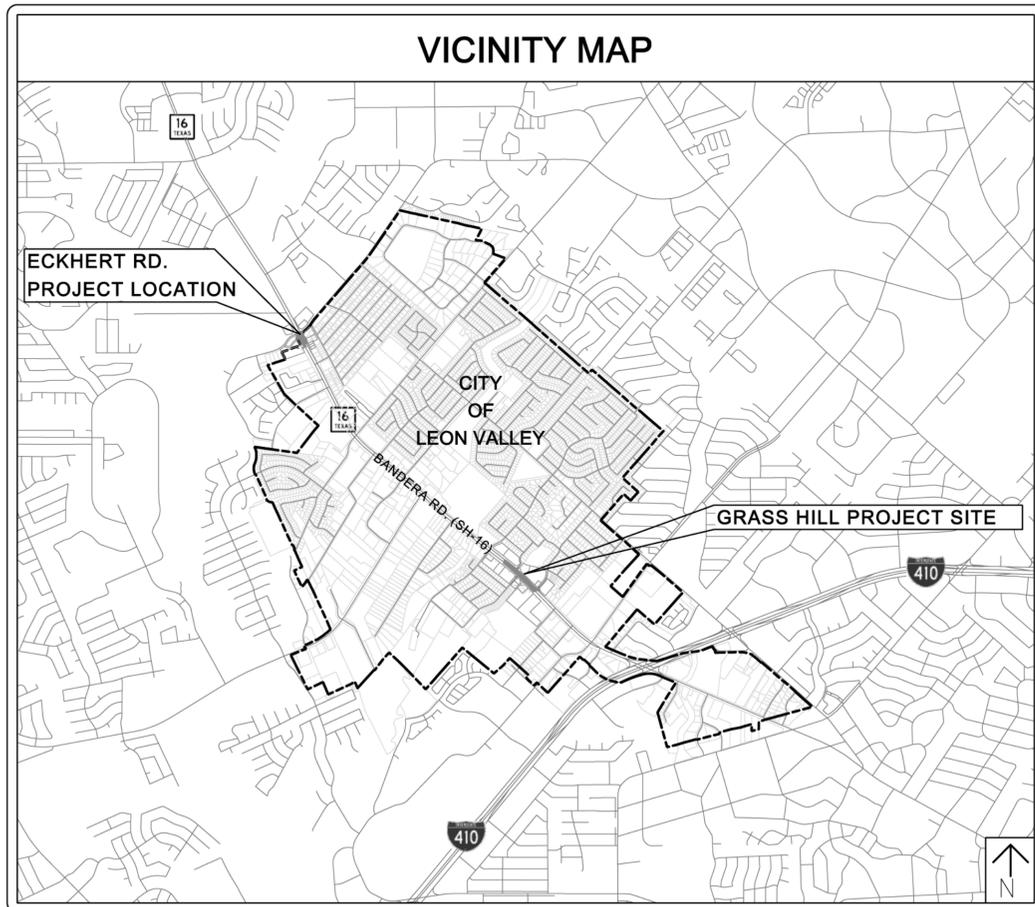


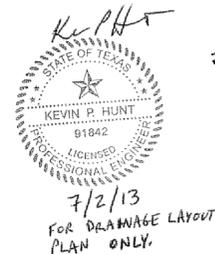
# BANDERA ROAD (SH-16) GATEWAY MONUMENT IMPROVEMENTS

CITY OF LEON VALLEY, TEXAS  
FOR BIDDING AND CONSTRUCTION  
AUGUST 2013

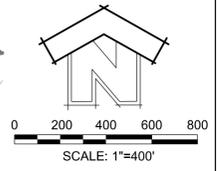
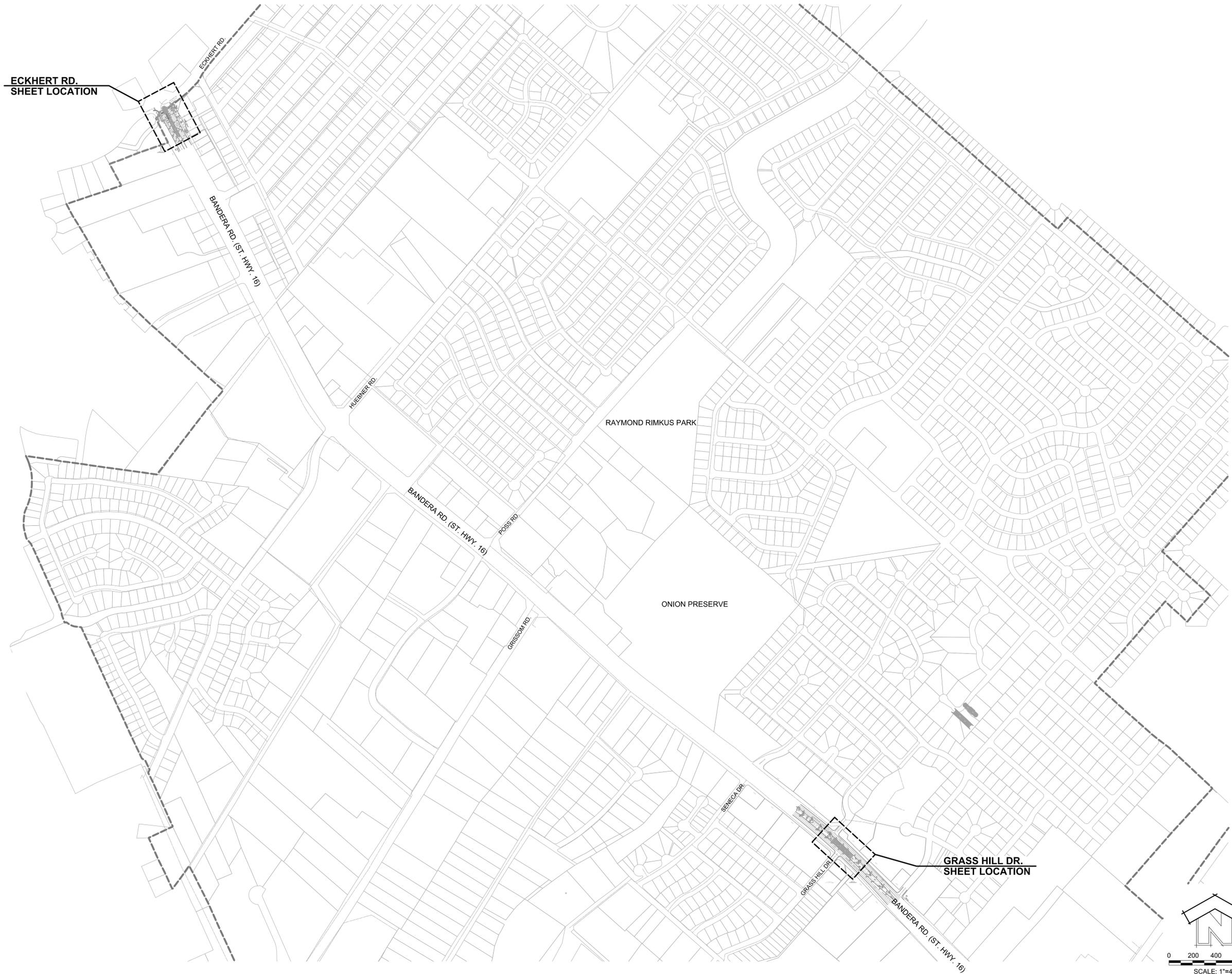


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**CITY OF LEON VALLEY**  
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 TBPE FIRM #312

Revision No.	Date	Description



Project No.: 29149  
 Issued: 08/16/2013  
 Drawn By: BS  
 Checked By: JC  
 Scale: AS NOTED

Sheet Title  
**PROJECT ORIENTATION PLAN**

**L1.00**  
 Sheet Number

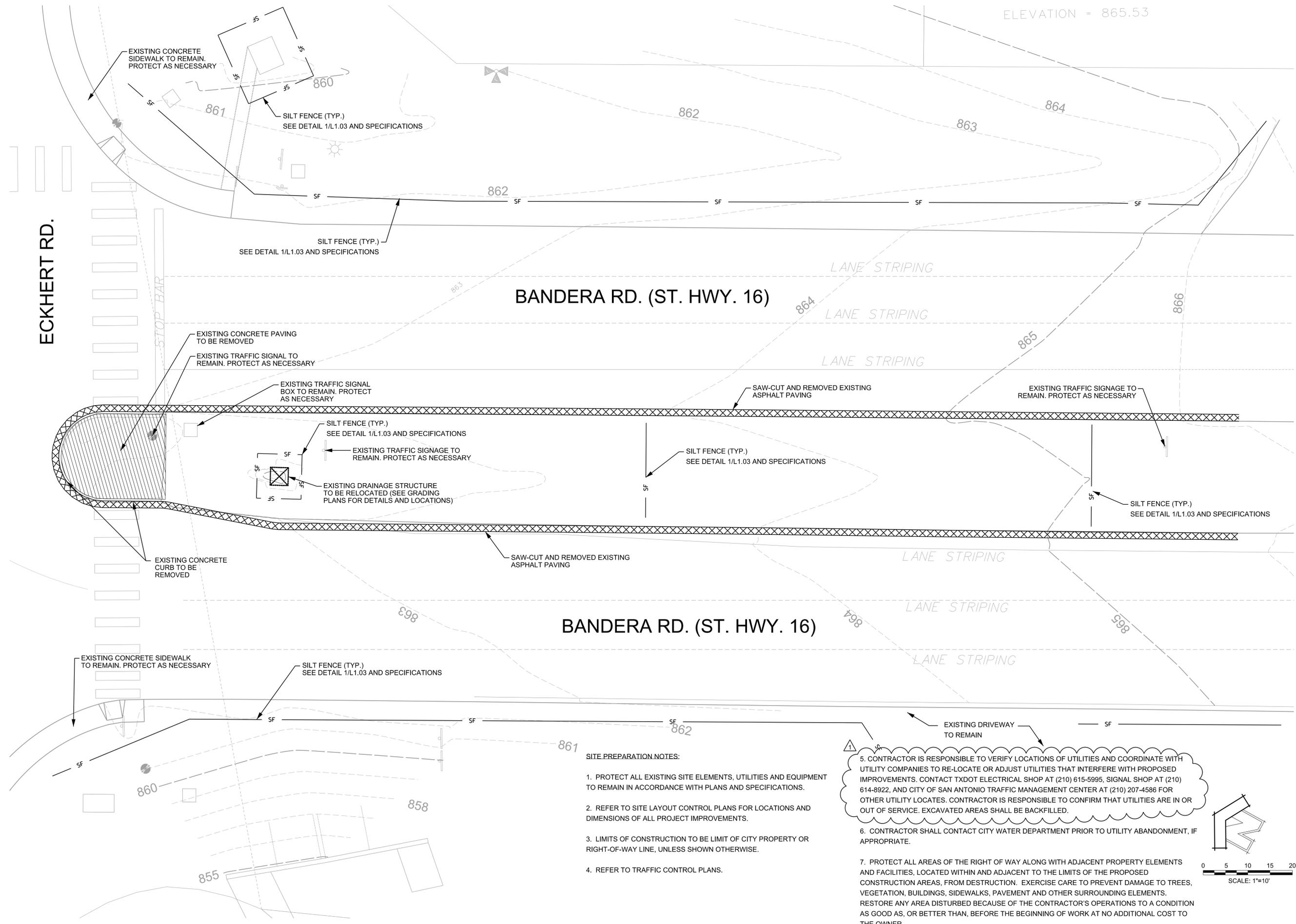
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ECKHERT RD.

ELEVATION = 865.53

BANDERA RD. (ST. HWY. 16)

BANDERA RD. (ST. HWY. 16)



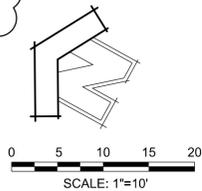
SITE PREPARATION NOTES:

1. PROTECT ALL EXISTING SITE ELEMENTS, UTILITIES AND EQUIPMENT TO REMAIN IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.
2. REFER TO SITE LAYOUT CONTROL PLANS FOR LOCATIONS AND DIMENSIONS OF ALL PROJECT IMPROVEMENTS.
3. LIMITS OF CONSTRUCTION TO BE LIMIT OF CITY PROPERTY OR RIGHT-OF-WAY LINE, UNLESS SHOWN OTHERWISE.
4. REFER TO TRAFFIC CONTROL PLANS.

5. CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTACT TXDOT ELECTRICAL SHOP AT (210) 615-5995, SIGNAL SHOP AT (210) 614-8922, AND CITY OF SAN ANTONIO TRAFFIC MANAGEMENT CENTER AT (210) 207-4586 FOR OTHER UTILITY LOCATES. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED.

6. CONTRACTOR SHALL CONTACT CITY WATER DEPARTMENT PRIOR TO UTILITY ABANDONMENT, IF APPROPRIATE.

7. PROTECT ALL AREAS OF THE RIGHT OF WAY ALONG WITH ADJACENT PROPERTY ELEMENTS AND FACILITIES, LOCATED WITHIN AND ADJACENT TO THE LIMITS OF THE PROPOSED CONSTRUCTION AREAS, FROM DESTRUCTION. EXERCISE CARE TO PREVENT DAMAGE TO TREES, VEGETATION, BUILDINGS, SIDEWALKS, PAVEMENT AND OTHER SURROUNDING ELEMENTS. RESTORE ANY AREA DISTURBED BECAUSE OF THE CONTRACTOR'S OPERATIONS TO A CONDITION AS GOOD AS, OR BETTER THAN, BEFORE THE BEGINNING OF WORK AT NO ADDITIONAL COST TO THE OWNER.



**CITY OF LEON VALLEY**  
 BANDERA ROAD (ST. HWY. 16)  
 GATEWAY IMPROVEMENTS  
 Leon Valley, Texas

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Revision No.	Date	Description
1	10/02/2013	REVISION #1

Half Associates TBPE FIRM #F-312

James E. Carillo  
8-16-2013

Project No.: 29149  
 Issued: 08/16/2013  
 Drawn By: BS  
 Checked By: JC  
 Scale: AS NOTED

Sheet Title  
**SITE PREPARATION PLAN  
 ECKHERT RD.**

**L1:01**  
 Sheet Number

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ECHO DR.

SITE PREPARATION NOTES:

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1

CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTACT TXDOT ELECTRICAL SHOP AT (210) 615-5995, SIGNAL SHOP AT (210) 614-8922, AND CITY OF SAN ANTONIO TRAFFIC MANAGEMENT CENTER AT (210) 207-4586 FOR OTHER UTILITY LOCATES. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED.

LANE STRIPING

LANE STRIPING

BANDERA RD. (ST. HWY. 16)

LANE STRIPING

LANE STRIPING

BANDERA RD. (ST. HWY. 16)

GRASS HILL DR.

CURB INLET PROTECTION (TYP.)  
SEE DETAIL 2/L1.03 AND SPECIFICATIONS

EXISTING CURB AND GUTTER TO  
REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

SILT FENCE (TYP.)  
SEE DETAIL 1/L1.03 AND SPECIFICATIONS

EXISTING STREET LIGHT TO  
REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

SILT FENCE (TYP.)  
SEE DETAIL 1/L1.03 AND SPECIFICATIONS

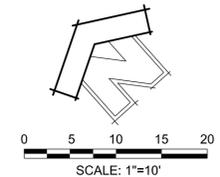
EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO  
REMAIN. PROTECT AS NECESSARY

EXISTING CURB AND GUTTER TO  
REMAIN. PROTECT AS NECESSARY

SILT FENCE (TYP.)  
SEE DETAILS AND SPECIFICATIONS

STORM DRAIN INLET PROTECTION (TYP.)  
GRAVEL FILTER AROUND ALL SIDES  
SEE DETAIL 2/L1.03 AND SPECIFICATIONS



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TBP# FIRM #512

Revision No.	Date	Description
1	10/02/2013	REVISION #1

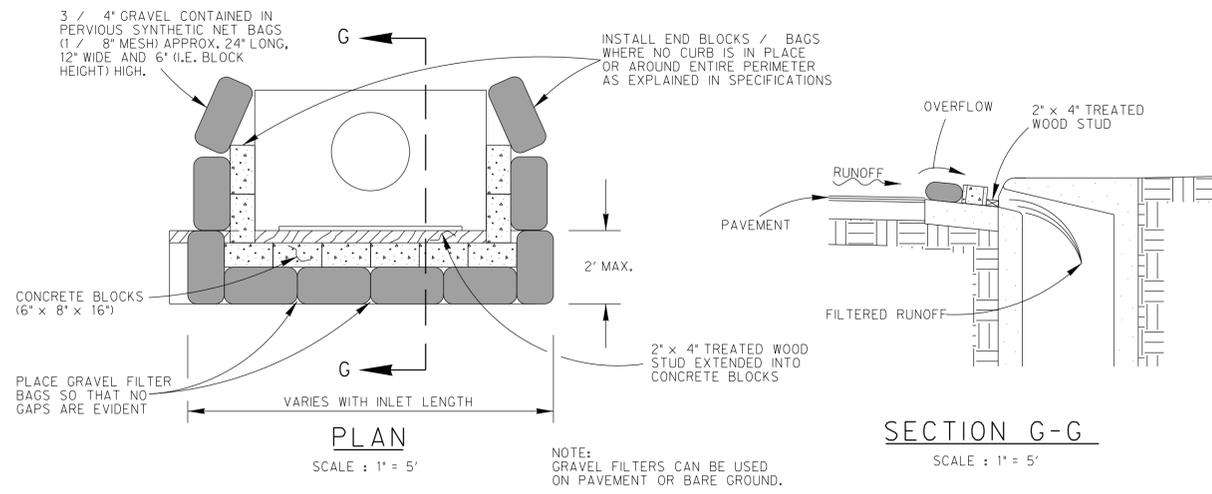
Half Associates TBP# FIRM #F-312

James E. Carillo  
8-16-2013

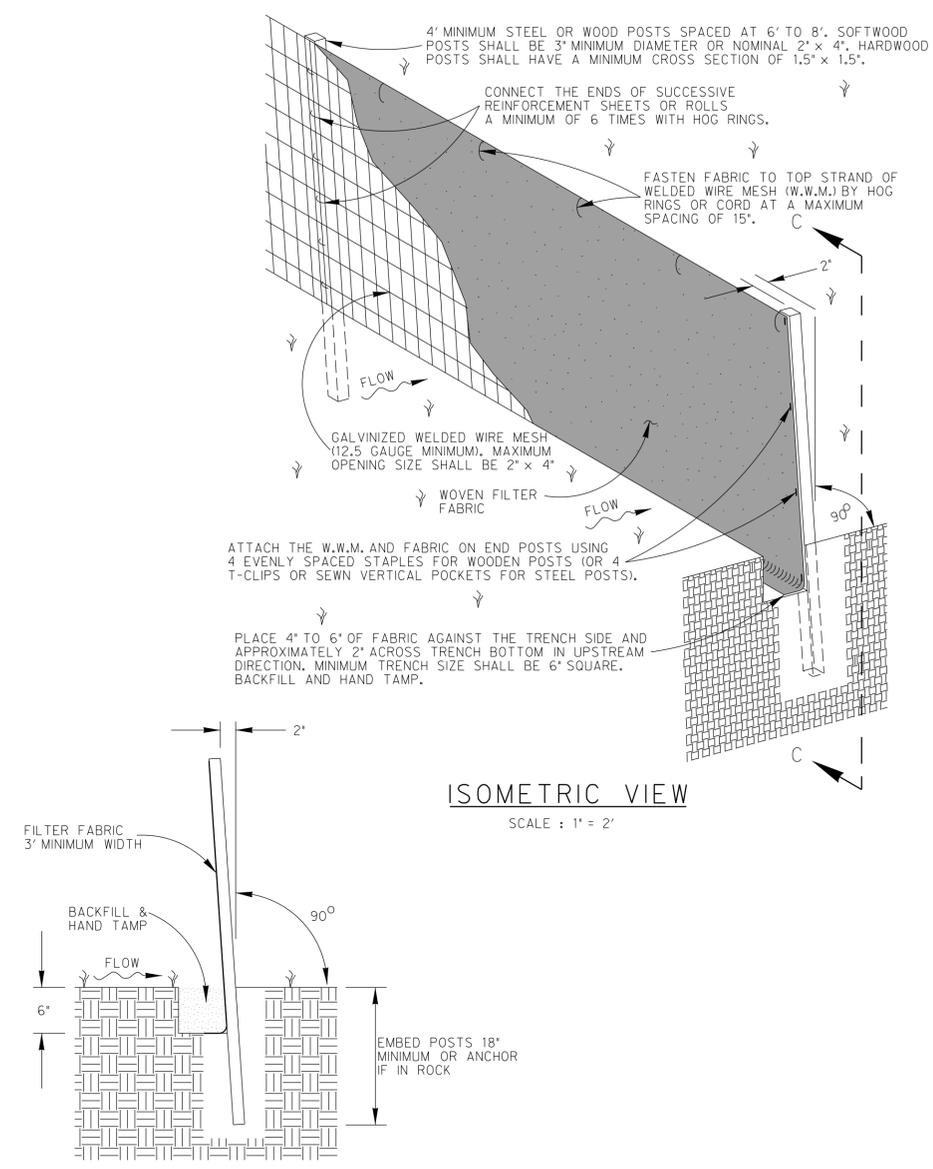
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Issued: 08/16/2013  
Drawn By: BS  
Checked By: JC  
Scale: AS NOTED

Sheet Title  
**SITE PREPARATION  
GRASS HILL DR.**

**L1.02**  
Sheet Number



**2** INLET GRAVEL FILTER DETAIL  
SCALE = NTS



**SEDIMENT CONTROL FENCE USAGE GUIDELINES**

A SEDIMENT CONTROL FENCE MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUN-OFF. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED.

SEDIMENT CONTROL FENCE SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 100 GPM / FT SQUARED. SEDIMENT CONTROL FENCE IS NOT RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA LARGER THAN 2 ACRES.

**GENERAL NOTES**

1. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

**TEMPORARY SEDIMENT CONTROL FENCE**

**1** SILT FENCE DETAIL  
SCALE = NTS

Revision No.	Date	Description

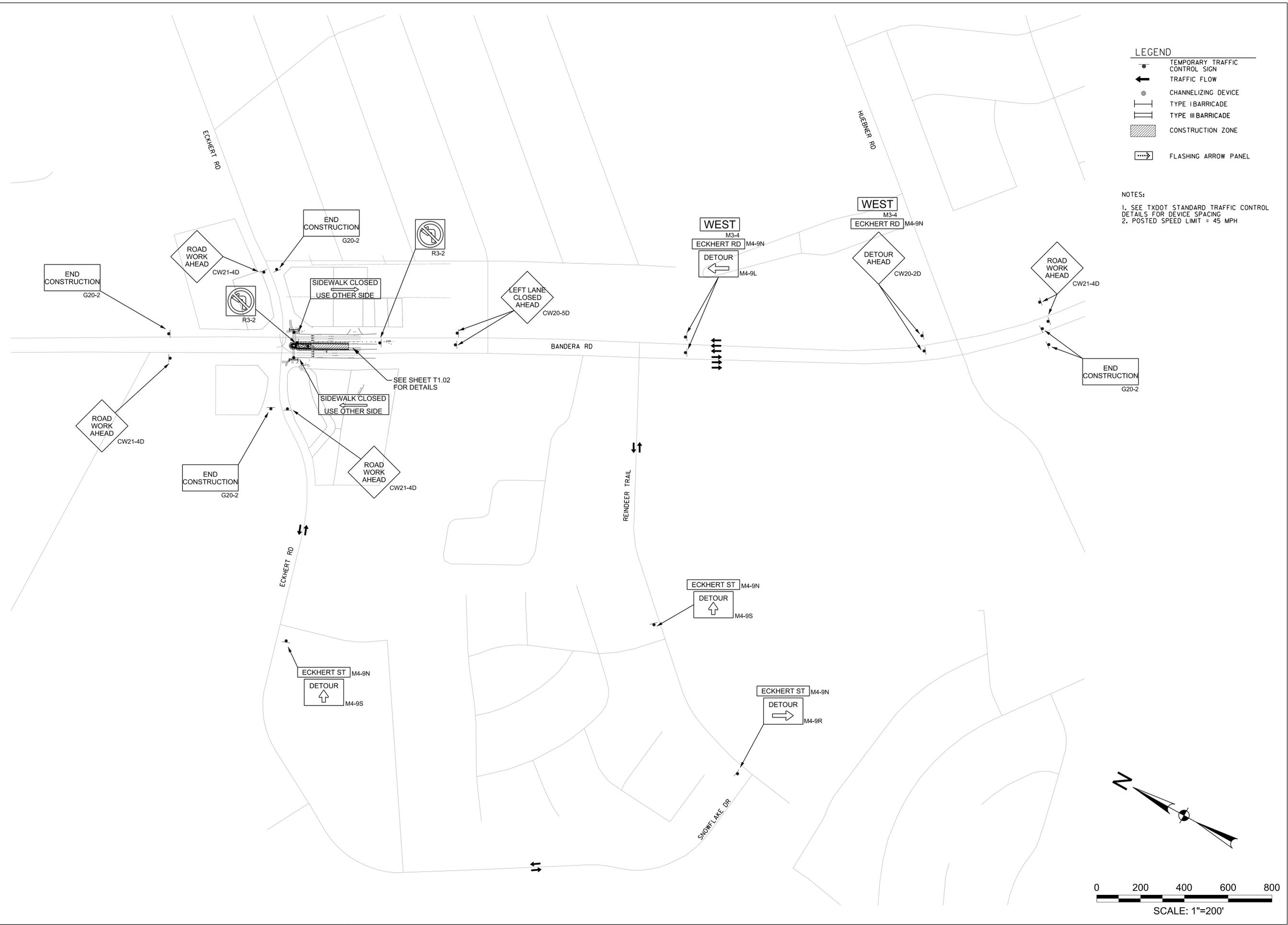
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8-16-2013

Project No.:	29149
Issued:	08/16/2013
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Sheet Title  
**EROSION CONTROL DETAILS**

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- LEGEND**
- TEMPORARY TRAFFIC CONTROL SIGN
  - ↑ TRAFFIC FLOW
  - ⊙ CHANNELIZING DEVICE
  - ▬ TYPE I BARRICADE
  - ▬▬ TYPE III BARRICADE
  - ▨ CONSTRUCTION ZONE
  - ⊠ FLASHING ARROW PANEL

**NOTES:**

1. SEE TXDOT STANDARD TRAFFIC CONTROL DETAILS FOR DEVICE SPACING
2. POSTED SPEED LIMIT = 45 MPH

**CITY OF LEON VALLEY**  
**BANDERA ROAD (ST. HWY. 16)**  
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 Leon Valley, Texas

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Revision No.	Date	Description

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4/28/13

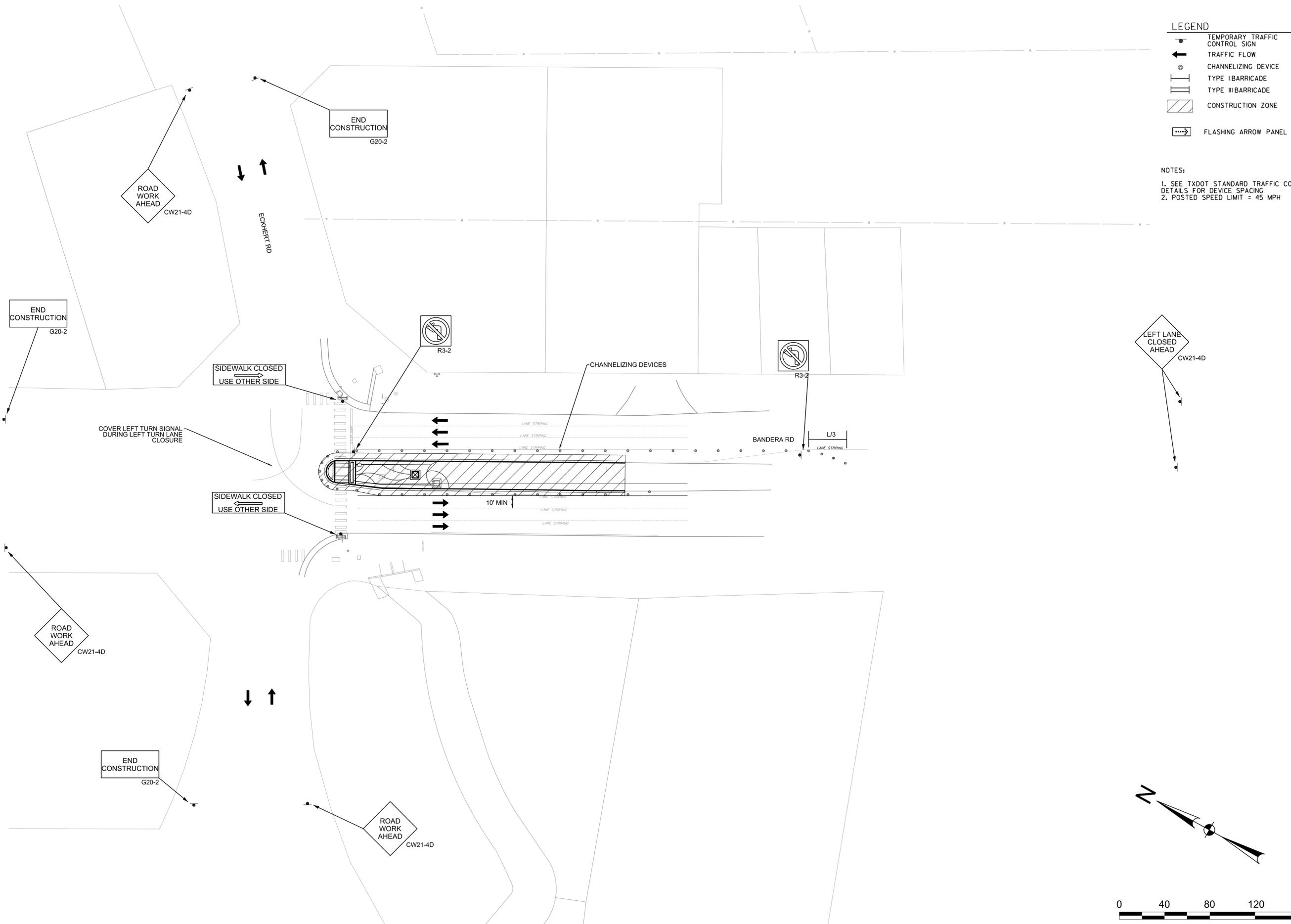
MARY ELIZABETH MAZZE  
 81290  
 PROFESSIONAL ENGINEER

Project No.: 29149  
 Issued: 06/28/2013  
 Drawn By: DK  
 Checked By: MM  
 Scale: AS NOTED

Sheet Title  
**TRAFFIC CONTROL  
 DETOUR PLAN  
 ECKHART RD**

**T1.01**  
 Sheet Number

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**LEGEND**

- TEMPORARY TRAFFIC CONTROL SIGN
- TRAFFIC FLOW
- CHANNELIZING DEVICE
- TYPE I BARRICADE
- TYPE III BARRICADE
- CONSTRUCTION ZONE
- FLASHING ARROW PANEL

- NOTES:**
1. SEE TXDOT STANDARD TRAFFIC CONTROL DETAILS FOR DEVICE SPACING
  2. POSTED SPEED LIMIT = 45 MPH

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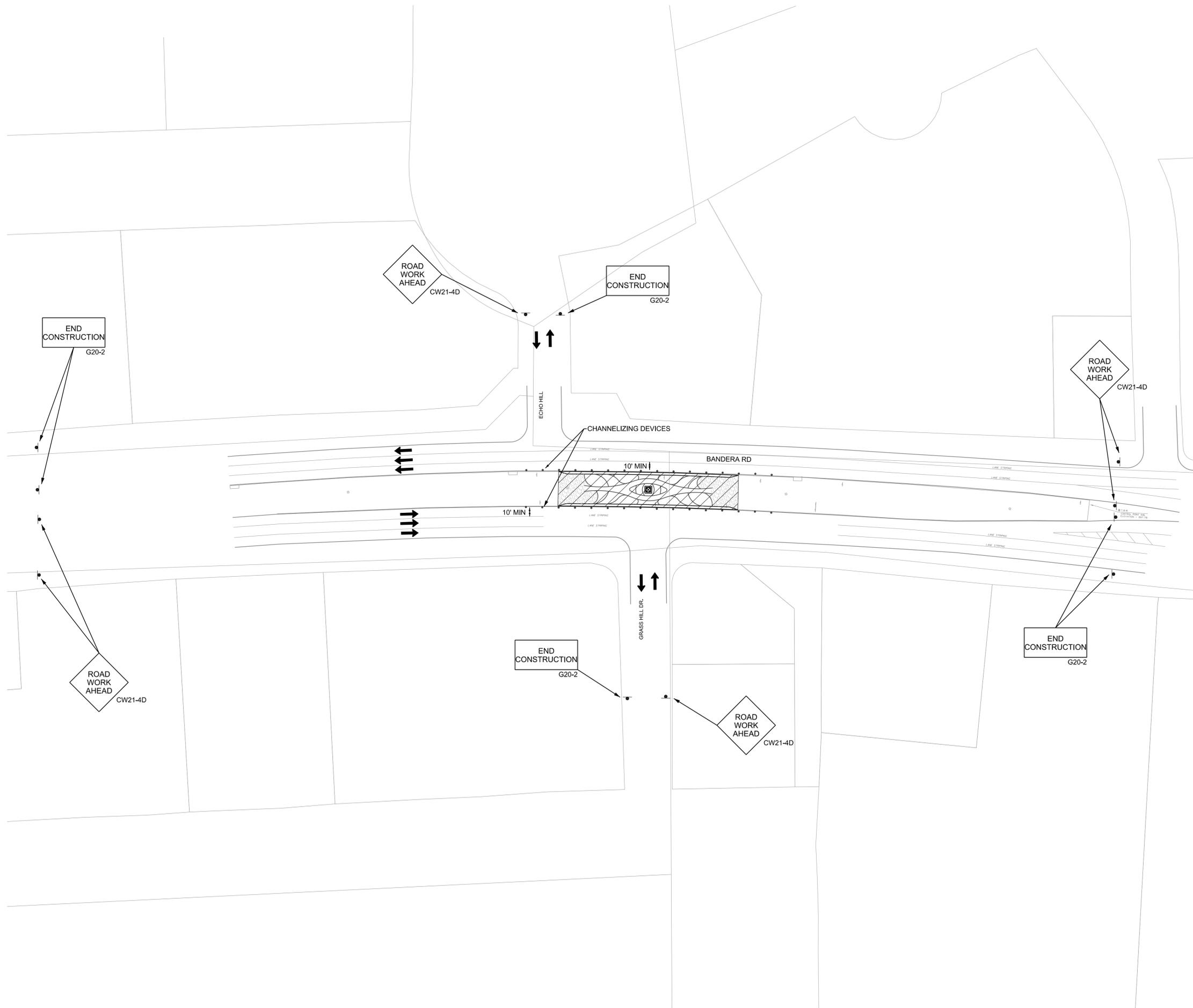
Revision No.	Date	Description

Half Associates TBPE FIRM #312

Project No.: 29149  
 Issued: 06/28/2013  
 Drawn By: DK  
 Checked By: MM  
 Scale: AS NOTED

Sheet Title  
**TRAFFIC CONTROL PLAN**  
 ECKHERT RD

**T1.02**  
 Sheet Number



LEGEND

- TEMPORARY TRAFFIC CONTROL SIGN
- TRAFFIC FLOW
- CHANNELIZING DEVICE
- TYPE III BARRICADE
- CONSTRUCTION ZONE
- FLASHING ARROW PANEL

NOTES:

1. SEE TXDOT STANDARD TRAFFIC CONTROL DETAILS FOR DEVICE SPACING
2. POSTED SPEED LIMIT = 45 MPH

Revision No.	Date	Description



Project No.: 29149  
 Issued: 06/28/2013  
 Drawn By: DK  
 Checked By: MM  
 Scale: AS NOTED

Sheet Title  
 TRAFFIC CONTROL PLAN  
 GRASS HILL DR

**T2.01**  
 Sheet Number

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### 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 and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
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" 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.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes prequalified 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) 416-3134

#### WEB ADDRESSES FOR REFERENCED DOCUMENTS

Compliant Work Zone Traffic Control Devices List (CWZTCD)  
<http://www.txdot.gov/publications/traffic.htm>

Texas Manual on Uniform Traffic Control Devices (TMUTCD)  
<http://www.txdot.gov/publications/traffic.htm>

Standard Highway Sign Designs for Texas (SHSD)  
<http://www.txdot.gov/publications/traffic.htm>

Traffic Engineering Standard Sheets  
<http://www.txdot.gov/business/disclaim.htm>

Material Producer List  
<http://www.txdot.gov/business/producer-list.htm>

Departmental Material Specifications (DMS)  
<http://www.txdot.gov/services/construction/material-specifications/>

Roadway Design Manual  
<http://www.txdot.gov/services/general-services/manuals.htm>



## BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

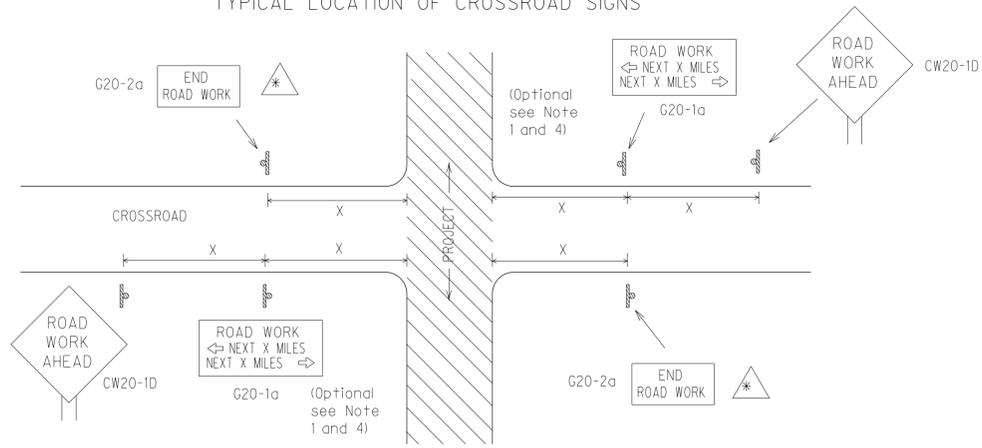
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© TxDOT 11-4-02	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
4-03 9-07	REVISIONS		CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY	SHEET NO.			
	15	BEXAR	T-3.01			

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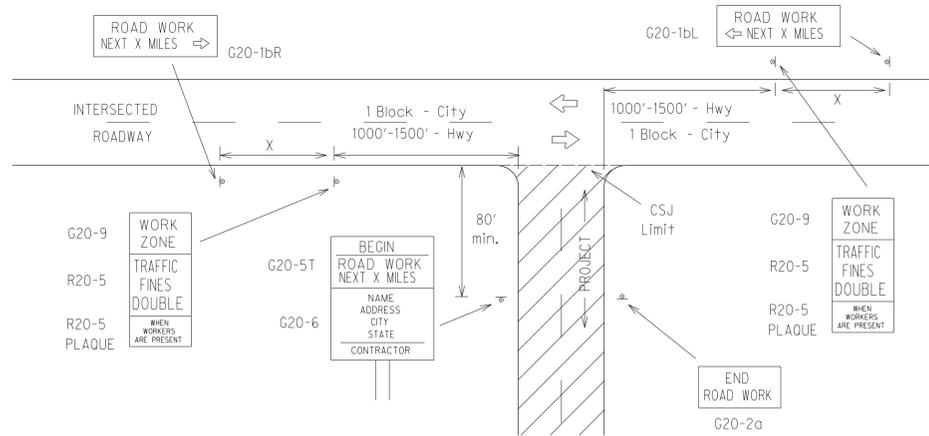
TYPICAL LOCATION OF CROSSROAD SIGNS



\* May be mounted on back of CW20-1D sign with approval of engineer. (See note 2 below)

- The typical minimum signing on a crossroad approach should be a CW20-1D ROAD WORK AHEAD sign and a G20-2a END ROAD WORK sign, unless noted otherwise in plans.
- The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" END ROAD WORK (G20-2a) 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.
- Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
- The G20-1a sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection the Contractor shall place the G20-6 "Contractor Name" sign behind the Type III Barricades for the road closure (see BC(10) also). The G20-1bL and G20-1bR signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

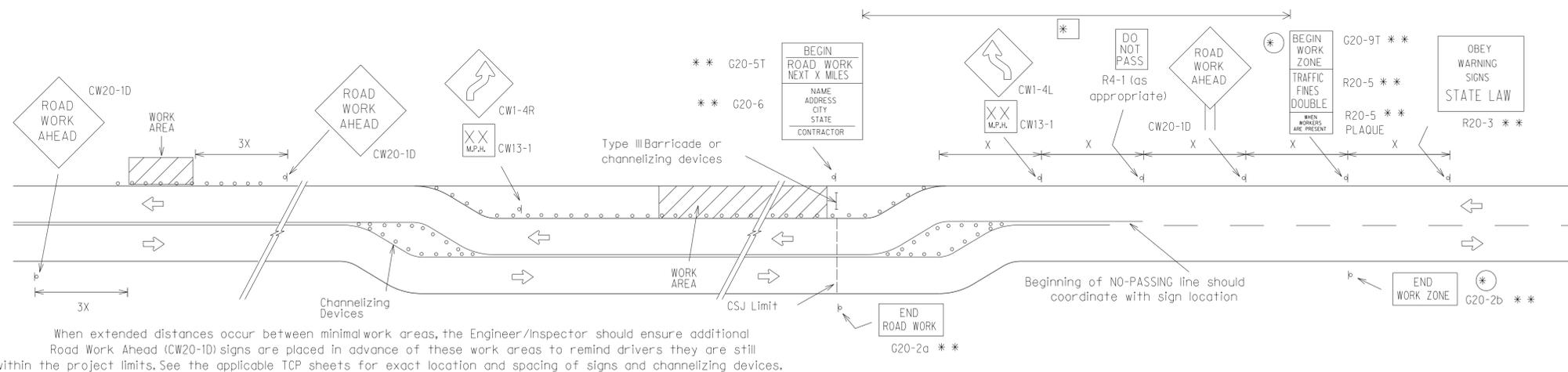
Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Spacing Δ Feet (Apprx.)
CW20 CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	30	120
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	45	320
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	50	400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

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

General Notes:

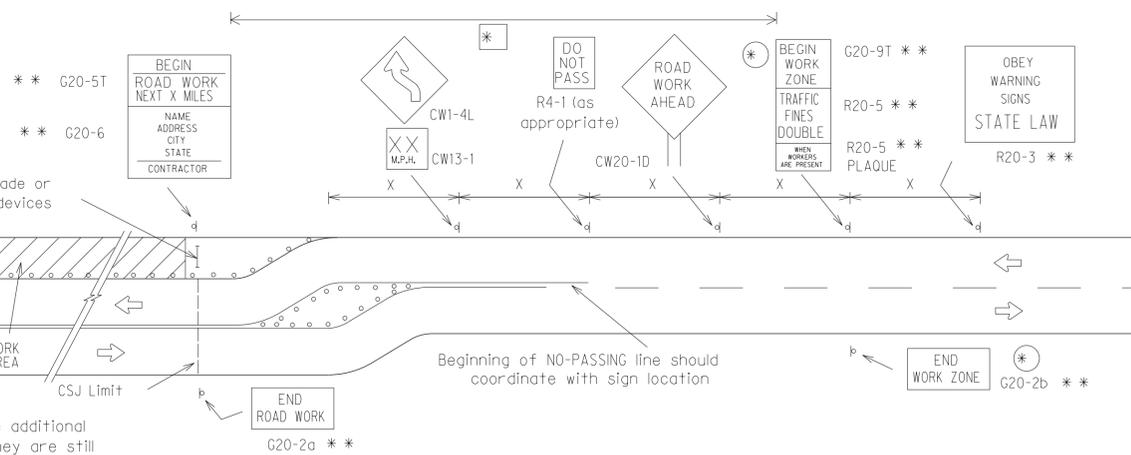
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" ROAD WORK AHEAD (CW20-1D) signs may be used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

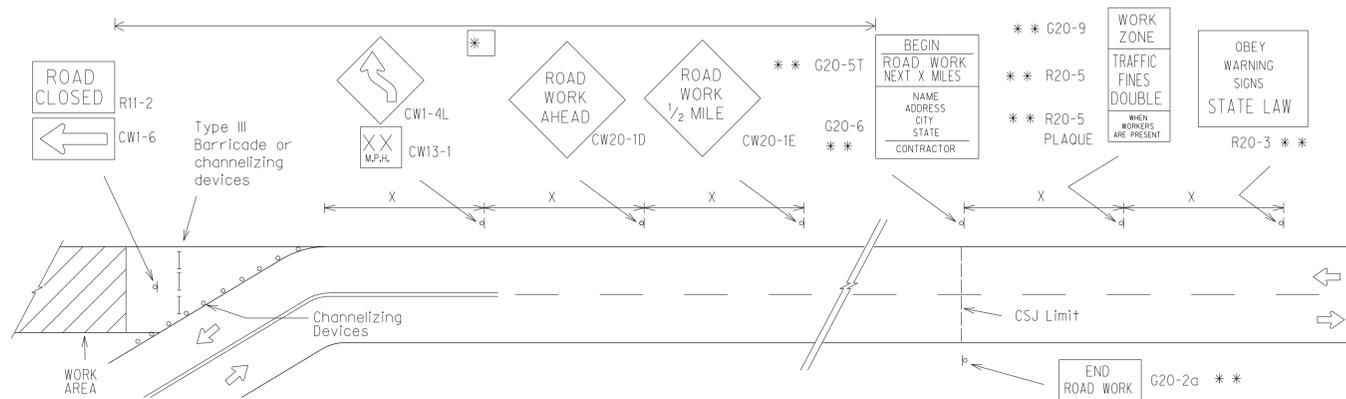


When extended distances occur between minimal work areas, the Engineer/Inspector should ensure additional Road Work Ahead (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing 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 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 G20-9T and G20-2b shall be used when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a work zone where traffic fines may double if workers are present.
- \*\* Required CSJ Limit signing. See Note 10 on BC(1).
- \* Area for placement of "ROAD WORK AHEAD" sign and other signs or devices as called for on the Traffic Control Plan.

LEGEND

- ⊙ Sign
- ⊙ Channelizing Devices
- I Type III Barricade
- X See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.



R20-3  
Legend/Border - Black  
Background - White

Texas Department of Transportation  
Traffic Operations Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT STANDARD

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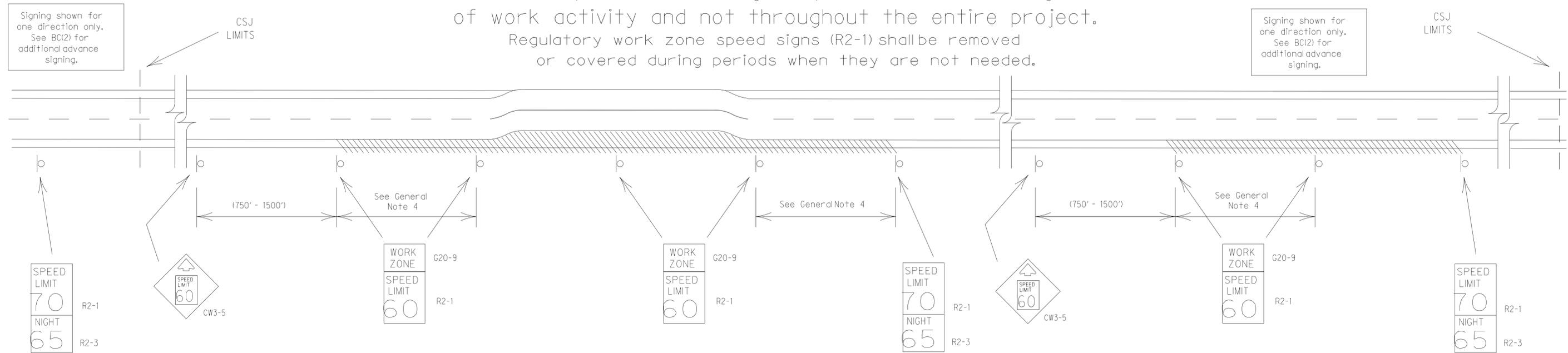
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		15	BEXAR	T-3.02	

DATE:  
FILE:

# 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 should be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 15 feet of pavement edge or actually on the pavement.

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 controls 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 CW3-5 sign, G20-9 plaque and the R2-1 and R2-3 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 otherwise noted.
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.

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## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT STANDARD

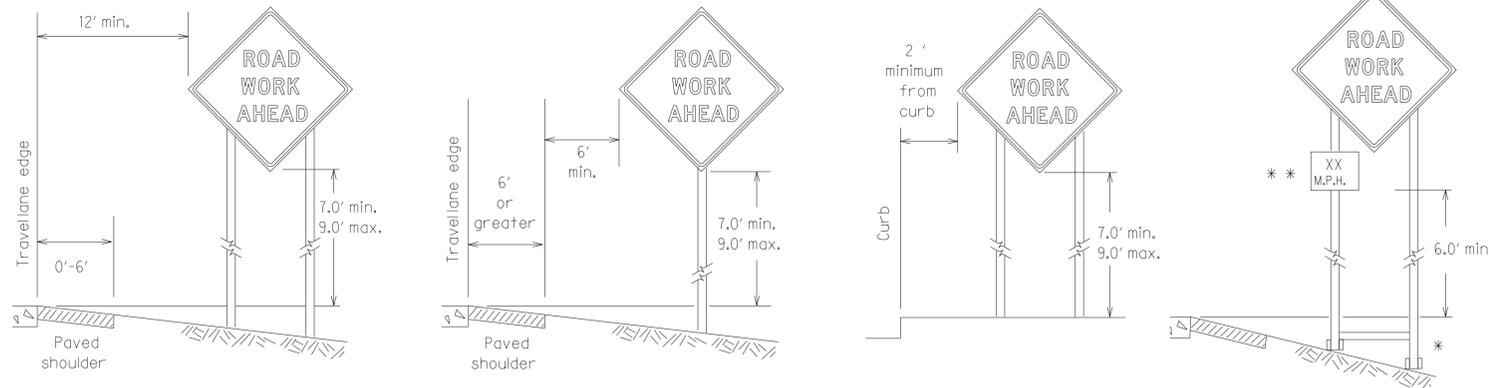
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9-07	REVISIONS	CONT	SECT	JOB	HIGHWAY
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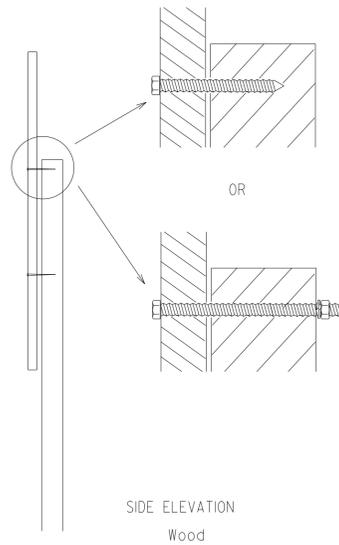
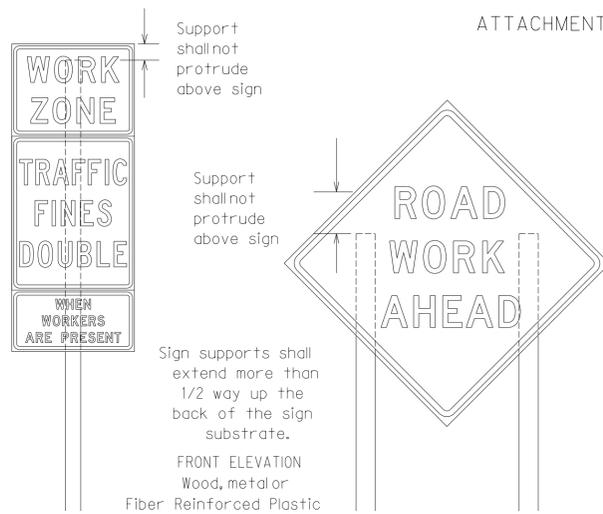
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



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

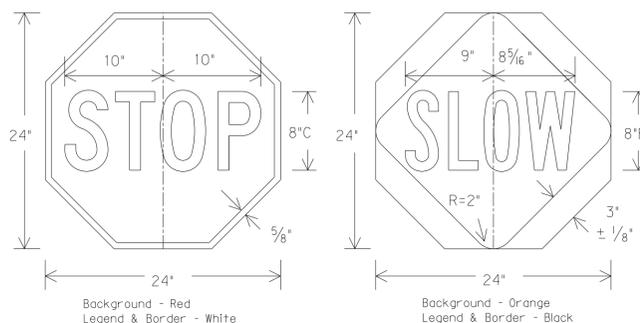
Nails will NOT be allowed.

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

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

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" 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.



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 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. 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. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
  6. 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.
  7. 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.
  8. 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.
  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 inch.
  10. 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 Engineer may allow the use of smaller size construction warning signs on secondary roads or city streets where speeds are low if the sign size is listed as an option on the "Typical Construction Warning Sign Size and Spacing" chart shown on BC(2).
2. The Contractor shall furnish the sign sizes shown in plans, the BC Sheets, the TCP sheets 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 C (High Specific Intensity), shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type E (Fluorescent Prismatic), 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 type of sign support meets the crashworthiness standards regardless of the direction of impact. 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. These materials can damage the retroreflectivity of sheeting.
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 is recommended.
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.
6. Rubber (such as tire inner tubes) shall NOT be used for sandbags.
7. 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.
8. 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.
9. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.



BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES STANDARD

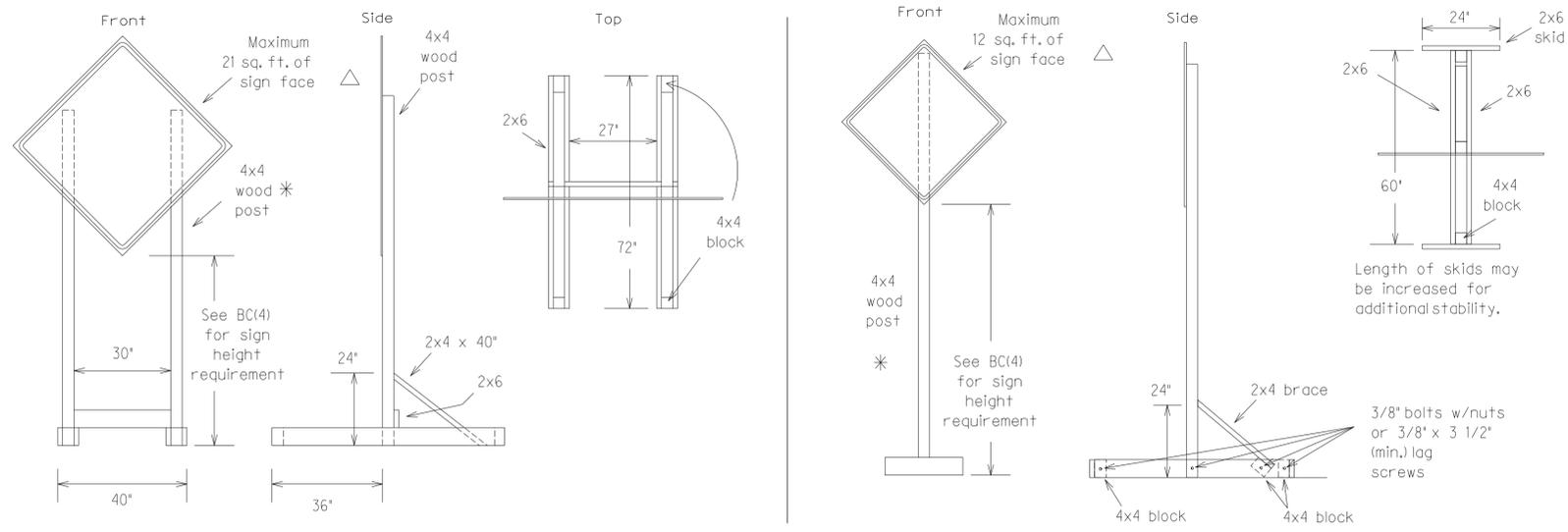
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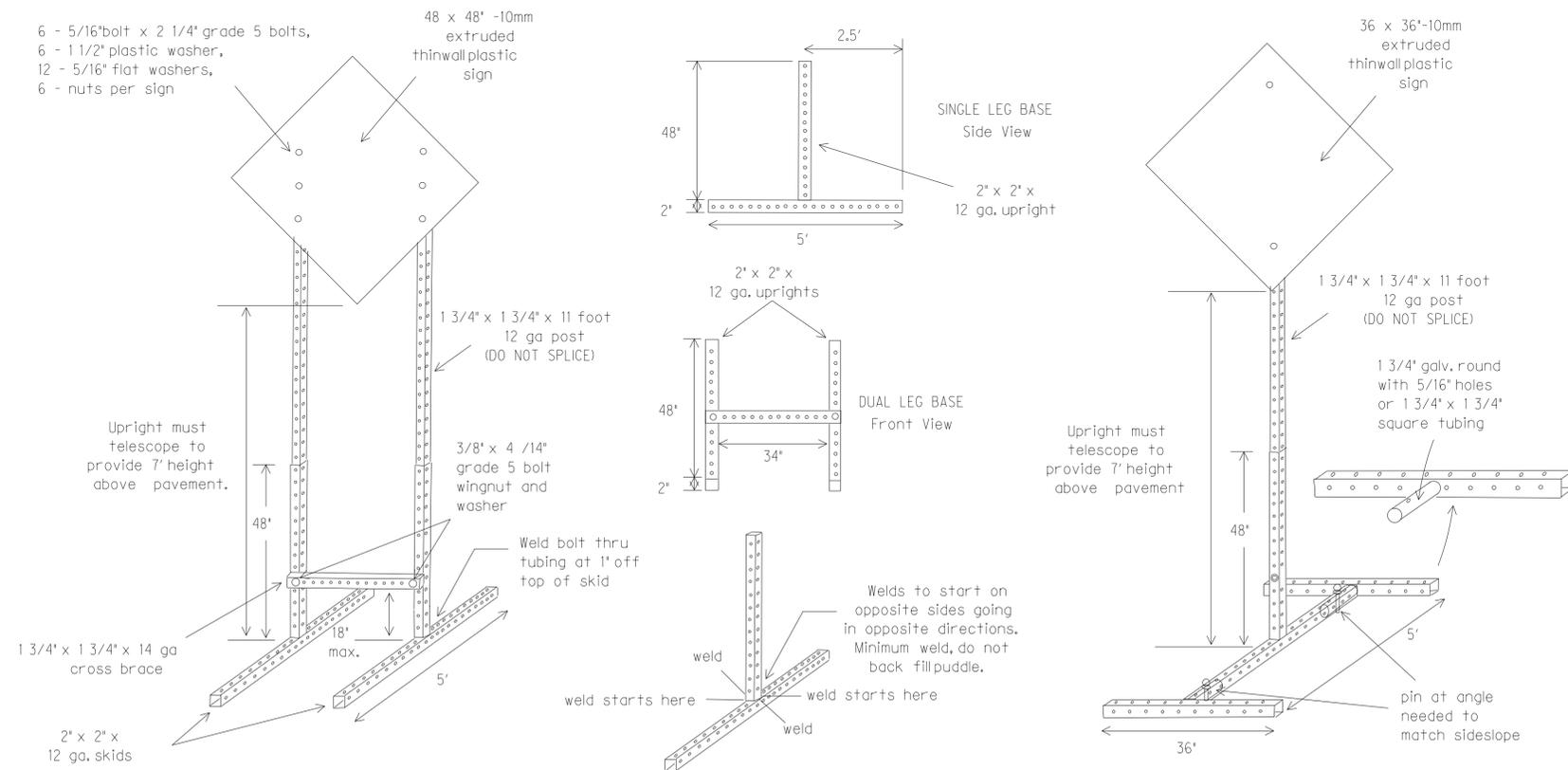
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## SKID MOUNTED WOOD SIGN SUPPORTS

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

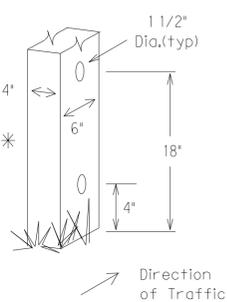


### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



### 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)).



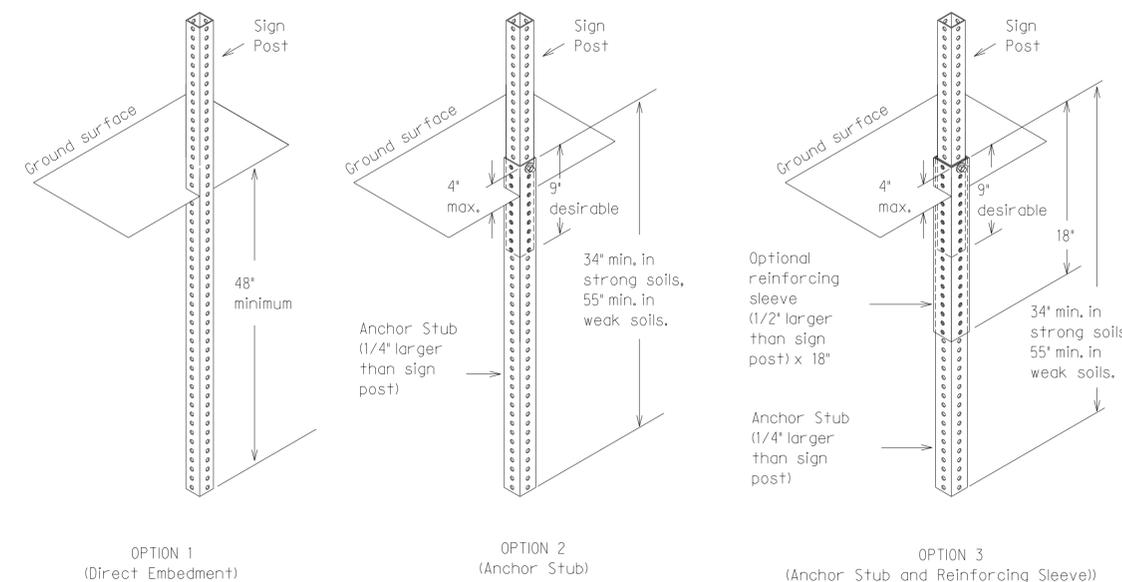
### WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

Nominal Post Size	Maximum No. of Posts	Minimum Sq. feet of Sign Face	Drilled Soil Hole(s) Embedment 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

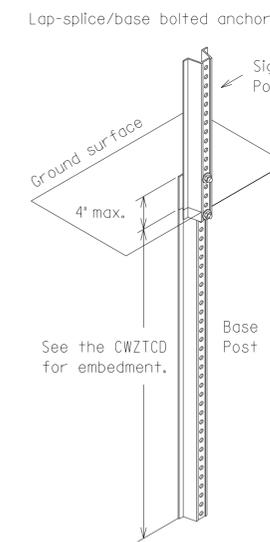
## GROUND MOUNTED SIGN SUPPORTS

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.

### PERFORATED SQUARE METAL TUBING



### WING CHANNEL



### GENERAL NOTES

- 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.
- More details of approved Long/Intermediate and Short Term supports can be found on the CWZTCD list. See BC(1) for website location.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

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

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

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

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PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

# 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
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXXX BLVD CLOSED

### Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT

ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
LANES SHIFT *

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

### Application Guidelines

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *

### Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXXX TO XXXXXXXX
US XXX TO FM XXXX

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

### Wording Alternatives

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

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS.

### FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbols/signs, such as the CW20-7a Flagger Symbol, are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbols/signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow panel 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

BARRICADE AND CONSTRUCTION  
PORTABLE CHANGEABLE  
MESSAGE SIGN (PCMS)  
STANDARD

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BC(6)-07

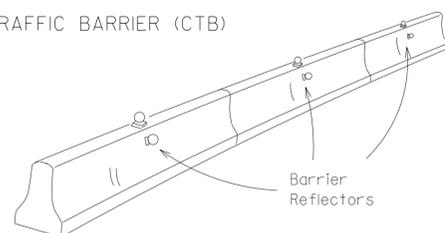
© TxDOT 11-4-02	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-07 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY	SHEET NO.	
15	BEXAR		T-3.06	

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## BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

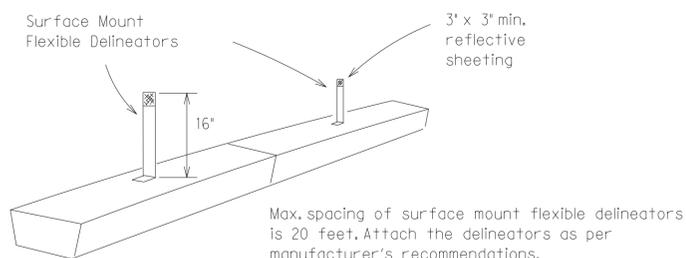
- Barrier Reflectors shall be prequalified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors (Type C Delineators) can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 502.

### CONCRETE TRAFFIC BARRIER (CTB)

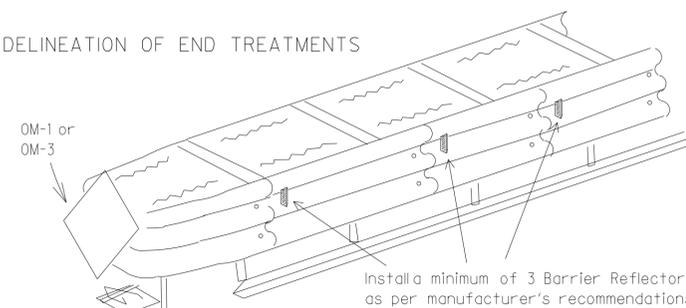


- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector.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

### LOW PROFILE CONCRETE BARRIER (LPCB)



### DELINEATION OF END TREATMENTS



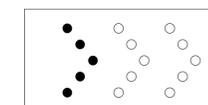
DELINEATION	APPROACHING TRAFFIC	
	BOTH SIDES	ONE SIDE
	OM-1	OM-3 or Vertical Panel

### END TREATMENTS FOR CTB'S USED IN WORK ZONES

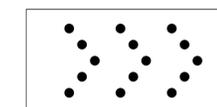
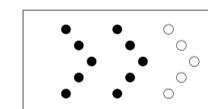
End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

## TYPICAL FLASHING ARROW PANEL

Arrow Panels 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.

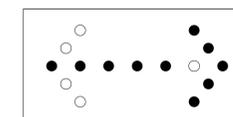


Sequential Chevron

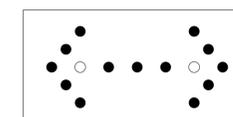


- The Flashing Arrow Panel should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Panels should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display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

Flashing RIGHT (LEFT) ARROW



Flashing DOUBLE ARROW



Flashing CAUTION

- The "CAUTION" display consists of four corner lamps flashing simultaneously.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Panel shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.

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

ATTENTION: Flashing Arrow Panels shall be equipped with automatic dimming devices.

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

- The Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Panel SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Panel provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted arrow panels should be 7 feet from roadway to bottom of panel.

### WARNING LIGHTS

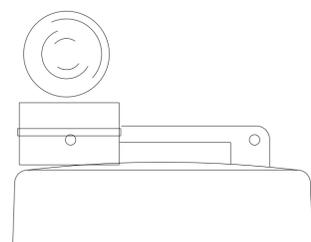
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

### WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

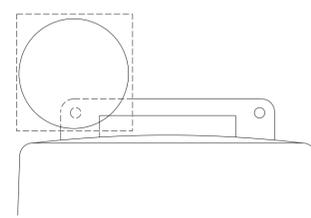
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



Type C Warning Light or approved substitute mounted adjacent to the travelway.



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

## TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the dates shown in the CWZTCD to ensure that the TMA meets the age requirements and the crashworthiness criteria established by the Federal Highway Administration (FHWA) for TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned approximately 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



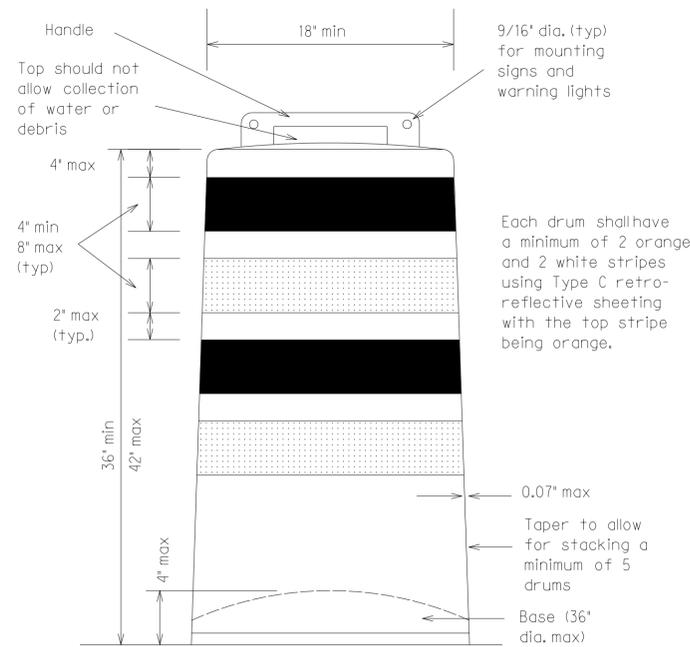
## BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR STANDARD

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BC(7)-07

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9-07	REVISIONS		CONT	SECT	JOB	HIGHWAY
			DIST	COUNTY		SHEET NO.
			15	BEXAR		T-3.07

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**GENERAL NOTES**

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

**GENERAL DESIGN REQUIREMENTS**

Prequalified plastic drums shall meet the following requirements:

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

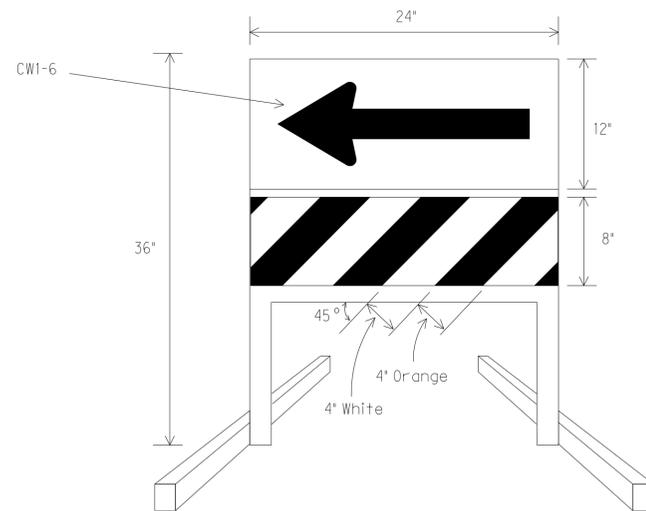
- Drum body shall have a minimum unballasted weight of 7.7 lbs. and maximum unballasted weight of 11 lbs. The wall of the drum body shall be a minimum of 0.07 inch in thickness. Weight of any drum supplied shall not vary more than 0.5 lb. from that of the prequalified sample.
- Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Flat Surface Reflective Sheeting." High Specific Intensity (Type C) retroreflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

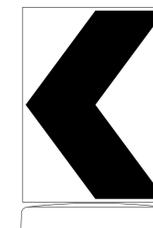
**BALLAST**

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



**DIRECTION INDICATOR BARRICADE**

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CWI-6) sign in the size shown with a black arrow on a background of Type E Fluorescent Prismatic Orange above a rail with Type C High Specific Intensity retroreflective sheeting in alternation 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



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



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

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

**SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS**

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



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD**

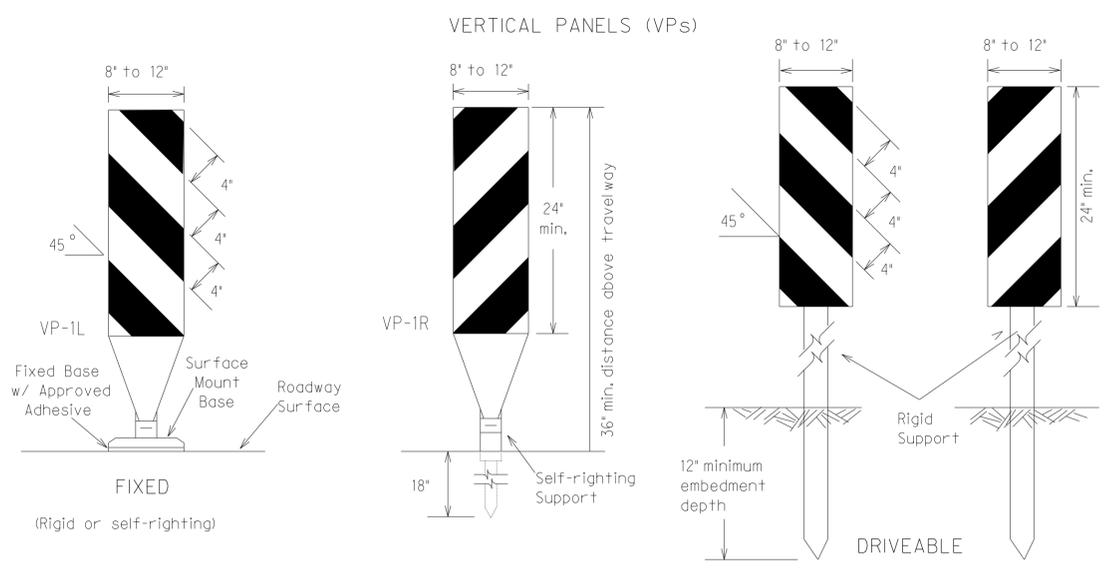
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4-03	REVISIONS	CONT	SECT	JOB	HIGHWAY
9-07					
		DIST	COUNTY	SHEET NO.	
		15	BEXAR	T-3.08	

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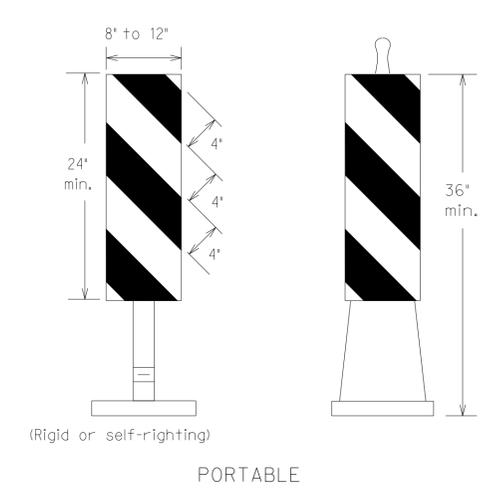
## CHANNELIZING DEVICES



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

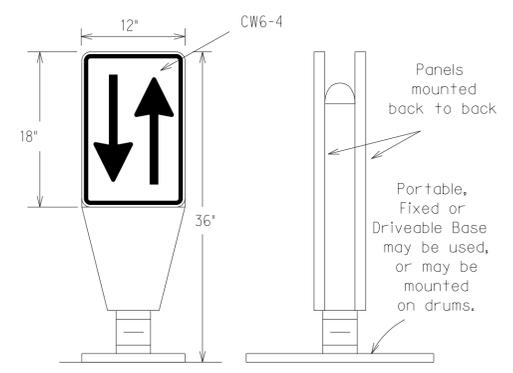
### GENERAL NOTES:

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh approximately 35 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.
- Examples on this sheet are commonly used channelizing devices in work zones. For other devices, refer to the CWZTCD.



- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
- 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.
- VP's used on expressways and freeways or other high speed roadways, shall have a minimum of 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panels is greater than 36 inches, a panel stripe of 6 inches shall be used.

### OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

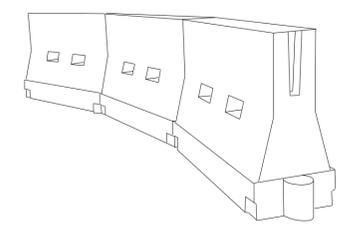


- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base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

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	40'	80'-100'
40		265'	295'	320'	45'	90'-110'
45	L=WS	450'	495'	540'	50'	100'-125'
50		500'	550'	600'	55'	110'-140'
55		550'	605'	660'	60'	120'-150'
60		600'	660'	720'	65'	130'-165'
65		650'	715'	780'	70'	140'-175'
70	700'	770'	840'	75'	150'-185'	
75	750'	825'	900'	80'	160'-195'	
80	800'	880'	960'			

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

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



#### LONGITUDINAL CHANNELIZING DEVICES

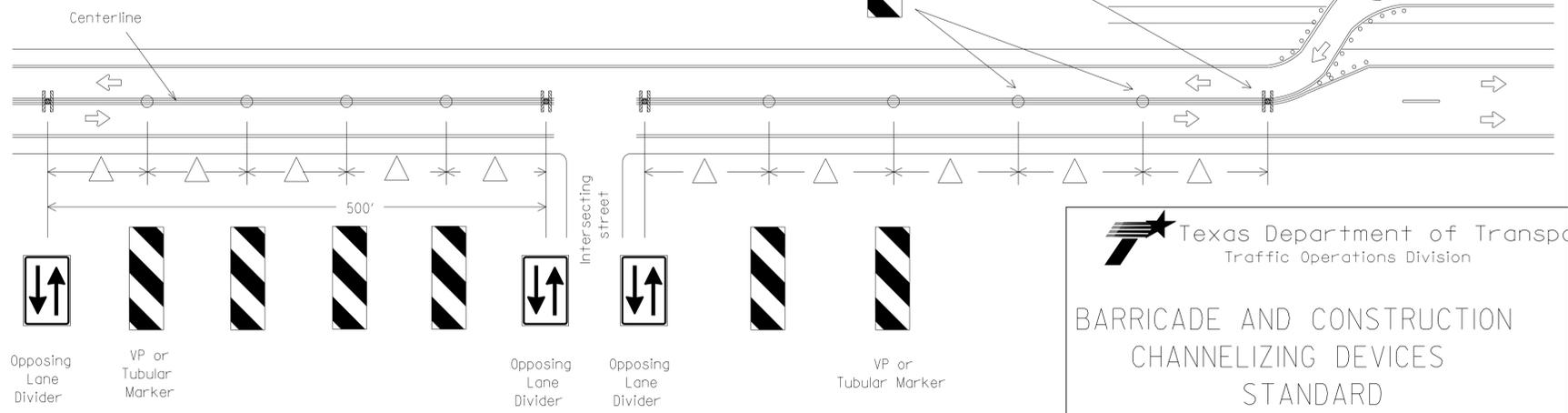
- Longitudinal channelizing devices are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to act as a barrier or to direct a vehicle or impact.
- Longitudinal channelizing devices may be used instead of a line of cones or drums.
- Longitudinal channelizing devices shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Longitudinal channelizing devices should not be used to provide positive protection for obstacles, pedestrians or workers.
- Longitudinal channelizing devices shall be retroreflective, or supplemented with retroreflective delineation as required for temporary barriers on BC(7)-07.

#### WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to 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 be not less than 32 inches in height.

### VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS SEPARATING TWO-WAY TRAFFIC (Typical application)



△ Spacing between the VP's or tubular markers shall not exceed 100 feet. On roadways with speeds less than 45 MPH, spacing between the tubular markers or VP's shall be as shown on the channelizing spacing table shown on this page. If the table shows spacing greater than 100 feet based on the roadway speed, then use a maximum of 100 feet spacing between the tubular markers or VP's. Every fifth channelizing device shall be an OTLD, except when the OTLD must be spaced closer to accommodate an intersection. Spacing between the OTLD shall not exceed 500 feet.

Texas Department of Transportation  
Traffic Operations Division

## BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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9-07	CONT	SECT	JOB	HIGHWAY
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**TYPE III BARRICADES**

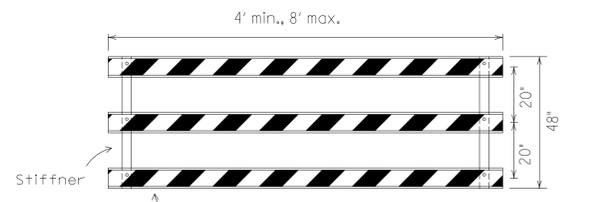
1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type III Barricades and a list of all materials used in the construction of Type III Barricades.
2. Type III Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades 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 C (High Specific Intensity) 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**



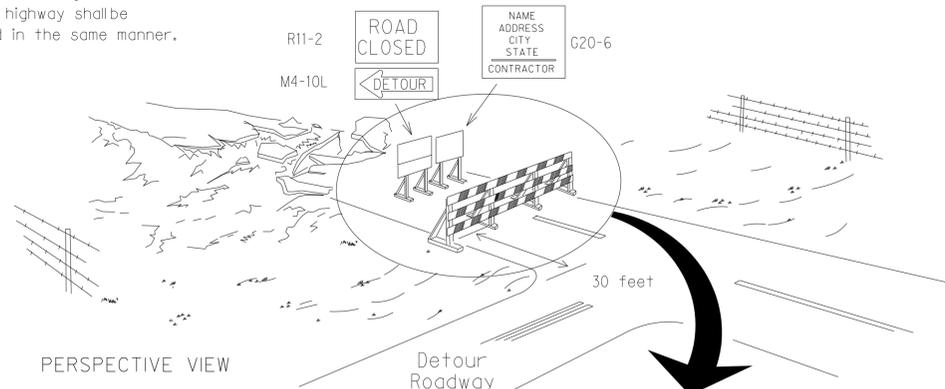
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**



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

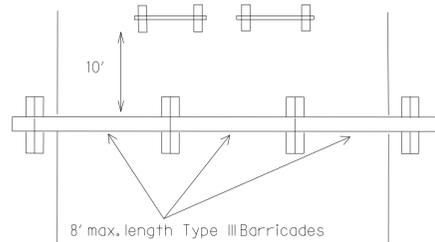
**TYPE III BARRICADE (POST AND SKID) TYPICAL APPLICATION**

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



PERSPECTIVE VIEW

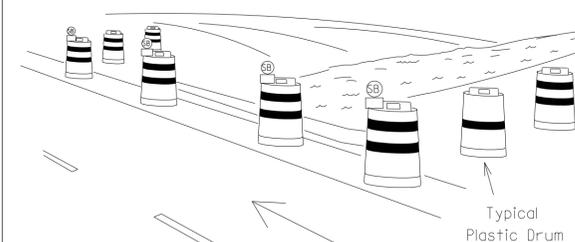
The three rails on Type III barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



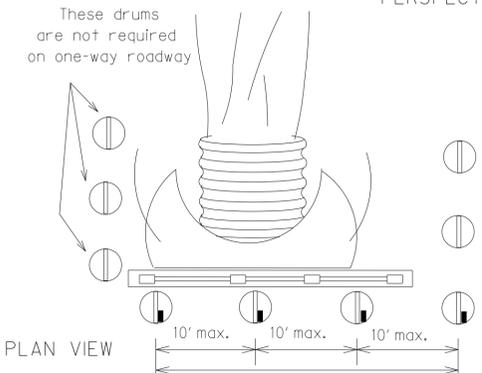
PLAN VIEW

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 III Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**



PERSPECTIVE VIEW



PLAN VIEW

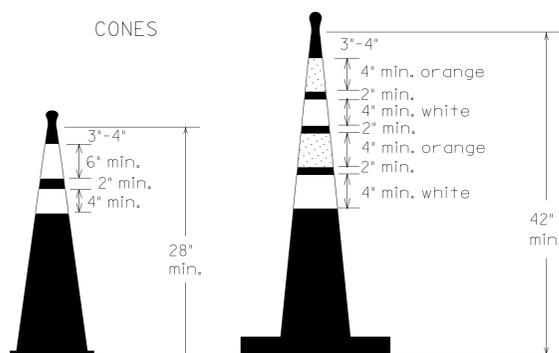
1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

**Legend**

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

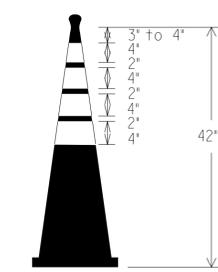
**CONES**



Two-Piece cones

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.

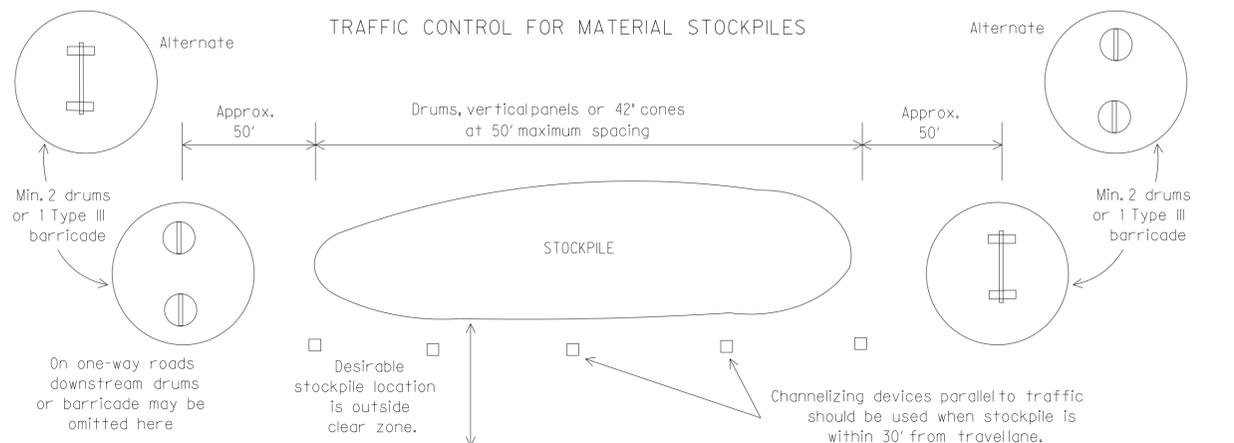
1. Traffic cones and tubular markers shall be a minimum of 28 inches in height when used either on freeways or at nighttime.
2. Cones or tubular markers shall be predominantly orange, fluorescent red-orange, or fluorescent yellow-orange. They should be kept clean and bright for maximum visibility.
3. Cones used only for daytime operations do not require the reflectorized bands.
4. Cones and tubular markers used for nighttime operations shall be reflectorized. Reflectorized material shall have a smooth, sealed outer surface that displays the same approximate color during the day and night. The reflectorized bands shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
5. When used at night, appropriate personnel shall ensure that cones and tubular markers remain in their proper location and in an upright position.
6. Reflectorization of 28" cones shall consist of a minimum 6 inch band placed at least 3 inches but not more than 4 inches from the top, supplemented by a minimum 4 inch band spaced a minimum of 2 inches below the 6 inch band.
7. Reflectorization of 42" cones shall be provided by alternating 4 to 6" orange and white stripes with orange on top.
8. Reflectorization of tubular markers shall be a minimum of two 3 inch bands placed a maximum of 2 inches from the top with a maximum of 6 inches between bands.
9. One-piece cones or tubular markers are generally suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels, drums or two-piece cones for long term usage. Care should be taken to ensure they remain in their proper location and in an upright position.
10. Cones or tubular markers used on each project shall be of the same size and shape.
11. The handle may be designed as a hook or other shape, fabricated from non-rigid materials similar to the cone material, and may extend up to a maximum of 8 inches above the top of cone. Length of the handle shall not be considered with regard to the overall height of the cone.



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 C encapsulated bead (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD**

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

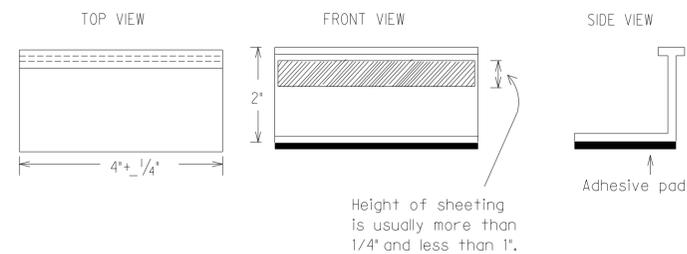
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

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

Guidemarks shall be designated as:

- YELLOW - (two amber reflective surfaces with yellow body).
- WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS

PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200	DMS-4300
TRAFFIC BUTTONS	DMS-6100	DMS-6130
EPOXY AND ADHESIVES	DMS-6130	DMS-8240
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-8241	DMS-8241
PREFABRICATED PAVEMENT MARKINGS-PERMANENT	DMS-8241	DMS-8241
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	DMS-8241	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).



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS STANDARD

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11-02		DIST	COUNTY	SHEET NO.	
9-07		15	BEXAR	T-3.11	

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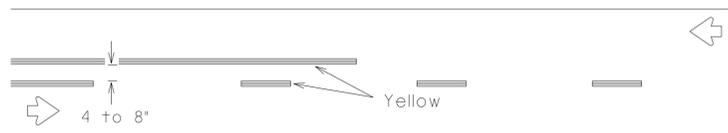
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## PAVEMENT MARKING PATTERNS

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

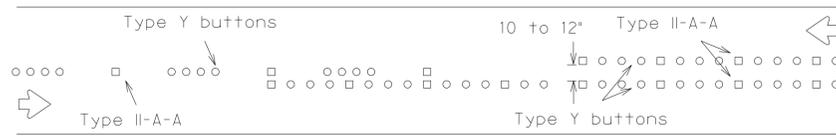


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

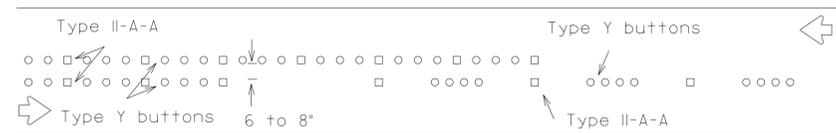


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

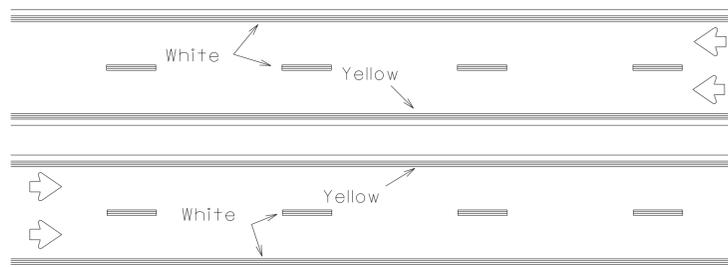


RAISED PAVEMENT MARKERS - PATTERN A



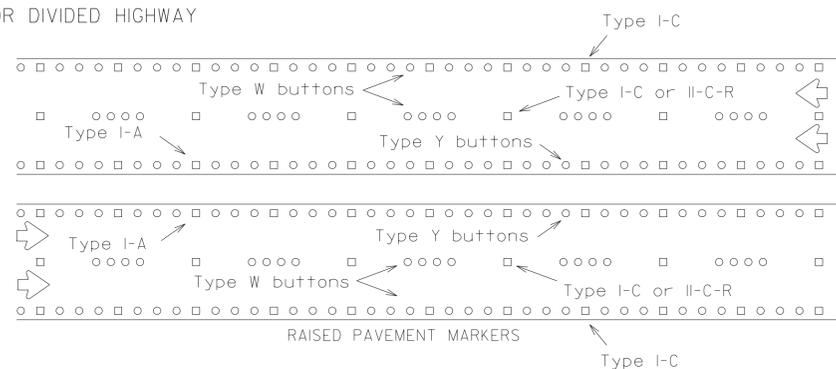
RAISED PAVEMENT MARKERS - PATTERN B

### EDGE & LANE LINES FOR DIVIDED HIGHWAY



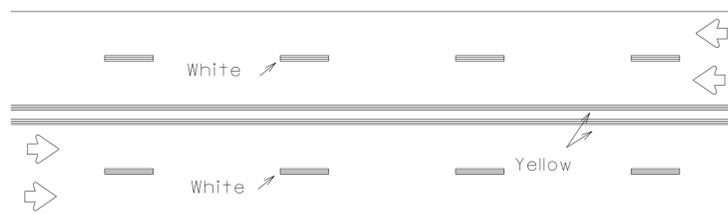
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



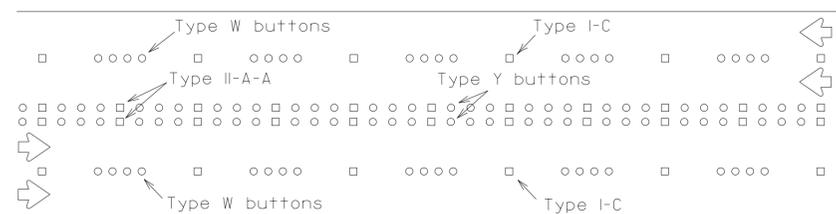
RAISED PAVEMENT MARKERS

### LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



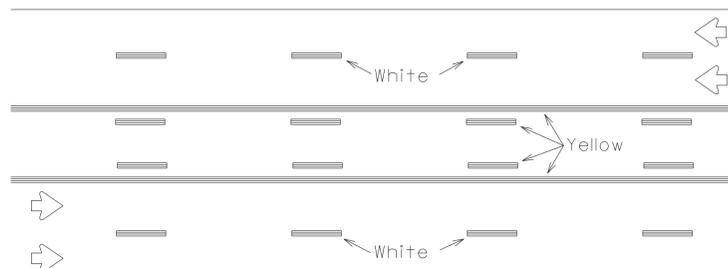
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



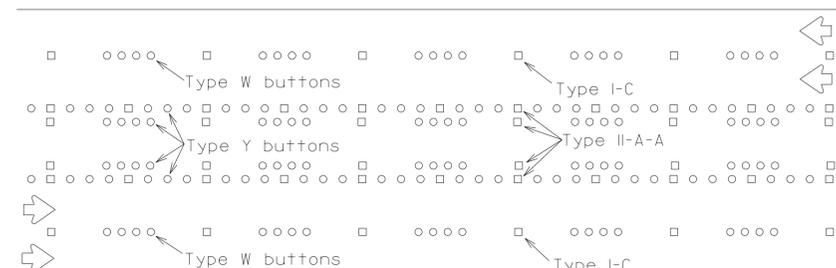
RAISED PAVEMENT MARKERS

### TWO-WAY LEFT TURN LANE



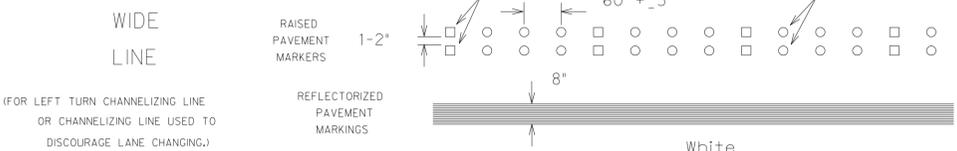
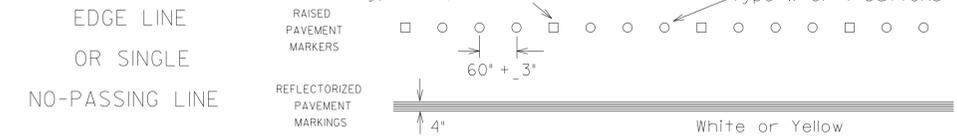
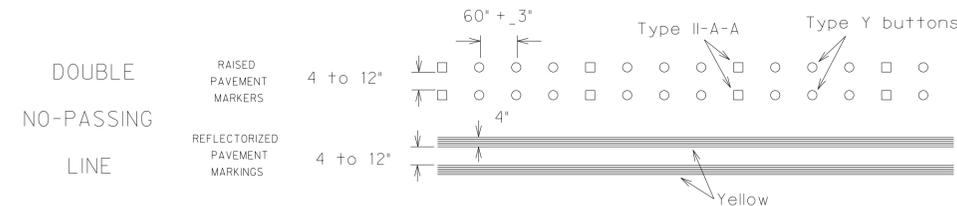
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



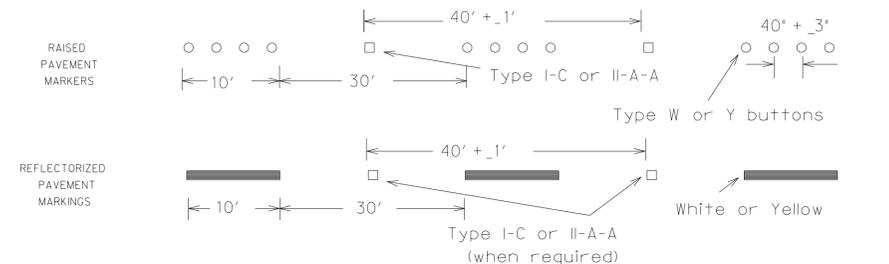
RAISED PAVEMENT MARKERS

## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



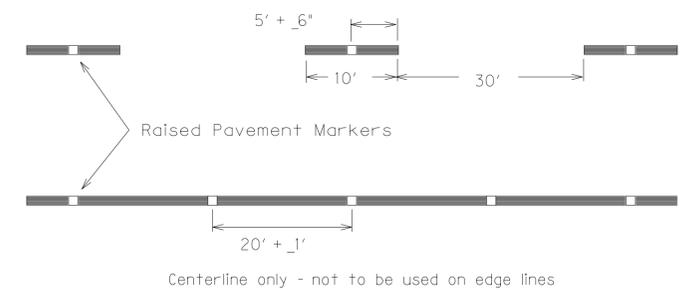
### BROKEN LINE

(FOR CENTER LINE OR LANE 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.



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

## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS STANDARD

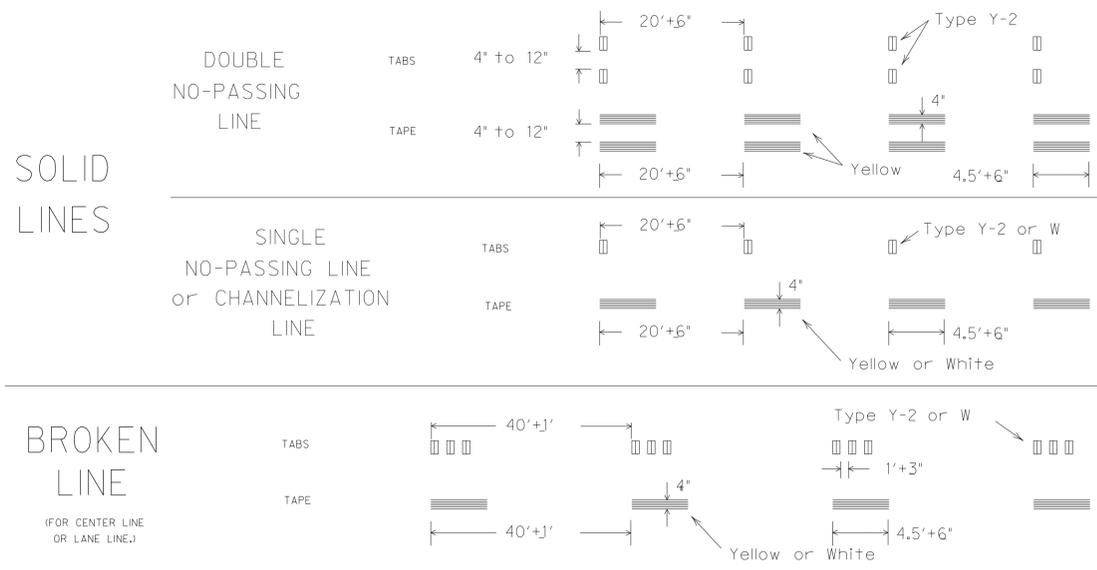
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1-97	REVISIONS	CONT	SECT	JOB	HIGHWAY
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## WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



### NOTES:

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

### TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(10).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

### REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241. A list of prequalified products can be found at the following web site:  
<http://ftp.dot.state.tx.us/pub/txdot-info/gsd/pdf/pavemark.pdf>

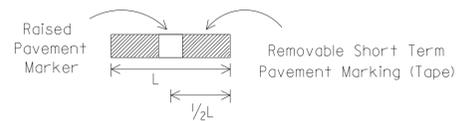
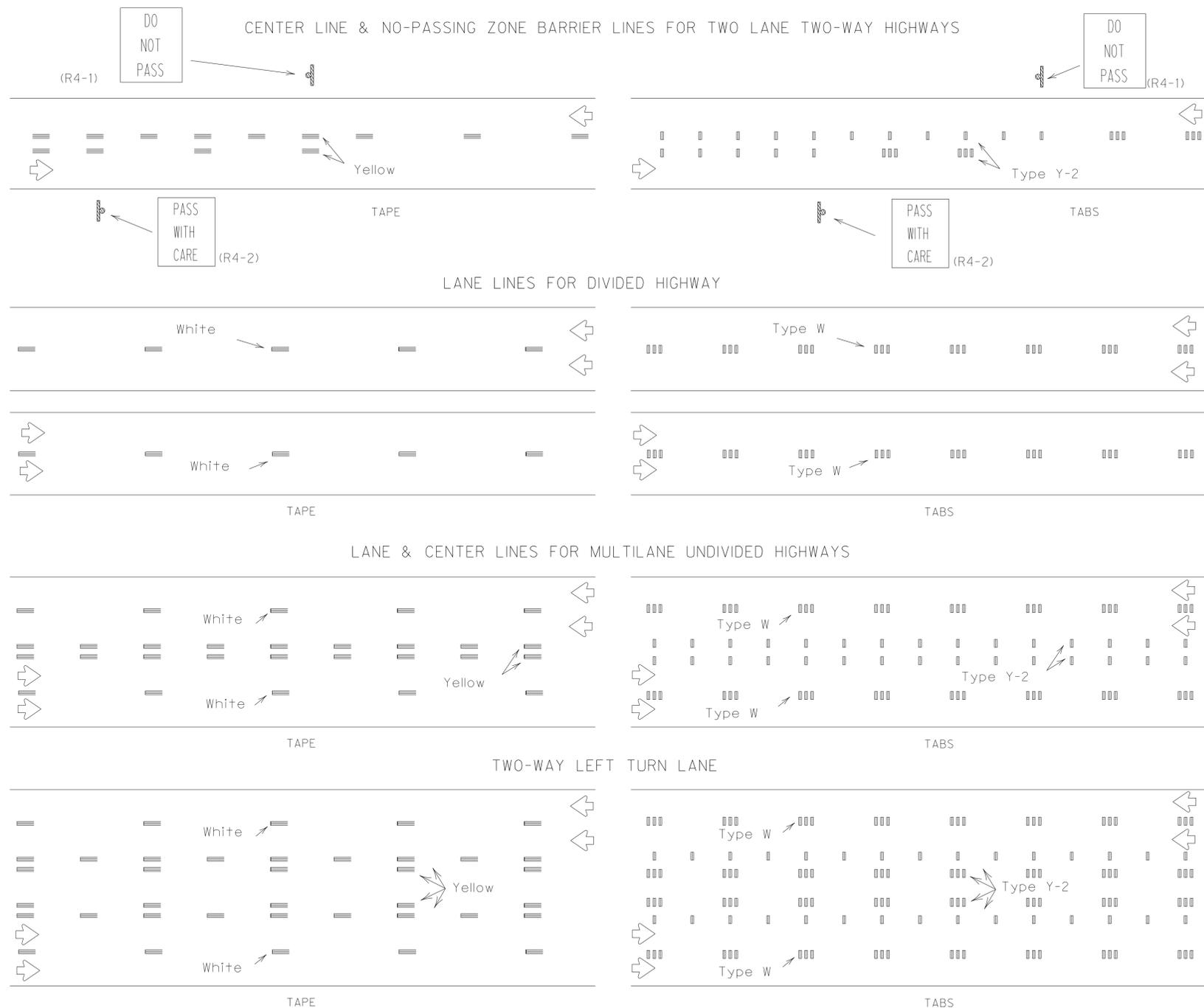
### NON REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

- Non-removable prefabricated pavement markings (foilback) shall meet the requirements of DMS-8240 or the TXDOT Purchase Specification No. 550-74-89. A list of prequalified products and a copy of the TXDOT Purchase Specifications can be found at web sites:  
<http://ftp.dot.state.tx.us/pub/txdot-info/gsd/pdf/pavement.pdf>  
<http://ftp.dot.state.tx.us/pub/txdot-info/gsd/pdf/tss/tss377.pdf>

### RAISED PAVEMENT MARKERS

- 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.
- A list of prequalified reflective raised pavement markers can be found at the following web site:  
<http://ftp.dot.state.tx.us/pub/txdot-info/gsd/pdf/dms4200preq.pdf>

## WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



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

DEPARTMENT MATERIAL SPECIFICATIONS	
PREFABRICATED PAVEMENT MARKINGS-PERMANENT	DMS-8240
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	DMS-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	DMS-8242
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200



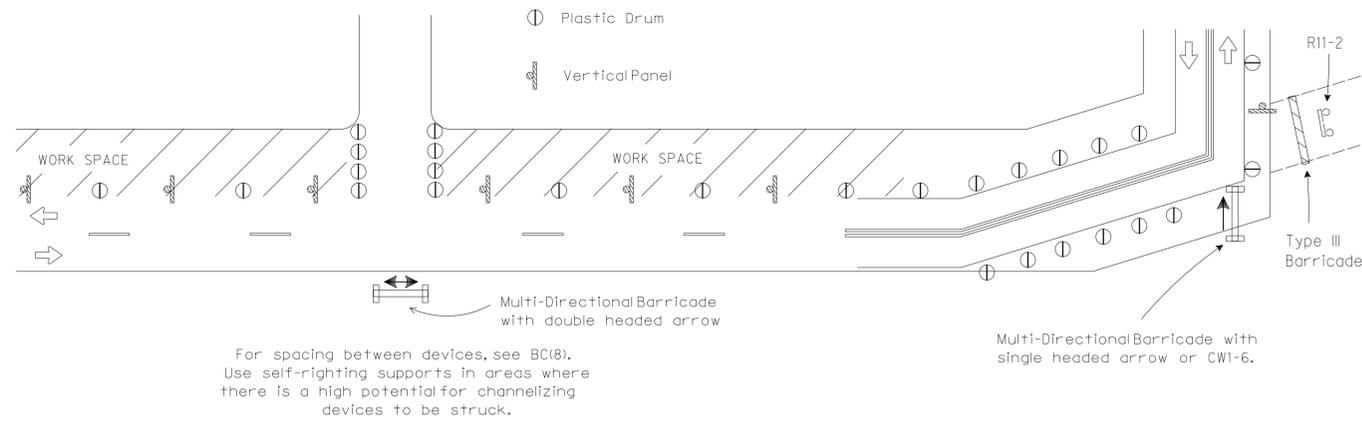
## WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-03

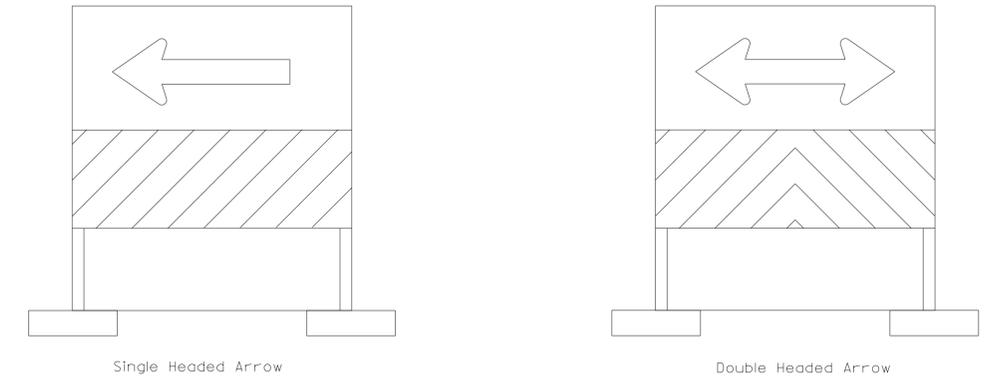
© TxDOT April 1992		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
1-97					
3-03					
	DIST	COUNTY		SHEET NO.	
	15	BEXAR		T-3,13	

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## CHANNELIZING DEVICES FOR URBAN ROADWAY TYPE PROJECT

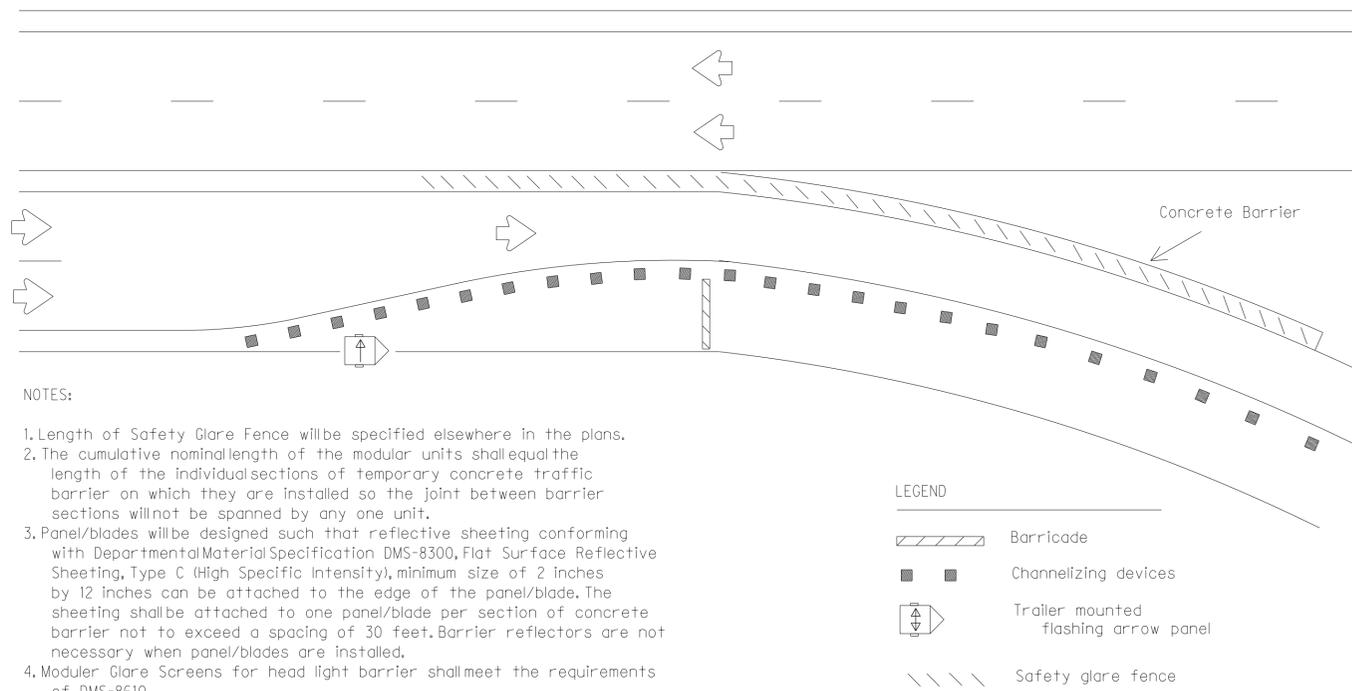


## MULTI-DIRECTIONAL BARRICADE

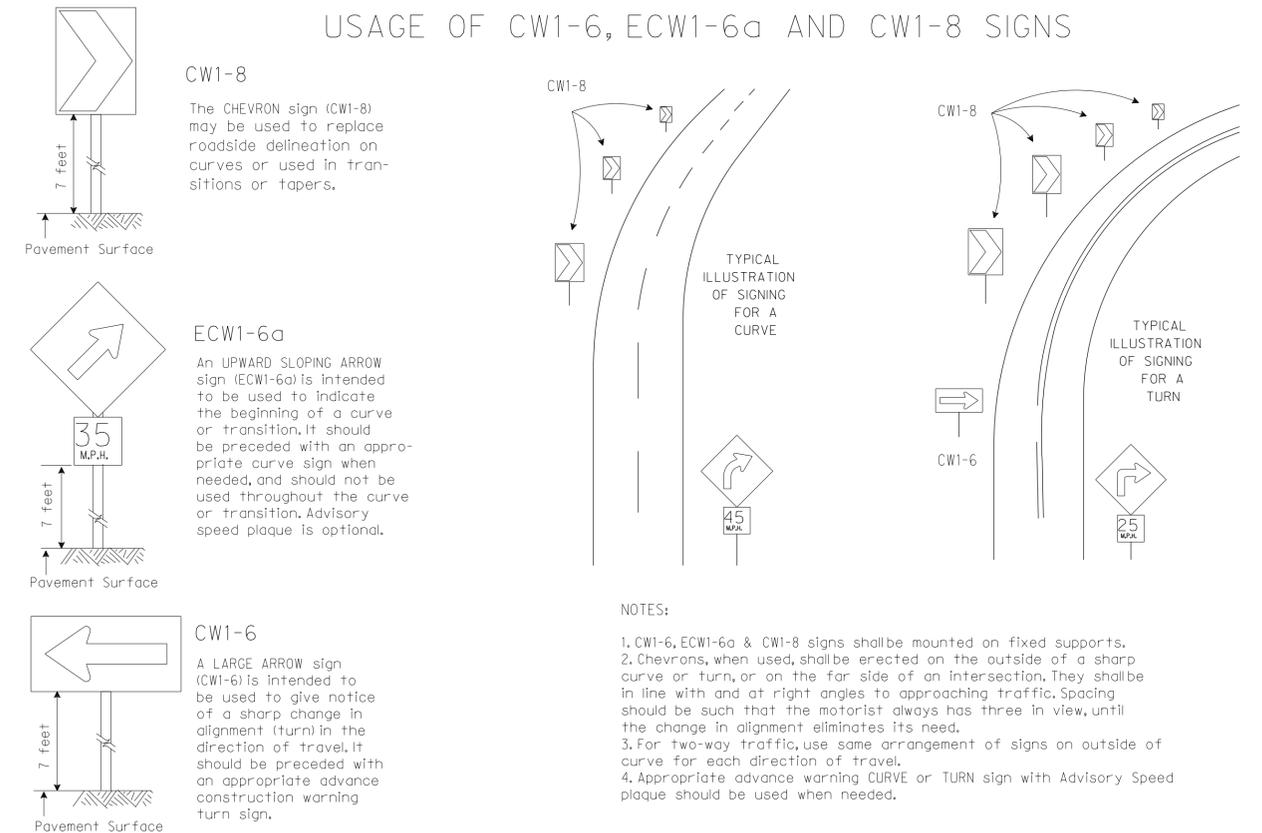


1. Multi-directional barricade shall not be used for lane closures.
2. May be used for sharp changes in alignment, or across roadway from stem of "T" intersection.
3. Typically used for Intermediate Term Stationary, Short Term Stationary or Short Duration work zone operations.
4. See the CWZTCD List for approved designs.

## BARRIER DELINEATION WITH SAFETY GLARE FENCE



## USAGE OF CW1-6, ECW1-6a AND CW1-8 SIGNS



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 obtained by contacting:

Standards Engineer  
Traffic Operations Division - TE  
Texas Department of Transportation  
125 East 11th Street  
Austin, Texas 78701-2483  
Phone (512) 416-3120  
Fax (512) 416-3299

Instructions to locate the 'CWZTCD' on TxDOT website are:

Start at website - [www.dot.state.tx.us](http://www.dot.state.tx.us)  
Click on "About TxDOT",  
Click on "Organizational Chart",  
Click on Traffic Operations Box,  
Click on "Compliant Work Zone Traffic Control Devices",  
Click on "View PDF".  
This site is printable.

PREQUALIFICATION PROCEDURES ARE OBTAINED FROM:

CONSTRUCTION DIVISION-MATERIALS AND TESTS SECTION  
TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)  
125 EAST 11th STREET  
AUSTIN, TX 78701-2483

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLAT SURFACE REFLECTIVE SHEETING DMS-8300  
DELINEATORS AND OBJECT MARKERS DMS-8600  
MODULER GLARE SCREENS DMS-8610

COLOR	USAGE	SIGN SHEETING
ORANGE	BACKGROUND	TYPE E (FLUORESCENT PRISMATIC)
WHITE	BACKGROUND	TYPE C (HIGH SPECIFIC INTENSITY)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE SHEETING

REFER TO THE BC SHEETS FOR SHEETING REQUIREMENT ON CHANNELIZING DEVICES.

The five categories of work duration and their time at a location shall be:

- A. Long-term stationary is work that occupies a location more than 3 days.
- B. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
- C. Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.
- D. Short duration is work that occupies a location up to 1 hour.
- E. Mobile is work that moves intermittently or continuously.

Texas Department of Transportation  
Traffic Operations Division

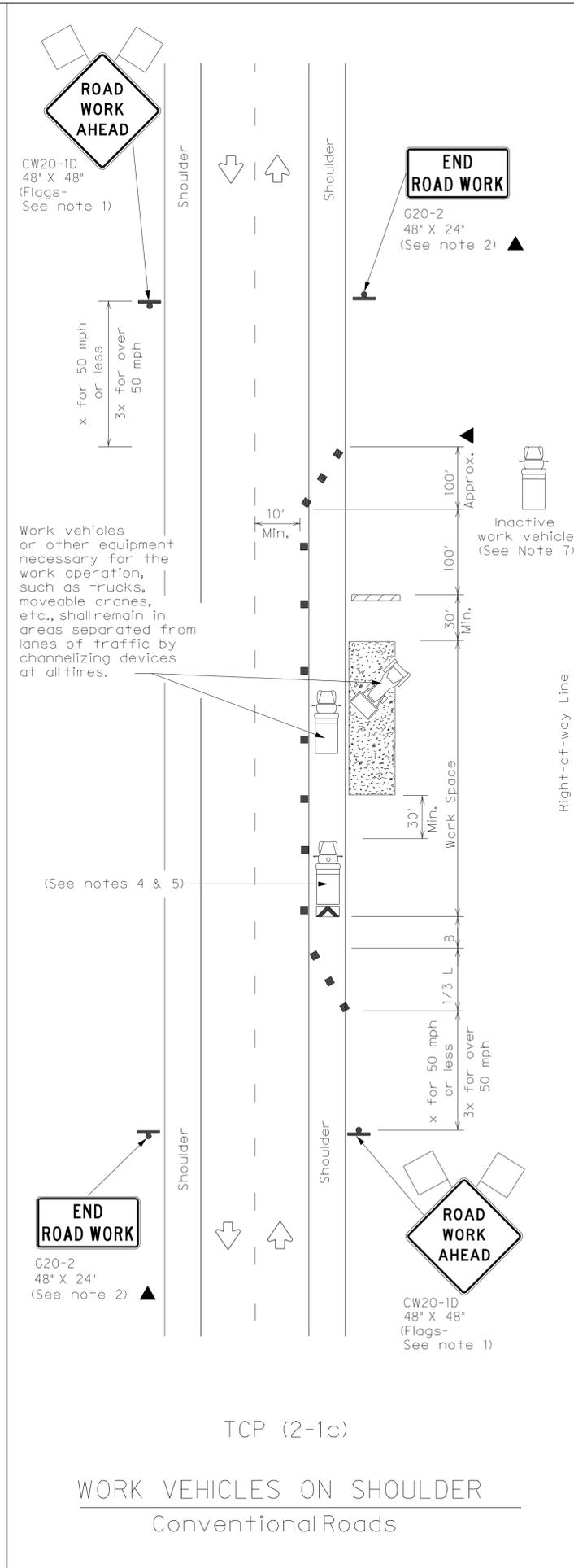
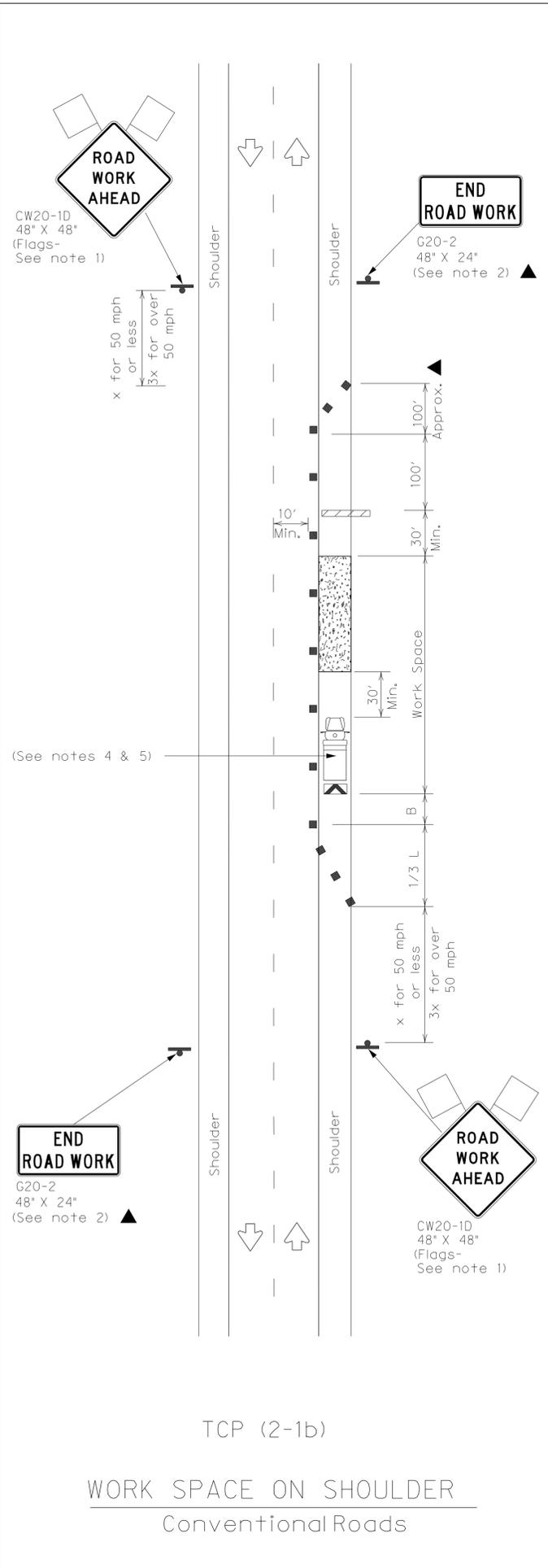
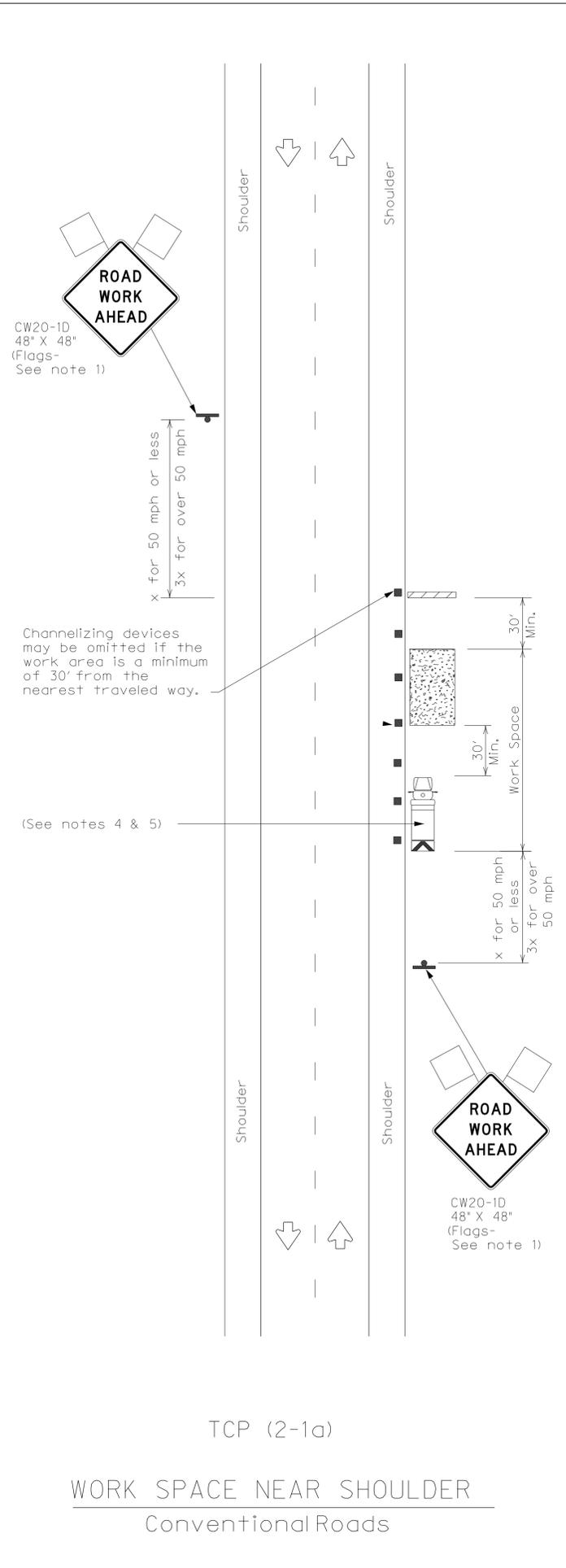
## TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-03

© TxDOT February 1998		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
4-98	3-03	CONT	SECT	JOB	HIGHWAY
		DIST	COUNTY		SHEET NO.
		15	BEXAR		T-3,14

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DATE:  
FILE:



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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing 'X' Distance	Suggested Longitudinal Buffer Space 'B'
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40	L = WS	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50	L = WS	500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60	L = WS	600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70	L = WS	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
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
  - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
  - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
  - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
  - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
  - CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation  
Traffic Operations Division

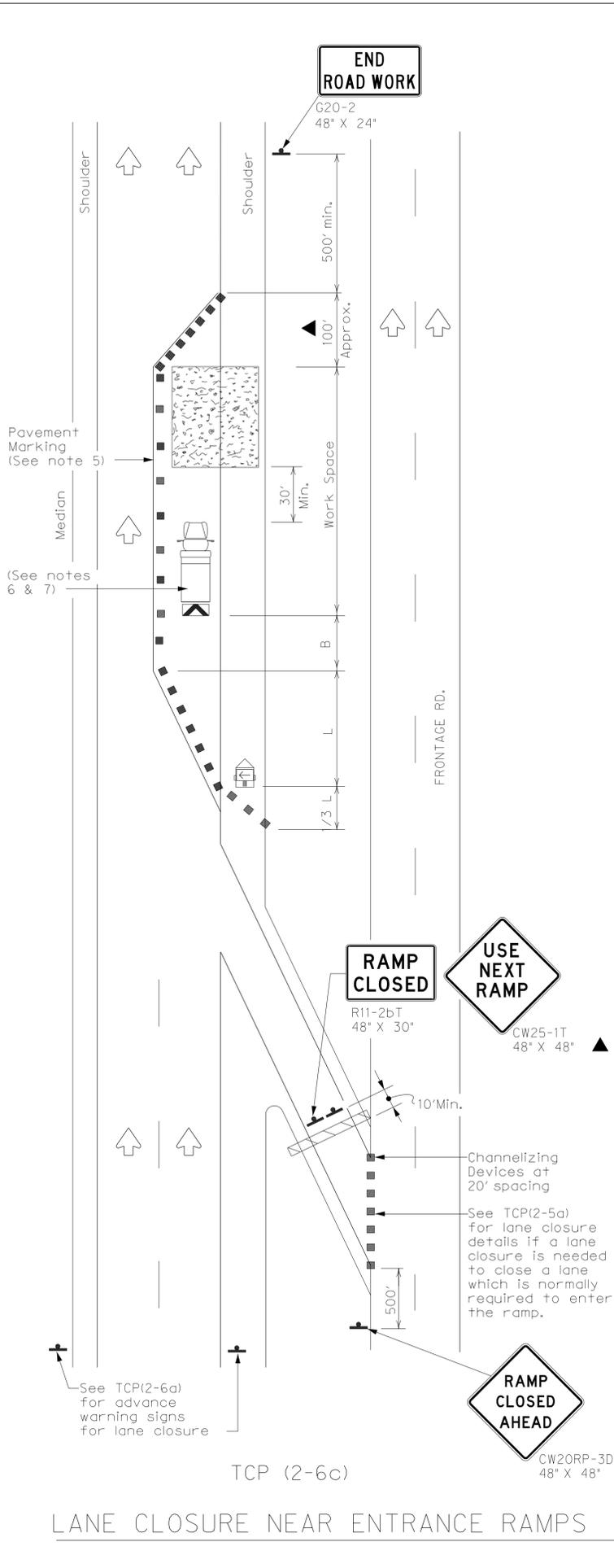
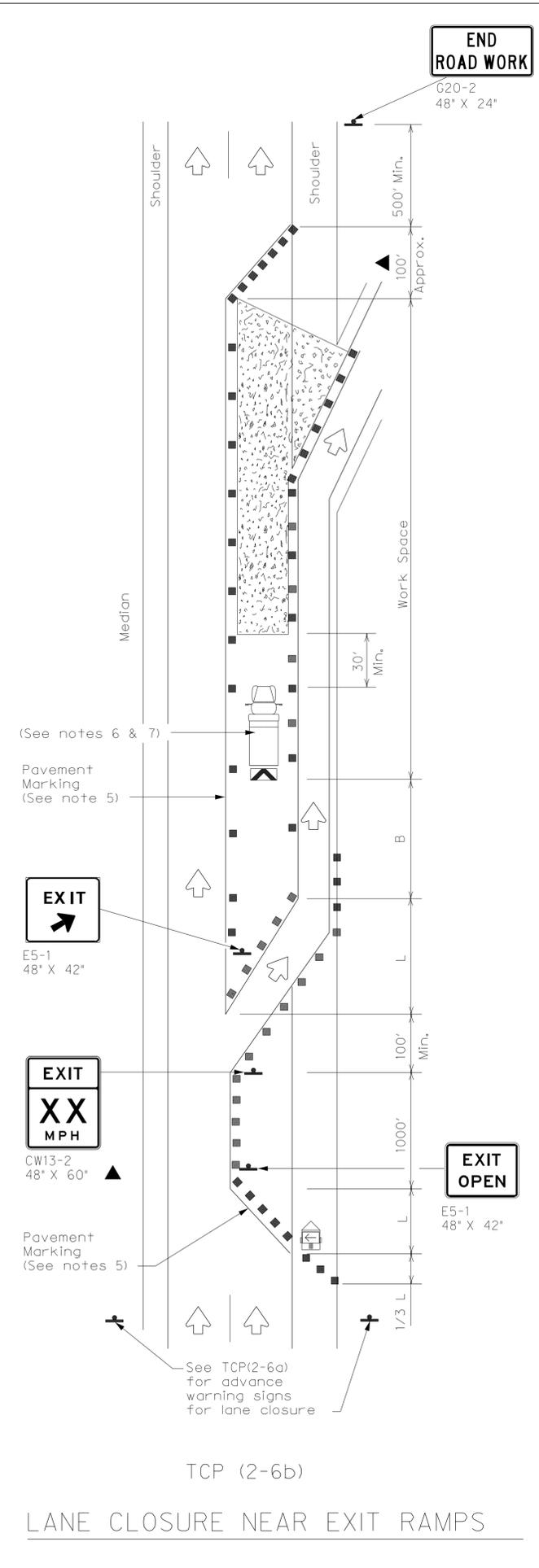
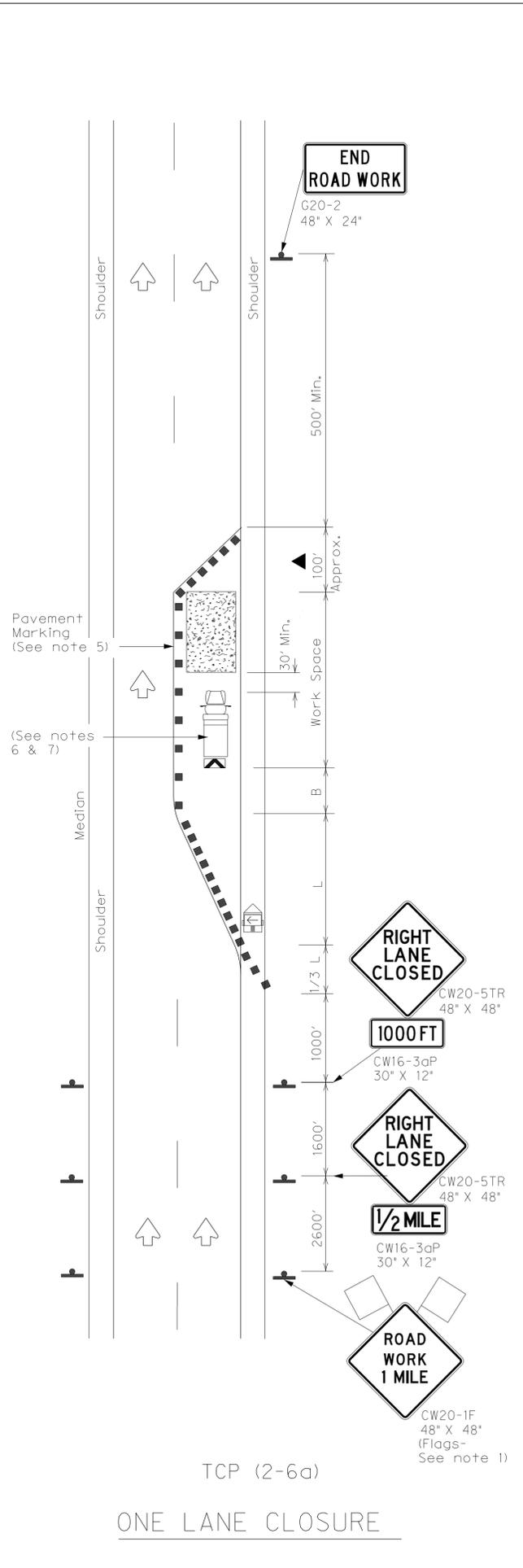
TRAFFIC CONTROL PLAN  
CONVENTIONAL ROAD  
SHOULDER WORK

TCP(2-1)-12

© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94	2-12				
8-95					
1-97		DIST	COUNTY		SHEET NO.
4-98		15	BEXAR		T-3,14
161					

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DATE:  
FILE:



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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing 'x' Distance	Suggested Longitudinal Buffer Space 'B'
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
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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**
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
  - Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on every other channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
  - The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
  - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation  
Traffic Operations Division

**TRAFFIC CONTROL PLAN**  
**LANE CLOSURES ON**  
**DIVIDED HIGHWAYS**

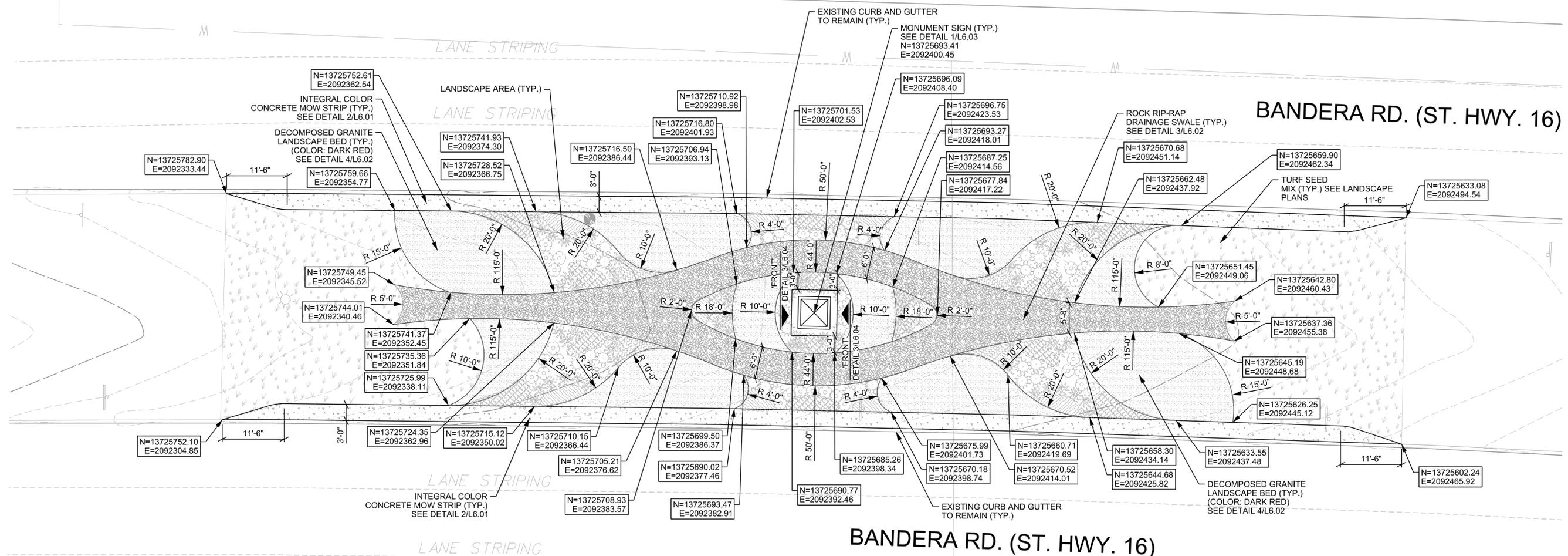
TCP(2-6)-12

© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94	2-12				
8-95					
1-97					
4-98					
		DIST	COUNTY	SHEET NO.	
		15	BEXAR	T-3,16	



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ECHO DR.

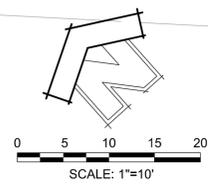


- SITE LAYOUT NOTES:
- EXISTING SURVEY INFORMATION SHOWN ON THE DRAWINGS WAS PROVIDED BY SIA Engineering, Inc. AND IS ASSUMED TO BE ACCURATE FOR THE PURPOSES OF LAYING-OUT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR FIELD-VERIFYING THE LOCATION (AND ELEVATION, WHERE RELEVANT) OF THE EXISTING SITE FEATURES. IF CONFLICTS ARE DISCOVERED BETWEEN WHAT IS SHOWN ON THE DRAWINGS AND WHAT IS PRESENT IN THE FIELD, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA, REPORT THE DISCREPANCY TO THE LANDSCAPE ARCHITECT, AND NOT PROCEED WITHOUT SPECIFIC WRITTEN DIRECTION.
  - CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED.
  - ALL PAVING DIMENSIONS TO EDGE OF PAVING OR BACK OF CURB UNLESS OTHERWISE SHOWN.
  - PROTECT ALL AREAS OF THE RIGHT OF WAY ALONG WITH ADJACENT PROPERTY ELEMENTS AND FACILITIES, LOCATED WITHIN AND ADJACENT TO THE LIMITS OF THE PROPOSED CONSTRUCTION AREAS, FROM DESTRUCTION. EXERCISE CARE TO PREVENT DAMAGE TO TREES, VEGETATION, BUILDINGS, SIDEWALKS, PAVEMENT AND OTHER SURROUNDING ELEMENTS. RESTORE ANY AREA DISTURBED BECAUSE OF THE CONTRACTOR'S OPERATIONS TO A CONDITION AS GOOD AS, OR BETTER THAN, BEFORE THE BEGINNING OF WORK AT NO ADDITIONAL COST TO THE OWNER.

BANDERA RD. (ST. HWY. 16)

BANDERA RD. (ST. HWY. 16)

GRASS HILL DR.



CITY OF LEON VALLEY  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

LEON VALLEY  
T E X A S

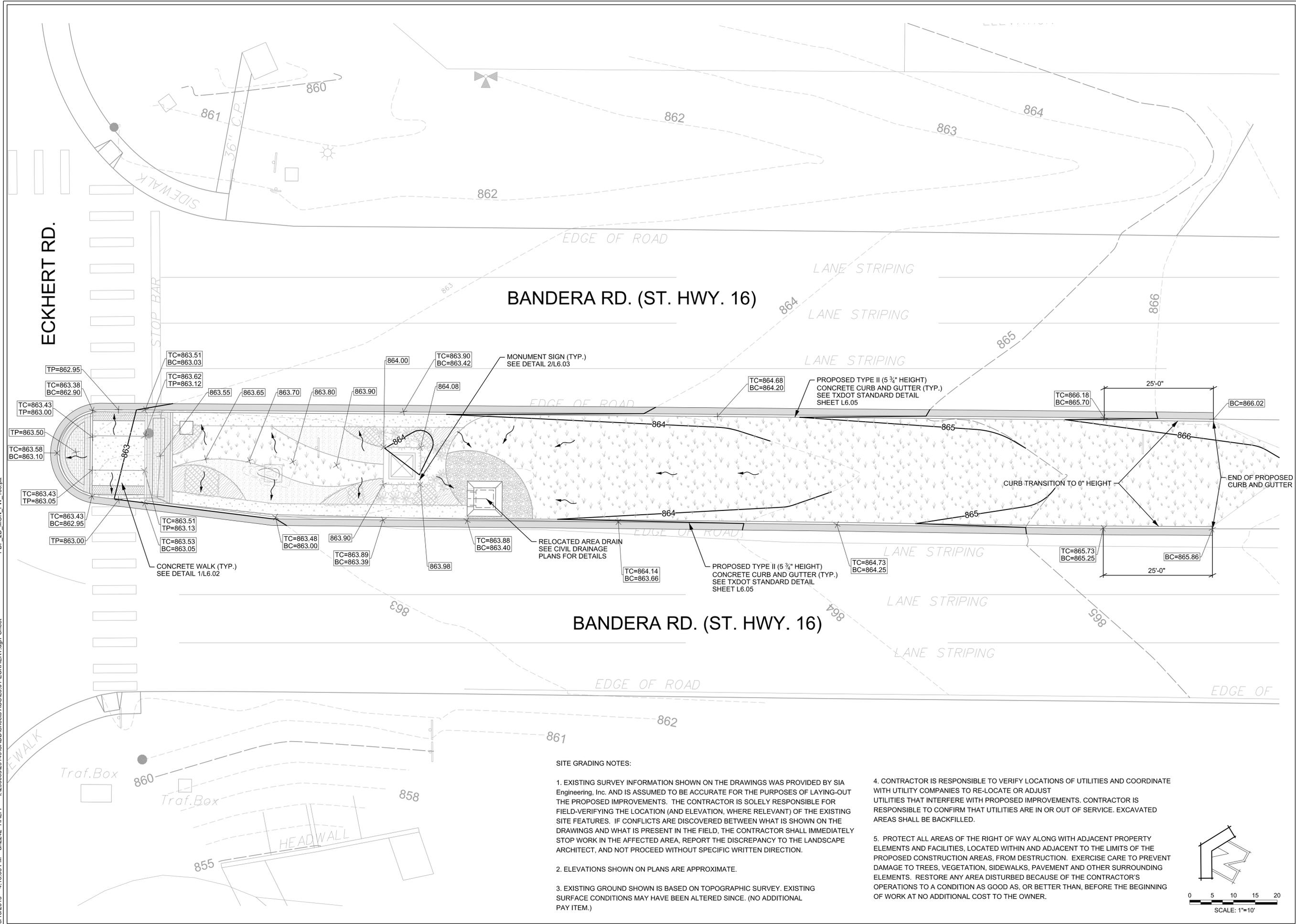
HALFF  
4030 WEST BRAKER LANE, SUITE 400  
LEON VALLEY, TEXAS 78556  
TEL (512) 252-3818  
FAX (512) 252-9141  
TBP# FIRM #512

Revision No.	Date	Description

Half Associates TBP# FIRM #F-312

James E. Carillo  
8-16-2013

Project No.:	29149
Issued:	08/16/2013
Drawn By:	BS
Checked By:	JC
Scale:	AS NOTED
Sheet Title	SITE LAYOUT PLAN GRASS HILL DR.
Sheet Number	L2.02



SITE GRADING NOTES:

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- ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE.
- EXISTING GROUND SHOWN IS BASED ON TOPOGRAPHIC SURVEY. EXISTING SURFACE CONDITIONS MAY HAVE BEEN ALTERED SINCE. (NO ADDITIONAL PAY ITEM.)

- CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED.
- PROTECT ALL AREAS OF THE RIGHT OF WAY ALONG WITH ADJACENT PROPERTY ELEMENTS AND FACILITIES, LOCATED WITHIN AND ADJACENT TO THE LIMITS OF THE PROPOSED CONSTRUCTION AREAS, FROM DESTRUCTION. EXERCISE CARE TO PREVENT DAMAGE TO TREES, VEGETATION, SIDEWALKS, PAVEMENT AND OTHER SURROUNDING ELEMENTS. RESTORE ANY AREA DISTURBED BECAUSE OF THE CONTRACTOR'S OPERATIONS TO A CONDITION AS GOOD AS, OR BETTER THAN, BEFORE THE BEGINNING OF WORK AT NO ADDITIONAL COST TO THE OWNER.

Revision No.	Date	Description

Half Associates TBPE FIRM #312

James E. Carillo  
8-16-2013

Project No.: 29149  
 Issued: 08/16/2013  
 Drawn By: BS  
 Checked By: JC  
 Scale: AS NOTED  
 Sheet Title  
 SITE GRADING PLAN  
 ECKHERT RD.  
 L3.01  
 Sheet Number

ECHO DR.

SITE GRADING NOTES:

1. EXISTING SURVEY INFORMATION SHOWN ON THE DRAWINGS WAS PROVIDED BY SIA Engineering, Inc. AND IS ASSUMED TO BE ACCURATE FOR THE PURPOSES OF LAYING-OUT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR FIELD-VERIFYING THE LOCATION (AND ELEVATION, WHERE RELEVANT) OF THE EXISTING SITE FEATURES. IF CONFLICTS ARE DISCOVERED BETWEEN WHAT IS SHOWN ON THE DRAWINGS AND WHAT IS PRESENT IN THE FIELD, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA, REPORT THE DISCREPANCY TO THE LANDSCAPE ARCHITECT, AND NOT PROCEED WITHOUT SPECIFIC WRITTEN DIRECTION.

2. ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE.

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LANE STRIPING

LANE STRIPING

BANDERA RD. (ST. HWY. 16)

LANE STRIPING

LANE STRIPING

BANDERA RD. (ST. HWY. 16)

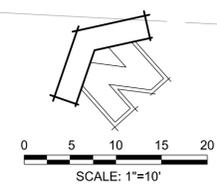
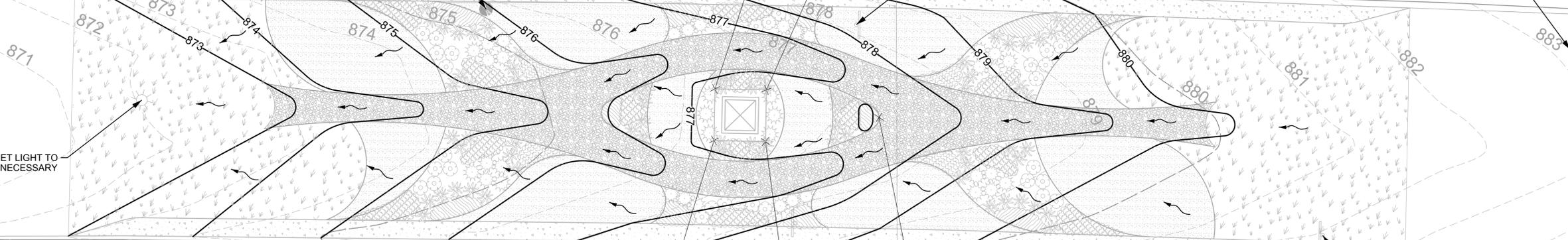
GRASS HILL DR.

EXISTING TRAFFIC SIGNAGE TO REMAIN. PROTECT AS NECESSARY

EXISTING STREET LIGHT TO REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO REMAIN. PROTECT AS NECESSARY

EXISTING TRAFFIC SIGNAGE TO REMAIN. PROTECT AS NECESSARY



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CITY OF LEON VALLEY  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

HALFF  
4030 WEST BRAKER LANE, SUITE 400  
LEON VALLEY, TEXAS 78556  
TEL (512) 262-3818  
FAX (512) 262-3141  
TBPE FIRM #312

Revision No.	Date	Description

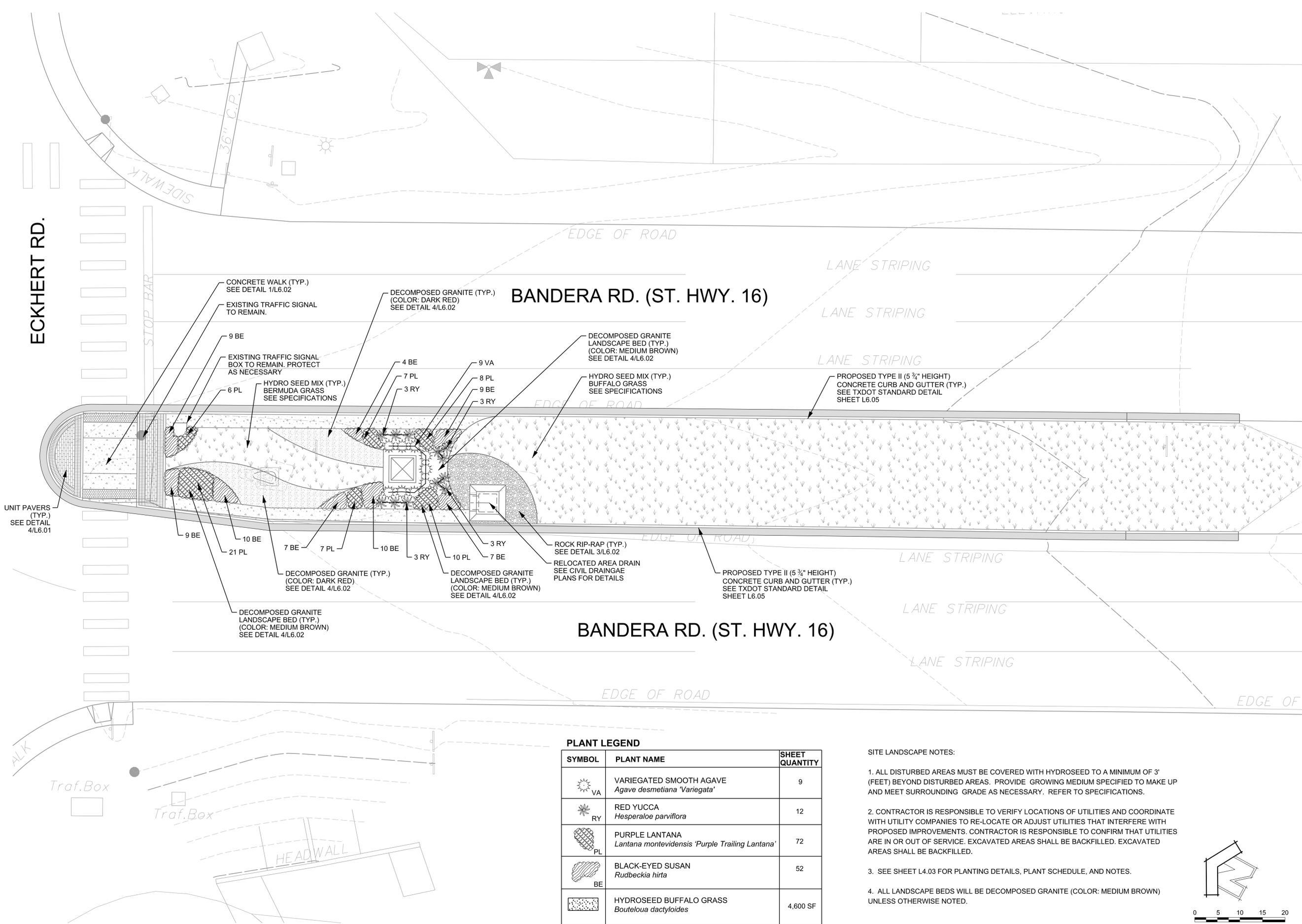
Half Associates TBPE FIRM #F-312  
James E. Carillo  
8-16-2013

Project No.: 29149  
Issued: 08/16/2013  
Drawn By: BS  
Checked By: JC  
Scale: AS NOTED

Sheet Title  
SITE GRADING PLAN  
GRASS HILL RD.

L3.02  
Sheet Number

ECKHERT RD.

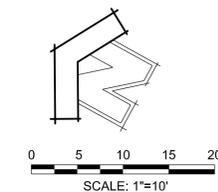


**PLANT LEGEND**

SYMBOL	PLANT NAME	SHEET QUANTITY
	VARIEGATED SMOOTH AGAVE <i>Agave desmetiana 'Variegata'</i>	9
	RED YUCCA <i>Hesperaloe parviflora</i>	12
	PURPLE LANTANA <i>Lantana montevidensis 'Purple Trailing Lantana'</i>	72
	BLACK-EYED SUSAN <i>Rudbeckia hirta</i>	52
	HYDROSEED BUFFALO GRASS <i>Bouteloua dactyloides</i>	4,600 SF

**SITE LANDSCAPE NOTES:**

- ALL DISTURBED AREAS MUST BE COVERED WITH HYDROSEED TO A MINIMUM OF 3' (FEET) BEYOND DISTURBED AREAS. PROVIDE GROWING MEDIUM SPECIFIED TO MAKE UP AND MEET SURROUNDING GRADE AS NECESSARY. REFER TO SPECIFICATIONS.
- CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED. EXCAVATED AREAS SHALL BE BACKFILLED.
- SEE SHEET L4.03 FOR PLANTING DETAILS, PLANT SCHEDULE, AND NOTES.
- ALL LANDSCAPE BEDS WILL BE DECOMPOSED GRANITE (COLOR: MEDIUM BROWN) UNLESS OTHERWISE NOTED.



Revision No.	Date	Description

Half Associates TBP# FIRM #312

James E. Carillo  
8-16-2013

Project No.:	29149
Issued:	08/16/2013
Drawn By:	BS
Checked By:	JC
Scale:	AS NOTED
Sheet Title	SITE LANDSCAPE PLAN ECKHERT RD.

8/16/2013 4:16:10 PM ah2242 HALFF I:\2000s\29149\CADD\Sheets AUS\14.02-GRASS HILL.dwg@sheet PDF\_2D\_MON\_FW\_150.plt

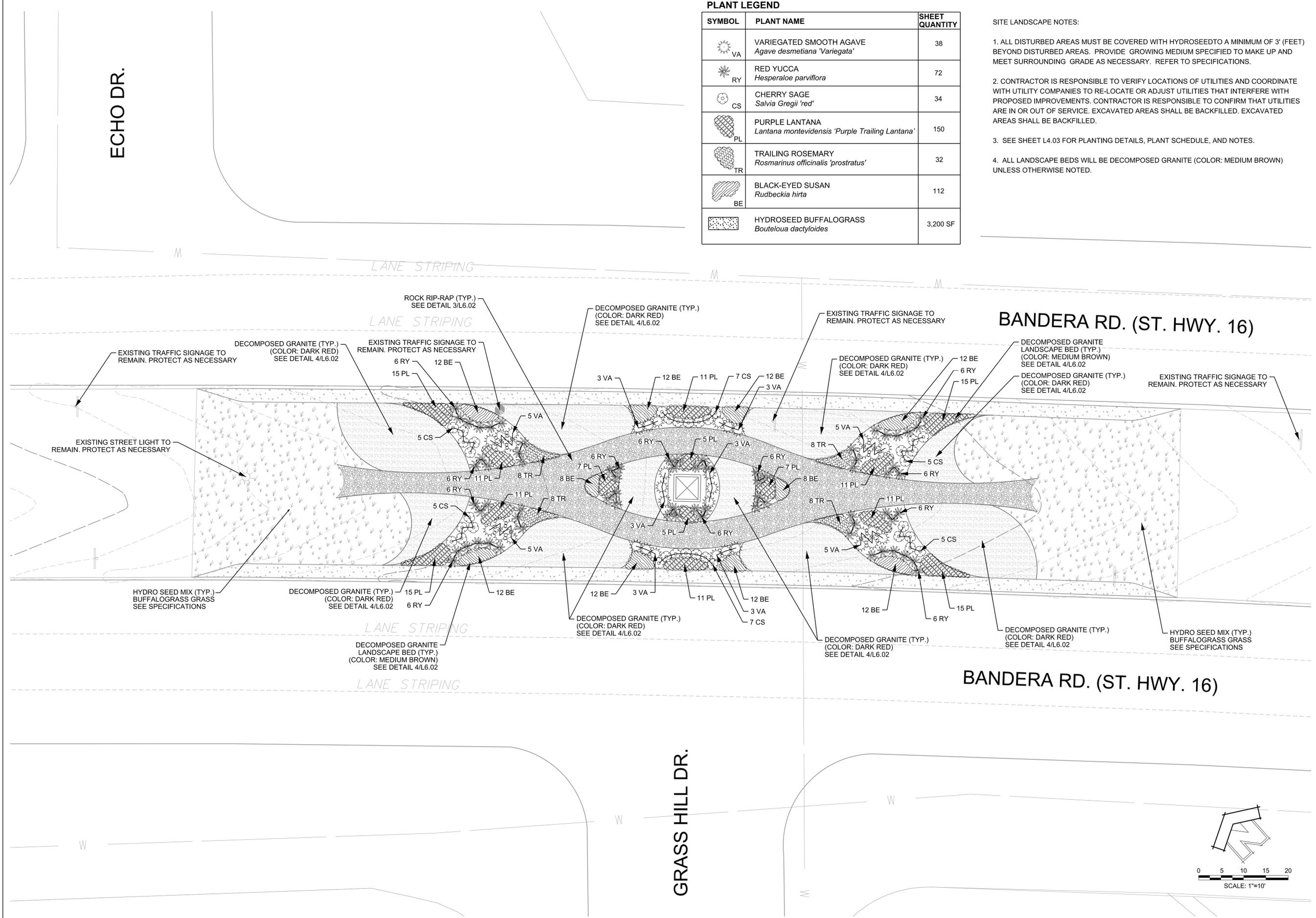
ECHO DR.

GRASS HILL DR.

PLANT LEGEND		
SYMBOL	PLANT NAME	SHEET QUANTITY
VA	VARIEGATED SMOOTH AGAVE <i>Agave desmetiana 'Variegata'</i>	38
RY	RED YUCCA <i>Hesperaloe parviflora</i>	72
CS	CHERRY SAGE <i>Salvia Gregii 'red'</i>	34
PL	PURPLE LANTANA <i>Lantana montevidensis 'Purple Trailing Lantana'</i>	150
TR	TRAILING ROSEMARY <i>Rosmarinus officinalis 'prostratus'</i>	32
BE	BLACK-EYED SUSAN <i>Rudbeckia hirta</i>	112
	HYDROSEED BUFFALOGRASS <i>Bouteloua dactyloides</i>	3,200 SF

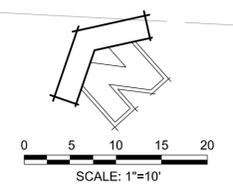
SITE LANDSCAPE NOTES:

1. ALL DISTURBED AREAS MUST BE COVERED WITH HYDROSEED TO A MINIMUM OF 3' (FEET) BEYOND DISTURBED AREAS. PROVIDE GROWING MEDIUM SPECIFIED TO MAKE UP AND MEET SURROUNDING GRADE AS NECESSARY. REFER TO SPECIFICATIONS.
2. CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE. EXCAVATED AREAS SHALL BE BACKFILLED. EXCAVATED AREAS SHALL BE BACKFILLED.
3. SEE SHEET L4.03 FOR PLANTING DETAILS, PLANT SCHEDULE, AND NOTES.
4. ALL LANDSCAPE BEDS WILL BE DECOMPOSED GRANITE (COLOR: MEDIUM BROWN) UNLESS OTHERWISE NOTED.



BANDERA RD. (ST. HWY. 16)

BANDERA RD. (ST. HWY. 16)



CITY OF LEON VALLEY  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

LEON VALLEY  
T E X A S

**HALFF**  
4030 WEST BRAKER LANE, SUITE 400  
LEON VALLEY, TEXAS 78556  
TEL (512) 252-9184  
FAX (512) 252-9141  
TBP# FIRM #512

Revision No.	Date	Description

Half Associates TBP# FIRM #F-312



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Checked By: JC  
Scale: AS NOTED  
Sheet Title  
SITE LANDSCAPE PLAN  
GRASS HILL RD.

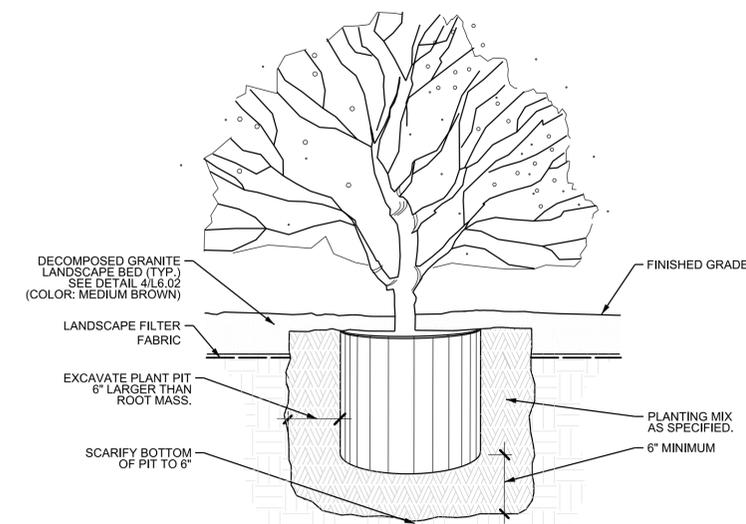
L4.02  
Sheet Number

### LANDSCAPE GENERAL NOTES:

- 1) WRITTEN DIMENSIONS AND GRADES SHALL PREVAIL OVER SCALED DIMENSIONS. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO INSTALLATION.
- 2) THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO THE INSTALLATION OF ANY PLANT MATERIAL OR IRRIGATION.
- 3) THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED COORDINATION WITH OTHER CONTRACTORS ON SITE AS REQUIRED TO ACCOMPLISHED ALL PLANTING OPERATIONS.
- 4) THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL FINAL QUANTITIES PER DRAWINGS AND SPECIFICATIONS. ANY QUANTITIES PROVIDED BY HALFF ASSOCIATES, INC. IS FOR CONVENIENCES ONLY AND SHALL NOT BE CONSIDERED ABSOLUTE. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO INSTALLATION. CONTRACTORS ARE TO BID THEIR OWN VERIFIED QUANTITIES.
- 5) PLANT MATERIAL SHALL CONFIRM TO THE SPECIFICATIONS AND SIZES GIVEN IN THE PLANT LIST AND SHALL BE NURSERY GROWN IN ACCORDANCE WITH "AMERICAN STANDARD FOR NURSERY STOCK" LATEST ADDITION BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION. PLANT SUBSTITUTION SHALL ONLY OCCUR IF APPROVED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

#### PLANT SCHEDULE - SEE PLANS FOR LOCATIONS

Qty.	Common Name	Scientific Name	Size	Height	Spacing
SHRUBS					
47	VARIEGATED SMOOTH AGAVE	<i>Agave desmetiana 'Variegata'</i>	5 GAL	2'-4"	SEE PLANS
84	RED YUCCA	<i>Hesperaloe parviflora</i>	3 GAL	2'-4"	SEE PLANS
34	CHERRY SAGE	<i>Salvia gregii 'red'</i>	3 GAL	2'	SEE PLANS
222	PURPLE LANTANA	<i>Lantana montevidensis 'Purple Trailing Lantana'</i>	1 GAL	6"-12"	18"
32	TRAILING ROSEMARY	<i>Rosmarinus officinalis 'prostratus'</i>	1 GAL	6"-12"	18"
164	BLACK-EYED SUSAN	<i>Rudbeckia hirta</i>	1 GAL	6"-12"	18"
7,800 SF	HYDROSEED BERMUDA GRASS	<i>Cynodon dactylon</i>	--	--	--



**1** PLANTING DETAILS  
SCALE = NTS

**CITY OF LEON VALLEY**  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

**LEON VALLEY**  
T E X A S

**HALFF**  
4030 WEST BRAKER LANE, SUITE 400  
DALLAS, TEXAS 75244  
TEL (972) 252-3818  
FAX (972) 252-3141  
TBP# FIRM #512

Revision No.	Date	Description

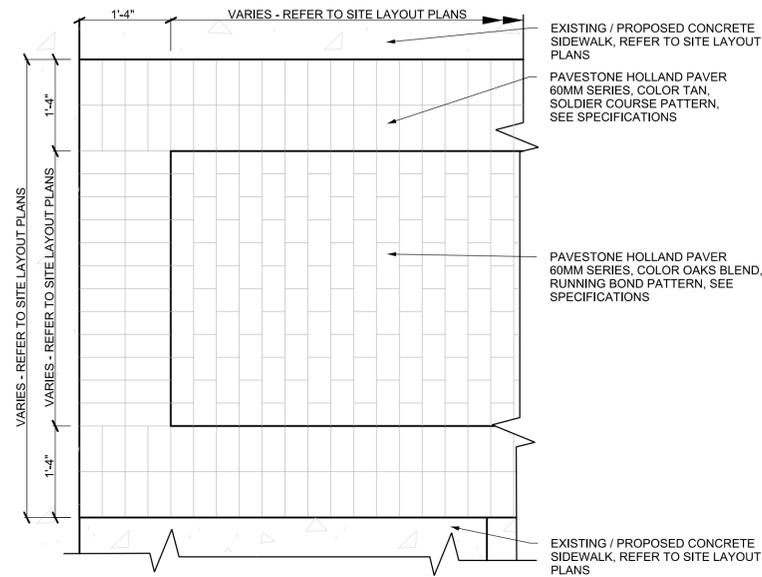
Half Associates TBP# FIRM #F-312

James E. Carillo  
8-16-2013

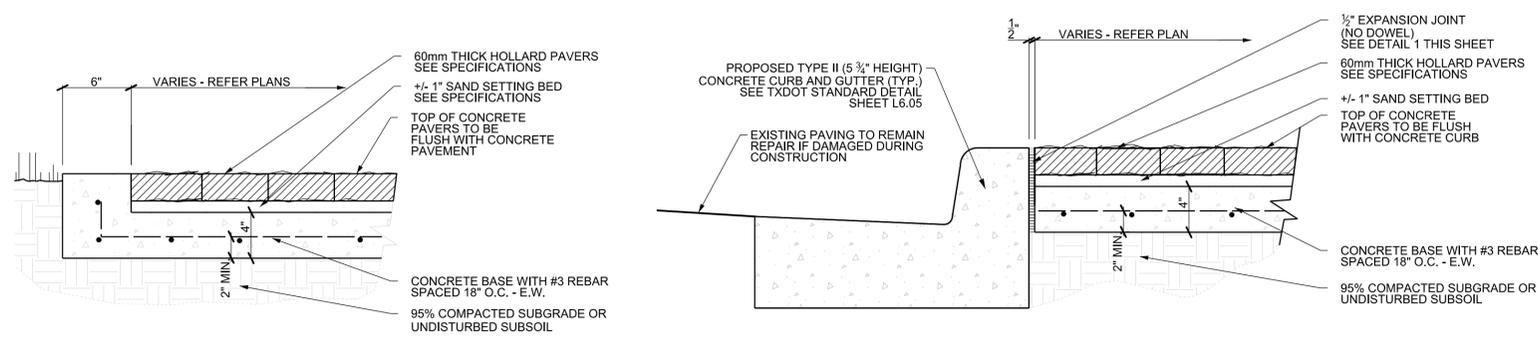
Project No.: 29149  
Issued: 08/16/2013  
Drawn By: BS  
Checked By: JC  
Scale: AS NOTED

Sheet Title  
**PLANTING DETAILS**

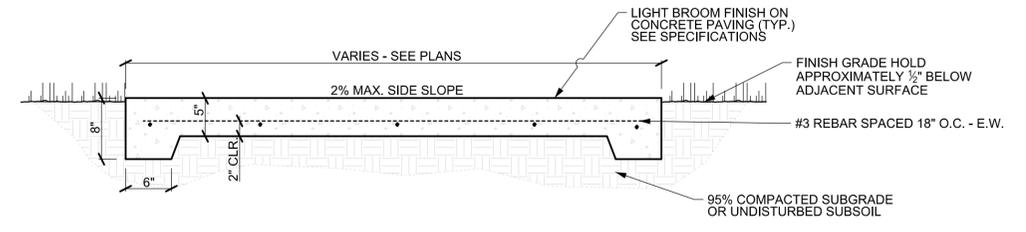
**L4.03**  
Sheet Number



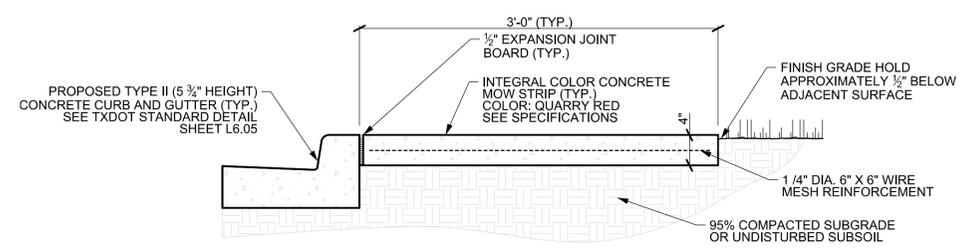
**5** ENLARGED PAVER PLAN  
SCALE = NTS



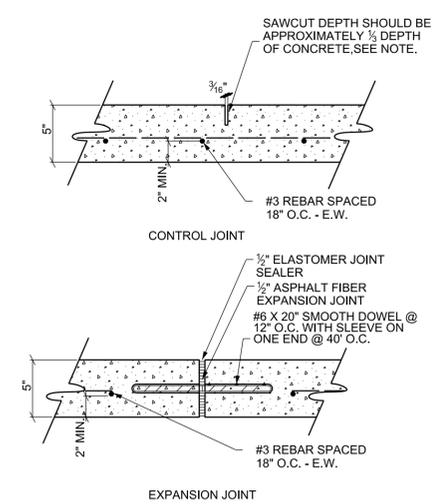
**4** TYPICAL PAVER SECTIONS  
SCALE = NTS



**3** CONCRETE SIDEWALK SECTION  
SCALE = NTS



**2** INTEGRAL COLOR CONCRETE MOW STRIP SECTION  
SCALE = NTS



TYPICAL SIDEWALK JOINTS NOTES:

1. PROVIDE EXPANSION JOINTS AS NOTED (MAX. 40'-0" O.C.E.W.) AND WHERE SIDEWALK ABUTS EXISTING SIDEWALKS.
2. PROVIDE CONSTRUCTION JOINTS AS NOTED AND WHERE SIDEWALK ABUTS STRUCTURES, EXISTING PAVEMENT AND CONCRETE CURBS.

**1** CONCRETE SIDEWALK JOINT DETAILS  
SCALE = NTS

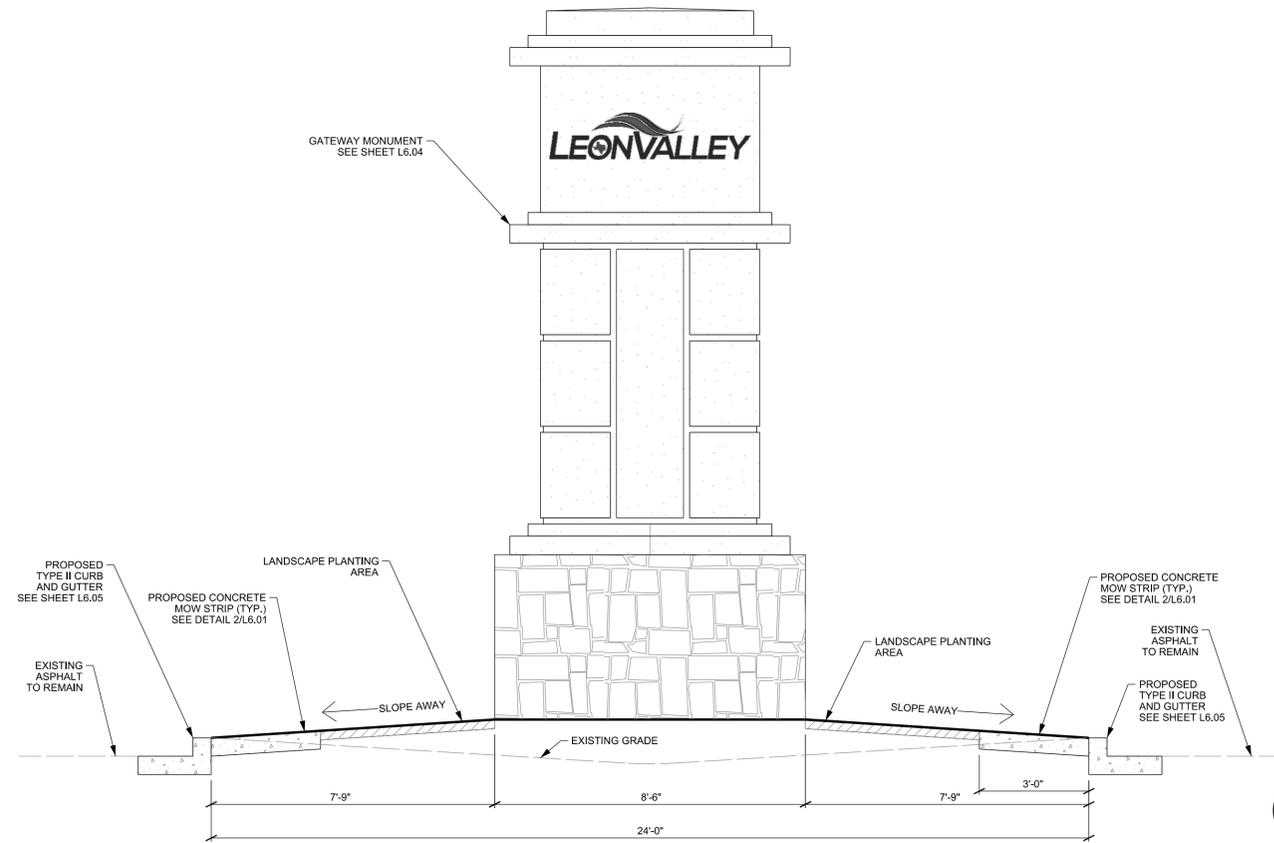
Revision No.	Date	Description

Half Associates TBP E FIRM #F-312

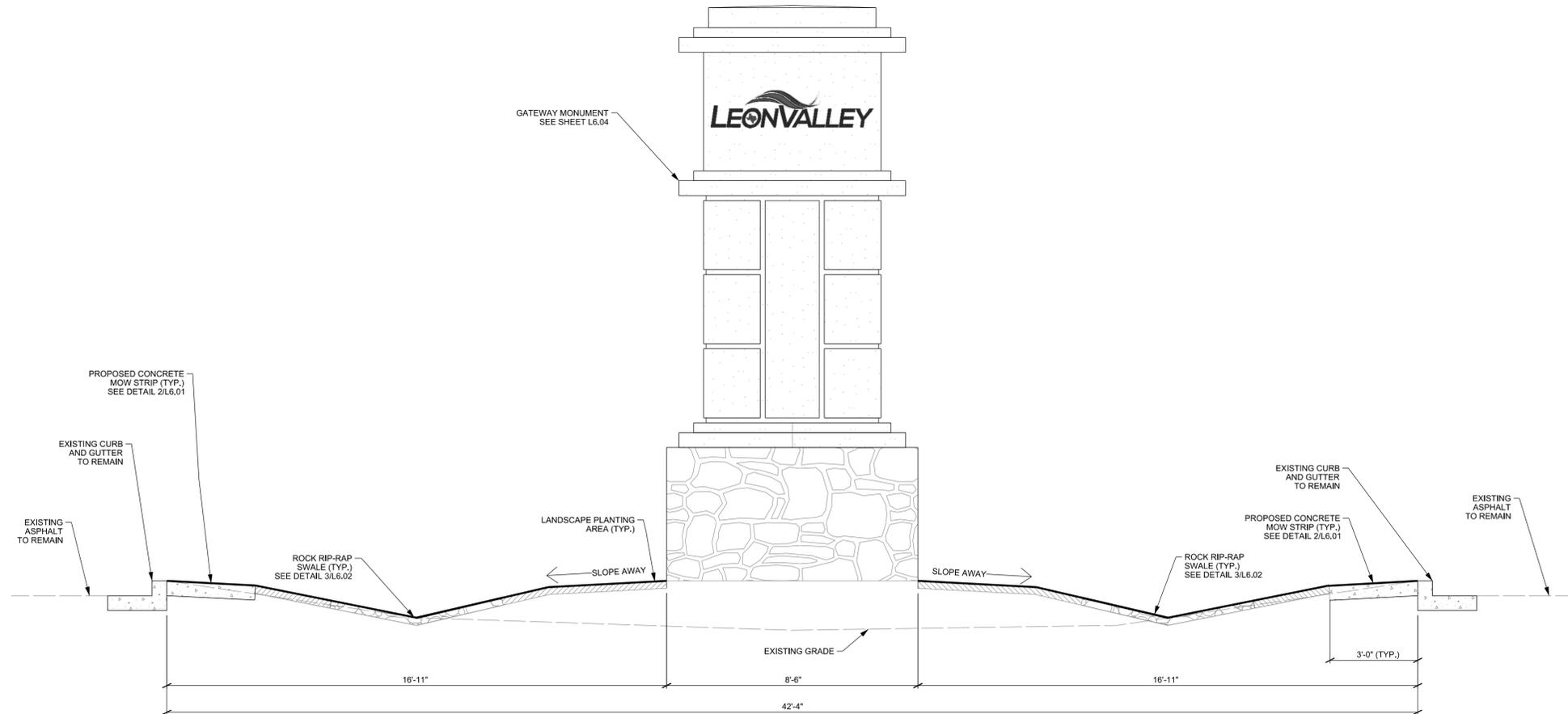
James E. Carillo  
8-16-2013

Project No.:	29149
Issued:	08/16/2013
Drawn By:	BS
Checked By:	JC
Scale:	AS NOTED
Sheet Title	DETAILS
Sheet Number	L6.01





**2** ECKHERT RD. GATEWAY MONUMENT TYPICAL SECTION  
SCALE: NTS



**1** GRASS HILL DR. GATEWAY MONUMENT TYPICAL SECTION  
SCALE: NTS

**CITY OF LEON VALLEY**  
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T E X A S

**HALFF**  
4030 WEST BRAKER LANE, SUITE 400  
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TEL: (972) 252-3184  
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TBP# FIRM #512

Revision No.	Date	Description

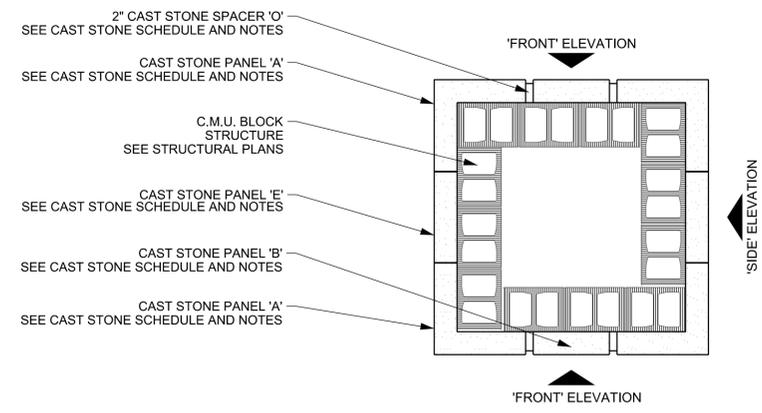
Half Associates TBP# FIRM #F-312

James E. Carillo  
8-16-2013

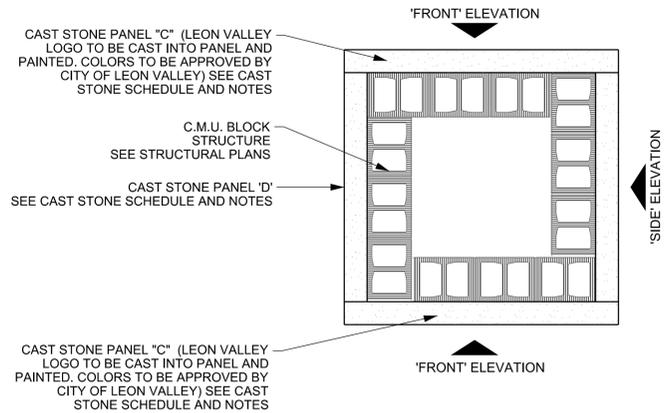
Project No.: 29149  
Issued: 08/16/2013  
Drawn By: BS  
Checked By: JC  
Scale: AS NOTED

Sheet Title  
GATEWAY MONUMENT  
TYPICAL SECTIONS

**L6.03**  
Sheet Number



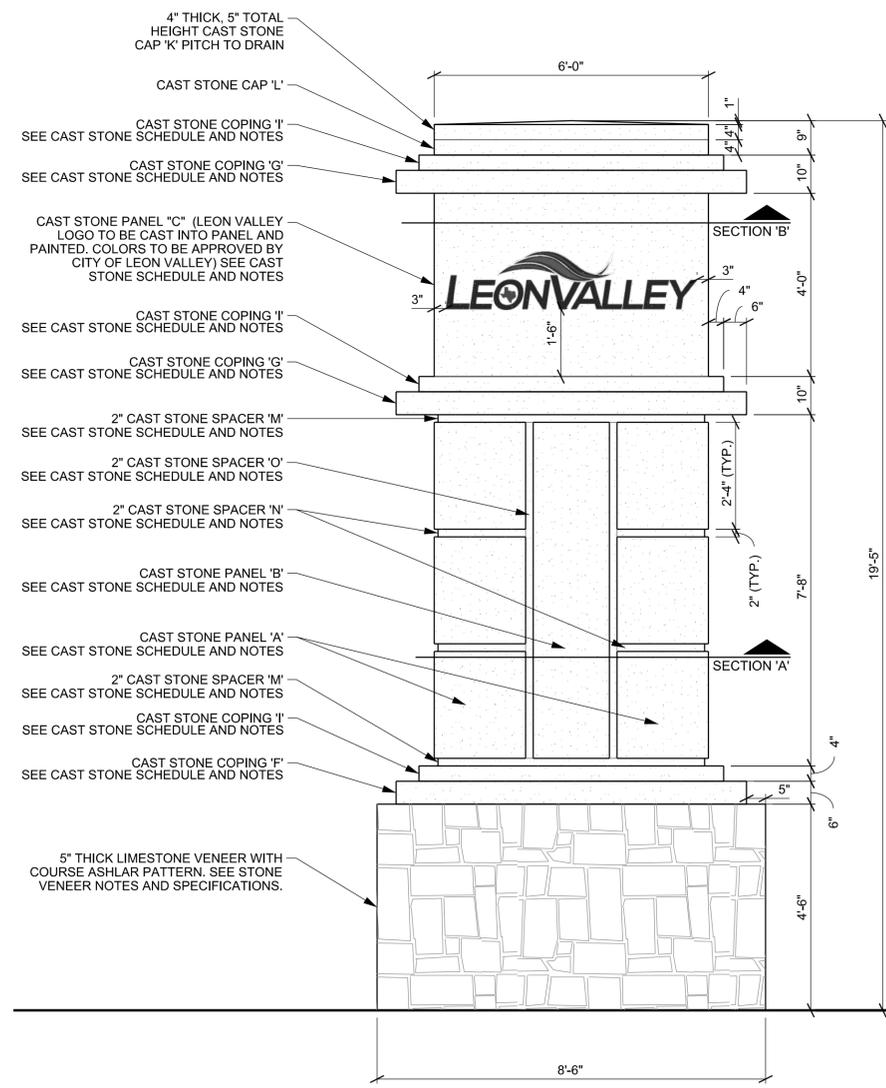
**5** GATEWAY MONUMENT PLAN VIEW SECTION 'A'  
SCALE: 1/2"=1'-0"



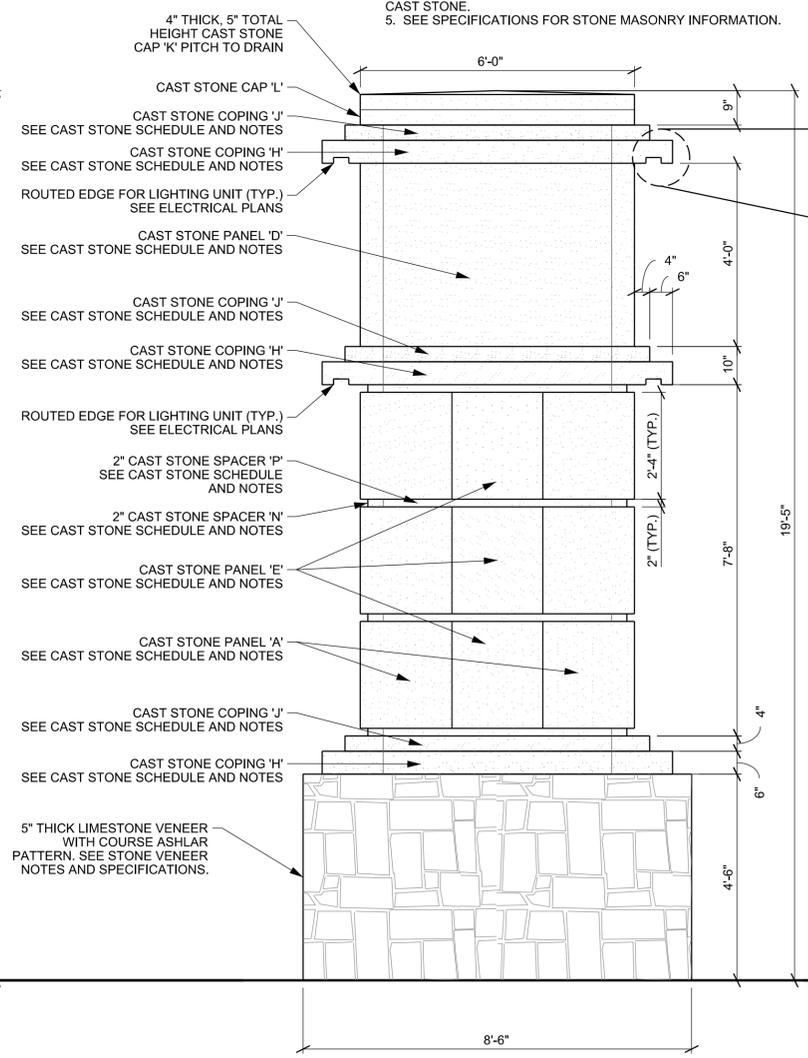
**4** GATEWAY MONUMENT PLAN VIEW SECTION 'B'  
SCALE: 1/2"=1'-0"

**STONE VENEER NOTES:**

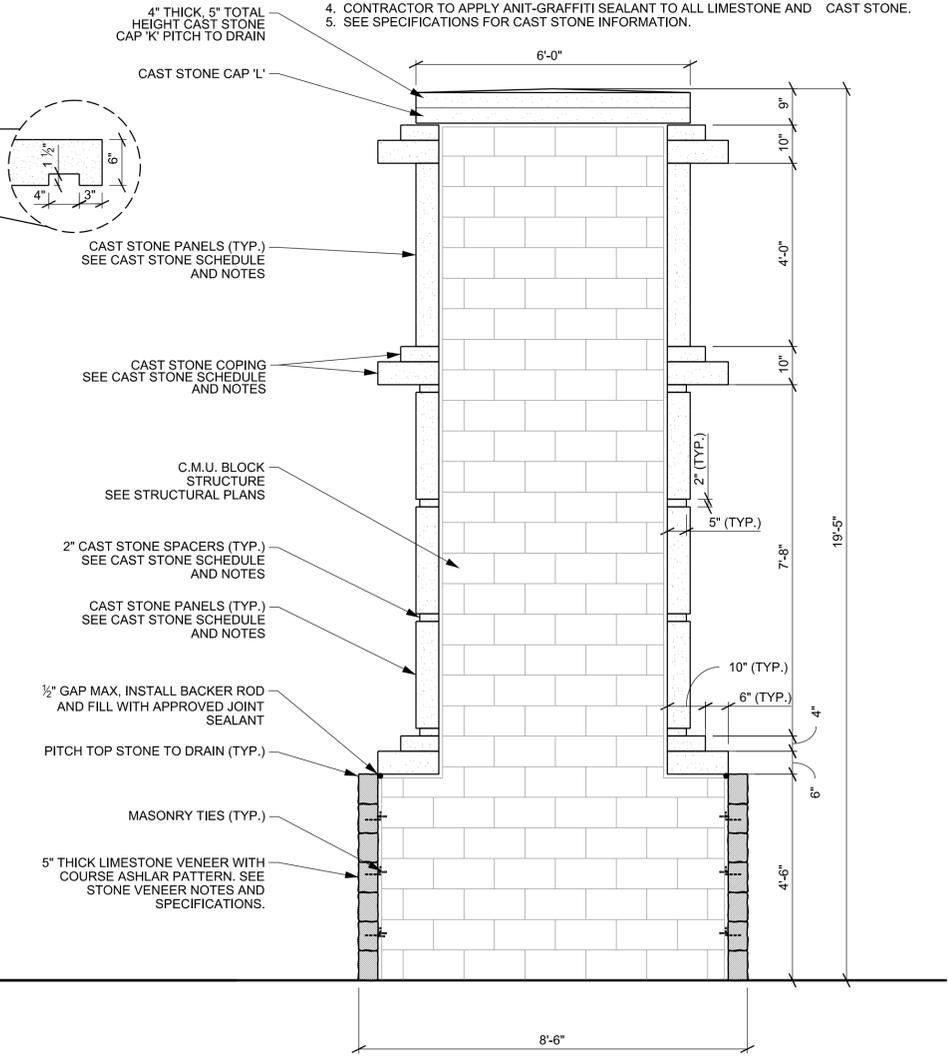
1. CHOPPED TEXAS LIMESTONE VENEER: COLOR MIX TO BE 60% LIGHT TAN, 25% CREAM, AND 15% MEDIUM TAN. COURSE HEIGHTS TO RANGE FROM 6" TO 18"
2. MORTAR: RECESSED 1/4". MORTAR JOINT MIN. WIDTH 1/4" MAX. WIDTH 1/2"
3. SUBMIT SAMPLES OF STONE AND MORTAR FOR OWNER'S APPROVAL BEFORE FINAL CONSTRUCTION.
4. CONTRACTOR TO APPLY ANIT-GRAFFITI SEALANT TO ALL LIMESTONE AND CAST STONE
5. SEE SPECIFICATIONS FOR STONE MASONRY INFORMATION.



**3** GATEWAY MONUMENT 'FRONT' ELEVATION  
SCALE: 1/2"=1'-0"



**2** GATEWAY MONUMENT 'SIDE' ELEVATION  
SCALE: 1/2"=1'-0"



**1** GATEWAY MONUMENT SECTION  
SCALE: 1/2"=1'-0"

CAST STONE SCHEDULE			
SYMBOL	CAST STONE SIZE	COLOR	QUANTITY PER MONUMENT
A	PANEL: 6" THICK, 2'-4" (H) x 2'-0" (W) L-SHAPE	WHITE LIMESTONE	12
B	PANEL: 6" THICK, 7'-4" (H) x 1'-8" (W)	WHITE LIMESTONE	2
C	PANEL: 6" THICK, 4'-0" (H) x 6'-0" (W)	WHITE LIMESTONE	2
D	PANEL: 6" THICK, 4'-0" (H) x 5'-0" (W)	WHITE LIMESTONE	2
E	PANEL: 6" THICK, 2'-4" (H) x 2'-0" (W)	WHITE LIMESTONE	6
F	COPING: 14 5/8" THICK, 6" (H) x 7'-8" (W)	RED SANDSTONE	2
G	COPING: 14 5/8" THICK, 6" (H) x 7'-8" (W) W/ ROUTED EDGE FOR ELECTRICAL	RED SANDSTONE	4
H	COPING: 14 5/8" THICK, 6" (H) x 5'-0" (W)	RED SANDSTONE	6
I	COPING: 9 5/8" THICK, 4" (H) x 6'-8" (W)	RED SANDSTONE	6
J	COPING: 9 5/8" THICK, 4" (H) x 5'-0" (W)	RED SANDSTONE	6
K	CAP: 4" THICK, 6'-0" (L) x 6'-0" (W) SQUARE W/ 5" (H) PITCH	WHITE LIMESTONE	1
L	CAP: 4" THICK, 6'-0" (L) x 6'-0" (W) SQUARE	WHITE LIMESTONE	1
M	SPACER: 4 5/8" THICK, 2" (H) x 6'-0" (W)	WHITE LIMESTONE	4
N	SPACER: 4 5/8" THICK, 2" (H) x 1'-11" (W)	WHITE LIMESTONE	8
O	SPACER: 4 5/8" THICK, 2" (H) x 7'-4" (W)	WHITE LIMESTONE	8
P	SPACER: 4 5/8" THICK, 2" (H) x 5'-0" (W)	WHITE LIMESTONE	8

**CAST STONE NOTES:**

1. CAST STONE: DALLAS CAST STONE CO. OR APPROVED EQUAL 4107 HANCOCK STREET DALLAS, TEXAS 75210 (214) 428-6269
2. CONTRACTOR TO INSTALL STAINLESS STEEL ANCHORS/FASTENERS PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO PROVIDE INSTALLATION SHOP DRAWINGS TO BE APPROVED BY OWNER PRIOR TO FINAL INSTALLATION.
3. CAST STONE MANUFACTURER TO PROVIDE CITY LOGO PANEL SHOPE DRAWINGS TO BE APPROVED BY OWNER PRIOR TO INSTALLATION.
3. SUBMIT SAMPLES OF CAST STONE FOR OWNER'S APPROVAL BEFORE FINAL CONSTRUCTION.
4. CONTRACTOR TO APPLY ANIT-GRAFFITI SEALANT TO ALL LIMESTONE AND CAST STONE.
5. SEE SPECIFICATIONS FOR CAST STONE INFORMATION.

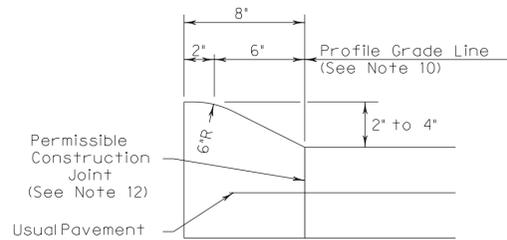
Revision No.	Date	Description



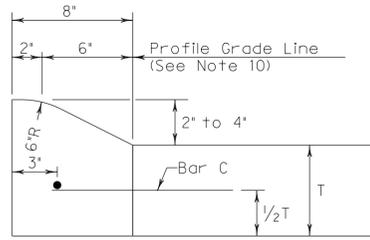
Project No.:	29149
Issued:	08/16/2013
Drawn By:	BS
Checked By:	JC
Scale:	AS NOTED
Sheet Title	GATEWAY MONUMENT DETAILS

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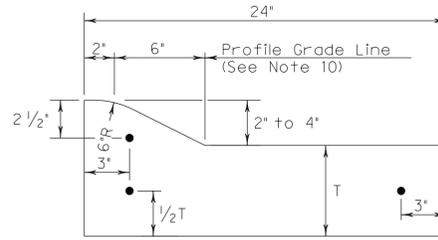
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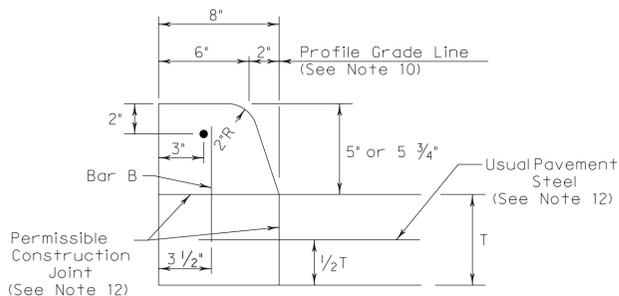
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2" - 4" HEIGHT



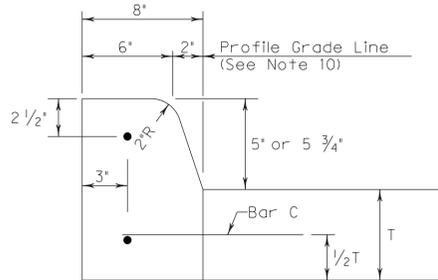
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2" - 4" HEIGHT



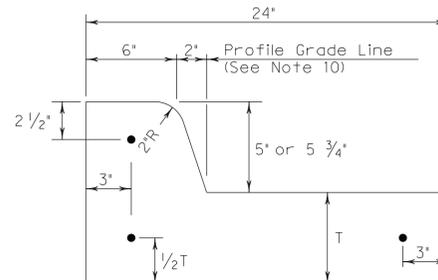
TYPE I CURB AND GUTTER  
2" - 4" HEIGHT



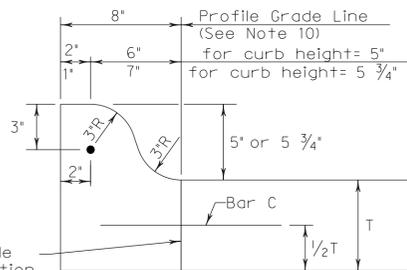
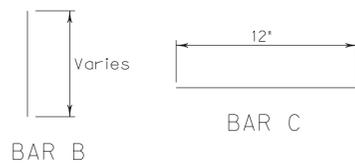
TYPE II CURB (MONOLITHIC)  
5" - 5 3/4" HEIGHT



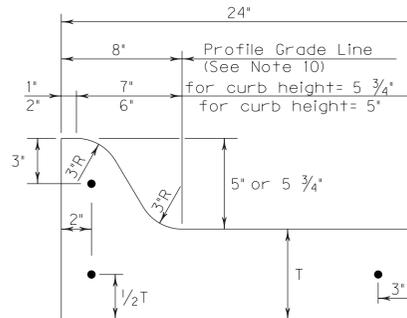
TYPE II CURB  
5" - 5 3/4" HEIGHT



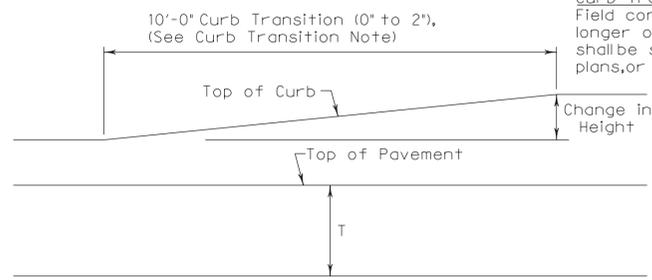
TYPE II CURB AND GUTTER  
5" - 5 3/4" HEIGHT



TYPE IIa CURB  
5" - 5 3/4" HEIGHT

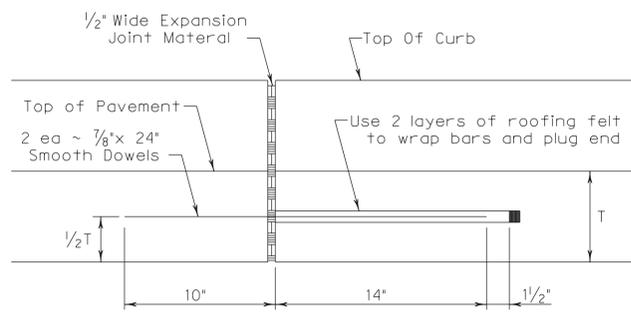


TYPE IIa CURB AND GUTTER  
5" - 5 3/4" HEIGHT



CURB TRANSITION  
Note: To be paid for as Highest Curb

**Curb Transition Note:**  
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



EXPANSION JOINT DETAIL

General Notes

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
4. Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.

Texas Department of Transportation  
Design Division Standard

CONCRETE CURB AND GUTTER

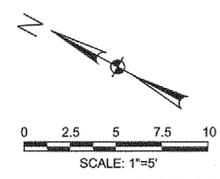
CCCG-10A

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REVISIONS	SH 16			
	DIST	COUNTY	SHEET NO.	
	SAT	BEXAR	TS5	

Revision No.	Date	Description

Half Associates TBP# FIRM #F-312

Project No.:	29149
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Sheet Title	CURB AND GUTTER DETAILS
Sheet No.	L6.05
Sheet Number	



PROP REFL PAVEMENT MARKING  
TY 1 (W) (24") SLD 100 MIL

ECKHERT RD.

PROP REFL PAVEMENT MARKING  
TY 1 (W) (24") SLD 100 MIL

EXISTING PAVEMENT MARKING

EXISTING PAVEMENT MARKING

APPROX. 10'

EXISTING PAVEMENT MARKING  
EXISTING PAVEMENT MARKING

MONUMENT SIGN  
SEE DETAIL LA PLANS

BANDERA RD. (ST. HWY. 16)

EXISTING PAVEMENT MARKING

ONLY

863.42(TP)  
863.92(TC)

863.35(TP)  
863.85(TC)

863

864.08

863.98

863.23(TG)

10+00

41.2 L.F. OF 36" R.C.P.

863

CONNECT PROP. 36" RCP TO  
EXIST. 10'x 4' BOX CULVERT  
INV (36" RCP) = 852.16

863.32(TP)  
863.82(TC)

863.39(TP)  
863.89(TC)

INSTALL 4'x 4' TYPE "H"  
INLET W/ GRATE  
INV = 858.23

REFL PAVEMENT MARKING  
TY 1 (Y) (4") SLD 100 MIL

EXISTING PAVEMENT MARKING

BANDERA RD. (ST. HWY. 16)

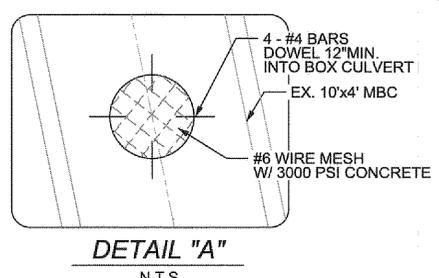
CONTRACTOR TO VERIFY HORIZONTAL AND  
VERTICAL OF EXIST BOX CULVERTS PRIOR TO  
START OF CONSTRUCTION AND NOTIFY  
ENGINEER OF ANY DISCREPANCIES.

2 - 10'x 4' MBC

APPROX. 13'

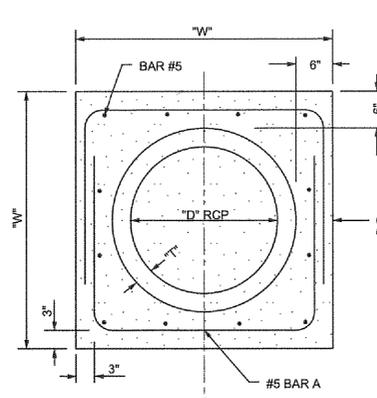
LEGEND

- CURB AND GUTTER
- 864 EXISTING CONTOUR
- 864.08 PROPOSED SPOT ELEVATION (TOP OF PAVEMENT UNLESS OTHERWISE NOTED)
- FLOW ARROW
- 863.32(TP) 863.82(TC) (TP) TOP OF PAVEMENT (TC) TOP OF CURB

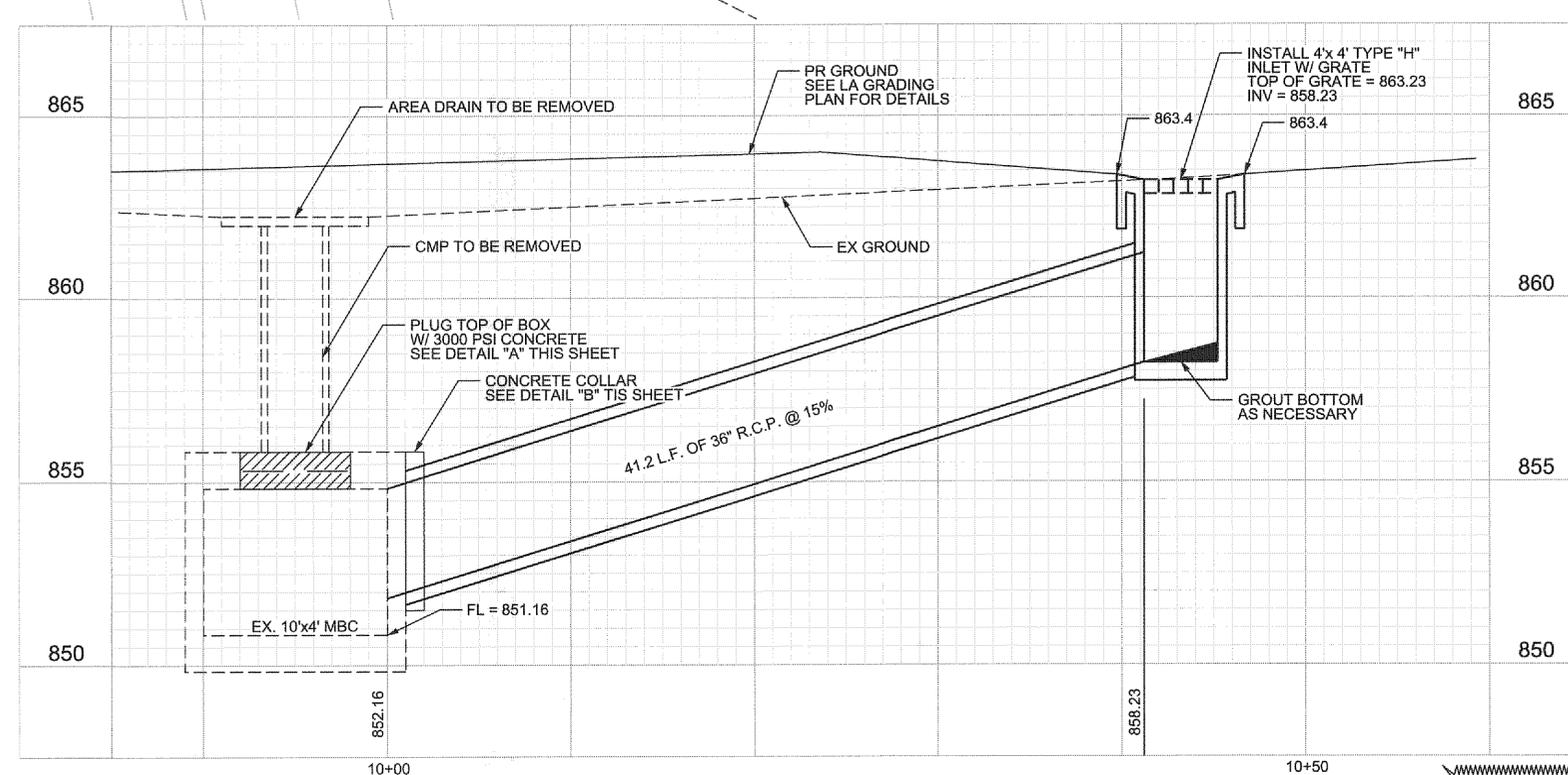


RCP DIA	"T" PIPE THICKNESS	"W" WIDTH	BAR	SIZE	SPACING	CLASS "C" CONCRETE
36"	4"	O.D.+12"	A	#5	12"	0.41 CU-YD

CONCRETE COLLARS SHALL BE USED ON ALL JOINTS AND CONNECTIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN ORDER TO ENSURE A PROPER WATER TIGHT SEAL ON ALL REINFORCED CONCRETE PIPE CONNECTIONS.



CONCRETE COLLAR DETAIL  
DETAIL "B"  
N.T.S.



CONTRACTOR SHALL BE RESPONSIBLE FOR  
LOCATING ALL UTILITIES WHETHER PUBLIC  
OR PRIVATE, PRIOR TO CONSTRUCTION

NOTES:

1. ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE.
2. CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF UTILITIES AND COORDINATE WITH UTILITY COMPANIES TO RE-LOCATE OR ADJUST UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT UTILITIES ARE IN OR OUT OF SERVICE.
3. EXISTING GROUND SHOWN IS BASED ON TOPOGRAPHIC SURVEY. EXISTING SURFACE CONDITIONS MAY HAVE BEEN ALTERED SINCE. (NO ADDITIONAL PAY ITEM.)

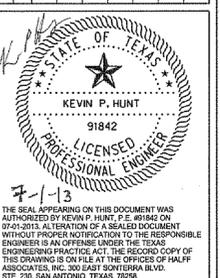
TRENCH SAFETY PROTECTION:

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATIONS SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

CITY OF LEON VALLEY  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

HALFF  
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TBP# FRM #512

Revision No.	Date	Description

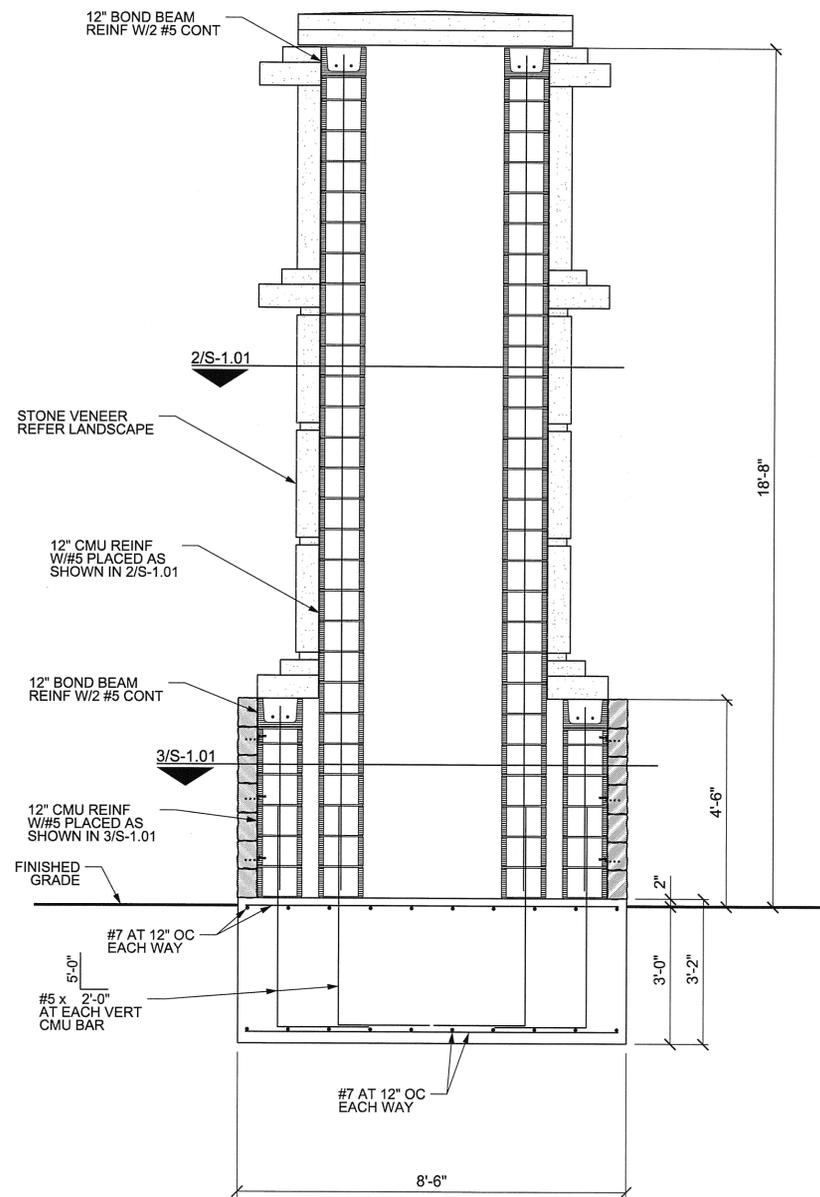


Project No.: 29149  
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Checked By: KH  
Scale: AS NOTED  
Sheet Title  
DRAINAGE PLAN  
ECKHERT RD

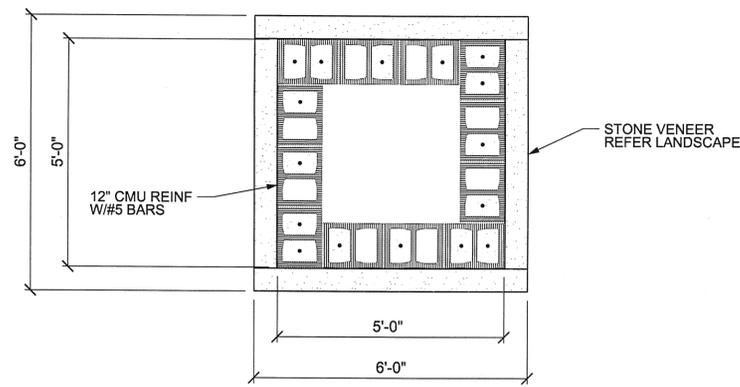
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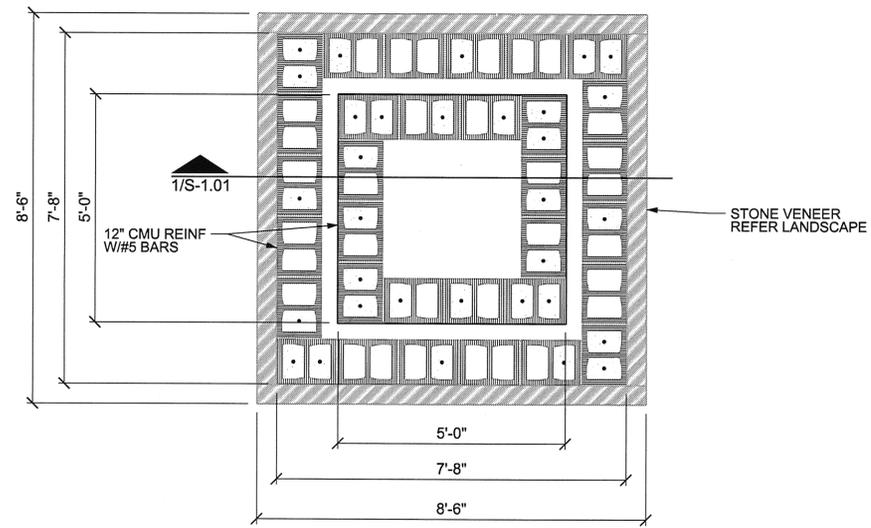
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**1** MONUMENT SIGN TYPICAL SECTION  
SCALE: 1/2" = 1'-0"



**2** MONUMENT SIGN SECTION  
SCALE: 1/2" = 1'-0"



**3** MONUMENT SIGN SECTION  
SCALE: 1/2" = 1'-0"

**CITY OF LEON VALLEY**  
BANDERA ROAD (ST. HWY. 16)  
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Revision No.	Date	Description

*Shane W. Ebbert*  
STATE OF TEXAS  
SHANE W. EBBERT  
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LICENSED PROFESSIONAL ENGINEER  
6/27/13

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Checked By: SWE  
Scale: AS NOTED

Sheet Title  
**MONUMENT SIGN  
STRUCTURAL DETAILS**

**S1.01**  
Sheet Number

GENERAL NOTES

1. THE STRUCTURAL DESIGN IS IN ACCORDANCE WITH THE 2009 INTERNATIONAL BUILDING CODE AND ALL APPLICABLE PROVISIONS OF THE CITY OF LEON VALLEY, TX.
2. COMPLETE SHOP DRAWINGS FOR THE STRUCTURAL WORK SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF CONSTRUCTION. IN ACCORDANCE WITH THE SPECIFICATIONS. A PERIOD OF AT LEAST 10 WORKING DAYS SHALL BE PROVIDED FOR THIS REVIEW. REVIEW OF SHOP DRAWINGS BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY FOR CORRECT FABRICATION AND CONSTRUCTION OF THE WORK.
3. ANY DEVIATION FROM, ADDITION TO, SUBSTITUTION FOR, OR MODIFICATION TO THE STRUCTURE OR ANY PART OF THE STRUCTURE SHOWN ON THESE DRAWINGS SHALL BE SUBMITTED IN WRITING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS THAT ARE SUBMITTED FOR REVIEW DO NOT CONSTITUTE "IN-WRITING" UNLESS IT IS CLEARLY NOTED THAT SPECIFIC CHANGES ARE BEING SUGGESTED.
4. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS FOR ELEVATIONS NOT SHOWN AND FOR EXACT LOCATIONS AND DIMENSIONS OF ALL ARCHITECTURAL DETAILS.
5. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE SITE AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN THE ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK.
6. PRINCIPAL OPENINGS ARE SHOWN ON THE STRUCTURAL DRAWINGS. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR SLEEVES, CURBS, INSERTS AND SIMILAR DETAILS NOT SHOWN. SIZE AND LOCATION OF ALL OPENINGS SHALL BE VERIFIED BY THE CONTRACTOR. ANY DEVIATION FROM OPENINGS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR APPROVAL PRIOR TO CONSTRUCTION.
7. THE STRUCTURAL DRAWINGS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.
8. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHODS OF CONSTRUCTION UNLESS SO STATED OR NOTED. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE WORKMEN AND OTHER PERSONS DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING OF ALL STRUCTURAL WORK AS REQUIRED FOR STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONDITION WHICH, IN HIS OPINION, MIGHT ENDANGER THE STABILITY OF THE STRUCTURE OR CAUSE DISTRESS IN THE STRUCTURE.
10. IF ANY INCONSISTENCIES OR DISCREPANCIES OCCUR WITHIN OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, THE GREATER QUANTITY OF ITEMS SHOWN, AND THE MOST COSTLY PRODUCT OR INSTALLATION METHOD SHALL BE PROVIDED, UNLESS INSTRUCTED OTHERWISE BY THE ENGINEER. IT SHALL BE DEEMED THAT THE CONTRACTOR BID AND INTENDS TO EXECUTE THE MORE STRINGENT OR HIGHER QUALITY REQUIREMENTS WITHOUT ANY INCREASE TO THE CONTRACT SUM OR CONTRACT TIME.

EARTHWORK AND FOUNDATIONS

1. THE FOUNDATION DESIGN IS IN ACCORDANCE WITH A GEOTECHNICAL ENGINEERING STUDY AND REPORT PREPARED BY ARIAS AND ASSOCIATES, INC., DATED APRIL 22, 2013.
2. ACCESS TO THE SITE SHALL BE GRANTED FOR THE GEOTECHNICAL ENGINEER TO OBSERVE ALL GRADING OPERATIONS AND THE REQUIRED TESTING FOR IMPLEMENTING THE RECOMMENDATIONS OF THE AFOREMENTIONED SUBSURFACE INVESTIGATION AND REPORT. THESE TESTS AND OBSERVATIONS SHOULD INCLUDE BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING:
  - o OBSERVATION AND TESTING DURING SITE PREPARATION AND EARTHWORK
  - o CONSULTATION AS REQUIRED DURING CONSTRUCTION
  - o VERIFICATION THAT THE BUILDING PAD IS SUITABLE FOR CONSTRUCTION
  - o OBSERVATION AND TESTING DURING CONSTRUCTION OF FOOTINGS.
3. LOCATE ALL UTILITIES AND UNDERGROUND SERVICES PRIOR TO EXCAVATION.
4. FOOTINGS ARE DESIGNED FOR AN ALLOWABLE BEARING PRESSURE OF 3,000 PSF AT A MINIMUM DEPTH OF 3 FEET BELOW FINISHED GRADE.
5. UNDERCUT AND REPLACE SOIL IN THE MONUMENT SIGN AREAS TO A DEPTH OF 7 FEET FOLLOWING THE PROCEDURE OUTLINED IN THE GEOTECHNICAL REPORT REFERENCED ABOVE. FOUNDATION EXCAVATION SHALL INCLUDE ALL EXCAVATION WITHIN THE MONUMENT FOOTPRINT AND IN THE ADJACENT AREA WITHIN 3 FEET OF THE MONUMENT. SOIL AT THE BASE OF THE EXCAVATION SHALL BE COMPACTED TO BETWEEN 93 AND 98 PERCENT OF OPTIMUM DENSITY (ASTM D-698) AT OPTIMUM TO +4% OF OPTIMUM MOISTURE CONTENT. A 4 INCH THICK SEAL SLAB SHALL BE PLACED ON THE EXPOSED SUBGRADE.
6. BACKFILL SHALL CONSIST OF A SELECT STRUCTURAL FILL CONSISTING OF PIT RUN MATERIAL WITH A PLASTICITY INDEX BETWEEN 12 AND 20 WITH AT LEAST 40% PASSING THE NO. 200 SIEVE, OR OF TxDOT ITEM 247, TYPE A GRADE 1 OR 2 CRUSHED LIMESTONE MATERIAL. SELECT FILL SHALL BE PLACED IN HORIZONTAL LIFTS 8 INCHES THICK OR LESS AND SHALL BE COMPACTED TO A MINIMUM OF 98% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698) AT A MOISTURE CONTENT OF -2 TO +3% OF OPTIMUM.
7. ANY CONCRETE, TREES, STUMPS, BRUSH, GRASS, ORGANICS, AND DELETERIOUS DEBRIS SHALL BE STRIPPED AND REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.
8. CONCRETE SHALL BE PLACED AS SOON AS POSSIBLE AFTER EXCAVATIONS ARE COMPLETED. FOUNDATION BEARING LEVEL SHALL BE FREE OF LOOSE SOIL, PONDED WATER, OR DEBRIS AND SHALL BE OBSERVED BY THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE PRIOR TO CONCRETING. FOUNDATION SOILS THAT HAVE BEEN DISTURBED BY RAINFALL OR SEEPAGE SHALL BE REMOVED AND REPLACED WITH COMPACTED SELECT FILL.

CAST-IN-PLACE REINFORCED CONCRETE

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITION OF ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2. MILD STEEL REINFORCING BARS SHALL CONFORM TO ASTM A-615, GRADE 60.
3. MILD STEEL REINFORCEMENT AND ACCESSORIES SHALL BE DETAILED AND FABRICATED IN ACCORDANCE WITH ACI SP-66.
4. PORTLAND CEMENT SHALL BE A SINGLE BRAND CONFORMING TO ASTM C-150, TYPE I OR TYPE II, UNLESS OTHERWISE APPROVED.
6. NORMAL WEIGHT AGGREGATES SHALL CONFORM TO ASTM C-33. ALL CONCRETE SHALL USE NORMAL WEIGHT AGGREGATES, UNLESS NOTED OTHERWISE.
7. ALL ADDITIVES FOR AIR ENTRAINMENT, WATER REDUCTION, AND SET CONTROL SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS. THE USE OF CALCIUM CHLORIDE IS PROHIBITED.
8. MIXES SHALL BE DESIGNED TO PROVIDE CONCRETE WITH A COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.
9. THE MAXIMUM NOMINAL SIZE OF COARSE AGGREGATE SHALL BE 1".
10. CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED AS INDICATED IN THE SPECIFICATIONS. AIR CONTENT SHALL BE CHECKED BY AN ACI APPROVED TESTER WITH AN AIR METER.
11. CONCRETE SLUMPS SHALL BE AS INDICATED IN THE SPECIFICATIONS.
12. MILD STEEL REINFORCEMENT SHALL BE PLACED AND SECURED IN ACCORDANCE WITH CRSI "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS."
13. CONCRETE PROTECTION FOR REINFORCEMENT SHALL BE AS FOLLOWS:
  - FOOTINGS ..... 1 1/2" TOP
  - ..... 3" BOTTOM
14. WELDING OF MILD STEEL REINFORCEMENT SHALL CONFORM TO THE AMERICAN WELDING SOCIETY "STRUCTURAL WELDING CODE - REINFORCING STEEL," AWS D-1.4.
15. THE TESTING LABORATORY SHALL BE NOTIFIED AFTER THE MILD STEEL REINFORCEMENT AND EMBEDS ARE POSITIONED PRIOR TO EACH CONCRETE PLACEMENT. NO CONCRETE SHALL BE PLACED UNTIL THESE ITEMS ARE CHECKED AND APPROVED BY THE TESTING LABORATORY.
16. EACH AREA OF CONCRETE WORK SHALL BE FINISHED AND CURED IN ACCORDANCE WITH THE SPECIFICATIONS. 3/4" CHAMFERS SHALL BE PROVIDED AT ALL EXPOSED EDGES AND CORNERS INCLUDING ALL EXTERIOR EXPOSED CORNERS OF GRADE BEAMS.

REINFORCED CONCRETE MASONRY

1. REINFORCED CONCRETE MASONRY WALL CONSTRUCTION SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f<sub>m</sub>) OF 1500 PSI. THESE VALUES SHALL BE VERIFIED IN ACCORDANCE WITH NCMA TR 75B, "SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF LOAD BEARING MASONRY".
2. CONCRETE BLOCK SHALL BE NORMAL WEIGHT UNITS CONFORMING TO ASTM C 90, TYPE 1 UNITS WITH A MINIMUM NET AREA COMPRESSIVE STRENGTH OF 1900 PSI.
3. MORTAR SHALL CONFORM TO ASTM C 270, TYPE S AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 1800 PSI AT 28 DAYS, TYPICAL. AGGREGATES FOR MORTAR SHALL CONFORM TO ASTM C 144. TYPE M MORTAR SHALL BE USED AT ALL CMU WHICH IS IN CONTACT WITH SOIL OR BELOW GRADE AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
4. GROUT SHALL CONFORM TO ASTM C 476. AGGREGATES FOR GROUT SHALL CONFORM TO ASTM C 404. GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60.
6. PROVIDE ADDITIONAL VERTICAL REINFORCING BARS AT FIRST TWO CELLS ADJACENT TO ALL CMU WALL OPENINGS, AT ALL CMU WALL CORNERS, AT WALL INTERSECTIONS SUCH AS INTERIOR/EXTERIOR WALLS, AND WHERE INDICATED ON THE ARCHITECTURAL DRAWINGS.
7. ALL CELLS OR BOND BEAMS CONTAINING REINFORCING BARS, BOLTS OR OTHER METAL ANCHORS SHALL BE GROUTED SOLID. ANY CELLS AT OR BELOW FINISHED GRADE SHALL BE GROUTED SOLID WITH TYPE M MORTAR, WHETHER REINFORCED OR NOT.
8. HORIZONTAL JOINT REINFORCEMENT SHALL BE FACTORY-FABRICATED, TRUSS TYPE 9 GA OR HEAVIER WIRE CONFORMING TO ASTM A 82. EXCEPT WHERE NOTED OTHERWISE, PLACE REINFORCEMENT CONTINUOUSLY AT A MAXIMUM VERTICAL SPACING OF 16" O.C.
9. ALL REINFORCED MASONRY SHALL BE PLACED IN ACCORDANCE WITH CHAPTER 24 OF THE INTERNATIONAL BUILDING CODE. SPECIAL INSPECTION SHALL BE PROVIDED FOR THE CMU WALL CONSTRUCTION.

CITY OF LEON VALLEY  
 BANDERA ROAD (ST. HWY. 16)  
 GATEWAY IMPROVEMENTS  
 Leon Valley, Texas



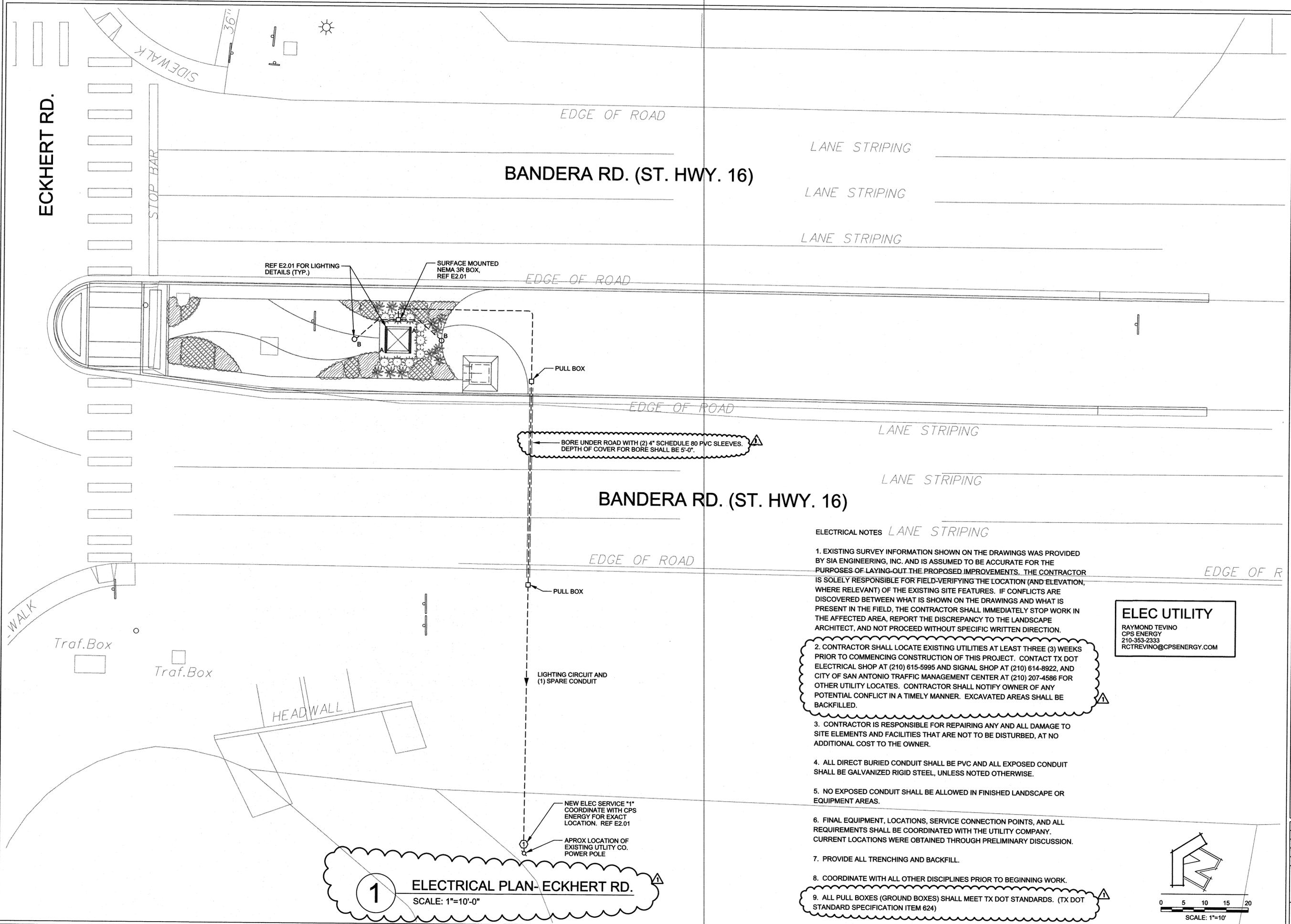
Revision No.	Date	Description



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**STRUCTURAL GENERAL NOTES**  
**S0.01**  
 Sheet Number

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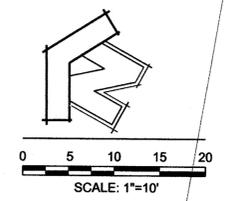


**1** ELECTRICAL PLAN-ECKHERT RD.  
SCALE: 1"=10'-0"

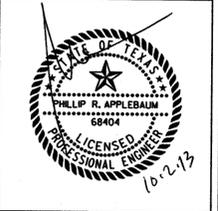
**ELECTRICAL NOTES** LANE STRIPING

- EXISTING SURVEY INFORMATION SHOWN ON THE DRAWINGS WAS PROVIDED BY SIA ENGINEERING, INC. AND IS ASSUMED TO BE ACCURATE FOR THE PURPOSES OF LAYING-OUT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR FIELD-VERIFYING THE LOCATION (AND ELEVATION, WHERE RELEVANT) OF THE EXISTING SITE FEATURES. IF CONFLICTS ARE DISCOVERED BETWEEN WHAT IS SHOWN ON THE DRAWINGS AND WHAT IS PRESENT IN THE FIELD, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA, REPORT THE DISCREPANCY TO THE LANDSCAPE ARCHITECT, AND NOT PROCEED WITHOUT SPECIFIC WRITTEN DIRECTION.
- CONTRACTOR SHALL LOCATE EXISTING UTILITIES AT LEAST THREE (3) WEEKS PRIOR TO COMMENCING CONSTRUCTION OF THIS PROJECT. CONTACT TX DOT ELECTRICAL SHOP AT (210) 615-5995 AND SIGNAL SHOP AT (210) 614-8922, AND CITY OF SAN ANTONIO TRAFFIC MANAGEMENT CENTER AT (210) 207-4586 FOR OTHER UTILITY LOCATES. CONTRACTOR SHALL NOTIFY OWNER OF ANY POTENTIAL CONFLICT IN A TIMELY MANNER. EXCAVATED AREAS SHALL BE BACKFILLED.
- CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY AND ALL DAMAGE TO SITE ELEMENTS AND FACILITIES THAT ARE NOT TO BE DISTURBED, AT NO ADDITIONAL COST TO THE OWNER.
- ALL DIRECT BURIED CONDUIT SHALL BE PVC AND ALL EXPOSED CONDUIT SHALL BE GALVANIZED RIGID STEEL, UNLESS NOTED OTHERWISE.
- NO EXPOSED CONDUIT SHALL BE ALLOWED IN FINISHED LANDSCAPE OR EQUIPMENT AREAS.
- FINAL EQUIPMENT, LOCATIONS, SERVICE CONNECTION POINTS, AND ALL REQUIREMENTS SHALL BE COORDINATED WITH THE UTILITY COMPANY. CURRENT LOCATIONS WERE OBTAINED THROUGH PRELIMINARY DISCUSSION.
- PROVIDE ALL TRENCHING AND BACKFILL.
- COORDINATE WITH ALL OTHER DISCIPLINES PRIOR TO BEGINNING WORK.
- ALL PULL BOXES (GROUND BOXES) SHALL MEET TX DOT STANDARDS. (TX DOT STANDARD SPECIFICATION ITEM 624)

**ELEC UTILITY**  
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Revision No.	Date	Description
1	10-2-2013	REVISION 1



**ELEC UTILITY**

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**GENERAL NOTES**

1. GENERAL NOTES 1 THROUGH 8 SHOWN ON SHEET E1.01 SHALL APPLY TO THIS DRAWING, AS APPLICABLE.

ECHO DR.

APROX LOCATION OF EXISTING UTILITY CO. POWER POLE  
NEW ELEC SERVICE "2" COORDINATE WITH CPS ENERGY FOR EXACT LOCATION. REF E2.01  
LIGHTING CIRCUIT AND (1) SPARE CONDUIT

PULL BOX

LANE STRIPING

LANE STRIPING

BANDERA RD. (ST. HWY. 16)

BORE UNDER ROAD WITH (2) 4" SCHEDULE 80 PVC SLEEVES. DEPTH OF COVER FOR BORE SHALL BE 5'-0"

EXISTING TRAFFIC SIGN TO REMAIN

PULL BOX

EXISTING STREET LIGHT TO REMAIN

SURFACE MOUNTED NEMA-3R BOX, REF E2.01

REF E2.01 FOR LIGHTING DETAILS (TYP.)

LANE STRIPING

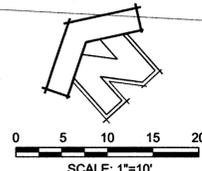
LANE STRIPING

BANDERA RD. (ST. HWY. 16)

**1** ELECTRICAL PLAN - GRASS HILL DR.

SCALE: 1"=10'-0"

GRASS HILL DR.



CITY OF LEON VALLEY  
BANDERA ROAD (ST. HWY. 16)  
GATEWAY IMPROVEMENTS  
Leon Valley, Texas

LEON VALLEY  
T E X A S

**HALFF**  
400 WEST BANDERA LANE, SUITE 450  
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TDD (512) 222-8194

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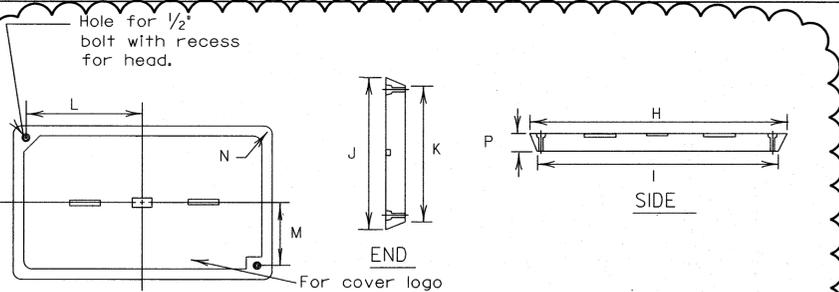
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ELECTRICAL PLAN  
GRASS HILL DR.

**E1.02**

Sheet Number

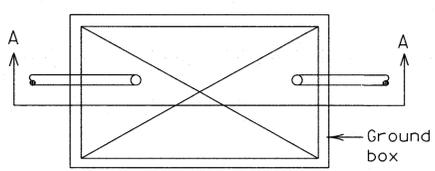
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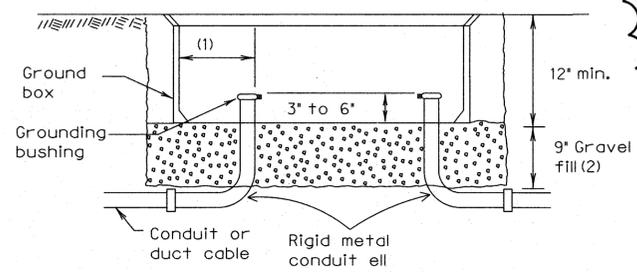


PLAN VIEW  
GROUND BOX COVER

GROUND BOX COVER DIMENSIONS								
BOX	DIMENSIONS (INCHES)							
SIZE	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



PLAN VIEW



SECTION A - A  
GROUND BOXES

- Final position of end of conduit shall not exceed one-half the distance to the side of box opposite the conduit entry.
- Place gravel under the box, not in the box. Gravel should not encroach on the interior volume of the box.
- Install bushing on the upper end of allels.
- Maintain sufficient space between all conduits so as to allow for proper installation of bushings.
- All conduits shall be installed in a neat and workmanlike manner.
- All conduits installed in the ground box shall be sealed after completion of conductor installation and any required pull tests. Silicone shall not be used as sealant.

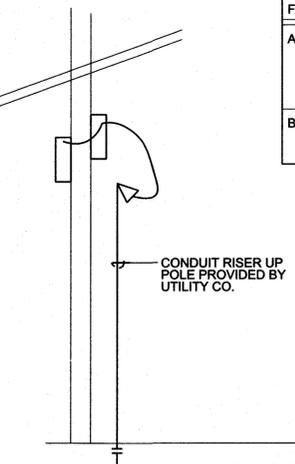
GROUND BOX  
A. MATERIALS

- Ground boxes 16x30x24 inches (WxLxD) or smaller shall be polymer concrete of the type required by the descriptive code shown elsewhere. Larger ground boxes shall be as shown elsewhere in the plans.
- All ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number and manufacturer's name or logo.
- Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.
- Ground box Types A, B, C, D & E shall meet the following requirements:
  - Ground boxes and covers be manufactured from polymer concrete reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The polymer concrete shall be made from catalyzed polyester resin, sand and aggregate, and shall have a minimum compressive strength of 11,000 psi. Polymer concrete containing chopped fiberglass or fiberglass reinforced plastic is not acceptable.
  - Minimum inside dimensions shall be as follows (width x length x depth):  
Type E shall be 11.5 inches x 21 inches x 16 inches, (122317)
  - Bottom edge of box or extension shall be footed with a minimum 1 1/4 inch flange.
  - Ground boxes shall withstand 600 lbs. per sq. ft. applied over the entire sidewall with less than 1/4 inch deflection per foot length of box. Ground boxes and covers shall withstand a test loading of 20,000 lbs. over a 10 inch by 10 inch area centered on the cover with less than 1/2 inch deflection. Ground boxes and covers shall meet Western Underground Standards 3.6. Manufacturer shall supply certification by an independent laboratory or sealed by a Texas-Licensed Professional Engineer.
  - Covers shall be 2 inch (nominal) thick polymer concrete. All hardware shall be stainless steel. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be self-retaining and shall withstand a minimum of 70 ft-lbs. torque and shall have a minimum 750 lbs. straight pullout strength. Nuts shall be floating and shall provide a minimum of 1/2 inch movement from the center of the nut. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown herein. Unless otherwise approved by the Engineer, cover shall be legibly imprinted with the following words in minimum 1 inch letters:  
Ground boxes containing wiring for sign illumination systems shall be labeled, Danger High Voltage Sign illumination.

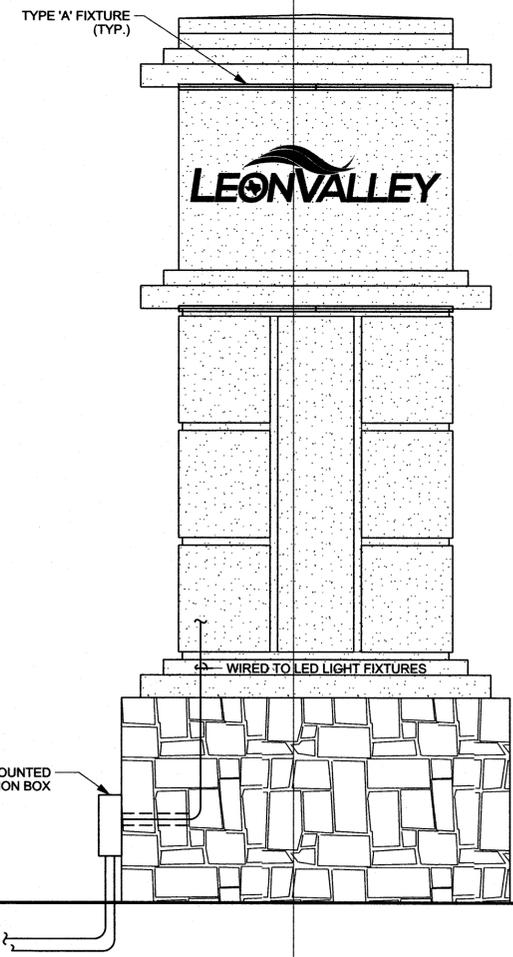
B. CONSTRUCTION METHODS

- Ground boxes shall be set on a 9 inch (minimum) bed of aggregate from 3/4" up to 2" in size. Aggregate shall be in place prior to setting box and conduits shall be capped. Any gravel or dirt in conduit shall be removed.
- Conduit holes may be cut in the walls of type B & D boxes at least 18 inches beneath the cover.

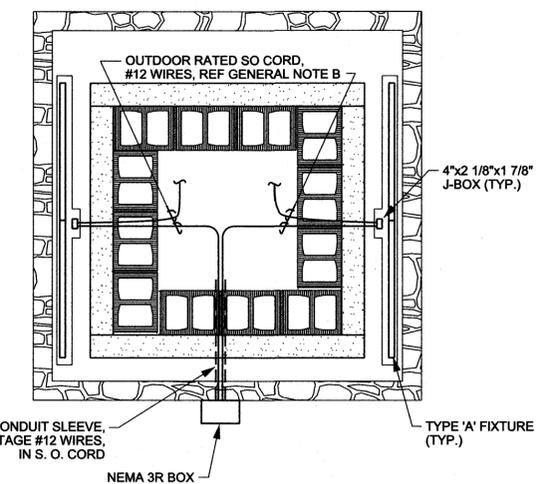
FIXTURES				
FIXTURE TYPE	MODEL	LENGTH	QTY.	DESCRIPTION
A	WINONA LIGHTING #WSL-107W-K6-30-27K-ND24-A-SGB-X-STD	6 FT	8	SMALL SCALE, LOW PROFILE LINEAR LED LUMINAIRE, 30 DEGREE BEAM SPREAD, ADJUSTABLE MOUNT. FIELD ADJUST AIMING OF FIXTURE (APPROX. 5 DEGREES OFF CENTER) TO ILLUMINATE MONUMENT WALL.
B	HYDREL TPS1-18LED-WHT30K-MVOLT-HSP- YM-ARTL-IHS-FGS-LPI-BL	-	4	LED FLOOD LIGHT, HORIZONTAL SPOT DISTRIBUTION, BASE MOUNT. PROVIDE GLARE VISOR



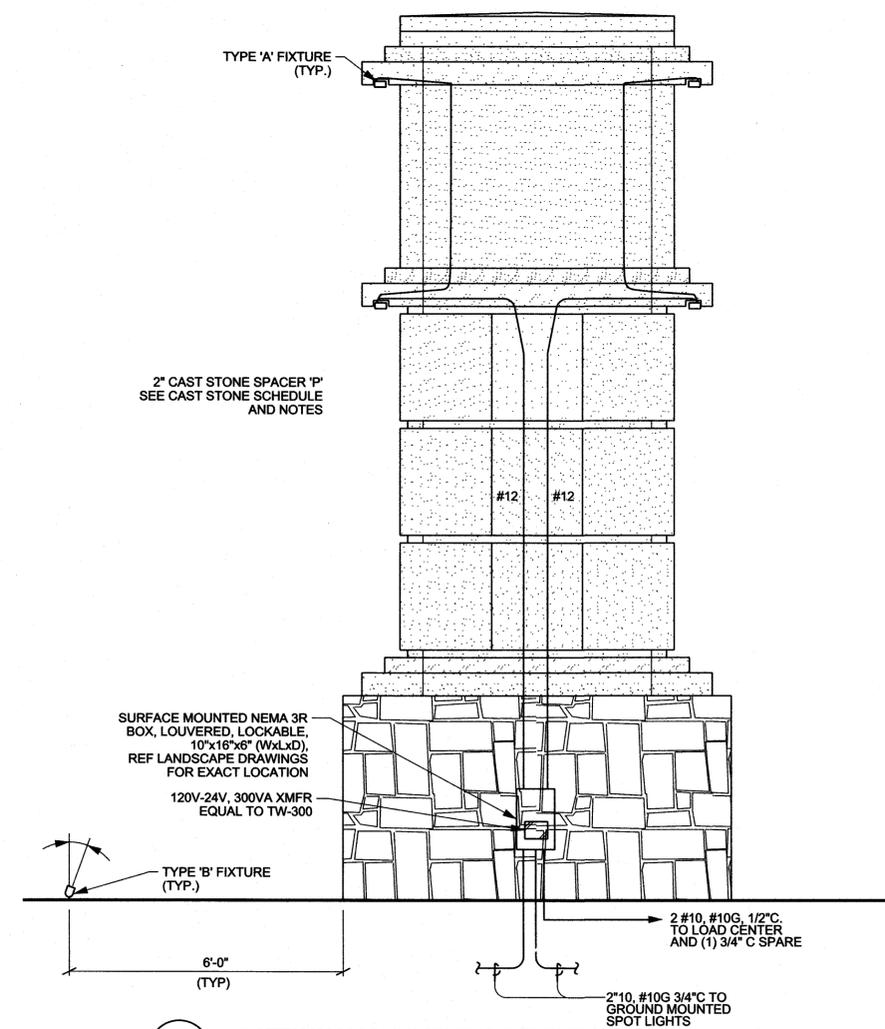
4 TYPICAL ELECTRIC RISER  
NO SCALE



2 GATEWAY MONUMENT 'FRONT' ELEVATION  
SCALE: 1/2"=1'-0"



3 GATEWAY MONUMENT PLAN VIEW  
SCALE: 1/2"=1'-0"



1 GATEWAY MONUMENT 'SIDE' ELEVATION  
SCALE: 1/2"=1'-0"

GENERAL NOTES

- REFER TO MANUFACTURER'S DRAWINGS FOR LIGHT FIXTURE CONNECTIONS.
- CONTRACTOR MAY USE SO CORD IN 1/2" ENT CONDUIT SLEEVE THROUGH CONCRETE STRUCTURE, ROUTED IN MONUMENT.

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1	10-02-13	REVISION 1



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