

NOMINAL WXL	DEPTH	BOX PART NO.	BOX WT.	COVER PART NO.	COVER WT.
13" X 24"	15"	6001868	20#	6001866	20#

**ELECTRIC PRECAST CONCRETE PULLBOX**

1  
1

Revision Date:

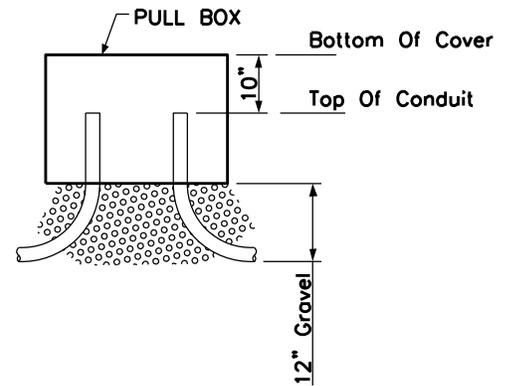
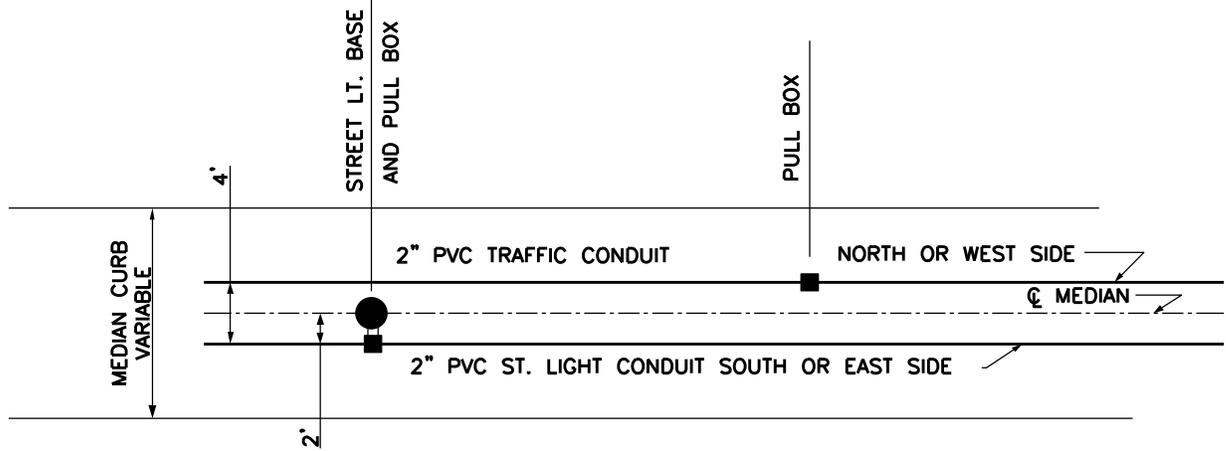
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 Design :  
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 Dwg. File : TRF\_27.DWG  
 Project No. : STANDARD-DETAILS



**ELECTRIC PRECAST  
CONCRETE PULLBOX**

PAGE

**1**



**FOR RELOCATING STREET LIGHT BASES**

CONTRACTOR SHALL NOTIFY GARLAND POWER AND LIGHT 24 HOURS PRIOR TO START OF CONSTRUCTION SO THAT POWER TO CIRCUIT MAY BE KILLED OUT AND LIGHT POLE REMOVED FROM BASE.

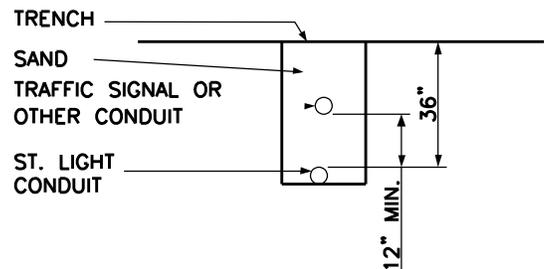
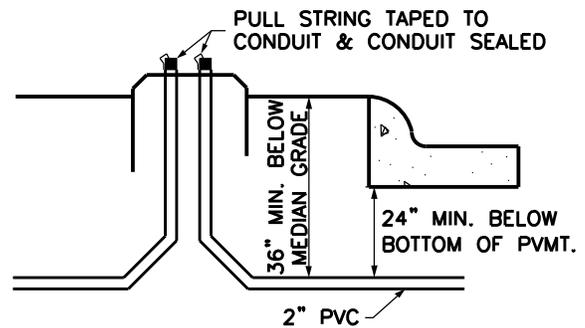
EXISTING STREET LIGHT BASES SHALL BE REMOVED AND NEW STREET LIGHT BASE, 2" PVC CONDUIT, AND NEW WIRING INSTALLED TO NEW BASE PRIOR TO REMOVING EXISTING CURB AND GUTTER FOR LEFT TURN LANE.

NEW WIRE INSTALLED SHALL CONSIST OF 2, #6 CU. INSULATED CONDUCTORS AND 1 #6 BARE CU. CONDUCTOR WITH MINIMUM OF THREE FOOT OF CONDUCTOR EXTENDING OUT OF TOP OF NEW STREET LIGHT BASE OR PEDESTAL BOX.

AFTER INSTALLATION OF WIRE CONTRACTOR SHALL NOTIFY GARLAND POWER AND LIGHT DISTRIBUTION DEPARTMENT (205-3528) TO HAVE STREET LIGHT POLE RE-INSTALLED. GARLAND POWER AND LIGHT WILL RE-ENERGIZE CIRCUIT.

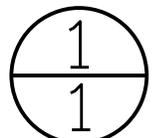
GARLAND POWER AND LIGHT INSPECTOR MAY BE REACHED AT THE FOLLOWING PHONE NUMBERS:

972-205-3576  
972-205-3448



**GENERAL NOTES-PULL BOXES**

PULL BOX- PRECAST, SEE SEPARATE DETAIL SHEET. FURNISHED BY GP & L. PICK UP AT CITY WHS.

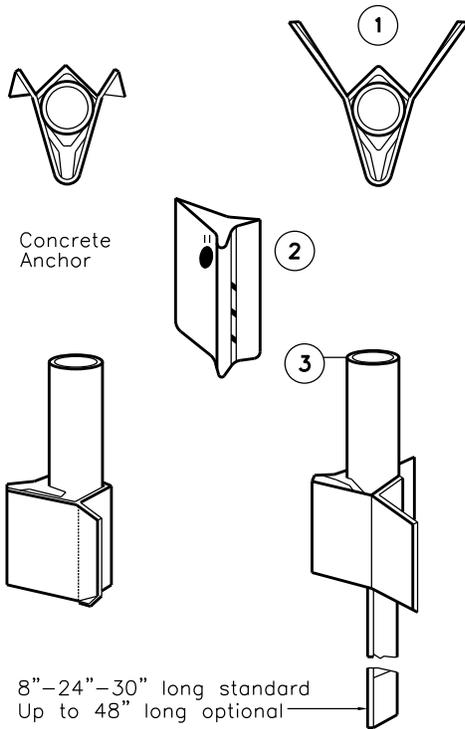


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**PULLBOX NOTES AND STREET LIGHT BASE RELOCATION NOTES**



8"-24"-30" long standard  
Up to 48" long optional

Specifications subject to change without notice  
Covered by one or more of the following U.S. Patents :  
No. 4,021,977-4,320,608-4,236,747

**SPECIFICATIONS**

**1 V-LOCK SOCKET:**

Stabilizer Fin is 12 gauge hot rolled carbon sheet steel, commercial quality. The fin is formed from sheet steel to the shown configuration.

Leg Angle- 1/4" x 2 1/2" x 2 1/2" angle HR 1020 commercial quality.

Welds six 1/4" x 1 1/2" fillets minimum.

Finish is dip-coated with rust inhibiting primer, Fed. Spec. TTP636. Galvanizing available.

**2 V-LOC WEDGE:**

The V-LOC wedge is steel tubing made to ASTM A-500, Grade B specifications, then pressed formed into wedge form.

**3 TUBING:**

The tubing is ASTM A500. Grade B mechanical tubing 2.375 O.D. x .065 minimum - .109 maximum wall thickness.

**FEATURES:**

1. Flush-to-the-ground.
2. Top stabilizing fins.
3. Wedge fastener, no bolts.
4. Driven from the ground.
5. 360° indexing and impact zone.
6. Permanent post hole.

**INTENDED USE:**  
**SMALL SIGN SUPPORT**  
**FENCE POST SUPPORT**



XXXX -4067  
2114 Pioneer Avenue  
Cheyenne, Wyoming 82003-4067  
(307) 635-4163

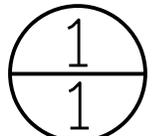


V-LOCK MODEL NO. 23

**SPECIFICATIONS**

**V-LOCK INSTALLATION FOR TRAFFIC SIGN**

1. The V-LOCKS shall be furnished by the City of Garland.
2. The shaft of the V-LOCK shall be no less than ten (10) inches in length, measured from the bottom of the pipe support area.
3. The pipe support area of the V-LOCK shall be sealed off on the top and bottom, before installation, to prohibit this area from being filled with concrete.
4. The V-LOCK shall be installed vertical, regardless of the contour or lay of the curbs.
5. The installation locations shall be a minimum of five (5) feet back from the face of a raised median nose and a minimum of eight (8) feet back from the nose of a mountable median nose.
6. The V-LOCK locations may be marked on the construction plans, or may be requested to be installed by the City Engineering Inspector, or by T&T personnel through the inspector.
7. The V-LOCK shall be installed flush with the top of the median cap, in a ten (10) inch minimum diameter hole, with a minimum of eighteen (18) inches of concrete that includes the thickness of the median cap.



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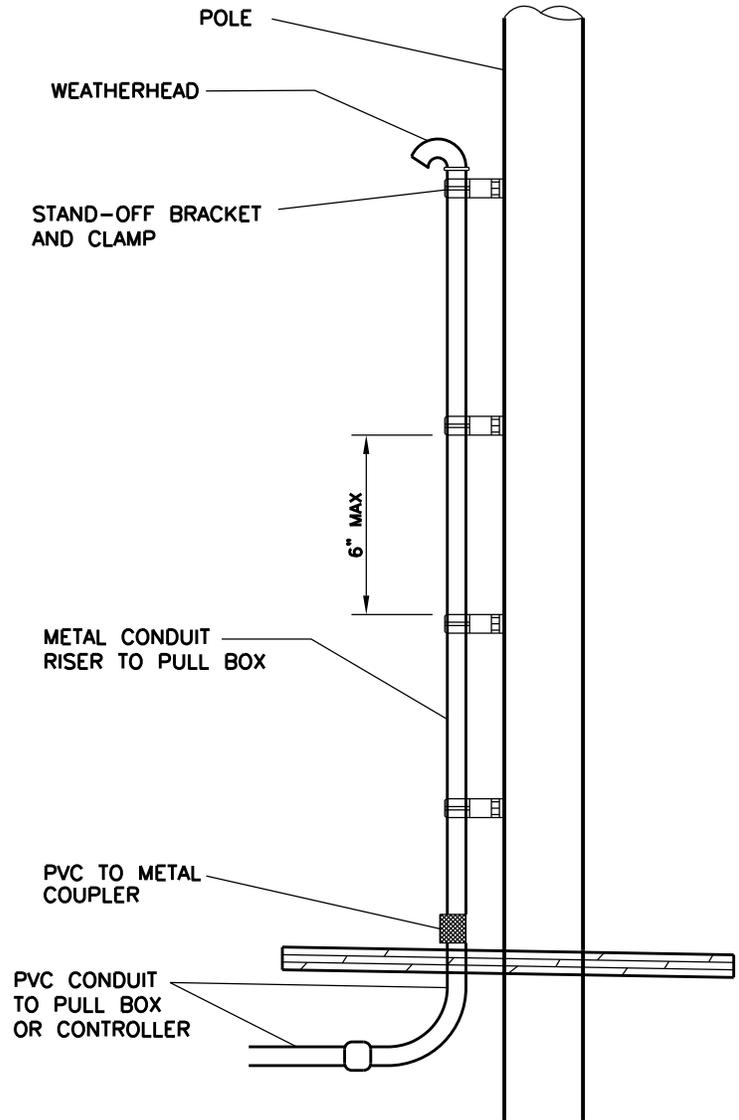
**TRAFFIC SIGN SUPPORT BASE**

PAGE

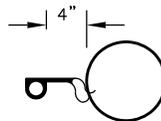
**3**

# CONDUIT RISER INSTALLATION

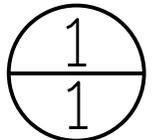
## STAND OFF



ELEVATION VIEW



PLAN VIEW



Revision Date:

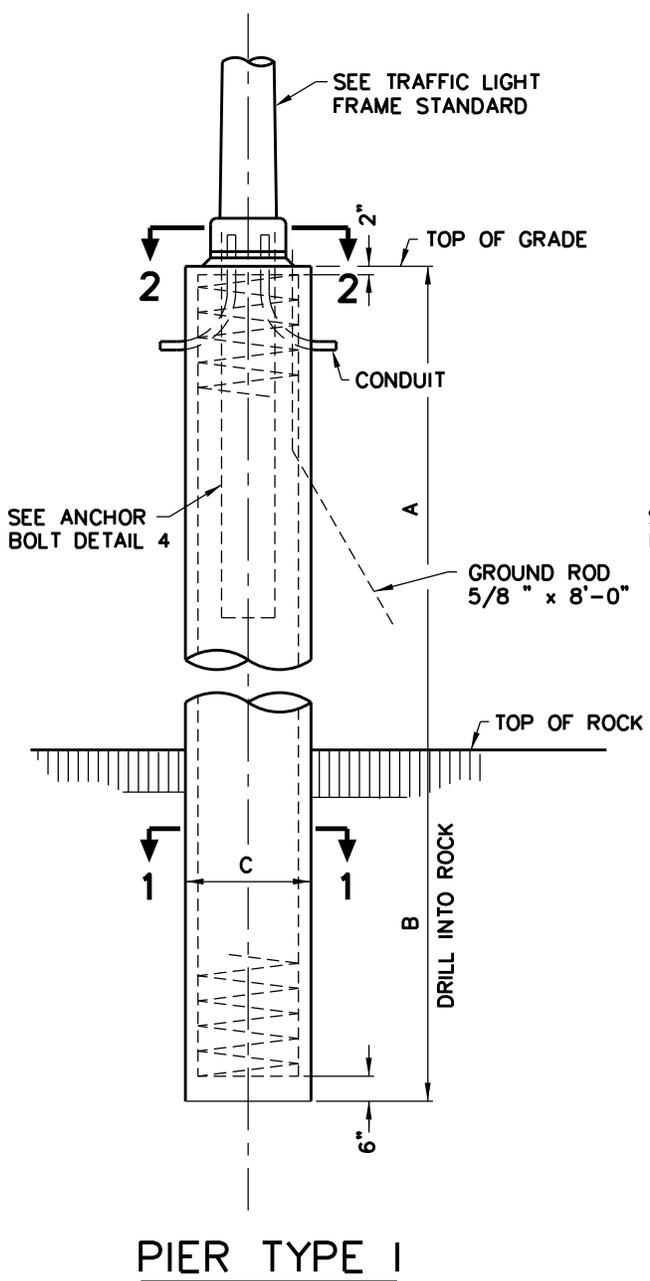
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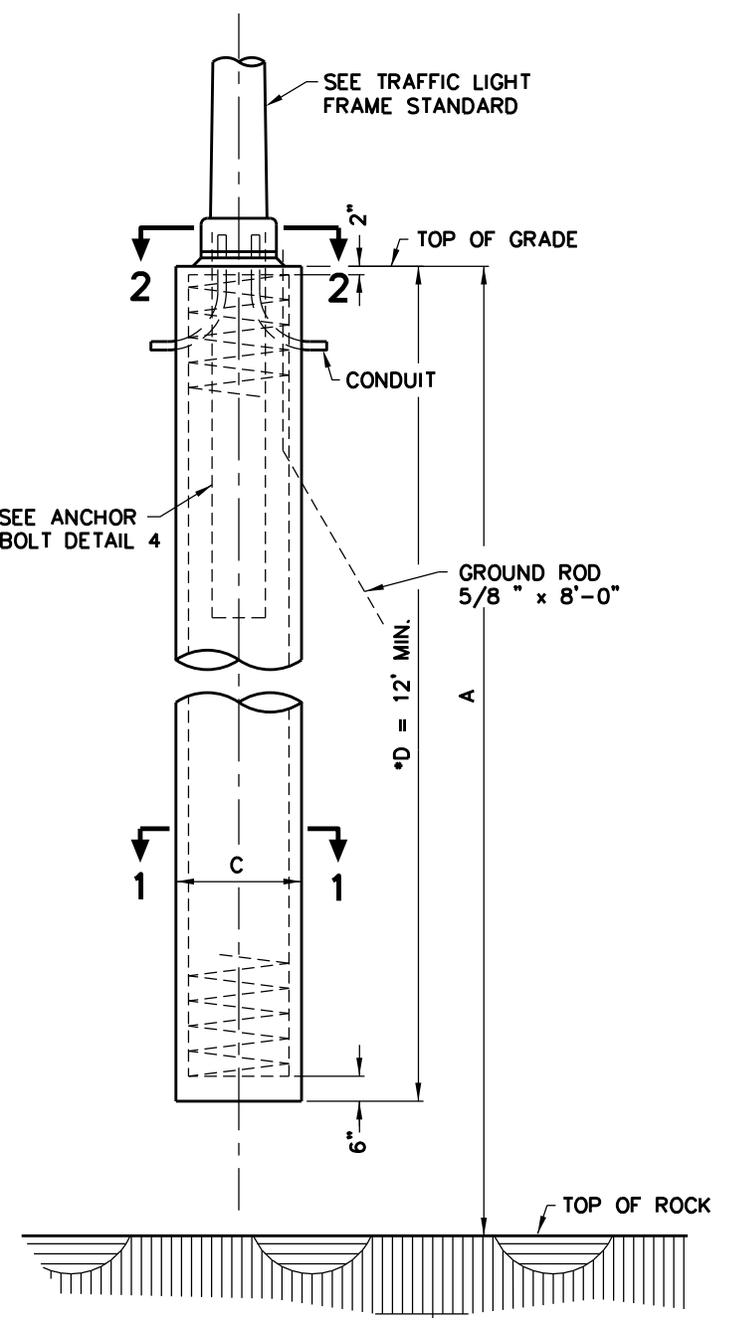
STREET LIGHT CONDUIT  
RISER CABLE INSTALLATION

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**4**

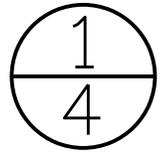


**PIER TYPE I**



**PIER TYPE II**

\*SEE NOTES 6, 7 & 11

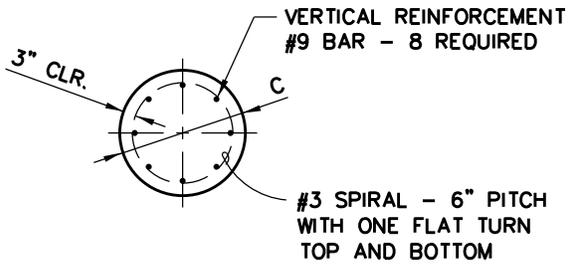


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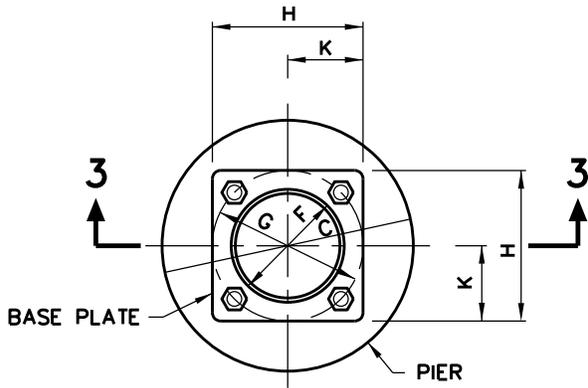
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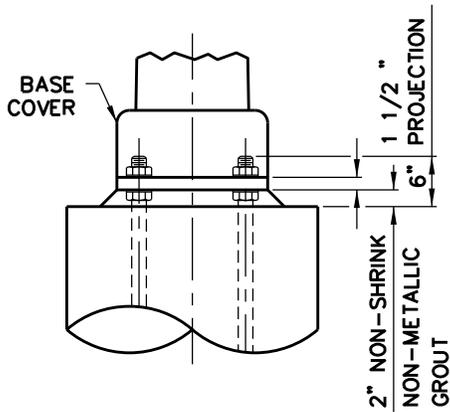
**TRAFFIC SIGNAL BASES**



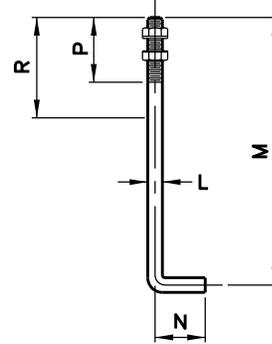
SECTION 1-1



SECTION 2-2

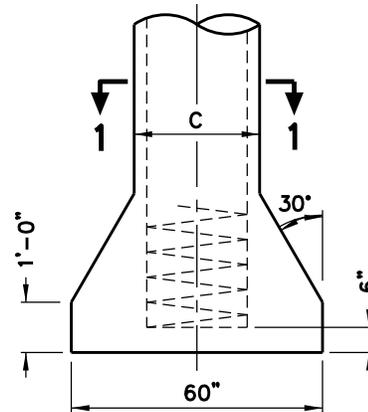


SECTION 3-3



DETAIL 4

ANCHOR BOLT - TYP.



DETAIL 5

ALTERNATE BELL BOTTOM

2  
4

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 STANDARD DETAILS

TRAFFIC SIGNAL BASES

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**6**

PIER DIMENSIONS				
PIER TYPE	A	B	C	D
TYPE I	12' OR LESS	7'-0"	30"	N/A
TYPE II	OVER 12'	N/A	30"	12' MIN.*

\* SEE NOTES 6, 7 & 11

BASE DIMENSIONS				
POLE TYPE	F	G	H	K
A	12"	16"	16 1/4 "	8 1/8 "
B	13 1/2 "	18"	18"	9"

ANCHOR BOLT DIMENSIONS					
POLE TYPE	L	M	N	P	R (GALVANIZED LENGTH)
A	1 1/2 "	54"	6"	8"	12"
B	1 3/4 "	84"	6"	8"	12"

3  
4

Revision Date:

Scale : N/A Date : 06/01/05  
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TRAFFIC SIGNAL BASES

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GENERAL NOTES:

1. PIERS DESIGNED TO 90 MPH WIND PLUS 1.3 GUST FACTOR.
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 4000 PSI WITH A 3 DAY EARLY STRENGTH OF MINIMUM 1800 PSI.
3. ALL REINFORCING BARS SHALL BE DEFORMED ASTM A615, GRADE 60 (60000 PSI YIELD).
4. ALL ANCHOR BOLTS SHALL BE SWEDGED ASTM A36 MODIFIED TO 55000 PSI YIELD STRESS FURNISHED EACH WITH TWO (2) HEXAGONAL NUTS AND TWO (2) FLAT WASHERS. ALTERNATELY, IF AVAILABLE, ASTM A325 BOLTS MAY BE FURNISHED WITH YIELD STRESS OF 81000 PSI EACH WITH TWO (2) HEXAGONAL NUTS AND TWO (2) FLAT HARDENED WASHERS.
5. GROUT SHALL BE NON-METALLIC, NON-SHRINK GROUT (DRY PACKED GROUT MAY BE USED IF DESIRED).
6. SOIL DATA:

THIS DESIGN IS BASED ON FOLLOWING MINIMUM SOIL PROPERTIES:

ROCK BEARING STRENGTH - 12000 PSF

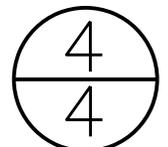
ROCK SKIN FRICTION - 1500 PSF ALONG PERIMETER OF PIER

STABLE SOIL BEARING STRENGTH - 4000 PSF (AT TWELVE FOOT (12')  
MINIMUM DEPTH)

UPLIFT VALUE - 1600 PSF ALONG PERIMETER OF PIER FOR A TEN FOOT (10')  
DEPTH FROM SURFACE.

7. IF PROPERTIES OF SOILS STATED IN NOTE 6 ARE NOT MET OR EXCEEDED, THE CONTRACTOR SHALL OBTAIN SUCH PROPERTIES FROM A SOIL BORING PERFORMED BY A SOIL LABORATORY UNDER THE SUPERVISION OF A REGISTERED GEOTECHNICAL ENGINEER.
8. IF WATER IS ENCOUNTERED DURING PIER DRILLING THE PIERS SHALL BE CASED.
9. THIS PIER DESIGN IS BASED ON THE ASSUMPTION THAT THE UNSTABLE AND EXPANSIVE SOIL LAYERS EXTEND TO NO GREATER DEPTH THAN TEN FEET (10') FROM SURFACE. WHERE SUCH LAYERS OF UNSTABLE AND EXPANSIVE SOILS EXTEND BELOW TEN FOOT DEPTH, THIS DRAWING DOES NOT APPLY, AND CUSTOM DESIGN ACCOMPANIED BY SOIL ANALYSIS (NOTE 7) SHALL BE PREPARED.
10. THIS DESIGN IS BASED ON AN INTERFACE WITH CITY OF GARLAND DRAWING "TRAFFIC SIGNAL STRUCTURES" BY VALMONT INDUSTRIES, SHEET 1 OF 1 (NO REVISION). IF STRUCTURES NOT SHOWN ON THAT DRAWING ARE USED, THIS DESIGN DOES NOT APPLY AND MUST BE MODIFIED BY A REGISTERED STRUCTURAL ENGINEER.
11. FOR TYPE II (STRAIGHT PIER IN CLAY) UPLIFT UP TO 6" MAY BE POSSIBLE. IF THIS CANNOT BE TOLERATED, THEN INSTALL A BELLED BOTTOM TO 2 DIAMETERS OF PIER (SEE DETAIL 5).

NOTE: ANCHOR BOLT ALIGNMENT SHALL BE APPROVED BY THE  
T&T DEPARTMENT PRIOR TO POURING CONCRETE.



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TRAFFIC SIGNAL BASES

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Direction of Travel

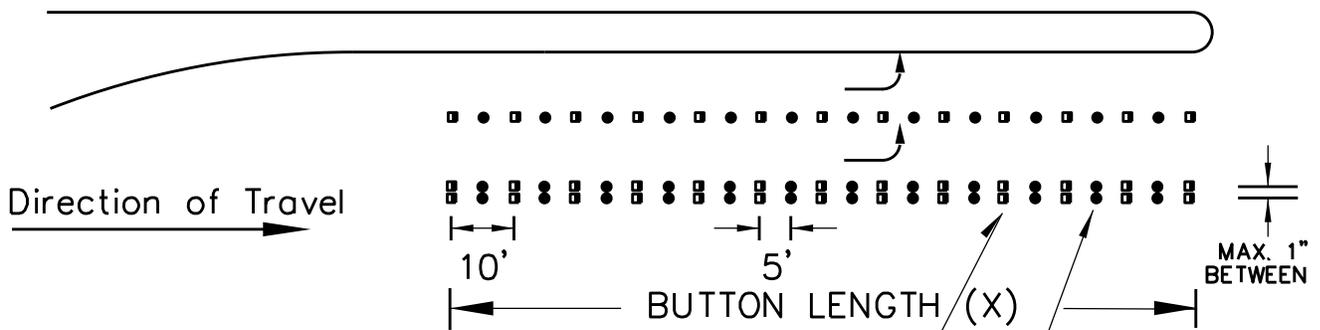


WHITE NON-REFLECTIVE ROUND CERAMIC 4" MARKER

WHITE MONO-DIRECTIONAL REFLECTIVE ACRYLIC 4" X 4" MARKER

TYPE 3 - SOLID WHITE LANE LINE OR LEFT/ RIGHT TURN LANE

STORAGE LENGTH (L)



WHITE MONO-DIRECTIONAL REFLECTIVE ACRYLIC 4" X 4" MARKERS

WHITE NON-REFLECTIVE ROUND CERAMIC 4" MARKERS

L = length of turn bay storage  
 X = length of button installation  
 $X = L \times 80\%$

TYPE 4 - DUAL LEFT/RIGHT TURN BAY LINE OR DOUBLE SOLID WHITE LINE

2/9

Revision Date: 06/01/2011

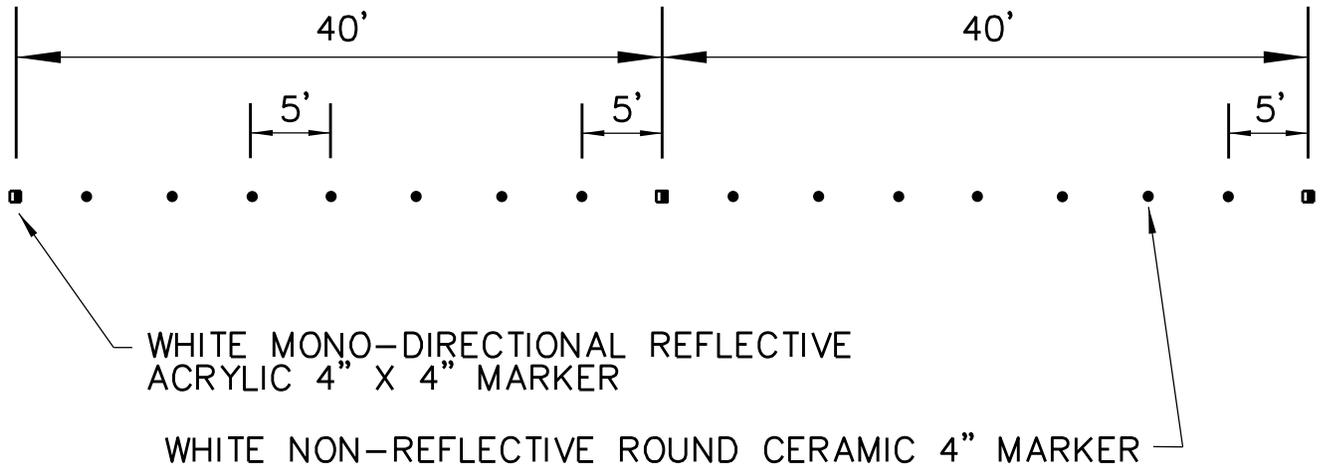
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TRAFFIC BUTTON DETAILS

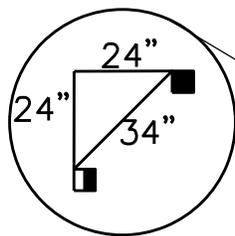
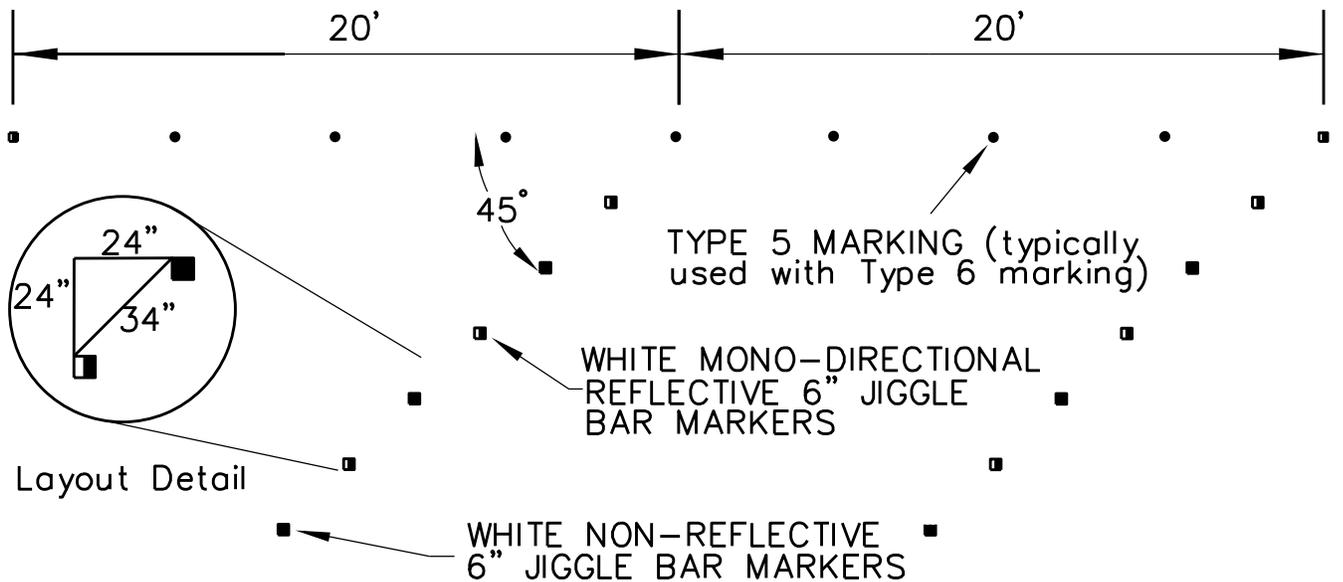
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Direction of Travel →



TYPE 5 - SOLID WHITE EDGE LINE

Direction of Travel →



Layout Detail

TYPE 6 - CROSSHATCHING-JIGGLE BAR MARKERS

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Project No. : STANDARD-DETAILS

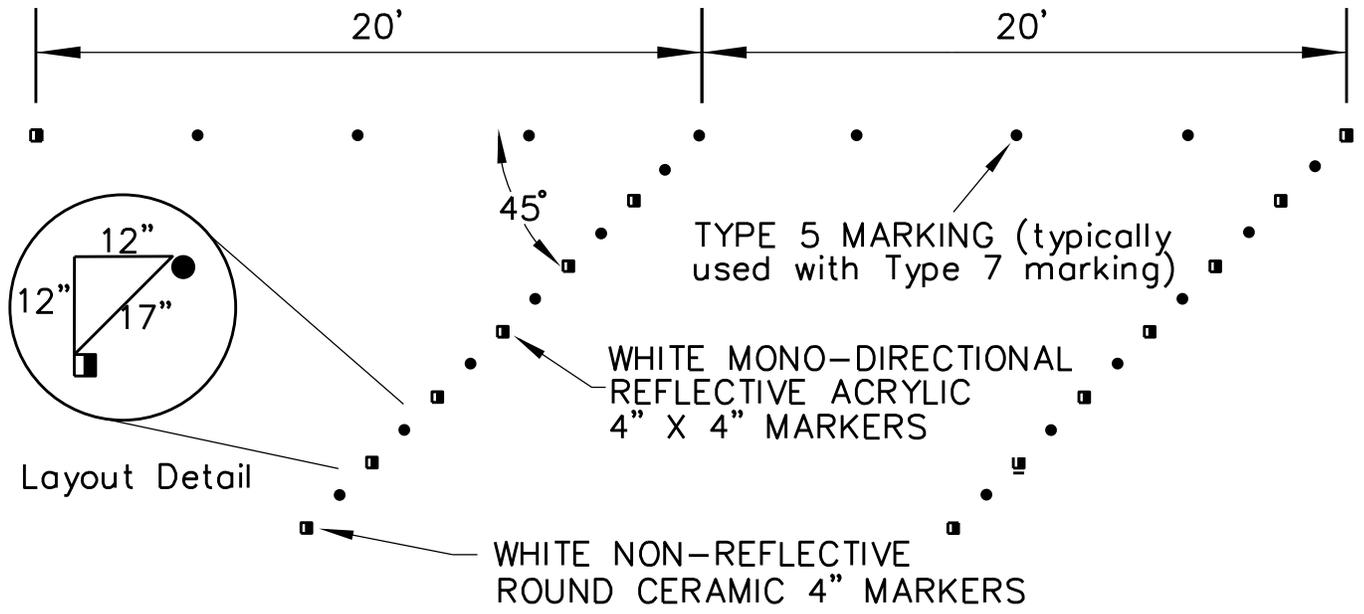


TRAFFIC BUTTON DETAILS

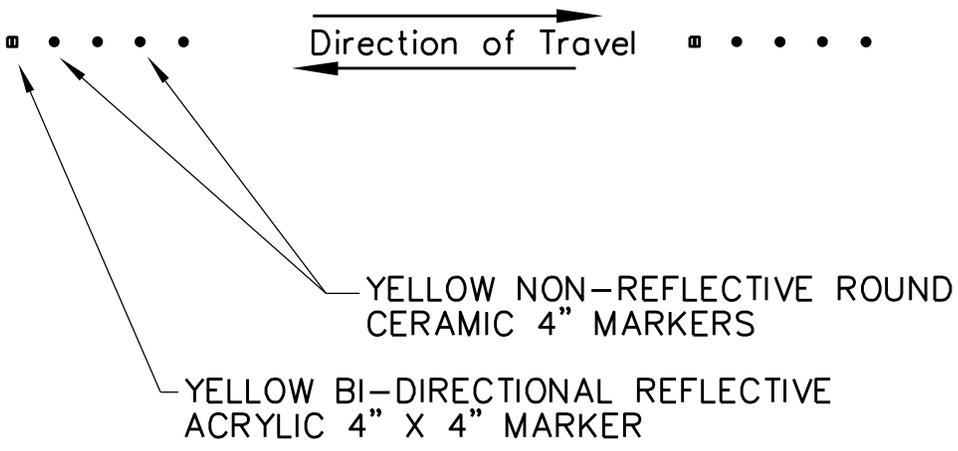
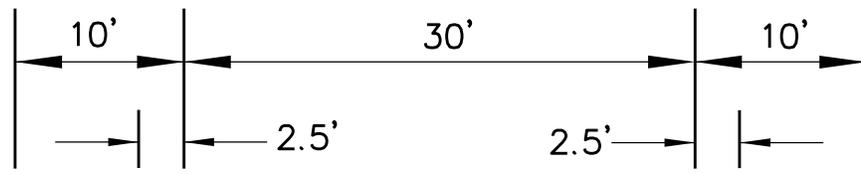
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Direction of Travel



**TYPE 7 - CROSSHATCHING-STANDARD MARKERS**



**TYPE A - SKIPPED YELLOW LANE LINE**

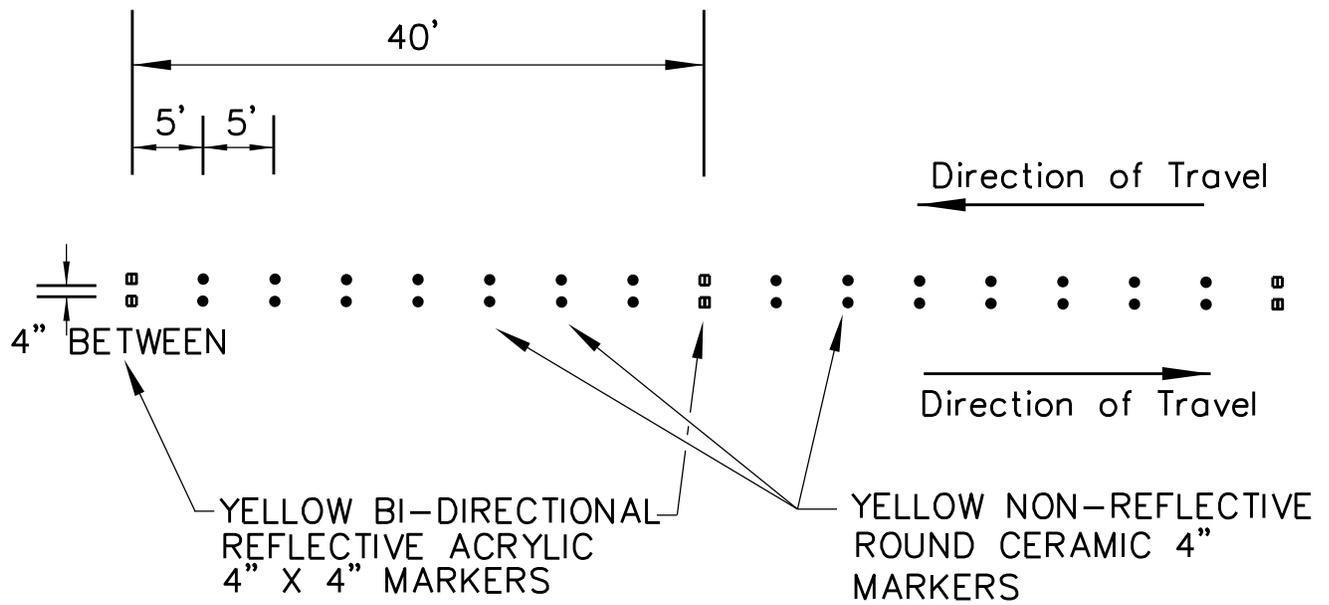
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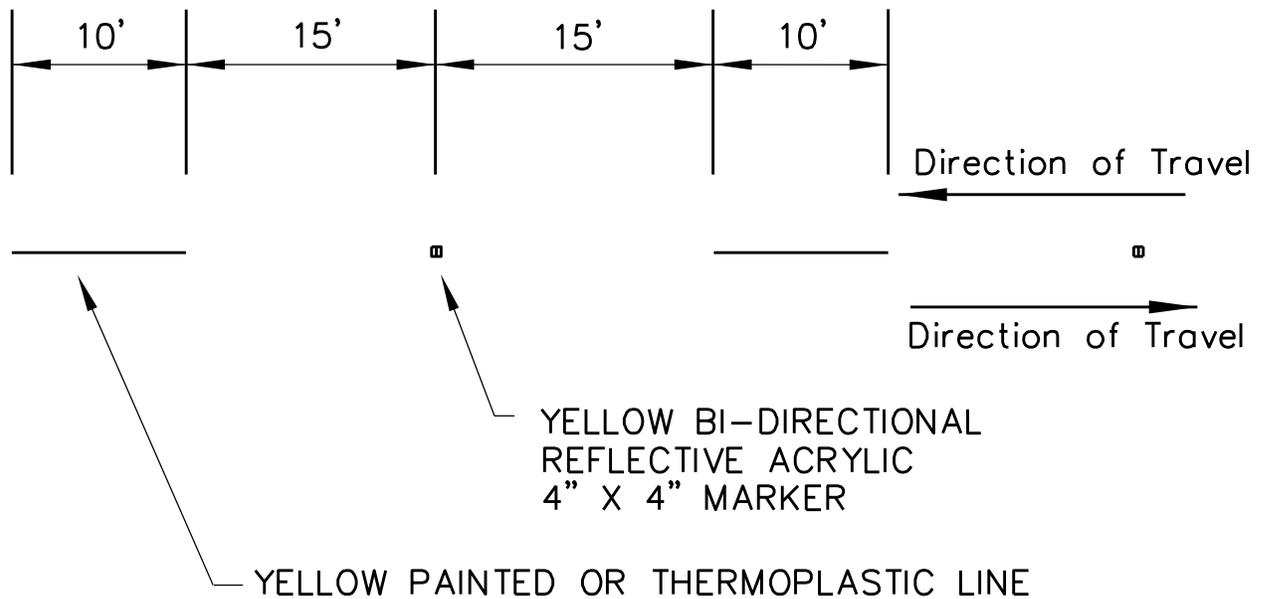
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Project No. : STANDARD-DETAILS



**TRAFFIC BUTTON DETAILS**



TYPE B - SOLID DOUBLE YELLOW CENTERLINE



TYPE C - SINGLE YELLOW MARKER

5  
9

Revision Date:

Scale : N/A Date : 06/01/05

Design :

Drawn : GAV

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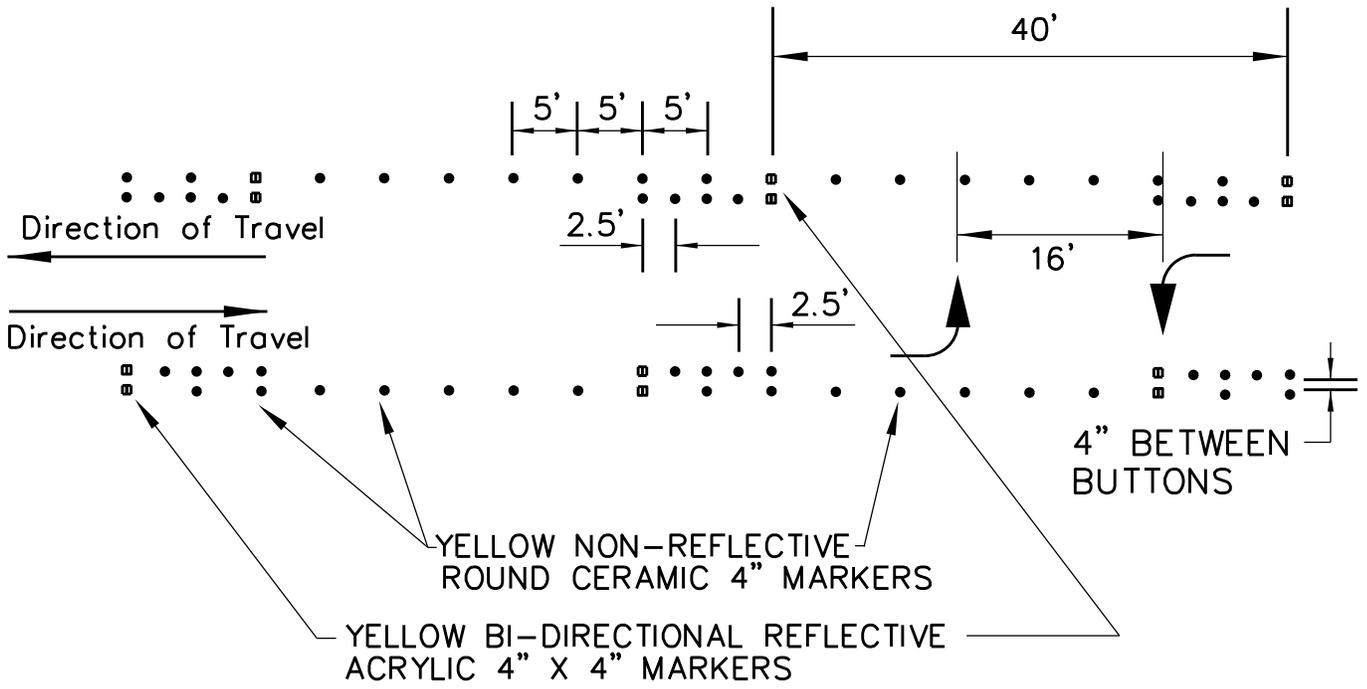
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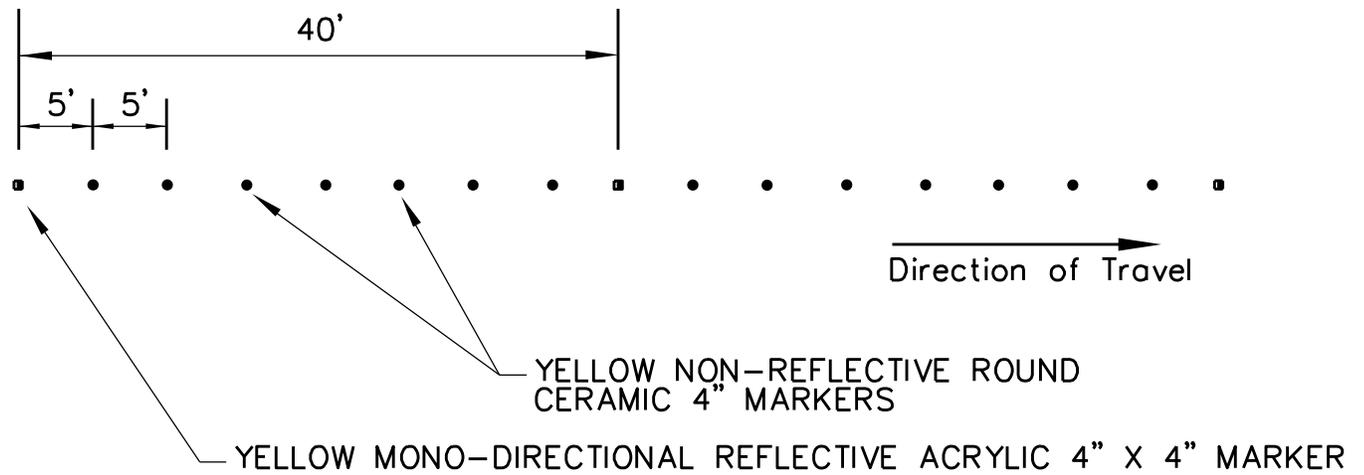
TRAFFIC BUTTON DETAILS

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**TYPE D - TWO WAY LEFT TURN LANE**



**TYPE E - SOLID YELLOW EDGE LINE**

6  
9

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Scale : N/A Date : 06/01/05

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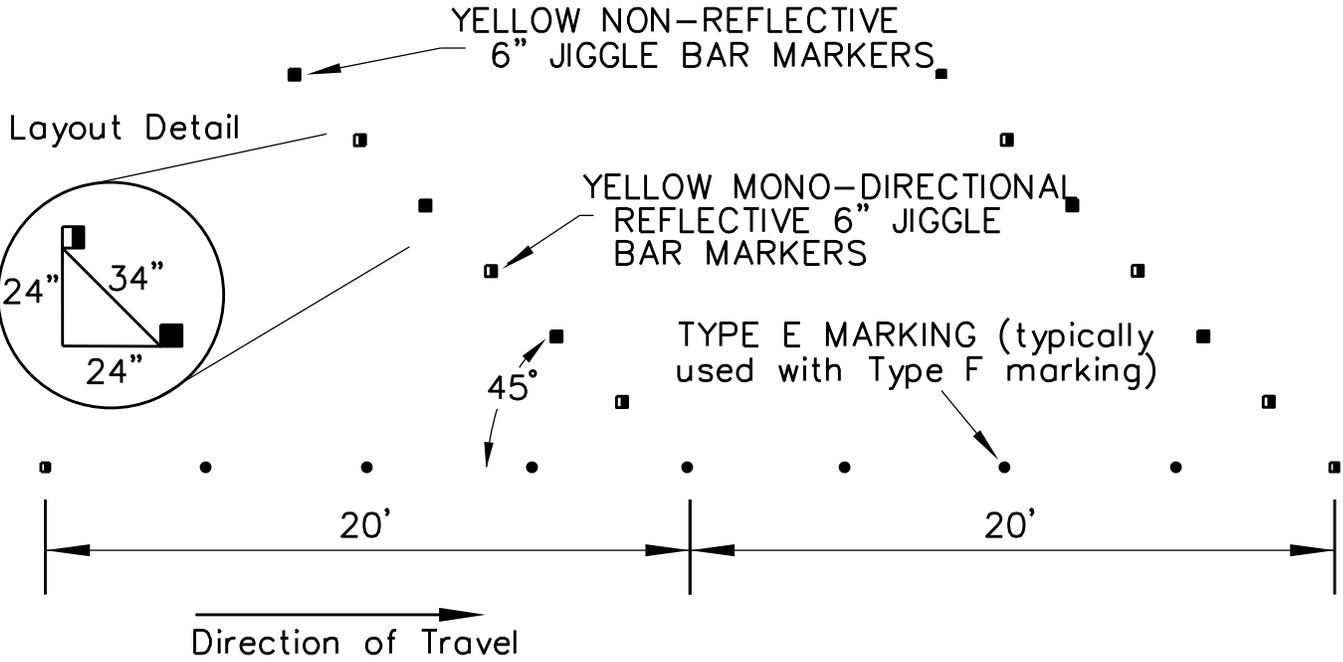
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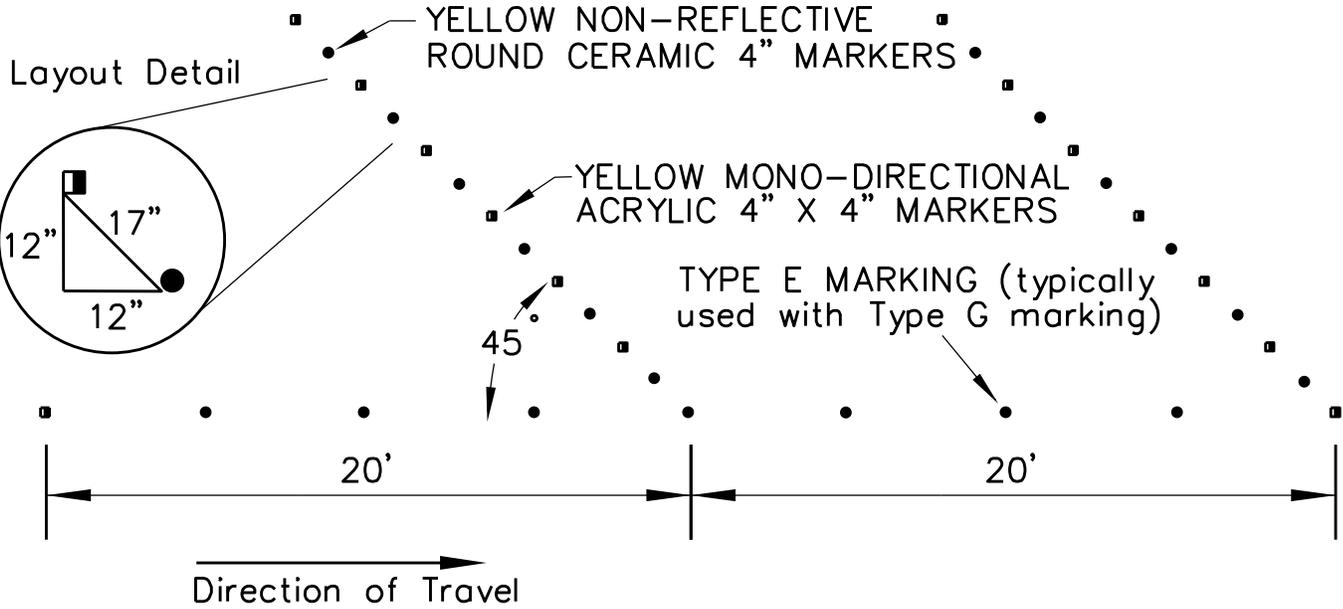
TRAFFIC BUTTON DETAILS

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**TYPE F – CROSSHATCHING–JIGGLE BAR MARKERS**



**TYPE G – CROSSHATCHING–STANDARD MARKERS**

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9

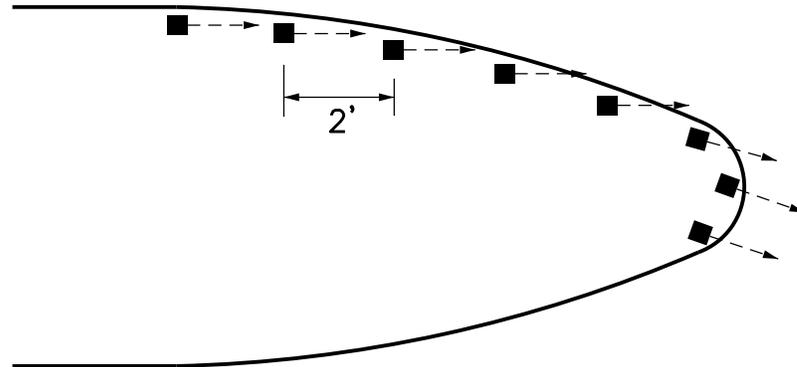
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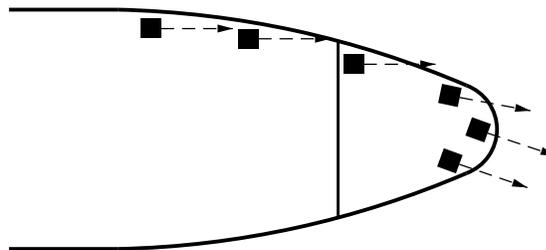


**TRAFFIC BUTTON DETAILS**

1. LARGE MEDIAN NOSE - (TYPICALLY 16 FT-9 REFLECTIVE BUTTONS)



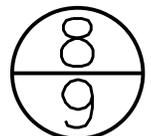
2. SMALL MEDIAN NOSE - (TYPICALLY 4 FT-6 REFLECTIVE BUTTONS)



BUTTON PLACEMENT DETAILS

- 1) YELLOW MONO-DIRECTIONAL REFLECTIVE ACRYLIC 4"X4" MARKERS
- 2) REFLECTORS PLACED ON TOP OF MEDIAN CURB

TYPE H - MEDIAN NOSE REFLECTORS



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TRAFFIC BUTTON DETAILS

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NOTES:

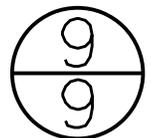
See City of Garland Specifications for Pavement Marker Installation for additional information. This detail sheet is intended to provide general layout information only.

Markings / layout dimensions may be modified by the City in order to match existing markings for some projects.

MARKERS:

All non-reflective 4" markers and all reflective and non-reflective 6" jiggle bar tiles shall be glazed ceramic type and must be approved by the City. All markers as described herein shall be similar in design and function to Permark brand manufactured by the American Clay Forming Plant of the Ferro Corporation.

All reflective 4" markers shall be 4" X 4" acrylic type with encapsulated lens and must be approved by the City. All reflective markers shall be similar in design and function to the Ray-O-Lite, model AA, type G and type H.



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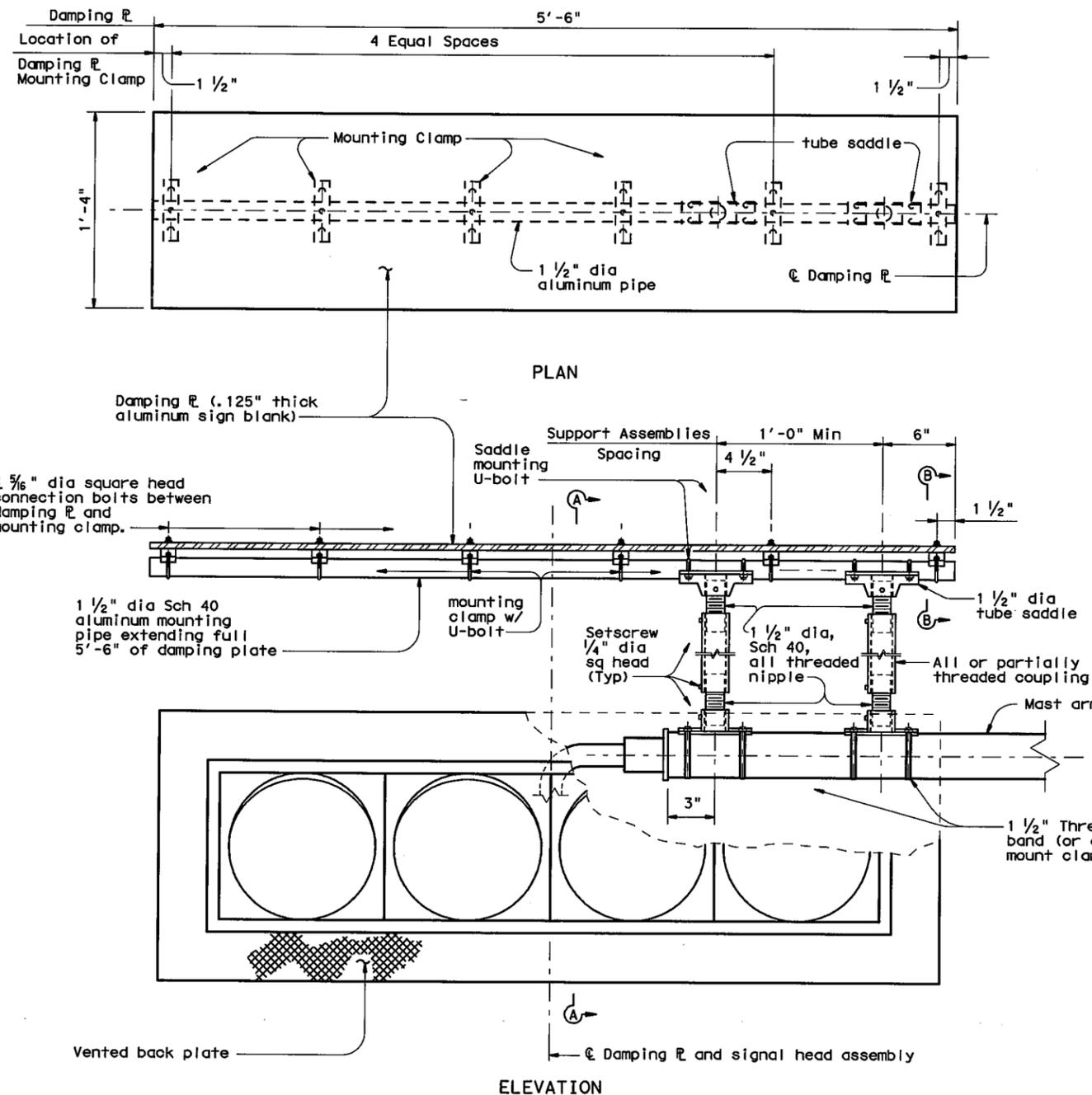
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**TRAFFIC BUTTON DETAILS**

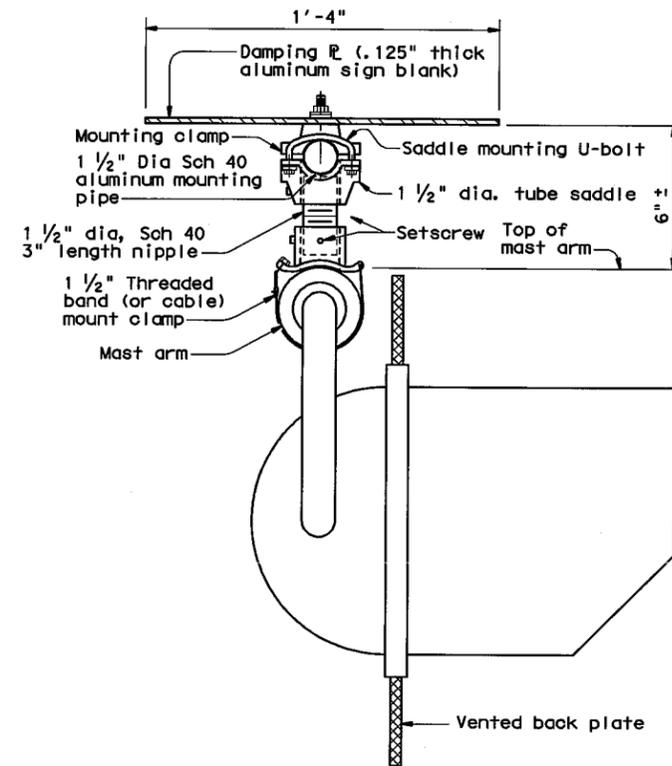
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

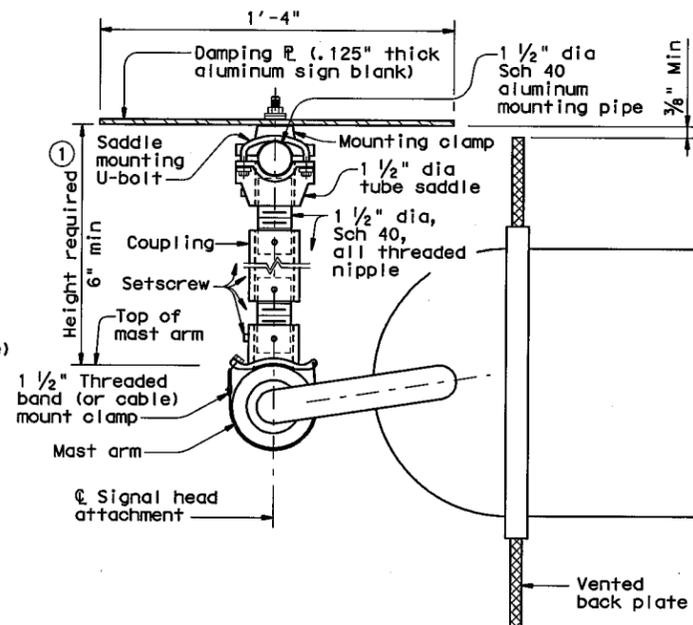


**DAMPING PLATE MOUNTING DETAILS**

(Showing alternate placement of signal head)



**SECTION A-A**  
(Showing standard placement of signal head)  
(Mounting clamp U-bolt is not shown for clarity)



**SECTION A-A**  
(Showing alternate placement of signal head)  
(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height			
Height required	One nipple each length	Two nipples each length	plus One coupling each length
6"-6 3/4"	3"	-	-
7"-8 1/2"	4"	-	-
9"-10 1/2"	6"	-	-
11"-15 1/2"	-	4"	5"
16"-24"	-	6"	10"

**GENERAL NOTES:**

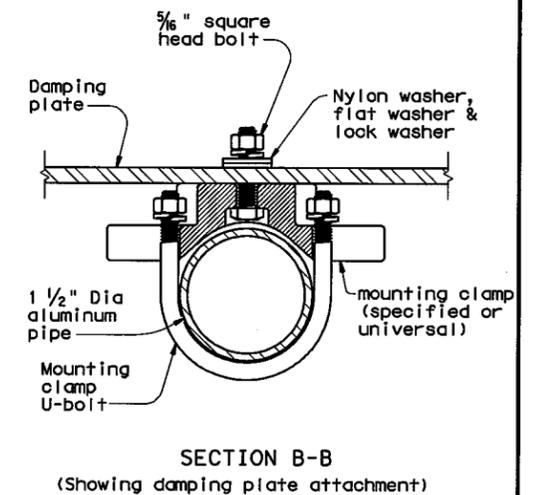
In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

Aluminum sign blank for damping plate shall conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle shall be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling shall be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and U-bolt assemblies shall conform to Standard sheet SMD (GEN)-08. U-bolts for saddle mounting shall have a minimum yield strength of 36 ksi.

Damping plate shall be mounted horizontally. Position centerline of damping plate to align with centerline of signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate shall be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

Unless stipulated by the manufacturers, all steel parts shall be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

Contractor shall verify applicable field dimensions before the installation.



**SECTION B-B**  
(Showing damping plate attachment)

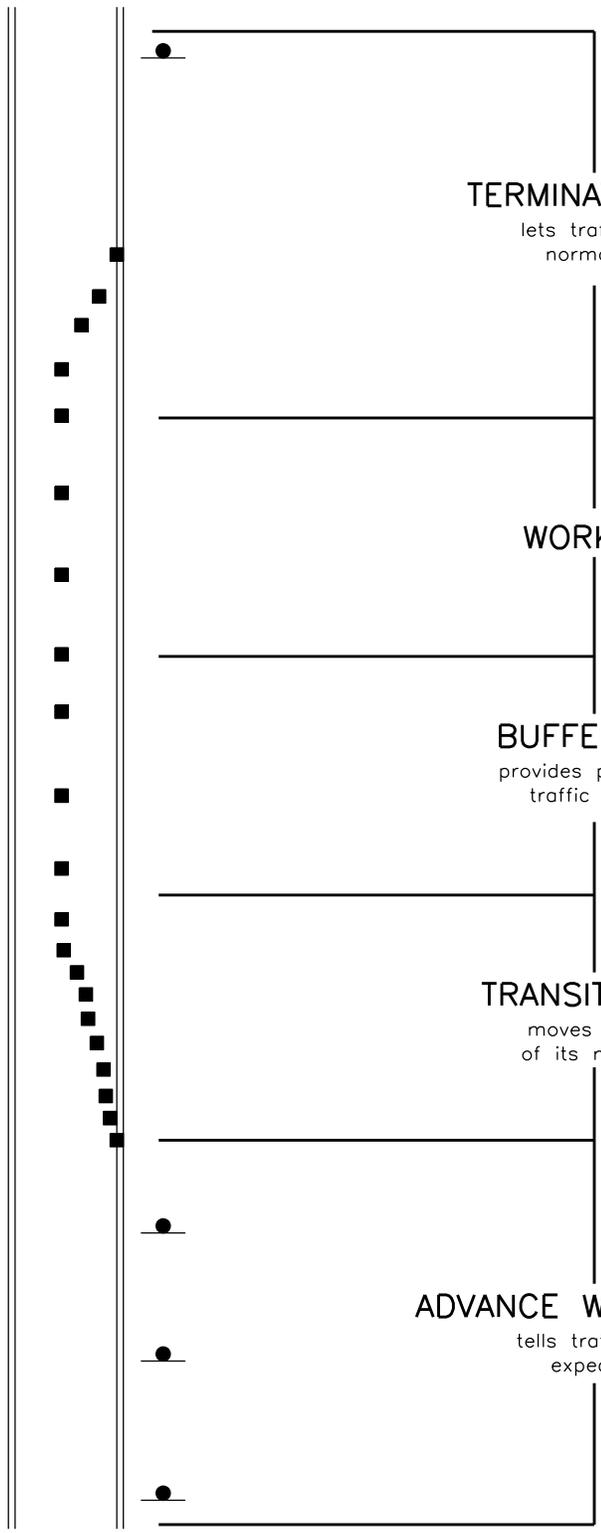
Texas Department of Transportation  
Traffic Operations Division

**MAST ARM DAMPING PLATE DETAILS**

MA-DPD-12

© TxDOT January 2012	DW: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST		COUNTY	SHEET NO.





**TRAFFIC CONTROL ZONES**

When traffic is affected by construction, maintenance, or utility operations, traffic control is needed to safely guide and protect motorists, pedestrians, and workers in a "traffic control zone." The traffic control zone is the distance between the first advance warning sign and the point beyond the work area where traffic is no longer affected.

Most traffic control zones can be divided into these specific parts :

- \* 1. Advance Warning Area
- \* 2. Transition Area
- 3. Buffer Space
- \* 4. Work Area
- 5. Termination Area

If no lane or shoulder closure is involved, the transition area will not be used.

\* Most important areas on urban streets.



Revision Date:

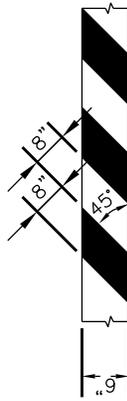
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Design :	
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Dwg. File : TRF_28.DWG	
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**CONSTRUCTION SIGNING  
AND BARRICADING  
GENERAL NOTES**

BARRICADE NOTES

1. CHANNELIZING DEVICES OTHER THAN BARRICADES SHOULD NORMALLY BE USED FOR CHANNELIZATION PURPOSES.
2. BARRICADES SHOULD NORMALLY BE PLACED PERPENDICULAR TO THE TRAFFIC FLOW. OTHER CHANNELIZING DEVICES, SUCH AS DRUMS, VERTICAL PANELS OR PORTABLE BARRIERS, SHOULD BE USED WHERE NEEDED TO SEPARATE TRAFFIC FROM THE WORK AREA. IN ALL CASES, THE BARRICADES SHOULD BE SO LOCATED AS TO MOST ADVANTAGEOUSLY WARN AND DIRECT TRAFFIC.
3. BARRICADES MAY BE DESIGNED AND CONSTRUCTED FROM WOOD, PVC PIPE OR ANY OTHER SUITABLE MATERIAL IN A MANNER APPROVED BY THE ENGINEER; THE DETAILS OF RAIL WIDTH AND STRIPING, NUMBER AND SPACING OF RAILS, MINIMUM LENGTH AND HEIGHT (ABOVE PAVEMENT) OF RAILS MUST BE ADHERED TO.
4. BARRICADES ARE TO BE CONSTRUCTED IN A FIRST-CLASS WORKMANSHIP MANNER OF CLEAN SOUND MATERIAL. ALL SURFACES ABOVE GROUND, WHICH ARE NOT STRIPED, SHALL BE WHITE.
5. THE CONTRACTOR SHALL MAINTAIN EACH BARRICADE IN A CLEAN AND GOOD CONDITION.
6. BARRICADES SHALL BE REMOVED UPON COMPLETION OF THE WORK AND/OR ELIMINATION OF THE HAZARD ON ANY SECTION.

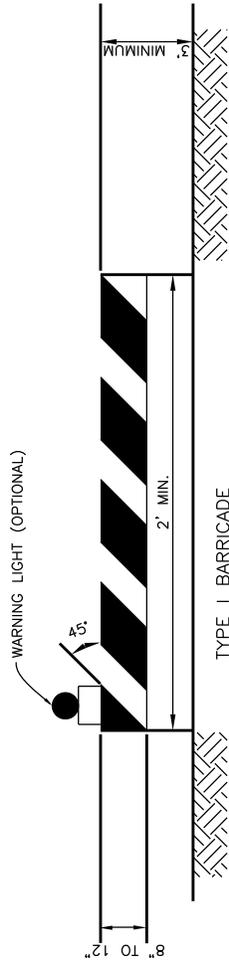


STRIPING FOR BARRICADE

1. WHERE A BARRICADE EXTEND ENTIRELY ACROSS A ROADWAY, IT IS DESIRABLE THAT THE STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING. WHEN BOTH RIGHT AND LEFT TURNS ARE PROVIDED FOR, THE CHEVRON STRIPING MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE.
2. STRIPING SHOULD COVER THE FULL WIDTH OF THE RAIL. STRIPING OF RAILS, PANELS AND GATES FOR THE RIGHT SIDE OF THE ROADWAY IS SHOWN ABOVE. FOR THE LEFT SIDE OF THE ROADWAY, STRIPING SHOULD SLOPE DOWNWARD TO THE RIGHT.
3. FOR ALL TYPES OF BARRICADES WITH RAILS LESS THAN 3'-0" LONG, STRIPES 4" WIDE SHALL BE USED.
4. THE 8" RAIL WIDTH IS A NOMINAL DIMENSION FOR RAILS MADE OF LUMBER.
5. IDENTIFICATION MARKINGS SHALL NOT BE SHOWN ON THE FRONT SIDE OF BARRICADE RAILS. IDENTIFICATION MARKINGS MAY BE SHOWN ONLY ON BACK SIDE OF BARRICADE RAILS.

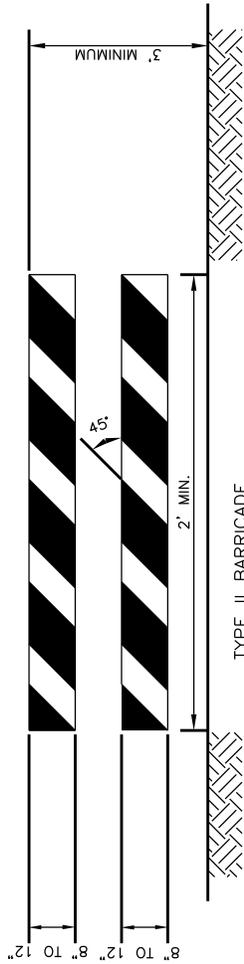


WARNING LIGHT (OPTIONAL)



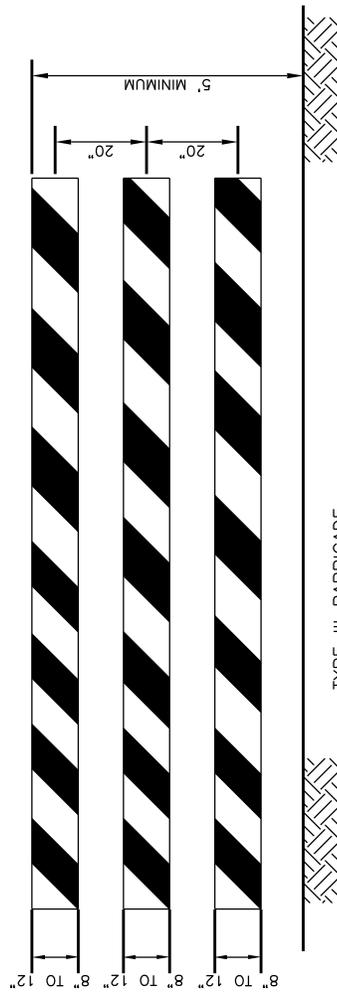
TYPE I BARRICADE

For Type I barricade, both sides of top rail shall have reflective orange and reflective white striping.



TYPE II BARRICADE

For Type II barricades, all four (4) rail faces shall have reflective orange and reflective white striping.



TYPE III BARRICADE

For Type III barricade, the (3) rails shall be reflective orange and reflective white strips on one side if it is facing traffic in one direction only, and on both sides if it serves traffic in two directions.

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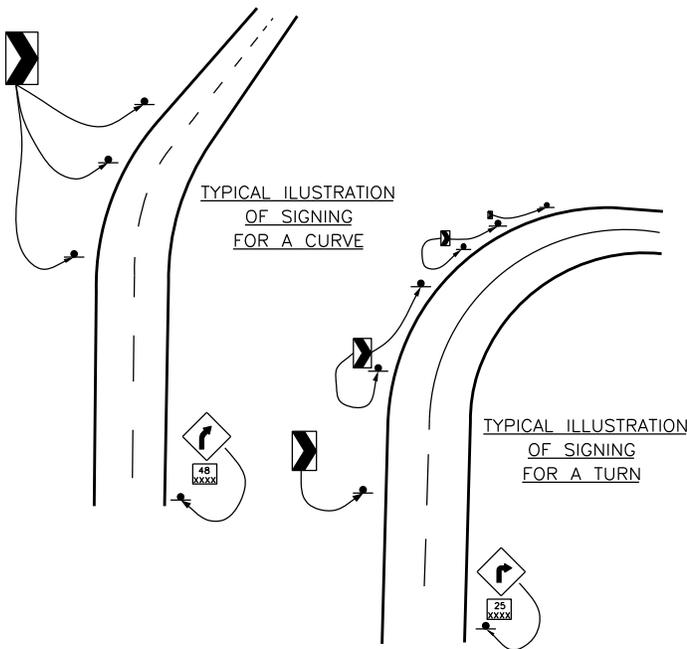
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# CONSTRUCTION SIGNING AND BARRICADING GENERAL NOTES

USAGE OF CWI-6, CWI-6A AND CWI-8 SIGNS

1. CWI-6, CWI-6A, CWI-8 SIGNS MAY BE MOUNTED ON TEMPORARY SUPPORTS.
2. CHEVRON ALIGNMENT SIGNS, WHEN USED, ARE ERECTED ON THE OUTSIDE OF A CURVE, SHARP TURN OR ON THE FAR SIDE OF AN INTERSECTION IN LINE WITH AND AT RIGHT ANGLES TO APPROACHING TRAFFIC. SPACING OF THE SIGNS SHOULD BE SUCH THAT TWO ARE VISIBLE THROUGHOUT THE CHANGE IN HORIZONTAL ALIGNMENT.
3. FOR TWO-WAY TRAFFIC, USE SAME ARRANGEMENT OF SIGNS ON OUTSIDE OF CURVE FOR EACH DIRECTION OF TRAVEL
4. APPROPRIATE ADVANCE WARNING TURN OR CURVE SIGN WITH ADVISORY SPEED PLAQUE SHOULD BE USED WHEN NEEDED.

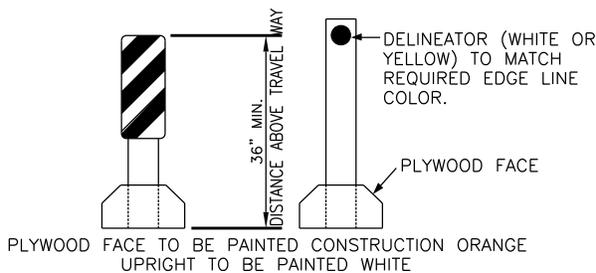


TYPICAL PORTABLE VERTICAL PANEL OR DELINEATOR MOUNTING

OTHER SIMILAR SUPPORTS MAY BE USED WHEN APPROVED OR DIRECTED BY THE ENGINEER

DELINEATORS

1. DELINEATORS ARE NORMALLY USED TO INDICATE ROADWAY ALIGNMENTS WHERE IMPROVED NIGHTTIME VISIBILITY IS NEEDED BUT OTHER ROADWAY FEATURES ARE SUFFICIENT FOR DAYTIME ALIGNMENT. THEY SHOULD GENERALLY BE USED ON HIGH FILLS AND HORIZONTAL AND VERTICAL CURVES WHERE ONLY NIGHTTIME DELINEATION IS NEEDED. DELINEATORS, WHEN REQUIRED FOR TEMPORARY USE TO CONTROL TRAFFIC THROUGH CONSTRUCTION AREAS WILL BE CONSIDERED SUBSIDIARY TO THE ITEM BARRICADES, SIGNS AND TRAFFIC HANDLING. WHEN USED, DELINEATORS ON THE RIGHT SIDE OF THE ROADWAY FACING TRAFFIC SHALL BE WHITE. THE COLOR OF DELINEATORS USED ALONG THE LEFT EDGE OF DIVIDED STREETS AND HIGHWAYS AND ONE-WAY ROADWAYS SHALL BE YELLOW.



SPACING DELINEATORS

2. SPACING OF DELINEATORS ON CURVES SHOULD BE ACCORDING TO THE TABLE BELOW. SPACING OF DELINEATORS ON TANGENT SECTIONS SHOULD NORMALLY BE BETWEEN 100 AND 200 FEET WITH THE CLOSER SPACING FOR LOWER SPEEDS AND GREATER SPACING FOR HIGHER SPEEDS.

RADIUS OF CURVE (FEET)	50	150	200	250	300	400	500	600	700	800	900	1000
APPROX. SPACING ON CURVE (FEET)	20	30	35	40	50	56	65	70	75	80	85	90



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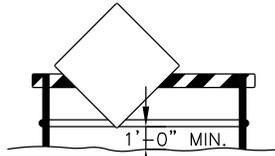
  
**GARLAND**  
 ENGINEERING  
 STANDARD DETAILS

**CONSTRUCTION SIGNING  
 AND BARRICADING  
 GENERAL NOTES**

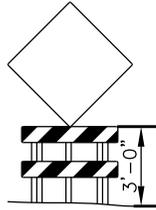
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# TYPICAL SIGN SUPPORTS

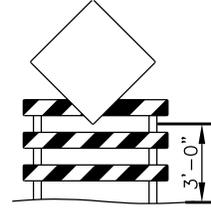
## PORTABLE SUPPORTS



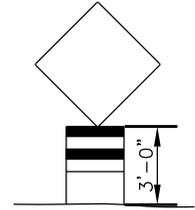
TYPE I BARRICADE SIGN SUPPORT  
BARRICADE TYPES I, II OR III MAY BE USED



TYPE II BARRICADE SIGN SUPPORT



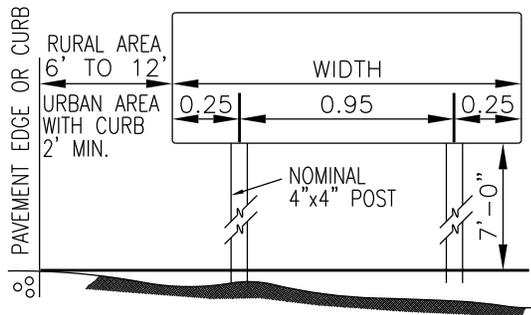
TYPE III BARRICADE SIGN SUPPORT



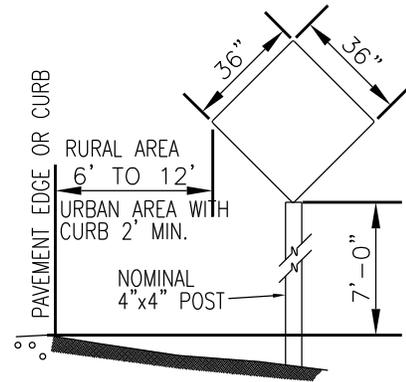
DRUM SIGN BARRICADE SUPPORT

## TEMPORARY SUPPORTS

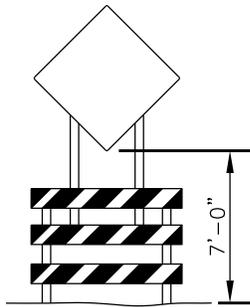
## FIXED SUPPORTS



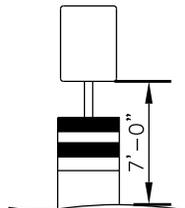
WOOD POST SIGN SUPPORT FOR RECTANGULAR REGULATORY SIGNS, GUIDE SIGNS, AND D 20 SIGNS.



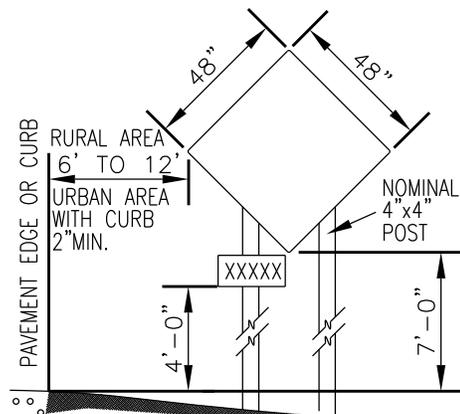
WOOD POST SIGN SUPPORT FOR 36" x 36" AND SMALLER WARNING SIGNS, AND OTHER SIGNS HAVING AN AREA NOT EXCEEDING 9 SQ. FT.



TYPE III BARRICADE SIGN SUPPORT FOR XXXXX OR GUIDE SIGNS



DRUM SUPPORT REGULATORY SIGN



WOOD POST SIGN SUPPORT FOR 48" x 48" WARNING SIGNS

OTHER TYPES OF SIGN SUPPORTS MAY BE USED WITH APPROVAL OF THE ENGINEER.

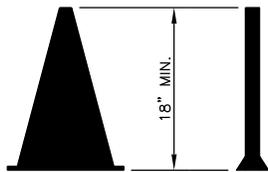


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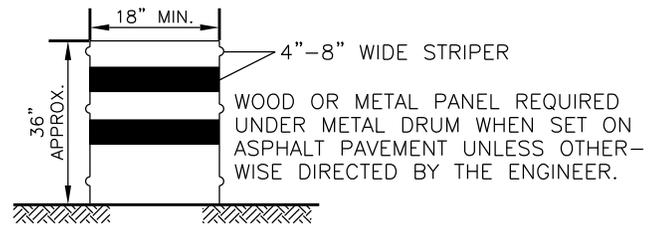


## CONSTRUCTION SIGNING AND BARRICADING GENERAL NOTES



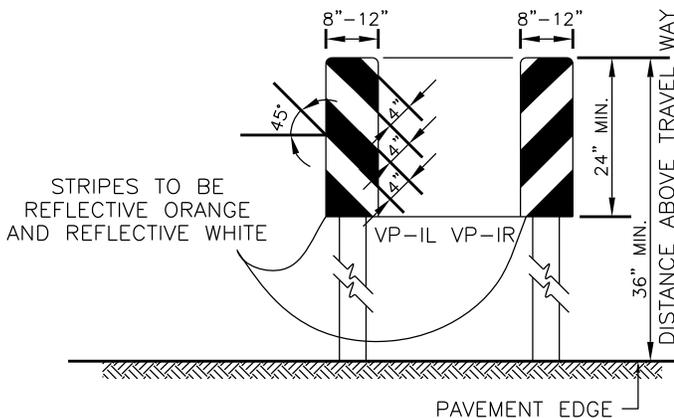
CONES

1. TRAFFIC CONES AND TUBULAR MARKERS SHALL BE A MINIMUM OF 18 INCHES IN HEIGHT WITH A BROADENED BASE AND MAY BE MADE OF VARIOUS MATERIALS TO WITHSTAND IMPACT WITHOUT DAMAGE TO THEMSELVES OR TO VEHICLES. LARGER SIZES SHOULD BE USED ON FREEWAYS AND OTHER ROADWAYS WHERE SPEEDS ARE RELATIVELY HIGH OR WHEREVER MORE CONSPICUOUS GUIDANCE IS NEEDED. ORANGE SHALL BE THE PREDOMINANT COLOR ON CONES AND TUBULAR MARKERS. THEY SHOULD BE KEPT CLEAN AND BRIGHT FOR MAXIMUM TARGET VALUE. FOR NIGHTTIME USE THEY SHALL BE REFLECTORIZED.
2. CONES OR TUBULAR MARKERS ARE GENERALLY ONLY SUITABLE FOR TEMPORARY USAGE (UP TO 8 HOURS) WITH OTHER CHANNELIZATION DEVICES SUCH AS VERTICAL PANELS OR BARRICADES PREFERRED FOR LONGER TERM USAGE. CARE SHOULD BE TAKEN TO INSURE THAT THEY REMAIN IN THEIR PROPER LOCATION AND IN AN UPRIGHT POSITION.



DRUMS

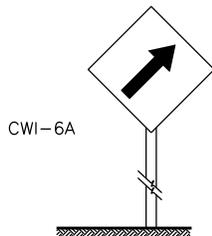
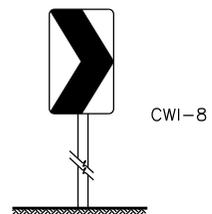
1. DRUMS, SET ON END, AND USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE APPROXIMATELY 36" IN HEIGHT AND MINIMUM OF 18" DIAMETER. THE CONTRACTOR, AT HIS OPTION, MAY USE DRUMS MADE FROM STEEL BARRELS OR BLACK POLYETHYLENE PLASTIC DRUM LINERS WEIGHING APPROXIMATELY EIGHT POUNDS EACH. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, REFLECTORIZED ORANGE AND REFLECTORIZED WHITE STRIPES, 4 TO 8 INCHES WIDE. THE FIRST REFLECTORIZED STRIPE SHOULD START WITHIN TWO (2) INCHES OF THE TOP OF THE DRUM. THERE SHALL BE AT LEAST TWO ORANGE AND TWO WHITE STRIPES ON EACH DRUM. IF THERE ARE NON-REFLECTORIZED SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES, THEY SHALL BE NO MORE THAN 2 INCHES WIDE. ALL NON-REFLECTORIZED SURFACES OTHER THAN TOP AND BOTTOM OF BARREL SHALL BE THE SAME COLOR FOR ALL DRUMS. WHEN DRUMS ARE PLACED IN THE ROADWAY, APPROPRIATE WARNING SIGNS SHOULD BE USED. DURING HOURS OF DARKNESS, A FLASHING WARNING LIGHT SHOULD BE PLACED ON DRUMS USED SINGLY AS A WARNING DEVICE. STEADY BURN ELECTRIC LIGHTS OR DELINEATORS SHOULD BE PLACED ON DRUMS USED IN SERIES FOR TRAFFIC CHANNELIZATION. DRUMS SHOULD NOT BE WEIGHTED WITH SAND, WATER OR OTHER MATERIAL TO THE EXTENT THAT IT WOULD MAKE THE DRUMS DANGEROUS TO MOTORISTS.
2. CWI-8 CHEVRON SIGNS, CWI-6A ARROW SIGNS OR VP-1 VERTICAL PANELS MOUNTED ABOVE DRUMS MAY BE USED AS SUPPLEMENT TO DRUM DELINEATION.



VERTICAL PANELS (VP)

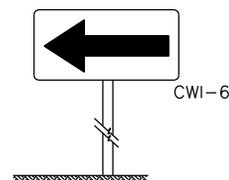
1. VERTICAL PANELS ARE NORMALLY USED AS CHANNELIZING DEVICES TO INDICATE TANGENT OR NEARLY TANGENT ROADWAY ALIGNMENT WHERE GOOD TARGET VALUE OF A DEVICE IS NEEDED IN DAYTIME AS WELL AS THE NIGHTTIME. IN ADDITION, VERTICAL PANELS SHOULD BE USED AT THE EDGE OF SHOULDER DROP-OFFS AND OTHER AREAS SUCH AS LANE TRANSITIONS WHERE POSITION DAY AND NIGHT DELINEATION MAY BE REQUIRED. VERTICAL PANELS SHOULD BE MOUNTED BACK TO BACK IF USED AT THE EDGE OF CUTS ADJACENT TO TWO-WAY TWO LANE ROADWAYS. STRIPES SHOULD ALWAYS SLOPE DOWNWARD TOWARD THE TRAVELED WAY.

THE CHEVRON SIGN (CWI-8) MAY BE USED TO SUPPLEMENT THE CWI-6 OR CWI-6A SIGN.



AN UPWARD SLOPING ARROW SIGN (CWI-6A) IS INTENDED TO BE USED TO INDICATE THE BEGINNING OF A CURVE OR TRANSITION. IT SHOULD BE PRECEDED WITH AN APPROPRIATE CURVE SIGN WHEN NEEDED.

A LARGE ARROW SIGN (CWI-6) IS INTENDED TO BE USED TO GIVE NOTICE OF A SHARP CHANGE IN ALIGNMENT (TURN) IN THE DIRECTION OF TRAVEL. IT SHOULD BE PRECEDED WITH AN APPROPRIATE TURN SIGN.



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# CONSTRUCTION SIGNING AND BARRICADING GENERAL NOTES

GENERAL NOTES

CONSTRUCTION SIGNS

WARNING LIGHTS

1. ALL SIGNS, SIGN COLOR, SIGN LETTERING AND SIGN REFLECTORIZATION SHALL CONFORM WITH THE TEXAS MANUAL ON TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. THE CONTRACTOR SHALL MAINTAIN EACH SIGN IN A CLEAN AND GOOD CONDITION.
2. CONSTRUCTION SIGNS SHALL BE MADE FROM WOOD OR METAL. THE DESIGNATION OF METAL AND WOOD AS PRIMARY MATERIALS FOR SIGNS SHALL NOT BE INTERPRETED TO EXCLUDE OTHER SUITABLE RIGID MATERIALS NOW OR HERE-AFTER AVAILABLE.
3. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK. INDIVIDUAL WARNING SIGNS SHALL BE REMOVED, TURNED AWAY FROM THE VIEW OF TRAFFIC, OR COVERED WHENEVER THE SPECIFIC DANGER OF WHICH THE PARTICULAR SIGN WARNS HAS CEASED TO EXIST, EITHER PERMANENTLY OR TEMPORARILY. THE SIGN MUST BE PROMPTLY REPLACED, TURNED INTO VIEW, OR UNCOVERED WHEN THE SITUATION AGAIN BECOMES A POTENTIAL DANGER.
4. SIGN ERECTED ON PORTABLE SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS WHICH ARE USED DURING THE DAY TO WARN OR GUIDE TRAFFIC THROUGH AND OR AROUND THE ACTUAL CONSTRUCTION AREA, BUT AT THE END OF THE WORKDAY SUCH SIGNS ARE EITHER REMOVED OR TURNED AWAY FROM THE VIEW OF TRAFFIC. PORTABLE SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. THE BOTTOM OF THE SIGN SHALL BE A MINIMUM OF ONE (1) FOOT ABOVE THE PAVEMENT EDGE. SIGNS REQUIRED FOR NIGHTTIME USAGE SHOULD NOT NORMALLY BE MOUNTED ON PORTABLE SUPPORTS EXCEPT WHEN APPROVED BY THE ENGINEER.
5. SIGNS ERECTED ON FIXED SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS THAT ARE TO REMAIN IN PLACE FOR BOTH DAY AND NIGHT USAGE TO REGULATE, WARN AND GUIDE TRAFFIC IN ADVANCE OF AND WITHIN THE LIMIT OF THE PROJECT INCLUDING THE CROSSROAD APPROACHES. HOWEVER, UNDER CERTAIN CONDITIONS, SUCH AS WHERE A SIGN MAY BE REQUIRED FOR A FEW DAYS' DURATION AND THEN IS NO LONGER NEEDED, OR WHERE A SIGN IS MOVED FROM LOCATION TO LOCATION EVERY FEW DAYS OR WHERE IT IS NOT PRACTICAL OR DESIRABLE TO PROVIDE A FIXED MOUNTING, SUCH SIGNS MAY BE ERECTED ON A TEMPORARY TYPE OF SUPPORT. TEMPORARY SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. SIGNS ERECTED ON TEMPORARY SUPPORTS SHOULD BE AT A MINIMUM HEIGHT OF 3 FEET. SIGNS ERECTED ON FIXED SUPPORTS SHOULD BE A MINIMUM OF SEVEN (7) FEET. REGARDLESS OF THE TYPE OF SUPPORT USED, REGULATORY SIGNS SHOULD NOT BE ERECTED AT HEIGHT LESS THAN 7-FOOT MINIMUM SPECIFIED ABOVE UNLESS A LOWER HEIGHT IS APPROVED BY THE ENGINEER. POSTS FOR FIXED SUPPORTS SHOULD BE SET IN THE GROUND WITHOUT CONCRETE FOOTINGS.
6. WHERE PORTABLE OR TEMPORARY SUPPORTS REQUIRE THE USE OF WEIGHTS TO KEEP A SIGN OR BARRICADE FROM TURNING OVER, THE USE OF SOME TYPE OF SANDBAG IS RECOMMENDED. THE USE OF PIECES OF CONCRETE, ROCKS, IRON, STEEL OR OTHER SOLID OBJECTS WILL NOT BE PERMITTED.

1. Warning lights are portable lens directed, enclosed lights. The color of the light emitted shall be yellow. The lights should be mounted at a minimum height of 36 inches to the bottom of the lens and be in accordance with the Texas MUTCD.
2. Type A low intensity flashing warning lights are commonly mounted on barricades, other channelization devices or advance warning signs and are intended to warn the driver that he is approaching a hazardous area. Their use shall be as specified elsewhere in the plans, or as directed by the engineer.
3. Type B high intensity flashing warning lights are normally mounted on the first advance warning signs at each end of the project. Also extremely hazardous site conditions within the construction area may require that the lights be mounted on barricades, signs, or other supports. As these lights are effective in daylight as well as dark, they are designed to operate 24 hours per day. Their use shall be specified elsewhere in the plans or as directed by the the engineer.
4. Type C steady burn lights are intended to be used in a series for delineation to supplement other traffic control devices used to delineate the edge of the traveled way on detour curves, lane changes, lane closures, shoulder drop-offs and other similar conditions or hazards. The series of steady burn lights should have a type B high intensity flashing warning light at the beginning and end of the series to mark the hazard. Where steady burn lights are to be used for delineation, the contractor may at his option, utilize delineators.

REFLECTORIZATION

The reflectorized white and reflectorized orange stripes for barricades, drums, and vertical panels shall be constructed of High Intensity sheeting and shall be maintained to meet the appearance, color, and reflectivity requirements of "High Specific Intensity Flat Surface Reflective Sheeting" in accordance with Departmental Specification D-9-8300

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**CONSTRUCTION SIGNING  
AND BARRICADING  
GENERAL NOTES**

GENERAL NOTES

CONSTRUCTION PAVEMENT MARKINGS

1. WHEN REQUIRED ELSEWHERE IN THE PLANS, THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING PAVEMENT MARKINGS ON ALL ROADWAYS THAT ARE OPEN TO TRAFFIC WITHIN THE LIMITS OF THE PROJECT. ON PROJECTS INVOLVING ROADWAY SURFACING WHICH WILL REQUIRE PAVEMENT MARKING FOR CONTROL OF TRAFFIC DURING CONSTRUCTION, THE MARKINGS MAY INCLUDE BOTH STANDARD AND ABBREVIATED MARKINGS AS DEFINED BELOW:
  - A. STANDARD PAVEMENT MARKINGS – STANDARD MARKINGS PLACED IN CONFORMANCE WITH THE REQUIREMENTS OF THE TEXAS MUTCD. SUCH MARKINGS SHOULD BE PLACED ON ALL ROADWAYS OPEN TO TRAFFIC DURING CONSTRUCTION, INCLUDING NEW PAVEMENT, RESURFACING, DETOURS OR OTHER ROADWAYS WHERE CONSTRUCTION ACTIVITIES MAY HAVE COVERED OR OBLITERATED EXISTING MARKINGS. STANDARD MARKINGS SHOULD BE PLACED AS SOON AS POSSIBLE AND PRACTICAL. WHEN IT IS NOT PRACTICAL OR POSSIBLE TO PLACE STANDARD MARKINGS AT THE END OF EACH DAY’S WORK, ABBREVIATED MARKINGS MAY BE UTILIZED FOR SHORT PERIODS UNTIL STANDARD MARKINGS CAN BE PLACED.
  - B. ABBREVIATED PAVEMENT MARKINGS – ABBREVIATED PAVEMENT MARKINGS ARE SHORTER IN LENGTH THAN STANDARD MARKINGS. ABBREVIATED PAVEMENT MARKINGS MAY BE USED TO DELINEATE LANE CONTINUITY ONLY UNTIL SUCH TIME AS STANDARD MARKINGS CAN BE PLACED. THEY ARE NOT INTENDED TO SUBSTITUTE FOR STANDARD MARKINGS FOR PERIODS GREATER THAN TWO (2) WEEKS. TO SEPARATE TRAFFIC FLOWS IN OPPOSING DIRECTIONS, THE PAVEMENT MARKINGS SHALL BE YELLOW. WHITE PAVEMENT MARKINGS SHALL BE USED TO DELINEATE THE SEPARATION OF TRAFFIC FLOWS IN THE SAME DIRECTION.
  - C. PAVEMENT MARKINGS, MATERIALS – TEMPORARY PAVEMENT MARKING MAY BE ACCOMPLISHED BY USE OF STANDARD TRAFFIC PAVEMENT MARKING PAINT OR BY PAVEMENT MARKING TAPE (SCOTCHLANE OR STAMARK BRAND OR AS APPROVED BY THE ENGINEER). TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY WHEN NO LONGER APPLICABLE.
2. WHEN ABBREVIATED PAVEMENT MARKINGS ARE USED, A DO NOT PASS SIGN SHALL BE USED TO MARK THE BEGINNING OF THE SECTION WHERE PASSING IS TO BE PROHIBITED AND A PASS WITH CARE SIGN SHALL BE USED TO MARK THE BEGINNING OF A SECTION WHERE PASSING IS PERMITTED.

REMOVAL OF PAVEMENT MARKINGS

1. REMOVAL OF PAVEMENT MARKINGS – INCLUDES CENTERLINE, BARRIER LINES, LANE LINES, EDGE LINES, AND RAISED PAVEMENT MARKINGS.
2. IMMEDIATELY UPON OPENING A DETOUR TO TRAFFIC, ANY PAVEMENT MARKINGS ON THE EXISTING ORIGINAL ROADWAY IN THE DETOUR TRANSITION AREA THAT ARE NO LONGER APPLICABLE AND WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST TOWARD OR INTO THE CLOSED PORTION OF THE ROADWAY, SHALL BE REMOVED OR OBLITERATED. IN ADDITION, WHEN A DETOUR IS TO BE DISCONTINUED, ANY PAVEMENT MARKINGS USED TO TRANSITION TRAFFIC INTO THE DETOUR WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST INTO THE DISCONTINUED DETOUR SHALL LIKEWISE BE REMOVED OR OBLITERATED. THE ABOVE SHALL NOT APPLY TO DETOURS OF A SHORT TIME DURATION OF A FEW HOURS WHERE FLAGMEN OR SUFFICIENT CHANNELIZING DEVICES ARE USED TO OUTLINE THE DETOUR ROUTE AND THE DETOUR IS NOT TO BE MAINTAINED OVERNIGHT.
3. THE REMOVAL OF PAVEMENT MARKINGS SHALL BE AN INTEGRAL PART OF ESTABLISHING THE DETOUR. DETOURS SHALL BE PLANNED AND SCHEDULED WELL ENOUGH IN ADVANCE TO ALLOW ADEQUATE TIME TO COMPLETE ALL PHASES OF THE OPERATION PRIOR TO DARKNESS. IF INCLEMENT WEATHER OR DARKNESS BECOMES A FACTOR, IT WILL BE THE CONTRACTORS DECISION TO CONTINUE WITH THE DETOUR OPERATION OR RETAIN THE EXISTING TRAVELWAY OPEN TO TRAFFIC WHEN ANY OR ALL OF THE REQUIREMENTS OF THE DETOUR CANNOT BE ACCOMPLISHED.
4. PAVEMENT MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE, SO AS NOT TO LEAVE A DISCERNIBLE MARKING, BY ANY METHOD THAT DOES NOT MATERIALLY DAMAGE THE SURFACE OR TEXTURE OF THE PAVEMENT. SUBJECT TO THE APPROVAL OF THE ENGINEER, ANY METHOD THAT PROVES TO BE SUCCESSFUL ON A PARTICULAR TYPE PAVEMENT MAY BE USED. OVERPAINTING OF THE MARKING WILL NOT BE PERMITTED. REMOVAL OF RAISED PAVEMENT MARKINGS SHALL BE AS DIRECTED BY THE ENGINEER.
5. WHERE MECHANICAL MEANS OF MARKING REMOVAL HAVE BEEN EMPLOYED TO COMPLETELY REMOVE THE MARKING AND ITS REFLECTIVITY, PAINT OF A COLOR MATCHING THE PAVEMENT SURFACE OR USED CRANKCASE OIL MAY BE EMPLOYED IF NECESSARY AS A MEANS OF COVERING CONTRASTING PAVEMENT TEXTURE. NIGHTTIME INSPECTIONS ARE NEEDED TO VERIFY THE CONTINUED EFFECTIVENESS OF THE CHANGE.
6. PAVEMENT MARKINGS TO BE REMOVED SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REMOVAL OF PAVEMENT MARKINGS WILL BE CONSIDERED SUBSIDIARY TO THE ITEM BARRICADES, SIGNS AND TRAFFIC HANDLING.



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Drawn : JMK	
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Project No. : STANDARD-DETAILS	



**CONSTRUCTION SIGNING  
AND BARRICADING  
GENERAL NOTES**

# MINIMUM CONSTRUCTION WARNING SIGN SPACING

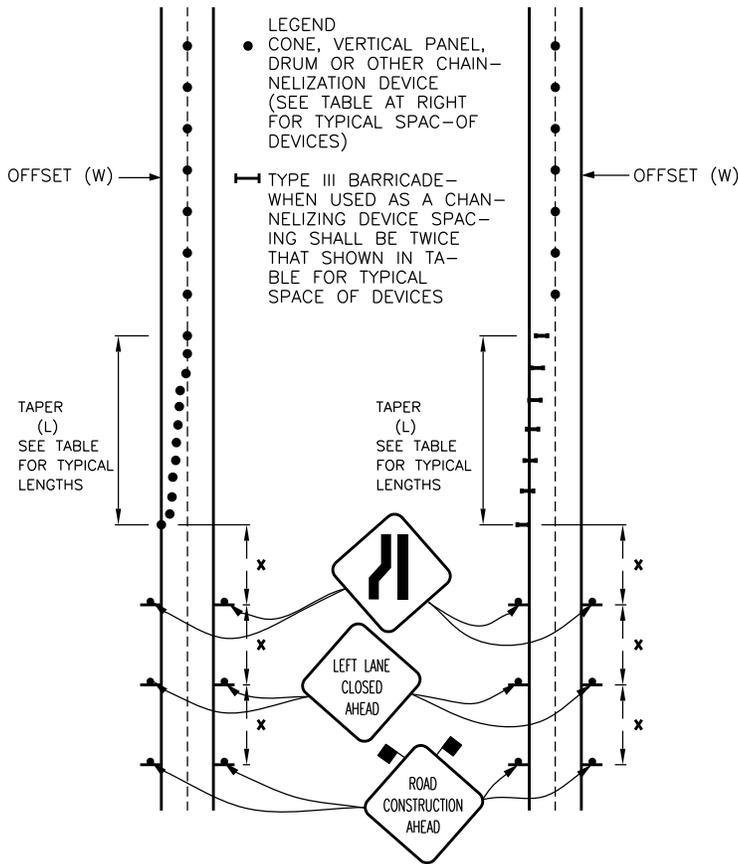
POSTED SPEED OR 85% SPEED	30 OR LESS	35	40	45	50	55
X MINIMUM DISTANCE (FT.)	120	160	240	300	400	500

⊞ FOR ROADS WITH A 55 MPH POSTED SPEED LIMIT, ADVANCE WARNING SIGNS SHOULD BE PLACED APPROXIMATELY 1,500 FEET IN ADVANCE OF THE CONDITION TO WHICH THEY ARE CALLING ATTENTION. WHERE A SERIES OF ADVANCE WARNING SIGNS ARE USED, THE WARNING SIGN NEAREST THE WORK SITE SHOULD BE PLACED APPROXIMATELY 500 FEET FROM THE POINT OF RESTRICTION WITH THE ADDITIONAL SIGN AT APPROXIMATELY 500-1000 FOOT INTERVALS.

TYPICAL TRANSITION LENGTHS  
AND  
SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES

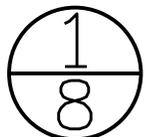
POSTED SPEED*	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS**			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	715'	780'	60'	130'-175'

\* 85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT  
 \*\*TAPER LENGTHS HAVE BEEN ROUNDED OFF  
 L=LENGTH OF TAPER (FT) W=WIDTH OF OFFSET (FT)  
 S=POSTED SPEED (MPH)



## TYPICAL TRANSITION & SIGNING FOR DIVIDED ROADWAYS

(NOT TO SCALE)



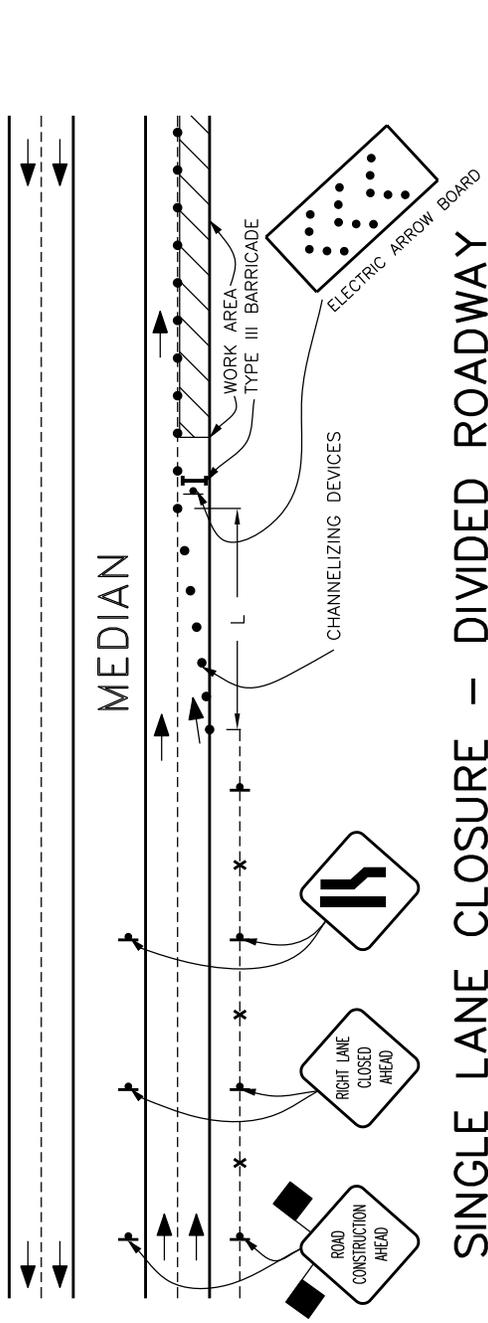
Revision Date: \_\_\_\_\_

Scale : N/A Date : 06/01/05  
 Design : \_\_\_\_\_  
 Drawn : JMK  
 Dwg. File : TRF\_29.DWG  
 Project No. : STANDARD-DETAILS

  
**GARLAND**  
 ENGINEERING  
**STANDARD DETAILS**

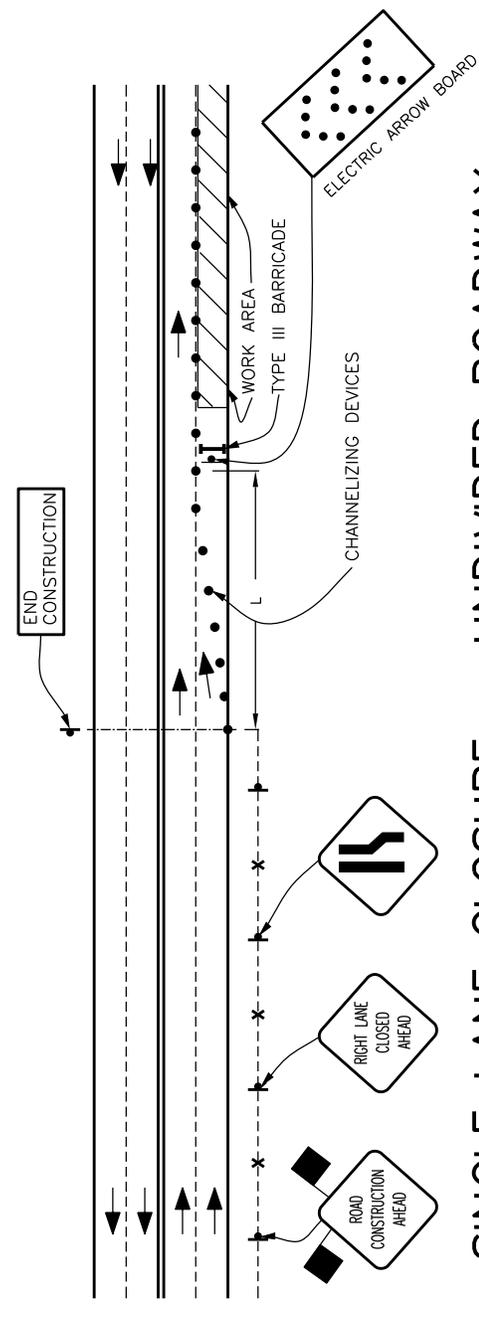
**CONSTRUCTION SIGNING  
AND BARRICADING DETAILS**

PAGE  
**35**



### SINGLE LANE CLOSURE – DIVIDED ROADWAY

(NOT TO SCALE)



### SINGLE LANE CLOSURE – UNDIVIDED ROADWAY

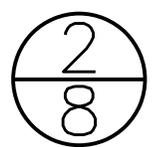
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Revision Date:  

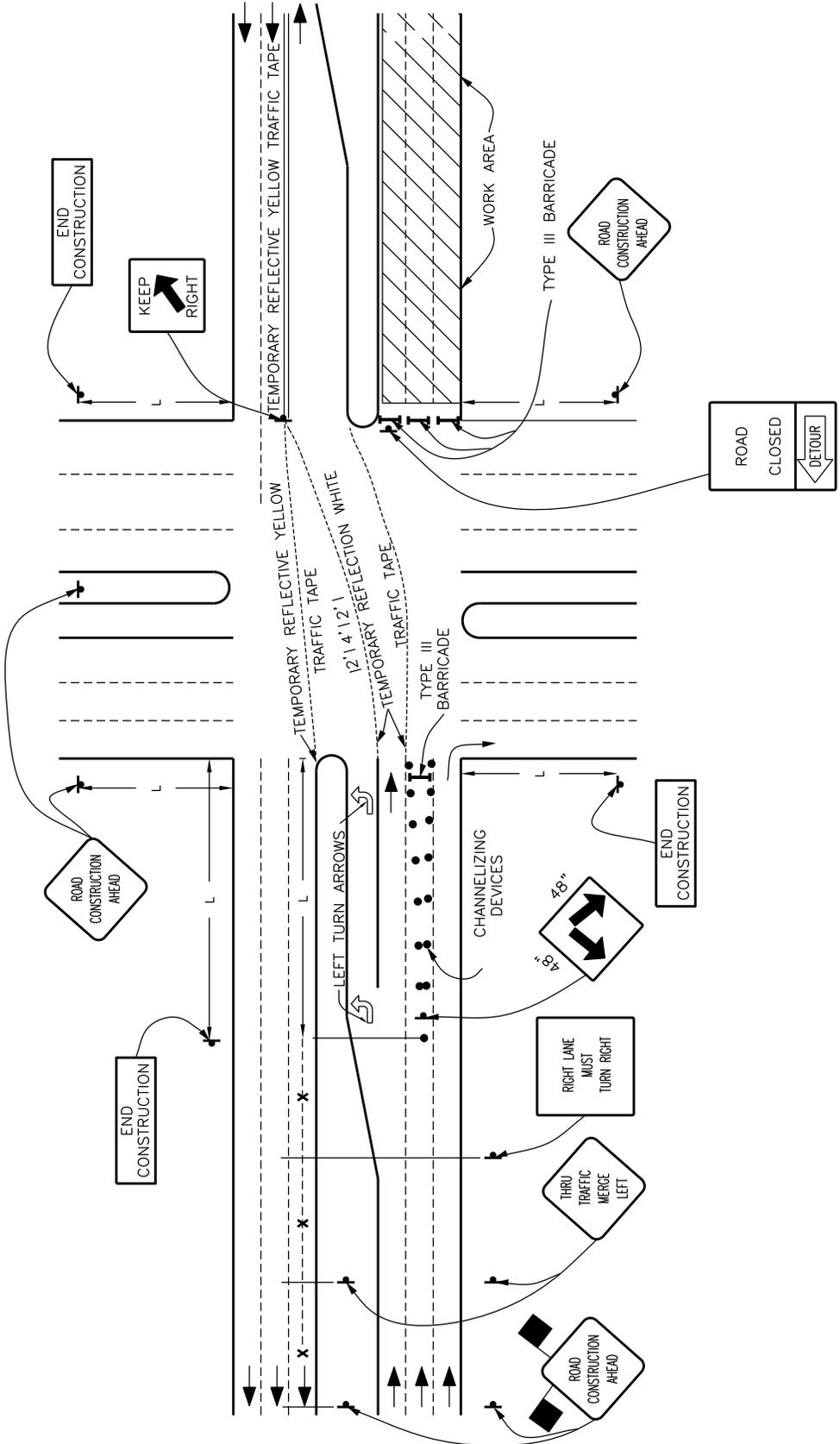
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Dwg. File : TRF_29.DWG	
Project No. : STANDARD-DETAILS	



## CONSTRUCTION SIGNING AND BARRICADING DETAILS

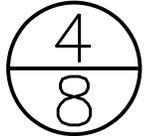






# FAR SIDE LANE CLOSURE – 6 LANE DIVIDED ROADWAY

(NOT TO SCALE)

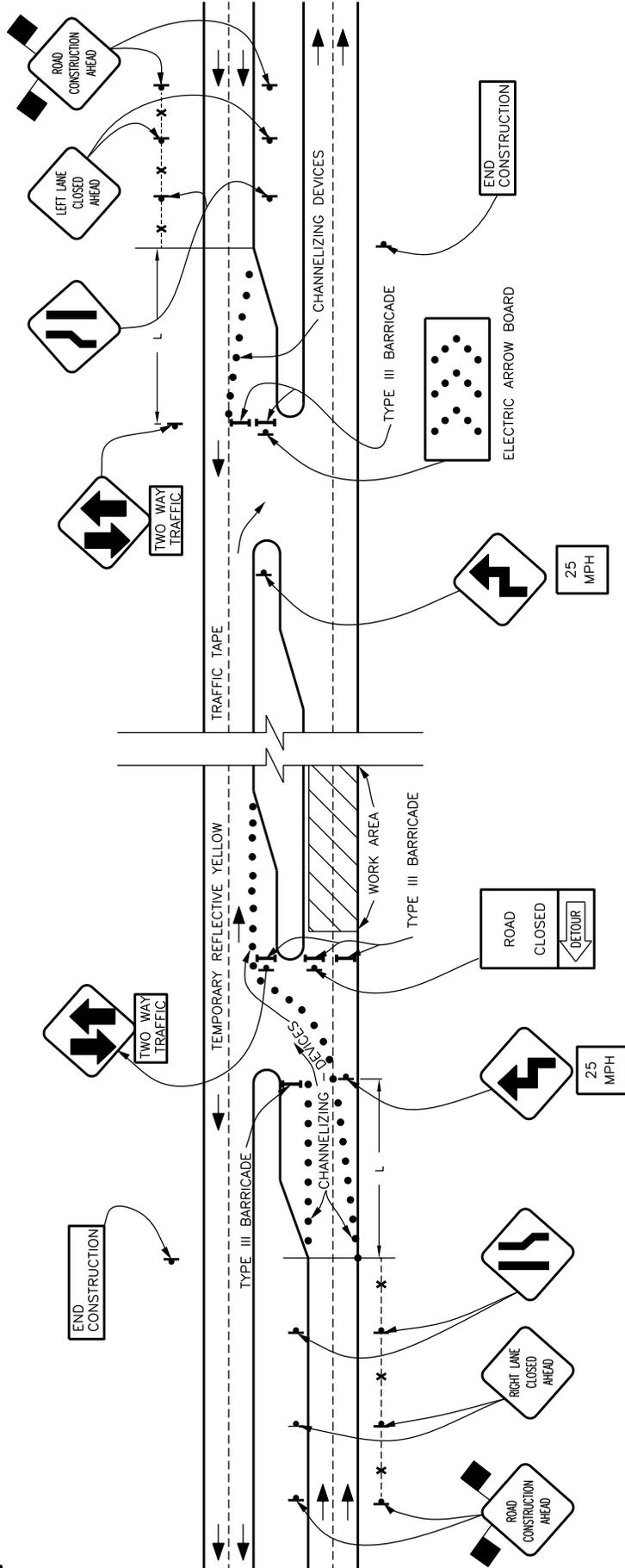


Revision Date: \_\_\_\_\_

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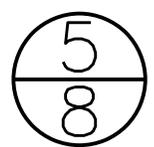


## CONSTRUCTION SIGNING AND BARRICADING DETAILS



**SINGLE DIRECTION CLOSURE - 4 LANE DIVIDED ROADWAY**

(NOT TO SCALE)

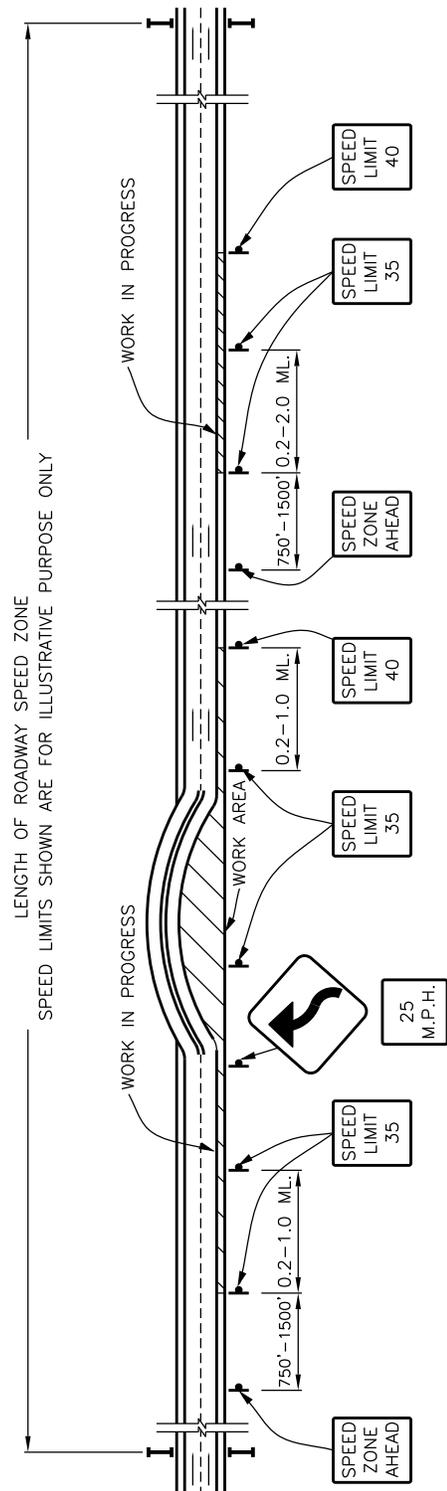


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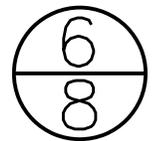
**CONSTRUCTION SIGNING AND BARRICADING DETAILS**



TYPICAL APPLICATION OF SPEED ZONE SIGNS

NOTES:

1. FREQUENCY OF SPEED SIGNS SHOULD BE EVERY 0.2 TO 2.0 MILES FOR SPEEDS 40MPH AND ABOVE AND 0.2 TO 1.0 MILES FOR SPEEDS 35 MPH AND BELOW.
2. REDUCE SPEEDS WHEN REQUIRED SHOULD ONLY BE POSTED IN THE VICINITY OF WORK BEING PERFORMED OR OTHER AREAS WHEN NEEDED RATHER THAN THROUGHOUT THE ENTIRE PROJECT.
3. SPEED ZONE SIGNS ARE ILLUSTRATED FOR ONE DIRECTION OF TRAVEL ONLY AND ARE NORMALLY POSTED FOR EACH DIRECTION OF TRAVEL
4. REGULATORY CLASS SPEED ZONE SIGNS SHALL HAVE BLACK LEGEND ON A WHITE REFLECTIVE BACKGROUND.



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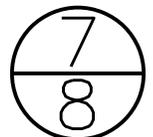
# CONSTRUCTION SIGNING AND BARRICADING DETAILS

## CONSTRUCTION SIGNS

1. ALL SIGNS, SIGN COLOR, SIGN LETTERING AND SIGN REFLECTIONIZATION SHALL CONFORM WITH THE TEXAS MANUAL ON TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. THE CONTRACTOR SHALL MAINTAIN EACH SIGN IN A CLEAN AND GOOD CONDITION.
2. CONSTRUCTION SIGNS SHALL BE MADE FROM WOOD OR METAL. THE DESIGNATION OF METAL AND WOOD AS PRIMARY MATERIALS FOR SIGNS SHALL NOT BE INTERPRETED TO EXCLUDE OTHER SUITABLE RIGID MATERIALS NOW OR HERE-AFTER AVAILABLE.
3. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK. INDIVIDUAL WARNING SIGNS SHALL BE REMOVED, TURNED AWAY FROM THE VIEW OF TRAFFIC, OR COVERED WHENEVER THE SPECIFIC DANGER OF WHICH THE PARTICULAR SIGN WARNS HAS CEASED TO EXIST, EITHER PERMANENTLY OR TEMPORARILY. THE SIGN MUST BE PROMPTLY REPLACED, TURNED INTO VIEW, OR UNCOVERED WHEN THE SITUATION AGAIN BECOMES A POTENTIAL DANGER.
4. SIGN ERECTED ON PORTABLE SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS WHICH ARE USED DURING THE DAY TO WARN OR GUIDE TRAFFIC THROUGH AND OR AROUND THE ACTUAL CONSTRUCTION AREA, BUT AT THE END OF THE WORKDAY SUCH SIGNS ARE EITHER REMOVED OR TURNED AWAY FROM THE VIEW OF TRAFFIC. PORTABLE SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. THE BOTTOM OF THE SIGN SHALL BE A MINIMUM OF ONE (1) FOOT ABOVE THE PAVEMENT EDGE. SIGNS REQUIRED FOR NIGHTTIME USAGE SHOULD NOT NORMALLY BE MOUNTED ON PORTABLE SUPPORTS EXCEPT WHEN APPROVED BY THE ENGINEER.
5. SIGNS ERECTED ON FIXED SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS THAT ARE TO REMAIN IN PLACE FOR BOTH DAY AND NIGHT USAGE TO REGULATE, WARN AND GUIDE TRAFFIC IN ADVANCE OF AND WITHIN THE LIMIT OF THE PROJECT INCLUDING THE CROSSROAD APPROACHES. HOWEVER, UNDER CERTAIN CONDITIONS, SUCH AS WHERE A SIGN MAY BE REQUIRED FOR A FEW DAYS' DURATION AND THEN IS NO LONGER NEEDED, OR WHERE A SIGN IS MOVED FROM LOCATION TO LOCATION EVERY FEW DAYS OR WHERE IT IS NOT PRACTICAL OR DESIRABLE TO PROVIDE A FIXED MOUNTING, SUCH SIGNS MAY BE ERECTED ON A TEMPORARY TYPE OF SUPPORT. TEMPORARY SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. SIGNS ERECTED ON TEMPORARY SUPPORTS SHOULD BE AT A MINIMUM HEIGHT OF 3 FEET. SIGNS ERECTED ON FIXED SUPPORTS SHOULD BE A MINIMUM OF SEVEN (7) FEET. REGARDLESS OF THE TYPE OF SUPPORT USED, REGULATORY SIGNS SHOULD NOT BE ERECTED AT HEIGHT LESS THAN 7-FOOT MINIMUM SPECIFIED ABOVE UNLESS A LOWER HEIGHT IS APPROVED BY THE ENGINEER. POSTS FOR FIXED SUPPORTS SHOULD BE SET IN THE GROUND WITHOUT CONCRETE FOOTINGS.
6. WHERE PORTABLE OR TEMPORARY SUPPORTS REQUIRE THE USE OF WEIGHTS TO KEEP A SIGN OR BARRICADE FROM TURNING OVER, THE USE OF SOME TYPE OF SANDBAG IS RECOMMENDED. THE USE OF PIECES OF CONCRETE, ROCKS, IRON, STEEL OR OTHER SOLID OBJECTS WILL NOT BE PERMITTED.

## REMOVAL OF PAVEMENT MARKINGS

1. REMOVAL OF PAVEMENT MARKINGS - INCLUDES CENTERLINE, BARRIER LINES, LANE LINES, EDGE LINES, AND RAISED PAVEMENT MARKINGS.
2. IMMEDIATELY UPON OPENING A DETOUR TO TRAFFIC, ANY PAVEMENT MARKINGS ON THE EXISTING ORIGINAL ROADWAY IN THE DETOUR TRANSITION AREA THAT ARE NO LONGER APPLICABLE AND WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST TOWARD OR INTO THE CLOSED PORTION OF THE ROADWAY, SHALL BE REMOVED OR OBLITERATED. IN ADDITION, WHEN A DETOUR IS TO BE DISCONTINUED, ANY PAVEMENT MARKINGS USED TO TRANSITION TRAFFIC INTO THE DETOUR WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST INTO THE DISCONTINUED DETOUR SHALL LIKEWISE BE REMOVED OR OBLITERATED. THE ABOVE SHALL NOT APPLY TO DETOURS OF A SHORT TIME DURATION OF A FEW HOURS WHERE FLAGMEN OR SUFFICIENT CHANNELIZING DEVICES ARE USED TO OUTLINE THE DETOUR ROUTE AND THE DETOUR IS NOT TO BE MAINTAINED OVERNIGHT.
3. THE REMOVAL OF PAVEMENT MARKINGS SHALL BE AN INTEGRAL PART OF ESTABLISHING THE DETOUR. DETOURS SHALL BE PLANNED AND SCHEDULED WELL ENOUGH IN ADVANCE TO ALLOW ADEQUATE TIME TO COMPLETE ALL PHASES OF THE OPERATION PRIOR TO DARKNESS. IF INCLEMENT WEATHER OR DARKNESS BECOMES A FACTOR, IT WILL BE THE CONTRACTORS DECISION TO CONTINUE WITH THE DETOUR OPERATION OR RETAIN THE EXISTING TRAVELWAY OPEN TO TRAFFIC WHEN ANY OR ALL OF THE REQUIREMENTS OF THE DETOUR CANNOT BE ACCOMPLISHED.
4. PAVEMENT MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE, SO AS NOT TO LEAVE A DISCERNIBLE MARKING, BY ANY METHOD THAT DOES NOT MATERIALLY DAMAGE THE SURFACE OR TEXTURE OF THE PAVEMENT. SUBJECT TO THE APPROVAL OF THE ENGINEER, ANY METHOD THAT PROVES TO BE SUCCESSFUL ON A PARTICULAR TYPE PAVEMENT MAY BE USED. OVERPAINTING OF THE MARKING WILL NOT BE PERMITTED. REMOVAL OF RAISED PAVEMENT MARKINGS SHALL BE AS DIRECTED BY THE ENGINEER.
5. WHERE MECHANICAL MEANS OF MARKING REMOVAL HAVE BEEN EMPLOYED TO COMPLETELY REMOVE THE MARKING AND ITS REFLECTIVITY, PAINT OF A COLOR MATCHING THE PAVEMENT SURFACE OR USED CRANKCASE OIL MAY BE EMPLOYED IF NECESSARY AS A MEANS OF COVERING CONTRASTING PAVEMENT TEXTURE. NIGHTTIME INSPECTIONS ARE NEEDED TO VERIFY THE CONTINUED EFFECTIVENESS OF THE CHANGE.
6. PAVEMENT MARKINGS TO BE REMOVED SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REMOVAL OF PAVEMENT MARKINGS WILL BE CONSIDERED SUBSIDIARY TO THE ITEM BARRICADES, SIGNS AND TRAFFIC HANDLING.



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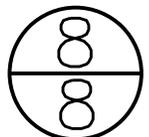
# CONSTRUCTION SIGNING AND BARRICADING DETAILS

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**41**

**CONSTRUCTION PAVEMENT MARKINGS**

1. WHEN REQUIRED ELSEWHERE IN THE PLANS, THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING PAVEMENT MARKINGS ON ALL ROADWAYS THAT ARE OPEN TO TRAFFIC WITHIN THE LIMITS OF THE PROJECT. ON PROJECTS INVOLVING ROADWAY SURFACING WHICH WILL REQUIRE PAVEMENT MARKING FOR CONTROL OF TRAFFIC DURING CONSTRUCTION, THE MARKINGS MAY INCLUDE BOTH STANDARD AND ABBREVIATED MARKINGS AS DEFINED BELOW:
  - A. STANDARD PAVEMENT MARKINGS – STANDARD MARKINGS PLACED IN CONFORMANCE WITH THE REQUIREMENTS OF THE TEXAS MUTCD. SUCH MARKINGS SHOULD BE PLACED ON ALL ROADWAYS OPEN TO TRAFFIC DURING CONSTRUCTION, INCLUDING NEW PAVEMENT, RESURFACING, DETOURS OR OTHER ROADWAYS WHERE CONSTRUCTION ACTIVITIES MAY HAVE COVERED OR OBLITERATED EXISTING MARKINGS. STANDARD MARKINGS SHOULD BE PLACED AS SOON AS POSSIBLE AND PRACTICAL. WHEN IT IS NOT PRACTICAL OR POSSIBLE TO PLACE STANDARD MARKINGS AT THE END OF EACH DAY'S WORK, ABBREVIATED MARKINGS MAY BE UTILIZED FOR SHORT PERIODS UNTIL STANDARD MARKINGS CAN BE PLACED.
  - B. ABBREVIATED PAVEMENT MARKINGS – ABBREVIATED PAVEMENT MARKINGS ARE SHORTER IN LENGTH THAN STANDARD MARKINGS. ABBREVIATED PAVEMENT MARKINGS MAY BE USED TO DELINEATE LANE CONTINUITY ONLY UNTIL SUCH TIME AS STANDARD MARKINGS CAN BE PLACED. THEY ARE NOT INTENDED TO SUBSTITUTE FOR STANDARD MARKINGS FOR PERIODS GREATER THAN TWO (2) WEEKS. TO SEPARATE TRAFFIC FLOWS IN OPPOSING DIRECTIONS, THE PAVEMENT MARKINGS SHALL BE YELLOW. WHITE PAVEMENT MARKINGS SHALL BE USED TO DELINEATE THE SEPARATION OF TRAFFIC FLOWS IN THE SAME DIRECTION.
  - C. PAVEMENT MARKINGS, MATERIALS – TEMPORARY PAVEMENT MARKING MAY BE ACCOMPLISHED BY USE OF STANDARD TRAFFIC PAVEMENT MARKING PAINT OR BY PAVEMENT MARKING TAPE (SCOTCHLANE OR STAMARK BRAND OR AS APPROVED BY THE ENGINEER). TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY WHEN NO LONGER APPLICABLE.
2. WHEN ABBREVIATED PAVEMENT MARKINGS ARE USED, A DO NOT PASS SIGN SHALL BE USED TO MARK THE BEGINNING OF THE SECTION WHERE PASSING IS TO BE PROHIBITED AND A PASS WITH CARE SIGN SHALL BE USED TO MARK THE BEGINNING OF A SECTION WHERE PASSING IS PERMITTED.



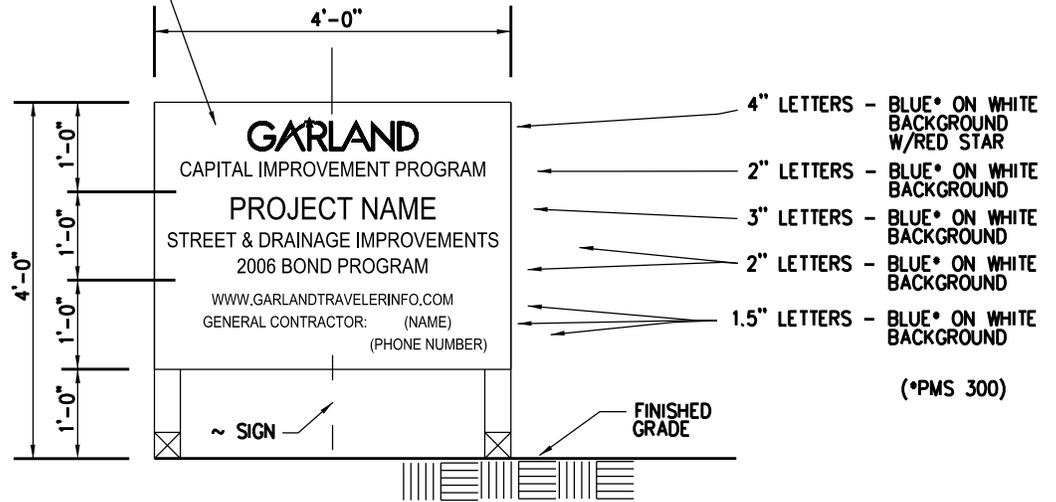
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Project No. : STANDARD-DETAILS	



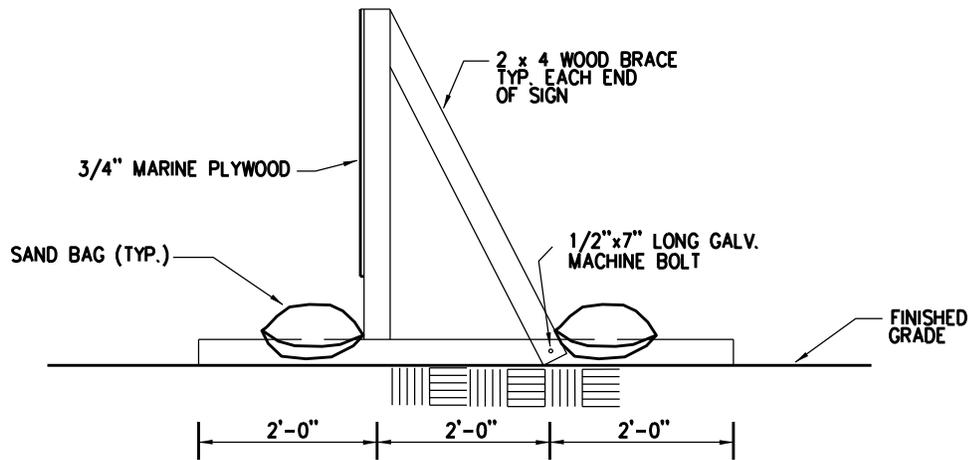
**CONSTRUCTION SIGNING  
AND BARRICADING DETAILS**

3/4" MARINE PLYWOOD

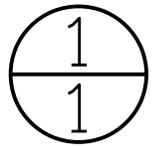


NOTE:  
 GRAPHICS SHALL BE EXTERIOR GRADE  
 ENAMEL PAINT OR VINYL LETTERING.  
 BLUE LETTERS ON WHITE BACKGROUND.  
 ALL LETTERS SHALL BE HELVETICA.

**FRONT ELEVATION**



**SIDE ELEVATION/SECTION**



Revision Date: 09/06

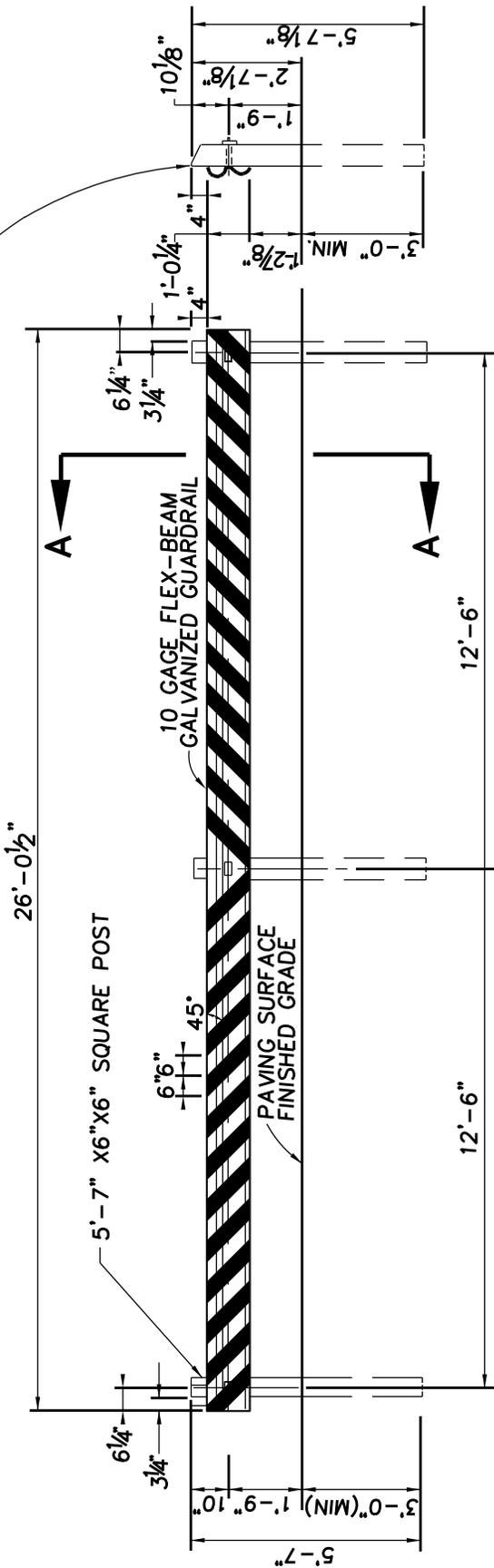
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Drawn : JMK	
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Project No. : STANDARD-DETAILS	



**CAPITAL IMPROVEMENTS SIGN**

LANE WIDTH FT.	BARRICADE LENGTH FT.
2-33	26
2-24	26
1-44	38.5
1-36	26
1-26	26

6"X6" SQUARE POST  
ALL POSTS SHALL BE TREATED  
WITH A WOOD PRESERVATIVE OR  
CREOSOTE BEFORE INSTALLATION



SECTION A--A

TYPICAL ELEVATION

1/5

Revision Date:

Scale : N/A Date : 06/01/05

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Drawn : COG

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Project No. : STANDARD-DETAILS

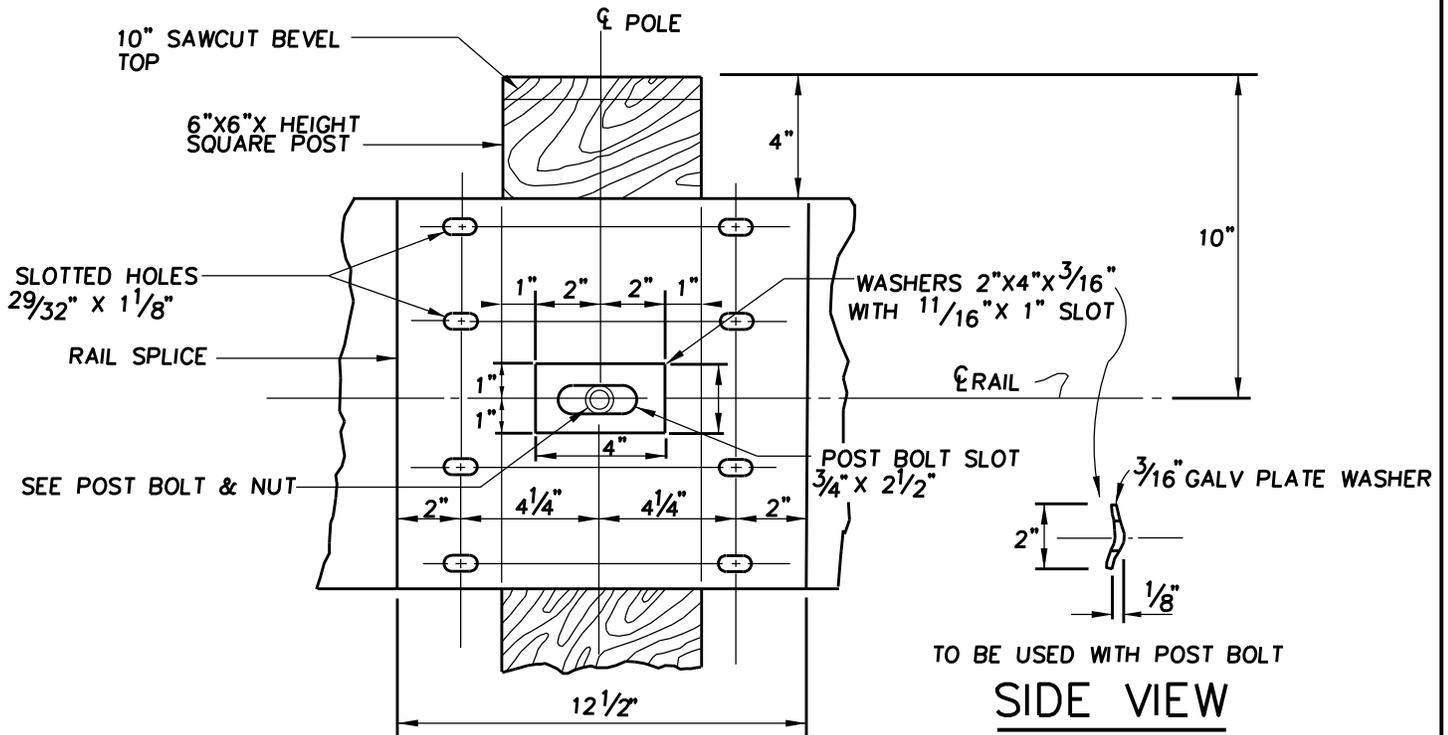


STANDARD DETAILS

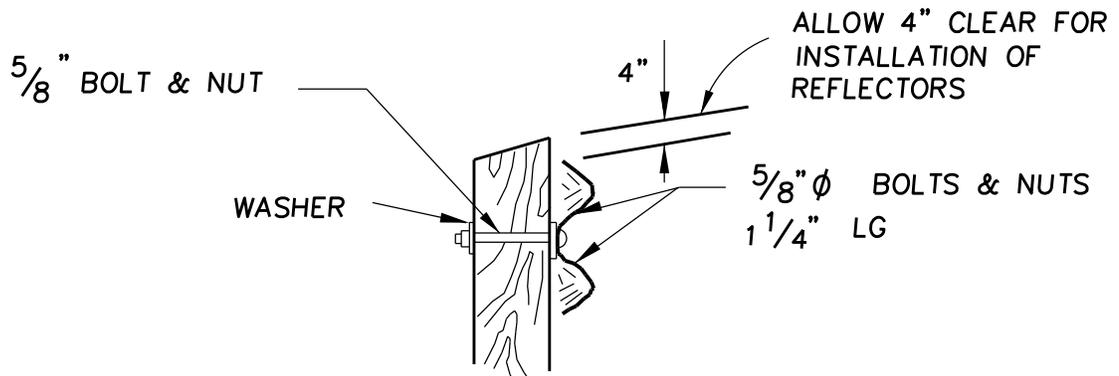
END OF STREET  
BARRICADE

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## WOOD POST CONNECTION



## ARRANGEMENT AT POST

2  
5

Revision Date:

Scale : N/A Date : 06/01/05

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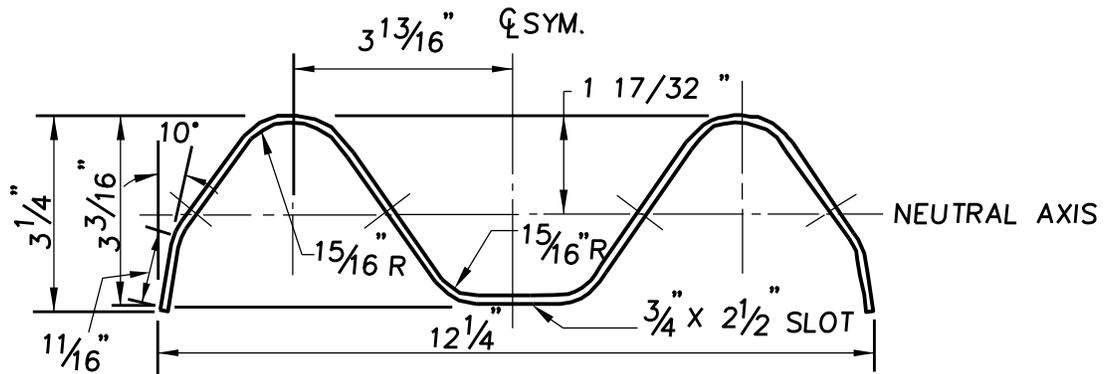
Project No. : STANDARD-DETAILS

  
**GARLAND**  
 ENGINEERING  
 STANDARD DETAILS

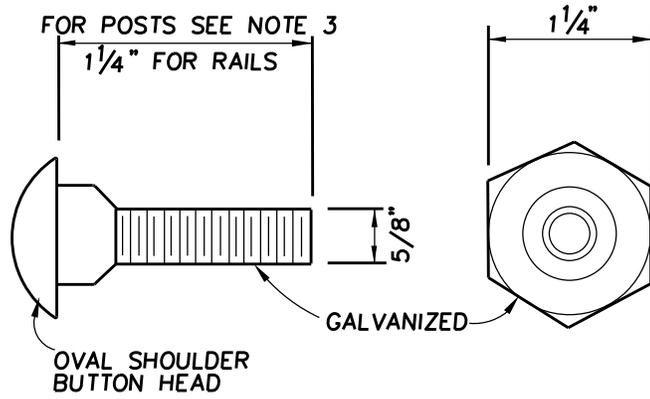
END OF STREET  
 BARRICADE

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GUARD RAIL SECTION



BOLT & NUT FOR POST & RAIL

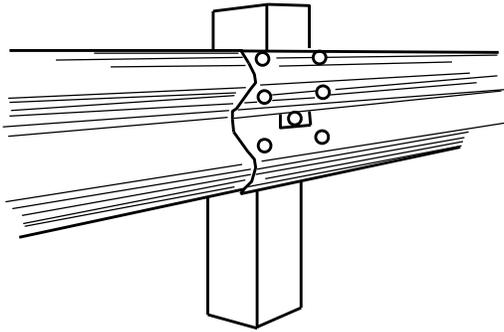
3  
5

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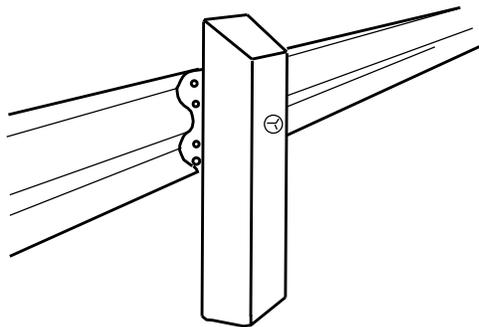
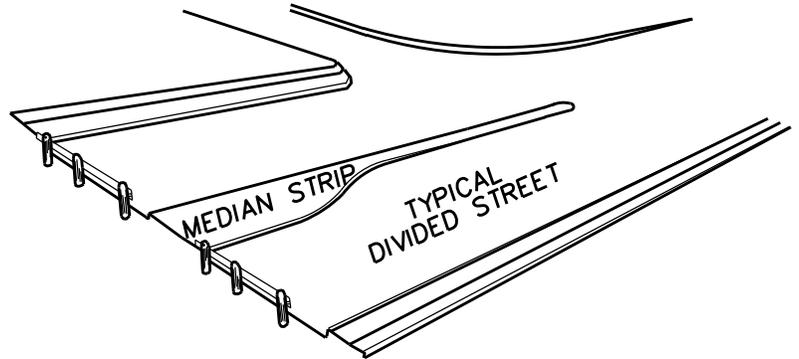
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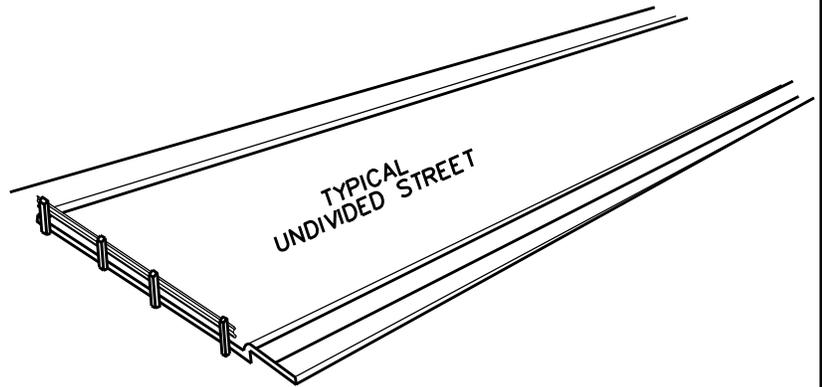
END OF STREET  
 BARRICADE



TRAFFIC FACE



REAR FACE  
GUARD RAIL CONNECTION  
AT POST



BARRICADE LOCATION  
AT HEADER

4  
5

Revision Date:

Scale : N/A Date : 06/01/05

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Dwg. File : TRF\_30.DWG

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END OF STREET  
BARRICADE

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## GENERAL NOTES

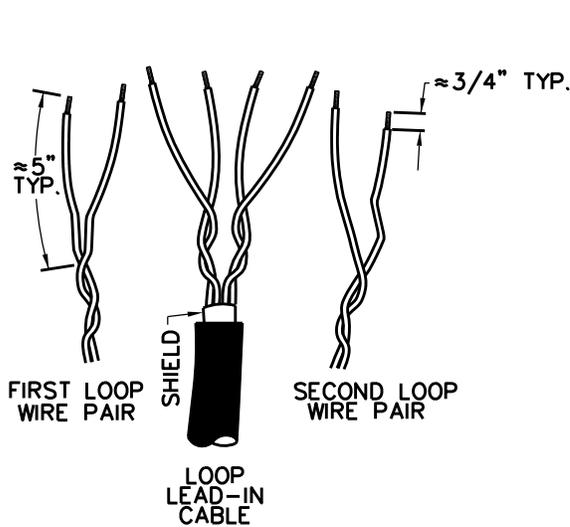
- 1 METAL FLEX-BEAM GUARD RAIL SHALL BE 10 GAGE, GALVANIZED AS PER ASTM A93.
- 2 AT THE OPTION OF THE CONTRACTOR THE RAIL ELEMENT OF THE GUARD FENCE MAY BE FURNISHED IN EITHER 12 1/2 OR 25 FEET NOMINAL LENGTHS. RAIL SHALL BE FURNISHED WITH POST BOLT SLOTS FOR 5/8" DIAMETER BOLT CONNECTION TO POSTS.
- 3 BOLTS USED IN ATTACHING RAIL TO POST SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT.
- 4 LOCATION OF BARRICADES SHALL BE IMMEDIATELY BEYOND THE STREET HEADER UNLESS OTHERWISE DETERMINED BY THE ENGINEER.
- 5 WHERE ROCK IS ENCOUNTERED OR WHERE SHOWN ON THE PLANS, THE DIAMETER OF HOLES AND THE MATERIAL FOR BACKFILLING SHALL BE AS DIRECTED BY THE ENGINEER.
- 6 TIMBER POSTS MAY BE BEVELED AT APPROX. 10° ON THE TOP OR BOTH ENDS WITH HIGH SIDE PLACED TOWARD THE ROADWAY OR THEY MAY BE DOMED.
- 7 THE CONTRACTOR HAS THE OPTION OF USING 7" DIA ROUND POST INSTEAD OF SQUARE POST
- 8 THE RAIL SHALL BE COVERED COMPLETELY WITH RETROFLECTIVE RED AND WHITE STRIPED TAPE. THE STRIPES SHOULD BE POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE.

5  
5

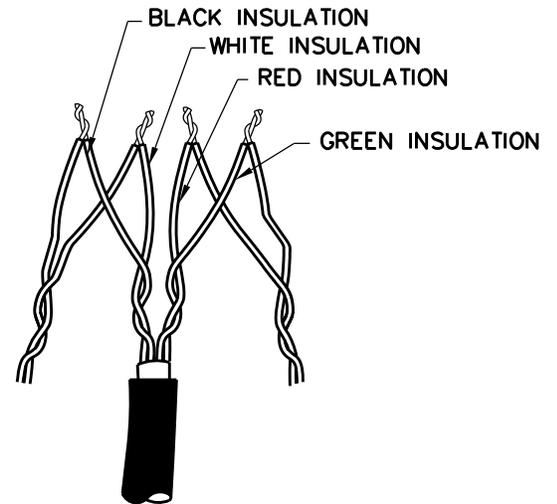
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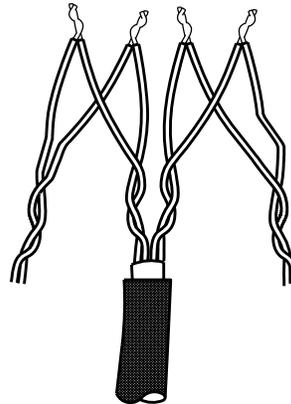
# LOOP WIRE / LOOP LEAD - IN CABLE SPLICE DETAIL



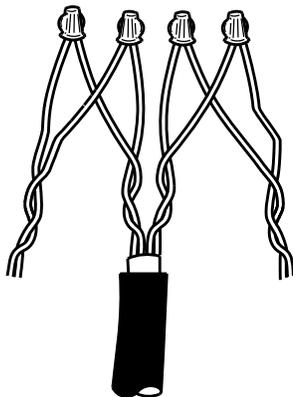
**STEP 1**  
STRIP INSULATION AS SHOWN



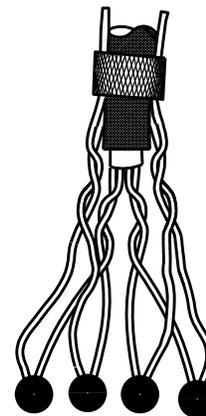
**STEP 2**  
TWIST BARE CONDUCTORS TOGETHER.



**STEP 3**  
SOLDER EACH SPLICE USING  
ROSIN-CORE SOLDER.



**STEP 4**  
ADD WIRE NUT TO EACH SPLICE.



**STEP 5**  
SEAL EACH SPLICE WITH WATERTIGHT  
SEALANT AND TIE OR TAPE WIRES.  
ALTERNATE SPLICE CAN BE USED WITH  
WATERTIGHT WIRE NUTS.

1/3

Revision Date: \_\_\_\_\_

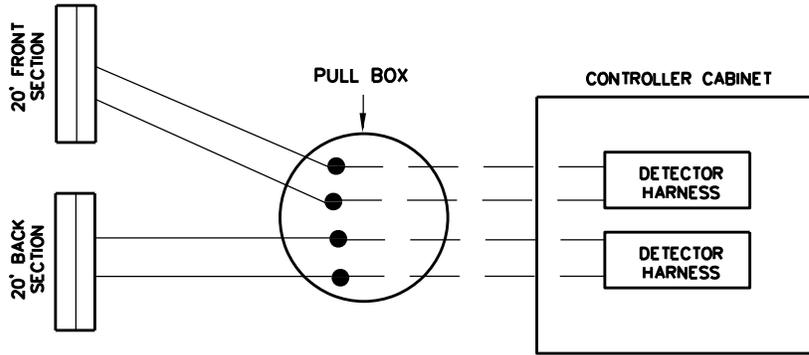
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Project No. : STANDARD-DETAILS

  
**GARLAND**  
ENGINEERING  
STANDARD DETAILS

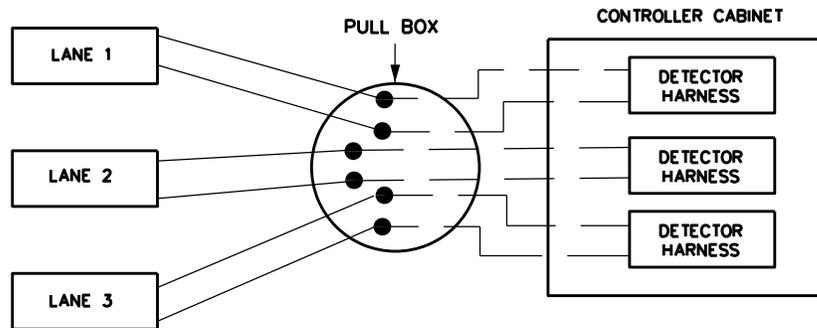
LOOP WIRE /  
LOOP LEAD-IN DETAIL

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2-SECTION LEFT TURN QUADRUPOLE  
LOOP DETECTOR (EC-DC OPERATION)  
PARALLEL WIRING



LOOPS-PARELLEL WIRING



2  
3

Revision Date:

Scale : N/A Date : 06/01/05

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Project No. : STANDARD-DETAILS

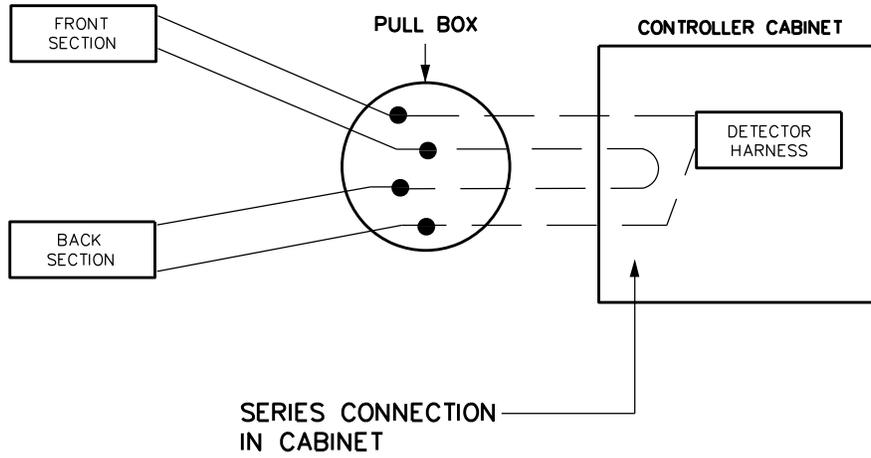


LOOP WIRE /  
LOOP LEAD-IN DETAIL

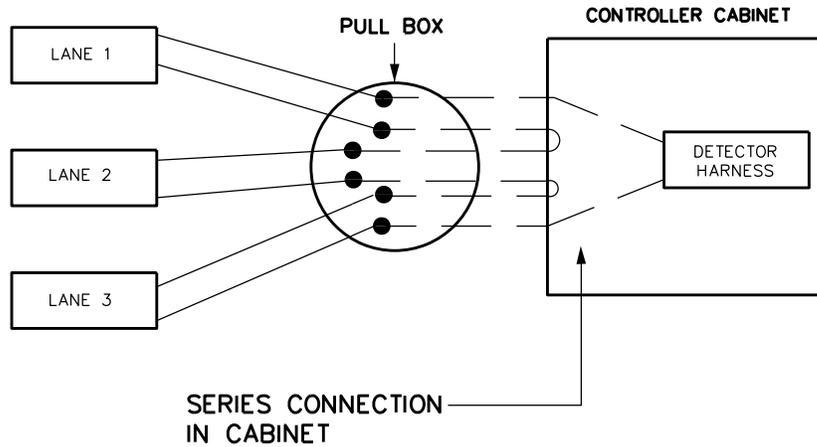
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LOOPS SERIES WIRING  
2 DETECTOR



LOOPS-SERIES WIRING  
3 DETECTOR



NOTE: WIRING METHOD WILL BE DETERMINED ON-SITE BY  
TRANSPORTATION DEPT. REPRESENTATIVES.

LEGEND

-  #14 AWG XHHW LOOP WIRE
-  1 CONDUCTOR OF SHIELDED DETECTOR CABLE
-  WATERTIGHT SOLDERED CONNECTION OF #14 AWG XHHW WIRE AND 2 CONDUCTOR OF SHIELDED DETECTOR CABLE

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Dwg. File : TRF\_33.DWG

Project No. : STANDARD-DETAILS



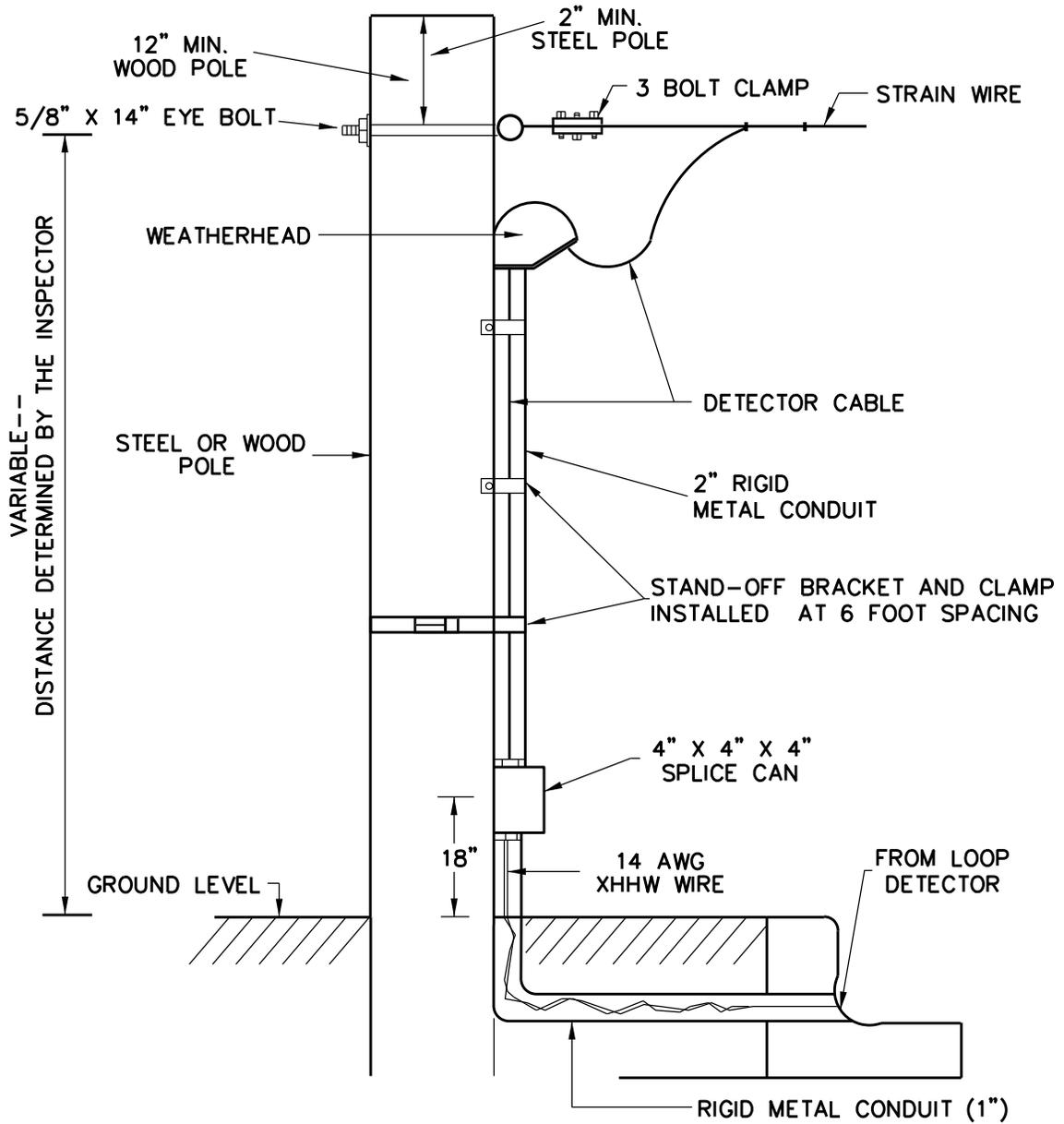
LOOP WIRE/  
LOOP LEAD-IN DETAIL

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# OVERHEAD DETECTOR RUN DETAIL



1  
2

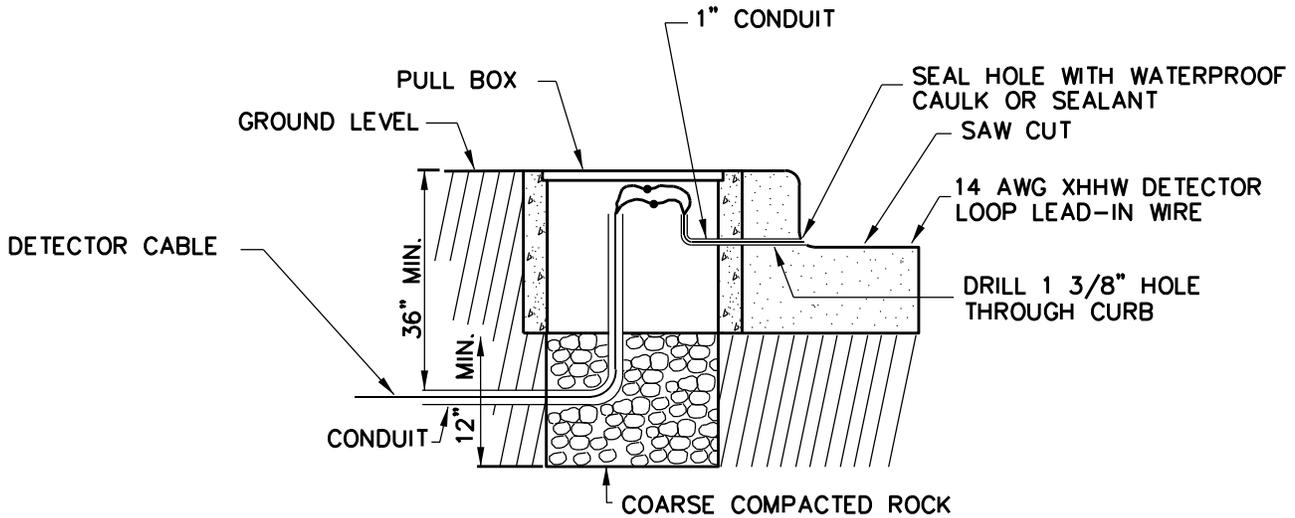
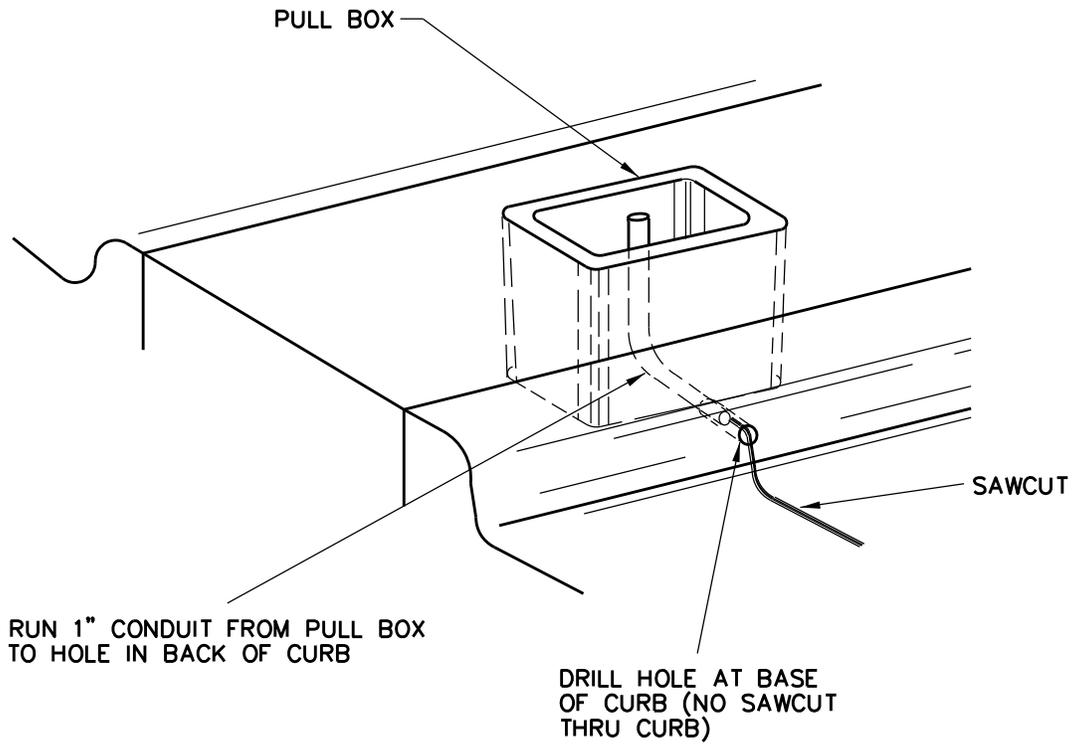
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Project No. : STANDARD-DETAILS	



## OVERHEAD DETECTOR RUN DETAIL

# DETECTOR RUN INTO PULL BOX DETAIL



SOLDER ALL CONNECTIONS AND SEAL THEM WITH A WATERTIGHT WRAPPING OR WATERTIGHT WIRE NUTS.

2  
2

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Dwg. File : TRF\_34.DWG

Project No. : STANDARD-DETAILS



## DETECTOR RUN INTO PULL BOX DETAIL

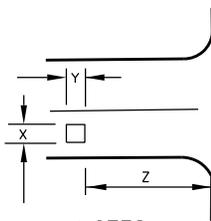
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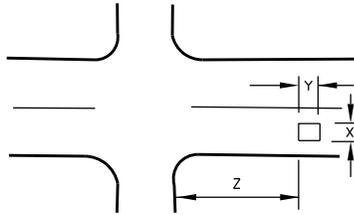
# GENERAL LOOP LOCATION AND LAYOUT

## PULSE OR SYSTEM LOOP

### CALLING LOOP ON INTERSECTION APPROACH



### SYSTEM LOOP ON INTERSECTION EXIT

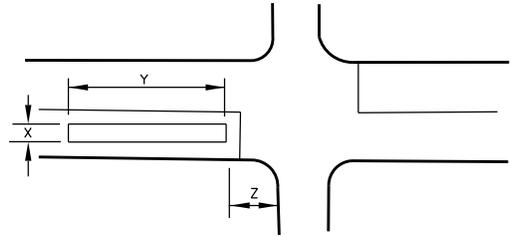


**NOTES:**

1. UNLESS OTHERWISE NOTED:  
 $X = 6'$   
 $Y = 6'$
2. DIMENSION Z WILL BE DEFINED BY SITE SKETCH OR PLANS.
3. LOOP TO HAVE 3 TURNS OF WIRE.

## PRESENCE INTERSECTION DETECTOR LOOP

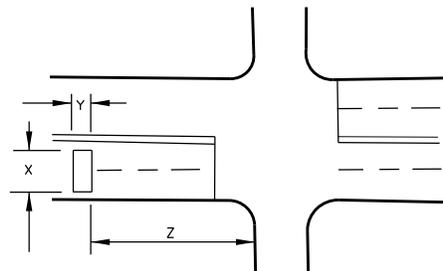
### LOOP ON INTERSECTION APPROACH



**NOTES:**

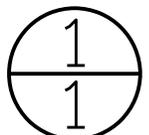
1. UNLESS OTHERWISE NOTED:  
 $X = 6'$   
 $Y = 40'$
2. DIMENSION Z WILL BE DEFINED ON THE SITE SKETCHES OR PLANS

## MULTILANE DETECTOR LOOP



**NOTES:**

1. UNLESS OTHERWISE NOTED  $Y = 6'$
2. DIMENSIONS X AND Z WILL BE DEFINED ON THE PLANS.
3. IF X IS LESS THAN 40', THE LOOPS SHALL HAVE 3 TURNS OF WIRE IF X IS 40' OR GREATER, THE LOOP SHALL HAVE 2 TURNS OF WIRE.



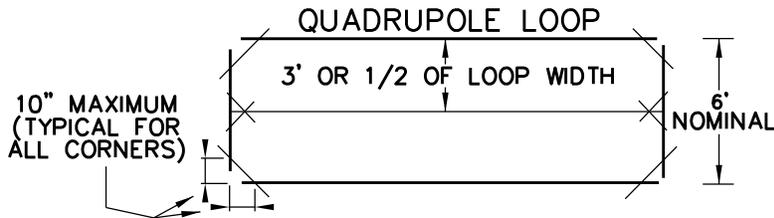
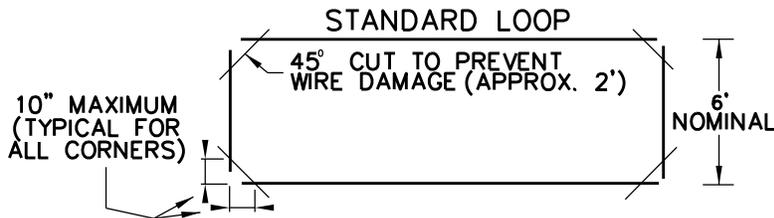
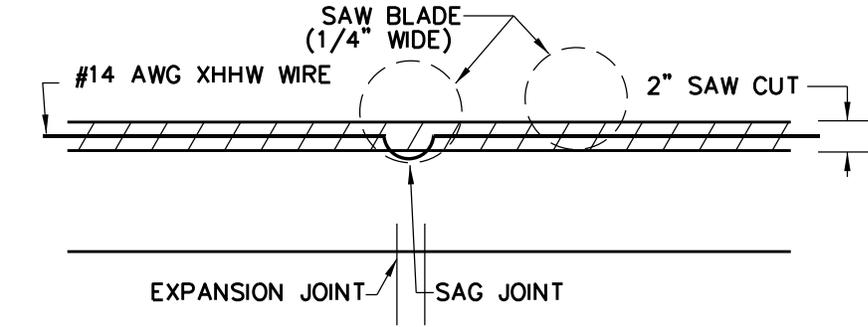
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 Project No. : STANDARD-DETAILS



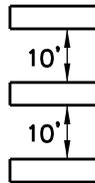
## GENERAL LOOP LOCATION AND LAYOUT

# LOOP DETECTOR INSTALLATION DETAILS

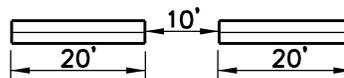


NOTE: BOTH OF THE ABOVE LOOP TYPES HAVE VARIABLE LENGTHS

WHEN INDIVIDUAL LATERAL LOOP SECTIONS ARE TIED TOGETHER ON THE SAME DETECTOR HARNESS TO FORM A DETECTOR PAD, THE SPACING BETWEEN INDIVIDUAL LOOP SECTIONS SHALL BE AS SHOWN BELOW.



LONGITUDINAL-TYPE QUADRUPOLE LEFT TURN LOOP DETECTOR PADS SHALL HAVE A 10' SPACING BETWEEN INDIVIDUAL LOOP SECTIONS.



EACH LOOP SHALL HAVE SEPARATE LEAD-IN PAIR TO CABINET.

1  
2

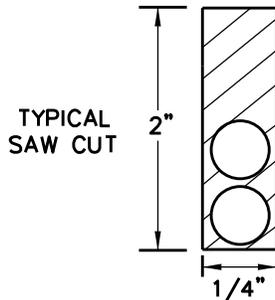
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Scale : N/A Date : 06/01/05  
Design :  
Drawn : COG  
Dwg. File : TRF\_35.DWG  
Project No. : STANDARD-DETAILS

  
**GARLAND**  
ENGINEERING  
STANDARD DETAILS

LOOP DETECTOR  
INSTALLATION DETAIL

PAGE  
**55**



NOTES:

1. INSTALLATION OF LOOP DETECTORS IS TO BE MADE IN THE SHORTEST TIME PRACTICAL (NOT TO EXCEED A 4 HOUR MAX.) AND SCHEDULED DURING OFF PEAK HOURS TO MINIMIZE DELAY TO TRAFFIC.
2. SAW CUTS ARE TO BE MADE USING A CONCRETE SAW WITH A SINGLE 1/4" WIDE DIAMOND BLADE, FORMING STRAIGHT LINES WITH LOOSE MATERIALS REMOVED. SAW CUTS SHALL BE A MINIMUM OF TWO (2) INCHES IN DEPTH AND 1/4" IN WIDTH. SAW CUTS SHALL CONTINUE ACROSS SAW CUTS TO THE CENTER OF THE SAW BLADE TO ASSURE A SMOOTH BOTTOM OF THE CROSSING SAW CUTS. WHEN A SAW CUT CROSSES A TRANSVERSE EXPANSION JOINT, LOWER THE DEPTH BY 2" WHEN THE SAW IS CENTERED OVER THE EXPANSION JOINT.
3. WIRING OF STANDARD LOOPS--  
LOOPS SMALLER THAN 6' X 40' SHALL HAVE 3 TURNS OF #14 AWG XHHW WIRE.  
LOOPS 6' X 40' AND LARGER SHALL HAVE 2 TURNS OF #14 AWG XHHW WIRE.
4. QUADRUPOLE LOOPS SHALL HAVE 2 TURNS (2-4-2) OF #14 AWG XHHW WIRE.
5. A NON-CONDUCTIVE WEDGE SHALL BE PLACED IN EACH MITERED CORNER OF THE LOOP AND IN THE CENTER OF ANY SAW CUT OVER 6'. 1/4" BACKER ROD SHALL BE INSTALLED IN ALL SAW CUTS TO PROTECT LOOP WIRE.

2  
—  
2

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Project No. : STANDARD-DETAILS

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 ENGINEERING  
 STANDARD DETAILS

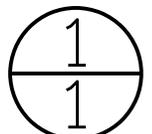
**LOOP DETECTOR  
 INSTALLATION DETAIL**

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## GENERAL DETECTOR LOOP NOTES

1. NO SPLICES SHALL BE PERMITTED IN THE LOOP WIRE. IT SHALL BE ONE CONTINUOUS WIRE FROM THE LEAD-IN SPLICE, THROUGH THE LOOP AND BACK TO THE LEAD-IN SPLICE.
2. NO SPLICES SHALL BE PERMITTED IN THE LEAD-IN CABLE EXCEPT THE SPLICE TO THE LOOP WIRES, UNLESS APPROVED BY THE ENGINEER.
3. EXCEPT FOR MULTILANE DETECTORS, LOOPS SHALL BE CENTERED IN THEIR RESPECTIVE LANES, UNLESS OTHERWISE NOTED. FOR WIDE CURB LANES WITH PARKING, THE EDGE OF THE LANE SHALL BE CONSIDERED TO BE 8 FEET FROM THE CURB FACE FOR PARALLEL PARKING AND 18 FEET FROM THE CURB FACE FOR ANGLE PARKING, UNLESS OTHERWISE NOTED.
4. LOOP WIRE SHALL BE A.W.G. NO.14 STANDARD COPPER WITH XHHW INSULATION.
5. LOOPS IN ADJACENT LANES SHALL BE FORMED OF LOOP WIRES HAVING DIFFERENT COLOR INSULATION. NO TWO LOOPS ON THE SAME STREET LEG AND ENTERING THE SAME PULL BOX SHALL HAVE THE SAME COLOR INSULATION UNLESS MORE THAN FOUR LOOPS MUST BE ACCOMMODATED.
6. LOOP LEAD-IN SHIELD CONTINUITY SHALL BE MAINTAINED. THE SHIELD SHALL NOT BE GROUNDED.



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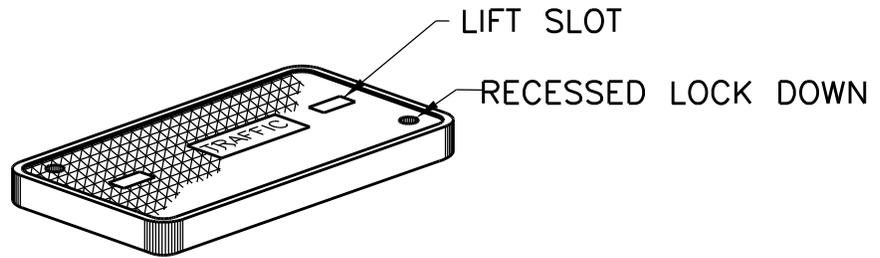
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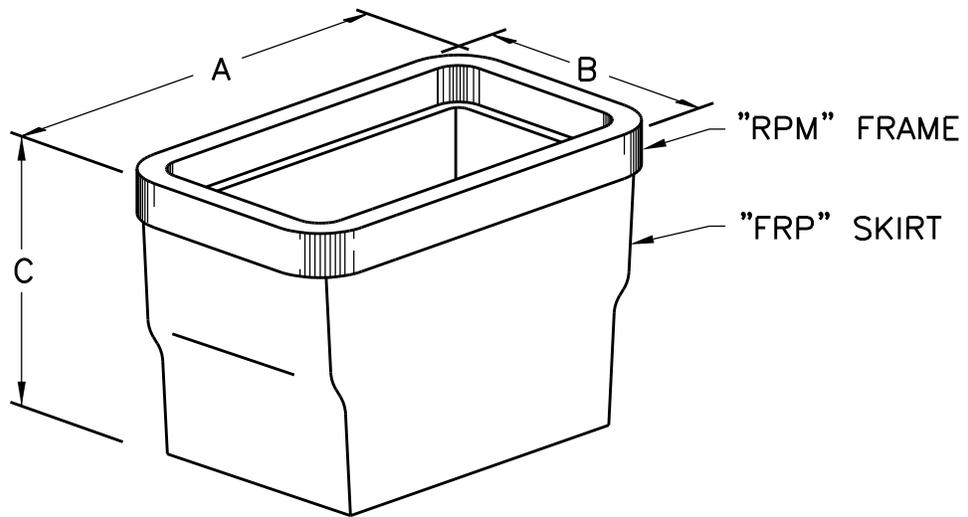
**GENERAL DETECTOR  
LOOP NOTES**

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# DETAIL OF TRAFFIC PULL BOX



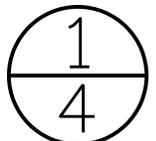
COVER



BOX

DIMENSIONS (INCHES)			
	STND.	TY 'C'	TY 'D'
A	24	30	30
B	13	15	17
C	16	16	22

\* BOX & COVER MUST BE RATED TO SUPPORT 20,000 POUNDS.



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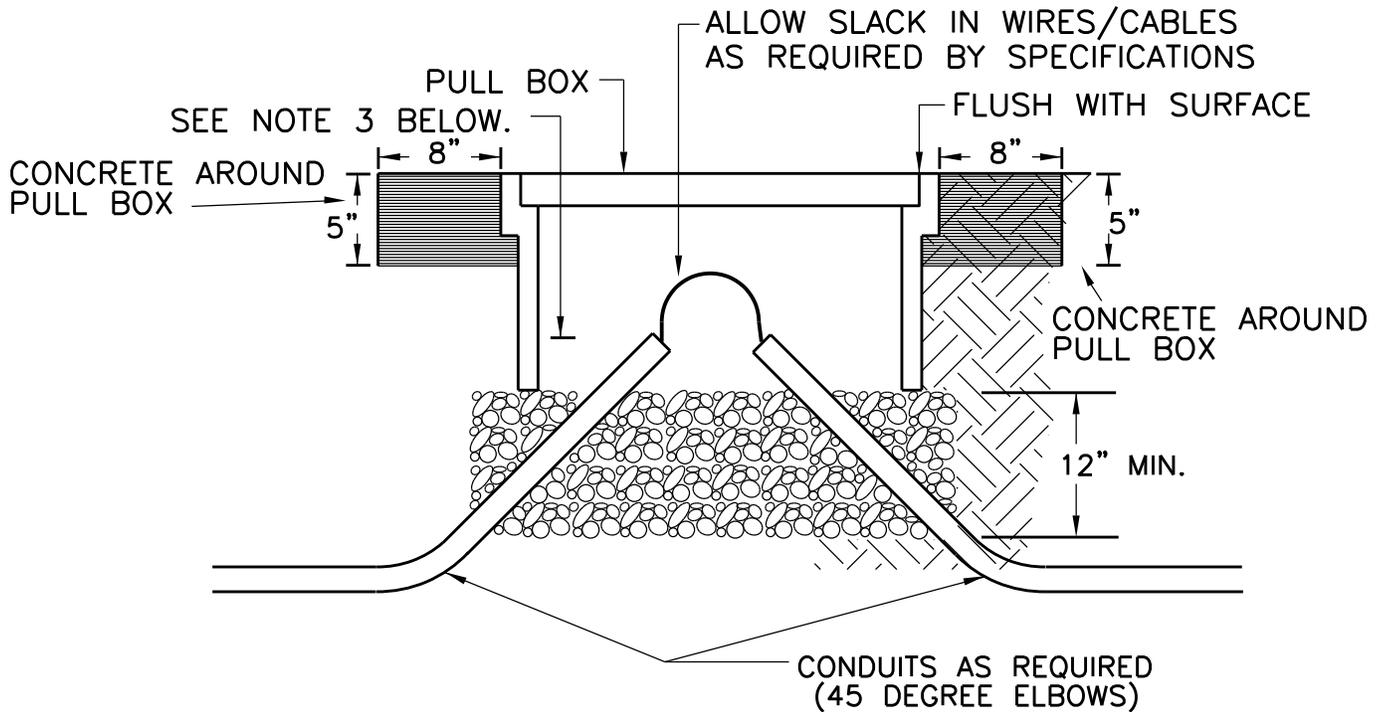
  
**GARLAND**  
 ENGINEERING  
 STANDARD DETAILS

DETAIL OF TRAFFIC  
PULL BOX

PAGE

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## PULL BOX INSTALLATION



### INSTALLATION NOTES

1. INSTALL PULL BOX ON BED OF CRUSHED STONE WHICH IS AT LEAST 12" DEEP AND EXTENDS AT LEAST 3" BEYOND BOX ON ALL SIDES.
2. CRUSHED STONE SHALL BE AGGREGATE WHICH MEET GRADATION LIMITS, SOUNDNESS AND SHALE REQUIREMENTS FOR GRADE NO. 2 COARSE AGGREGATE.
3. CONDUITS SHALL EXTEND NO CLOSER THAN 10" TO THE BOTTOM OF PULL BOX COVER.

2  
4

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 Dwg. File : TRF\_36.DWG  
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**STANDARD PULL  
BOX INSTALLATION**

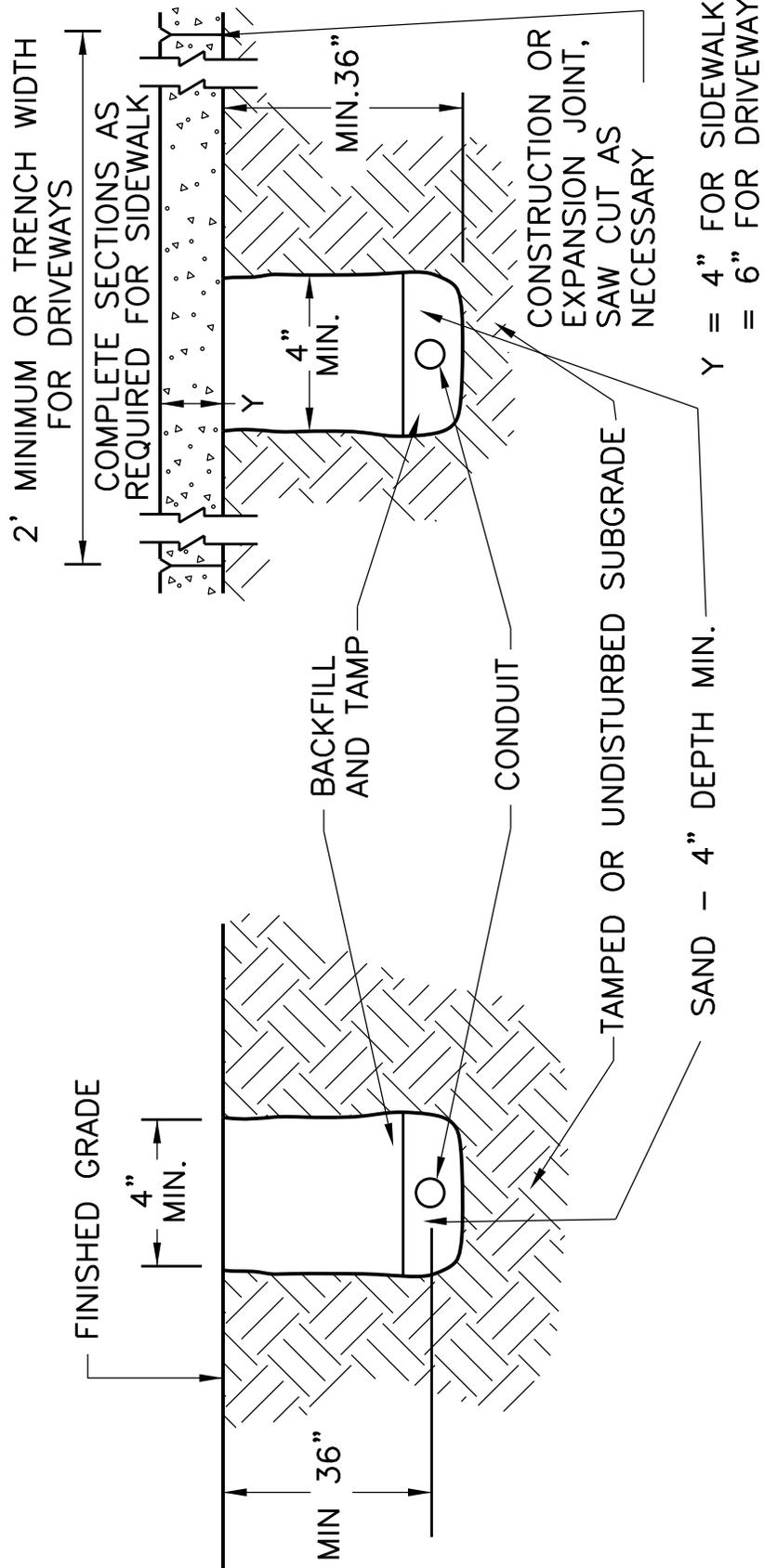
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# CONDUIT INSTALLATION

IN AREAS NOT  
EXPOSED TO VEHICULAR  
TRAFFIC

UNDER SIDEWALK  
OR DRIVEWAY



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## CONDUIT INSTALLATION

3  
4

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NOTES:

1. SAW CUT SHALL BE A MINIMUM OF TWO (2) INCHES IN DEPTH. FOR SIDEWALKS, SAW CUTS SHALL BE MADE ONLY AT CONSTRUCTION AND/OR EXPANSION JOINTS. THE ENTIRE SECTION OF SIDEWALK BETWEEN CONSTRUCTION/EXPANSION JOINTS SHALL BE REPLACED. FOR DRIVEWAYS, SAW CUTS SHALL BE A MINIMUM OF TWO (2) FEET APART OR THE WIDTH OF THE TRENCH, WHICHEVER IS GREATER. EXISTING REINFORCING SHALL BE CUT AT CENTER OF TRENCH AND BENT BACK UNTIL SLAB REPAIR IS MADE.
2. BEFORE POURING REPLACEMENT CONCRETE, THE ENGINEERING DEPARTMENT SHALL BE NOTIFIED FOR INSPECTION.
3. BACKFILLING OF TRENCH SHALL BE MADE BY SELECT MATERIAL COMPACTED TO 95% DENSITY IN 12" MAXIMUM LIFTS.
4. EXPANSION JOINTS AND SAW CUTS ARE TO BE REPLACED OR CONTINUED AS NECESSARY.
5. FAILURE TO COMPLY WITH THESE REGULATIONS MAY LEAD TO THE UNCOVERING OF THE CONDUIT OR THE REMOVAL OF THE CONCRETE SO THAT PROPER INSPECTIONS CAN BE MADE.

4  
4

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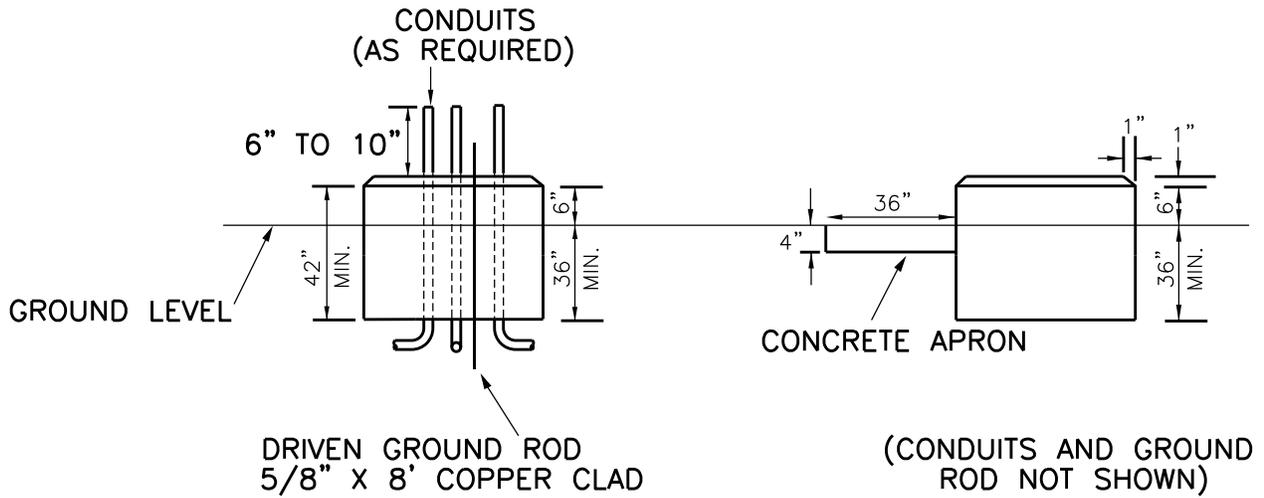


CONDUIT INSTALLATION  
NOTES

PAGE

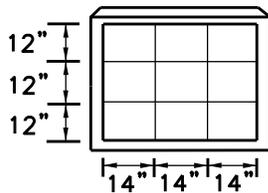
61

# CONCRETE CABINET BASES



48"

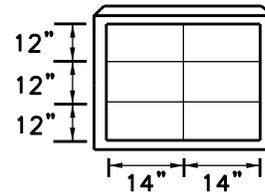
FRONT VIEW



REBAR SPACING  
FRONT/ REAR VIEW

36"

SIDE VIEW



REBAR SPACING  
SIDE VIEW

1  
2

Revision Date:

Scale : N/A    Date : 06/01/05  
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 Drawn : COG  
 Dwg. File : TRF\_37.DWG  
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**GARLAND**  
 ENGINEERING  
 STANDARD DETAILS

**CONCRETE CABINET  
 FOUNDATION**

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NOTES:

1. THE CONTROLLER CABINET FOUNDATION SHALL BE 42" HIGH (6" ABOVE GROUND AND 36" BELOW GROUND), 48" WIDE ACROSS THE FRONT, AND 36" DEEP. SIDEWALK MEETS MINIMUM SLAB REQUIREMENTS.
2. A 4" THICK 48" WIDE X 36" DEEP APRON SHALL BE POURED AT THE FRONT OF THE FOUNDATION.
3. A 5/8" X 8' MINIMUM COPPER CLAD GROUND ROD SHALL BE INSTALLED.
4. CONDUIT SHALL BE INSTALLED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE INSPECTOR. THEY SHALL EXTEND 6" TO 10" ABOVE THE TOP OF THE FOUNDATION.
5. A REBAR CAGE OF APPROXIMATE DIMENSIONS 42" X 28"X36" HIGH SHALL BE USED. REBARS SHALL BE #5. THE CAGE SHALL BE SUPPORTED AND PLACED SUCH THAT IT IS COVERED BY AT LEAST 2" OF CONCRETE. SEE SPEC BOOK FOR DETAILS.
6. CABINETS SHALL BE ATTACHED TO THE FOUNDATION USING 1/2" X 4-1/4" WEDGE ANCHORS.

2  
2

Revision Date: 6/2019

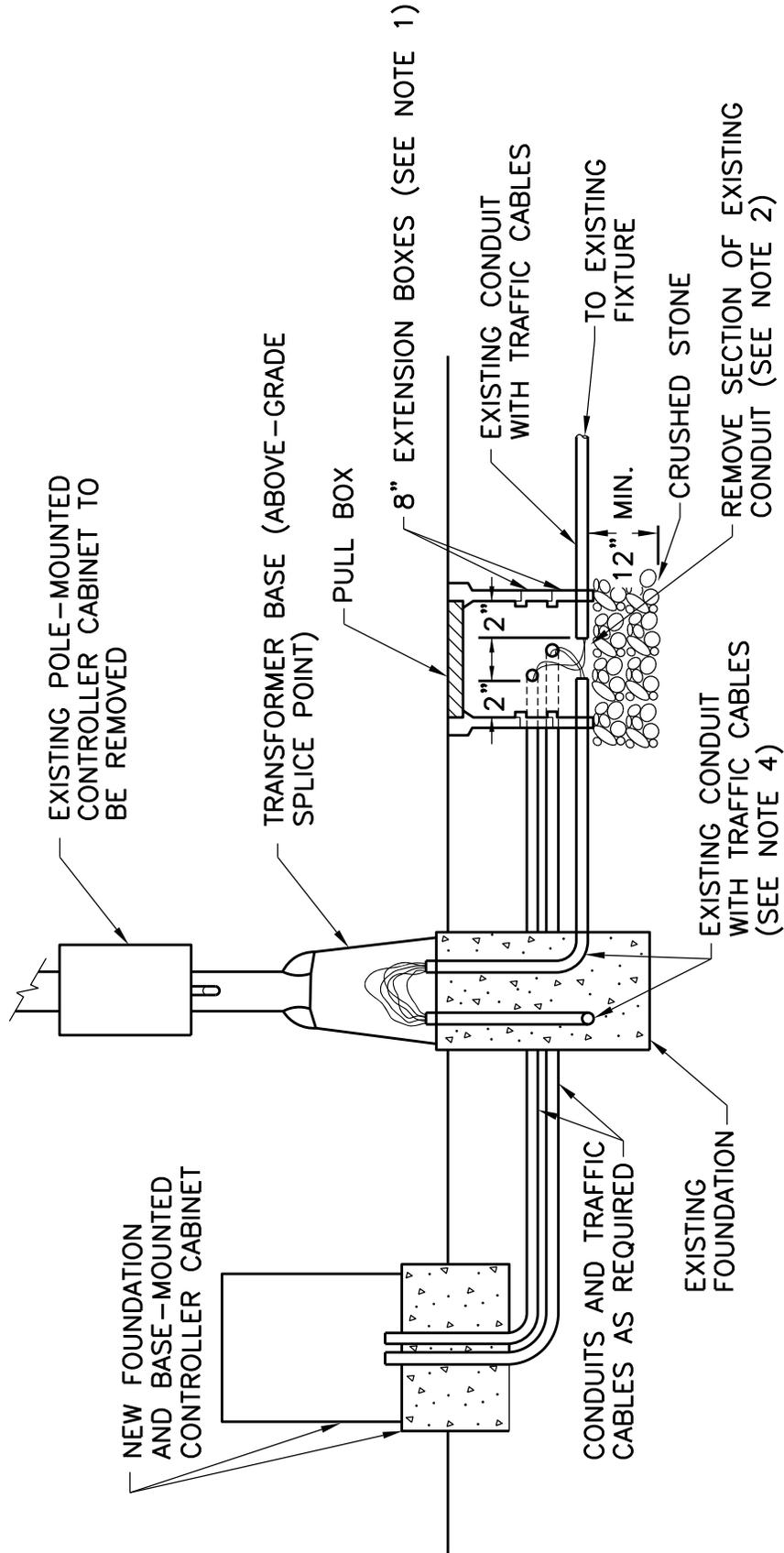
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**CONCRETE CABINET  
FOUNDATION**

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# BREAK-IN TYPE PULL BOX INSTALLATION



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## BREAK-IN TYPE PULL BOX INSTALLATIONS

1  
2

NOTES:

1. BREAK-IN PULL BOXES ARE USED TO INSTALL A NEW PULL BOX IN AN EXISTING CONDUIT RUN. ADDITIONAL CONDUITS MAY BE ADDED AT THIS PULL BOX. THE NEW PULL BOX MAY BE REPLACING A REMOVED FOUNDATION.
2. THE FOLLOWING METHOD SHALL BE USED:
  - A. DISCONNECT AND EXTRACT EXISTING CABLES FROM AFFECTED CONDUIT LOCATION.
  - B. REMOVE FOUNDATION CONCRETE IF APPLICABLE.
  - C. REMOVE DESIRED CONDUIT SECTION.
  - D. INSTALL NEW BREAK-IN PULL BOX AND ANY NEW CONDUITS.
  - E. REPLACE AND RECONNECT CABLES.
3. IF THE DEPTH OF EXISTING CONDUITS WOULD REQUIRE THE USE OF MORE THAN TWO EXTENSION PULL BOXES, THE NEWLY CREATED ENDS OF THE EXISTING CONDUIT SHALL BE EXTENDED UPWARD AND THE PULL BOX SHALL BE INSTALLED WITHOUT ANY EXTENSIONS IN ACCORDANCE WITH A STANDARD PULL BOX INSTALLATION.
4. THE REQUIREMENT FOR THE STANDARD PULL BOX INSTALLATION RELATING TO THE INSTALLATION OF CRUSHED STONE, CONCRETE AROUND THE PULL BOX, AND CONDUIT INTRUSION INTO THE PULL BOX SHALL APPLY AND ARE SHOWN ON DETAIL SHEET NO. 36.

2  
2

Revision Date:

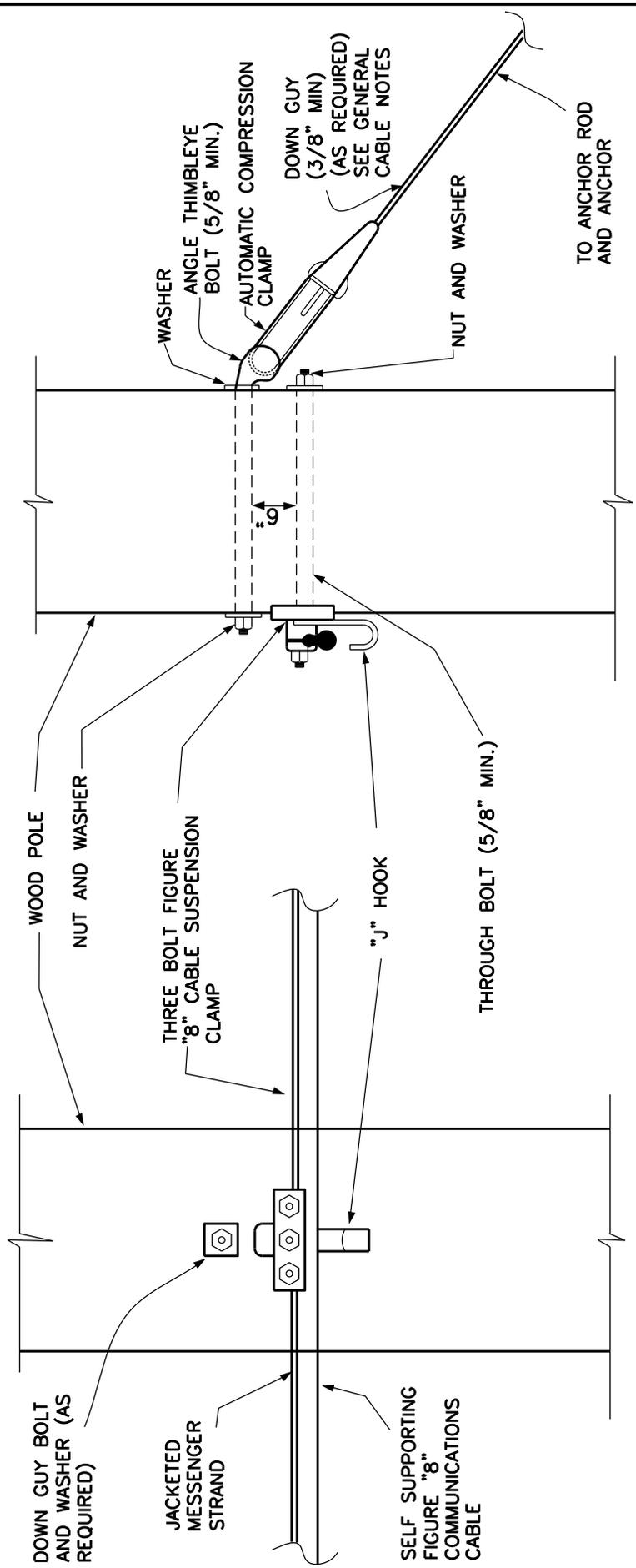
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**GARLAND**  
ENGINEERING  
STANDARD DETAILS

**BREAK-IN TYPE PULL BOX  
INSTALLATIONS**

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# OVERHEAD INTERCONNECT CONTINUATION DETAIL

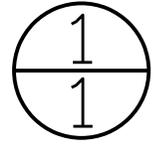


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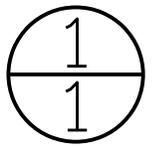
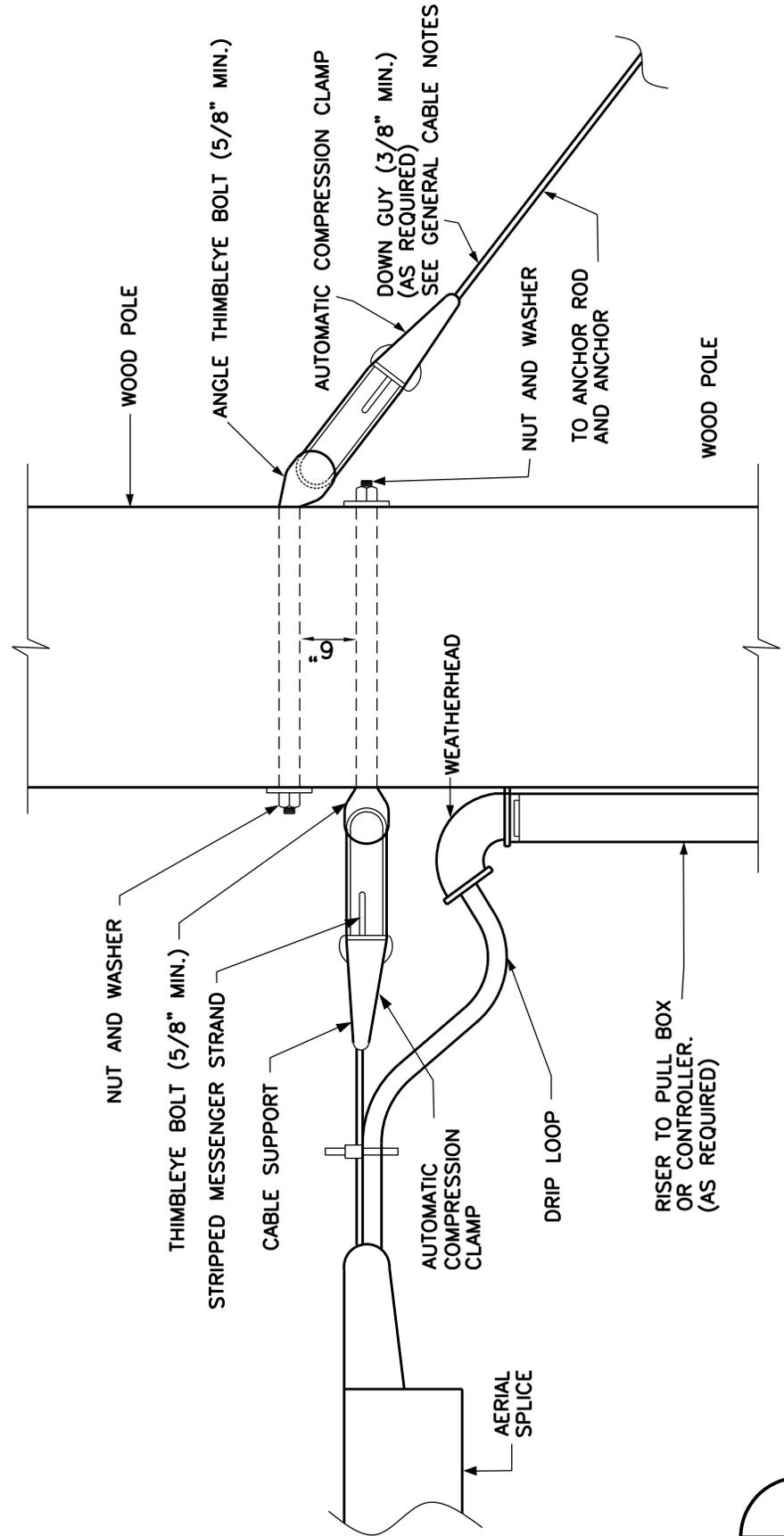
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Project No. : STANDARD-DETAILS	



## OVERHEAD INTERCONNECT CONTINUATION DETAIL



# OVERHEAD INTERCONNECT TERMINATION DETAIL



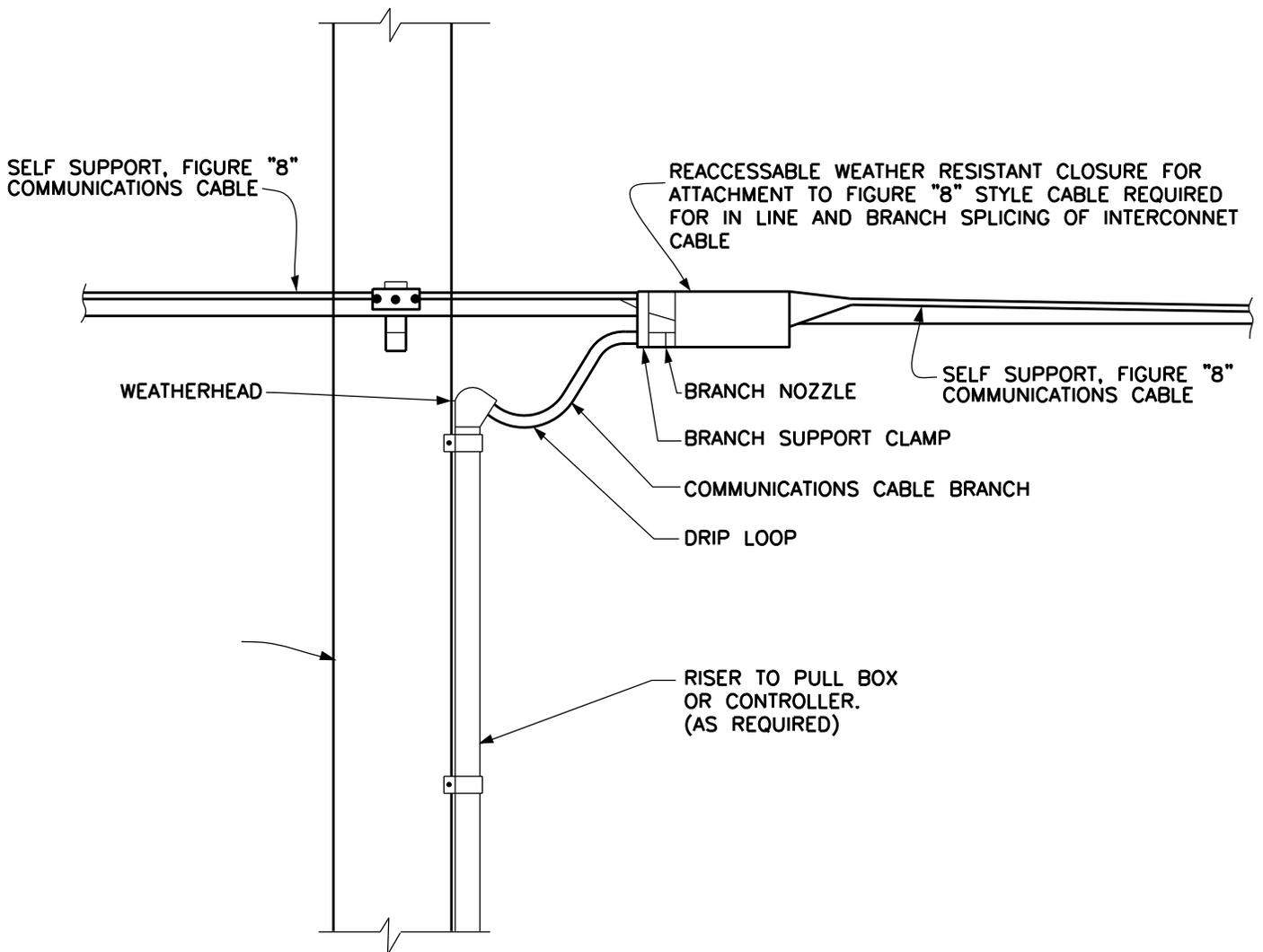
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## OVERHEAD INTERCONNECTED TERMINATION DETAIL

# OVERHEAD INTERCONNECT SPLICING



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1

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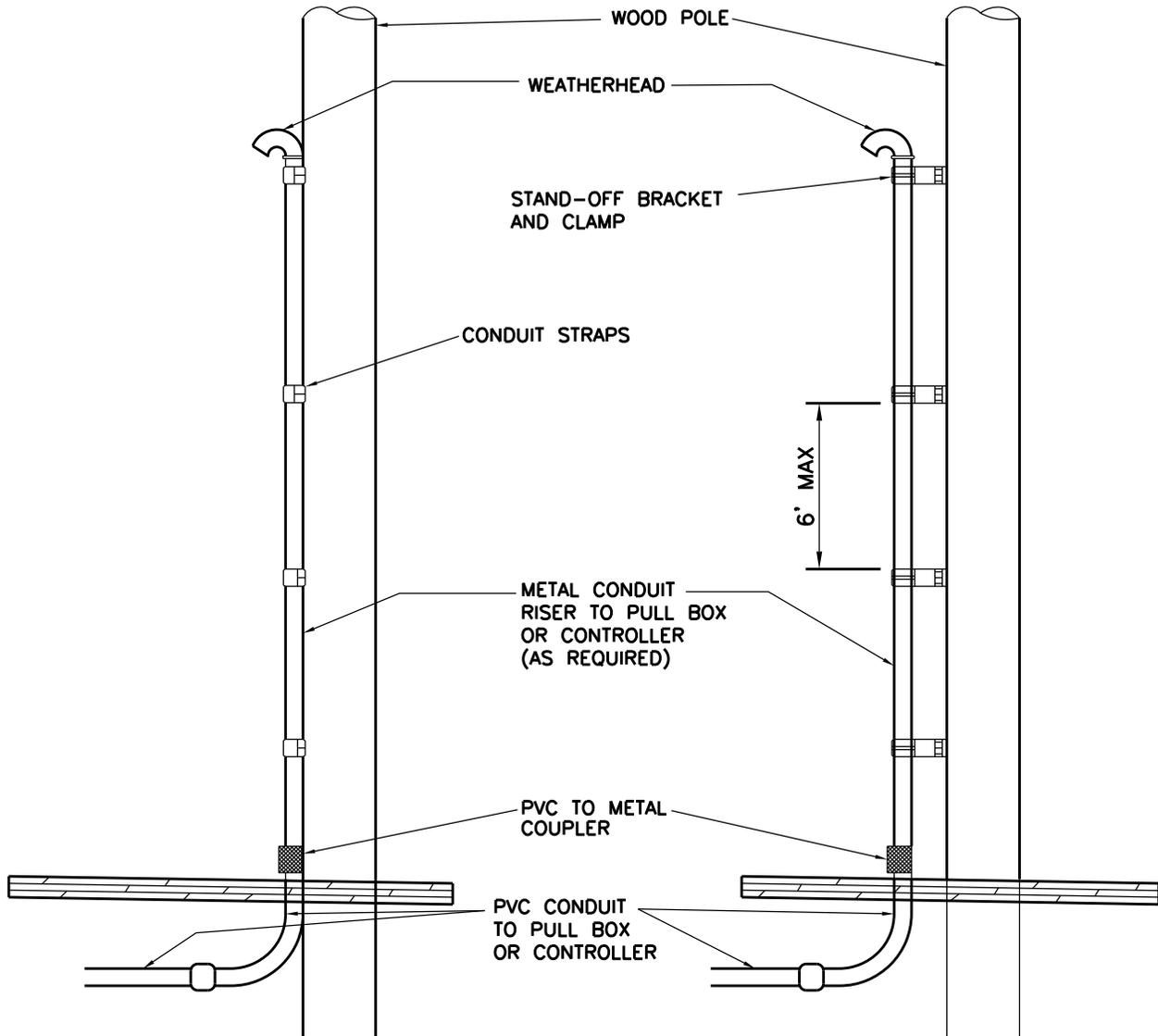


## OVERHEAD INTERCONNECT SPLICING

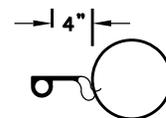
# CONDUIT RISER INSTALLATION

STANDARD

STAND OFF  
(AS REQUIRED)



ELEVATION VIEW



PLAN VIEW

1  
1

Revision Date:

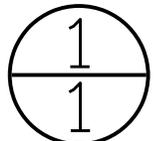
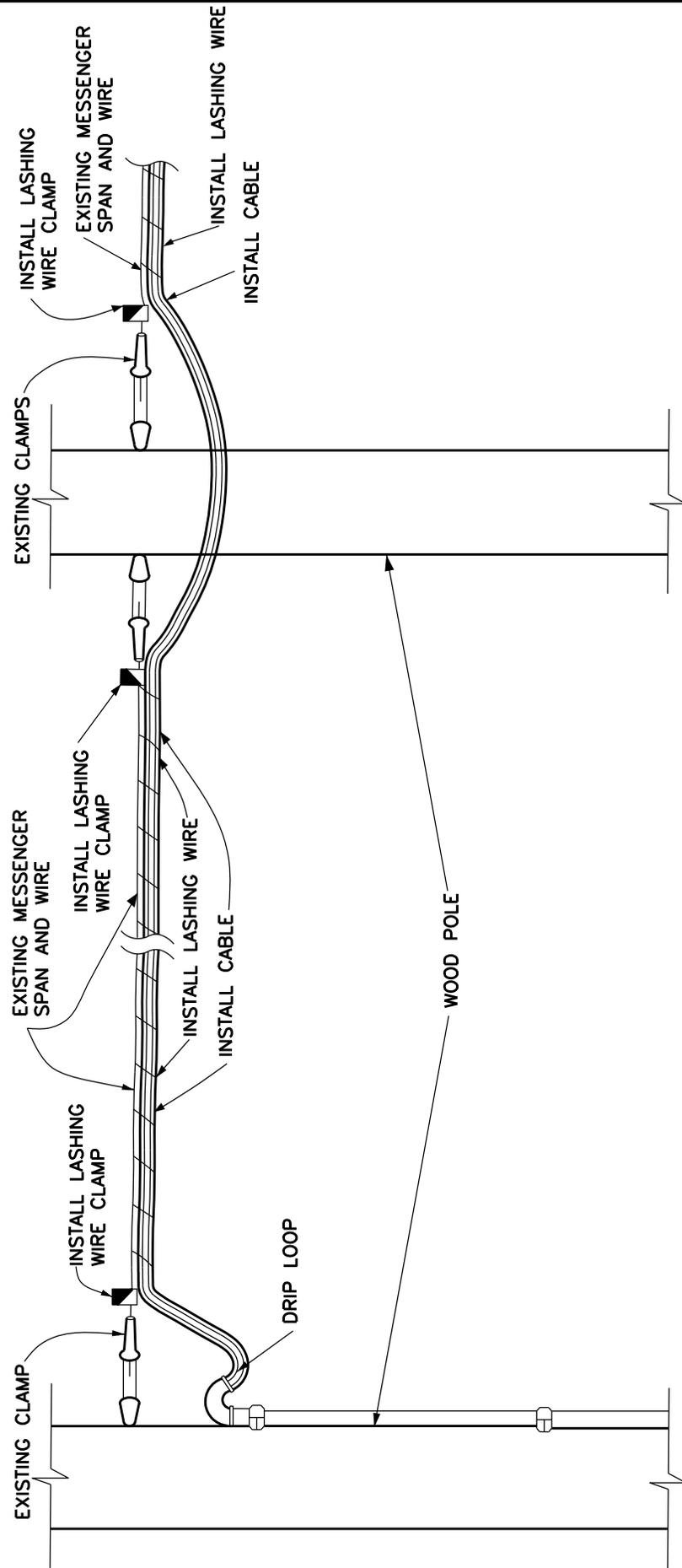
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**GARLAND**  
 ENGINEERING  
**STANDARD DETAILS**

**STREET LIGHT CONDUIT  
 RISER CABLE INSTALLATION**

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# OVERHEAD INTERCONNECT CONTINUATION DETAIL



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## OVERHEAD CABLE INSTALLATION ON EXISTING SPAN

# GENERAL CABLE NOTES

1. ALL OVERHEAD CABLE INSTALLATIONS SHALL MEET THE REQUIREMENTS OF THE NATIONAL ELECTRIC SAFETY CODE.
2. OVERHEAD CABLE SHALL BE INSTALLED SUCH THAT IT DOES NOT INTERFERE WITH THE MOTORISTS VIEW OF THE TRAFFIC SIGNAL DISPLAYS.
3. WHEN AN OVERHEAD CABLE IS REQUIRED TO ENTER THE CONDUIT, AN OVERHEAD INTERCONNECT SPLICE SHALL BE MADE TO CONVERT FROM THE 12 PAIR "FIGURE 8" TYPE CABLE TO A 12 PAIR NON-"FIGURE 8" TYPE CABLE. SEE SPECIFICATIONS FOR CABLE TYPE REQUIREMENTS.
4. NO SPLICES SHALL BE PERMITTED IN THE COMMUNICATIONS CABLE EXCEPT AT CONTROLLER CABINETS AND AERIAL SPLICES AS SHOWN ON THE PLANS.
5. WHEN SPLICING THE NEW CABLE TO EXISTING CABLE, THE PAIRS OF THE NEW CABLE SHALL BE SPLICED TO THE FIRST PAIRS OF THE EXISTING CABLE SUCH THAT COLOR CODED WIRES MATCH.
6. POLE DOWN GUYS SHALL BE INSTALLED ON POLES SUPPORTING CABLE AND MEETING THE FOLLOWING CRITERIA:
  - A. WHEN A CABLE TERMINATES AT A POLE, A GUY SHALL BE INSTALLED ON THE OPPOSITE SIDE OF AND IN-LINE WITH THE TERMINATING CABLE.
  - B. WHEN A CONTINUING CABLE IS SUPPORTED AT A POLE AND THE ANGLE AT WHICH IT ENTERS AND LEAVES IS SUCH THAT IT IS NOT AN EQUALIZED PULL, A GUY SHALL BE INSTALLED ON THE OPPOSITE SIDE OF AND IN-LINE WITH THE TENSION CREATED BY THE ANGLED CABLE.
- 7.
8. ALL COMMUNICATIONS CABLE ENTERING AN AERIAL SPLICE SHALL HAVE THEIR METALLIC SHEIELDS MADE ELECTRICALLY COMMON BY APPROPRIATE BONDING CLAMPS.
9. ALL OVERHEAD "FIGURE 8" COMMUNICATIONS CABLES INSTALLED SHALL BE TWISTED BETWEEN POLE SUPPORTS TO PROVIDE 1 TWIST PER 14 FEET OF RUN. A CONDUIT STRAP SHALL BE INSTALLED 2" BELOW EVERY CONDUIT COUPLING IN ADDITION TO THE 6' MAXIMUM SPACING REQUIREMENTS.

1  
1

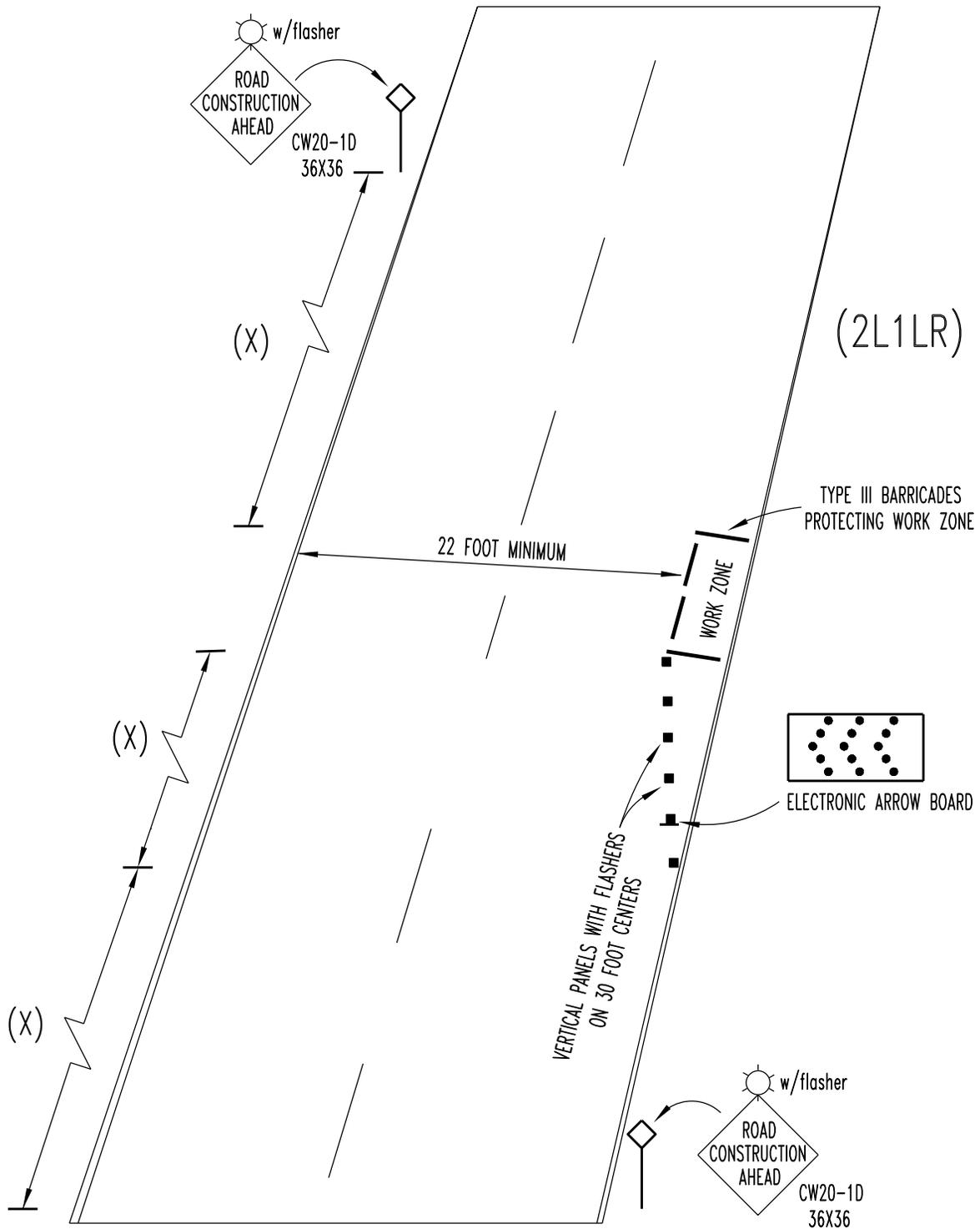
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## GENERAL CABLE NOTES

# 2 LANE ROADWAY ONE LANE ROADWORK



1  
6

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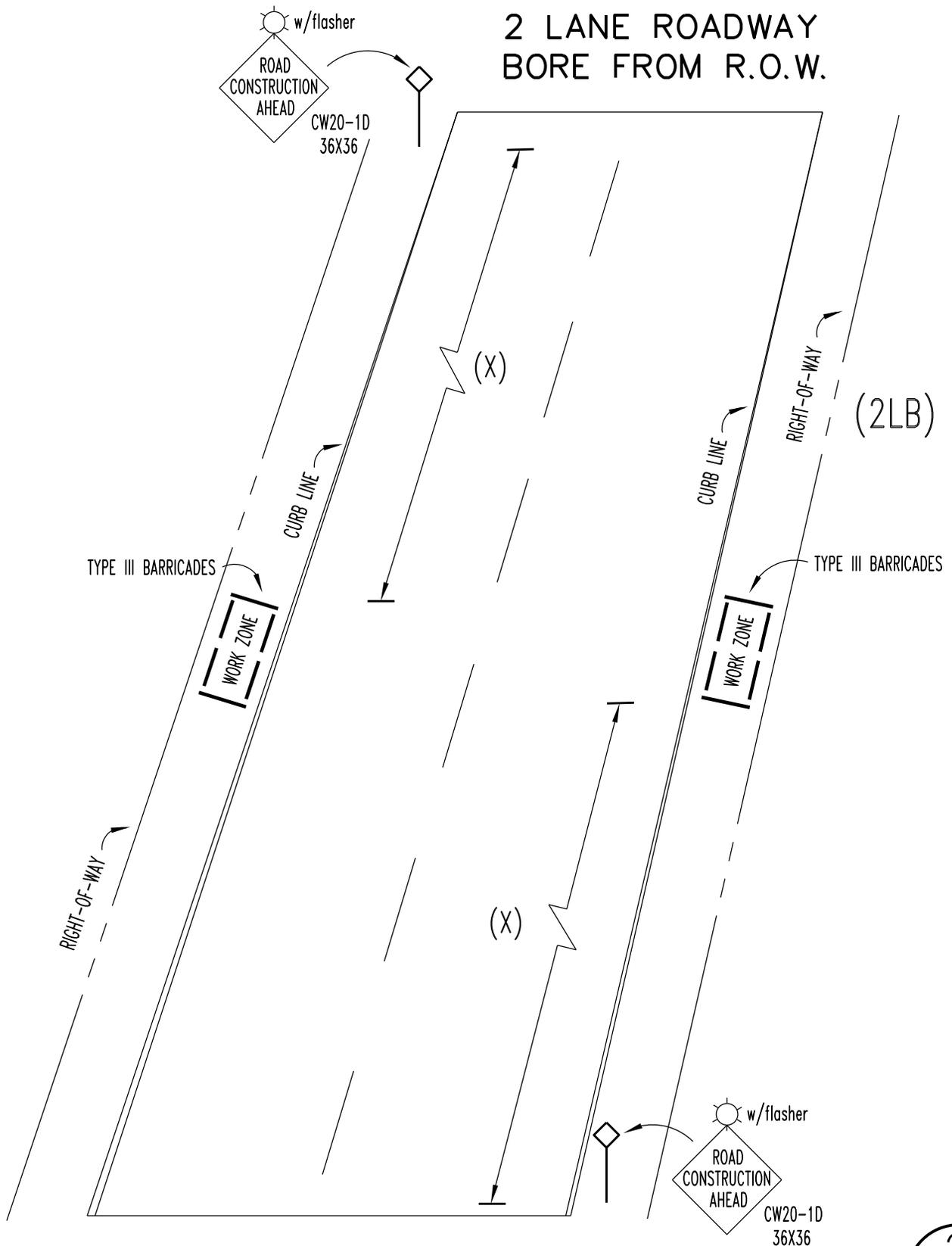
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**CONSTRUCTION BARRICADING DETAIL  
TWO LANE ROADWAY**

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# 2 LANE ROADWAY BORE FROM R.O.W.



2  
6

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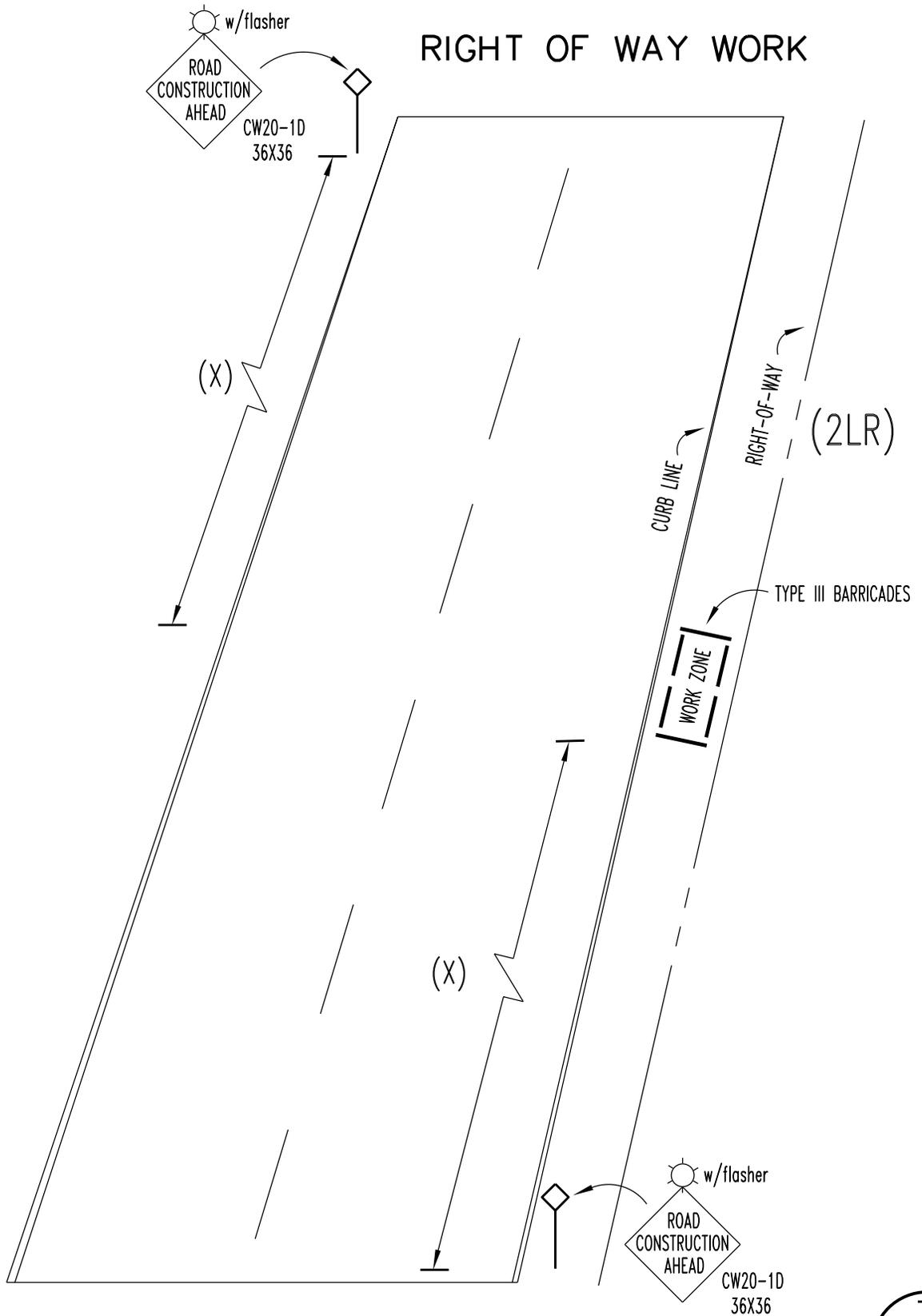
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## CONSTRUCTION BARRICADING DETAIL TWO LANE ROADWAY

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# RIGHT OF WAY WORK



3  
6

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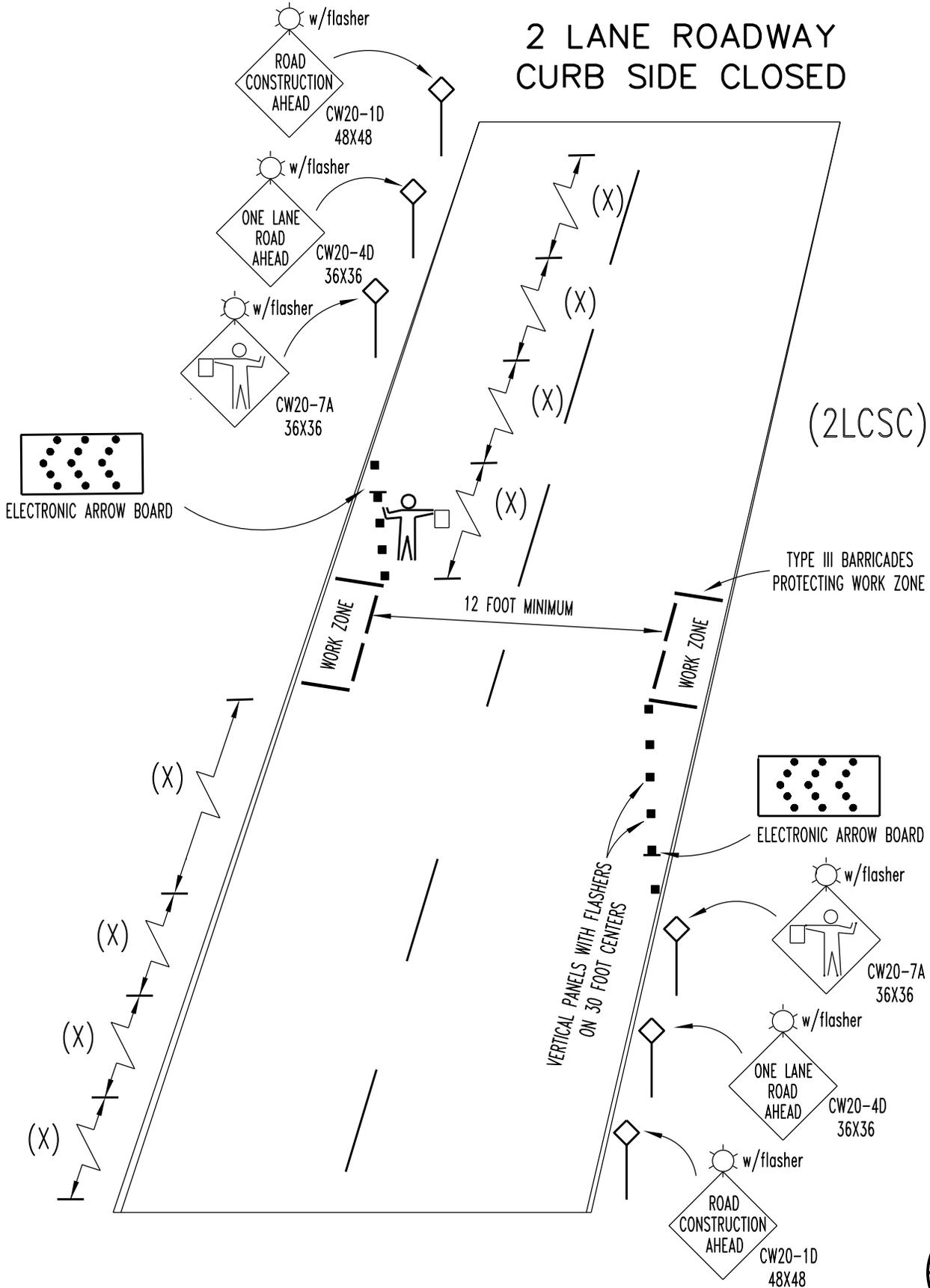
## CONSTRUCTION BARRICADING DETAIL TWO LANE ROADWAY

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# 2 LANE ROADWAY CURB SIDE CLOSED

(2LCSC)



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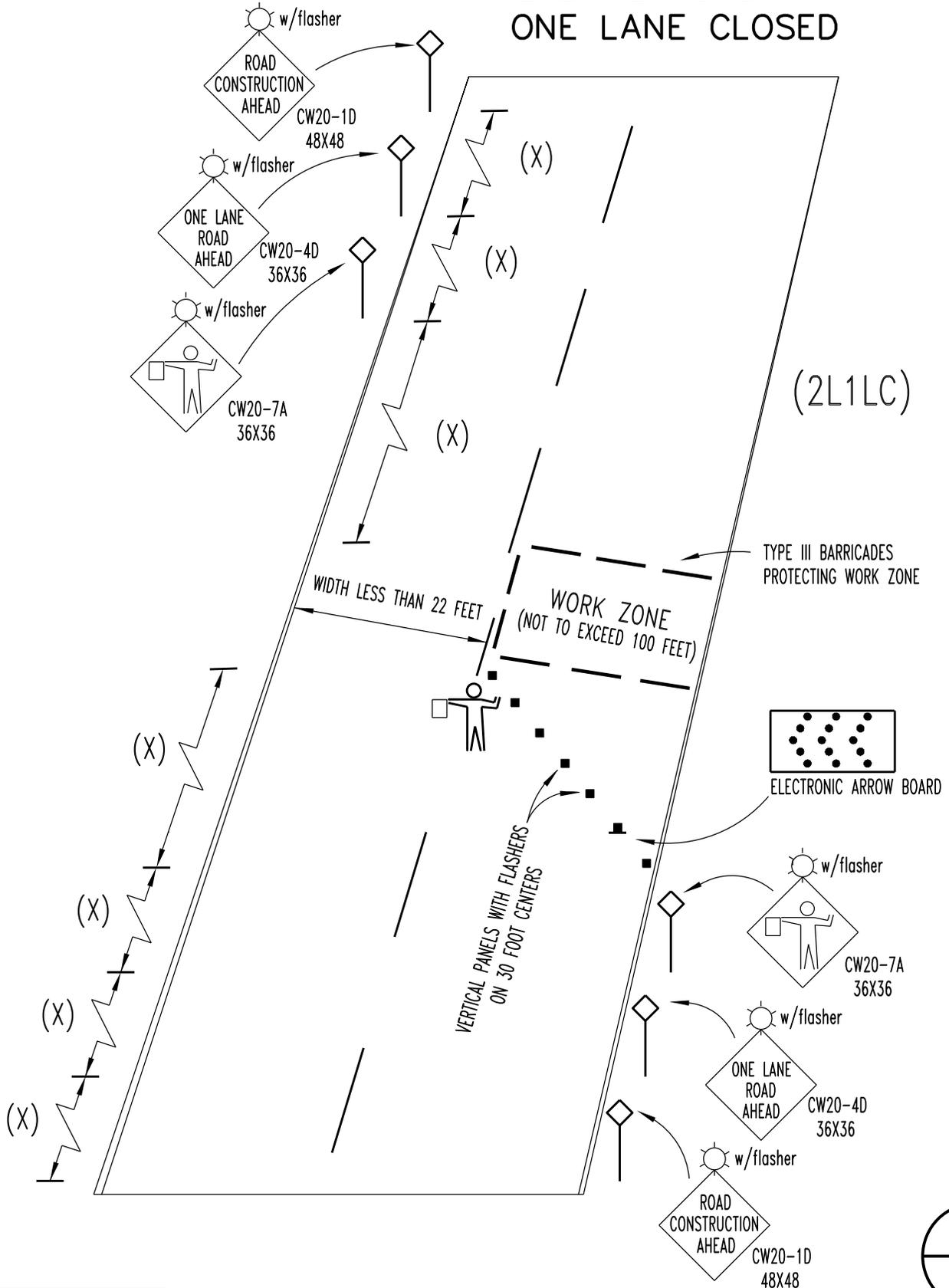


## CONSTRUCTION BARRICADING DETAIL TWO LANE ROADWAY

4  
6

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# 2 LANE ROADWAY ONE LANE CLOSED



5  
6

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## CONSTRUCTION BARRICADING DETAIL TWO LANE ROADWAY

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# BARRICADE NOTES

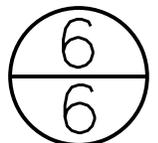
ALL SIGNS & BARRICADES TO BE IN PLACE FROM 9:00AM TO 4:00PM.

FROM 4:00PM TO 9:00AM BACKFILL OR PLATE TO ALLOW ALL THRU LANES OF TRAFFIC AND REMOVE ALL SIGNS & BARRICADES EXCEPT, "ROAD CONSTRUCTION AHEAD".

SIGN SPACING TABLE

POSTED SPEED LIMIT MPH	30	35	40	45	50	55
DISTANCE (X) IN FEET	120'	160'	240'	320'	400'	500'

△ REV. 2/20/03 REPLACED SIGN WITH "ELECTRONIC ARROW BOARD"



Revision Date:

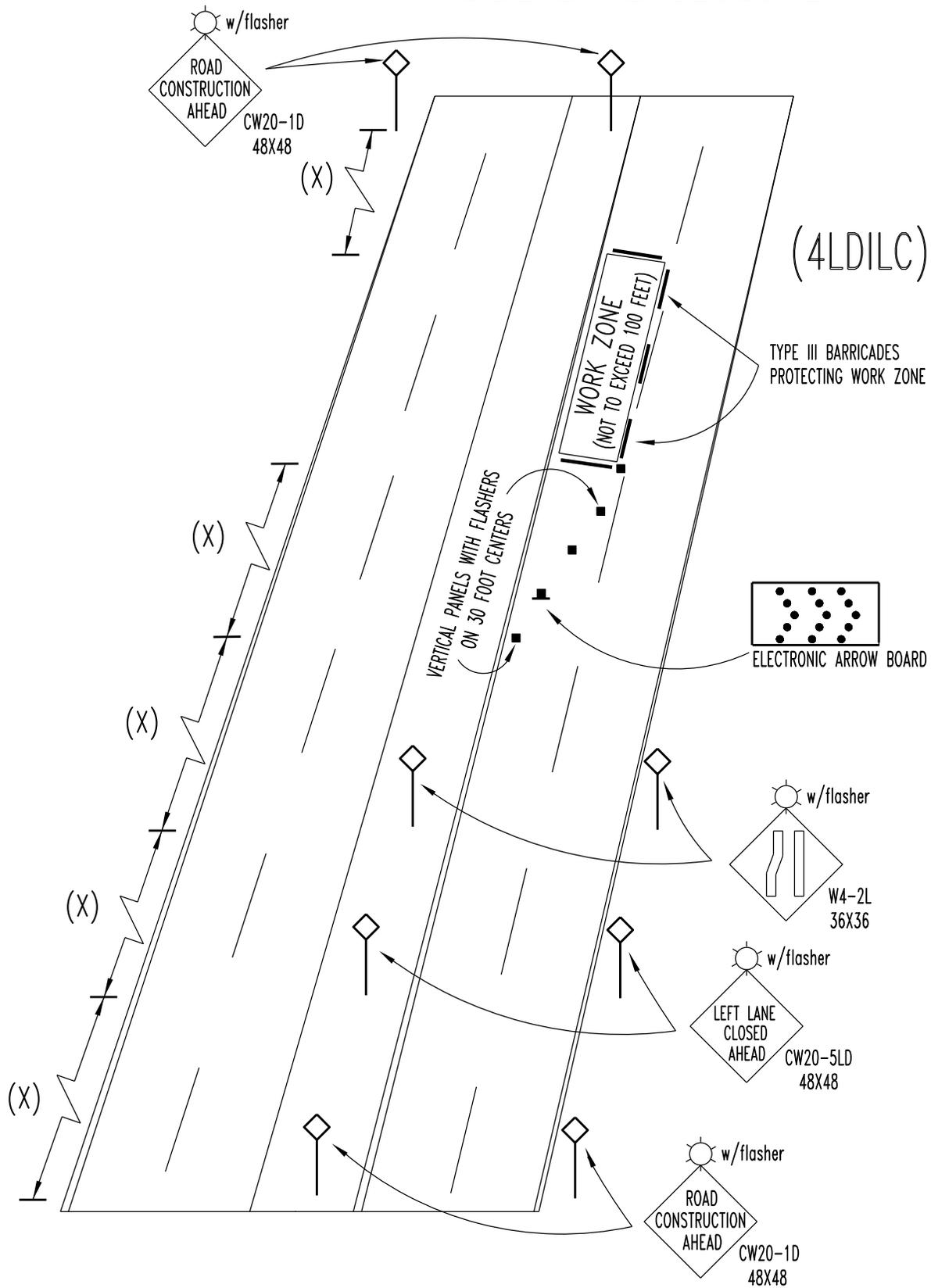
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**CONSTRUCTION BARRICADING DETAIL  
TWO LANE ROADWAY**

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# 4 LANE DIVIDED INSIDE LANE CLOSURE



1  
4

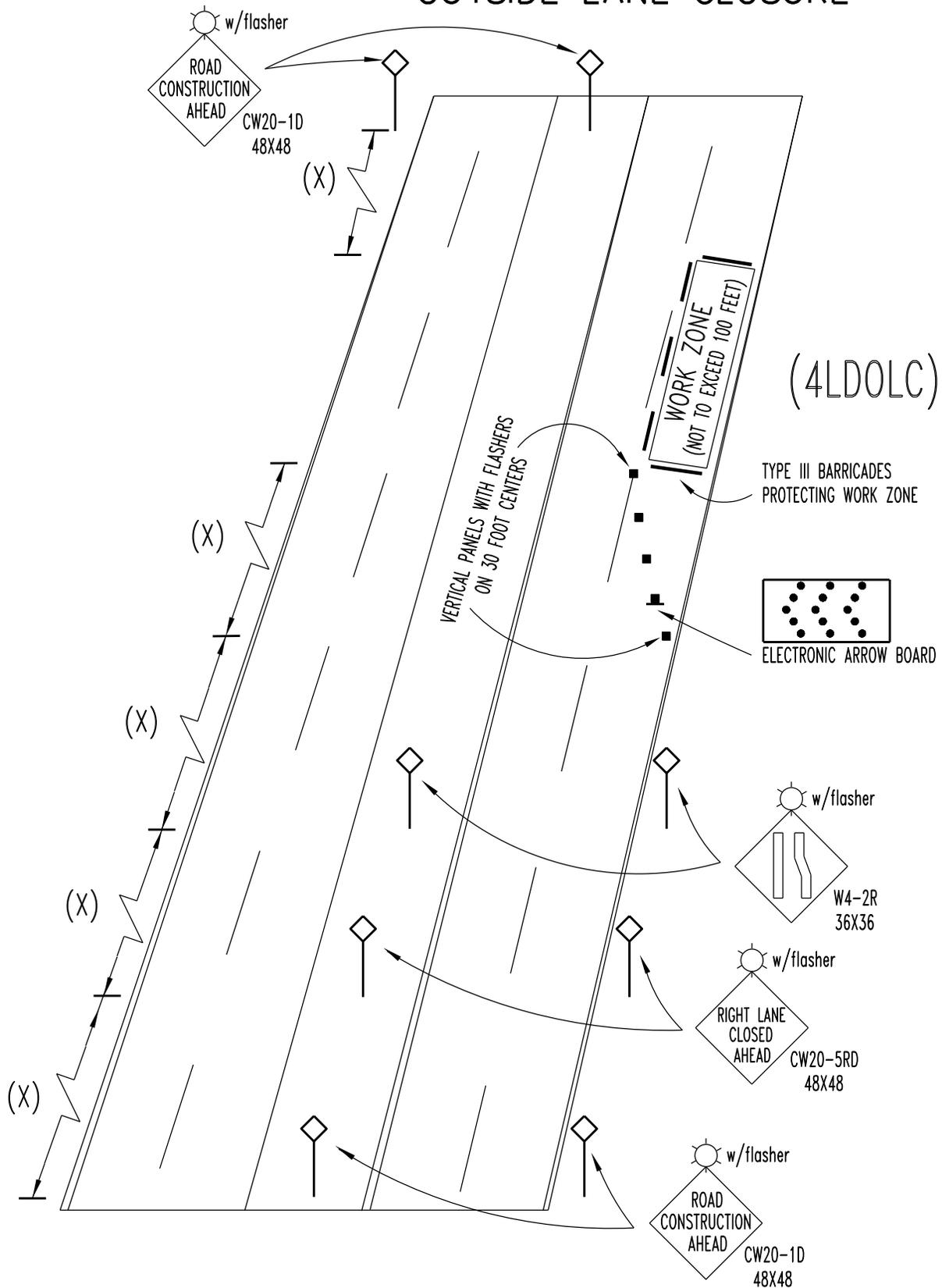
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Project No. : STANDARD-DETAILS	



## CONSTRUCTION BARRICADING DETAIL FOUR LANE UNDIVIDED

# 4 LANE DIVIDED OUTSIDE LANE CLOSURE



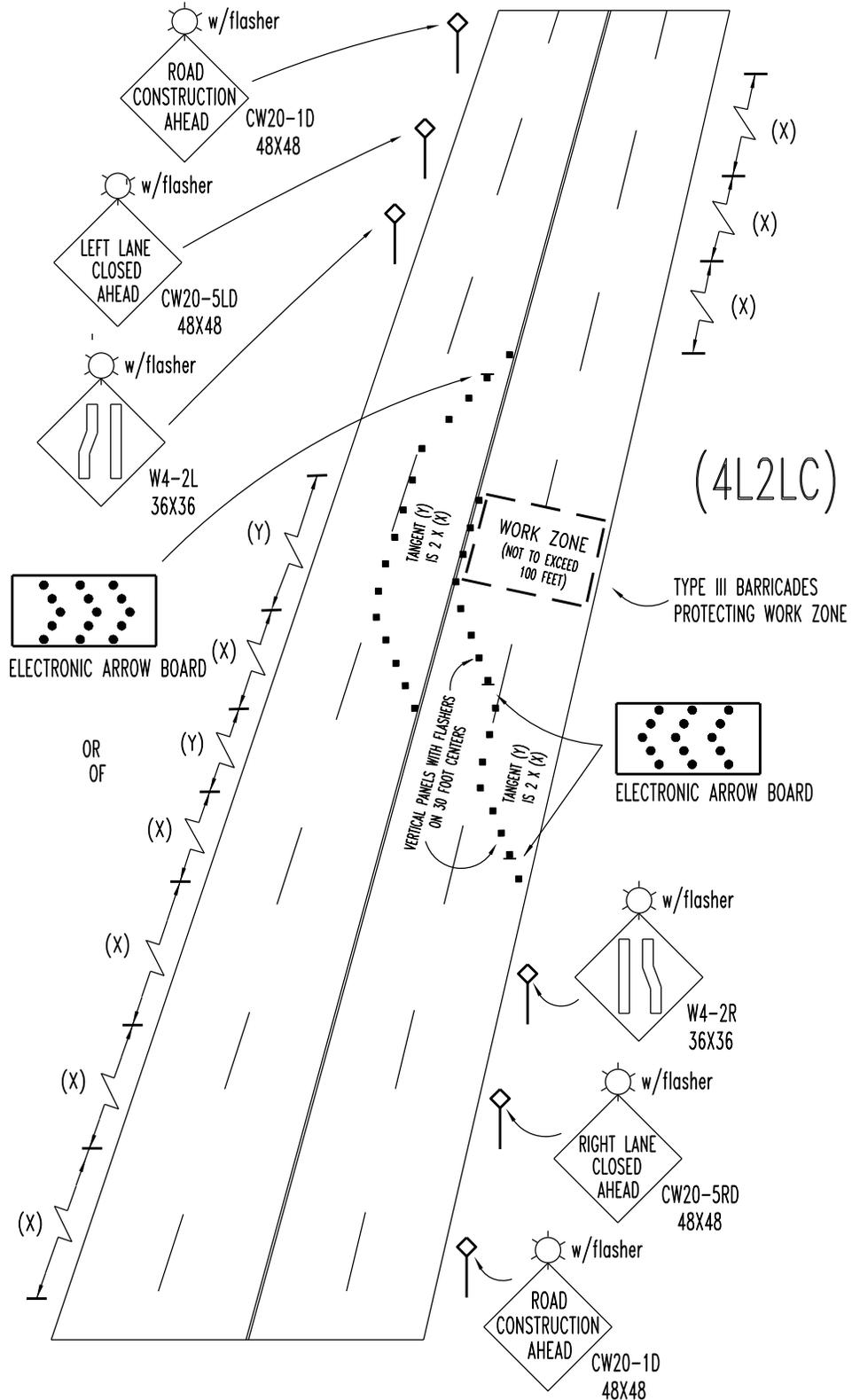
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## CONSTRUCTION BARRICADING DETAIL FOUR LANE UNDIVIDED

# 4 LANE UNDIVIDED TWO LANE CLOSURE



3  
4

Revision Date:

Scale : N/A Date : 06/01/05  
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 Drawn : GAV  
 Dwg. File : TRF\_43.DWG  
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**GARLAND**  
 ENGINEERING  
 STANDARD DETAILS

**CONSTRUCTION BARRICADING  
 DETAIL FOUR LANE UNDIVIDED**

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# BARRICADE NOTES

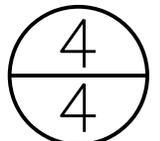
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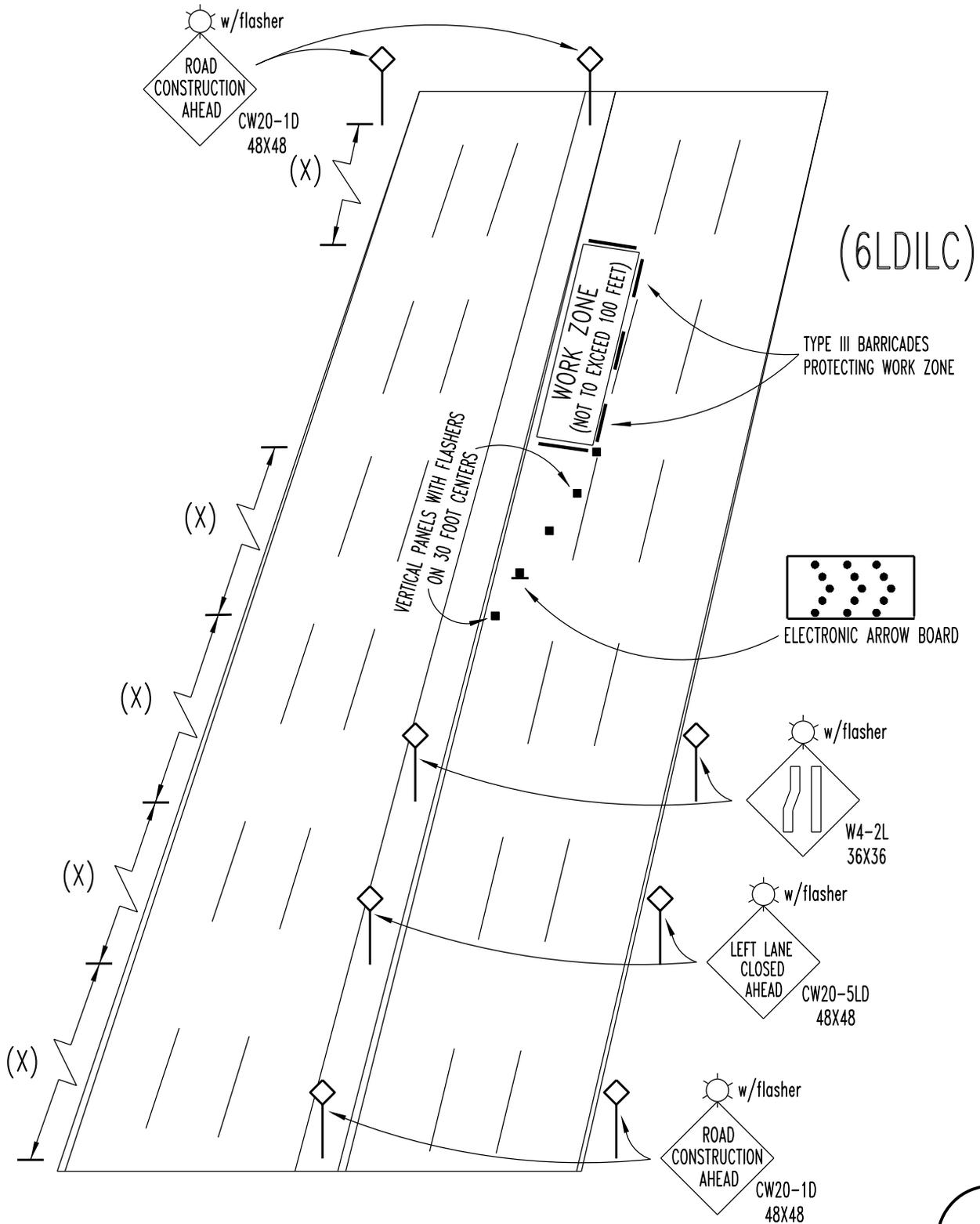


CONSTRUCTION BARRICADING  
DETAIL FOUR LANE UNDIVIDED

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# 6 LANE DIVIDED INSIDE LANE CLOSURE



1  
6

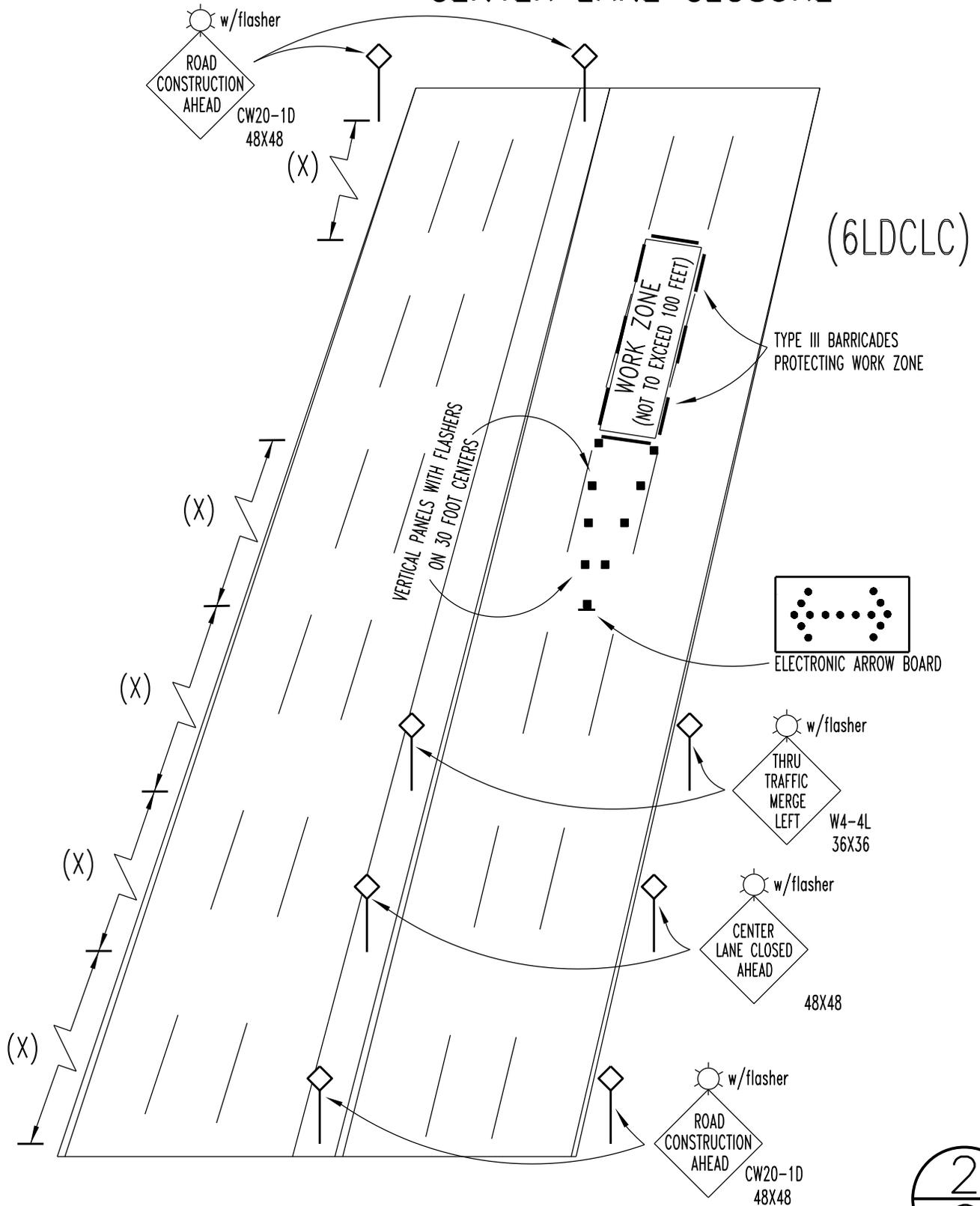
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## CONSTRUCTION BARRICADING DETAIL SIX LANE ROADWAY

# 6 LANE DIVIDED CENTER LANE CLOSURE



2  
6

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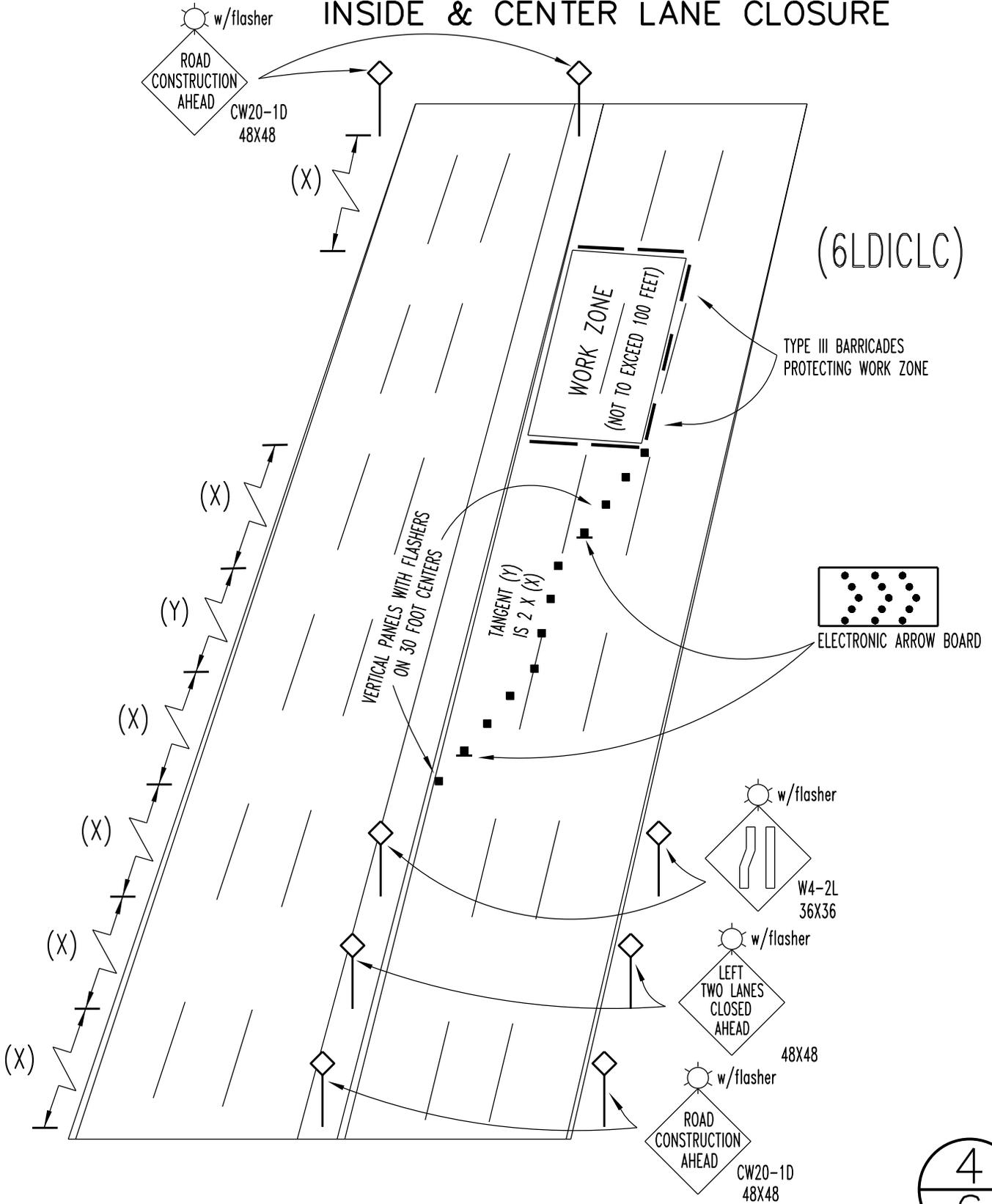


## CONSTRUCTION BARRICADING DETAIL SIX LANE ROADWAY

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# 6 LANE DIVIDED INSIDE & CENTER LANE CLOSURE



4  
6

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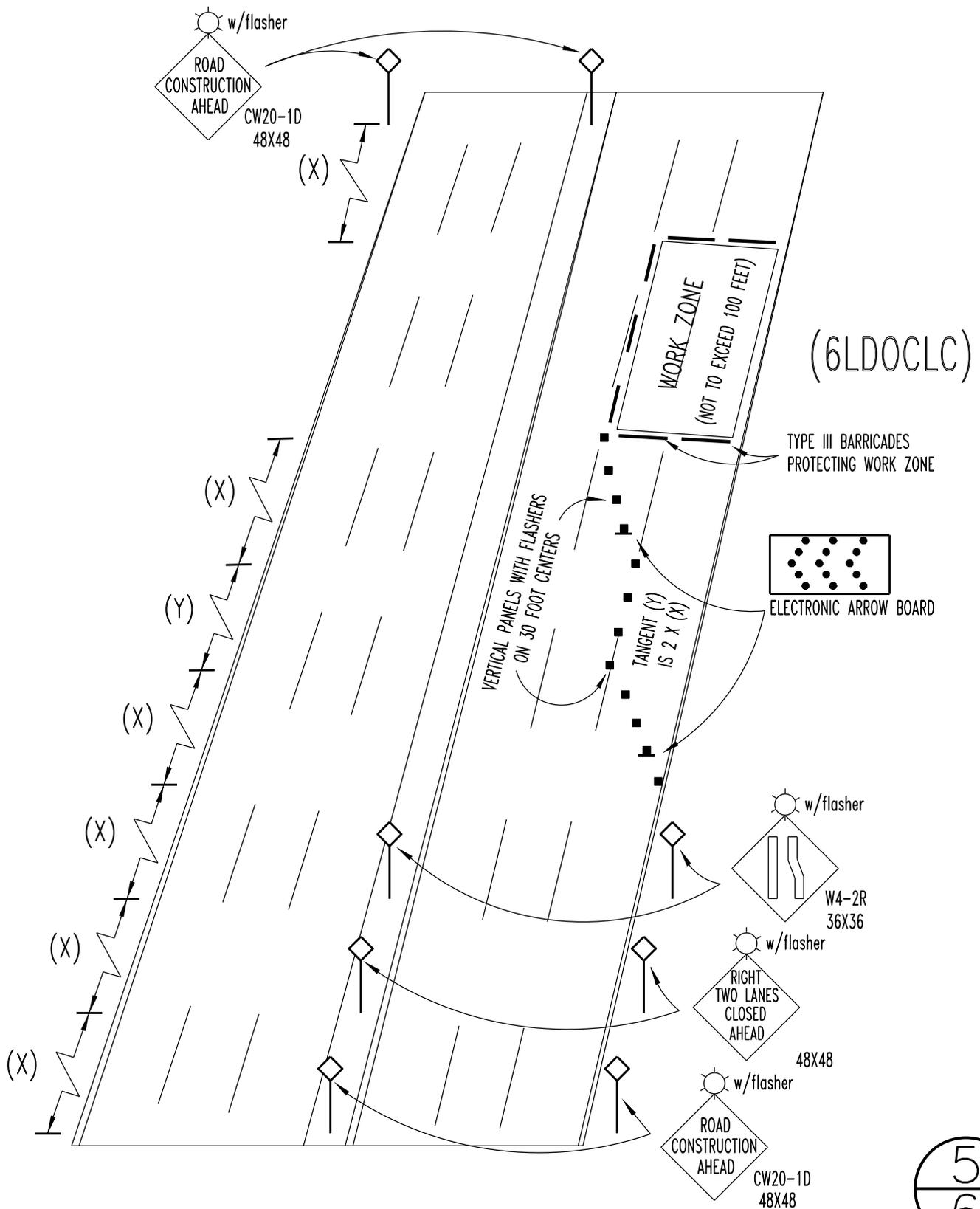


## CONSTRUCTION BARRICADING DETAIL SIX LANE ROADWAY

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# 6 LANE DIVIDED OUTSIDE & CENTER LANE CLOSURE



5  
6

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## CONSTRUCTION BARRICADING DETAIL SIX LANE ROADWAY

# BARRICADE NOTES

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**CONSTRUCTION BARRICADING  
 DETAIL SIX LANE ROADWAY**