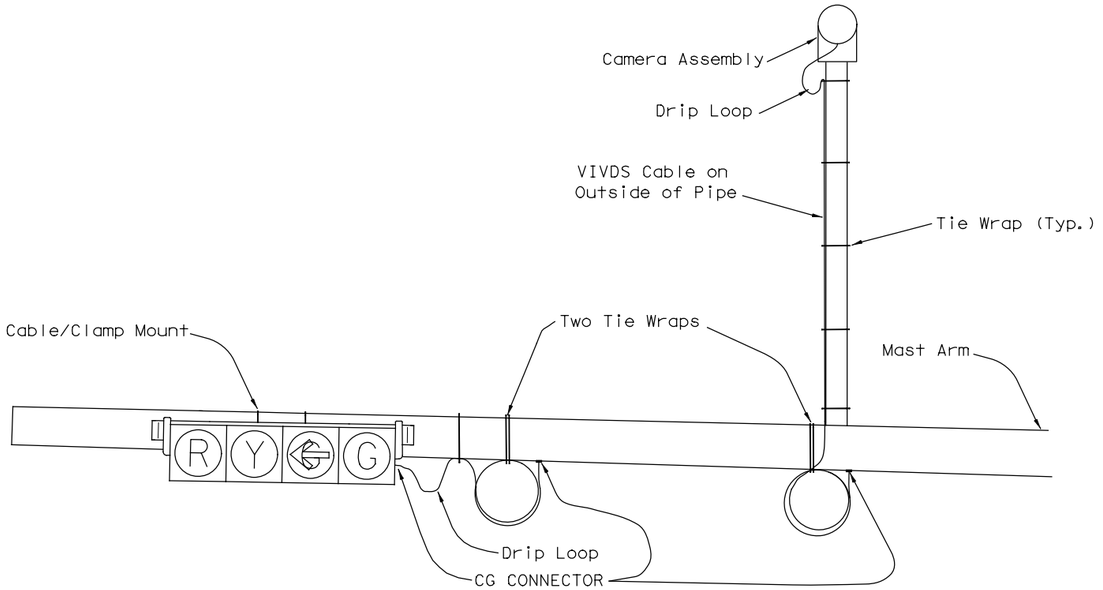
Texas Department of Transportation

Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

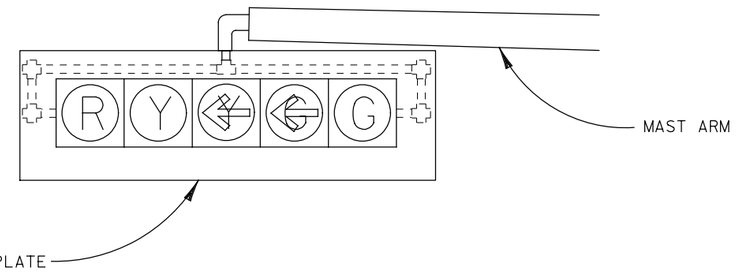
WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0152	01	080, ETC.	US 183, ETC.
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	DIST	COUNTY		SHEET NO.
	14	TRAVIS		208

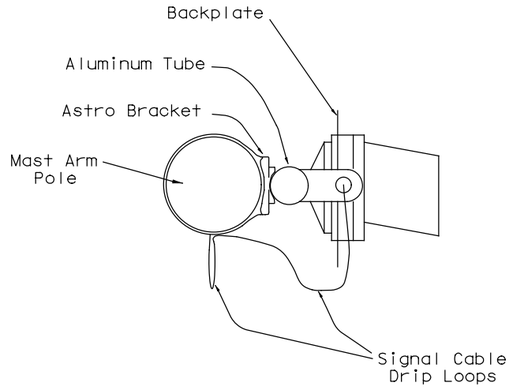


MAST ARM
ELEVATION VIEW

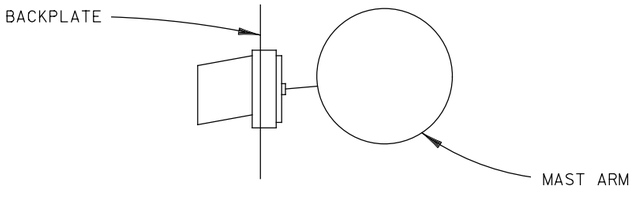
Backplate Not Shown



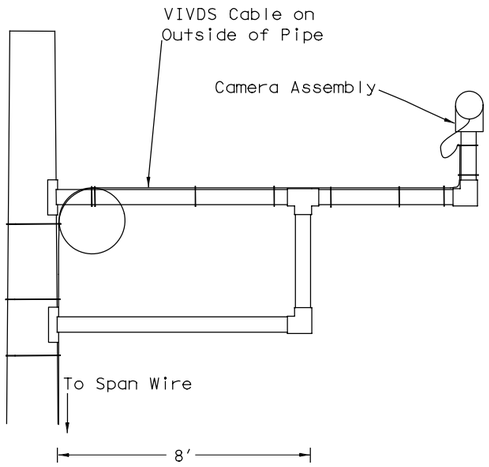
ELEVATION VIEW



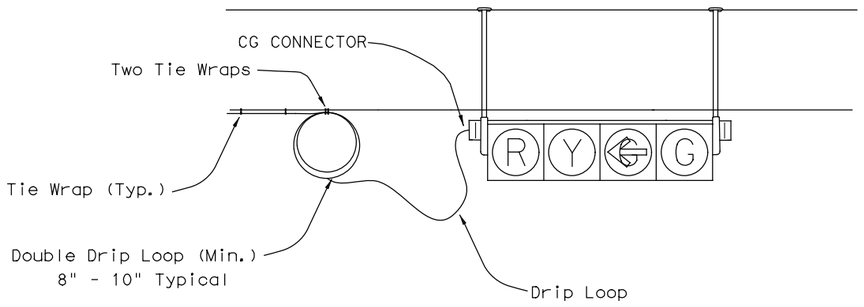
MAST ARM
SECTION VIEW(SIDE)



SECTION VIEW



ELEVATION VIEW - CAMERA BRACKET



ELEVATION VIEW - SPAN WIRE

Backplate Not Shown

NO SCALE

Texas Department of Transportation | Austin District Standard

Austin District Traffic

MISC. ATTACHMENT DETAILS

MAD-14(AUS)

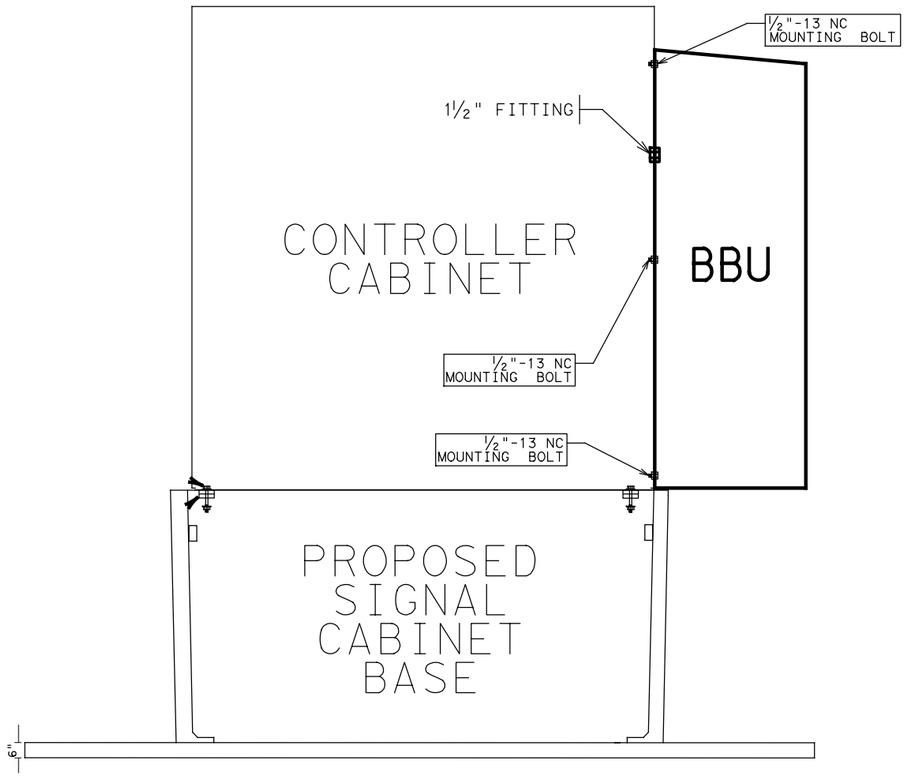
REVISIONS

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		209

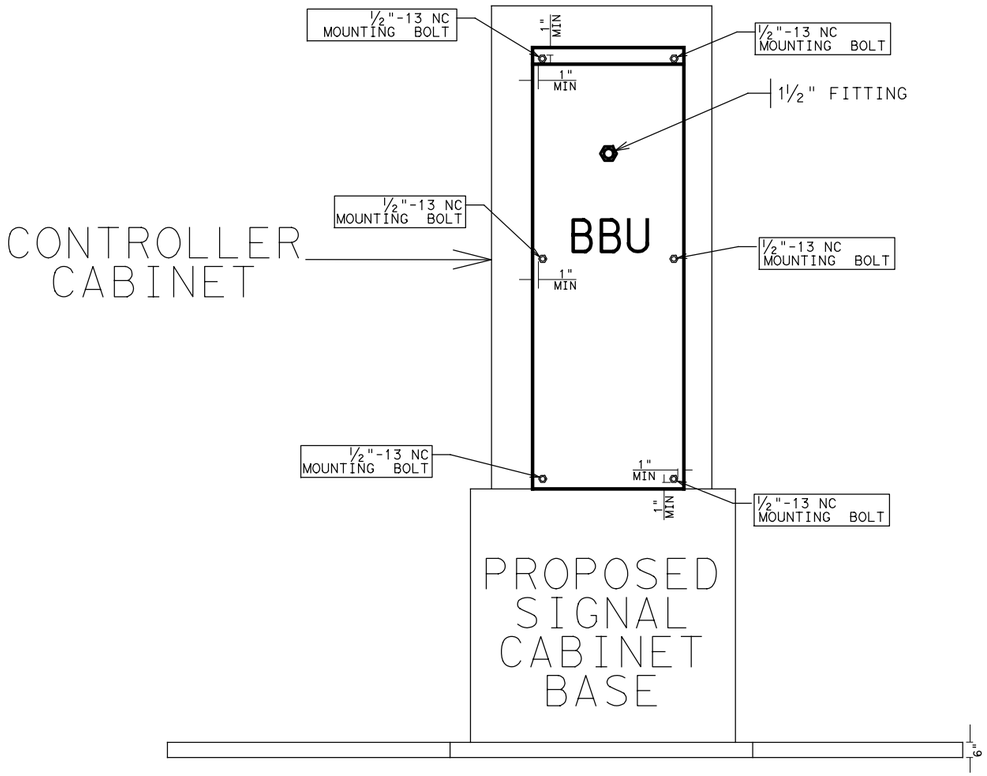
DATE: 3/24/2021 5:16:54 PM
FILE: c:\pwworking\central01\d0461046\MAD-14(AUS).dgn

NOTES:

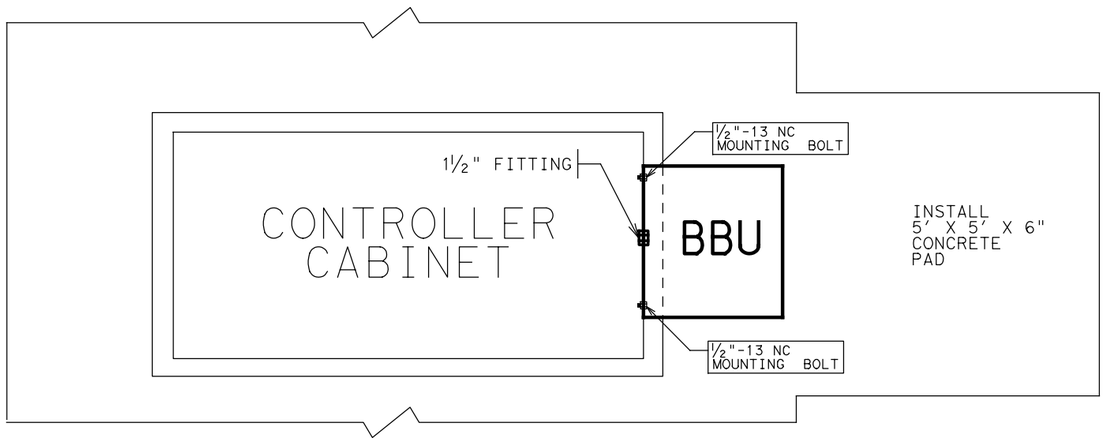
1. INSTALL 1½" FITTING WITH SIX # 6 AWG CONDUCTORS AND 6 EA OF ½"-1½" BOLTS BETWEEN THE TWO CABINETS.
2. CAULK BETWEEN THE CABINETS OF THE EXISTING CONTROLLER AND BBU UNIT.
3. ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT SUBSIDIARY TO THE ITEM OF BBU.
4. INSTALL A 5' X 5' CONCRETE PAD (REFER TO CURRENT TS-CF STANDARD, 6" SLAB) UNDER THE BBU AND NEXT TO THE 6" SLAB OF SIGNAL CABINET BASE AS DIRECTED.
5. THE INSTALLATION OF BBU IS FOR REFERENCE ONLY. BBU SYSTEM WILL BE APPROVED ACCORDING TO THE SPECIAL SPECIFICATIONS.



ELEVATION VIEW



SIDE VIEW



PLAN VIEW

NO SCALE

Texas Department of Transportation | Austin District Standard

Austin District Traffic

BATTERY BACK-UP EXTERNAL BATTERY CABINET (SIDE MOUNT)

BBU-14 (AUS)

REVISIONS

CONT	SECT	JOB	HIGHWAY
0152	01	080, ETC.	US 183, ETC.
DIST	COUNTY		SHEET NO.
14	TRAVIS		210

DATE: 3/24/2021 5:16:57 PM
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