FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	F 2021(772)		VARIOUS
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	YKM	DEWITT, ETC.	1
CONTROL	SECTION	JOB	
0913	00	114	

SEE SHEET 2 "INDEX OF SHEETS"

FINAL PLANS

NAME OF CONTRACTOR: _____

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

SUMMARY OF CHANGE ORDERS:

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT

_____, P.E.

Signature of Registrant & Date

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

TRAFFIC SIGNAL UPGRADES

FEDERAL AID PROJECT

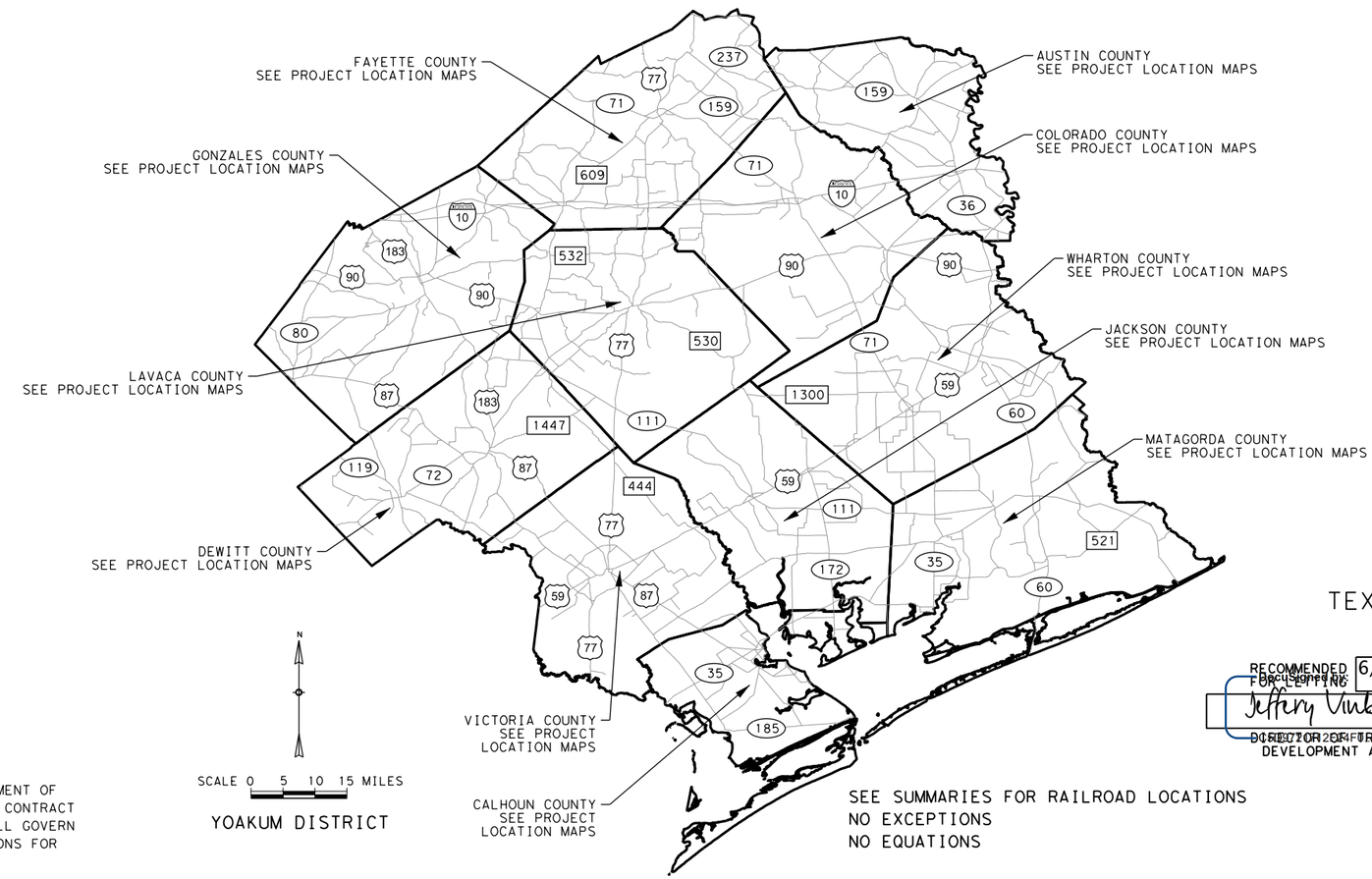
CSJ: 0913-00-114

VARIOUS ROADWAYS

VARIOUS COUNTIES

LIMITS: DISTRICTWIDE

TYPE OF WORK: FOR THE CONSTRUCTION OF MISCELLANEOUS WORK
CONSISTING OF: NON-SITE SPECIFIC TRAFFIC SIGNAL CABINET AND EQUIPMENT INSTALLATION



YOAKUM DISTRICT

SEE SUMMARIES FOR RAILROAD LOCATIONS
NO EXCEPTIONS
NO EQUATIONS

PLANS PREPARED BY:

Kimley»Horn
TBPE FIRM F-928

13455 NOEL ROAD
TWO GALLERIA OFFICE TOWER, SUITE 700
DALLAS, TEXAS 75240
PH (972) 770-1300
CONTACT; NATHAN C. NEW, P.E.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING 6/3/2021 20
Docusigned by: Jeffery Vinklarek, P.E.
DIRECTOR OF TRANSPORTATION, DEVELOPMENT AND PLANNING

SUBMITTED FOR LETTING AUGUST 20 21
_____, P.E.
PROJECT MANAGER

APPROVED FOR LETTING 6/3/2021 20
Docusigned by: _____, P.E.
303F64...
DISTRICT ENGINEER

NOTE:

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

SHEETS	DESCRIPTION
I. GENERAL	
1	TITLE SHEET
2	INDEX OF SHEETS
3 - 3J	GENERAL NOTES
4	QUANTITY SHEETS
5	SUMMARY OF QUANTITIES
II. TRAFFIC SIGNAL UPGRADES	
AUSTIN COUNTY	
6	PROJECT LOCATION MAP
7	INTERSECTION DETAILS
CALHOUN COUNTY	
8	PROJECT LOCATION MAP
9	INTERSECTION DETAILS
COLORADO COUNTY	
10	PROJECT LOCATION MAP
11	INTERSECTION DETAILS
DEWITT COUNTY	
12	PROJECT LOCATION MAP
13	INTERSECTION DETAILS
FAYETTE COUNTY	
14	PROJECT LOCATION MAP
15	INTERSECTION DETAILS
GONZALES COUNTY	
16	PROJECT LOCATION MAP
17	INTERSECTION DETAILS
JACKSON COUNTY	
18	PROJECT LOCATION MAP
19	INTERSECTION DETAILS
LAVACA COUNTY	
20	PROJECT LOCATION MAP
21	INTERSECTION DETAILS
MATAGORDA COUNTY	
22	PROJECT LOCATION MAP
23	INTERSECTION DETAILS
VICTORIA COUNTY	
24	PROJECT LOCATION MAP
25	INTERSECTION DETAILS
WHARTON COUNTY	
26	PROJECT LOCATION MAP
27	INTERSECTION DETAILS

SHEETS	DESCRIPTION
III. TRAFFIC CONTROL	
*28 - 29	WZ (BTS-1,2) -13
*30 - 41	BC (1-12) - 14
*42	TCP (2-1) - 18
*43	TCP (2-2) - 18
*44	TCP (2-3) - 18
*45	TCP (2-4) - 18
*45A	WZ (RS)-16
IV. STANDARD DETAILS	
46	TRAFFIC SIGNAL CABINET INSTALLATION DETAILS (SIZE 5 CONFIGURATION 3)
47	TRAFFIC SIGNAL CABINET INSTALLATION DETAILS (SIZE 6 CONFIGURATION 4)
47A	TRAFFIC SIGNAL CABINET INSTALLATION DETAILS (SIZE 7 CONFIGURATION 4)
48	BATTERY BACKUP UNIT INSTALLTION DETAILS (EXTERNAL SIDE MOUNT CABINET)
V. TxDOT STANDARD DETAILS	
*49 - 54	ED(1,3-6,8)-14
*55	TS-CF-21
*56	ITS(15)-15
*57	ITS(17)-15
*58	ITS(26)15
*59	EPIC
VI. RAILROAD DETAILS	
60 - 64	RAILROAD SCOPE OF WORK
65 - 66	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

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

_____, P.E. 5/26/2021
Signature of Registrant & Date

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

INDEX OF SHEETS

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	2
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwproad\daniel.reiczek\d0124126\YKM_SHT_002_Index.dgn
40.0000 ft / in.
BY: daniel.reiczek

GENERAL NOTES:

GENERAL:

The contractor shall not have materials, equipment, traffic control, or any other construction activity within 50’ of Railroad ROW.

Contractor questions on this project are to be addressed to the following individual(s):
Camille Marek Camille.Marek@txdot.gov
Greg Dubose Greg.Dubose@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.

I. UNION PACIFIC RAILROAD COMPANY

PROTECTION OF FIBER OPTIC CABLE SYSTEMS

Fiber optic cable systems may be buried on the railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The state and/or its contractor shall telephone the railroad during normal business hours (7:00 a.m. to 9:00 p.m., central time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, seven-day number for emergency calls) to determine if fiber optic cable is buried on the railroad's premises to be used by the state. If it is, the state and/or its contractor will telephone the telecommunications company(ies) involved, arrange for a cable locator and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the railroad's premises.

II. BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

PROTECTION OF FIBER OPTIC CABLE SYSTEMS

The state and/or its contractor shall, five working days before any work is performed, call the railroad's communications network control center at 1-800-533-2891 (a 24-hour number) to assist in determining if fiber optic communications, control systems, or other type of cable systems are buried in the general locations where work is to be performed. In the event such

Project Number: **Sheet: 3**

County: De Witt **Control: 0913-00-114**

Highway: Various

cable is present, the state and/or its contractor shall then call the owner of the cable line to determine its exact location. The contractor shall indemnify and hold harmless the railroad against any cost or claims arising out of damage to any fiber optic communications, control systems or other types of cable systems, but only to the extent such damage is caused by negligence of the contractor.

III. KANSAS CITY SOUTHERN RAILWAY COMPANY

Fiber optic cable systems may be buried on the railroad’s property. Protection of the fiber optic cable system is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The state and/or its contractor shall telephone Texas One Call at 1-800-344-8377 (a 24-hour number) to determine if fiber optic cable is buried anywhere on the railroad’s premises to be used by the state. If it is, the state and/or its contractor will telephone the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the railroad premise.

IV. UNIVERSAL TEXAS

Fiber optic cable systems may be buried on the railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The state and/or its contractor shall telephone Texas One Call at 1-800-545-6005 (a 24-hour number) to determine if fiber optic cable is buried anywhere on the railroad's premises to be used by the state. If it is, the state and/or its contractor will telephone the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the railroad's premises.

Work that requires the shut down and removal of power from the controller and cabinet assembly resulting in the traffic signal being inoperable shall only occur from 9:30 am -2:30 pm except for the following locations which can only be shut down from 9:00 pm – 4:00 am (night time).

County	**Location #’s**
Austin	6, 10
Colorado	25, 27, 30, 31, 32
Fayette	51
Lavaca	71
Matagorda	77 to 83, 85 to 97, 99 to 101
Wharton	116 to 123, 125, 128, 132

The contractor's attention is directed to any overhead powerline above the existing traffic signal cabinet locations identified to be replaced. Prior to the pre-construction meeting, the contractor is required to verify if there is a potential threat for equipment to contact the overhead powerline when removing and installing new cabinets. The contractor shall initiate and conduct a coordination meeting with the Engineer and the power company representative(s) when the potential for conflict exists. Construction clearance limitations, de-energization options, and advanced notice requirements will need to be determined and agreed upon prior to starting any work on the project sites.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

The Department has determined that a USACE Nationwide or Individual Permit is not necessary for the project since all work shall be conducted outside the USACE jurisdictional areas. Any impacts to these jurisdictional areas by the Contractor without a USACE permit will be the responsibility of the Contractor. If the Contractor deems it necessary to impact the USACE jurisdictional areas, then it becomes the Contractor's entire responsibility to consult with the USACE pertaining to the need for a Nationwide or Individual Permit. TXDOT will then hold the Contractor responsible for following all conditions of the approved permit.

No significant traffic generator events identified.

If the contractor proposes work beyond the TxDOT obtained permit limitations, the contractor is responsible for additional costs, delays, and obtaining new or revised permits prior to construction.

All temporary construction access work and materials will not be measured or paid for directly but will be subsidiary to pertinent items. Prior to the scheduling of a Pre-Construction Meeting, submit a Temporary Construction Access Plan to the Area Engineer and to District Environmental Staff for their approval. The Construction Plan should contain a description of the equipment, such as barges, structures, etc., which may occupy waters of the US including jurisdictional wetlands, and a detailed work schedule. No work of any kind will be allowed until the pre-construction meeting has been held.

Temporary construction waterway crossings have not been environmental cleared/permitted within Right of Way. Restrict construction operations in any water body to the necessary areas as shown on the plans or applicable permit, or as directed. All work must comply with the General Conditions of the appropriate USACE permit.

ITEM 8: PROSECUTION AND PROGRESS

Provide progress schedule as a Bar Chart.

Project Number: **Sheet: 3A**

County: De Witt **Control: 0913-00-114**

Highway: Various

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

Law enforcement assistance for this project is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement in a marked vehicle as directed or agreed by the Engineer. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Use WZ(RS)-16 in conjunction with TCP(2-2)(2-3), & (2-4).

Use TCP(2-2b) for one-lane, two-way traffic control.

When using TCP(2-2b), a pilot car is required to lead traffic through the work space with or without channelizing devices on the center line unless otherwise approved.

When using TCP(2-2b), channelizing devices may be omitted during base, subgrade and seal coat operations unless otherwise directed. Flaggers will be required at public intersections when channelizing devices are omitted.

When using TCP(2-2b), arrow boards, displaying the caution mode, may be used to enhance the flagger stations. If used, place the arrow board in advance of the flagger station a distance of ½X, the sign spacing distance shown on BC(2). Use arrow boards as shown on BC(7).

When using TCP(2-2b), the temporary 24" stop line and the CW16-2P plaques may be omitted.

When using TCP(2-2b), an additional "Road Work Ahead" and "Be Prepared To Stop" signs will be required on each end of the lane closure unless otherwise approved.

Provide suitable warning lights mounted high enough to be visible from all directions on all construction equipment, including pilot vehicles, and operate warning lights when the equipment is within the right of way. Equip other equipment such as trucks, trailers, autos, etc., with emergency flashers and use emergency flashers while within the work area.

Project limit traffic control devices will not be required for this project.

ITEM 506: TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

The storm water pollution prevention plan (SW3P) for this project will consist of utilizing existing vegetation. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7.

ITEM 680: INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

Use materials from the prequalified material producer lists as shown on the Texas Department of Transportation (TxDOT) material producer list (MPL): http://www.txdot.gov/inside-txdot/division/construction/producer-list.html

Requirements for this Item include the following work, all of which are subsidiary to this Item. This project shall consist of the installation of all the materials necessary for complete signal systems as follows:

1. Notify the Yoakum District Traffic Shop (361-293-4300) (403 Huck Street, Yoakum, Texas) one week before beginning any work involving traffic signals.

2. Provide submittal literature for all traffic signal equipment before installation.

3. Review by the Engineer does not relieve the Contractor of his responsibilities to meet the requirements of the specifications and plans.

4. Furnish and install a new controller (eight phase NEMA TS 2 Type 1), cabinet (NEMA TS 2 Size 5, Configuration 3, 12 position load bay for pole mounted installations, or NEMA TS 2 Size 6, Configuration 4, 16 position load bay for ground mounted installations), and breakaway base for ground mounted cabinets, meeting the requirements of Departmental Materials Specifications DMS-11170. Provide detector panel toggle switches that additionally permit the user to disconnect the detector. Provide new MMU with Ethernet port. For a pole-mount controller cabinet, provide three mounting brackets. Furnish, and install all required materials, incidentals and any equipment necessary to make a **fully operational** traffic signal.

Project Number: **Sheet: 3B**

County: De Witt **Control: 0913-00-114**

Highway: Various

5. Furnish and install Trafficware 980 B-140 (ATC), or equivalent, controllers at locations identified on the plans. Ensure controllers are compatible with the existing Trafficware ATMS.now and can fully communicate with the existing central system.

6. Deliver the cabinet, controller, and accessories (with all cabinet components completely connected and securely strapped down) to the Yoakum District Signal Shop (403 Huck Street, Yoakum, Texas) for testing. Notify the District Signal Shop two working days before delivery at (361-293-4300).

7. The Department will not assume responsibility for the maintenance of the traffic signals until the project is completed and accepted.

8. Install the controller cabinet in an orientation as directed.

9. The contractor shall match the existing cable terminations when replacing an existing cabinet with a new cabinet and connect all field wiring to the controller assembly.

10. Where work requires the removal of power from the controller and cabinet assembly, erect temporary stop sign panels. Remove the stop sign panels after the traffic signals are in operation.

11. The contractor will program the new controller or update firmware on existing controller for operation, hook up the malfunction management unit (MMU) or conflict monitor, detector units, and other equipment including all ethernet ready devices to match existing setup, and turn on the controller with District oversight. The contractor will ensure all new replacement traffic signal cabinets will be operational prior to the end of the day. Have a qualified technician and a vendor representative from the controller supplier on the project site to place the traffic signals in operation. The contractor will be responsible for all fees associated with having the vendor on-site, include the controller assembly and cabinet vendor. Have a qualified technician on the project site to place the traffic signal in operation. The contractor shall complete all pertinent work on a single corridor prior to moving onto another corridor.

12. **Project Inspection:** For electrical project inspection, the Area Office and Chief Inspector should contact the Yoakum District Signal Shop in advance of needed inspections. At the time of the final electrical inspection, the Yoakum District Signal Shop office will create a punch list of discrepancies to be corrected and/or repaired before signal is put into flash

mode. Upon the satisfactory completion of repairs or corrections, the signals shall operate in a flashing mode for two or three days prior to the beginning of the test period for full signal operation.

13. **Signal Cabinet and Controller Changeout and Turn-On:** Notify the Yoakum District Signal Shop 361-293-4300 a minimum of two (2) weeks in advance of the signal changeout and turn on. Signal technicians from the Yoakum Signal Shop must be present when the signals are placed in full operation. Unless otherwise directed or approved, place the signal in full operation at the direction of the Yoakum District.

14. **Test Period for Signals:** The signals shall operate continuously for a minimum of 30 calendar days in a satisfactory manner. Equipment failures during these 30 days will cause the test period to start over.

15. During the thirty-day test period, the Yoakum District Signal Shop will be the First Responders to all trouble calls. They will, in turn contact the Contractor. Provide qualified personnel to respond to these and all trouble calls. Repair and diagnose any malfunctions to signal equipment supplied for the project. Provide a local telephone number, not subject to frequent changes and available to receive calls on a 24-hour basis. Respond to reported calls within a reasonable travel time, (i.e. from a Bay City area address), but not more than 2 hours maximum. Make appropriate repairs within 24 hours. Place a logbook in each controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. The error log in the conflict monitor shall not be cleared during the thirty-day test period without approval. If it is necessary to replace equipment, such as a controller, in order to return the signals to normal operation, TxDOT will replace the equipment with loaned equipment until the original equipment is repaired and then replaced.

16. Prevent any damage to property owner's poles, fences, shrubs, mailboxes, etc. Protect all underground and overhead utilities and repair any damage. Provide access to all driveways during construction.

17. Salvage existing traffic signal cabinets and equipment at the project locations as directed by the Yoakum District Signal Shop representative. This equipment remains the property of the Texas Department of Transportation. The cabinets or material selected is to be stockpiled at the Yoakum District Signal Shop, 403 Huck Street, Yoakum, Texas as directed. Contact the District Signal Shop at (361-293-4300) 48 hours in advance of

Project Number: **Sheet: 3C**

County: De Witt **Control: 0913-00-114**

Highway: Various

delivery. All other material removed in this project will become the property of the Contractor. Dispose of material off the right of way in accordance with federal, state, and local regulations. Maintain the operation of the existing traffic signal until directed to remove it.

18. Contractor shall procure and install retrofit cabinet lock at each identified traffic control cabinet per manufacturer installation procedure. Payment for the items identified below shall be subsidiary to Item 680.

    Create a log containing electronic lock serial numbers and physical intersection cross streets where each lock was installed. Provide to the District office twenty-four (24) Bluetooth capable electronic keys, with remote charging cable. Each key shall support recharging of the key battery with a simple mini-USB cable.

    Provide to the District office the programming communicator hardware and software suitable for programming all electronic keys. The applicable programming software will be downloaded and installed on to the programming unit. Contractor to program a minimum of 10 keys in the presence of District personnel using user-privilege data provided by the District. Provide suitable training to District staff on use and operation of programming unit, remote key privileges configuration, and electronic key use. Provide training or instruction to the District personnel on required software to be installed on the user's mobile device(s) to support remote key credential update.

    There is one approved electronic lock system for use on this project: Cyberlock. The procurement shall be consistent with the following part numbers, or approved equivalent:

    <u>Cyberlock System Part Numbers</u>
    Field cabinet lock – part number CL-TC2L (reference quantity sheet for number of units). Each of these locks are left-hand open doors.

    Field cabinet keys – part number CK-BLUE3 (quantity identified above)

    District programming unit – part number CKS-020 (quantity 1)

19. Contractor shall transport, install, and test District-furnished cellular router with power supply and power cable assembly. Provide a minimum of 30 days' notice to the District for pick-up of the routers. Install cellular router in equipment cabinets in accordance with details shown in the plans or as directed. Provide all materials not supplied by the District necessary for the cellular router installation. Router shall be powered by hardwiring to power panel on right side of signal cabinet. Before fabrication, submit for approval five prints of the working drawings for attachment of the cellular routers. Show the details of any additional brackets, connections, and methods of attachment.

Create a log containing cellular router serial numbers and physical intersection cross streets where each cellular router was installed.

Testing of the cellular router is for the purpose of relieving the Contractor of maintenance of the system. The Contractor will be relieved of the responsibility for maintenance of the cellular router in accordance with Item 7 after all testing is successfully completed.

After all cellular routers have been installed, the Department will conduct approved continuity, stand alone, and cellular router tests on the installed field equipment with central, remote, and laptop equipment.

20. At intersections where cellular router is installed, provide four ethernet cables to connect cellular router ethernet ports to the controller, MMU, and two other equipment located within the cabinet. Each cable length shall be 5 ft long minimum, and all extra length shall be neatly coiled and tie-wrapped. Ethernet cables shall be factory terminated and are not to be cut or terminated by Contractor.

    Contractor shall provide Category 6 Ethernet communication cables in accordance with Item 6004, "Networking Intelligent Transportation System (ITS) Communication Cable." Provide 4 Ethernet communication cables following the color scheme and assignment information as follows:

    - Blue – Traffic Signal Controller
    - Green – Malfunction Monitor Unit (MMU)
    - Yellow – APS (Accessible Pedestrian System) if present
    - Black – Detection (i.e. radar, video, etc.), if present

    The cellular router has a total of 4 ethernet ports. The Contractor shall coordinate with the District which equipment shall be connected to the router, up to the maximum of 4.

21. When railroad preemption is present, the contractor shall document the existing preemption setup in the signal cabinet. Contact the railroad representatives to be present during traffic signal cabinet changeout and to determine if the tracks are still in use or abandoned. Coordinate with the District to relocate or salvage existing preemption equipment when railroad equipment is not operational. Active railroad preemption equipment shall be relocated to the new traffic signal control cabinet when directed by the District. Additionally, make any preemption cable terminations in the new traffic signal control cabinet. Complete all preemption work and ensure all is operational prior to the end of the working day.

Project Number: **Sheet: 3D**

County: De Witt **Control: 0913-00-114**

Highway: Various

Cabinet Design and Configuration:

1. No self-tapping fasteners are to be used in the construction of any part of the cabinet design.

2. Provide NEMA TS 2 Size 5, Configuration 3, cabinet for pole mounted locations identified in the plans. Provide NEMA TS 2 Size 6, Configuration 4 for ground mounted locations identified in the plans.

3. Existing cabinet risers are to be reused for mounting Size 6 cabinet. Ensure cabinet base anchor bolt hole pattern matches existing riser bolt hole pattern prior to fabrication.

4. Provide cabinet door(s) with a full-length piano hinge with stainless steel pins spot-welded at the top of the hinge. Provide door stops at the top and bottom meeting NEMA Standards Publication 2016 NEMA TS-2 Version 03.07 Clause 7.5.3. Provide three position "J" hook arm mounted door stops.

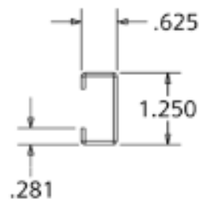
5. Provide smart lock in accordance with Cyberlock System specifications and install in place of standard No. 2 Corbin lock. Provide smart keys, charging station, vendor software, operations manual, and associated system accessories to the Department.

6. Attach aluminum lifting ears to the top of the cabinet to permit lifting the cabinet with a sling. Lifting ears with holes are provided on the cabinet so that the cabinet can be loaded and unloaded and transported in an upright position. The comers of each eye or ear shall be rounded and in the down position when shipped. These ears shall utilize only one bolt for easy reorientation with no tools needed for positioning of the ear for lifting purposes. Lifting ears may be permanently fabricated to the cabinet frame as long as they do not interfere with the construction and operation of the sunshield (if provided). Manufacturer may provide removable lifting ears that can be removed after installation. Seal any penetrations to the cabinet exterior or sunshield after removal of lifting eyes.

7. Department to provide TxDOT logo sticker for all cabinets under department control. Department to obtain TxDOT logo from TRF.

8. Powder-coat the interior of the cabinet 90% gloss smooth white.

9. Provide vertical shelf support and side Unistrut “C” channels meeting the approved dimensions detailed as follows:



10. Provide cabinet shelves, perforated to encourage efficient air flow inside the cabinet but not impacting equipment placement and orientation.

11. Provide finger-safe thermostats, Bud Industries Part No. TS-15-A, or equivalent.

12. Provide a locking, auxiliary police door in the door of the cabinet to provide access to a panel containing a signal-shutdown switch, a signal-flash switch, a manual-automatic switch, and a manual-advance, push-button switch on a 6-foot, retractable cord. The police door must be gasketed to prevent entry of moisture or dust, and the lock must be provided with one brass key. All the switches within the police panel shall be a two-position toggle switch. All switches will be labeled according to their functions show in figure below.

    i. Switch Functions

        1. Mode (Normal/Flash)
            a. Normal - In the normal position, the signals will operate in a normal operation
            b. Flash - In the flash position, the signals flash switch shall cause the intersection to be placed in flashing position and the controller shall stop time. Power shall not be dropped to the CU, MMU, BIUs, and detector rack when the police panel switch is in the FLASH position.

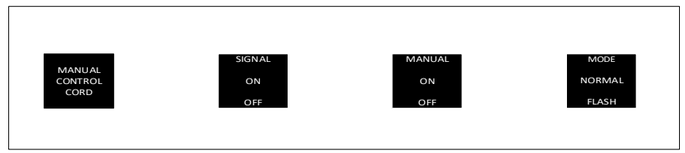
        2. Manual (On/Off)
            a. ON - When in the ON position, control of the controller unit from the police door must override any external control (external logic, etc.) in effect when the manual-automatic switch is in the on (manual) position. Each actuation of the manual-advance push-button switch must advance the controller to the next interval. Manual control must not override any calls for PE.
            b. OFF - When in the OFF position, the controller will operate in a normal operation.

Project Number: **Sheet: 3E**

County: De Witt **Control: 0913-00-114**

Highway: Various

        3. Signal (On/Off)
            a. ON - When in the ON position, the signals shall cause all intersection displays to be turned on.
            b. OFF - When in the OFF position, the signals shall cause all intersections displays to be turned off.



13. Provide a reusable, washable, aluminum mesh air filter.

14. Provide a door switch meeting the following requirements:

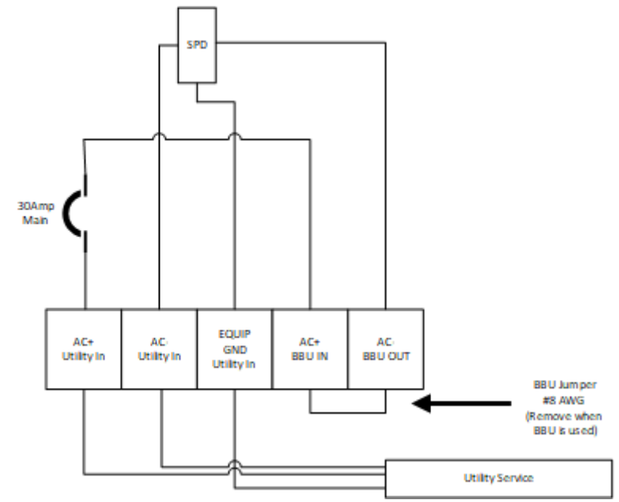
- momentary, pin-type door switch,
- installed in the cabinet or on the door,
- connected to a terminal so that the equipment installed in the cabinet can confirm input is connected to logic ground when the cabinet door is open, and
- engage cabinet light when the door is opened.

15. Provide 2 momentary, pin-type door switches for each door provided with the cabinet. Wire 1 switch to turn on the cabinet lights when the door is open, and off when the door is closed. Wire the other in parallel to a terminal block to detect a cabinet intrusion condition.

16. All connector-wiring harnesses shall terminate all wires on terminal blocks, whether the wires are utilized or not. This pertains to all devices being installed at the factory or in the field.

17. Provide AC internal cabinet wiring in accordance with the most current version of the NEC. Size conductors serving receptacles to be rated for receptacle amperage rating in accordance with the NEC.

18. Provide a finger-safe terminal block with a minimum of five compression-fitting terminals designed to accept up to a 4 AWG stranded wire for connection of the AC power lines. The block must be rated at 50 amperes. Use Ferraz Shawmut FSPDB1C or exact equivalent. The terminal block will allow additional BBU wiring without the need to use any Burndy style connectors. The wiring info below is an illustration of what shall be provided. The wiring of the terminal block shall be as follows:



19. Provide all load switches having both input and output indicators. For each circuit in each load switch. The indicator light must be on when a “Low Voltage Active” input to the load switch is present. The indicator light must be on when a “High Voltage Active’ input to the load switch is present.

20. Provide five circuit breakers as follows:

- Main breaker – Size the main circuit breaker such that the load of all branch circuits is less than the main circuit breaker ampere rating in accordance with the most current version of the NEC. This breaker must protect the signal load circuits, controller circuits, MMU, and card-rack- detector power supply
- Accessory breaker – Minimum 15 A. Size to service LED lights, trouble light, fans, door switches, smart lock, and GFCI receptacle in accordance with the NEC.

Project Number: **Sheet: 3F**

County: De Witt **Control: 0913-00-114**

Highway: Various

- Equipment breaker – Minimum 15 A. Size to service IP addressable power strip, electronic equipment, network or ITS equipment, and convenience duplex receptacles in accordance with the NEC.
- Flasher breaker – Minimum 15 A. Size to service 2-circuit flasher and lighting panel.
- Spare – Minimum 15 A. Provide one spare equipment breaker for future use.

The four minimum 15 A and main thermal-type circuit breakers must be mounted and wired in the cabinet.

The breakers must be Square “D,” QUO-150 Series or approved equivalent.

Equip the circuit breakers with solderless connectors and install on the right-side wall (facing the cabinet) or lower-right side of the back panel inside the cabinet. Position the breakers so that they are easily accessible and rating markings are visible.

The above breakers are in addition to any auxiliary fuses furnished with the controller to protect component parts, such as transformers, etc.

Mount and wire a NEMA Type 5-15R GFCI type duplex receptacle to the maintenance panel on the inside of the cabinet door. This GFCI duplex receptacle is intended for maintenance personnel and is not to be used to serve equipment inside the cabinet. Permanently label GFCI duplex receptacles “Service Receptacle”.

Provide GFCI with a self-monitoring system that provides light indicators as follows:

- A green light – If the green light is on this means the outlet is working as intended, and it is providing the necessary protection.
- A red light – A red light means that there is a problem with the device. Further investigation needs to be carried out.
- No lights – If neither red nor green light is flashing, this means that no power is reaching the outlet or that the outlet may be tripped.

GFCI shall have test buttons on the face of it that perform the following:

- Test - To ensure the outlet is working properly
- Reset – To return power to the outlet after a test or trip has taken place

These ‘Test’ and ‘Reset’ buttons on the face of the GFCI shall be colored coded as the following:

- Test – Shall be ‘Red’ in color
- Reset – Shall be ‘Black’ in color

Mount and wire two additional duplex receptacles (to service network, ITS, and other electronic equipment) in the upper-left side and upper-right side of the cabinet. These receptacles are to be protected by the equipment breaker.

21. There shall be a maintenance panel on the inside of the main door containing the following:

- GFCI duplex convenience outlet
- Stop time (On/Off) Switch
- Test (Normal/Flash) Switch
- Controller (On/Off) Switch
- System/Free Switch
- Vehicle Switch
- Ped Switch
- Preempt Test Switch

All the switches on this maintenance panel shall be a two-position toggle switch. All switches will be labeled according to their functions show in figure below.

Switch Functions:

- Stop Time (ON/OFF)
    - On - In the ON (UP) position, stop timing power shall be applied to the controller.
- Off - In the OFF (DOWN) position shall be the normal operating position and allow auxiliary devices to apply stop timing inputs to the controller. The conflict monitor shall be wired through the stop time switch such that when in the OFF setting and a conflict is detected, stop timing shall be applied to the controller.

- Test (NORMAL/FLASH)
    - Normal - When the switch is in the NORMAL position, the signals will operate in a normal operation.
    - Flash - When the switch is in the FLASH position, the call for flashing operation must occur. No power is to be removed to the CU, MMU or Power Supply when in this position.

- Controller (ON/OFF)
    - On - In the ON position, the signals will operate in a normal operation.
    - Off - In the OFF position, this switch shall remove power from the CU and MMU and the intersection shall be placed in flashing operation.

Project Number: **Sheet: 3G**

County: De Witt **Control: 0913-00-114**

Highway: Various

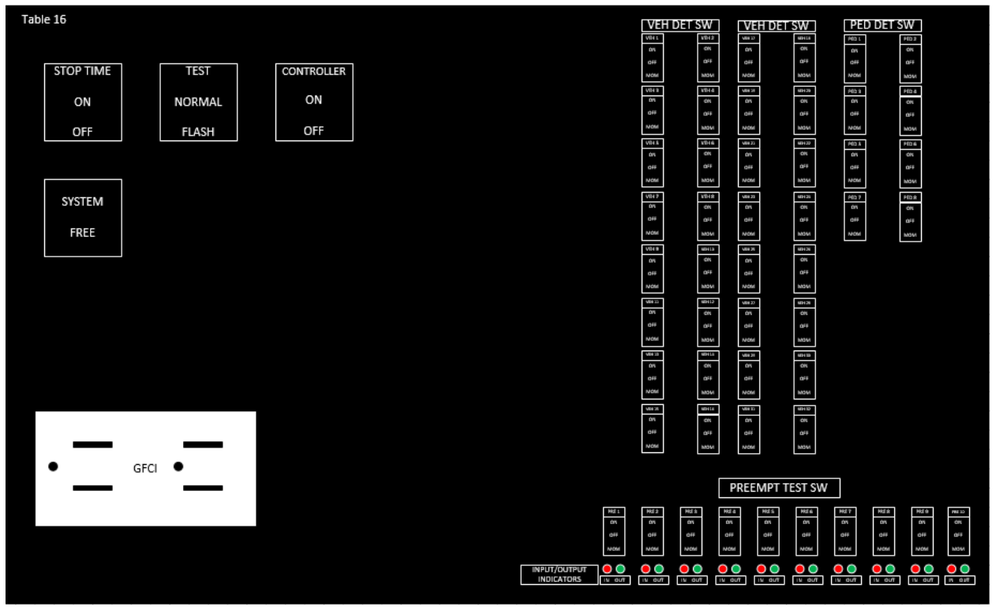
- System/Free (SYSTEM/FREE)
    - System - When in the ‘SYSTEM’ (UP) position, the controller unit shall be under the control of the master controller, or TBC.
    - Free - When the system switch is in the ‘FREE’ (DOWN) position, the controller unit shall operate in a non- coordinated (free) mode that releases the local controller to operate in an isolated, full-actuated manner when necessary for maintenance purposes.

- Vehicle (ON/OFF/CALL)
    - On – Normal operation
    - Off – Detector operation is off
    - Call – Momentary call of detector

- Ped (ON/OFF/CALL)
    - On – Normal operation
    - Off – Detector operation is off
    - Call – Momentary call of detector

- Preempt (CALL/OFF)
    - Call – Momentary call
    - Off – Normal operation

Switch guards or switch covers will be installed on all switches mounted to door interiors such as; the Test-normal switch and stop time switch to prevent accidental activation when the door is open. A single clear, nonconductive plastic cover to prevent accidental activation meeting the functional intent are acceptable but require approval in writing by the Engineer. If a single cover is to be used, the cover will lock in the up right (open) position when activating switches behind the cover.



22. Only use a 15 pin SDLC bus panel for all SDLC connections within the cabinet. Provide, one spare SDLC port on the SDLC bus and one spare SDLC cable that will be connected additional equipment to be added to the cabinet and giving access to the controller unit.

23. The cabinet must include parallel surge protection device (SPD) (Series installed SPD not permitted) on the AC service input that meets or exceeds the following requirements:

    - Install an SPD inside of the cabinet on the power distribution to the equipment. Keep leads as short as possible with all conductor bends formed to the maximum possible radius. Connect the SPD ground lead directly to the ground bus. Use of wire nuts is prohibited. Install in accordance with manufacturers recommendations.

    - Provide UL Listed Type 1 SPD labeled to UL 1449 4th edition posted at UL.com, under Certifications UL Category Code VZCA, and have a 20kA I-nominal rating. Provide SPD rated for appropriate environmental use per application

    - Do not exceed 1500V V on the Voltage Protection Rating (VPR) on any mode (L-N and N-G and L-G)

Project Number: **Sheet: 3H**

County: De Witt **Control: 0913-00-114**

Highway: Various

- A minimum voltage of 150V for the Maximum Continuous Operating Voltage (MCOV).

- Equal or exceed 50kA at 8/20µs the SPD surge current rating per mode (L-N) and (N-G) and L-G.

- Equal or exceed 50 kA at 8/20µs or the available short circuit current, whichever is higher for the SPD UL 1449 4th edition for Short Circuit Current Rating (SCCR).

- SPD provided with Metal Oxide Varistors (MOV) shall include thermal disconnect for each MOV for safety purposes

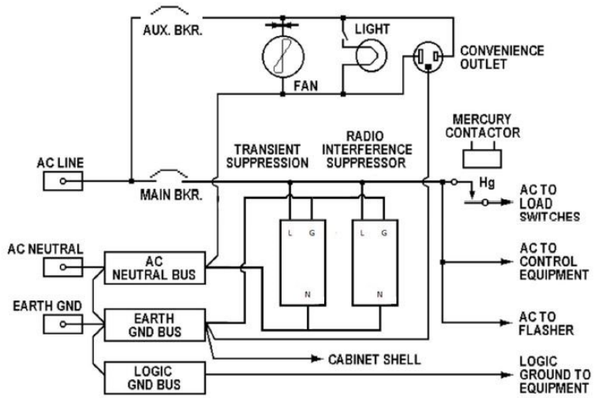
- Gas tube and spark gap SPD are not be permitted alone on any current carrying phase. Ensure each MOV's operational status can be monitored via visual indicator, including N-G mode when applicable.

- Provide SPD with one set of Normally Open (NO), Normally Closed (NC) Form C contacts for remote monitoring, and replaceable modules.

- SPD shall not allow any leakage current to ground

- An EMI/RFI filter, independent from the SPD shall be provided and installed on the load side of the signal circuit breaker and shall be protected by the surge protector. This filter shall be rated for the maximum load of the cabinet and shall provide a minimum attenuation of 50 decibels over the frequency range of 200 kHz to 75 MHz. This Filter shall be UL 1283 Certified, under Certifications UL Category Code FOKY.

The figure below presents a typical cabinet power distribution schematic with parallel SPD protection.



Typical Power Distribution with Parallel SPD

24. The cabinet must include a low-voltage power, control, and data surge protection devices that meets or exceeds the following requirements:

- Install a specialized SPD on all conductive circuits including, but not limited to, data communication cables, coaxial video cables, and low-voltage power cables. Ensure that these devices comply with the functional requirements shown in the table below for all available modes (i.e., power L-N, N-G; data and signal center pin-to-shield, L-L, L-G, and shield-G where appropriate).

- These specialized SPD must have an operating voltage matching the characteristics of the circuit. Ensure that these specialized SPD are UL 1449 4th edition, VZCA for low voltage power and control, UL497B, QVGQ for Dataline surge protection, or UL 497E,QVLA, for Coaxial surge protection, as applicable.

- Provide the SPD with 3 stages of surge suppression in a Pi (π) configuration. The first stage (primary side) consists of parallel-connected Gas Discharge Tubes (GDTs). The second stage consists of a series connected resistor or inductor. The third stage (secondary side) consists of parallel-connected transorbs or silicone avalanche diodes (SADs).

- Ground the SPD to the DIN rail and a wire terminal connection point. (Grounding solely through the DIN rail connection is not adequate and does not meet the performance or intent of this specification.)

Project Number: **Sheet: 3I**

County: De Witt **Control: 0913-00-114**

Highway: Various

- Install coaxial SPDs in a manner that prevents ground loops and resulting signal deterioration. This is usually caused where the cable has different references to ground at either end and connecting SPDs at both ends that have only Pin to Shield protection completes a ground loop circuit through the Shield. Provide independent shield protection not connected to ground.

SPD Minimum Requirements

Circuit Description	Maximum Continuous Operating Voltage (MCOV)	Frequency/ Bandwidth/ Data Rate	Surge Capacity	Maximum Let-Through Voltage
Power – UL 1449 Category code VZCA				
12 VDC	15-20 V	N/A	5 kA per mode (8x20 µs)	<150 Vpk
24 VAC	30-55 V	N/A	5 kA per mode (8x20 µs)	<175 Vpk
48 VDC	60-85 V	N/A	5 kA per mode (8x20 µs)	<200 Vpk
12 VDC	15-20 V	N/A	5 kA per mode (8x20 µs)	<150 Vpk
Coaxial Lead-in Conductors – UL 497E category code QVLA				
Coaxial Lead-in Conductors	4-8 V	Up to 4GHz	10 kA per mode (8x20 µs)	<100 Vpk

Circuit Description	Maximum Continuous Operating Voltage (MCOV)	Frequency/ Bandwidth/ Data Rate	Surge Capacity	Maximum Let-Through Voltage
Data Line Communications- UL 497B category code QVGQ				
RS422/RS485	8-15 V	Up to 10 Mbps	10 kA per mode (8x20 µs)	<30 Vpk
T1	13-30V	Up to 10 Mbps	10 kA per mode (8x20 µs)	<30 Vpk
Ethernet Data	7-12V	Up to 1000 Mbps	2kAper mode (10x1000 µs)	<30 Vpk
Serial Communication	6-15V	Up to 40Mbps	400A 8x20 µs	Serial Communication

25. Provide low-amperage quick-connect LED lighting for interior lighting in the cabinet. The lighting must illuminate the back and side panels so all stenciled lettering is readable in the cabinet. A toggle switch will be provided allowing the user to manually turn off LED lighting. In addition to the toggle switch, the LED lighting shall turn on when the cabinet door is opened and turn off when the cabinet door is closed. A MOV or other such transient suppression device shall be placed across the AC power input to the LED power supply lighting.

    Install three LED lights with switches with equivalent light quality in the cabinet. One light is to be located at the top of the cabinet, one light is to be located to illuminate the pull out drawer, and one light is to be located on one side wall of the cabinet to illuminate the load switch bay. Enable lights to turn on when the cabinet door is opened and turn off when the cabinet door is closed. Power the lights with quick-connect wiring.

26. Provide low-amperage quick-connect fans.

27. All back panels within the cabinet shall be matte black anodized aluminum, silkscreen printed in white lettering for identifying all inputs/outputs-termination points. The silk screen shall meet all temperature requirements in section 2 of the NEMA Standards Publication 2016 NEMA TS-2 Version 03.07, or latest version to prevent fading, peeling, etc.

28. Provide copper ground buses for both the power-supply neutral (common) and chassis ground. Each bus bar must provide a minimum of ten unused terminals with eight 32 × 5/16-in. or larger screws. Provide two neutral and ground bus bars, left and right of the lower part of the. Also, provide three neutral bus bars located that the bottom of the main load switch panel directly below the field output terminals. All neutral buses shall be bonded, and all ground buses shall be bonded. Space neutrals buses out equally across the field output terminals.

29. Provide power supplies with a separate front panel indicator LED for each of the four (4) outputs. Front panel banana jack test points for 24VDC and logic ground shall also be provided. The cabinet power supply shall be shelf mounted. It shall not be attached to the back panel or shelf.

30. Provide bus interface units (BIUs) meeting all NEMA TS2 Section 8 requirements. Provide BIUs with three (3) separate front panel indicator light emitting diodes (LEDs) for power, transmit, and valid data.

31. Provide flash transfer relays meeting NEMA TS2 Section 6 requirements.

32. Except when the Ethernet communications cable color scheme is specifically identified by the District, the following Category 6 Ethernet communication cables in accordance with Item 6004, “Networking Intelligent Transportation System (ITS) Communication Cable,

Project Number: **Sheet: 3J**

County: De Witt **Control: 0913-00-114**

Highway: Various

shall be provided.” Each cable to measure 5 linear feet and be bundled and stored in the controller cabinet pull out drawer during delivery and for Contractor use. Ethernet communication cables shall follow the color scheme and assignment information as follows:

- White - Ethernet Switch (Patch Cord)
- Blue – Traffic Signal Controller
- Green – Malfunction Monitor Unit (MMU)
- Red – Battery Backup Unit (BBU)
- Yellow - APS (Accessible Pedestrian System)
- Black – Detection (i.e. radar, video, etc.)
- Purple - PTZ Camera
- Orange - Other
- Grey - Other
- Pink - Broadband Radio

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

Shadow vehicle(s) with TMA are set up for stationary operations. The contractor will be responsible for determining if operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

QUANTITY SHEET

CONTROLLING PROJECT ID 0913-00-114 **DISTRICT** Yoakum **COUNTY** De Witt
HIGHWAY Various

			CONTROL SECTION JOB		**0913-00-114**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00133716**		
			COUNTY		**De Witt**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	680-6011	INSTALL HWY TRF SIG (UPGRADE)	EA	122.000		122.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000		20.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF QUANTITIES															
ITEM	CODE	DESCRIPTION	UNIT	TOTAL QUANTITY	AUSTIN COUNTY	CALHOUN COUNTY	COLORADO COUNTY	DEWITT COUNTY	FAYETTE COUNTY	GONZALES COUNTY	JACKSON COUNTY	LAVACA COUNTY	MATAGORDA COUNTY	VICTORIA COUNTY	WHARTON COUNTY
680	6011	INSTALL HIGHWAY TRAFFIC SIGNALS (UPGRADE)	EA	122	7	11	7	9	8	9	5	5	29	3	29
*		ELECTRONIC LOCK (PROCURE & INSTALL)	EA	122	7	11	7	9	8	9	5	5	29	3	29
*, **, +		CELLULAR ROUTER (INSTALL ONLY)	EA	122	7	11	7	9	8	9	5	5	29	3	29
*		SMART MMU (PROCURE & INSTALL IN EXISTING CABINET)	EA	73	4	3	5	2	5	4	4	4	17	1	24
*		TRAFFIC SIGNAL CONTROLLER (PROCURE & INSTALL IN EXISTING CABINET)	EA	93	5	4	6	5	6	6	5	4	22	2	28
*		TRAFFIC SIGNAL CABINET AND CONTROLLER (SIZE 5 - CONFIGURATION 3)	EA	32	1		2	1	3	4	1	2			18
*		TRAFFIC SIGNAL CABINET AND CONTROLLER (SIZE 6 - CONFIGURATION 4)	EA	33	2	3	1	1	1		3	2	15	1	4
*		TRAFFIC SIGNAL CABINET AND CONTROLLER (SIZE 7 - CONFIGURATION 4)	EA	4	1		2		1						
*		CONTROLLER FIRMWARE (UPDATE)	EA	14			1	4	2	2			4		1
*		REMOVE & RELOCATE BBU	EA	1								1			
6185	6002	TMA (STATIONARY)	DAY	20	1	1	2	1	2	1	1	1	3	1	6

* SUBSIDIARY TO ITEM 680, FOR TxDOT'S INFORMATION ONLY

** FURNISHED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR

\+ CONTRACTOR SHALL FURNISH AND INSTALL (4) FACTORY TERMINATED ETHERNET CABLES, 5 FOOT LONG MINIMUM, AT EACH INTERSECTION. SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.

The proposed Traffic Signal Cabinets and Controllers shall be manufactured/supplied by Trafficware.

The Smart MMUs shall be manufactured/supplied by Eberle Design, Inc. (EDI)

6/24/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

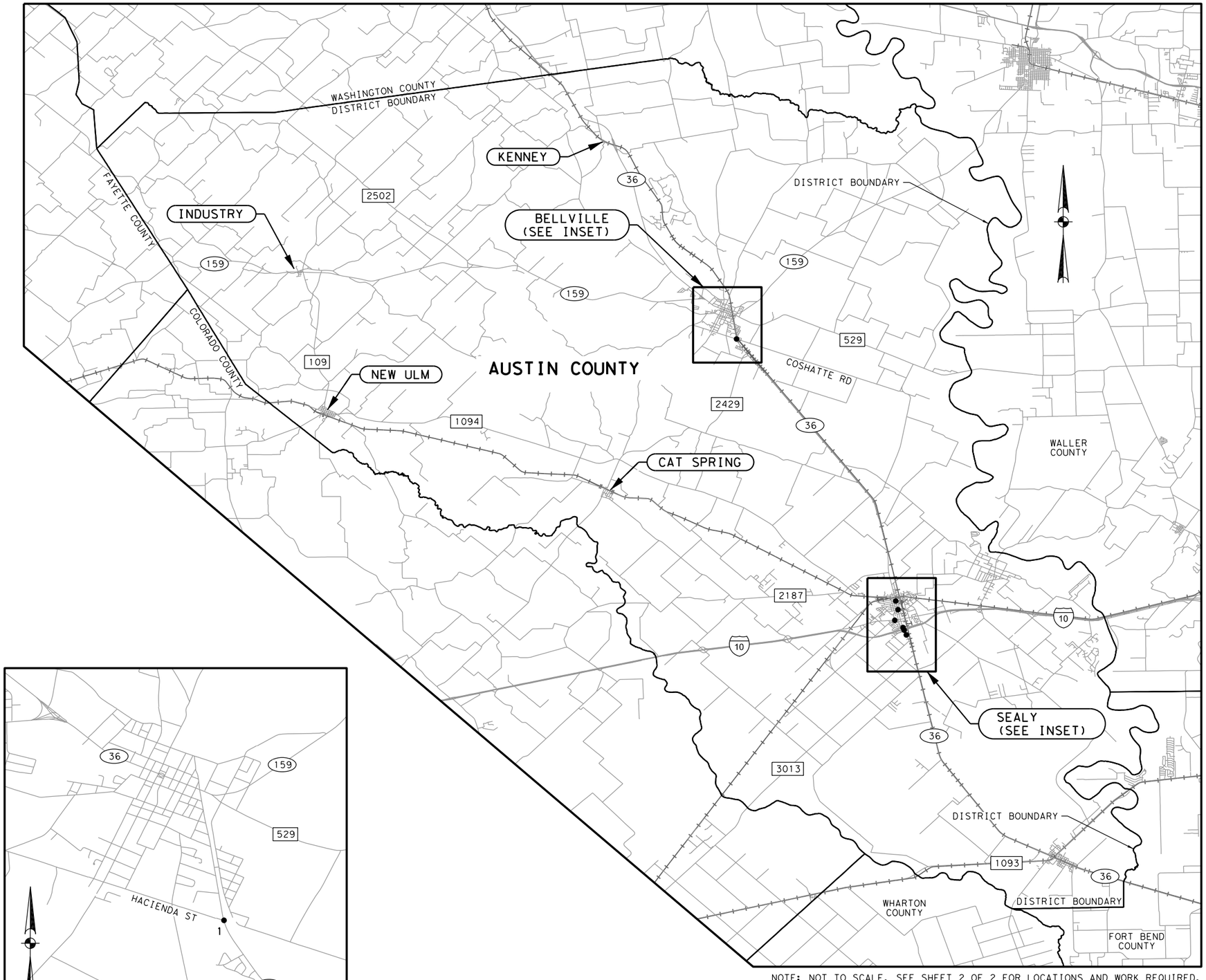
TRAFFIC SIGNAL UPGRADES

SUMMARY OF QUANTITIES

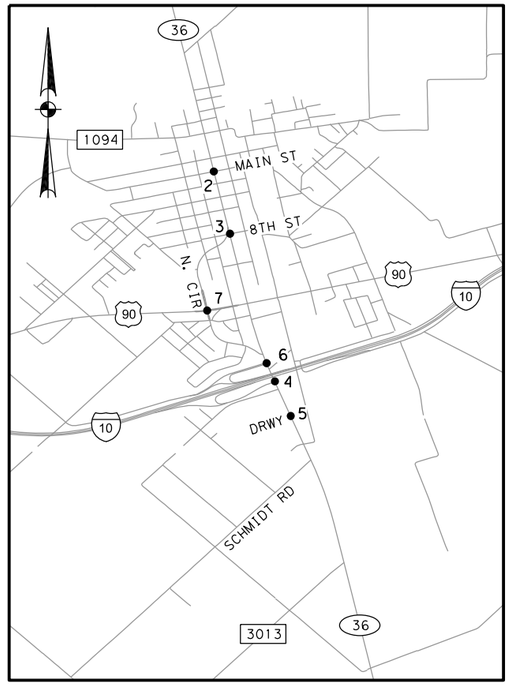
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	5
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 6/24/2021 40.0000 ft / in. BY: daniel.rejcek
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_005_Quantities.dgn



NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



SEALY

BELLVILLE

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn

F-928

13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

AUSTIN COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	6
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_010_Austin.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
1	Austin	Bellville	SH 36	Hacienda St	29.933419°	-96.250046°	1	1	1	1			1		(RR)
2	Austin	Sealy	SH 36	Main St	29.780937°	-96.157481°	1	1	1	1		1			
3	Austin	Sealy	SH 36	Loop 350	29.775926°	-96.156174°	1	1	1	1		1			
4	Austin	Sealy	SH 36	EB Off Ramp	29.764044°	-96.152563°	1	1		1					
5	Austin	Sealy	SH 36	TSC (Drwy)	29.761260°	-96.151286°	1	1							
6	Austin	Sealy	SH 36	WB Off Ramp	29.765510°	-96.153229°	1	1	1	1	1				(SP)
7	Austin	Sealy	US 90	SL 350	29.769746°	-96.158017°	1	1							
AUSTIN COUNTY TOTAL:							7	7	4	5	1	2	1		

(RR) = (SEE NOTES 9, 10, & 11) EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT AT THIS INTERSECTION. RELOCATE EXISTING RAILROAD PREEMPTION EQUIPMENT TO NEW TRAFFIC SIGNAL CABINET.
(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUS, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS,OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

9. AT INTERSECTION NUMBERS CONTAINING (RR), EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT. WHEN PERFORMING TRAFFIC SIGNAL CABINET REPLACEMENT, CONTRACTOR IS RESPONSIBLE FOR THE INITIAL UNHOOKING, RELOCATION, AND FINAL RE-CONNECTION OF THE EXISTING RAILROAD ADVANCED PREEMPTION SIGNAL CABLE. ONCE SCOPE OF WORK IS PERFORMED, CONTRACTOR MUST CONTACT RAILROAD COMPANY TO SCHEDULE A CUTOVER/FINAL INSPECTION TO VERIFY EXISTING RAILROAD ADVANCED PREEMPTION IS OPERATIONAL AS ORIGINALLY INTENDED. REFER TO THE RAILROAD SCOPE OF WORK SHEETS FOR RAILROAD CROSSING INFORMATION. CONTRACTOR MUST CONTACT TXDOT YOAKUM DISTRICT SIGNAL SHOP REPRESENTATIVE TO JOIN THE CONCURRENT CUTOVER/FINAL INSPECTION WITH THE RAILROAD COMPANY. RAILROAD COMPANY WILL INVOICE TXDOT AND WILL BE REIMBURSED BY TXDOT AGAINST THE PROJECT'S RAILROAD FORCE ACCOUNT AND THE INVOICES WILL BE PROOF OF FINAL INSPECTION TAKING PLACE. THE DISTRICT WILL FOLLOW UP WITH A SECTION 130 PROJECT FOR A FULL PREEMPTION REVIEW AND UPDATE.

10. ANY WOK NEAR THE RAILROAD RIGHT-OF-WAY MUST BE PHASED TOWARDS THE END OF THE OVERALL CONSTRUCTION TIME ESTIMATE.

11. PRIOR TO ANY CONSTRUCTION WITHIN RAILROAD RIGHT-OF-WAY, CONTRACTOR SHALL PROVIDE PROOF OF THE EXECUTED CONTRACTOR RIGHT-OF-ENTRY WITH ASSOCIATED RAILROAD COMPANIES WHERE REQUIRED.

5/26/2021

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

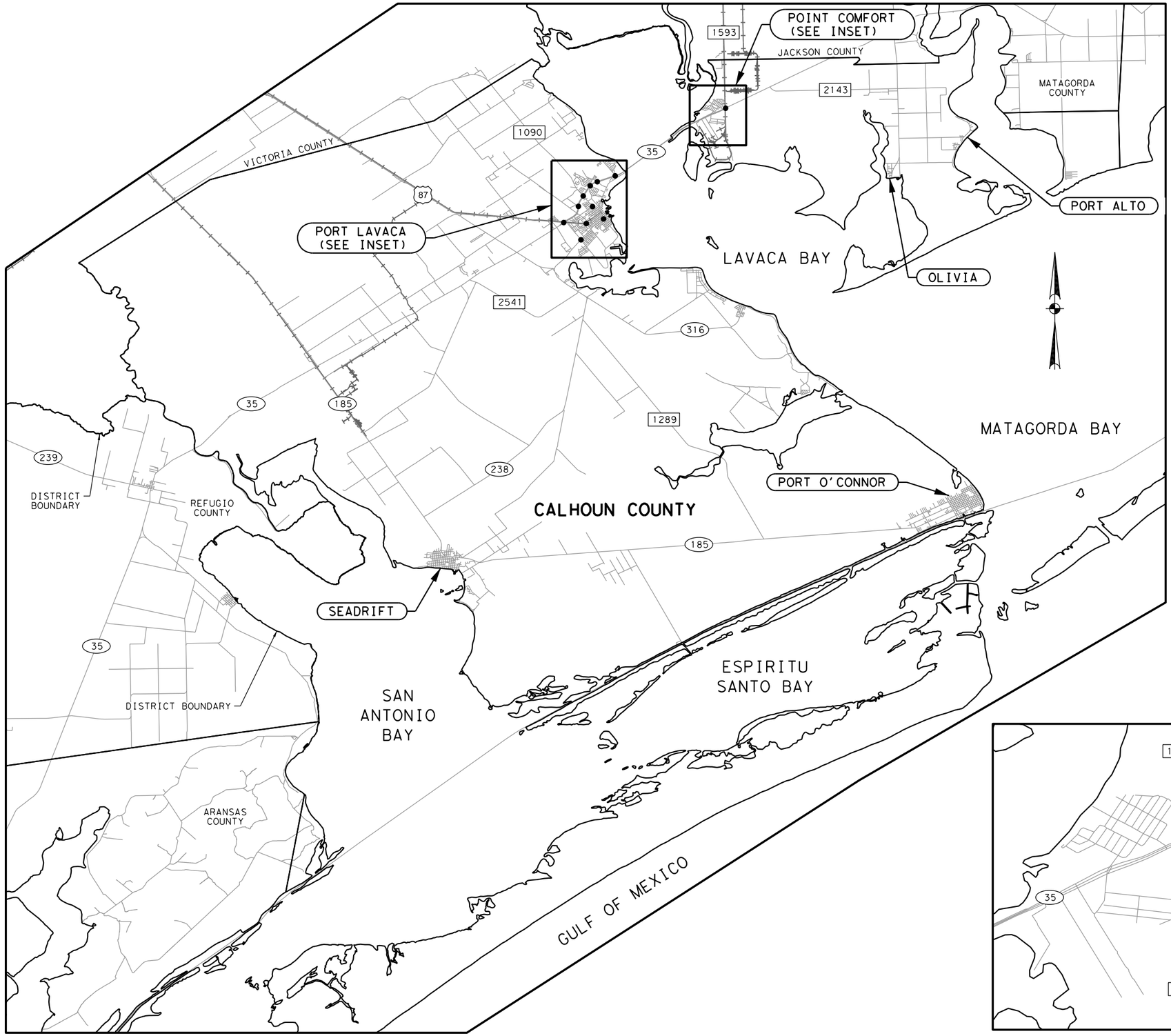
TRAFFIC SIGNAL UPGRADES

AUSTIN COUNTY INTERSECTION DETAILS

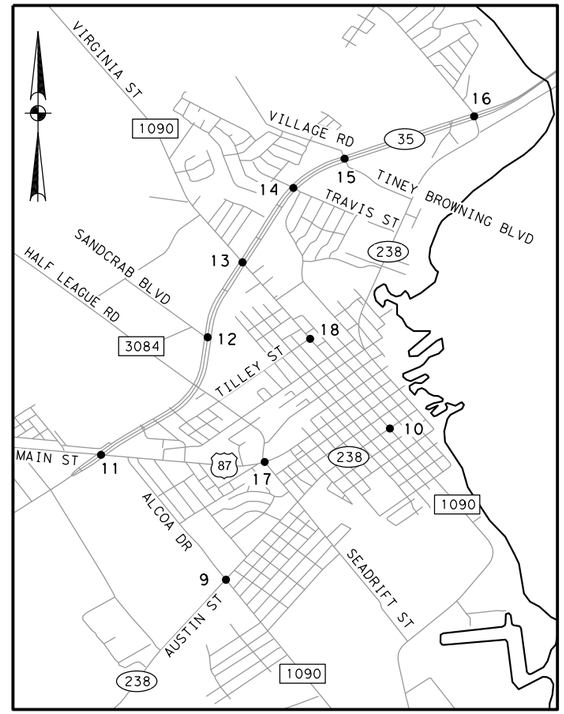
SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	7
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_011_Austin.dgn
40.0000 ft / in.
BY: daniel.rejcek



NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



PORT LAVACA

POINT COMFORT

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel, No, (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

CALHOUN COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	8
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_020_Calhoun.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED							
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)
8	Calhoun	Point Comfort	SH 35	FM 1593	28.677055°	-96.552795°	1	1						
9	Calhoun	Port Lavaca	SH 238	FM 1090 (Alcoa Dr)	28.600299°	-96.637201°	1	1	1	1		1		
10	Calhoun	Port Lavaca	SH 238	FM 1090 (Virginia St)	28.612469°	-96.624010°	1	1	1	1		1		
11	Calhoun	Port Lavaca	SH 35	US 87	28.610347°	-96.647256°	1	1						
12	Calhoun	Port Lavaca	SH 35	Sandcrab	28.619810°	-96.638675°	1	1						
13	Calhoun	Port Lavaca	SH 35	FM 1090	28.625840°	-96.635871°	1	1						
14	Calhoun	Port Lavaca	SH 35	Travis St	28.631827°	-96.631778°	1	1						
15	Calhoun	Port Lavaca	SH 35	Tiney Brown	28.634181°	-96.627654°	1	1						
16	Calhoun	Port Lavaca	SH 35	SH 238	28.637586°	-96.617227°	1	1						
17	Calhoun	Port Lavaca	US 87	Seadrift St	28.609779°	-96.634088°	1	1		1				
18	Calhoun	Port Lavaca	FM 1090	Tilley St	28.619684°	-96.630429°	1	1	1	1		1		
						CALHOUN COUNTY TOTAL:	11	11	3	4		3		

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

6/11/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

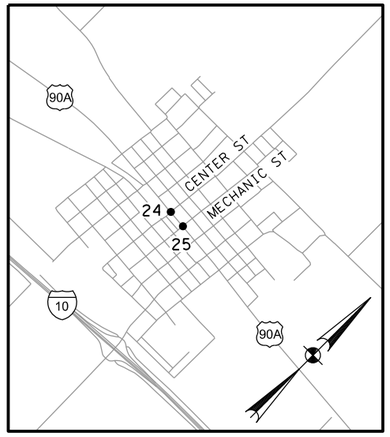
TRAFFIC SIGNAL UPGRADES

CALHOUN COUNTY INTERSECTION DETAILS

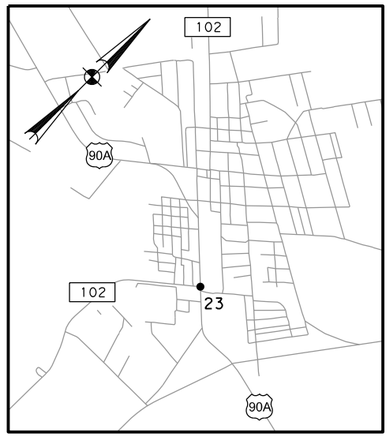
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	9
CHECK NCN	CONTROL	SECTION	JOB	
CHECK KCK	0913	00	114	

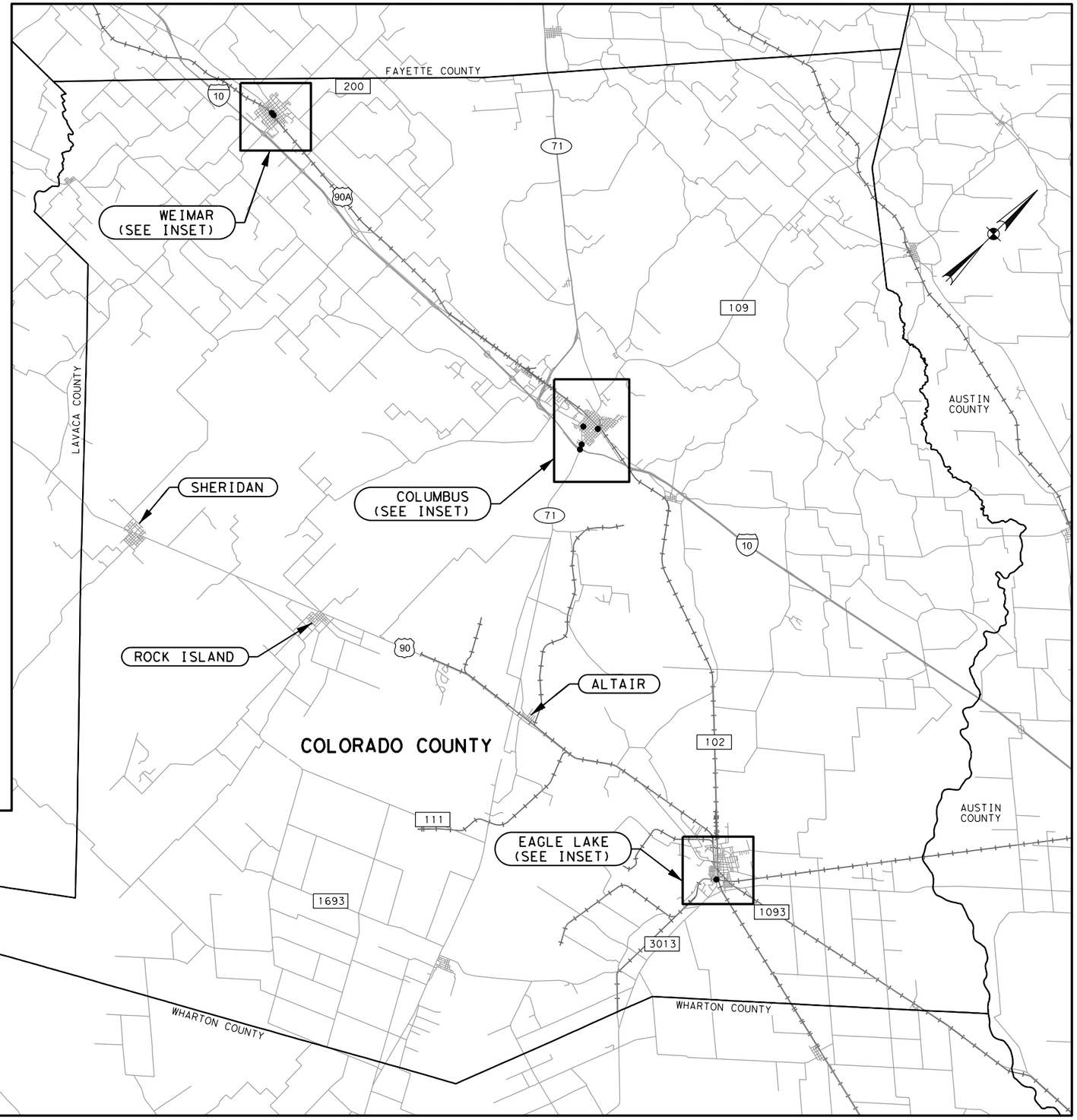
PLOTTED: 6/11/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_021_Calhoun.dgn
40.0000 ft / in.
BY: daniel.rejcek

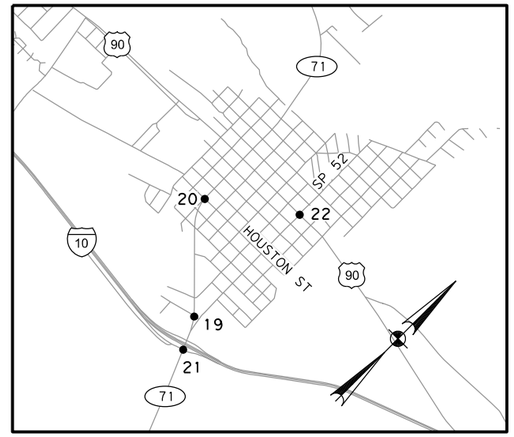


WEIMAR



EAGLE LAKE





COLUMBUS

NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

COLORADO COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	10
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
19	Colorado	Columbus	BS 71-F	SP 52	29.694704°	-96.540721°	1	1	1	1	1				(SP)
20	Colorado	Columbus	BS 71-F	Houston	29.702001°	-96.546812°	1	1						1	
21	Colorado	Columbus	IH 10	SH 71-E	29.692194°	-96.539461°	1	1		1					
22	Colorado	Columbus	US 90	SP 52	29.706502°	-96.540513°	1	1	1	1	1				(SP)
23	Colorado	Eagle Lake	UA 90	FM 102	29.582309°	-96.327484°	1	1	1	1		1			
24	Colorado	Weimar	US 90	Center St	29.702745°	-96.780761°	1	1	1	1			1		(RR)
25	Colorado	Weimar	US 90	Mechanic St	29.702615°	-96.779252°	1	1	1	1			1		(RR)
						COLORADO COUNTY TOTAL:	7	7	5	6	2	1	2	1	

(RR) = (SEE NOTES 9, 10, & 11) EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT AT THIS INTERSECTION. RELOCATE EXISTING RAILROAD PREEMPTION EQUIPMENT TO NEW TRAFFIC SIGNAL CABINET.
(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUS, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS,OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

9. AT INTERSECTION NUMBERS CONTAINING (RR), EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT. WHEN PERFORMING TRAFFIC SIGNAL CABINET REPLACEMENT, CONTRACTOR IS RESPONSIBLE FOR THE INITIAL UNHOOKING, RELOCATION, AND FINAL RE-CONNECTION OF THE EXISTING RAILROAD ADVANCED PREEMPTION SIGNAL CABLE. ONCE SCOPE OF WORK IS PERFORMED, CONTRACTOR MUST CONTACT RAILROAD COMPANY TO SCHEDULE A CUTOVER/FINAL INSPECTION TO VERIFY EXISTING RAILROAD ADVANCED PREEMPTION IS OPERATIONAL AS ORIGINALLY INTENDED. REFER TO THE RAILROAD SCOPE OF WORK SHEETS FOR RAILROAD CROSSING INFORMATION. CONTRACTOR MUST CONTACT TXDOT YOAKUM DISTRICT SIGNAL SHOP REPRESENTATIVE TO JOIN THE CONCURRENT CUTOVER/FINAL INSPECTION WITH THE RAILROAD COMPANY. RAILROAD COMPANY WILL INVOICE TXDOT AND WILL BE REIMBURSED BY TXDOT AGAINST THE PROJECT'S RAILROAD FORCE ACCOUNT AND THE INVOICES WILL BE PROOF OF FINAL INSPECTION TAKING PLACE. THE DISTRICT WILL FOLLOW UP WITH A SECTION 130 PROJECT FOR A FULL PREEMPTION REVIEW AND UPDATE.

10. ANY WOK NEAR THE RAILROAD RIGHT-OF-WAY MUST BE PHASED TOWARDS THE END OF THE OVERALL CONSTRUCTION TIME ESTIMATE.

11. PRIOR TO ANY CONSTRUCTION WITHIN RAILROAD RIGHT-OF-WAY, CONTRACTOR SHALL PROVIDE PROOF OF THE EXECUTED CONTRACTOR RIGHT-OF-ENTRY WITH ASSOCIATED RAILROAD COMPANIES WHERE REQUIRED.

6/11/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

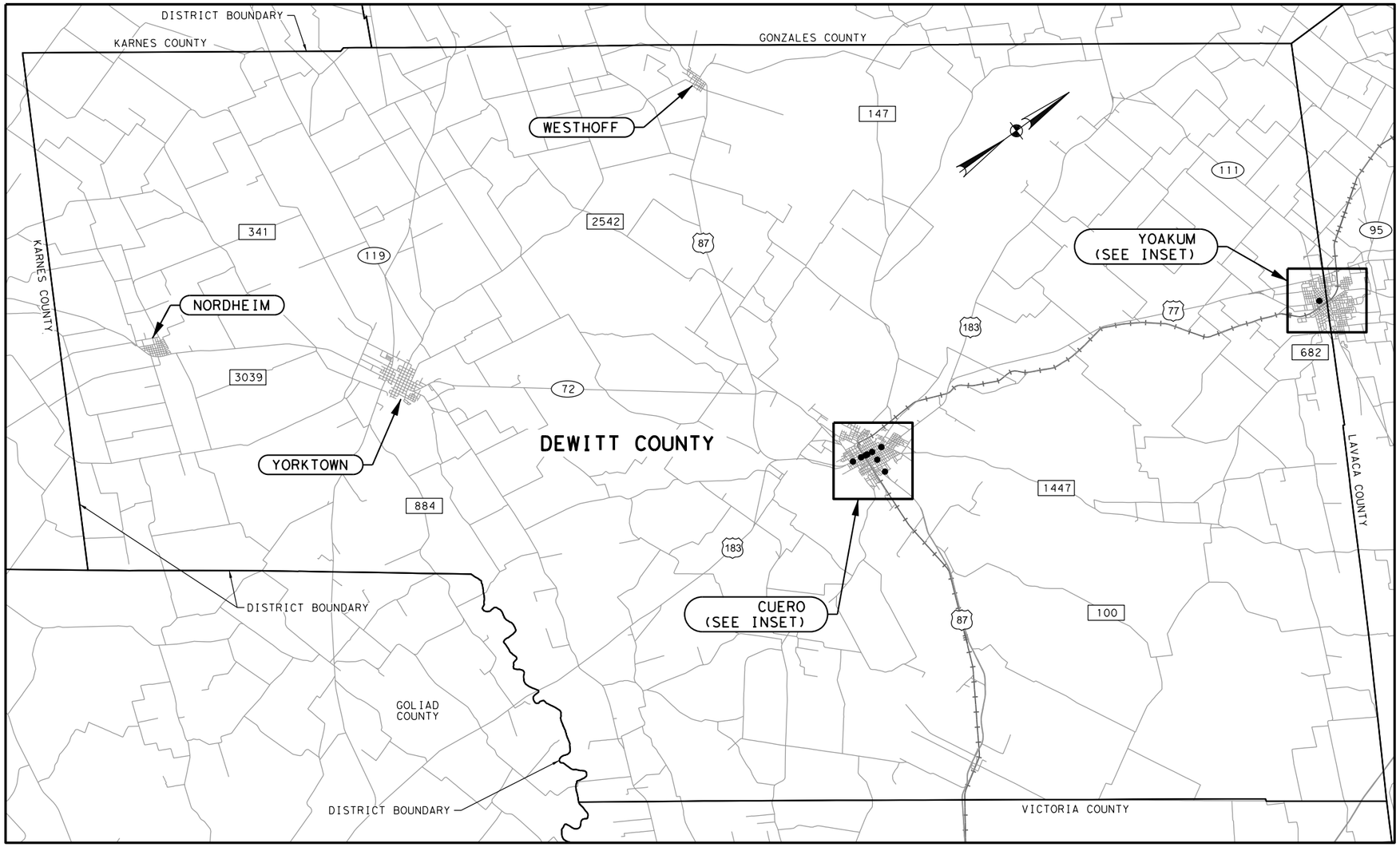
TRAFFIC SIGNAL UPGRADES

COLORADO COUNTY INTERSECTION DETAILS

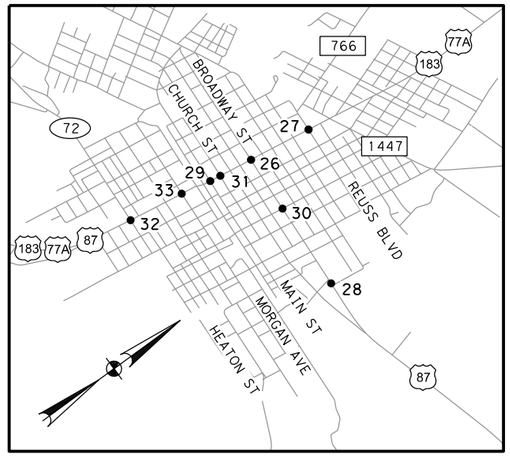
SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	11
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

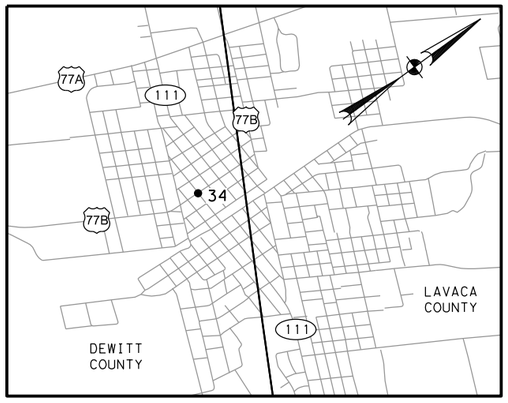
PLOTTED: 6/11/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_031_Colorado.dgn
40.0000 ft / in.
BY: daniel.rejcek



NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



CUERO



YOAKUM

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

DEWITT COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	12
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_040_DeWitt.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
26	DeWitt	Cuero	US 183	US 87	29.093816°	-97.290013°	1	1		1					
27	DeWitt	Cuero	US 183	FM 766	29.098495°	-97.287665°	1	1						1	
28	DeWitt	Cuero	US 87	Park Heights Dr	29.089558°	-97.278937°	1	1						1	
29	DeWitt	Cuero	US 87	Main St	29.090490°	-97.291669°	1	1						1	
30	DeWitt	Cuero	US 87	Hunt St	29.092129°	-97.285637°	1	1	1	1		1			
31	DeWitt	Cuero	US 87	Church St	29.091344°	-97.291242°	1	1						1	
32	DeWitt	Cuero	US 87	SH 72	29.084231°	-97.295003°	1	1		1					
33	DeWitt	Cuero	US 87	FM 236	29.088357°	-97.292904°	1	1		1					
34	DeWitt	Yoakum	BS 77Q	SH 111	29.287853°	-97.152436°	1	1	1	1	1				(SP)
						DEWITT COUNTY TOTAL:	9	9	2	5	1	1		4	

(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

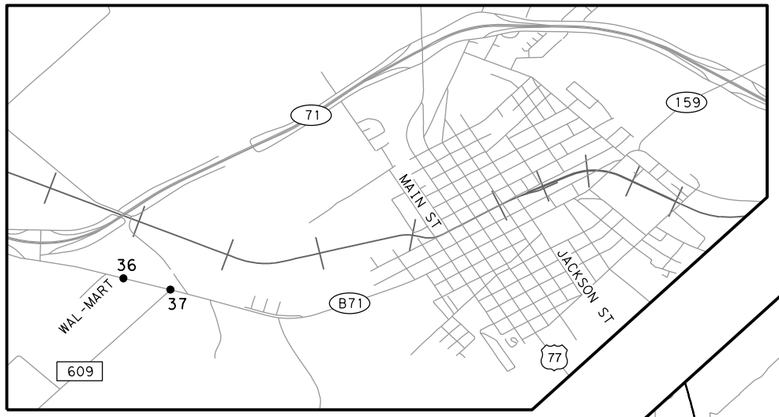
TRAFFIC SIGNAL UPGRADES

DEWITT COUNTY
INTERSECTION DETAILS

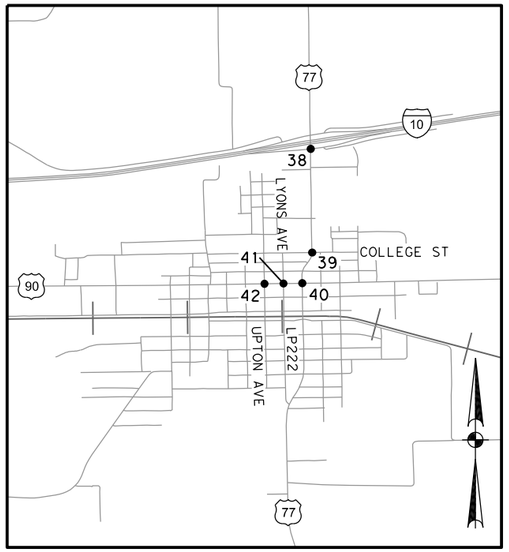
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	13
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_041_DeWitt.dgn
40.0000 ft / in.
BY: daniel.rejcek



LA GRANGE



SCHULENBURG

NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.

FLATONIA

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

FAYETTE COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	14
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_050_Fayette.dgn
40.0000 ft / in. BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
35	Fayette	Flatonia	US 90	SH 95	29.687708°	-97.108489°	1	1	1	1			1		(RR)
36	Fayette	La Grange	BU 71	Wal-Mart	29.903115°	-96.905177°	1	1						1	
37	Fayette	La Grange	BU 71	FM 609	29.902206°	-96.901396°	1	1		1					
38	Fayette	Schulenburg	IH 10	US 77	29.692918°	-96.902680°	1	1						1	
39	Fayette	Schulenburg	US 77	College St	29.684578°	-96.902561°	1	1	1	1		1			
40	Fayette	Schulenburg	US 77	US 90	29.682112°	-96.903359°	1	1	1	1	1				(SP)
41	Fayette	Schulenburg	US 90	LP 222	29.682085°	-96.904871°	1	1	1	1	1				(SP)
42	Fayette	Schulenburg	US 90	Upton Ave	29.682063°	-96.906404°	1	1	1	1	1				(SP)
						FAYETTE COUNTY TOTAL:	8	8	5	6	3	1	1	2	

(RR) = (SEE NOTES 9, 10, & 11) EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT AT THIS INTERSECTION. RELOCATE EXISTING RAILROAD PREEMPTION EQUIPMENT TO NEW TRAFFIC SIGNAL CABINET.
(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUS, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS,OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

9. AT INTERSECTION NUMBERS CONTAINING (RR), EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT. WHEN PERFORMING TRAFFIC SIGNAL CABINET REPLACEMENT, CONTRACTOR IS RESPONSIBLE FOR THE INITIAL UNHOOKING, RELOCATION, AND FINAL RE-CONNECTION OF THE EXISTING RAILROAD ADVANCED PREEMPTION SIGNAL CABLE. ONCE SCOPE OF WORK IS PERFORMED, CONTRACTOR MUST CONTACT RAILROAD COMPANY TO SCHEDULE A CUTOVER/FINAL INSPECTION TO VERIFY EXISTING RAILROAD ADVANCED PREEMPTION IS OPERATIONAL AS ORIGINALLY INTENDED. REFER TO THE RAILROAD SCOPE OF WORK SHEETS FOR RAILROAD CROSSING INFORMATION. CONTRACTOR MUST CONTACT TXDOT YOAKUM DISTRICT SIGNAL SHOP REPRESENTATIVE TO JOIN THE CONCURRENT CUTOVER/FINAL INSPECTION WITH THE RAILROAD COMPANY. RAILROAD COMPANY WILL INVOICE TXDOT AND WILL BE REIMBURSED BY TXDOT AGAINST THE PROJECT'S RAILROAD FORCE ACCOUNT AND THE INVOICES WILL BE PROOF OF FINAL INSPECTION TAKING PLACE. THE DISTRICT WILL FOLLOW UP WITH A SECTION 130 PROJECT FOR A FULL PREEMPTION REVIEW AND UPDATE.

10. ANY WOK NEAR THE RAILROAD RIGHT-OF-WAY MUST BE PHASED TOWARDS THE END OF THE OVERALL CONSTRUCTION TIME ESTIMATE.

11. PRIOR TO ANY CONSTRUCTION WITHIN RAILROAD RIGHT-OF-WAY, CONTRACTOR SHALL PROVIDE PROOF OF THE EXECUTED CONTRACTOR RIGHT-OF-ENTRY WITH ASSOCIATED RAILROAD COMPANIES WHERE REQUIRED.

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_051_Fayette.dgn
40.0000 ft / in.
BY: daniel.rejcek

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

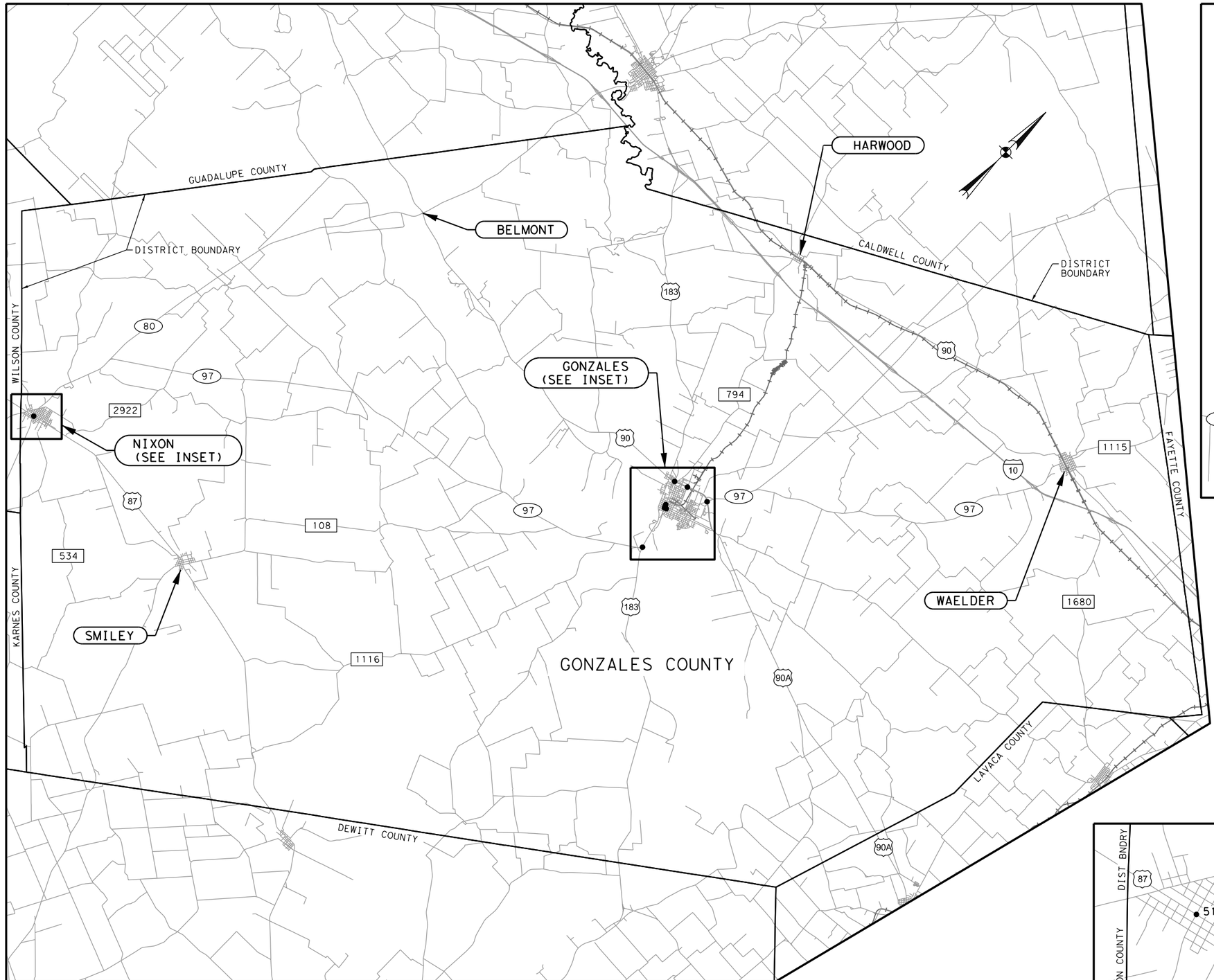
Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

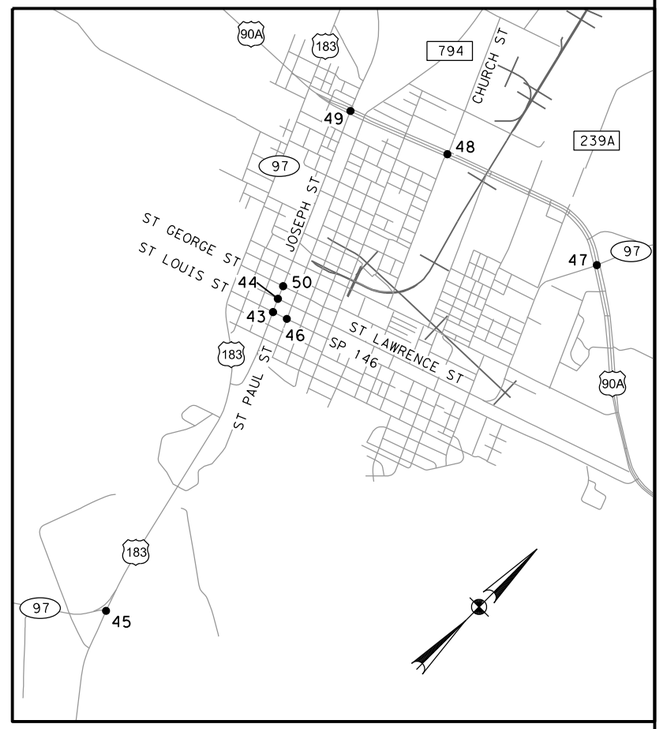
FAYETTE COUNTY INTERSECTION DETAILS

SHEET 2 OF 2

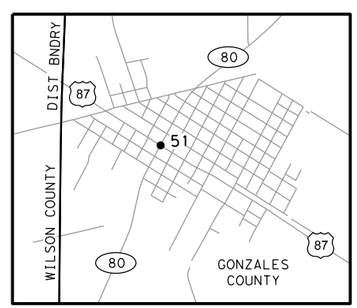
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	15
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				



NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



GONZALES



NIXON

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn

F-928

13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240

Tel. No. (972) 770-1300
Fax No. (972) 239-3820

Texas Department of Transportation
© 2021

TRAFFIC SIGNAL UPGRADES

GONZALES COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	16
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwproad\daniel.rejcek\d0124126\YKM_SHT_060_Gonzales.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
43	Gonzales	Gonzales	BU 183	Sp 146	29.500377°	-97.452323°	1	1	1	1	1				(WP)
44	Gonzales	Gonzales	BU 183	St Lawrence	29.501413°	-97.452802°	1	1	1	1	1				(WP)
45	Gonzales	Gonzales	SH 97	US 183	29.473862°	-97.444756°	1	1						1	
46	Gonzales	Gonzales	SP 146	St Paul St	29.500780°	-97.451149°	1	1	1	1	1				(WP)
47	Gonzales	Gonzales	UA 90	SH 97	29.521510°	-97.436541°	1	1		1					
48	Gonzales	Gonzales	UA 90	Chruch St	29.519508°	-97.451461°	1	1		1					
49	Gonzales	Gonzales	UA 90	BU 183	29.516232°	-97.459356°	1	1						1	
50	Gonzales	Gonzales	BU 183	St George St	29.502426°	-97.453221°	1	1	1	1	1				(SP)
51	Gonzales	Nixon	SH 80	US 87	29.267412°	-97.764626°	1	1							
						GONZALES COUNTY TOTAL:	9	9	4	6	4			2	

(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.
(WP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON WOOD POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

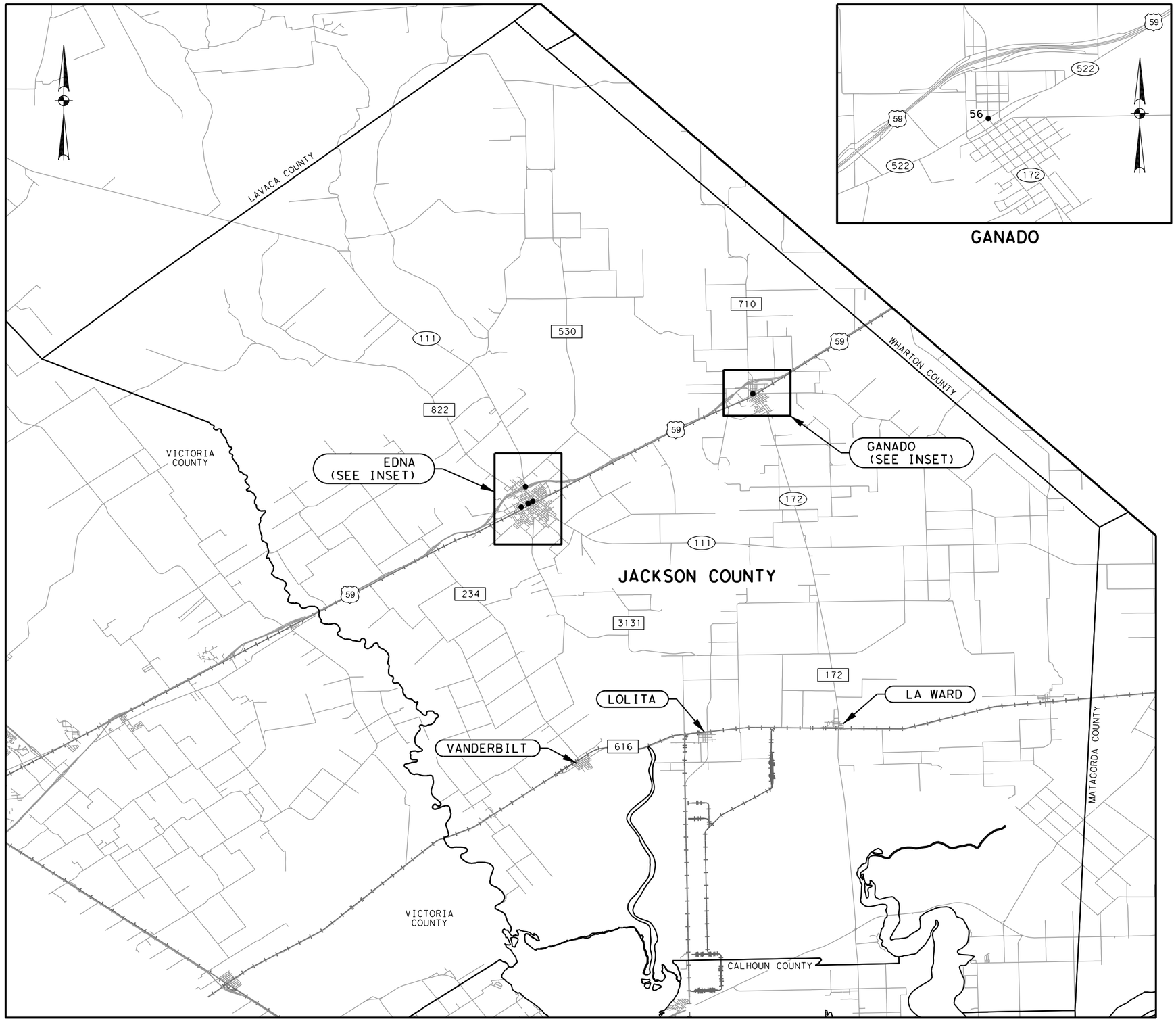
TRAFFIC SIGNAL UPGRADES

GONZALES COUNTY INTERSECTION DETAILS

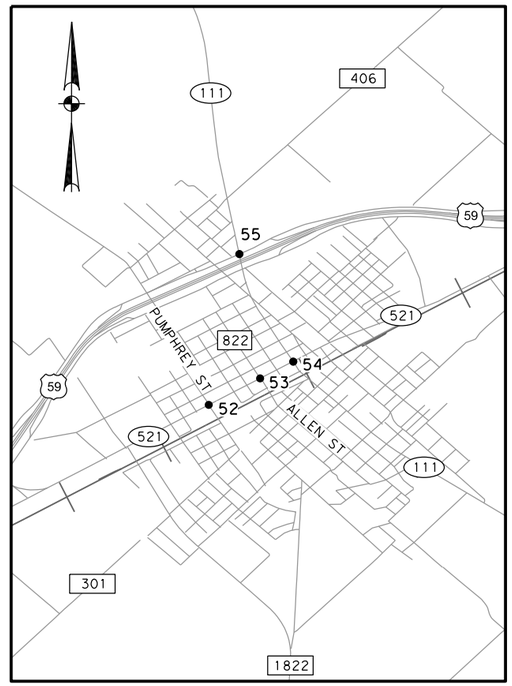
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	17
CHECK NCN	CONTROL	SECTION	JOB	
CHECK KCK	0913	00	114	

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_061_Gonzales.dgn
40.0000 ft / in.
BY: daniel.rejcek



GANADO



EDNA

NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

JACKSON COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	18
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_070_Jackson.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
52	Jackson	Edna	LP 521	Pumphrey	28.975067°	-96.653228°	1	1	1	1		1			
53	Jackson	Edna	LP 521	FM 822	28.977194°	-96.649091°	1	1	1	1	1				(WP)
54	Jackson	Edna	SH 111	LP 521	28.978547°	-96.646425°	1	1	1	1		1			
55	Jackson	Edna	SH 111	US 59	28.987202°	-96.650757°	1	1	1	1		1			
56	Jackson	Ganado	SL 522	SH 172	29.042560°	-96.515353°	1	1		1					
						JACKSON COUNTY TOTAL:	5	5	4	5	1	3			

(WP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON WOOD POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

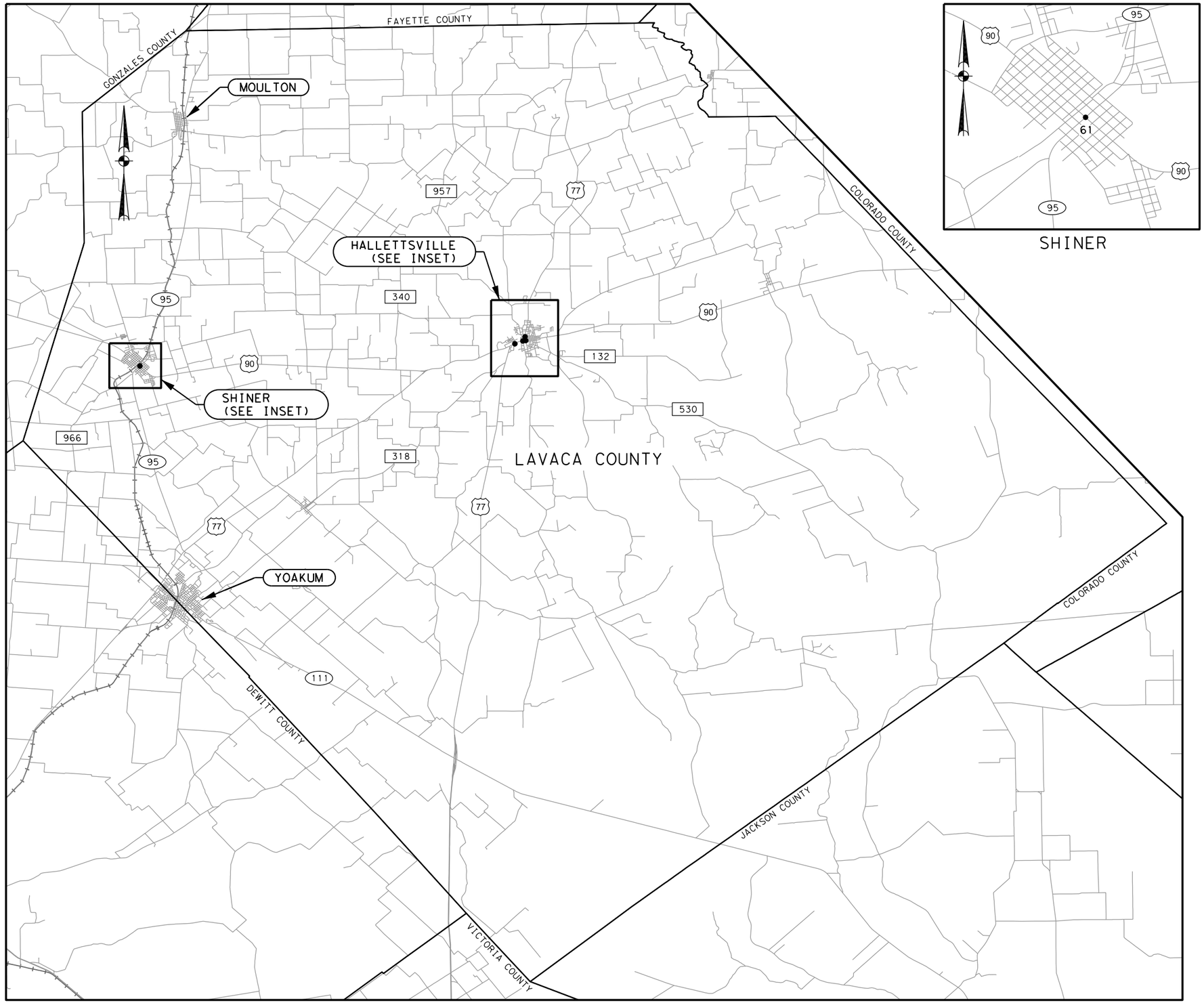
TRAFFIC SIGNAL UPGRADES

JACKSON COUNTY INTERSECTION DETAILS

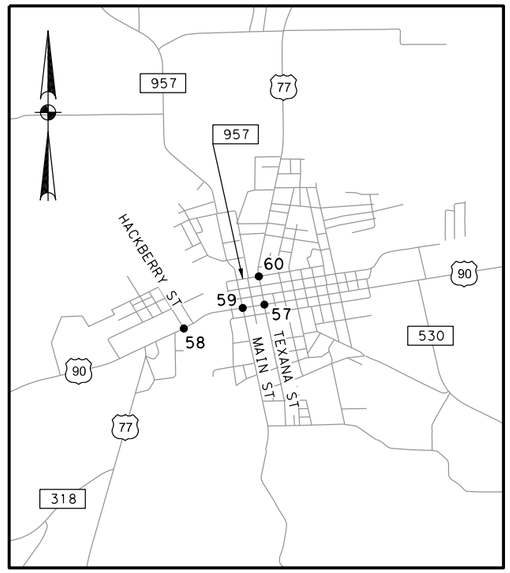
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	19
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_071_Jackson.dgn
40.0000 ft / in.
BY: daniel.rejcek



SHINER



HALLETTSVILLE

NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel, No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

LAVACA COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	20
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_080_Lavaca.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED									
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	REMOVE & RELOCATE BBU (EA)	
57	Lavaca	Hallettsville	UA 90	US 77	29.444087°	-96.941342°	1	1	1	1	1					(SP)
58	Lavaca	Hallettsville	UA 90	Hackberry St	29.442177°	-96.947796°	1	1	1	1		1				
59	Lavaca	Hallettsville	US 77	Main St	29.443795°	-96.943070°	1	1	1	1	1					(SP)
60	Lavaca	Hallettsville	US 77	FM 957 (1st St)	29.446358°	-96.941815°	1	1								
61	Lavaca	Shiner	SH 95	UA 90	29.428936°	-97.170691°	1	1	1	1		1			1	
						LAVACA COUNTY TOTAL:	5	5	4	4	2	2			1	

(SP) = INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

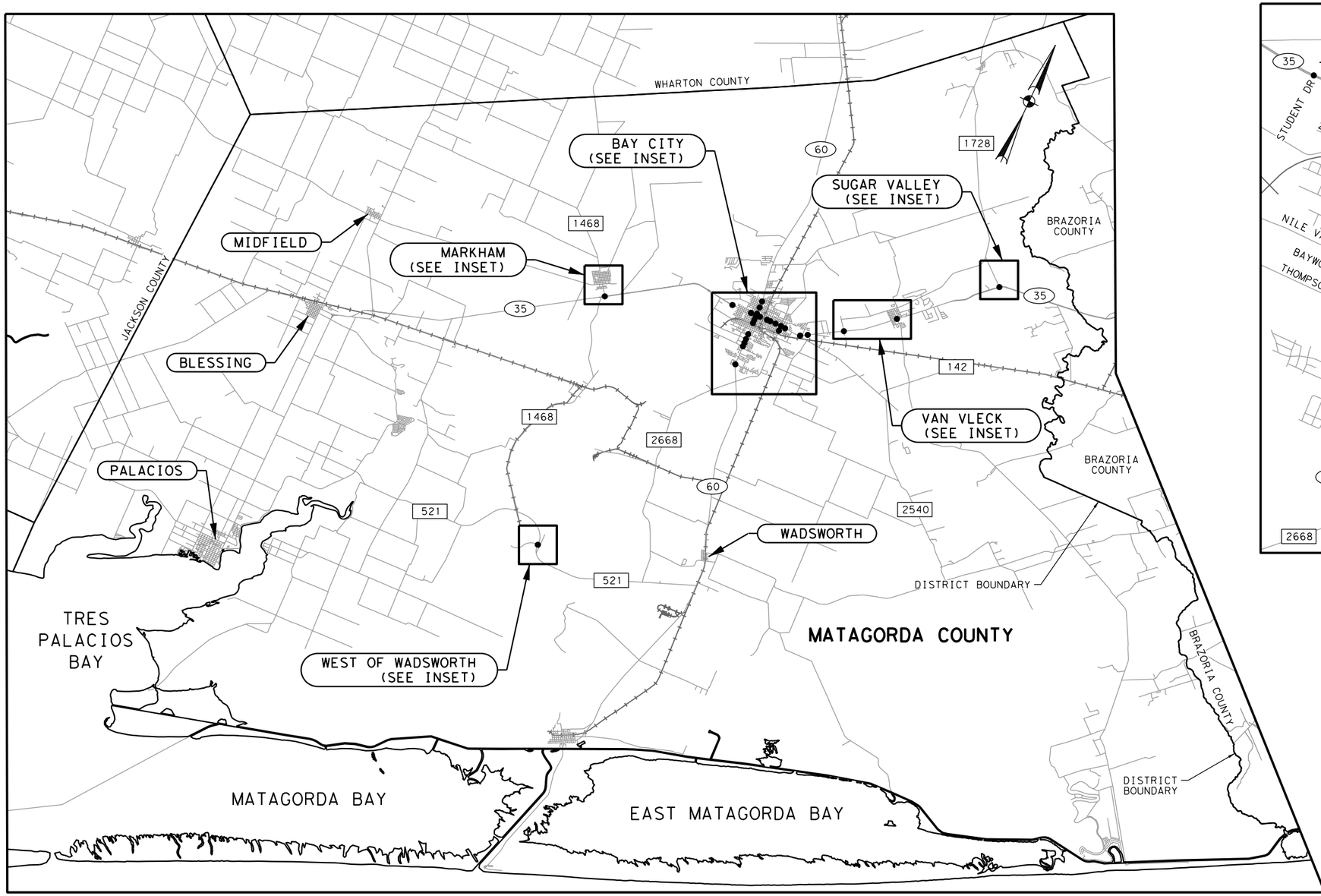
TRAFFIC SIGNAL UPGRADES

LAVACA COUNTY INTERSECTION DETAILS

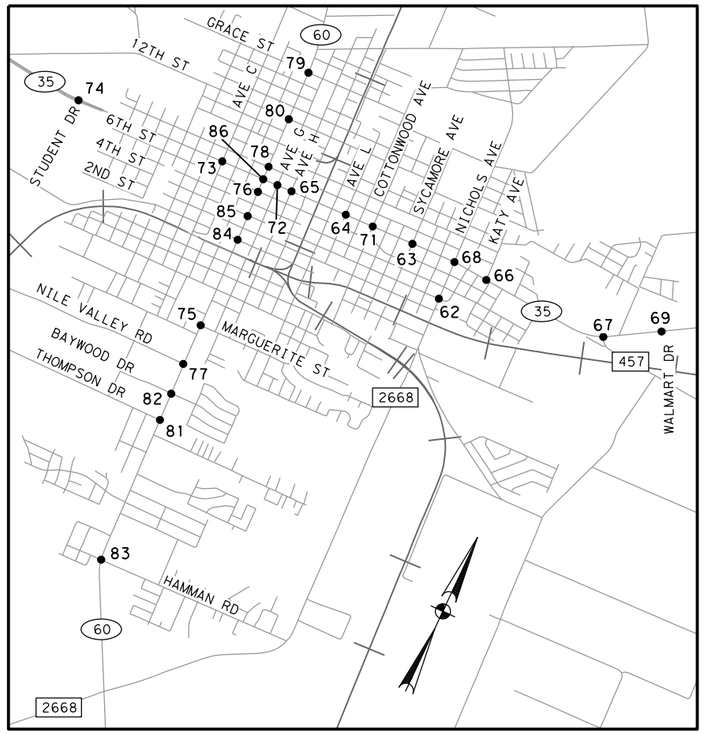
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	21
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

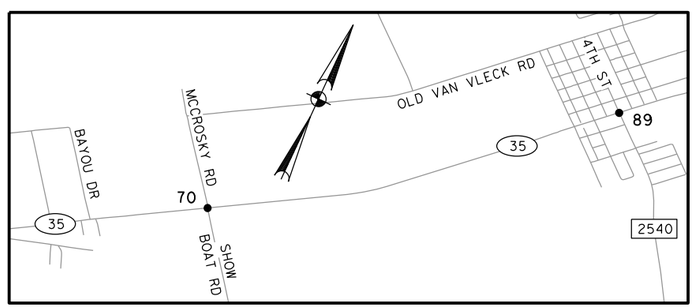
PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_081_Lavaca.dgn
40.0000 ft / in.
BY: daniel.rejcek



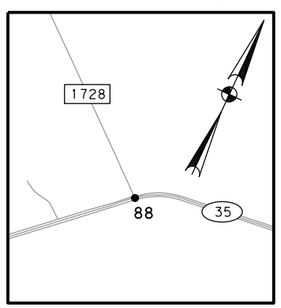
NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



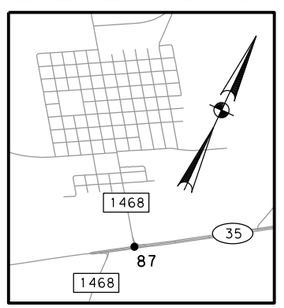
BAY CITY



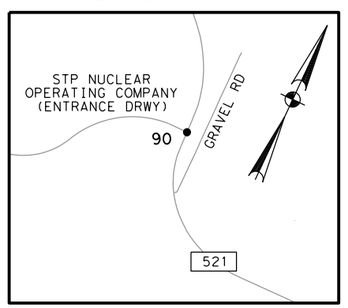
BAY CITY



SUGAR VALLEY



MARKHAM



WEST OF WADSWORTH

VAN VLECK

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn

F-928

13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

MATAGORDA COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	22
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khd\pwprod\daniel.rejcek\d0124126\YKM_SHT_090_Matagorda.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED							
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)
62	Matagorda	Bay City	FM 2668	4th St	28.980237°	-95.953197°	1	1	1	1				
63	Matagorda	Bay City	SH 35	Sycamore St	28.983341°	-95.956989°	1	1	1	1		1		
64	Matagorda	Bay City	SH 35	Avenue L	28.983204°	-95.962839°	1	1	1	1		1		
65	Matagorda	Bay City	SH 35	Avenue H	28.983056°	-95.967591°	1	1	1	1		1		
66	Matagorda	Bay City	SH 35	Katy Ave	28.983218°	-95.950395°	1	1	1	1		1		
67	Matagorda	Bay City	SH 35	FM 457	28.983046°	-95.939900°	1	1						
68	Matagorda	Bay City	SH 35	FM 2668	28.983440°	-95.953303°	1	1		1				
69	Matagorda	Bay City	SH 35	WalMart	28.985424°	-95.935832°	1	1		1				
70	Matagorda	Bay City	SH 35	McCrosky Rd	28.997044°	-95.916374°	1	1						1
71	Matagorda	Bay City	SH 35	Cottonwood Ave	28.983259°	-95.960475°	1	1		1				
72	Matagorda	Bay City	SH 35	Avenue G	28.983029°	-95.968834°	1	1	1	1		1		
73	Matagorda	Bay City	SH 35	Avenue C	28.982888°	-95.973664°	1	1	1	1		1		
74	Matagorda	Bay City	SH 35	Student Dr	28.982453°	-95.986228°	1	1	1	1		1		
75	Matagorda	Bay City	SH 60	Margette St	28.970201°	-95.969664°	1	1	1	1		1		
76	Matagorda	Bay City	SH 60	6th St	28.981875°	-95.970022°	1	1	1	1		1		
77	Matagorda	Bay City	SH 60	Nile Valley Rd	28.966785°	-95.969621°	1	1		1				
78	Matagorda	Bay City	SH 60	8th St	28.984071°	-95.970100°	1	1	1	1		1		
79	Matagorda	Bay City	SH 60	Grace St	28.992285°	-95.970392°	1	1						1
80	Matagorda	Bay City	SH 60	12th St	28.988222°	-95.970244°	1	1	1					
81	Matagorda	Bay City	SH 60	Thompson Dr	28.961912°	-95.969418°	1	1	1	1		1		
82	Matagorda	Bay City	SH 60	Baywood Dr	28.964202°	-95.969484°	1	1						1
83	Matagorda	Bay City	SH 60	Hamman Rd	28.949720°	-95.968952°	1	1						1
84	Matagorda	Bay City	SH 60	2nd St	28.977694°	-95.969873°	1	1	1	1		1		
85	Matagorda	Bay City	SH 60	4th St	28.979763°	-95.969951°	1	1	1	1		1		
86	Matagorda	Bay City	SH 60	SH 35	28.982981°	-95.970068°	1	1	1	1		1		
87	Matagorda	Markham	SH 35	FM 1468	28.953714°	-96.060682°	1	1		1				
88	Matagorda	Sugar Valley	SH 35	FM 1728	29.062912°	-95.840118°	1	1						
89	Matagorda	Van Vleck	SH 35	FM 2540	29.017984°	-95.889587°	1	1	1	1		1		
90	Matagorda	West of Wadsworth	STP Nuclear Operating Company (Entrance Drwy)	FM 521	28.795704°	-96.033050°	1	1		1				
						MATAGORDA COUNTY TOTAL:	29	29	17	22		15		4

SEE NOTE 9 FOR INFORMATION CONCERNING EXISTING LUMINAIRE POWER.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.
2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT
3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.
4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.
5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.
6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.
7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.
8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.
9. THE FOLLOWING INTERSECTIONS WERE IDENTIFIED TO HAVE LUMINAIRE POWER RUNNING THROUGH THE TRAFFIC SIGNAL CABINET. WHEN THE CONTRACTOR REPLACES THE SIGNAL CONTROL CABINET, THE LUMINIARES SHALL REMAIN WIRED THROUGH THE SIGNAL CABINET AS PREVIOUSLY DONE IN THE EXISTING CABINET UNLESS DIRECTED TO INSTALL DIFFERENTLY BY THE DISTRICT.
   # 64 - SH35 AT AVENUE L, BAY CITY (*LUMINAIRE CONTROLS IN CABINET*)
   # 67 - SH35 AT FM 457, BAY CITY
   # 74 - SH35 AT STUDENT DR, BAY CITY
   # 75 - SH60 AT MARGETTE ST, BAY CITY
   # 87 - SH35 AT FM1468, MARKHAM

6/11/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

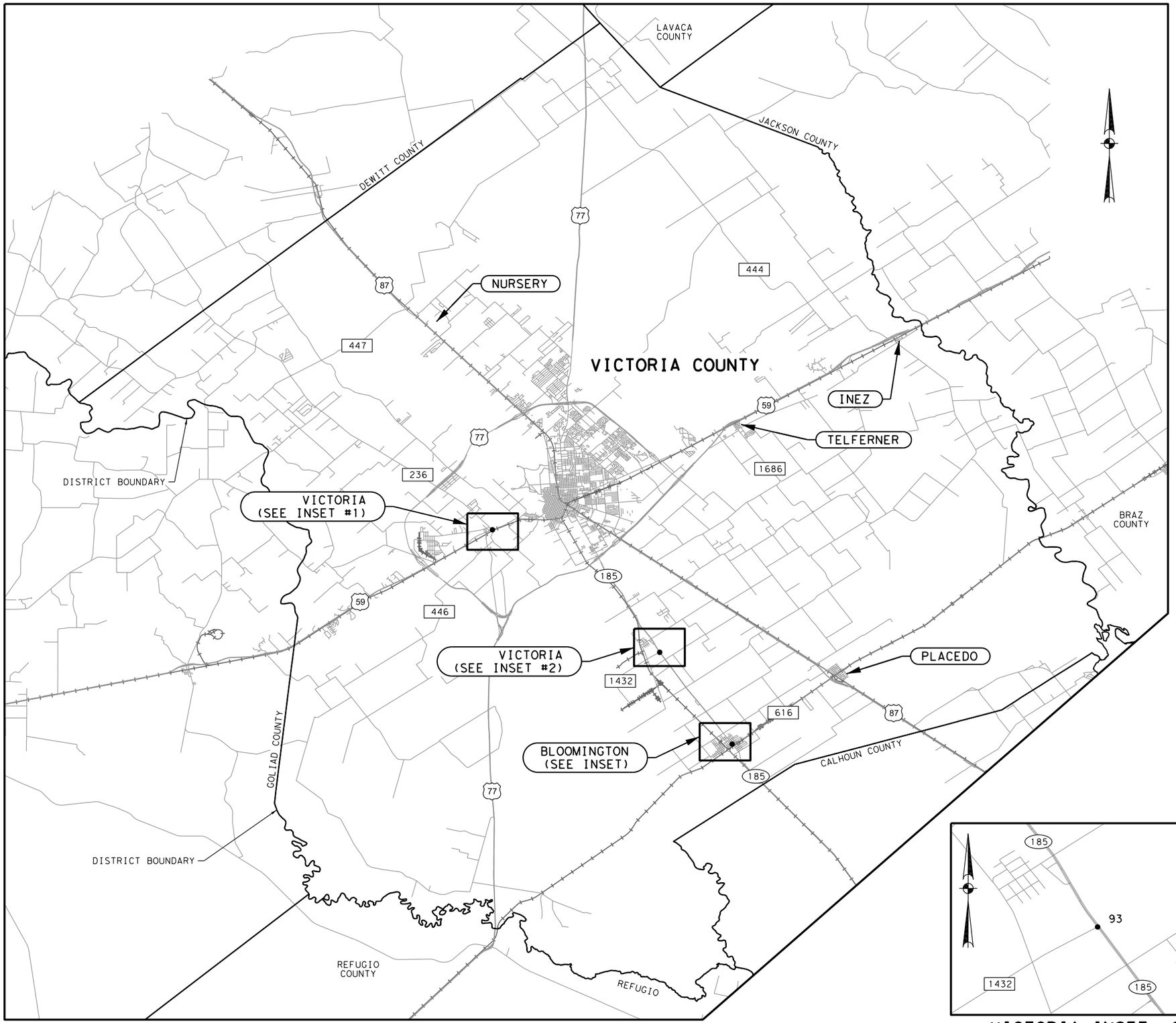
TRAFFIC SIGNAL UPGRADES

MATAGORDA COUNTY INTERSECTION DETAILS

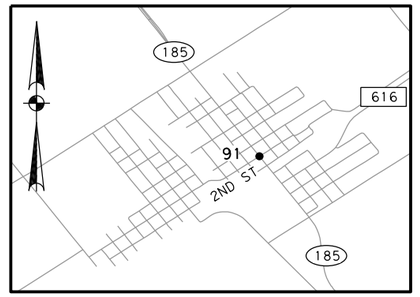
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	23
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

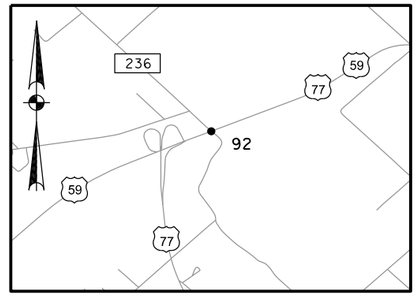
PLOTTED: 6/11/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_091_Matagorda.dgn
40.0000 ft / in.
BY: daniel.rejcek



NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.



BLOOMINGTON



VICTORIA INSET #1

VICTORIA INSET #2

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES
VICTORIA COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	24
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kho\pwprod\daniel.rejcek\d0124126\YKM_SHT_100_Victoria.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED							
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)
91	Victoria	Bloomington	SH 185	2nd St	28.648167°	-96.893249°	1	1	1	1		1		
92	Victoria	Victoria	BU 59	FM 236	28.783587°	-97.044729°	1	1						
93	Victoria	Victoria	SH 185	FM 1432	28.706163°	-96.939020°	1	1		1				
VICTORIA COUNTY TOTAL:							3	3	1	2		1		

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

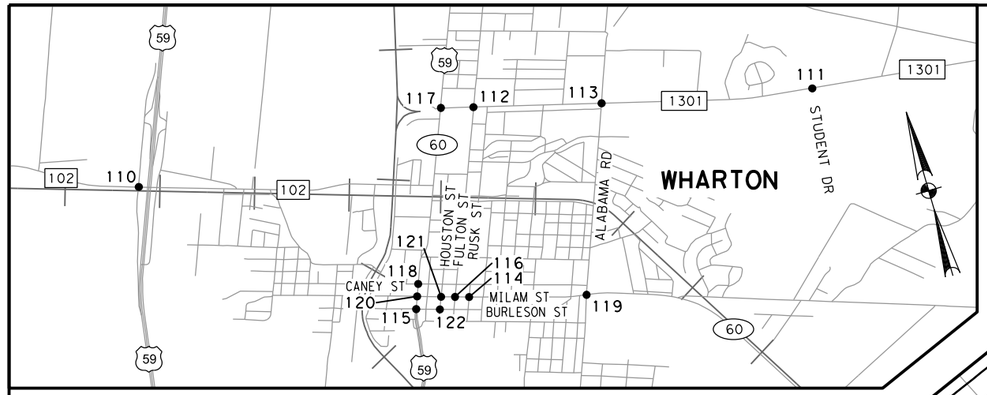
TRAFFIC SIGNAL UPGRADES

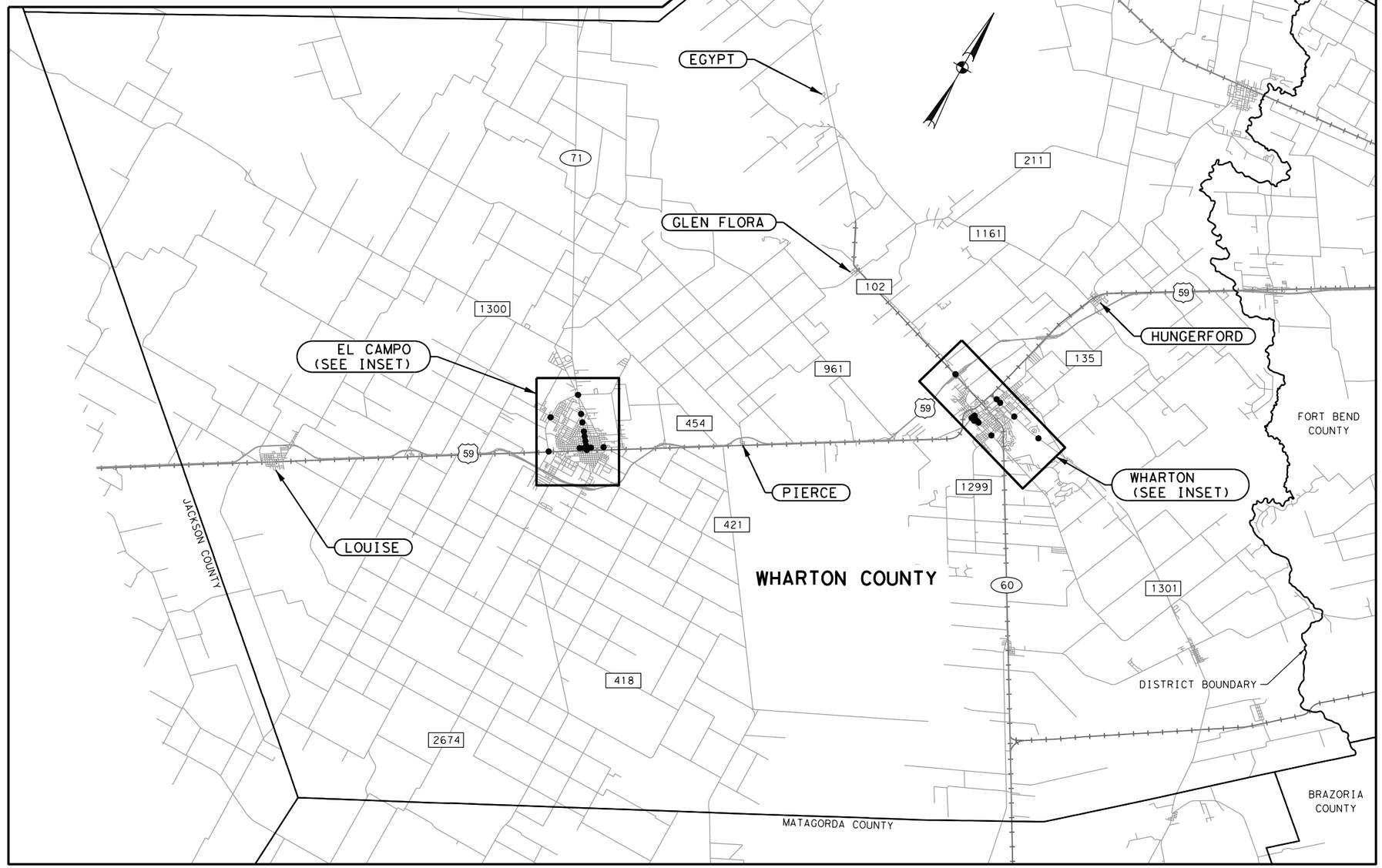
VICTORIA COUNTY INTERSECTION DETAILS

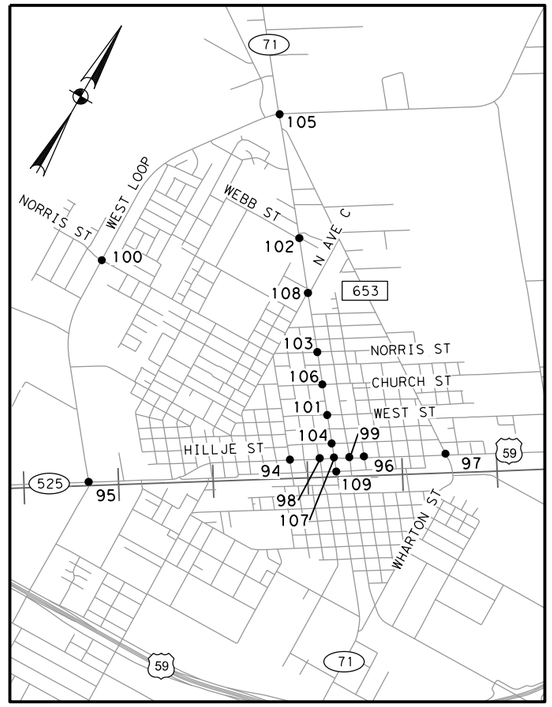
SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	25
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_101_Victoria.dgn
40.0000 ft / in.
BY: daniel.rejcek







EL CAMPO

NOTE: NOT TO SCALE. SEE SHEET 2 OF 2 FOR LOCATIONS AND WORK REQUIRED.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

WHARTON COUNTY
PROJECT LOCATION MAP

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR				
CHECK	TEXAS	YKM	DEWITT, ETC.	
NCN	CONTROL	SECTION	JOB	26
CHECK				
KCK	0913	00	114	

PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwproad\daniel.rejcek\d0124126\YKM_SHT_110_Wharton.dgn
40.0000 ft / in.
BY: daniel.rejcek

INTERSECTION NUMBER	COUNTY	CITY	HIGHWAY	STREET	LATITUDE	LONGITUDE	EQUIPMENT TO BE INSTALLED								
							ELECTRONIC LOCK (PROCURE & INSTALL) (EA)	CELLULAR ROUTER (INSTALL) (EA)	SMART MMU (PROCURE & INSTALL) (EA)	CONTROLLER (PROCURE & INSTALL) (EA)	CABINET SIZE 5 CONFIG 3 (PROCURE & INSTALL) (EA)	CABINET SIZE 6 CONFIG 4 (PROCURE & INSTALL) (EA)	CABINET SIZE 7 CONFIG 4 (PROCURE & INSTALL) (EA)	CONTROLLER FIRMWARE (UPDATE) (EA)	
94	Wharton	El Campo	BU 59	Hoskins St	29.194795°	-96.272878°	1	1	1	1	1				(SP)
95	Wharton	El Campo	BU 59	FM 2765	29.185148°	-96.286012°	1	1	1	1					(RR*)
96	Wharton	El Campo	BU 59S	Merchant St	29.198005°	-96.267849°	1	1	1	1	1				(SP)
97	Wharton	El Campo	BU 59S	FM 653	29.201470°	-96.262276°	1	1	1	1	1				(WP)
98	Wharton	El Campo	BU 59S	Fahrenthold St	29.196101°	-96.270860°	1	1	1	1	1				(SP)
99	Wharton	El Campo	BU 59S	N. Washington	29.197362°	-96.268837°	1	1	1	1	1				(SP)
100	Wharton	El Campo	FM 2765	Norris St	29.201131°	-96.294013°	1	1		1					
101	Wharton	El Campo	SH 71	West St	29.199406°	-96.272077°	1	1	1	1	1				(SP)
102	Wharton	El Campo	SH 71	Webb St	29.210614°	-96.281133°	1	1		1					
103	Wharton	El Campo	SH 71	Norris St	29.203396°	-96.275296°	1	1		1					
104	Wharton	El Campo	SH 71	Hiilje	29.197607°	-96.270618°	1	1	1	1	1				(SP)
105	Wharton	El Campo	SH 71	FM 2765	29.218456°	-96.287495°	1	1	1	1					
106	Wharton	El Campo	SH 71	Church St	29.201341°	-96.273648°	1	1	1	1	1				(WP)
107	Wharton	El Campo	SH 71	BU 59S	29.196728°	-96.269895°	1	1	1	1	1				(SP)
108	Wharton	El Campo	SH 71	Avenue C	29.207141°	-96.278328°	1	1	1	1	1				(SP)
109	Wharton	El Campo	SH 71	Monsarette St	29.195835°	-96.269170°	1	1	1	1	1				(SP) (RR)
110	Wharton	Wharton	FM 102	US 59	29.326364°	-96.122152°	1	1		1					
111	Wharton	Wharton	FM 1301	Student Dr	29.319045°	-96.067860°	1	1						1	
112	Wharton	Wharton	FM 1301	Fulton st	29.325107°	-96.094495°	1	1	1	1		1			
113	Wharton	Wharton	FM 1301	Alabama St	29.322570°	-96.084494°	1	1	1	1		1			
114	Wharton	Wharton	SH 60 (Milam St)	Rusk St	29.310539°	-96.099045°	1	1	1	1	1				(WP)
115	Wharton	Wharton	SH 60 (Richmond Rd)	SH 60S (Burleson St)	29.310781°	-96.103404°	1	1	1	1	1				(WP)
116	Wharton	Wharton	SH 60N (Milam St)	Fulton st	29.310836°	-96.100122°	1	1	1	1	1				(WP)
117	Wharton	Wharton	SH 60	FM 1301	29.325779°	-96.097029°	1	1	1	1		1			
118	Wharton	Wharton	SH 60	Caney St	29.312667°	-96.102691°	1	1	1	1	1				(WP)
119	Wharton	Wharton	SH 60	Alabama Rd	29.308083°	-96.089900°	1	1	1	1		1			
120	Wharton	Wharton	SH 60N (Milam St)	SH 60S (Richmond Rd)	29.311719°	-96.103054°	1	1	1	1	1				(SP)
121	Wharton	Wharton	SH 60N (Milam St)	Houston St	29.311168°	-96.101177°	1	1	1	1	1				(WP)
122	Wharton	Wharton	SH 60S (Burleson St)	Houston St	29.310232°	-96.101517°	1	1	1	1	1				(WP)
						WHARTON COUNTY TOTAL:	29	29	24	28	18	4		1	

(RR) = (SEE NOTES 9, 10, & 11) EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT AT THIS INTERSECTION. RELOCATE EXISTING RAILROAD PREEMPTION EQUIPMENT TO NEW TRAFFIC SIGNAL CABINET.

(RR*) = EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT AT THIS INTERSECTION. NO CABINET REPLACEMENT. ONLY INSTALL NEW SIGNAL CONTROLLER, SMART MMU, ELECTRONIC LOCK, AND CELLULAR ROUTER. CONTRACTOR SHALL COORDINATE RAILROAD COORDINATION WITH THE DISTRICT.

(SP) = (SEE NOTE 10) INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON STEEL POLE.

(WP) = (SEE NOTE 10) INSTALL TRAFFIC SIGNAL CABINET (SIZE 5 CONFIGURATION 3) ON WOOD POLE.

NOTES:

1. CONTRACTOR TO INSTALL SIGNAL EQUIPMENT AT LOCATIONS INDICATED IN THE TABLE. CONTRACTOR TO PROVIDE ELECTRONIC LOCKS, SMART MMUs, CONTROLLERS, AND CABINETS. CELLULAR ROUTERS WILL BE PROVIDED BY THE DISTRICT AND INSTALLED BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL TERMINATE ALL ETHERNET DEVICES INCLUDING TRAFFIC SIGNAL CONTROLLER, (MMU) MALFUNCTION MONITOR UNIT, (APS) ACCESSIBLE PEDESTRIAN SYSTEM CONTROLLER UNIT, AND DETECTION DEVICES TO THE CELLULAR ROUTER. USE THE FOLLOWING TRAFFIC SIGNAL NETWORK COLOR SCHEME:
   BLUE - TRAFFIC SIGNAL CONTROLLER
   GREEN - MALFUNCTION MONITOR UNIT (MMU)
   YELLOW - ACCESSIBLE PEDESTRIAN SYSTEM (APS) IF PRESENT
   BLACK - DETECTION (i.e. RADAR, VIDEO), IF PRESENT

3. CONTRACTOR SHALL MAINTAIN SIGNAL OPERATION UNTIL ALL EQUIPMENT IS READY FOR CHANGE OUT OR RELOCATION TO THE NEW SIGNAL CENTRAL CABINET. ALL WORK AT AN INTERSECTION SHALL BE PERFORMED IN A SINGLE DAY DURING ALLOWED WORKING HOURS.

4. ALL REMOVED EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO THE DISTRICT OFFICE AFTER THE INTERSECTION IS BACK TO NORMAL OPERATION.

5. LATITUDE AND LONGITUDE REPRESENT APPROXIMATE LOCATION OF TRAFFIC SIGNAL CABINET. CONTRACTOR TO CONFIRM LOCATION OF CABINET IN THE FIELD.

6. THE CELLULAR ROUTERS WILL BE CONFIGURED BY OTHERS, HOWEVER THE CONTRACTOR SHALL BE ON SITE AS NECESSARY FOR FINAL ROUTER ACCEPTANCE.

7. NEW TRAFFIC SIGNAL CABINETS SHALL BE INSTALLED ON EXISTING FOUNDATIONS, OR POLE MOUNTED TO THE SAME EXISTING STEEL OR WOOD POLE. UTILIZE EXISTING INTERSECTION WIRING AND CABLE TERMINATIONS.

8. CONTRACTOR TO UPDATE CONTROLLER FIRMWARE AS INDICATED IN THE TABLE. CONFIRM NEWEST ACCEPTABLE FIRMWARE VERSION WITH THE DISTRICT.

9. AT INTERSECTION NUMBERS CONTAINING (RR), EXISTING RAILROAD ADVANCED PREEMPTION IS PRESENT. WHEN PERFORMING TRAFFIC SIGNAL CABINET REPLACEMENT, CONTRACTOR IS RESPONSIBLE FOR THE INITIAL UNHOOKING, RELOCATION, AND FINAL RE-CONNECTION OF THE EXISTING RAILROAD ADVANCED PREEMPTION SIGNAL CABLE. ONCE SCOPE OF WORK IS PERFORMED, CONTRACTOR MUST CONTACT RAILROAD COMPANY TO SCHEDULE A CUTOVER/FINAL INSPECTION TO VERIFY EXISTING RAILROAD ADVANCED PREEMPTION IS OPERATIONAL AS ORIGINALLY INTENDED. REFER TO THE RAILROAD SCOPE OF WORK SHEETS FOR RAILROAD CROSSING INFORMATION. CONTRACTOR MUST CONTACT TXDOT YOAKUM DISTRICT SIGNAL SHOP REPRESENTATIVE TO JOIN THE CONCURRENT CUTOVER/FINAL INSPECTION WITH THE RAILROAD COMPANY. RAILROAD COMPANY WILL INVOICE TXDOT AND WILL BE REIMBURSED BY TXDOT AGAINST THE PROJECT'S RAILROAD FORCE ACCOUNT AND THE INVOICES WILL BE PROOF OF FINAL INSPECTION TAKING PLACE. THE DISTRICT WILL FOLLOW UP WITH A SECTION 130 PROJECT FOR A FULL PREEMPTION REVIEW AND UPDATE.

10. ANY WOK NEAR THE RAILROAD RIGHT-OF-WAY MUST BE PHASED TOWARDS THE END OF THE OVERALL CONSTRUCTION TIME ESTIMATE.

11. PRIOR TO ANY CONSTRUCTION WITHIN RAILROAD RIGHT-OF-WAY, CONTRACTOR SHALL PROVIDE PROOF OF THE EXECUTED CONTRACTOR RIGHT-OF-ENTRY WITH ASSOCIATED RAILROAD COMPANIES WHERE REQUIRED.

12. THE FOLLOWING INTERSECTIONS WERE IDENTIFIED WITH HAVING A DAMAGED SIGNAL POLE. CONTRACTOR SHALL COORDINATE WITH THE DISTRICT TO DETERMINE IF THE DISTRICT INTENDS TO REPLACE THE DAMAGED POLE PRIOR TO THE CONTRACTOR INSTALLING THE NEW TRAFFIC SIGNAL CONTROL CABINET.
   #102 - SH71 AT WEBB ST, EL CAMPO (STEEL POLE)
   #118 - SH60 AT CANEY ST, WHARTON (WOOD POLE)
   #119 - SH60 AT ALABAMA RD, WHARTON (STEEL POLE)

6/11/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel, No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

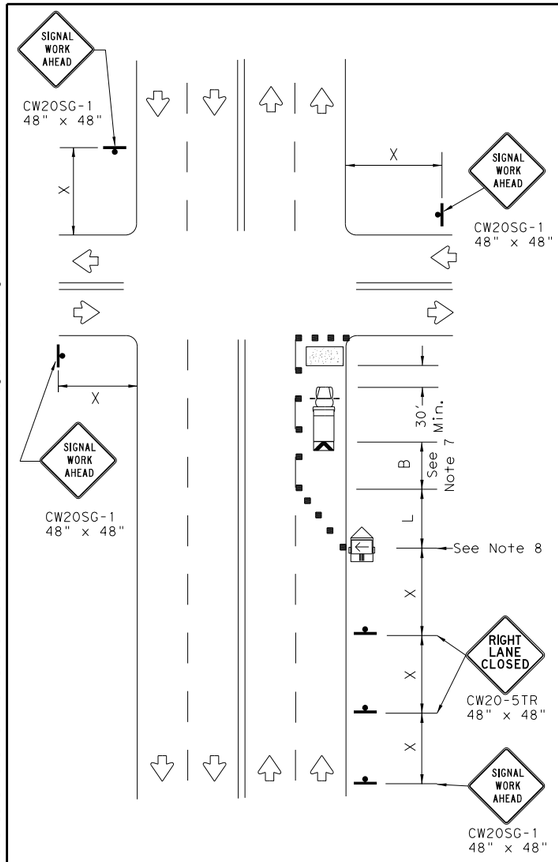
WHARTON COUNTY INTERSECTION DETAILS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	27
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

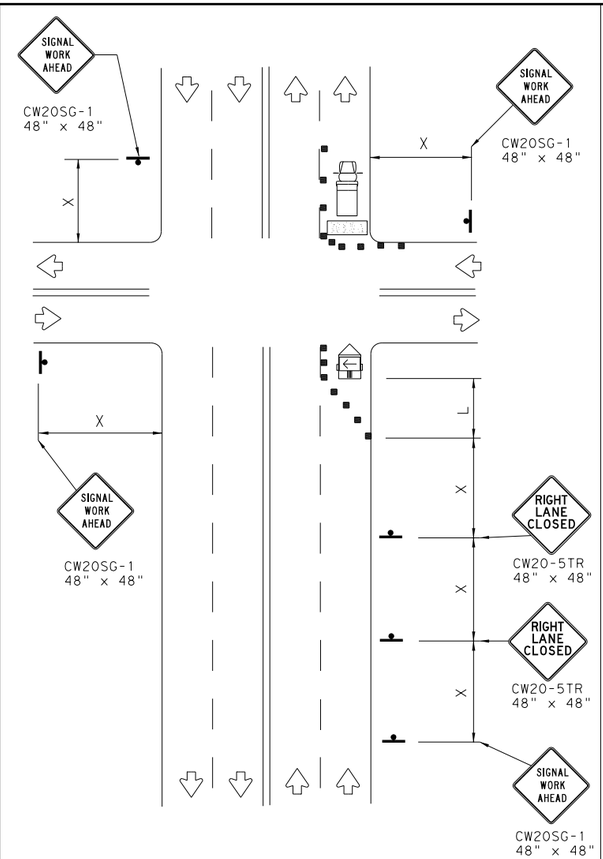
PLOTTED: 6/11/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_111_Wharton.dgn
40.0000 ft / in.
BY: daniel.rejcek

DATE:
FILE:



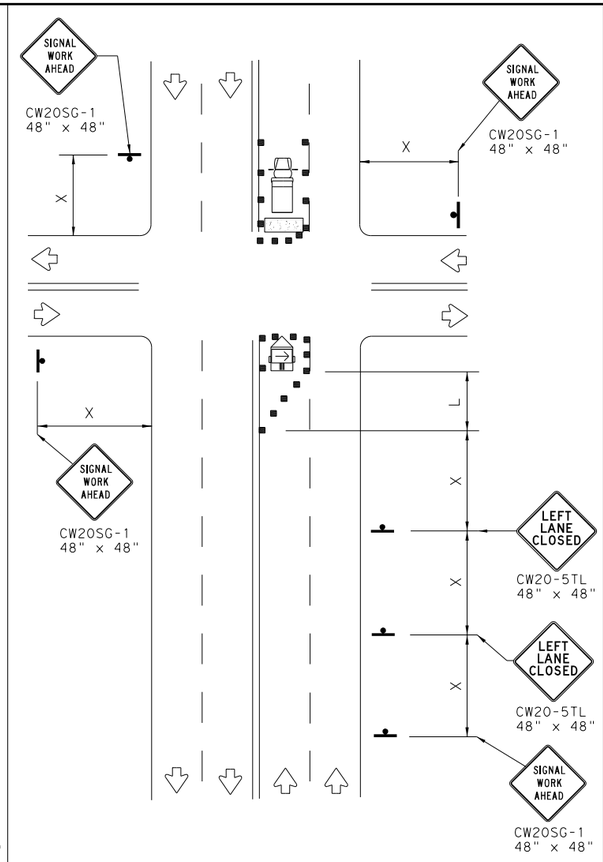
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



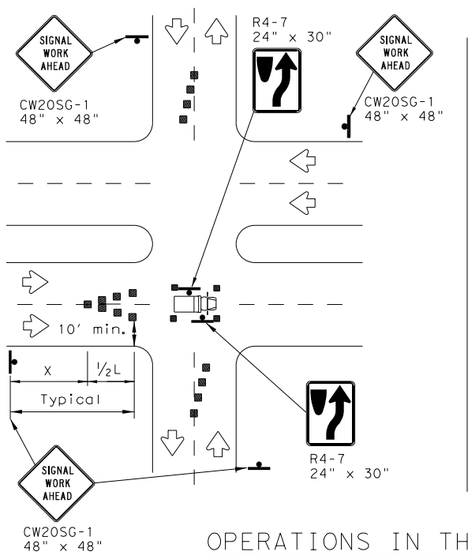
FAR SIDE RIGHT LANE CLOSURE

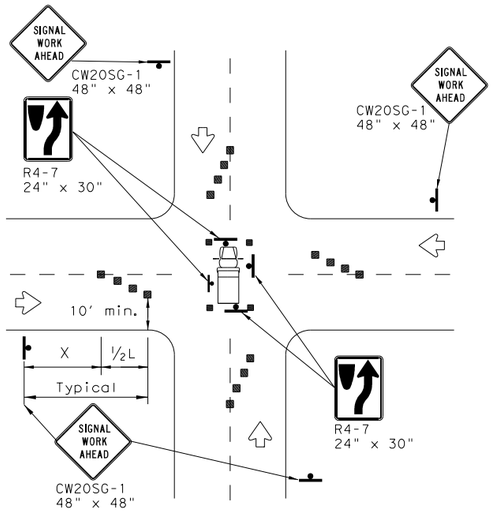
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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.

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.

Texas Department of Transportation

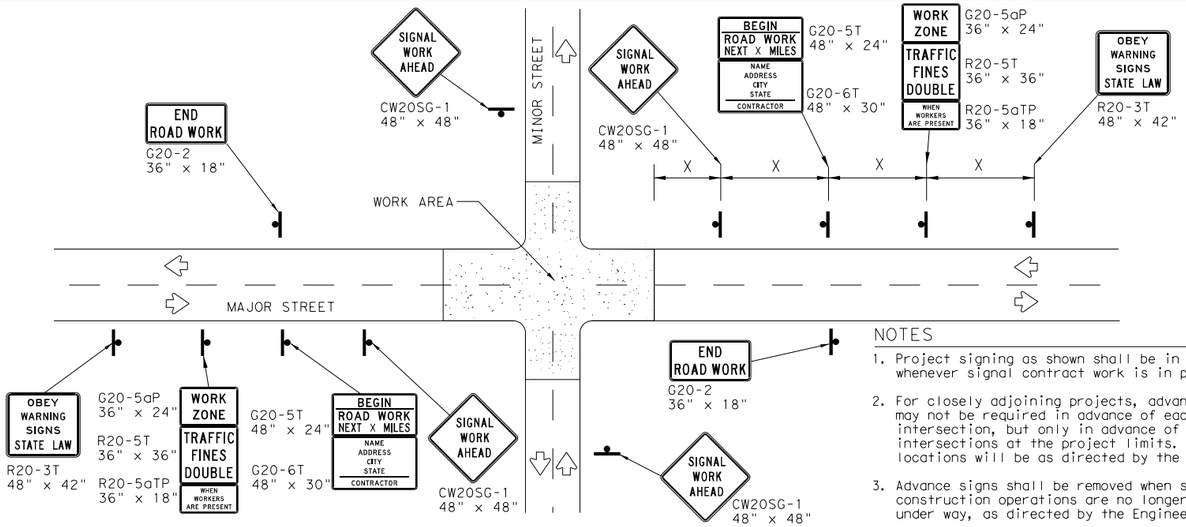
Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	YKM	DEWITT, ETC.		28

DATE:
FILE:



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 alluminum 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 backfilled 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

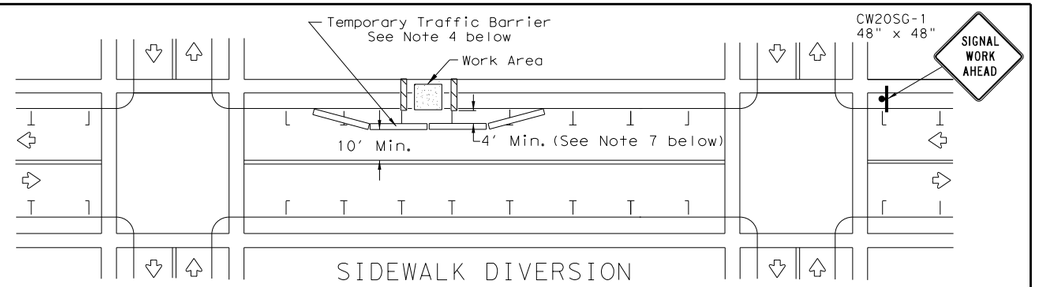
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

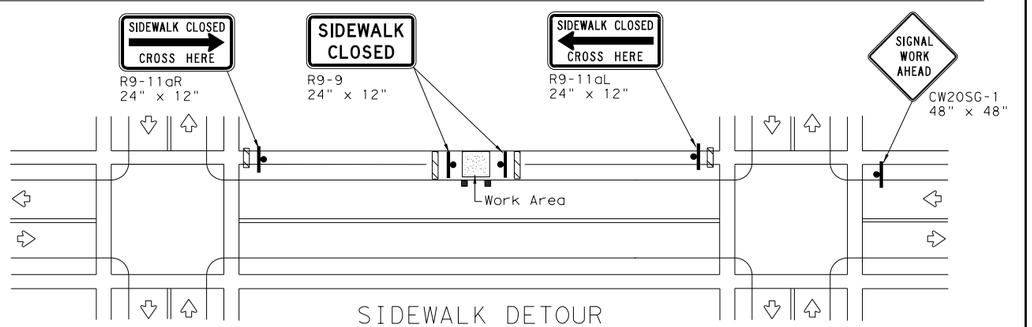
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

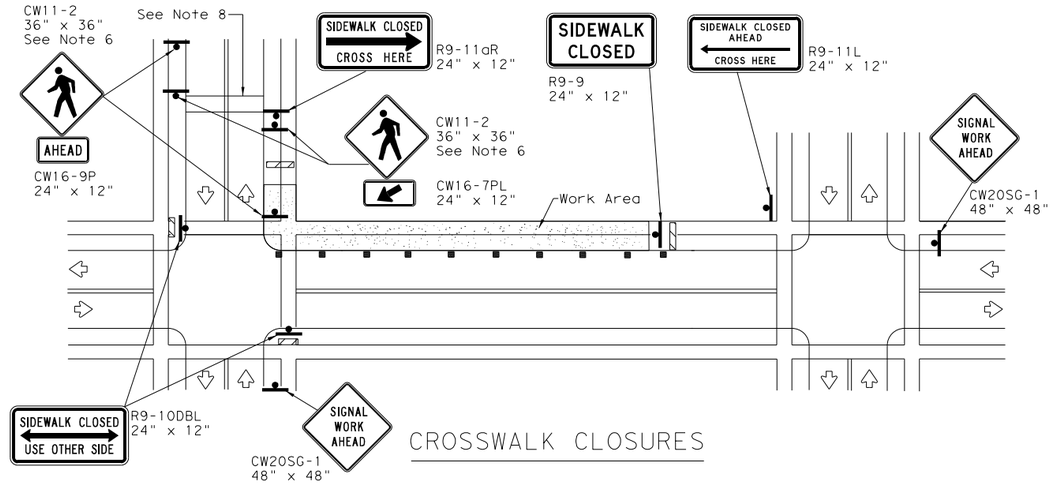
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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

FILE:	wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0913	00	114	VARIOUS
2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03		YKM	DEWITT, ETC.		29

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. 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.

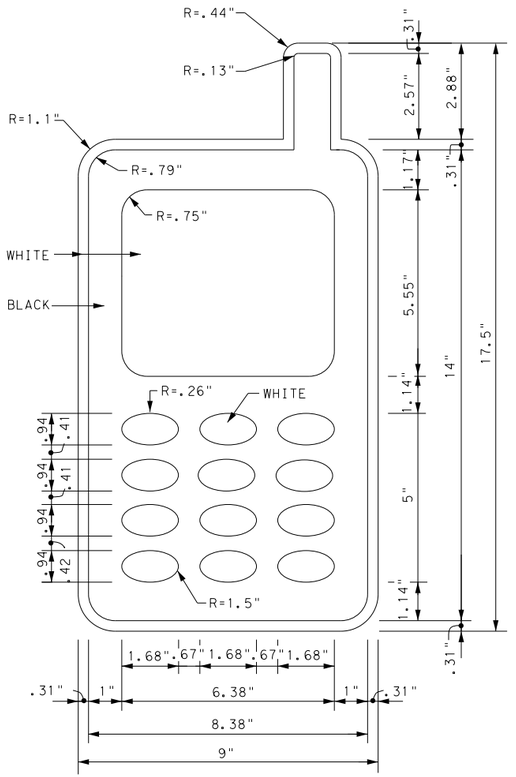
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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

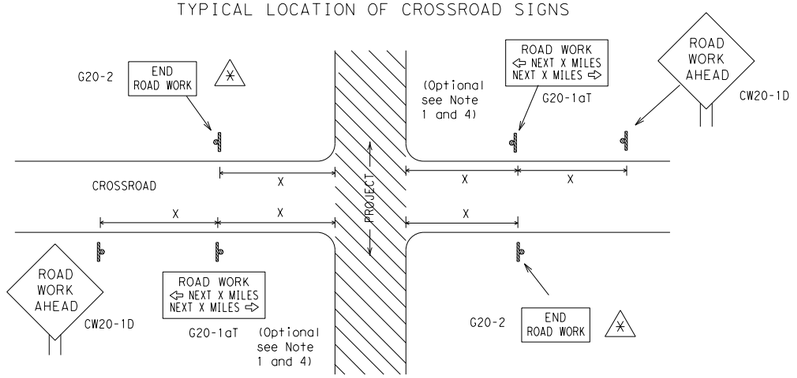
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	YKM	DEWITT, ETC.		30

DATE:
FILE:

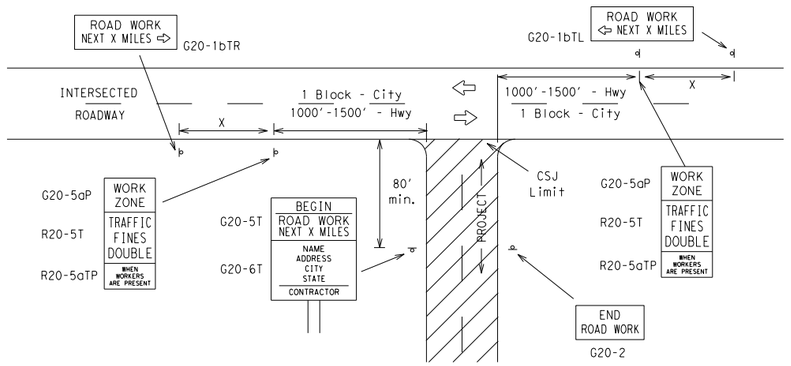
TYPICAL LOCATION OF CROSSROAD SIGNS



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

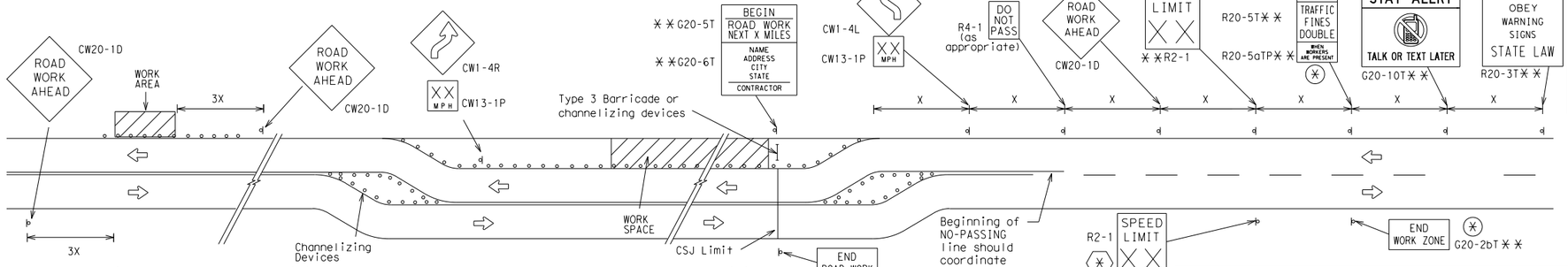
⁂ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

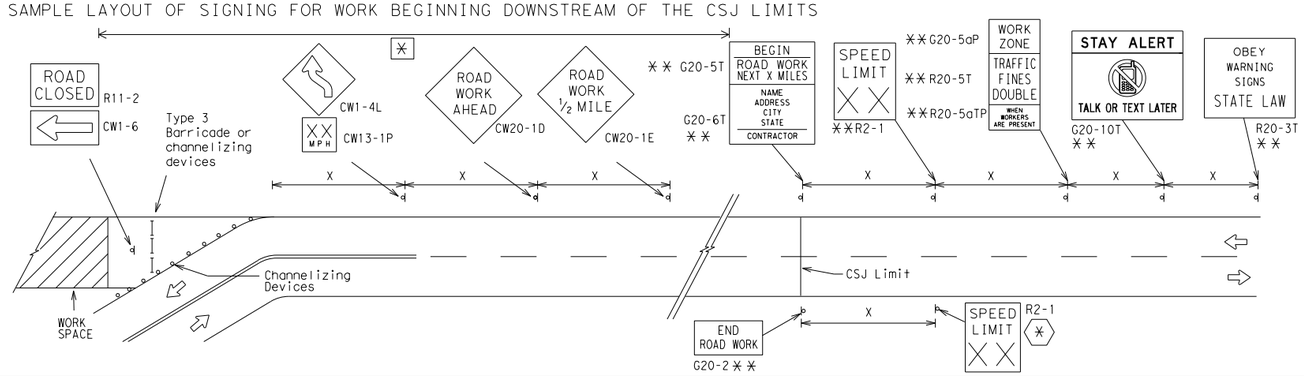
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

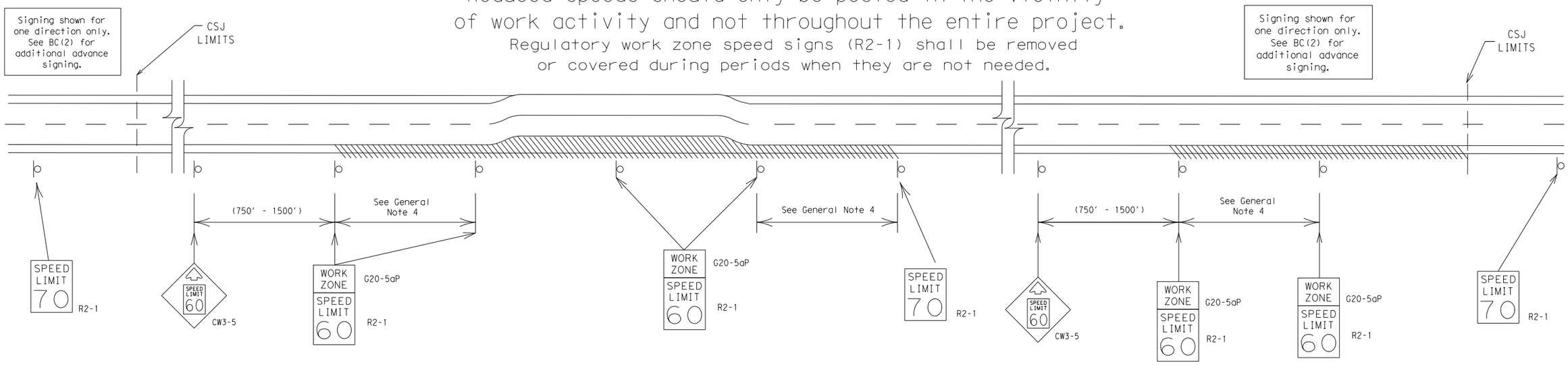
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	DEWITT, ETC.		31

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.

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

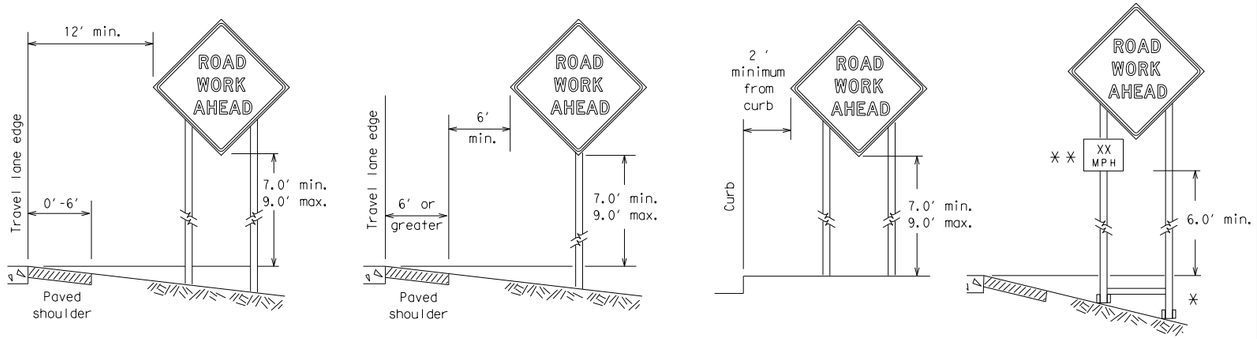
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		32

97

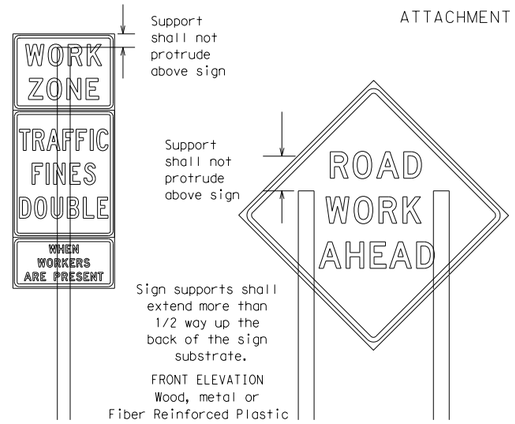
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



⁎ 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.

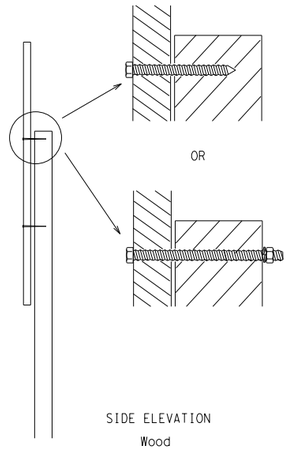
⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

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.



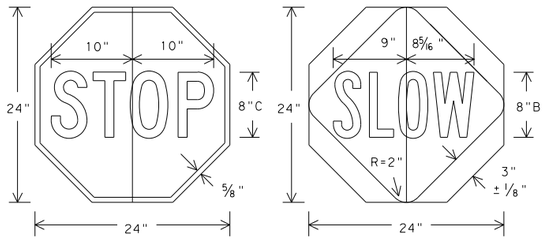
SIDE ELEVATION
Wood

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

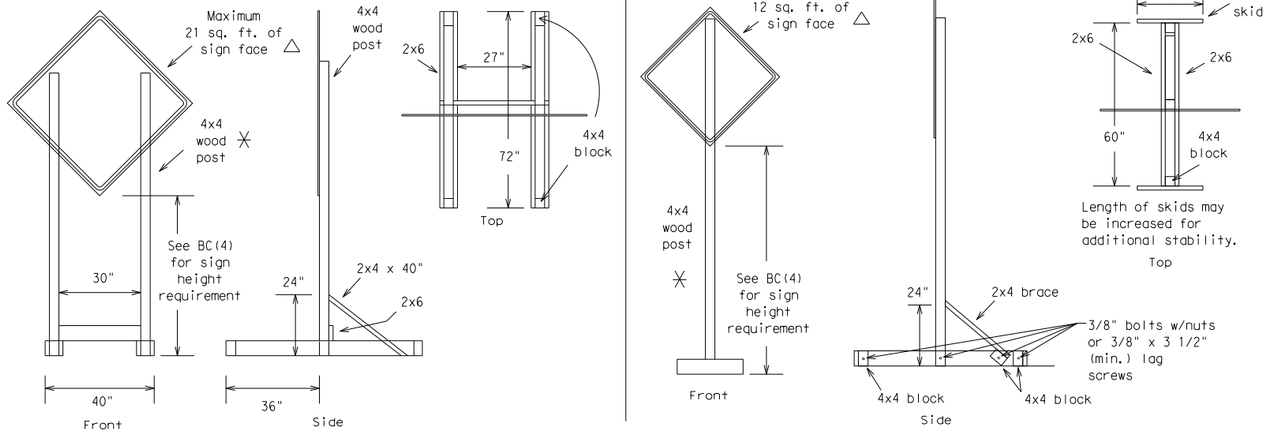
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	DEWITT, ETC.		33

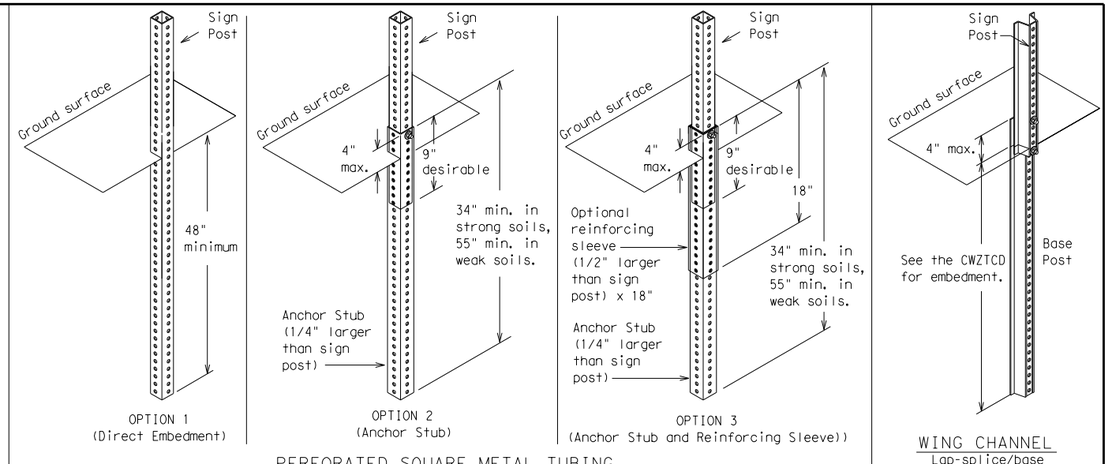
DATE:
FILE:

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.



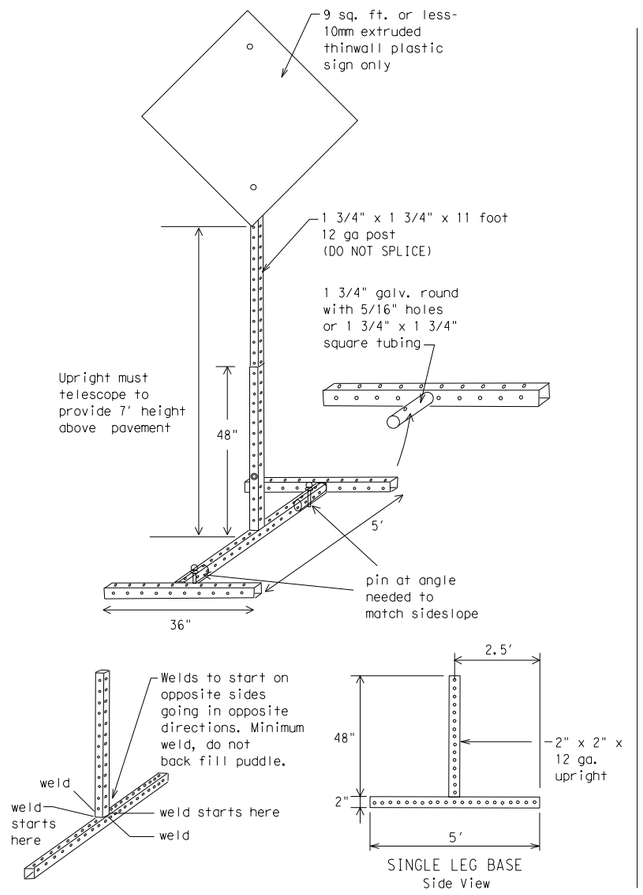
SKID MOUNTED WOOD SIGN SUPPORTS

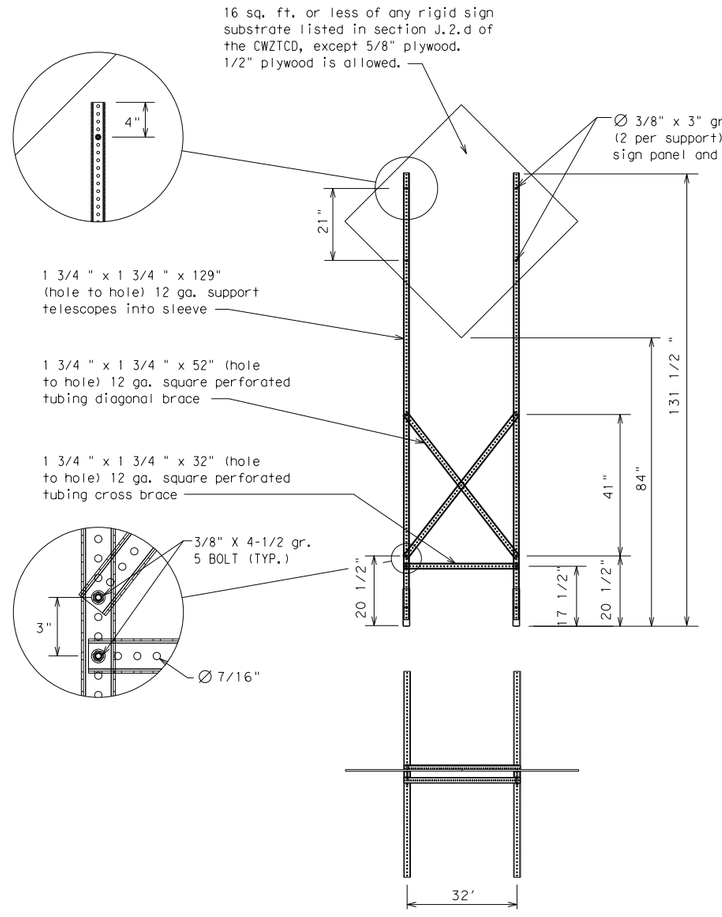
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

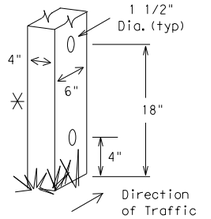


GROUND MOUNTED SIGN SUPPORTS

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

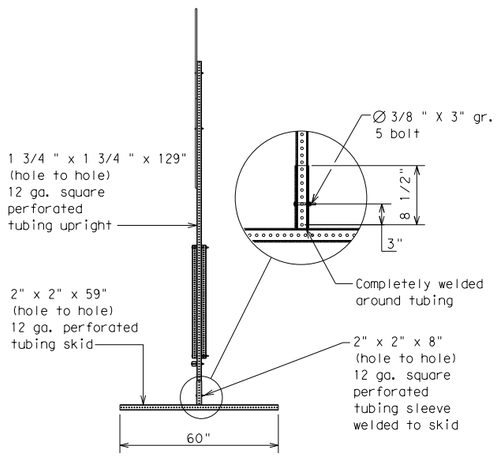






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

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 9-07 8-14 7-13	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		34

DATE:
FILE:

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

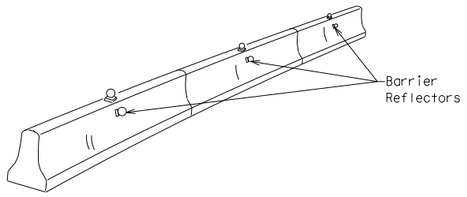
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0913	00	114	VARIOUS
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13		YKM	DEWITT, ETC.		35

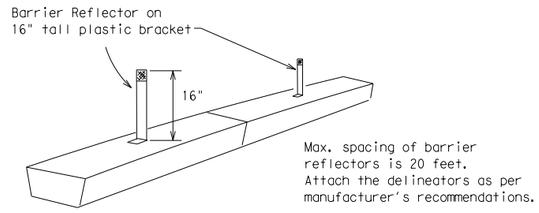
DATE:
FILE:

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.

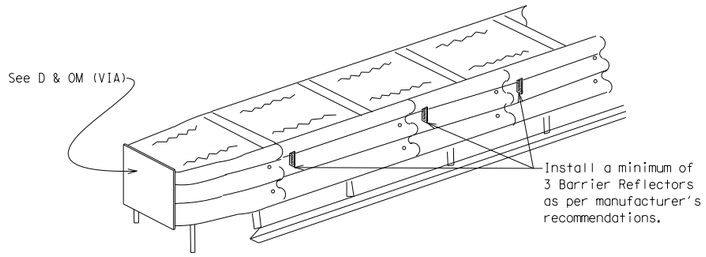


CONCRETE TRAFFIC BARRIER (CTB)

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

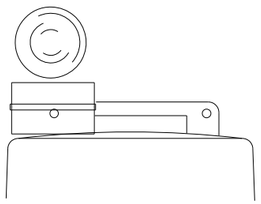
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

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

WARNING LIGHTS

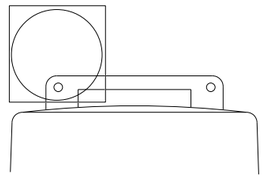
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this 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.



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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



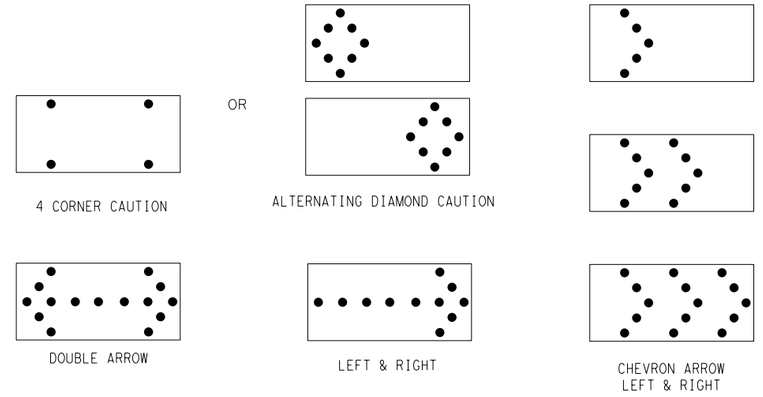
Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the 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	0913	00	114	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	DEWITT, ETC.		36

101

DATE:
FILE:

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:

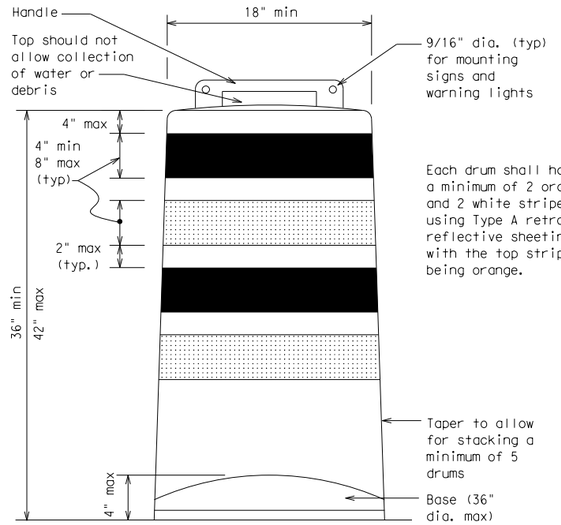
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

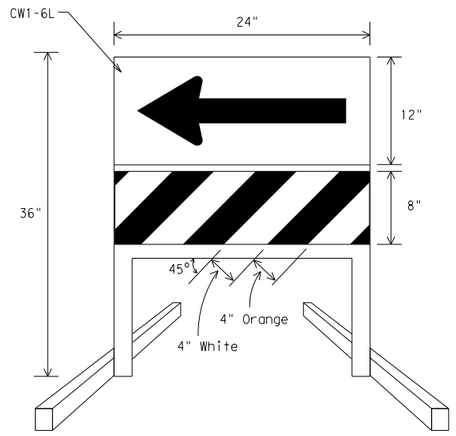
RETROREFLECTIVE SHEETING

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.





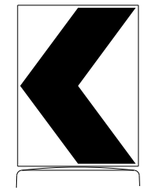
DIRECTION INDICATOR BARRICADE

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.

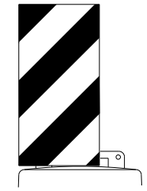
This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

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

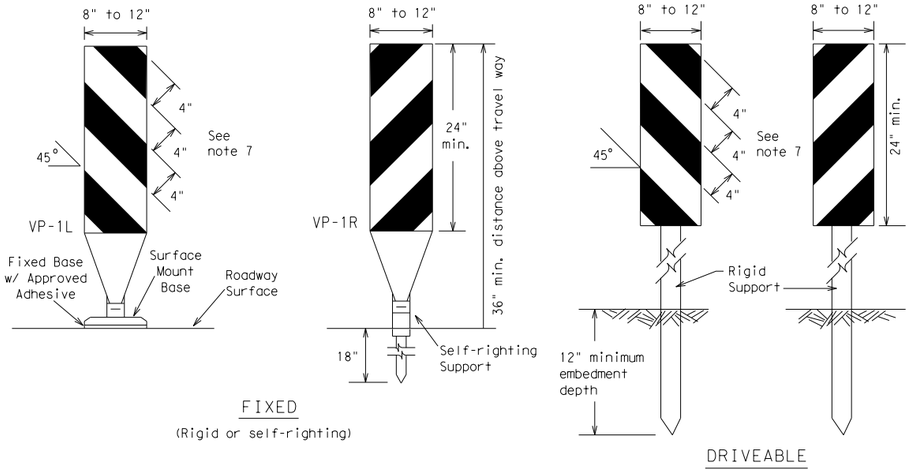
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

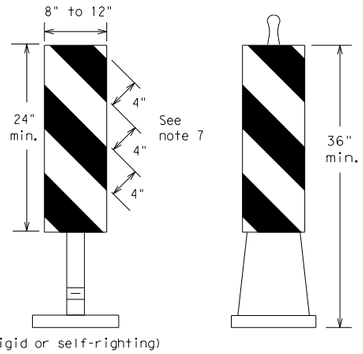
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	YKM	DEWITT, ETC.		37

DATE:
FILE:



FIXED
(Rigid or self-righting)

DRIVEABLE

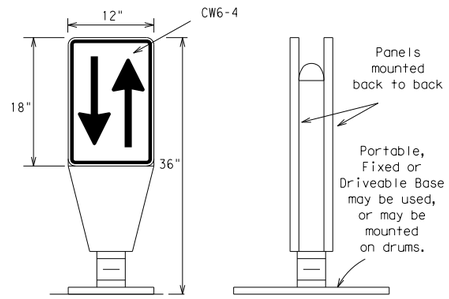


(Rigid or self-righting)

PORTABLE

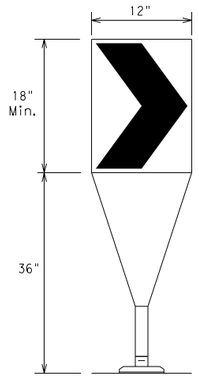
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



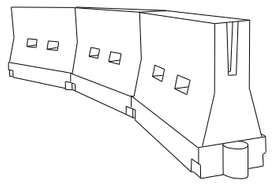
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

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

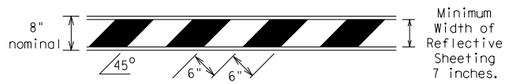
BC(9)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	YKM	DEWITT, ETC.		38

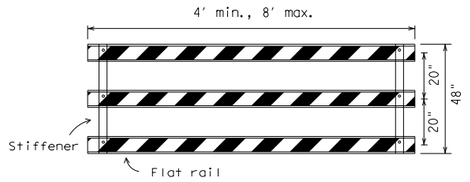
TYPE 3 BARRICADES

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.



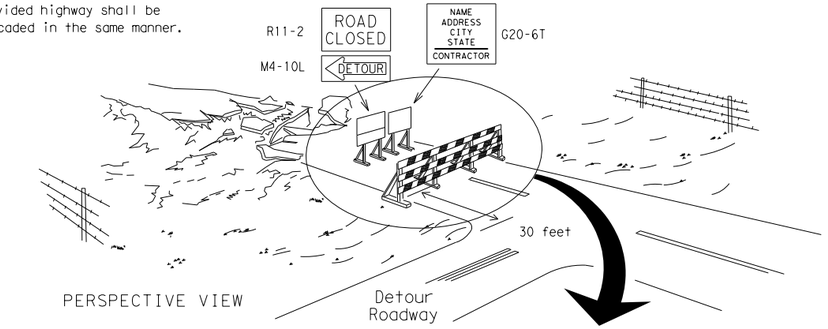
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

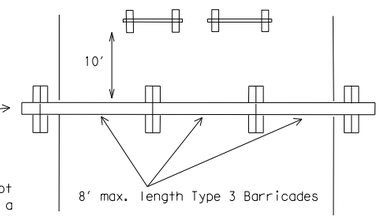
Each roadway of a divided highway shall be barricaded in the same manner.



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.

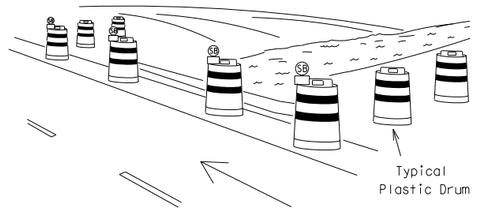
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

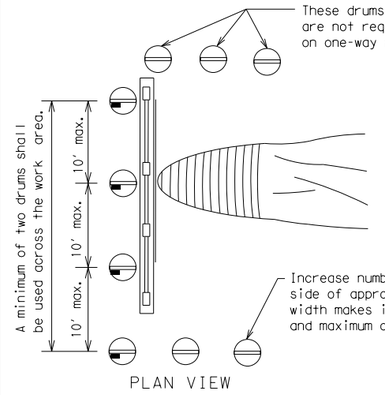
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

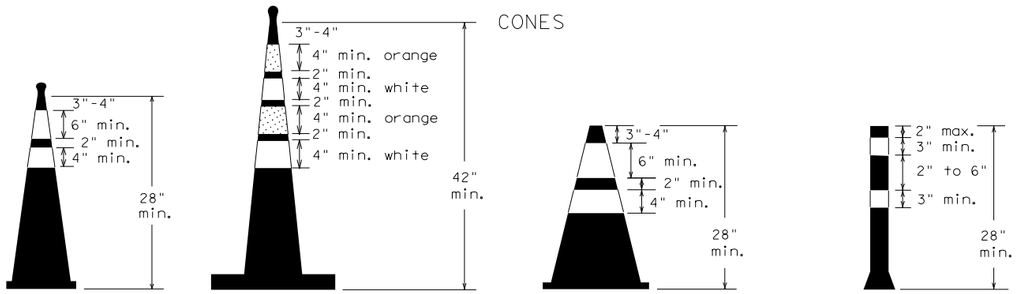
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

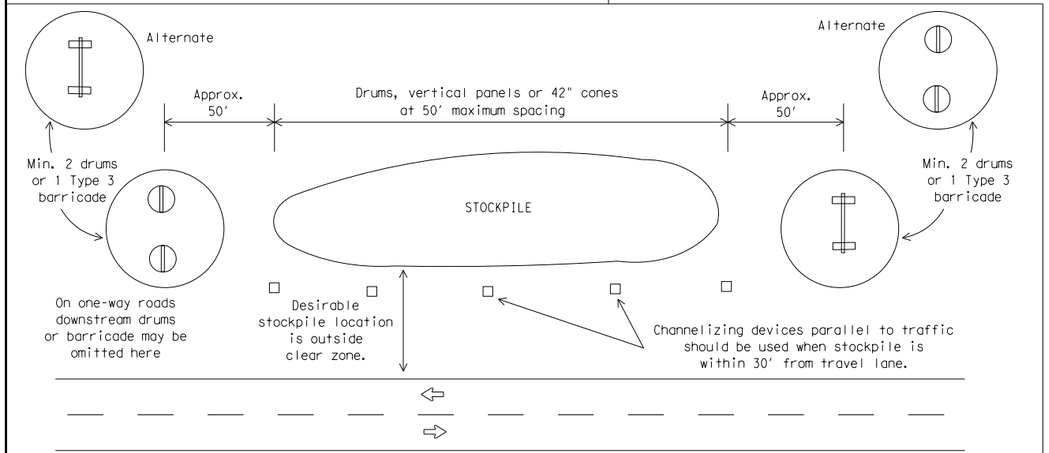
One-Piece cones

Tubular Marker

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

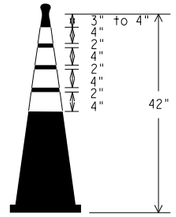
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-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	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		39

DATE:
FILE:

DATE:
FILE:

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.

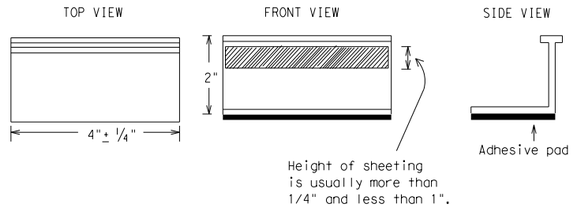
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

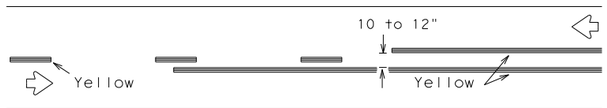
BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	YKM	DEWITT, ETC.		40
11-02 8-14				

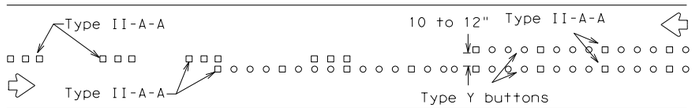
105

DATE:
FILE:

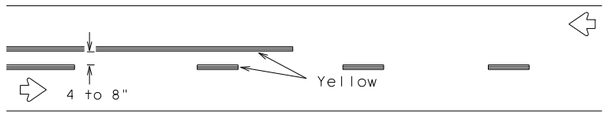
PAVEMENT MARKING PATTERNS



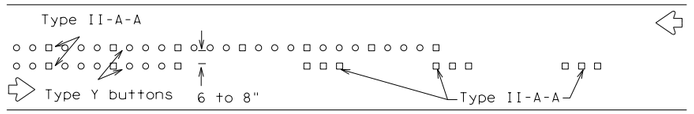
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



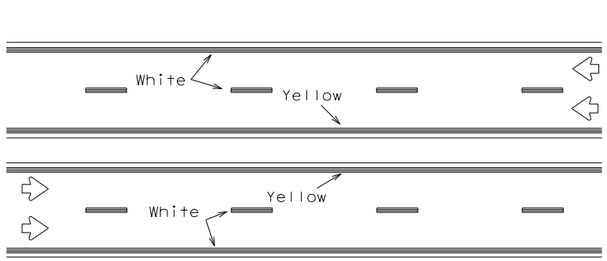
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



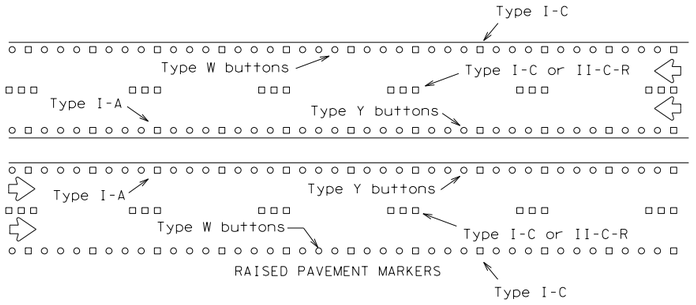
RAISED PAVEMENT MARKERS - PATTERN B

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



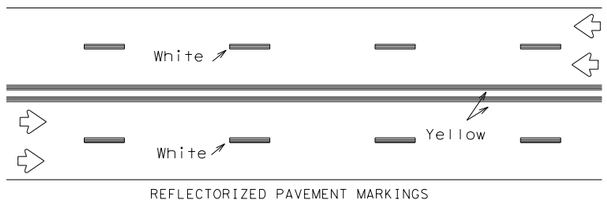
REFLECTORIZED PAVEMENT MARKINGS



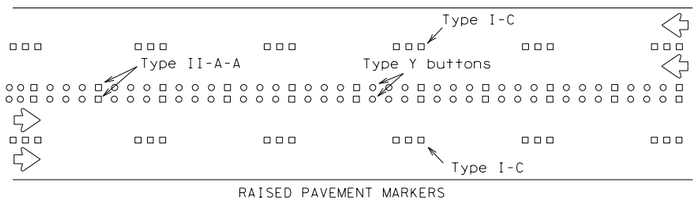
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



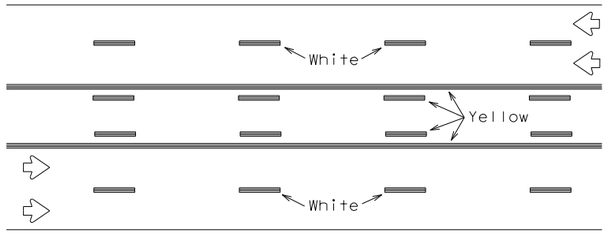
REFLECTORIZED PAVEMENT MARKINGS



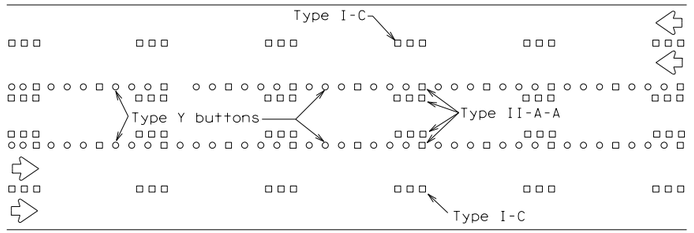
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

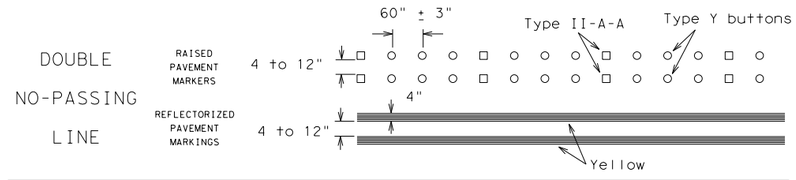
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

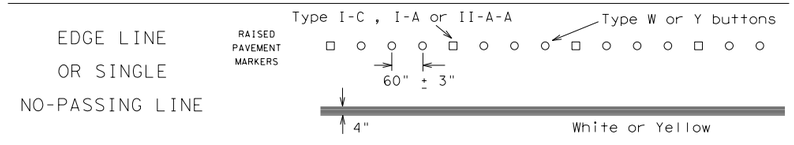
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

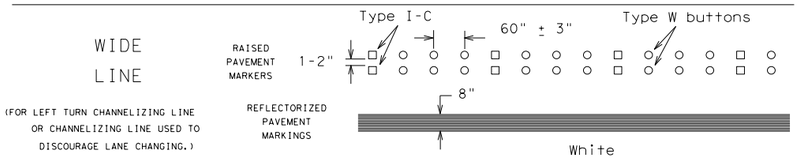


EDGE LINE OR SINGLE NO-PASSING LINE



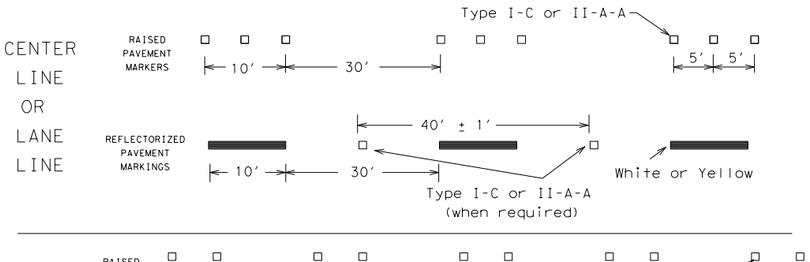
WIDE LINE

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

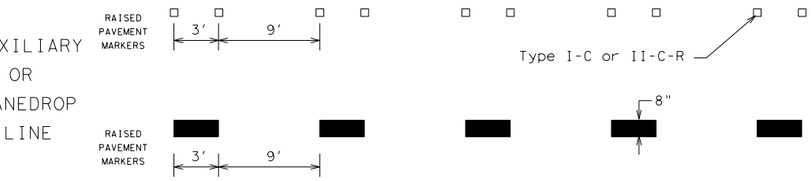


BROKEN LINES

CENTER LINE OR LANE LINE

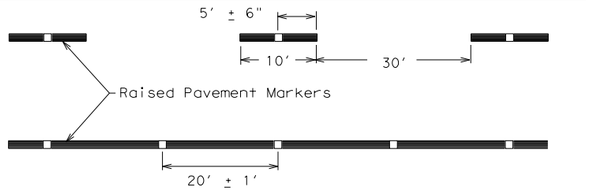


AUXILIARY OR LANEDROP LINE



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

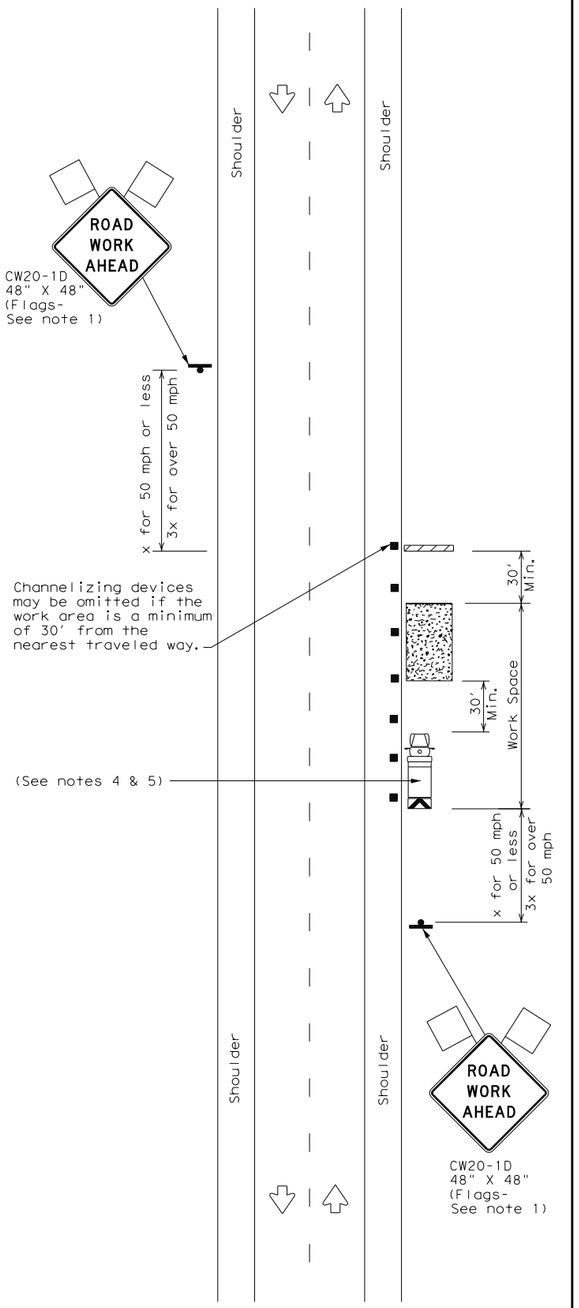
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

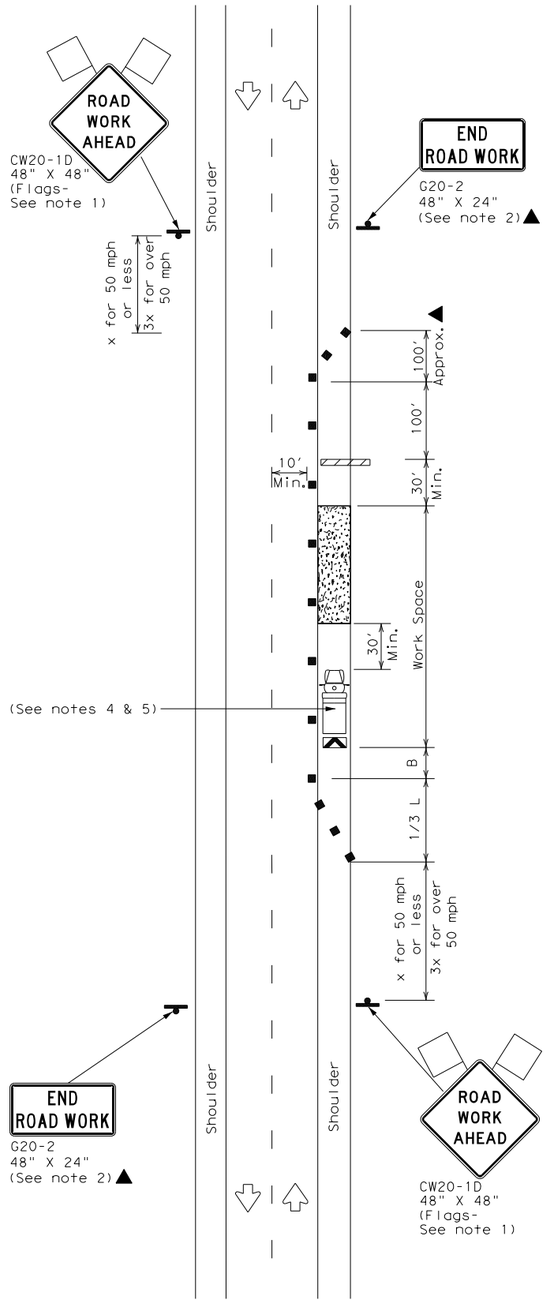
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	YKM	DEWITT, ETC.		41
11-02 8-14				

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.



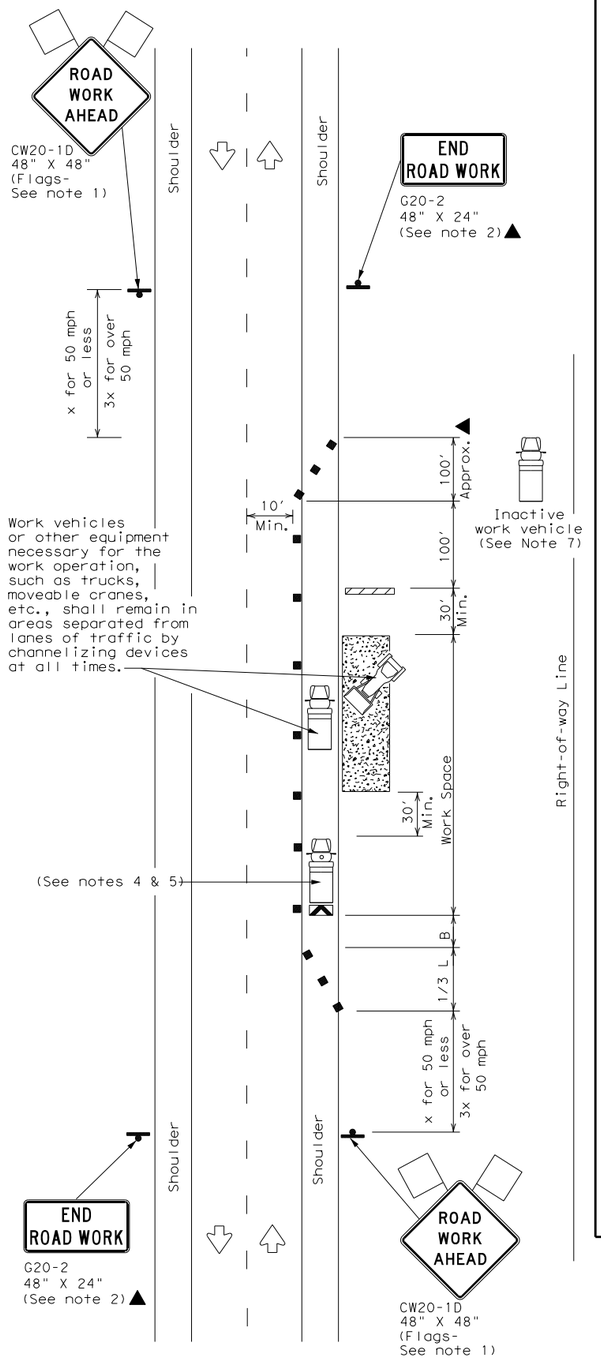
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

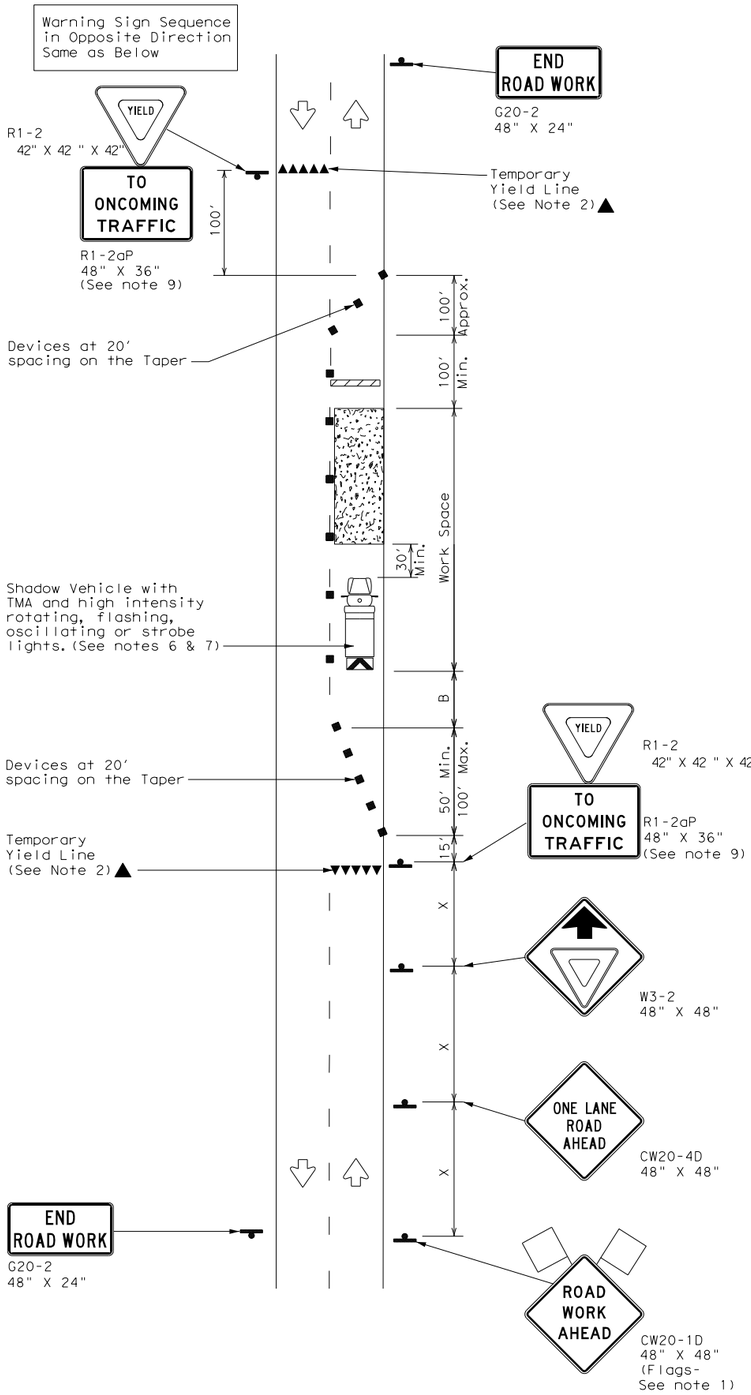
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	YKM	DEWITT, ETC.		42
1-97 2-18				

161

DATE: 5/26/2021
FILE: TCP(2-1)-18

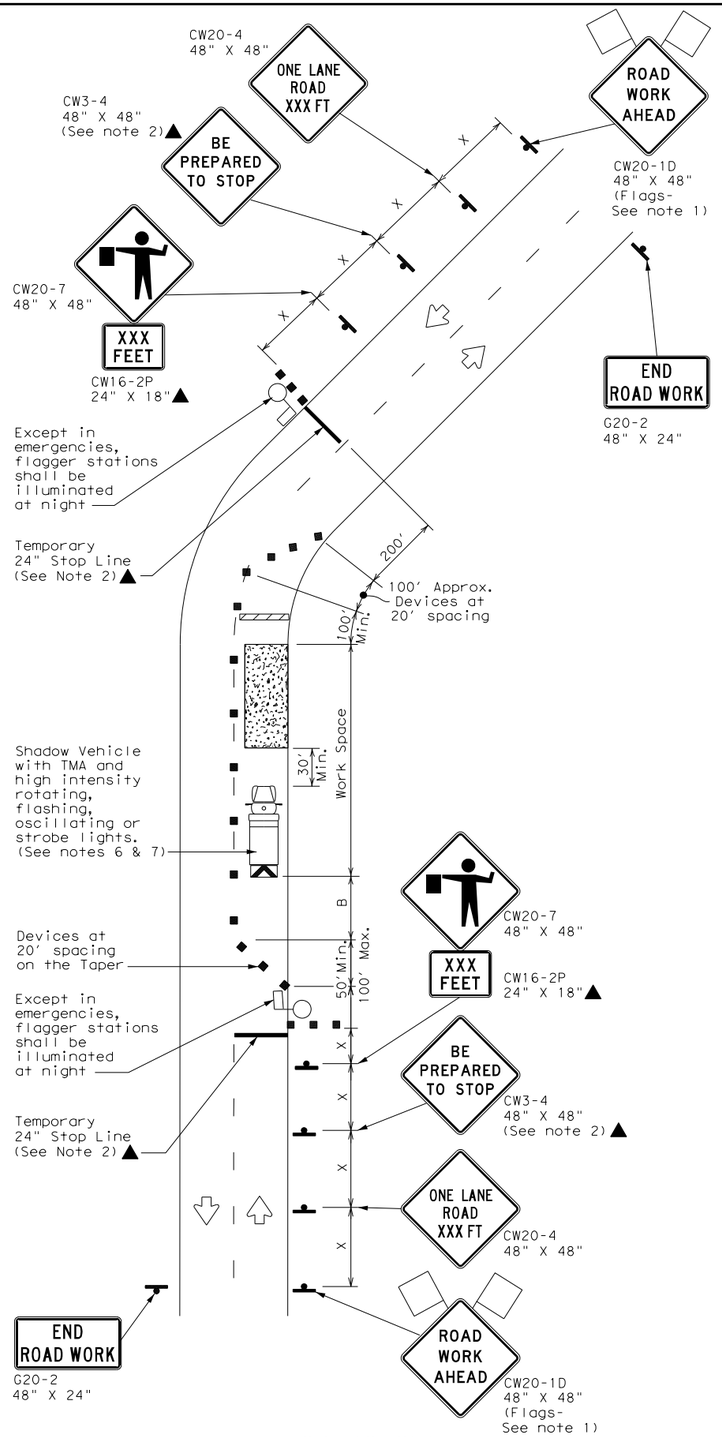


TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

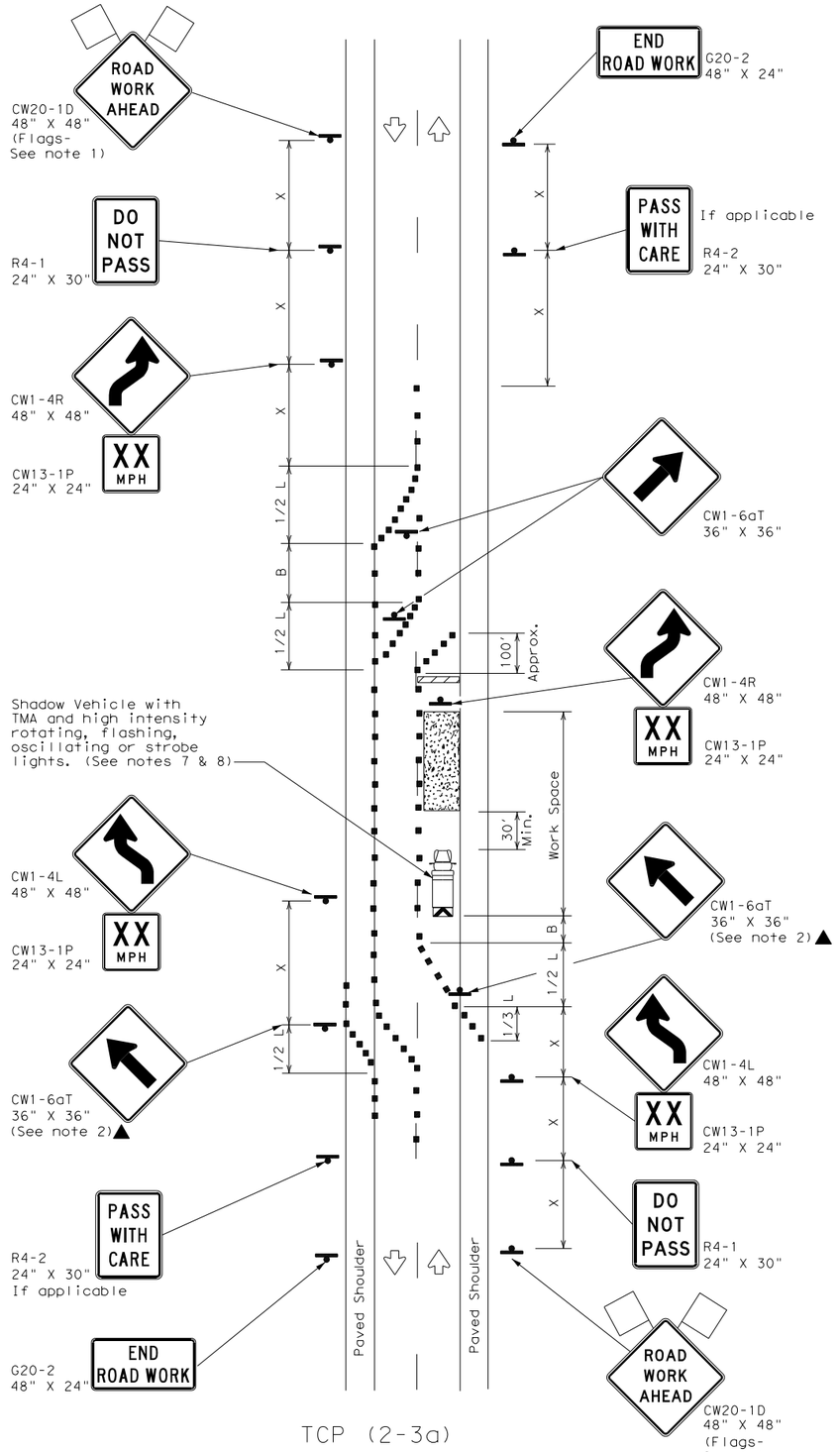
TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		43

162

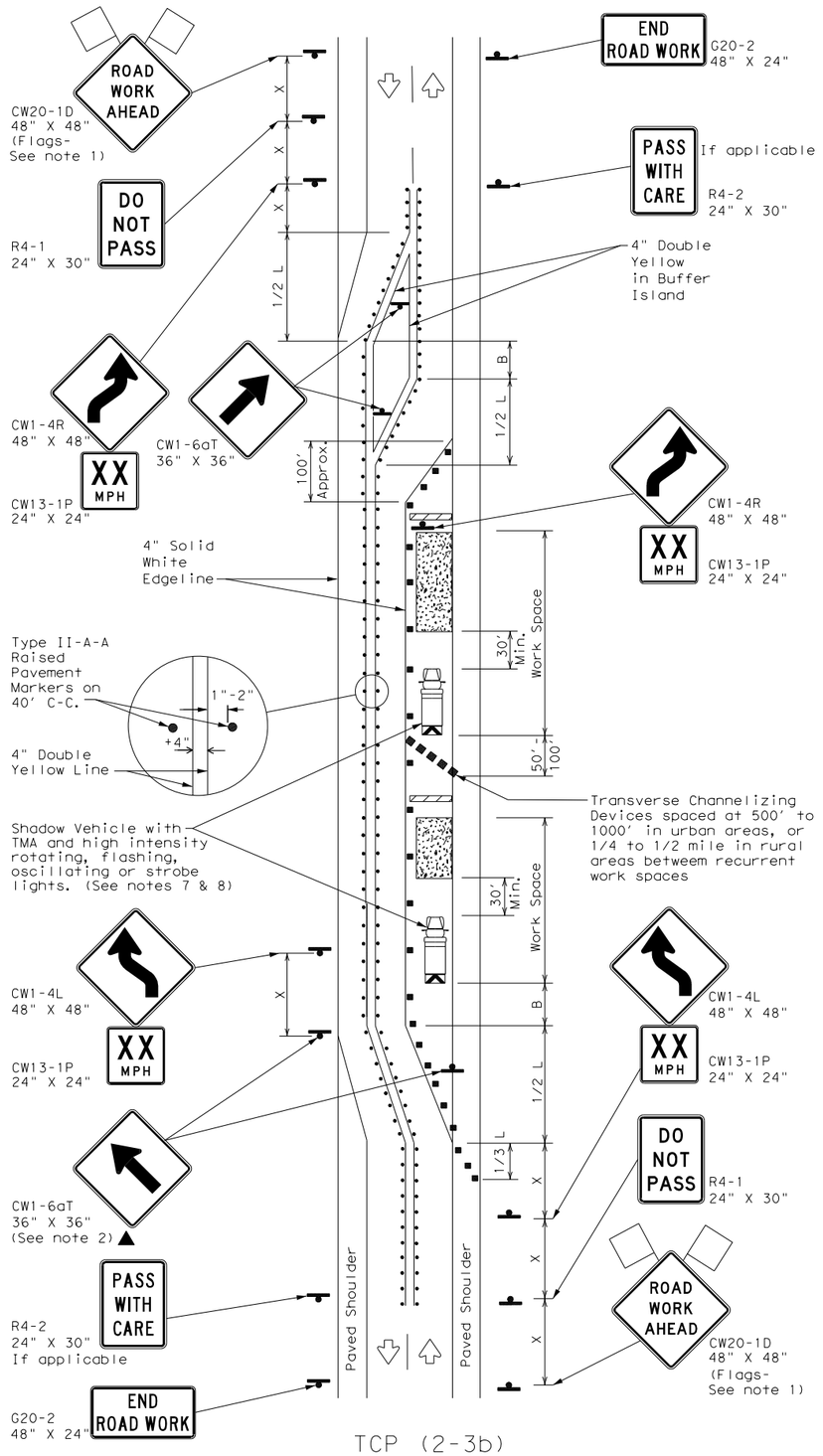
DATE: 5/26/2021
FILE: TCP(2-2)-18

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.



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

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 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
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

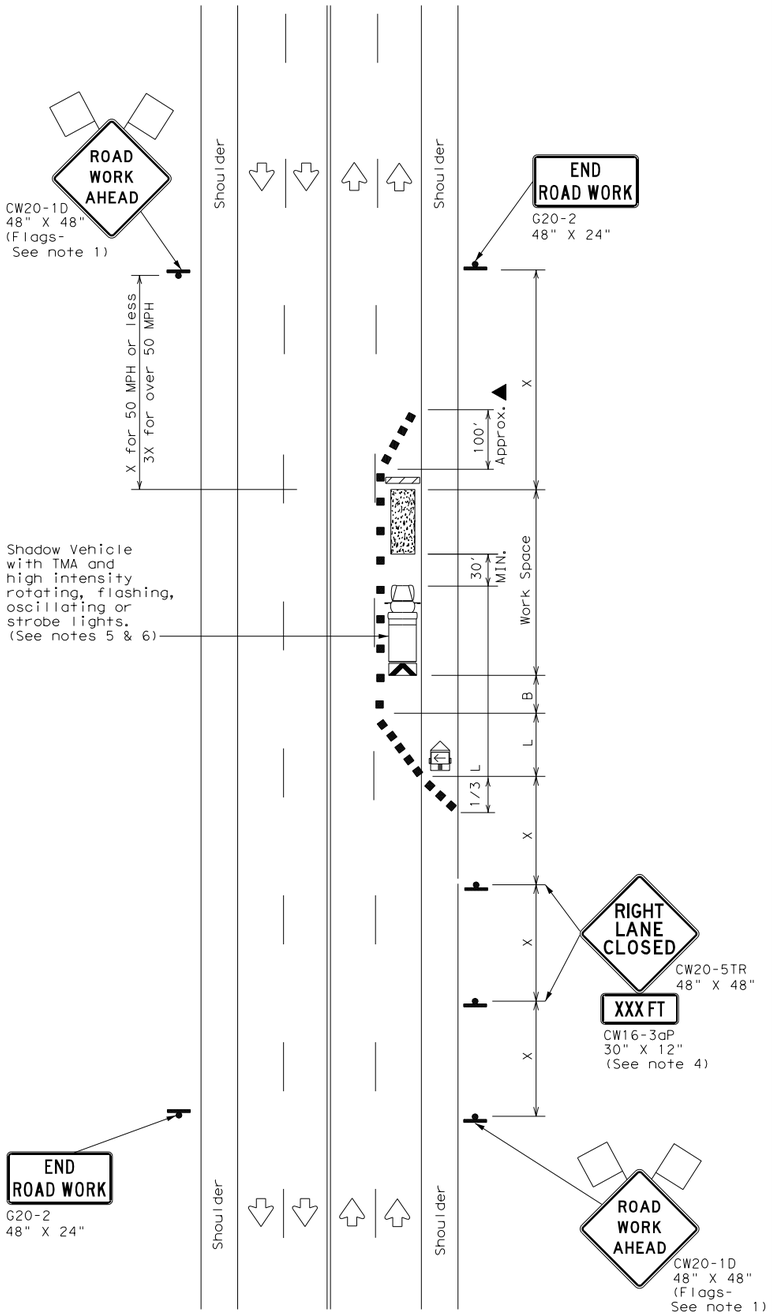
TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	YKM	DEWITT, ETC.		44
4-98 2-18				

163

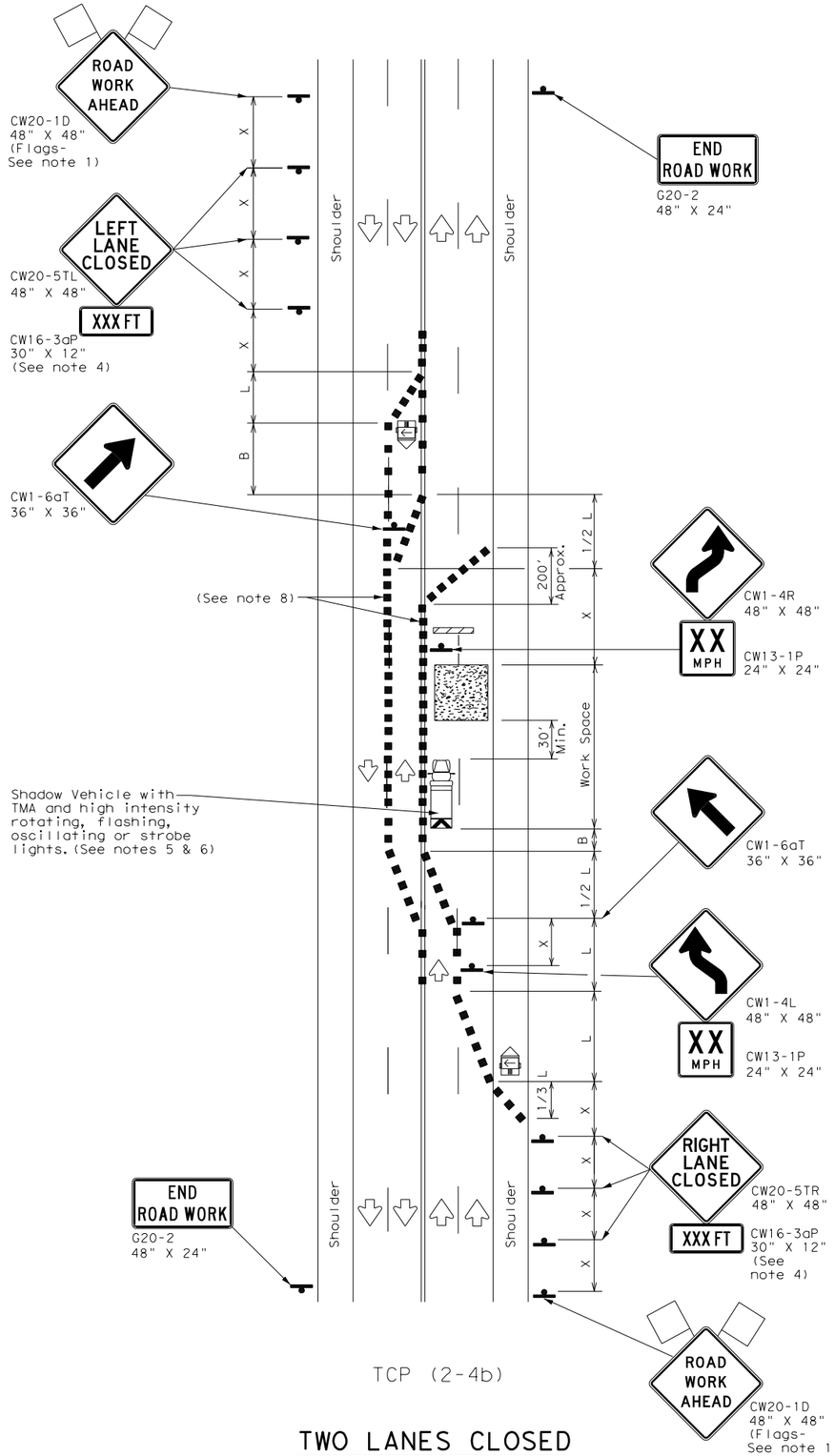
DATE: 5/26/2021
FILE: TCP(2-3)-18

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.



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

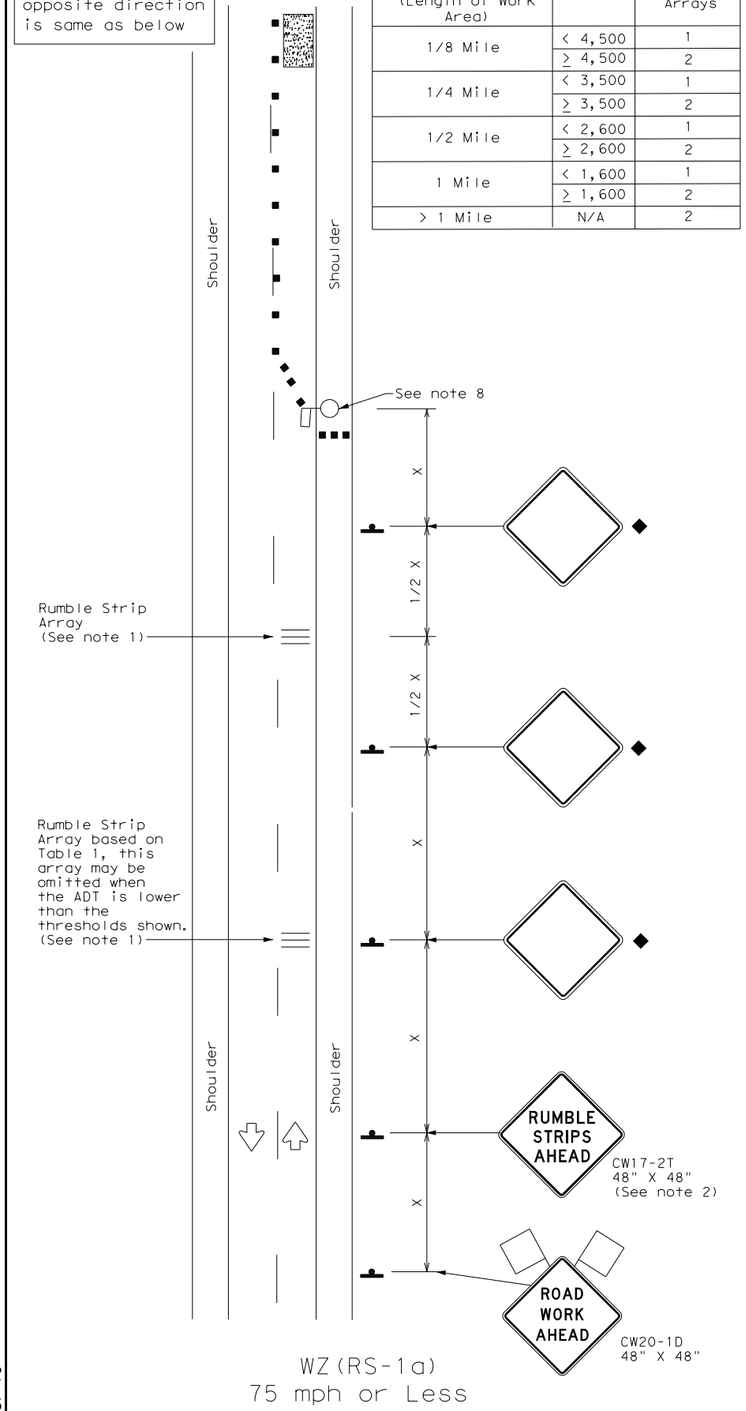
TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0913	00	114	VARIOUS
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	YKM	DEWITT, ETC.		45

DATE: 5/26/2021
FILE: TCP(2-4)-18

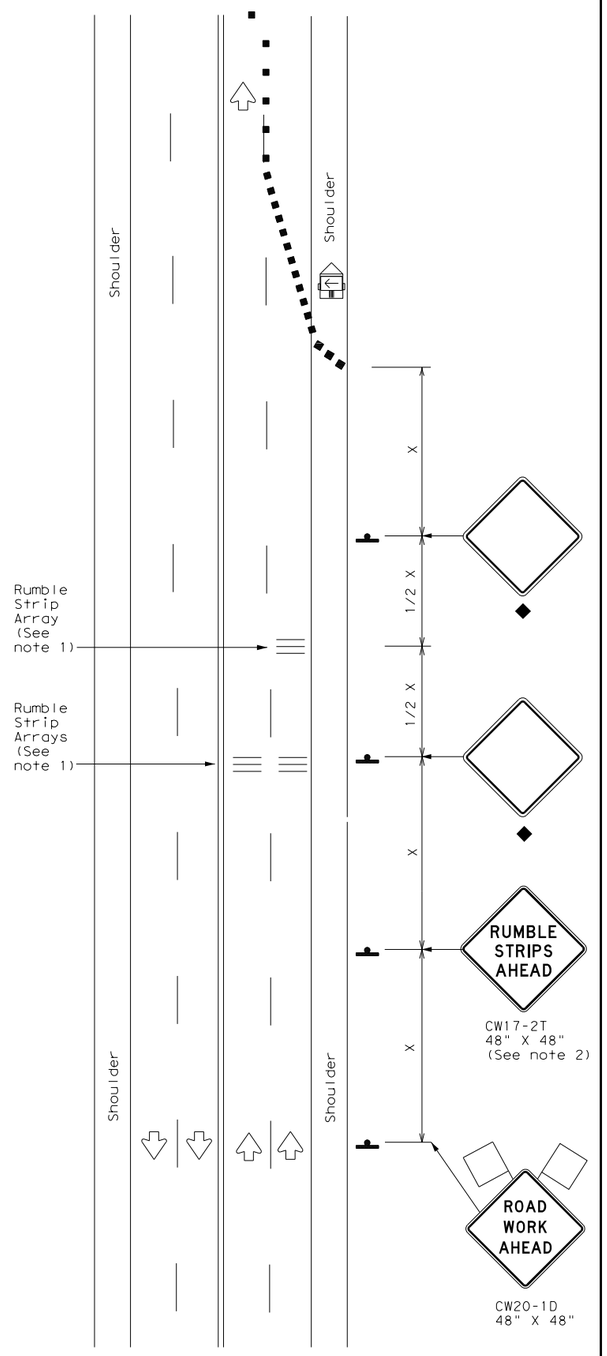
Warning sign and rumble strip sequence in opposite direction is same as below

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



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

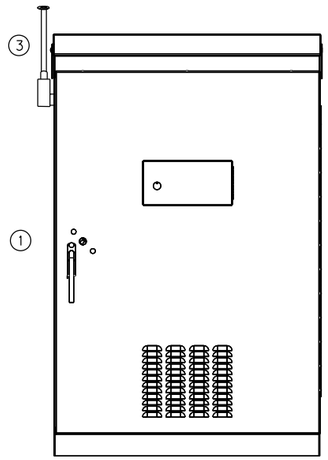
Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

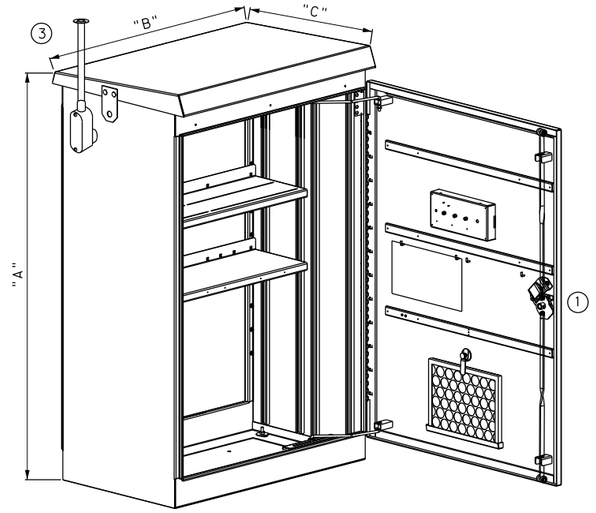
WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
2-14	DIST	COUNTY		SHEET NO.
4-16	YKM	DEWITT, ETC.		45A

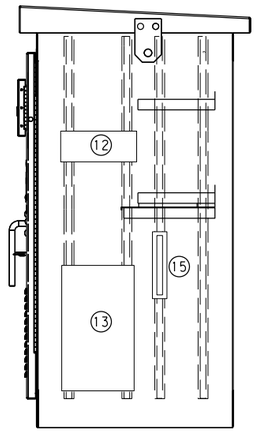
DATE: 5/26/2021
FILE: WZ(RS)-16



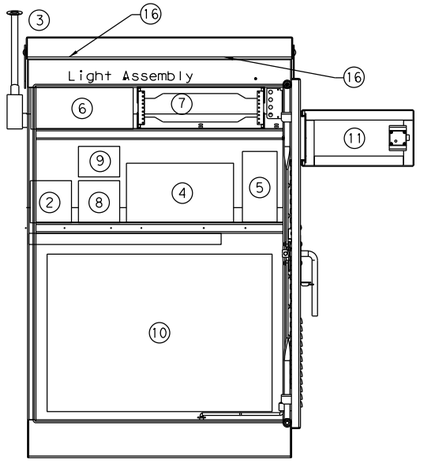
FRONT ELEVATION



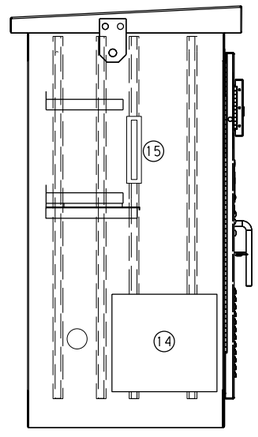
ISOMETRIC DETAIL



INSIDE LEFT WALL



INSIDE FRONT



INSIDE RIGHT WALL

CABINET EQUIPMENT CONFIGURATION

GENERAL NOTES:

1. External cabinet features and door configuration shown is diagrammatic in nature and intended to represent a typical pole mounted cabinet setup.
2. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred pole mounted cabinet setup. Hardware needed for each cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate traffic signal hardware in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
3. All dimensions are approximate and represent minimum dimensions.
4. Remove No. 2 lock and install smart lock per manufacturer instructions.
5. The contractor will be responsible for ensuring connectivity of cellular router. Install cellular router and antenna per manufacturer instructions.
6. Install signal controller and MMU per manufacturer instructions.
7. Contractor shall submit shop drawings showing equipment placement and configuration.

REFERENCE KEY NOTES:

1. Smart Lock
2. Cellular Router
3. Cellular Router Antenna
4. Traffic Signal Controller
5. Malfunction Management Unit (MMU)
6. Detection Card Equipment
7. 4RU (Size 5/6) or 7RU (Size 7) EIA 19" Rack
8. Power Supply
9. Ethernet Switch
10. Load Switch Bay and Back Panel
11. Police Panel
12. Preemption Panel (when required)
13. Loop Detector Panel
14. Power Distribution Panel
15. Light Assembly (Side Wall Mount)
16. Fan Assembly (Min. 2)

Cabinet Size	Cabinet Dimensions		
	"A"	"B"	"C"
	IN	IN	IN
Size 5	48	30	16

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

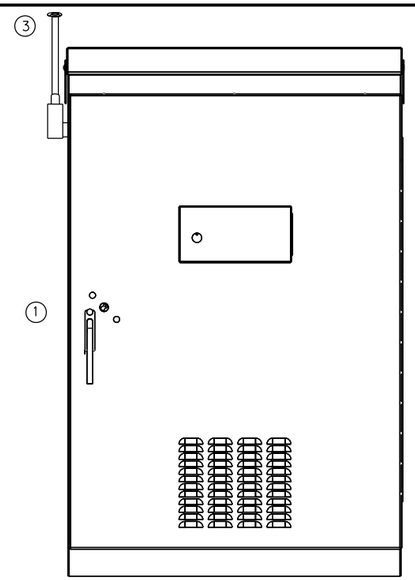
TRAFFIC SIGNAL CABINET INSTALLATION DETAILS

(SIZE 5 CONFIGURATION 3)

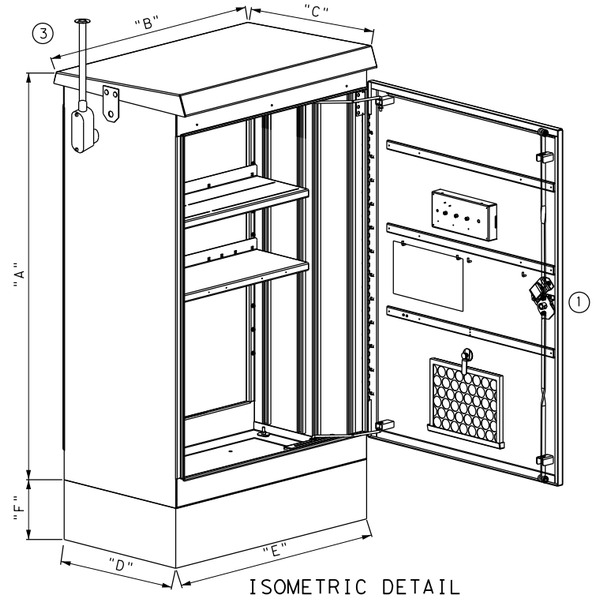
SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR				
CHECK	TEXAS	YKM	DEWITT, ETC.	
NCN	CONTROL	SECTION	JOB	46
CHECK	0913	00	114	
KCK				

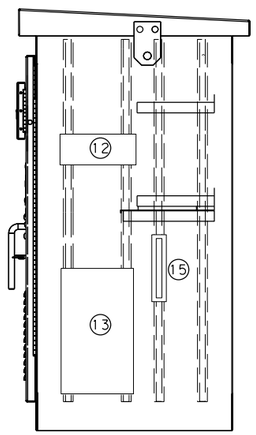
PLOTTED: 5/26/2021
FILENAME: c:\pwworking\khq\pwprod\daniel.rejcek\d0124126\YKM_SHT_901_Cabinet Detail.dgn
40.0000 ft / in.
BY: daniel.rejcek



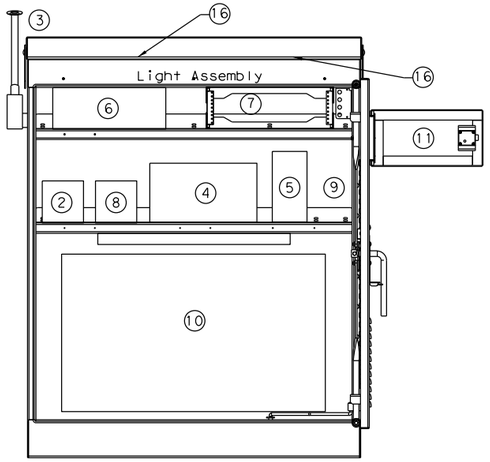
FRONT ELEVATION



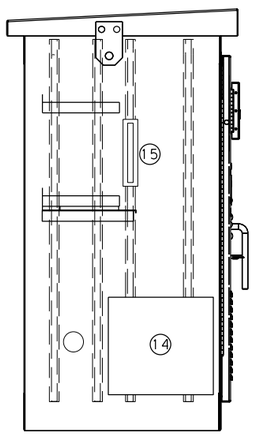
ISOMETRIC DETAIL



INSIDE LEFT WALL



INSIDE FRONT



INSIDE RIGHT WALL

CABINET EQUIPMENT CONFIGURATION

GENERAL NOTES:

1. External cabinet features and door configuration shown is diagrammatic in nature and intended to represent a typical ground mounted cabinet setup.
2. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Hardware needed for each cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate traffic signal hardware in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
3. All dimensions are approximate and represent minimum dimensions.
4. Remove No. 2 lock and install smart lock per manufacturer instructions.
5. The contractor will be responsible for ensuring connectivity of cellular router. Install cellular router and antenna per manufacturer instructions.
6. Install signal controller and MMU per manufacturer instructions.
7. Contractor shall submit shop drawings showing equipment placement and configuration.
8. Contractor shall verify bolt pattern of new cabinet matches bolt pattern of existing foundation and riser base.

REFERENCE KEY NOTES:

1. Smart Lock
2. Cellular Router
3. Cellular Router Antenna
4. Traffic Signal Controller
5. Malfunction Management Unit (MMU)
6. Detection Card Equipment
7. 4RU (Size 5/6) or 7RU (Size 7) EIA 19" Rack
8. Power Supply
9. Ethernet Switch
10. Load Switch Bay and Back Panel
11. Police Panel
12. Preemption Panel (when required)
13. Loop Detector Panel
14. Power Distribution Panel
15. Light Assembly (Side Wall Mount)
16. Fan Assembly (Min. 2)

Cabinet Size	Cabinet Dimensions			Riser Dimensions		
	"A"	"B"	"C"	"D"	"E"	"F"*
	IN	IN	IN	IN	IN	IN
Size 6	52	44	24	24	44	VARIES

* Riser Height Option 12", 18" or 24"

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

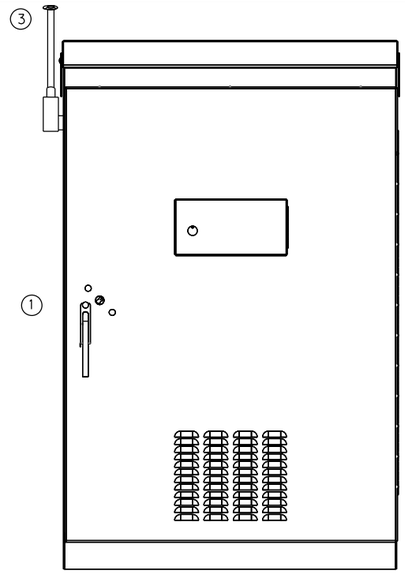
TRAFFIC SIGNAL UPGRADES

TRAFFIC SIGNAL CABINET INSTALLATION DETAILS

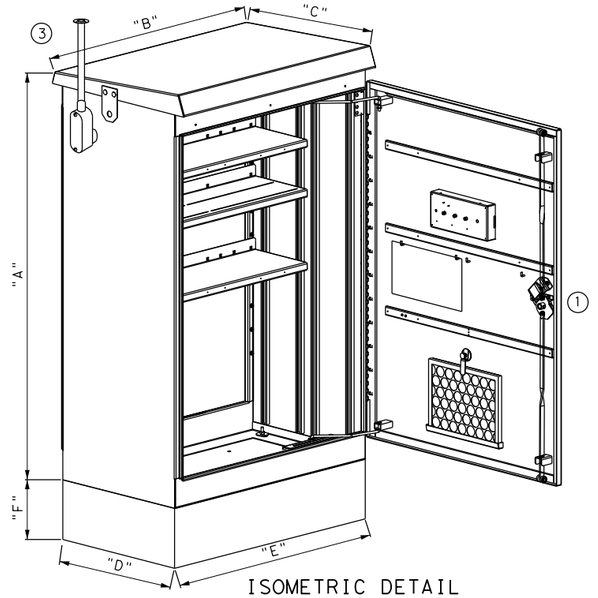
(SIZE 6 CONFIGURATION 4)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR	TEXAS	YKM	DEWITT, ETC.	47
CHECK	CONTROL	SECTION	JOB	
NCN	0913	00	114	
CHECK				
KCK				

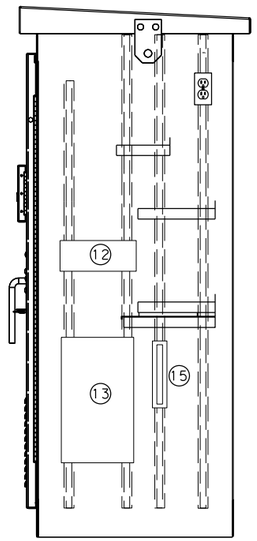
PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwroad\daniel.rejcek\d0124126\YKM_SHT_902_Cabinet Detail.dgn
40.0000 ft / in.
BY: daniel.rejcek



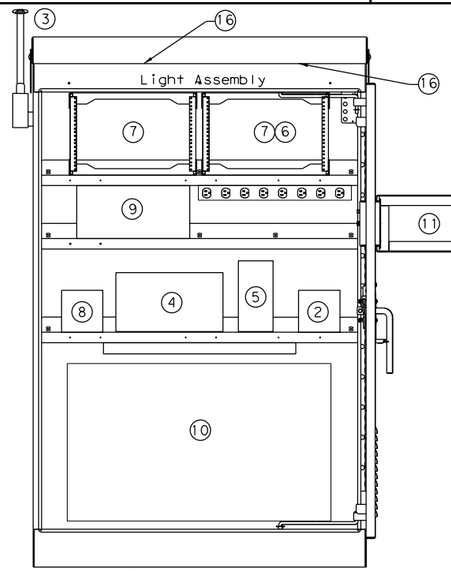
FRONT ELEVATION



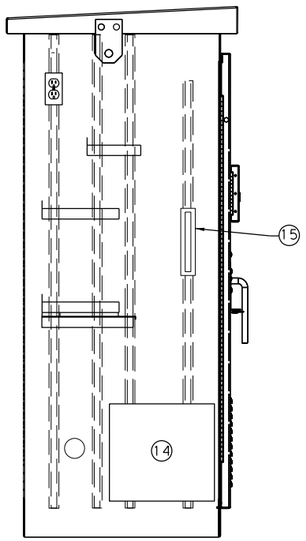
ISOMETRIC DETAIL



INSIDE LEFT WALL



INSIDE FRONT



INSIDE RIGHT WALL

CABINET EQUIPMENT CONFIGURATION

GENERAL NOTES:

1. External cabinet features and door configuration shown is diagrammatic in nature and intended to represent a typical ground mounted cabinet setup.
2. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Hardware needed for each cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate traffic signal hardware in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
3. All dimensions are approximate and represent minimum dimensions.
4. Remove No. 2 lock and install smart lock per manufacturer instructions.
5. The contractor will be responsible for ensuring connectivity of cellular router. Install cellular router and antenna per manufacturer instructions.
6. Install signal controller and MMU per manufacturer instructions.
7. Contractor shall submit shop drawings showing equipment placement and configuration.
8. Contractor shall verify bolt pattern of new cabinet matches bolt pattern of existing foundation and riser base.

REFERENCE KEY NOTES:

1. Smart Lock
2. Cellular Router
3. Cellular Router Antenna
4. Traffic Signal Controller
5. Malfunction Management Unit (MMU)
6. Detection Card Equipment
7. 4RU (Size 5/6) or 7RU (Size 7) EIA 19" Rack
8. Power Supply
9. Ethernet Switch
10. Load Switch Bay and Back Panel
11. Police Panel
12. Preemption Panel (when required)
13. Loop Detector Panel
14. Power Distribution Panel
15. Light Assembly (Side Wall Mount)
16. Fan Assembly (Min. 2)

Cabinet Size	Cabinet Dimensions			Riser Dimensions		
	"A"	"B"	"C"	"D"	"E"	"F"*
	IN	IN	IN	IN	IN	IN
Size 7	72	44	24	24	44	VARIES

* Riser Height Option 12", 18" or 24"

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

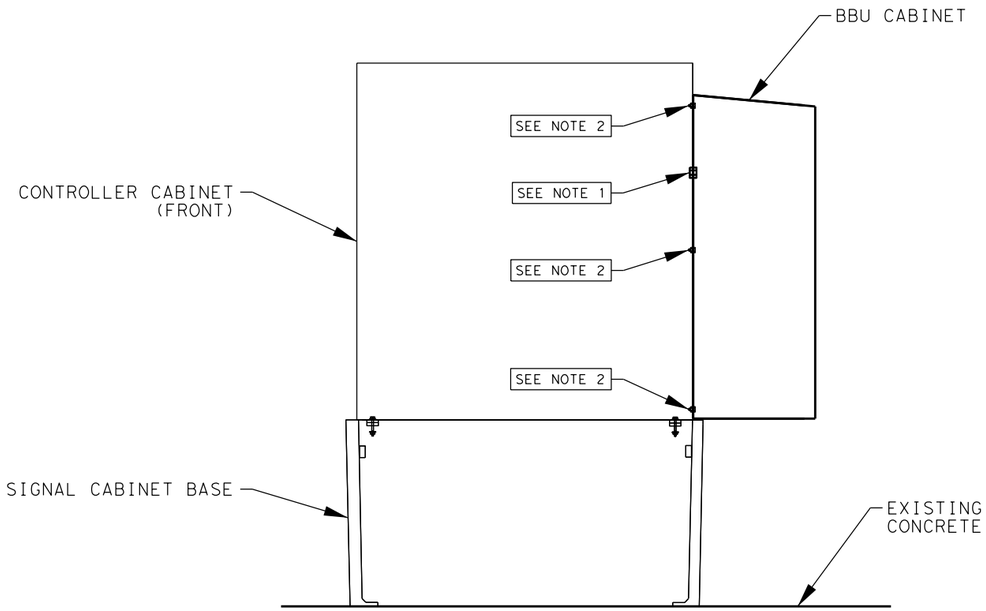
TRAFFIC SIGNAL CABINET INSTALLATION DETAILS

(SIZE 7 CONFIGURATION 4)

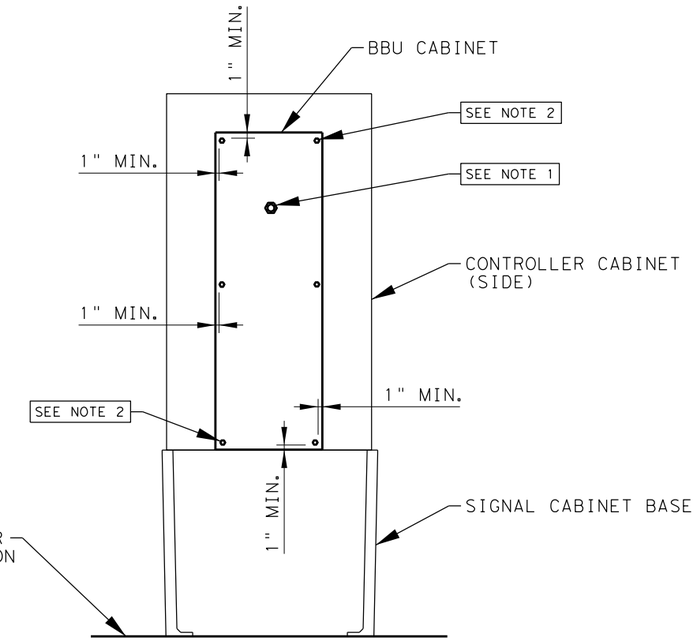
SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
DMR				
CHECK	TEXAS	YKM	DEWITT, ETC.	47A
NCN	CONTROL	SECTION	JOB	
CHECK	0913	00	114	
KCK				

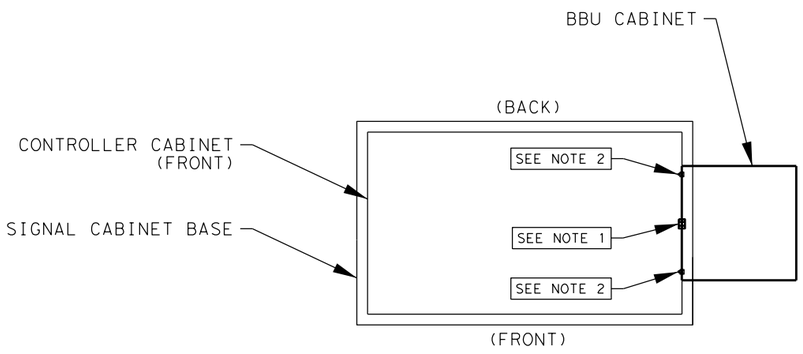
PLOTTED: 5/26/2021
FILENAME: c:\pwworking\kha\pwprod\daniel.rejcek\d0124126\YKM_SHT_903_Cabinet Detail.dgn
40.0000 ft / in.
BY: daniel.rejcek



ELEVATION VIEW
(BBU)



SIDE VIEW
(BBU)



PLAN VIEW
(BBU)

NOTES:

1. INSTALL 1½" ALL THREAD NIPPLE WITH BONDING BUSHINGS ON BOTH ENDS.
2. INSTALL 6 EA OF ½" X 1½" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND BBU).
3. USE SILICON SEALANT TO SEAL BETWEEN THE CABINETS OF THE CONTROLLER AND BBU UNIT.
4. USE EXISTING BATTERY BACKUP CONDUCTORS TO CONNECT THE BBU EQUIPMENT TO THE NEW TRAFFIC SIGNAL CABINET AND ENSURE THAT THE BBU IS FULLY OPERATIONAL. COORDINATE WITH THE DISTRICT IF ANY BBU EQUIPMENT IS INACTIVE OR MISSING.
5. THE ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 680.

LEGEND:

BBU = BATTERY BACKUP UNIT.

5/26/2021

STATE OF TEXAS
NATHAN C. NEW
101204
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

TRAFFIC SIGNAL UPGRADES

BATTERY BACKUP UNIT INSTALLATION DETAILS

(EXTERNAL SIDE MOUNT CABINET)

N. T. S.

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DMR	6			VARIOUS
GRAPHICS DMR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK NCN	TEXAS	YKM	DEWITT, ETC.	48
CHECK KCK	CONTROL 0913	SECTION 00	JOB 114	

DATE:
FILE:

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

FILE:	ed1-14.dgn	DN: .	CK: .	DW: .	CK: .
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0913	00	114	VARIOUS
		DIST	COUNTY		SHEET NO.
		YKM	DEWITT, ETC.		49

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.

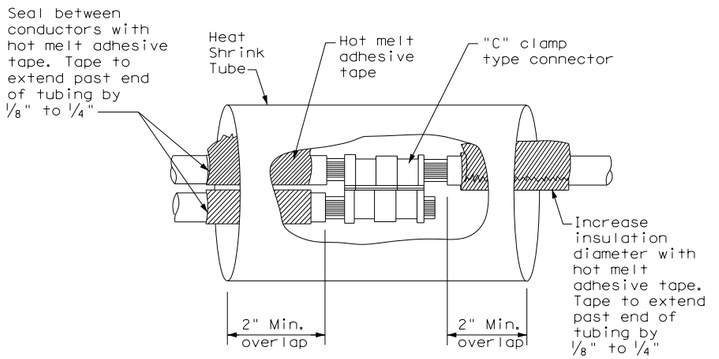
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

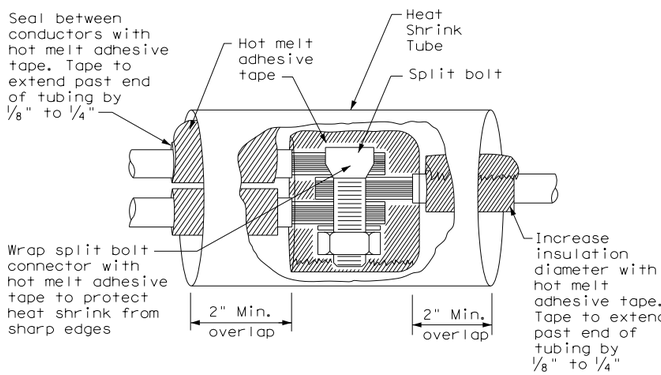
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

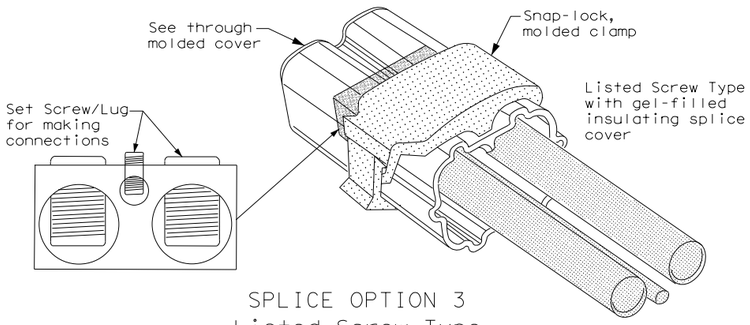
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

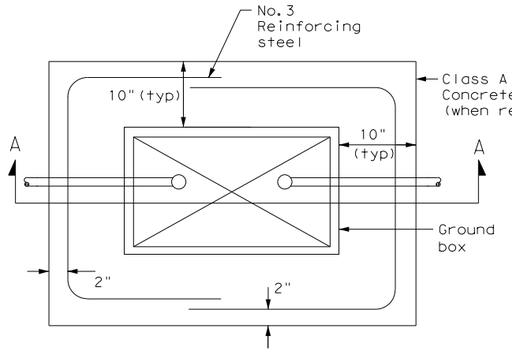
ED(3)-14

FILE:	ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0913	00	114	VARIOUS
		DIST	COUNTY		SHEET NO.
		YKM	DEWITT, ETC.		50

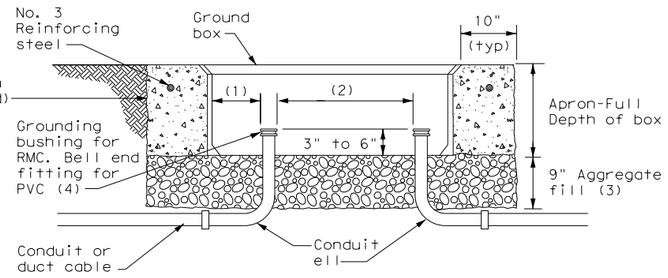
71C

DATE:
FILE:

DATE:
FILE:



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.

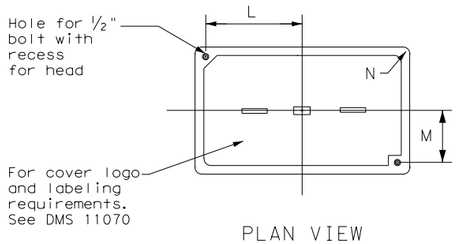
(2) Maintain sufficient space between conduits to allow for proper installation of bushings.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

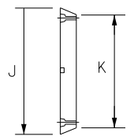
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

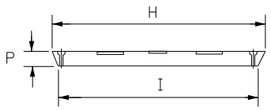
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



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

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		51

71D

DATE:
FILE:

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

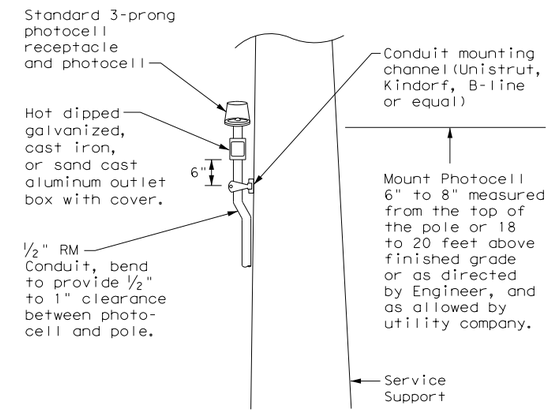
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

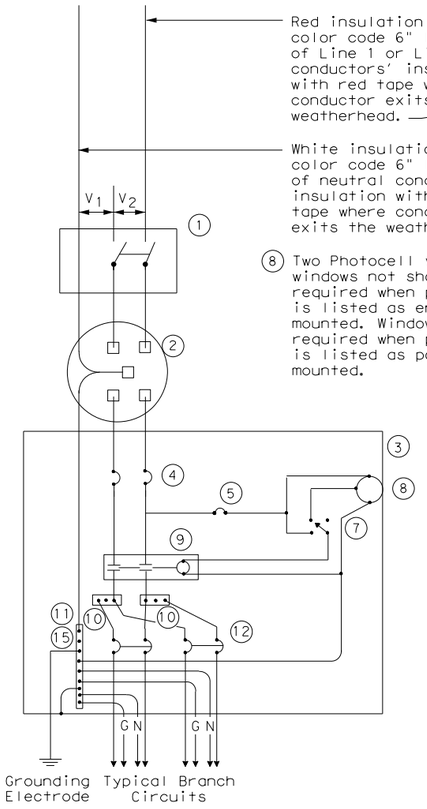
ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

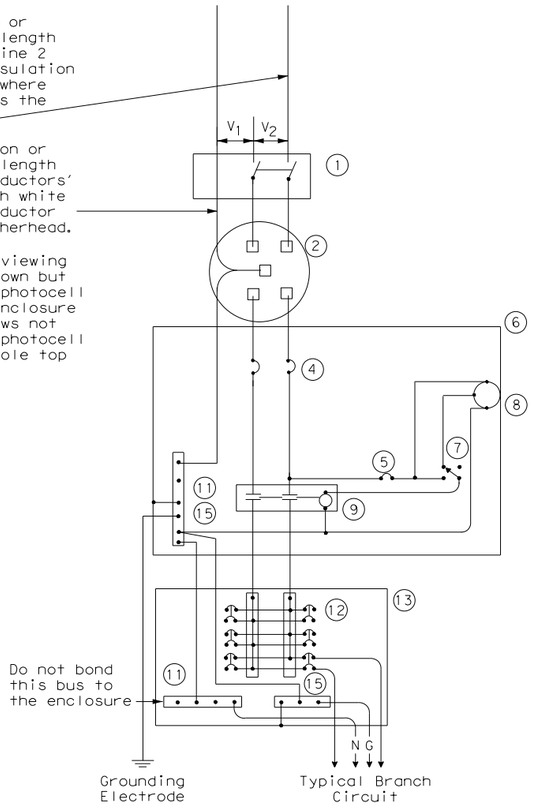
FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		52

71E

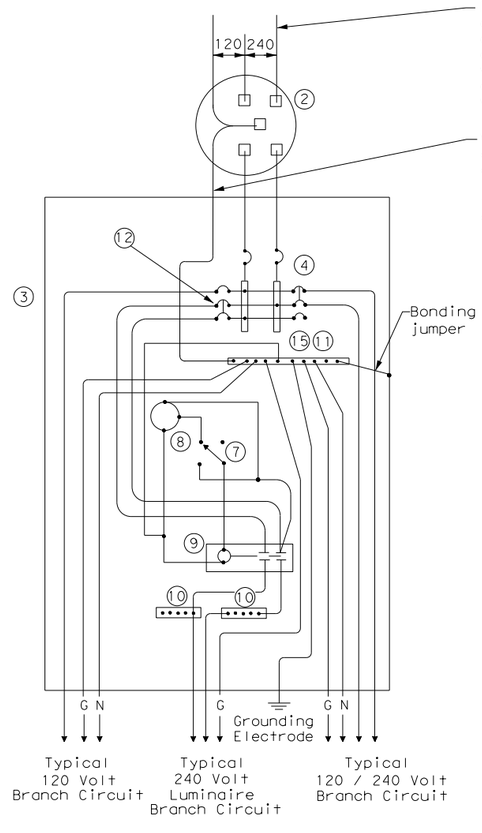
DATE:
FILE:



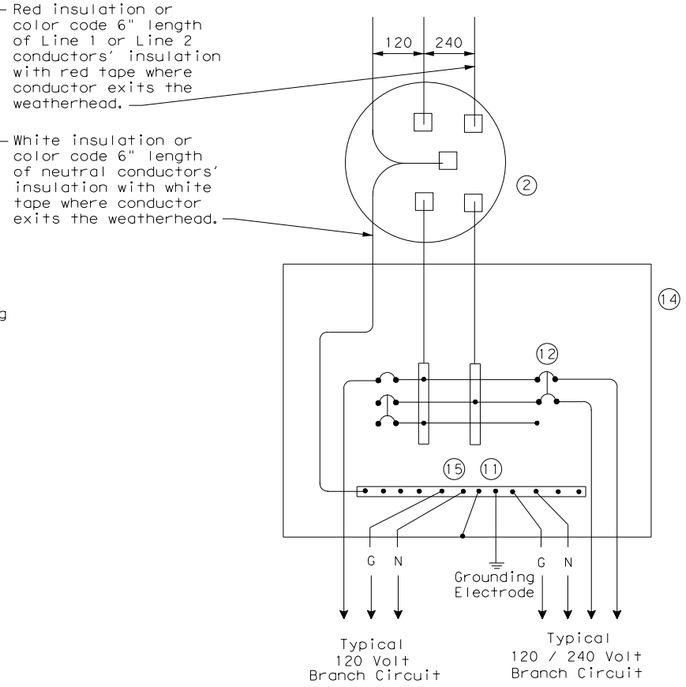
SCHEMATIC TYPE A
THREE WIRE



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

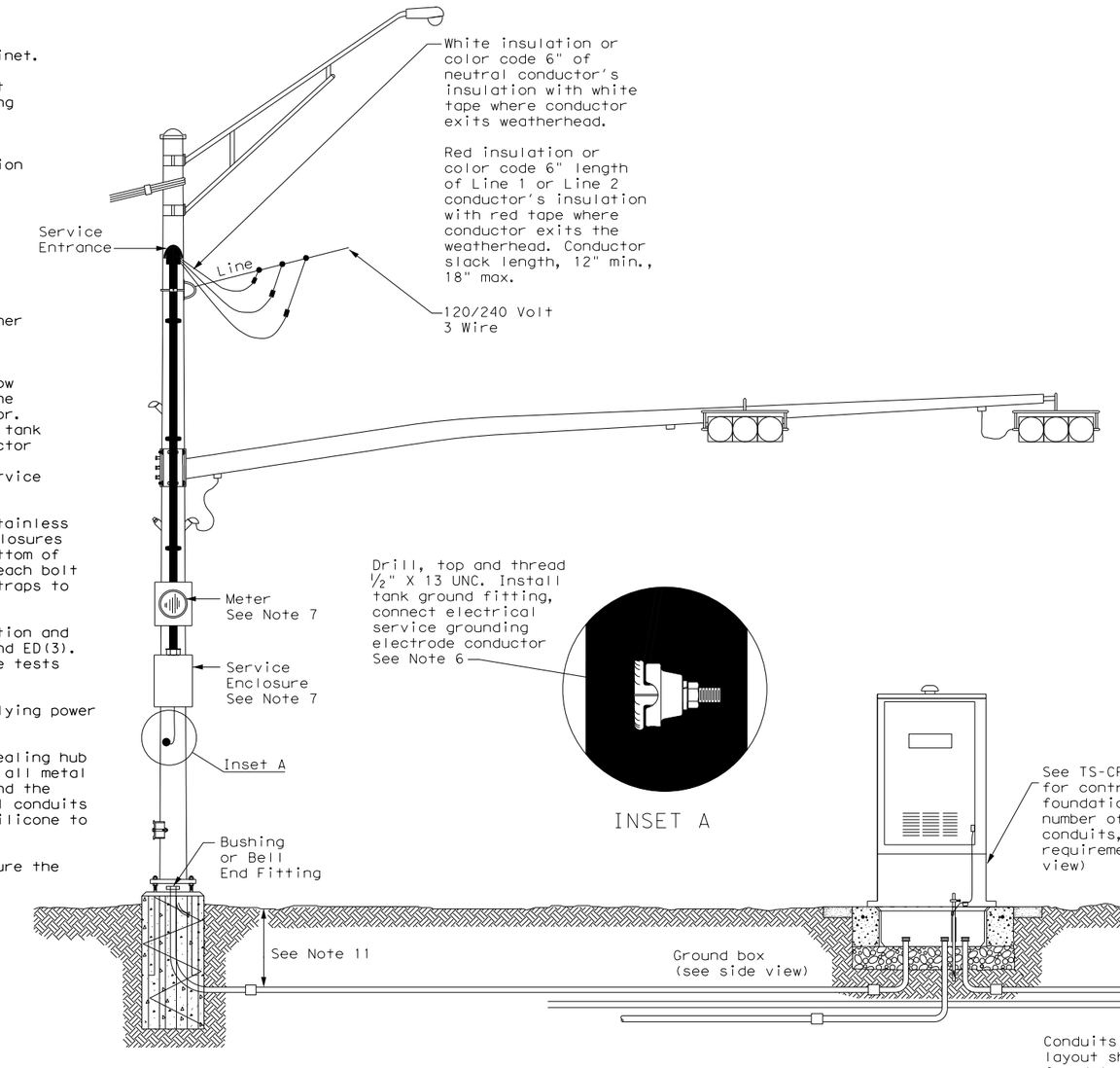
FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		53

71F

DATE:
FILE:

TRAFFIC SIGNAL NOTES

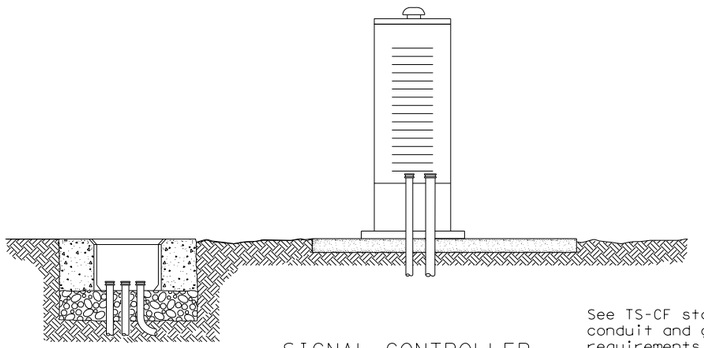
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material 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

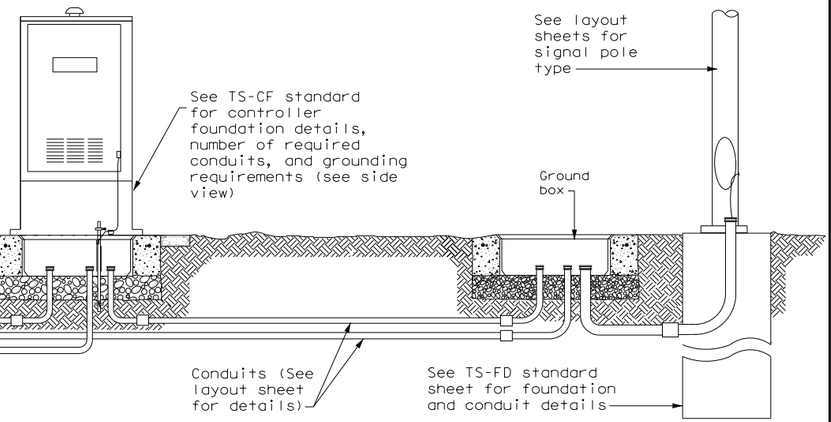
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

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

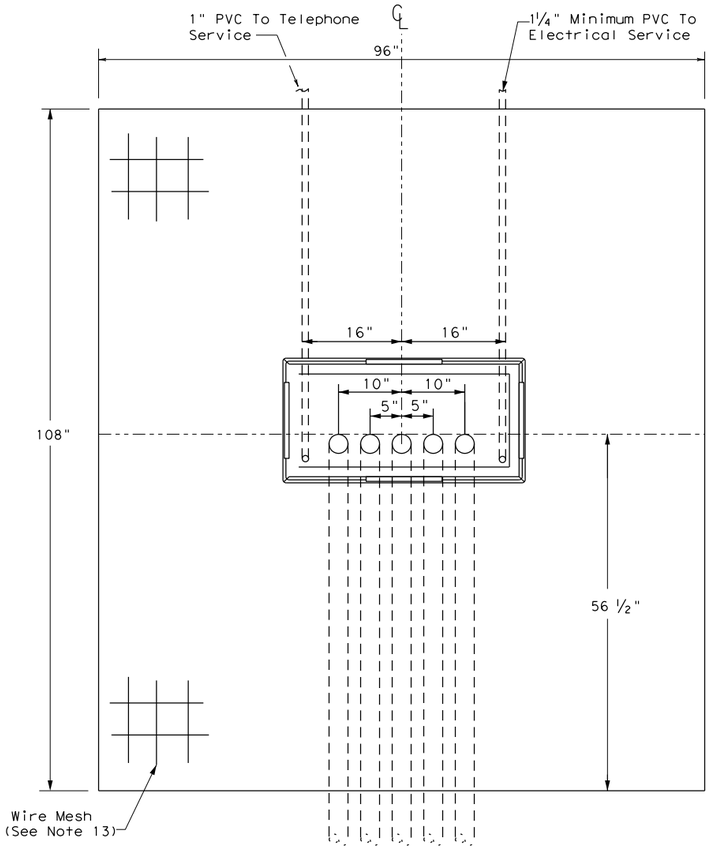
Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

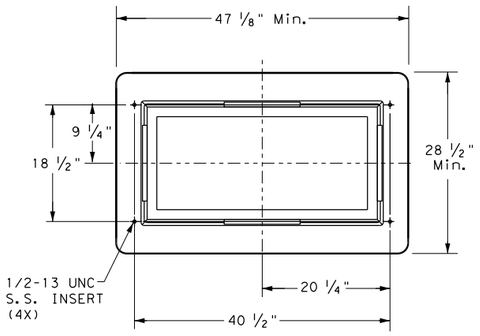
ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		54

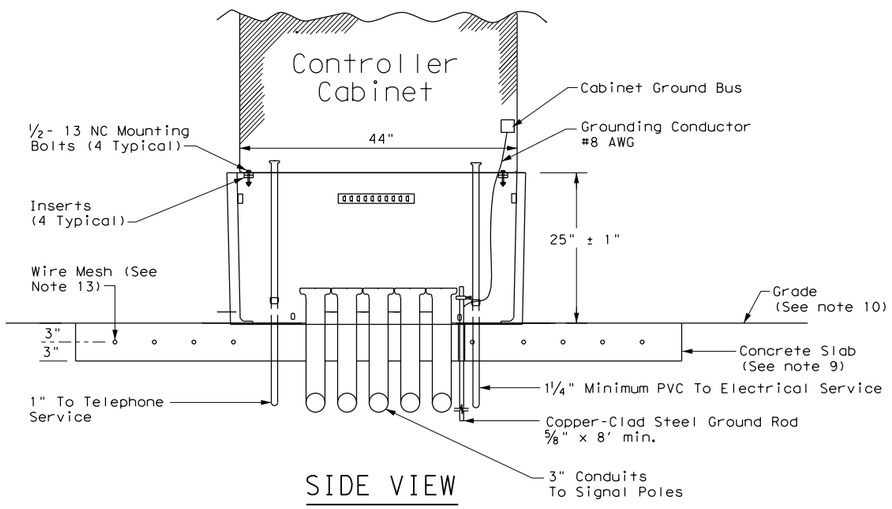
71H



TOP VIEW



CABINET BASE



SIDE VIEW

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 Safety 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 1#2"-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 9#16x 3#16inch 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 1#2"-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. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. 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.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. 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.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. 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.
16. 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.
17. 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.
18. 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:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

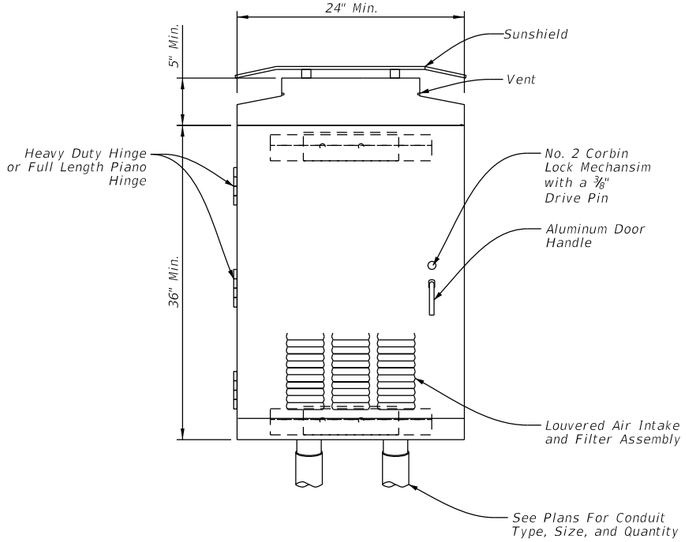
Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

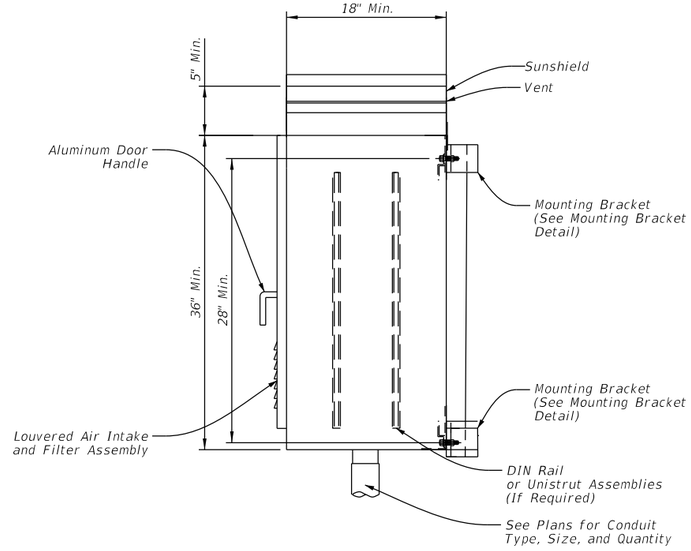
FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
12-04 2-21	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		55

DATE: 5/26/2021
FILE: c:\pwworking\khq\pwprod\daniel.rejcek\d0126033\TS-CF-21.dgn



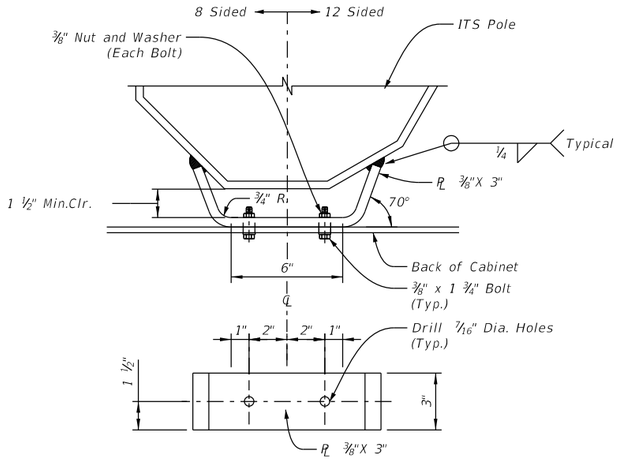
Pole Mounted Cabinet – Type 2 Front View

Not to Scale



Pole Mounted Cabinet – Type 2 Side View

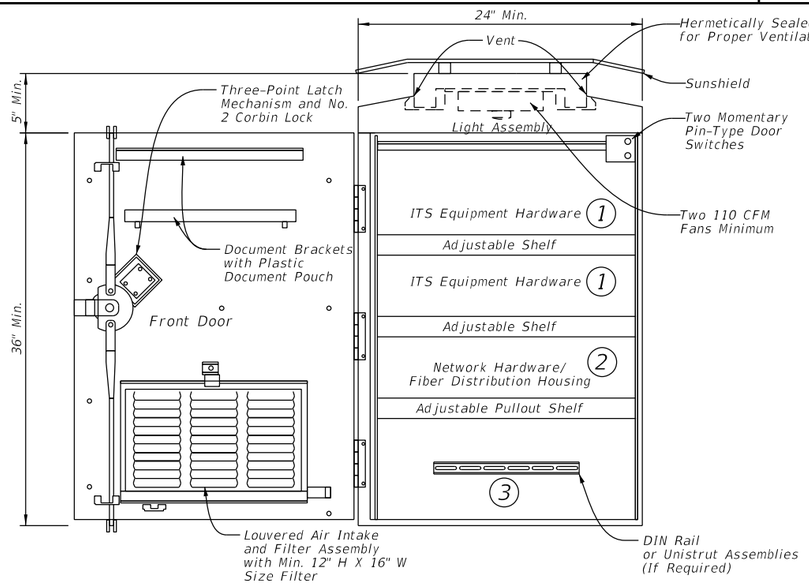
Not to Scale



Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

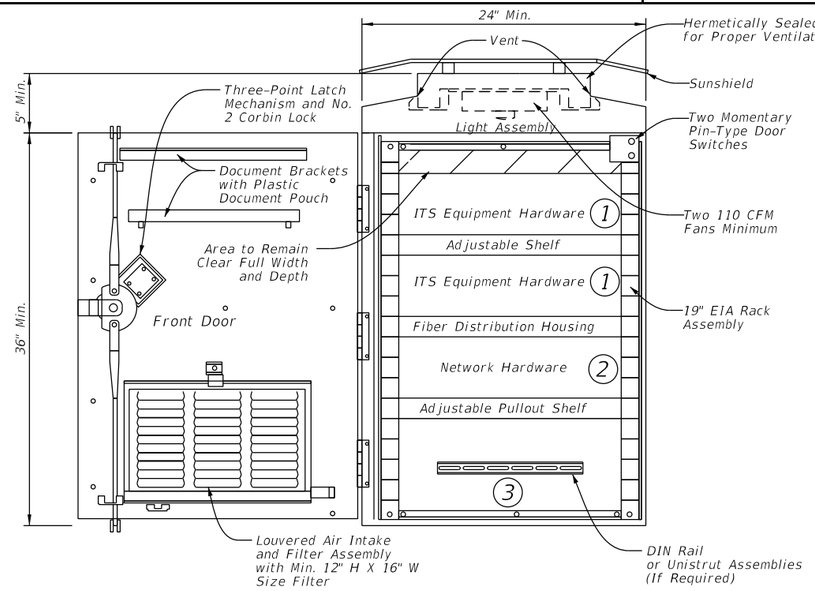
Mounting Bracket Detail

Not to Scale



Interior – Type 2 Without 19" EIA Rack – Front View

Not to Scale



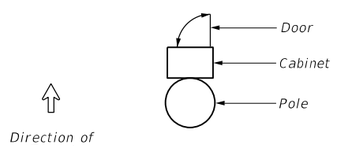
Interior – Type 2 With 19" EIA Rack – Front View

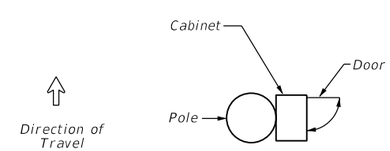
Not to Scale

Typical Equipment Layout Legend	
	Example Equipment
1	CCTV Interface Panel, Radar Vehicle Sensing Device (RVSD) Equipment, DMS/LCS Controller Environmental Sensor Station (ESS) Equipment, Bluetooth Equipment, or ITS Radio Equipment (See General Note 1)
2	Ethernet Switch, Video Encoder, Terminal Server, Fiber Optic Transceivers, or Media Conversion Equipment (See General Note 1)
3	Power Distribution Assembly, Service Entrance Breakers, Primary AC Power, Auxiliary Power Strip, Ground Bus Bar Surge Protection Equipment

General Notes:

1. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred Type 2 pole mounted cabinet setup. Hardware needed for each Type 2 cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
2. Mount cabinet as detailed on ITS(15) or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic.
3. For ITS pole sites located on slopes greater than 4H:1V, mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
4. All dimensions are approximate and represent minimum cabinet dimensions.
5. Provide conduit entrances at the bottom of the cabinet.
6. Paid under Special Specification "ITS Pole with Cabinet" (Configuration 1) without 19" EIA rack. Paid under Special Specification "ITS Pole with Cabinet" (Configuration 2) with 19" EIA rack.





Orientation of Type 2 Cabinet on ITS Pole (Typical)

Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

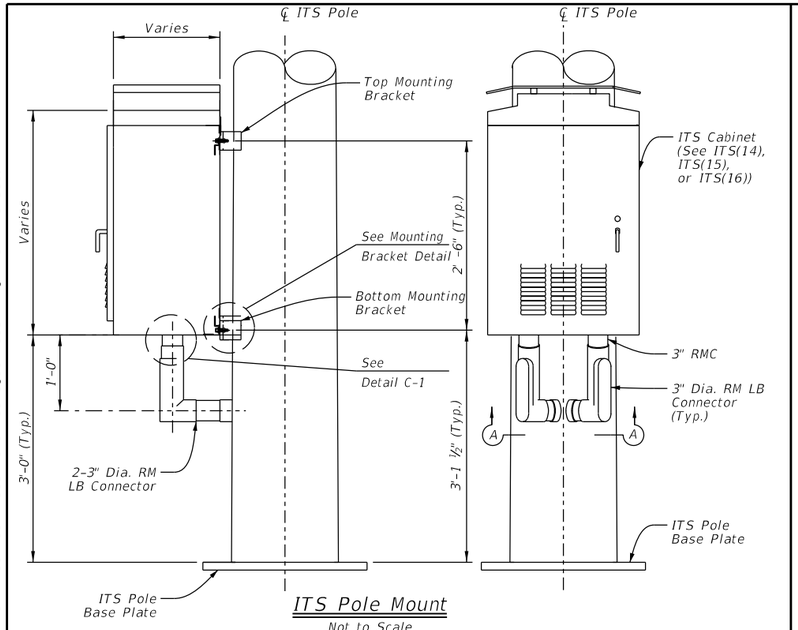
ITS POLE MOUNTED CABINET TYPE 2 DETAILS

ITS(15)-15

FILE: its(15)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		56

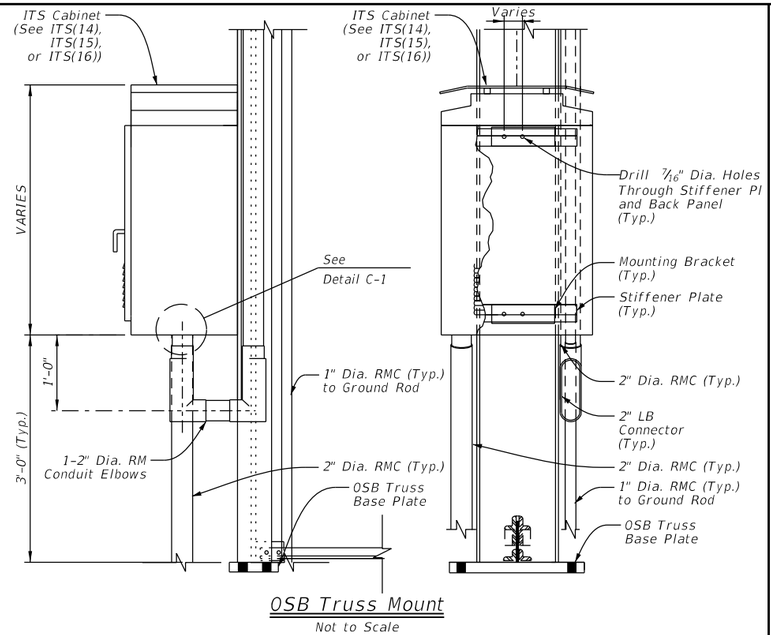
DATE: DATE TIME
FILE: DOCUMENT NAME

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.



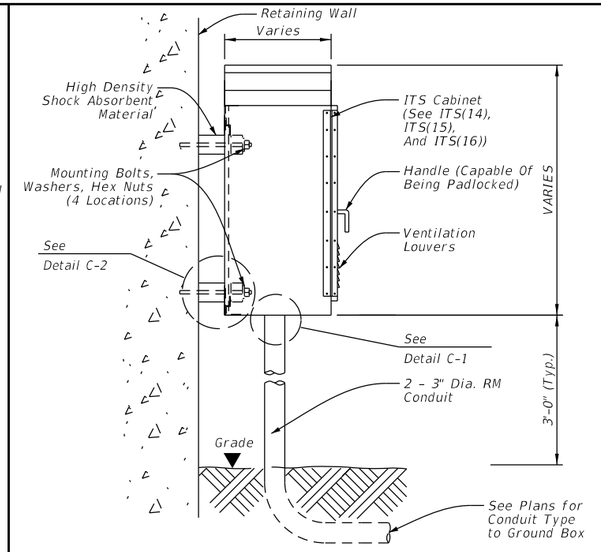
ITS Pole Mount

Not to Scale



OSB Truss Mount

Not to Scale



Retaining Wall Mount

Not to Scale

Section A-A

Not to Scale

Detail C-1

Detail C-2

Detail C-1 and C-2

Not to Scale

Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

Mounting Bracket Detail

Not to Scale

General Notes:

1. Mount cabinet as detailed on ITS(14), ITS(15), ITS(16), or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic.
2. For ITS pole sites located on slopes greater than 4V:1H, mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
3. All dimensions are approximate and represent minimum dimensions.
4. Provide conduit entrances at the bottom of the cabinet.

DATE: DATE TIME
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

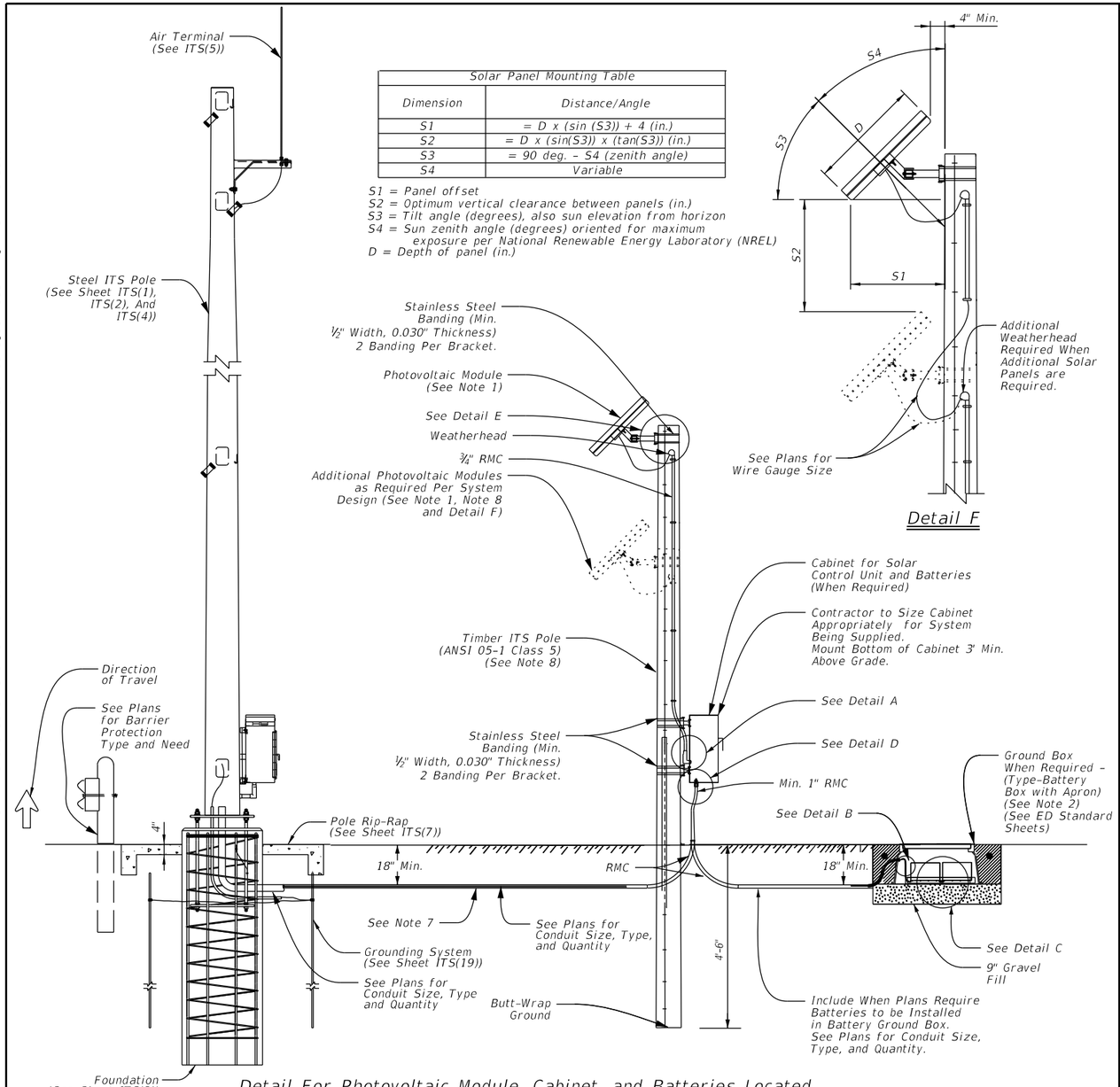
ITS POLE MOUNTED CABINET MISC. MOUNTING DETAILS

ITS(17)-15

FILE: its(17)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		57

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: DATE TIME
FILE: DOCUMENT NAME



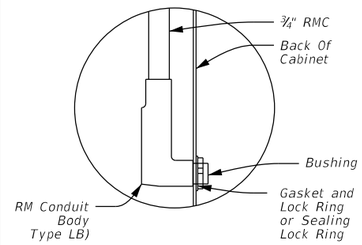
Solar Panel Mounting Table	
Dimension	Distance/Angle
S1	= D x (sin (S3)) + 4 (in.)
S2	= D x (sin(S3)) x (tan(S3)) (in.)
S3	= 90 deg. - S4 (zenith angle)
S4	Variable

S1 = Panel offset
S2 = Optimum vertical clearance between panels (in.)
S3 = Tilt angle (degrees), also sun elevation from horizon
S4 = Sun zenith angle (degrees) oriented for maximum exposure per National Renewable Energy Laboratory (NREL)
D = Depth of panel (in.)

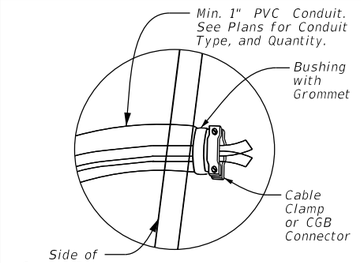
Detail F

Detail For Photovoltaic Module, Cabinet, and Batteries Located Out of Clear Zone on Timber Pole

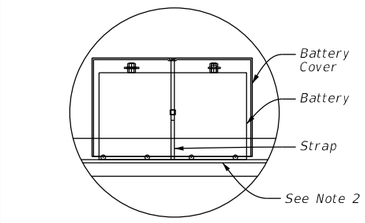
Not to Scale



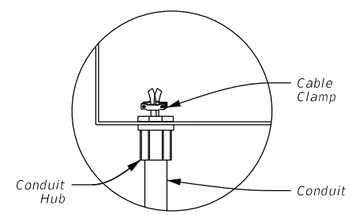
Detail A



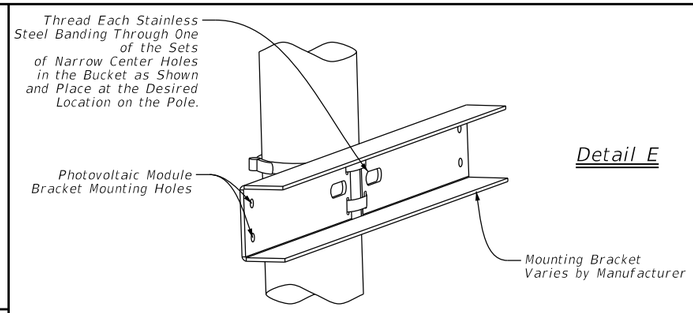
Detail B



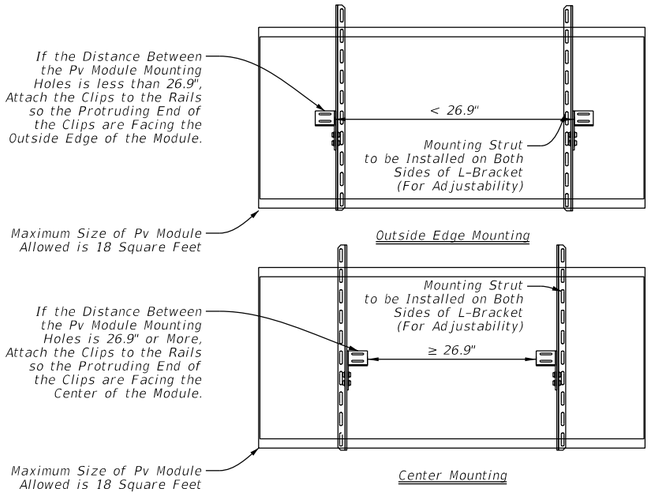
Detail C



Detail D



Detail E



Detail G

Explanation of ITS Solar Power System Descriptive Code

SPS X_1 (X_2W) X_3W (X_4AH) X_5xX_6A (X_7)

- Construction Application
  - INS = Install
  - REM = Remove
  - REL = Relocate
- Total System Load Capacity (Watts)
- Total Solar Panel Capacity (Watts)
- Total Battery Capacity (Amp Hours)
- No. of Charge Controllers (EA) x Amperage Capacity of Each (Amps)
- Cabinet Installation Type
  - 1 = ITS Pole Mounted Cabinet (Type 1, 2, or 3)
  - 2 = Manufacturer Supplied on Pedestal Pole
  - 3 = Manufacturer Supplied on Timber Pole

Example: SPS INS (60W) 1440W (750AH) 3x50A (1)

General Notes:

1. Orient photovoltaic module for optimum exposure to sunlight (face to the south) per National Renewable Energy Laboratory (NREL) guidelines. Prior to installation, check the location to ensure there is no overhead obstruction that would block the Photovoltaic Module from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
2. When required for batteries to be installed in a battery ground box, place the batteries on a 3/16" thick plastic sheet and connect batteries 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" thick plastic sheet will be subsidiary to Special Specification "ITS Solar Power System."
3. When required for batteries to be installed in an pole mounted cabinet, wire batteries according to manufacturer's recommendations. Provide the number of batteries as required by the manufacturer. Stack the batteries in the cabinet on shelves with 1" vertical separation.
4. See Electrical Details (ED) standard sheets for additional requirements regarding the installation of ground boxes/battery boxes, and conduit.
5. Use materials specifically designed for attaching cabinets, photovoltaic modules, etc., to poles.
6. See Special Specification "ITS Solar Power System" for further requirements.
7. See plans for electrical conductor circuit size from solar cabinet to ITS pole mounted cabinet. Circuit to be designed based off of ITS equipment design load and allowable 5% voltage drop over distance from the solar assembly to ITS cabinet.
8. Provide 20' or 40' in length ANSI 05-1 Class 5 timber poles treated per Item 627, "Treated Timber Poles". Install pole as shown or at the edge of the Right of Way. If more than two photovoltaic modules are needed provide the taller timber pole. Timber pole will be subsidiary to Special Specification "ITS Solar Power System."
9. Use materials specifically designed for attaching cabinets, photovoltaic modules, etc., to poles.
10. See sheets ITS(1), ITS(2), and ITS(4) "ITS Pole Details" for further information regarding the steel ITS pole assembly.
11. Pv = Photovoltaic
12. Use hardware specifically designed for attaching equipment (i.e., cabinet, photovoltaic module, etc.) to pole as recommended by equipment manufacturer. Provide mounting details for approval.

Texas Department of Transportation

Traffic Operations Division Standard

ITS SOLAR POWER SYSTEM WOOD POLE MOUNTING DETAILS

ITS(26)-15

FILE: its(26)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC.		58

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☒ No Action Required ☐ Required Action

Action No.

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.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

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

☒ No Action Required ☐ Required Action

VI. GENERAL NOTES

THE DEPARTMENT HAS DETERMINED THAT A USACE NATIONWIDE OR INDIVIDUAL PERMIT IS NOT NECESSARY FOR THE PROJECT SINCE ALL WORK SHALL BE CONDUCTED OUTSIDE THE USACE JURISDICTIONAL AREAS. ANY IMPACTS TO THESE JURISDICTIONAL AREAS BY THE CONTRACTOR WITHOUT A USACE PERMIT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. IF THE CONTRACTOR DEEMS IT NECESSARY TO IMPACT THE USACE JURISDICTIONAL AREAS, THEN IT BECOMES THE CONTRACTOR'S ENTIRE RESPONSIBILITY TO CONSULT WITH THE USACE PERTAINING TO THE NEED FOR A NATIONWIDE OR INDIVIDUAL PERMIT. TXDOT WILL THEN HOLD THE CONTRACTOR RESPONSIBLE FOR FOLLOWING ALL CONDITIONS OF THE APPROVED PERMIT.

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

VII. 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.

VIII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	00	114	VARIOUS
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	YKM	DEWITT		59
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

DATE:
FILE:

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

DOT #: 743314Y
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD
Operating RR Company at Track: UNION PACIFIC RAILROAD
RR MP: 98.940
RR Subdivision: GLIDDEN
City: WEIMAR
County: COLORADO
CSJ at this Crossing: 0913-00-114
Highway/Roadway name crossing the railroad: FM 155 (CENTER)
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0%

Scope of Work at this Crossing to Be Performed by State Contractor:
TRAFFIC SIGNAL UPGRADE TO US 90 @ FM 155 (CENTER ST.). NO WORK TO BE PERFORMED IN RAILROAD RIGHT OF WAY.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND INSPECTION

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

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

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Railroad Company at no cost, because this railroad exists via TxDOT spur permit
☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

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

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

☐ OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☐ Not Required
☒ Required: Contact Information for Construction Inspections:

BRANDON M. KASPER (MANAGER OF SPECIAL PROJECT) - BENESCH
CELL: (832) 312-1923
EMAIL: bkasper@benesch.com

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

☐ Required
☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies:

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call UNION PACIFIC RAILROAD
Railroad Emergency Line at 888-877-7267
Location: DOT 743314Y
RR Milepost: 98.940
Subdivision: GLIDDEN

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC		60

DATE:
FILE:

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

DOT #: 022809J
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF RAILWAY
Operating RR Company at Track: BNSF RAILWAY
RR MP: 106.580
RR Subdivision: GALVESTON
City: BELLVILLE
County: AUSTIN
CSJ at this Crossing: 0913-00-114
Highway/Roadway name crossing the railroad: HACIENDA ST.
# of regularly scheduled trains per day at this crossing: 30
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0%

Scope of Work at this Crossing to Be Performed by State Contractor:
TRAFFIC SIGNAL UPGRADE TO SH 36 @ HACIENDA STREET. NO WORK TO BE PERFORMED IN RAILROAD RIGHT OF WAY.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND INSPECTION

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

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

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

- ☐ Expected
- ☒ Not Expected

Flagging services will be provided by:

- ☐ Railroad Company: TxDOT will pay flagging invoices
- ☐ Railroad Company at no cost, because this railroad exists via TxDOT spur permit
- ☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- ☐ Not Required
- ☒ Required: Contact Information for Construction Inspections:

DANIEL CARDIFF (SIGNAL SUPERVISOR) WITH BNSF RAILWAY
CELL: (817) 964-8741
EMAIL: daniel.cardiff@bnsf.com

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

- ☐ Required
- ☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

- ☒ Not Required
- ☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- ☐ Required: Contractor to obtain (see Item 5, Article 8.4)
  With the following railroad companies:

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- ☒ Not Required
- ☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call BNSF RAILWAY
Railroad Emergency Line at 800-832-5452 OPTION 1
Location: DOT 022809J
RR Milepost: 106.580
Subdivision: GALVESTON

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:	
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS 3/2020	0913	00	114	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	YKM	DEWITT,ETC		61	

DATE:
FILE:

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

DOT #: 743313S
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD
Operating RR Company at Track: UNION PACIFIC RAILROAD
RR MP: 98.870
RR Subdivision: GLIDDEN
City: WEIMAR
County: COLORADO
CSJ at this Crossing: 0913-00-114
Highway/Roadway name crossing the railroad: MECHANIC ST.
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0%

Scope of Work at this Crossing to Be Performed by State Contractor:
TRAFFIC SIGNAL UPGRADE TO US 90 @ MECHANIC STREET. NO WORK TO BE PERFORMED IN RAILROAD RIGHT OF WAY.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND INSPECTION

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

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

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Railroad Company at no cost, because this railroad exists via TxDOT spur permit
☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

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

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

☐ OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☐ Not Required
☒ Required: Contact Information for Construction Inspections:

BRANDON M. KASPER (MANAGER OF SPECIAL PROJECT) - BENESCH
CELL: (832) 312-1923
EMAIL: bkasper@benesch.com

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

☐ Required
☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies:

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call UNION PACIFIC RAILROAD
Railroad Emergency Line at 888-877-7267
Location: DOT 743313S
RR Milepost: 98.870
Subdivision: GLIDDEN

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC		62

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

DOT #: 743435W
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: KCS RAILWAY
Operating RR Company at Track: TEXAS MEXICAN RAILWAY
RR MP: 931.190
RR Subdivision: ROSENBERG
City: EL CAMPO
County: WHARTON
CSJ at this Crossing: 0913-00-114
Highway/Roadway name crossing the railroad: MONSARETTE ST.
# of regularly scheduled trains per day at this crossing: 10
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0%

Scope of Work at this Crossing to Be Performed by State Contractor:
TRAFFIC SIGNAL UPGRADE TO SH 71 @ MONSARETTE STREET. NO WORK TO BE PERFORMED IN RAILROAD RIGHT OF WAY.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND INSPECTION

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

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

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

- ☐ Expected
- ☒ Not Expected

Flagging services will be provided by:

- ☐ Railroad Company: TxDOT will pay flagging invoices
- ☐ Railroad Company at no cost, because this railroad exists via TxDOT spur permit
- ☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- ☐ Not Required
- ☒ Required: Contact Information for Construction Inspections:
  RYAN TUCKER (KCS SIGNAL SUPERVISOR) - C: (402) 807-6384
  EMAIL: RTucker@KCSouthern.com
  NOTE: KCS needs at least 2 weeks prior notice to be available for the preemption cut over inspection.

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

- ☐ Required
- ☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

- ☒ Not Required
- ☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- ☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- ☒ Not Required
- ☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call KCS RAILWAY
Railroad Emergency Line at 877-527-9464
Location: DOT 743435W
RR Milepost: 931.190
Subdivision: ROSENBERG

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:		
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0913	00	114	VARIOUS		
3/2020	DIST	COUNTY		SHEET NO.		
	YKM	DEWITT, ETC		63		

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

DOT #: 763910D
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD
Operating RR Company at Track: UNION PACIFIC RAILROAD
RR MP: 119.560
RR Subdivision: GLIDDEN
City: FLATONIA
County: FAYETTE
CSJ at this Crossing: 0913-00-114
Highway/Roadway name crossing the railroad: SH 95 (PENN ST.)
# of regularly scheduled trains per day at this crossing: 24
# of switching movements per day at this crossing: 4
% of estimated contract cost of work within railroad ROW: 0%

Scope of Work at this Crossing to Be Performed by State Contractor:
TRAFFIC SIGNAL UPGRADE TO US 90 @ SH 95 (PENN ST.). NO WORK TO BE PERFORMED IN RAILROAD RIGHT OF WAY.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING AND INSPECTION

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

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

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

- ☐ Expected
- ☒ Not Expected

Flagging services will be provided by:

- ☐ Railroad Company: TxDOT will pay flagging invoices
- ☐ Railroad Company at no cost, because this railroad exists via TxDOT spur permit
- ☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- ☐ Not Required
- ☒ Required: Contact Information for Construction Inspections:

BRANDON M. KASPER (MANAGER OF SPECIAL PROJECT) - BENESCH
CELL: (832) 312-1923
EMAIL: bkasper@benesch.com

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

- ☐ Required
- ☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

- ☐ Not Required
- ☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- ☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies:

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- ☒ Not Required
- ☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call UNION PACIFIC RAILROAD
Railroad Emergency Line at 888-877-7267
Location: DOT 763910D
RR Milepost: 119.560
Subdivision: GLIDDEN

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT,ETC		64

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

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

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

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

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

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

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

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

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

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC		65

3.09 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.11 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.12 COMMUNICATIONS AND SIGNAL LINES

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

3.13 TRAFFIC CONTROL

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

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

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

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

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

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

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

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

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of ¼ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

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

3.16 CLEANING OF RIGHT-OF-WAY

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

DATE:
FILE:

Texas Department of Transportation

Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0913	00	114	VARIOUS
	DIST	COUNTY		SHEET NO.
	YKM	DEWITT, ETC		66