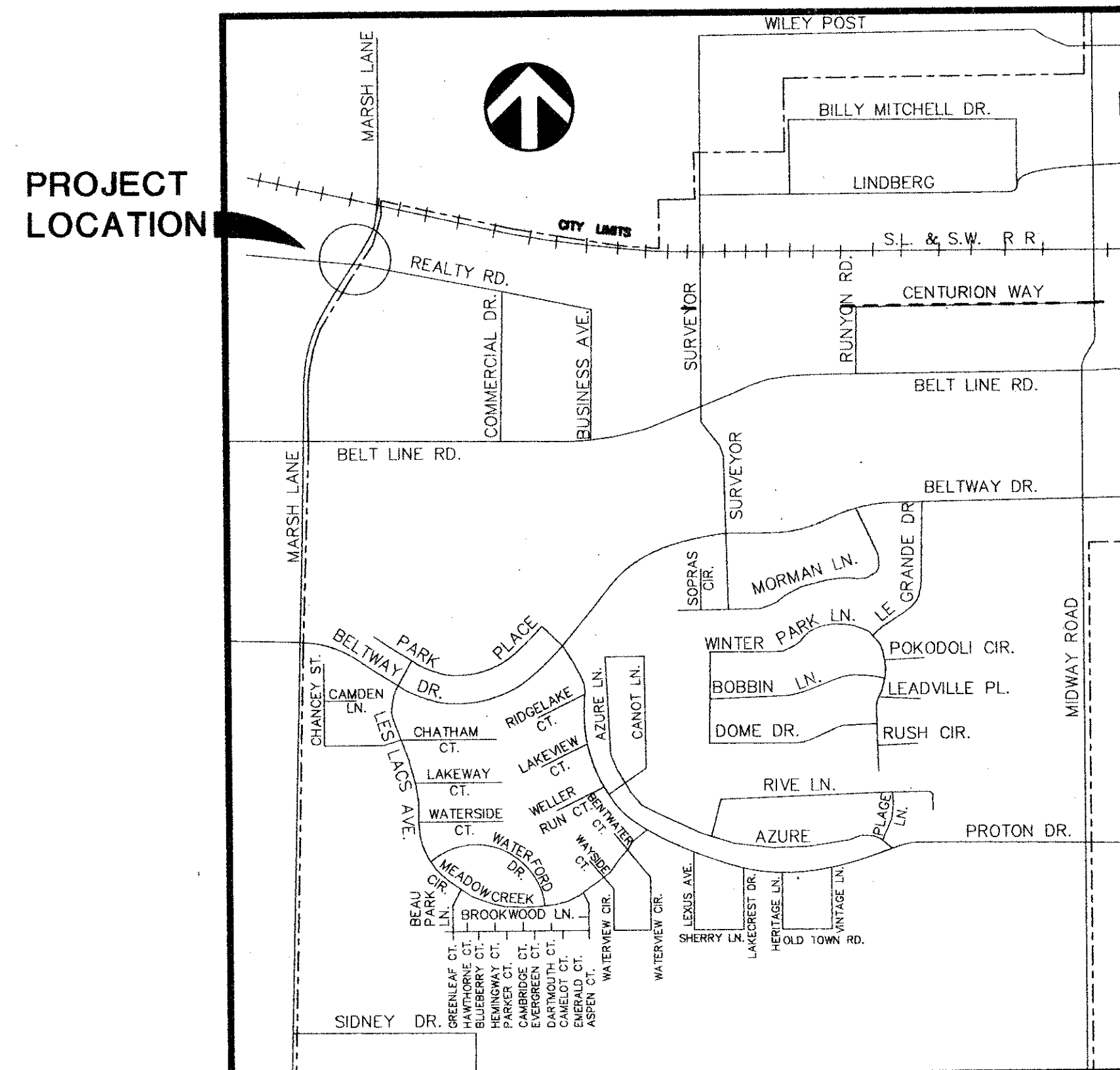


# SIGNAL DESIGN PLANS FOR MARSH LANE AND REALTY ROAD



1945 Jackson Road (214) 466-3050  
Carrollton, Texas 75006 FAX (214) 466-3175



LOCATION MAP

## INDEX OF DRAWINGS

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**BARTON-ASCHMAN  
ASSOCIATES, INC.**

5485 BELT LINE RD. #199 • DALLAS, TEXAS 75240 • (214) 991-1900

PARSONS TRANSPORTATION GROUP

CABLE CONDUCTOR	T-1		T-2		T-3		T-4	
	S.H. NO.	INDICATION	S.H. NO.	INDICATION	S.H. NO.	INDICATION	S.H. NO.	INDICATION
BLACK/RED	SPARE		SPARE		SPARE		SPARE	
WHITE	COMMON		COMMON		COMMON		COMMON	
WHITE/BLACK	COMMON		COMMON		COMMON		COMMON	
RED	1-4	R	5-7	R	8-11	R	12-14	R
ORANGE	1-4	Y	5-7	Y	8-11	Y	12-14	Y
GREEN	1-4	G	5-7	G	8-11	G	12-14	G
BLACK	4	<Y	SPARE		11	<Y	14	<Y
BLUE	4	<G	SPARE		11	<G	14	<G
GREEN/BLACK	15	W	16	W	17	W	19	W
BLUE/WHITE	SPARE		SPARE		18	W	20	W
RED/BLACK	15	DW	16	DW	17	DW	19	DW
ORANGE/BLACK	SPARE		SPARE		18	DW	20	DW
BLACK/WHITE	PB15	Ø4	PB16	Ø8	PB17	Ø8	PB19	Ø6
RED/WHITE	SPARE		SPARE		PB18	Ø6	PB20	Ø4
GREEN/WHITE	P.B. COM.		P.B. COM.		P.B. COM.		P.B. COM.	
BLUE/BLACK	SPARE		SPARE		SPARE		SPARE	

NO	TYPE	PHASE	BACKPLATE		12" VEH SEC	PED SIG.
			3 SEC	4 SEC		
1	V3	Ø4	1		3	
2	V3	Ø4	1		3	
3	V3	Ø4	1		3	
4	V4LT*	Ø7 & Ø4		1	4	
5	V3	Ø2	1		3	
6	V3	Ø2	1		3	
7	V3	Ø2	1		3	
8	V3	Ø8	1		3	
9	V3	Ø8	1		3	
10	V3	Ø8	1		3	
11	V4LT*	Ø3 & Ø8		1	4	
12	V3	Ø6	1		3	
13	V3	Ø6	1		3	
14	V4LT*	Ø1 & Ø6		1	4	
15,20	PED	PØ4				2
16,17	PED	PØ8				2
18,19	PED	PØ6				2
TOTALS			11	3	45	6

\* - Use green/yellow fiber optic turn arrow.

**LEGEND**

FIRE HYDRANT	⊙	LOOP DETECTOR (SAW-CUT)	⊖
POWER POLE	○	TRAFFIC SIGNAL ON ARM W/POLE	⊙
TELEPHONE LINE U.G.	—T—	COMB. ST. LIGHT/SIGNAL POLE	⊙
SEWER LINE	—S—	CONDUIT IDENTIFIER	⊙
STORM DRAIN LINE	—SD—	SIGNAL CONDUIT	---
GAS LINE	—G—	DETECTOR PULLBOX TYPE A	⊙
WATER LINE	—W—	DETECTOR PULLBOX TYPE C	⊙
MANHOLE	○	PEDESTRIAN SIGNAL AND PUSH BUTTON	⊙
LIGHT STANDARD WITH PHOTOCELL	⊙	PEDESTAL POLE W/SIGNALS	⊙
EXISTING RIGHT-OF-WAY	---	CONTROLLER CABINET	⊙
OPTICOM DETECTOR	⊙	SIGN PLATE TO BE INSTALLED	⊙
		SIGN PLATE AND POLE TO BE INSTALLED	⊙

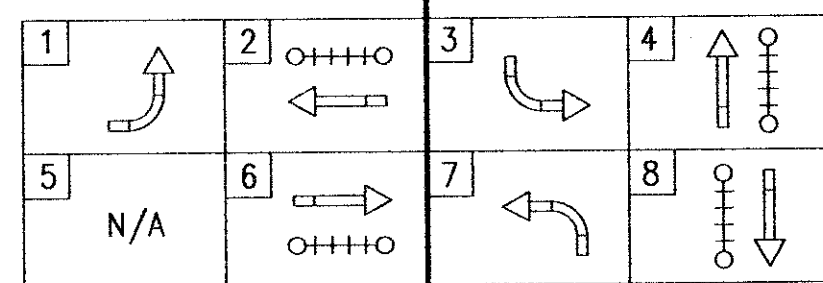
**PAVEMENT MARKINGS**

TYPE	QUANTITY	UNIT
6" X 6" WHITE REFLECTIVE JIGGLE BARS	30	EA.
4" YELLOW BIDIRECTIONAL RETROREFLECTIVE RAISED BUTTONS	200	EA.
24" SOLID WHITE ALKYD THERMOPLASTIC FOR STOP BARS	140	FT.
6" SOLID WHITE ALKYD THERMOPLASTIC FOR CROSSWALKS	430	FT.
SOLID WHITE ALKYD THERMOPLASTIC LEFT ARROW	3	EA.
SOLID WHITE ALKYD THERMOPLASTIC RIGHT ARROW	1	EA.
SOLID WHITE ALKYD THERMOPLASTIC "ONLY"	4	EA.
SOLID WHITE ALKYD THERMOPLASTIC THROUGH/LEFT ARROW	1	EA.
SOLID WHITE ALKYD THERMOPLASTIC THROUGH/RIGHT ARROW	1	EA.

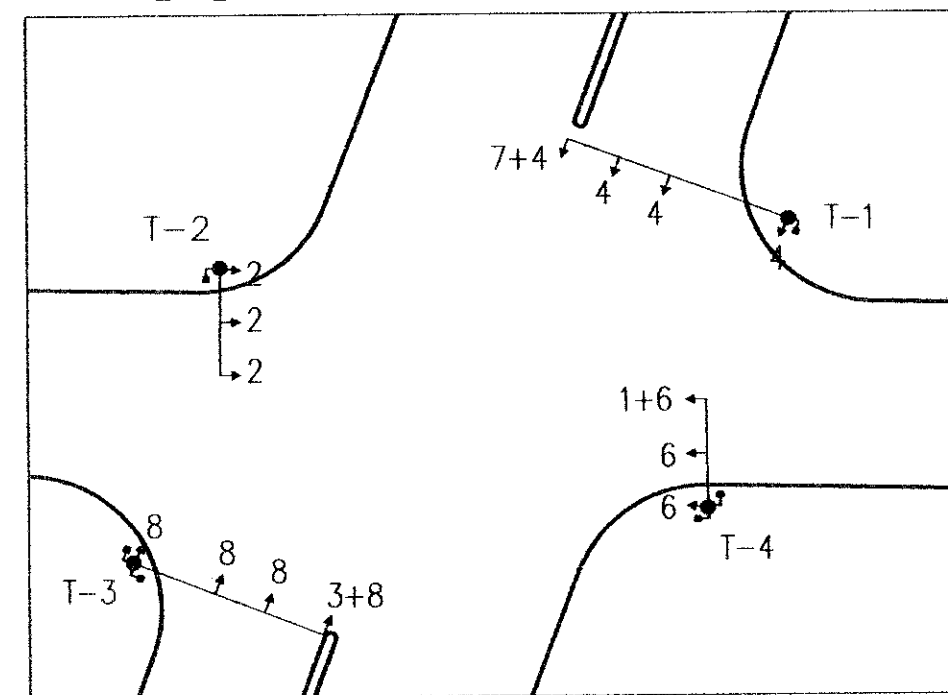
**DETECTOR DETAILS**

LOOP	DIMENSION	TURNS	DET. CTR.	SAW CUT
Ø1	5'X60' QUAD.	2	Presence	205
Ø2-1	5'X60' QUAD.	2	Presence	190
Ø2-2	5'X60' QUAD.	2	Presence	210
Ø3	5'X60' QUAD.	2	Presence	190
Ø4-1	5'X60' QUAD.	2	Presence	215
Ø4-2	5'X60' QUAD.	2	Presence	200
Ø4-3	5'X60' QUAD.	2	Presence	190
Ø6	5'X60' QUAD.	2	Presence	200
Ø7	5'X60' QUAD.	2	Presence	190
Ø8-1	5'X60' QUAD.	2	Presence	215
Ø8-2	5'X60' QUAD.	2	Presence	200
Ø8-3	5'X60' QUAD.	2	Presence	190
TOTALS				2395

**NEMA PHASE DIAGRAM**



**SIGNAL HEAD PHASING**



**CONDUIT SUMMARY**

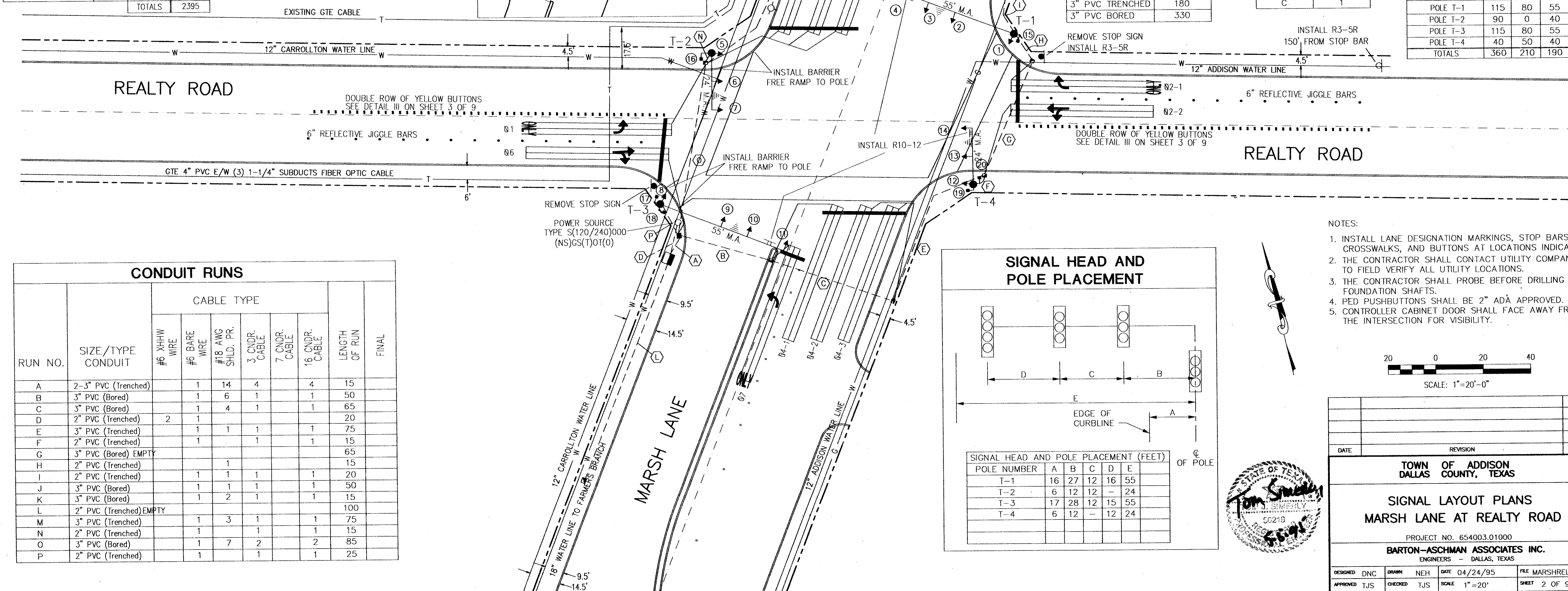
TYPE	LENGTH
2" PVC TRENCHED	210
3" PVC TRENCHED	180
3" PVC BORED	330

**GROUND BOX SUMMARY**

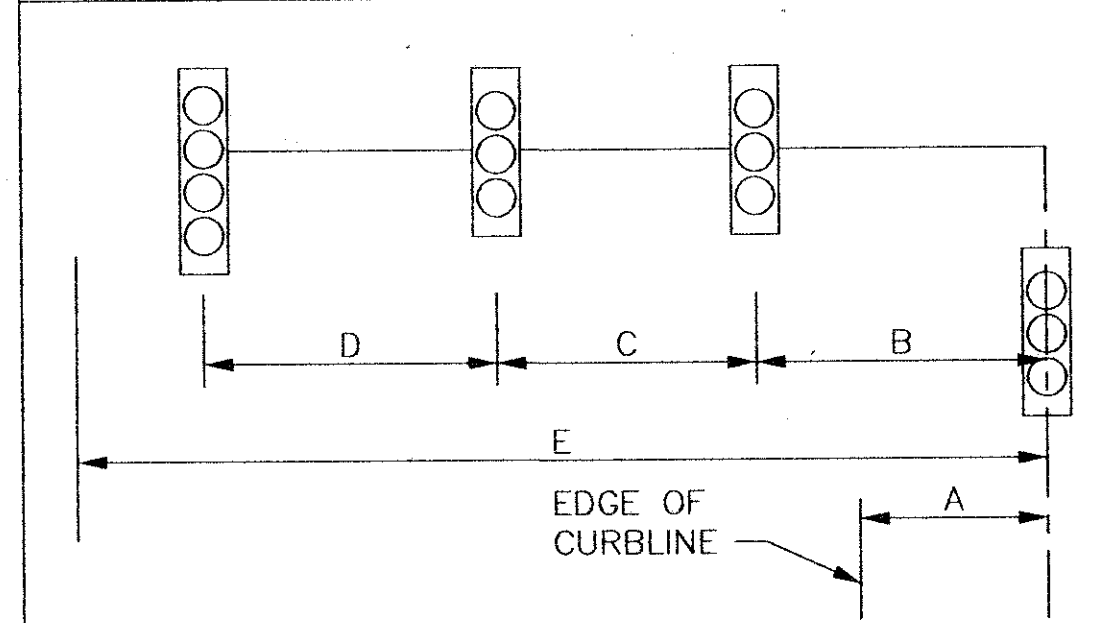
TYPE	EA
A	8
C	1

**CABLE SUMMARY**

SIGNAL POLE/MA	5 CNDR. CABLE	7 CNDR. CABLE	3 CNDR. CABLE
POLE T-1	115	80	55
POLE T-2	90	0	40
POLE T-3	115	80	55
POLE T-4	40	50	40
TOTALS	360	210	190



**SIGNAL HEAD AND POLE PLACEMENT**

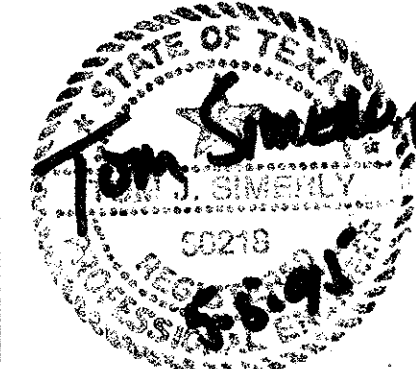
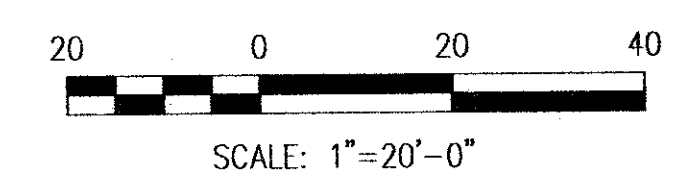


POLE NUMBER	A	B	C	D	E
T-1	16	27	12	16	55
T-2	6	12	12	-	24
T-3	17	28	12	15	55
T-4	6	12	-	12	24

**CONDUIT RUNS**

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE					LENGTH OF RUN	FINAL
		#6 XHHW WIRE	#6 BARE WIRE	#18 AWG SHLD. PR.	3 CNDR. CABLE	7 CNDR. CABLE		
A	2-3" PVC (Trenched)	1	14	4		4	15	
B	3" PVC (Bored)	1	6	1		1	50	
C	3" PVC (Bored)	1	4	1		1	65	
D	2" PVC (Trenched)	2	1				20	
E	3" PVC (Trenched)	1	1	1		1	75	
F	2" PVC (Trenched)	1		1		1	15	
G	3" PVC (Bored) EMPTY						65	
H	2" PVC (Trenched)		1				15	
I	2" PVC (Trenched)	1	1	1		1	20	
J	3" PVC (Bored)	1	1	1		1	50	
K	3" PVC (Bored)	1	2	1		1	15	
L	2" PVC (Trenched) EMPTY						100	
M	3" PVC (Trenched)	1	3	1		1	75	
N	2" PVC (Trenched)	1		1		1	15	
O	3" PVC (Bored)	1	7	2		2	85	
P	2" PVC (Trenched)	1		1		1	25	

- NOTES:**
1. INSTALL LANE DESIGNATION MARKINGS, STOP BARS, CROSSWALKS, AND BUTTONS AT LOCATIONS INDICATED.
  2. THE CONTRACTOR SHALL CONTACT UTILITY COMPANYS TO FIELD VERIFY ALL UTILITY LOCATIONS.
  3. THE CONTRACTOR SHALL PROBE BEFORE DRILLING FOUNDATION SHAFTS.
  4. PED PUSHBUTTONS SHALL BE 2" ADA APPROVED.
  5. CONTROLLER CABINET DOOR SHALL FACE AWAY FROM THE INTERSECTION FOR VISIBILITY.



DATE	REVISION	BY

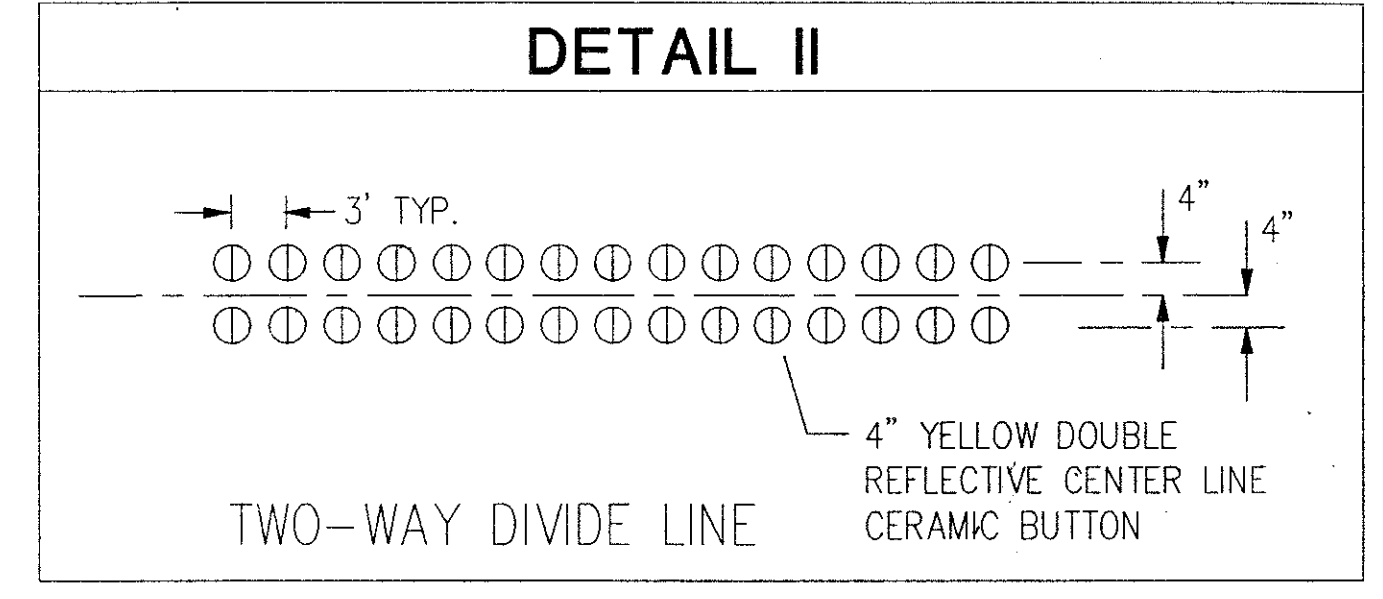
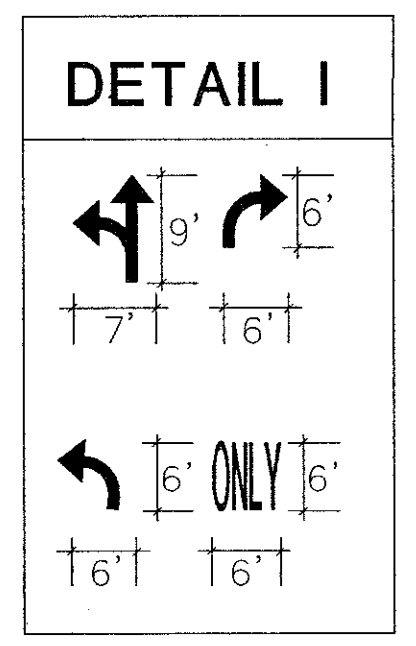
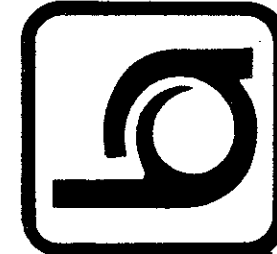
TOWN OF ADDISON  
DALLAS COUNTY, TEXAS

**SIGNAL LAYOUT PLANS**  
**MARSH LANE AT REALTY ROAD**

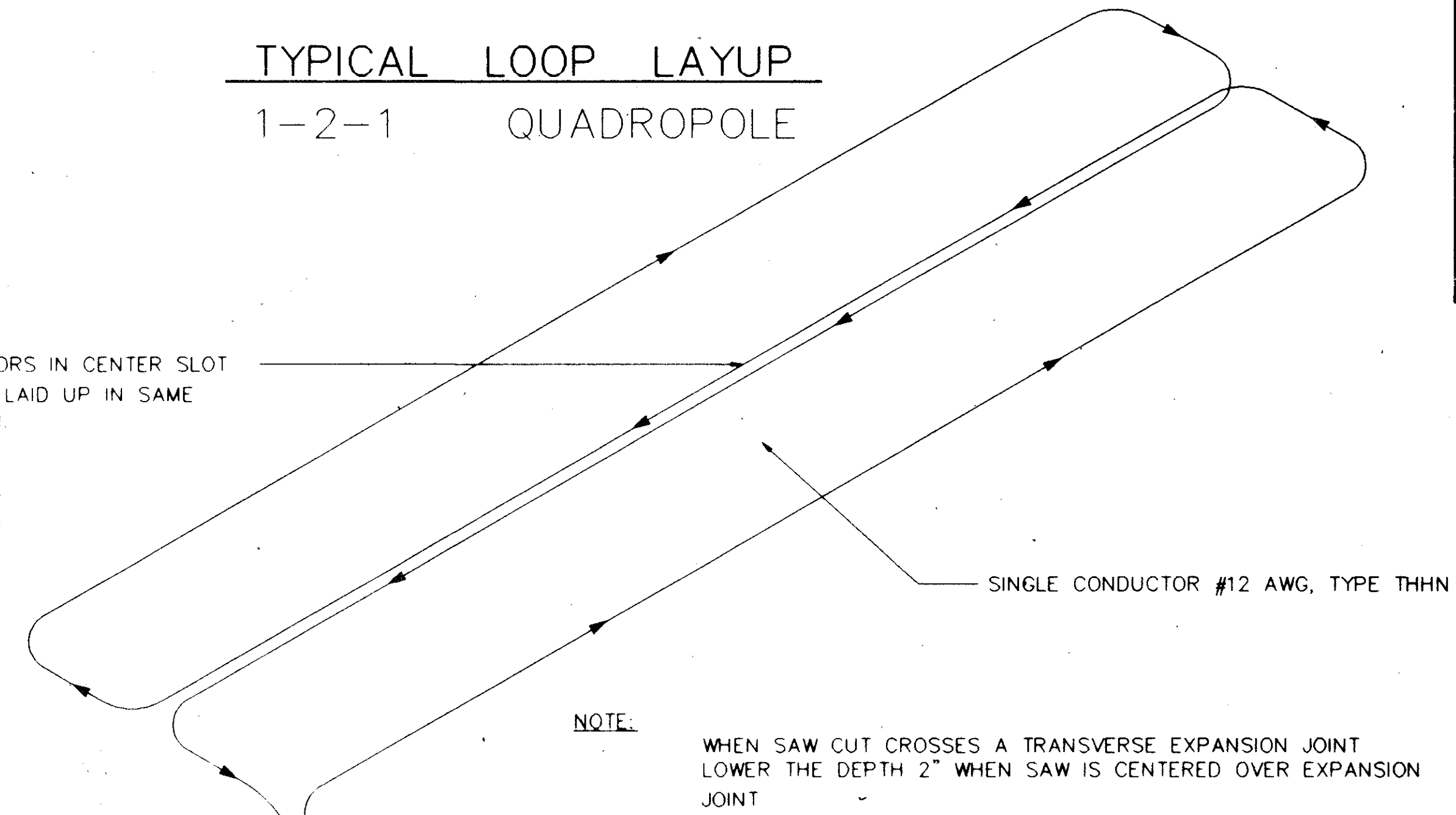
PROJECT NO. 654003.01000  
BARTON-ASCHMAN ASSOCIATES INC.  
ENGINEERS - DALLAS, TEXAS

DESIGNED DNC DRAWN NEH DATE 04/24/95 FILE MARSHREL.DWG  
APPROVED TJS CHECKED TJS SCALE 1"=20' SHEET 2 OF 9



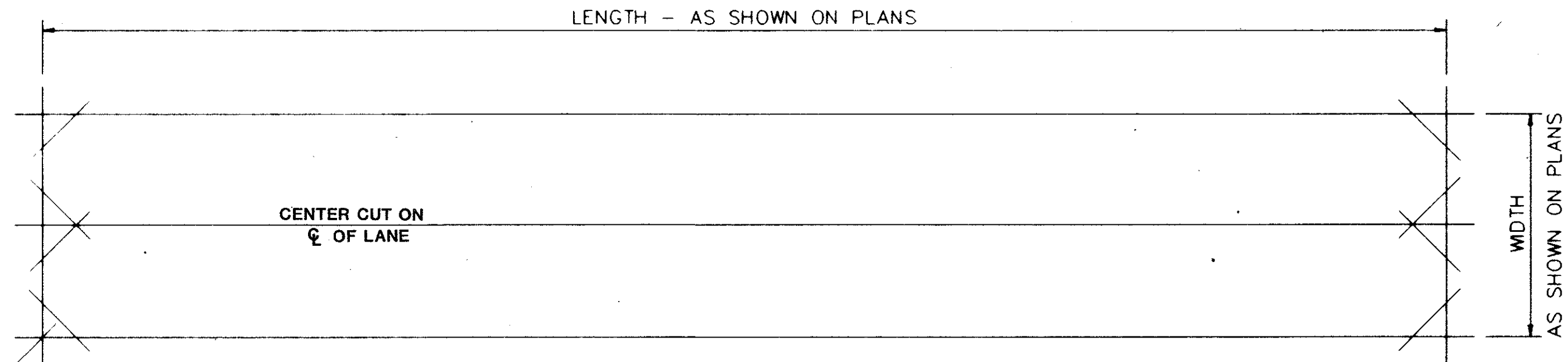
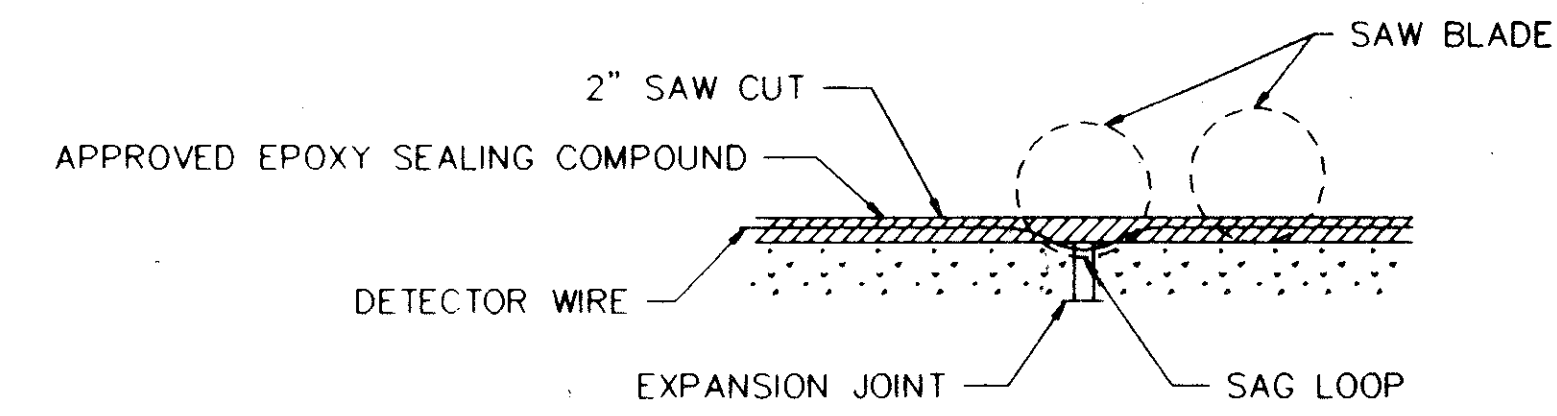


**TYPICAL LOOP LAYOUT**  
1-2-1 QUADROPOLE

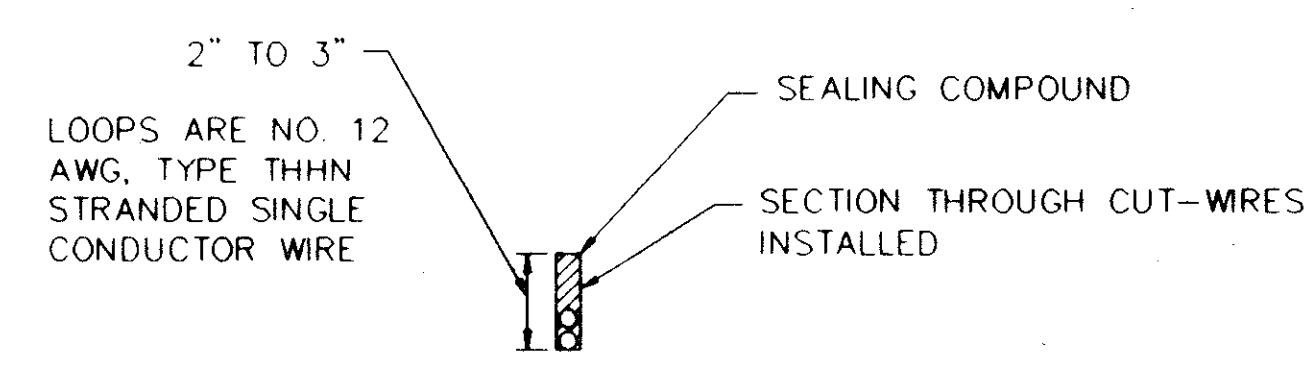


**NOTE:** WHEN SAW CUT CROSSES A TRANSVERSE EXPANSION JOINT LOWER THE DEPTH 2" WHEN SAW IS CENTERED OVER EXPANSION JOINT

WIRES TWISTED IN LEAD RUN CUT AT LEAST, 2 TURNS PER FOOT



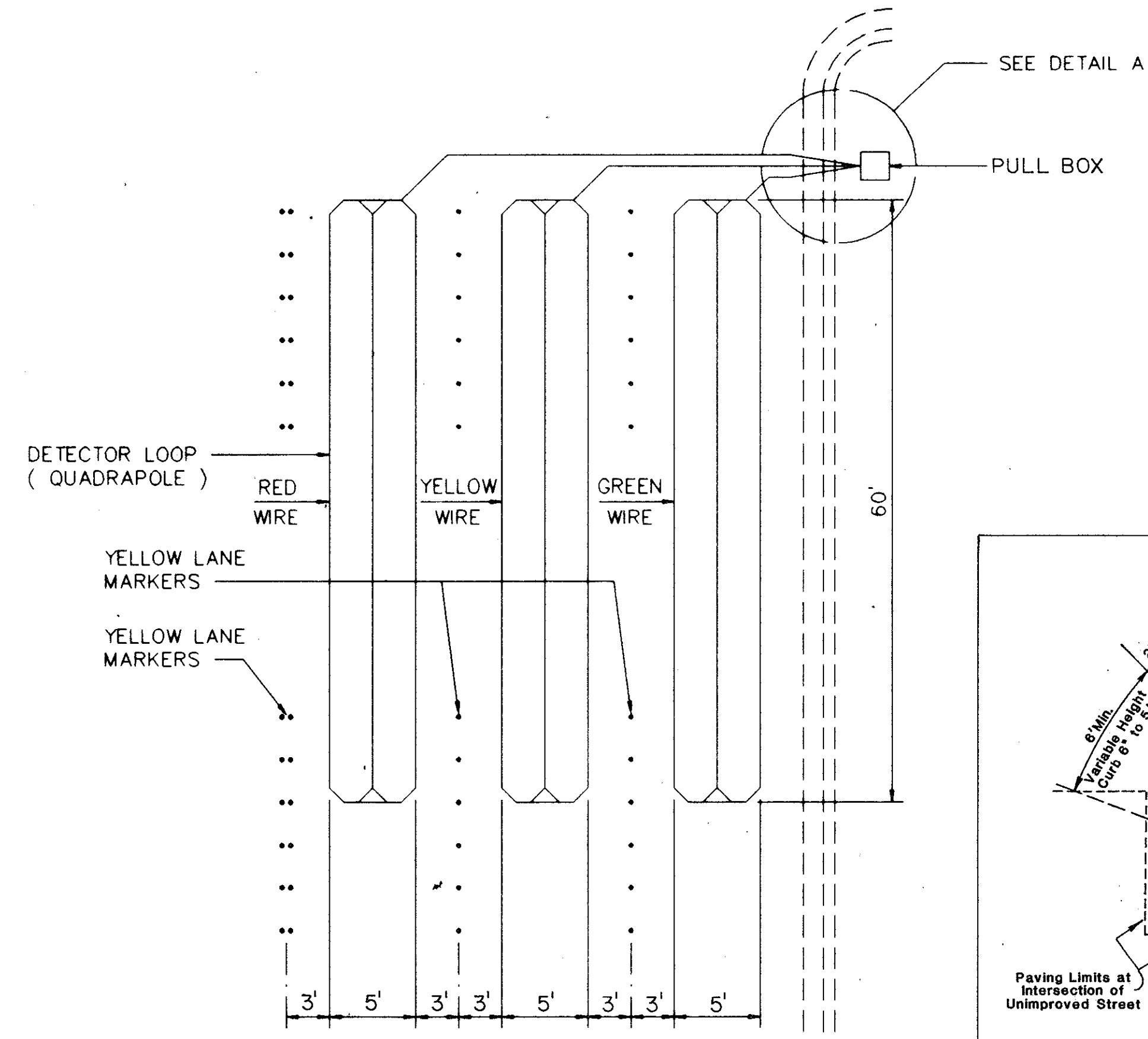
**PLAN**  
**SAW - CUT PATTERN FOR DETECTOR LOOPS**



ENTRY ANGLE FOR LEAD RUN VARIES

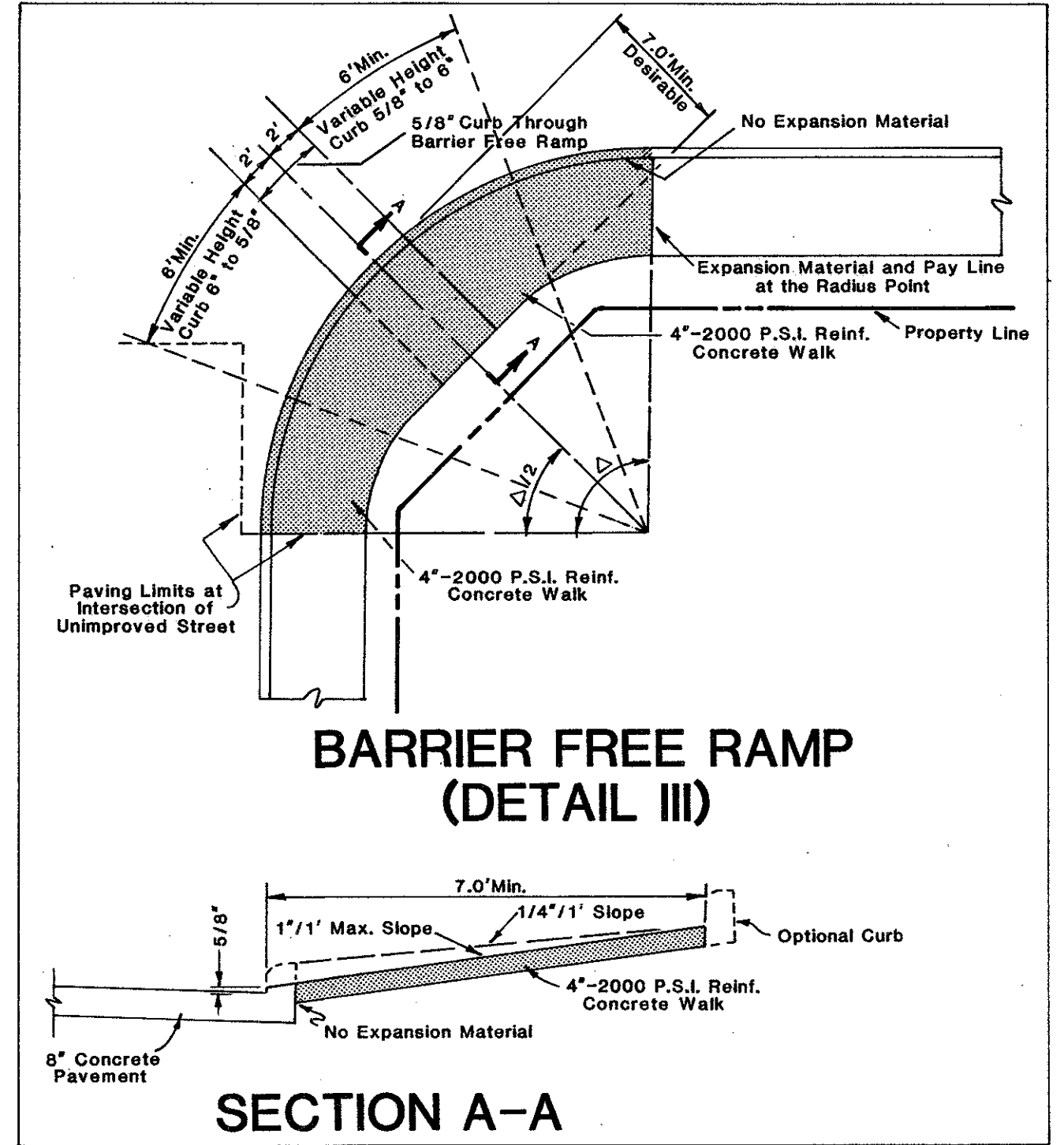
CUT FOR LEAD RUN TO PULL BOX AT CURB

1. INSTALLATION OF WIRE LOOPS IS TO BE MADE IN THE SHORTEST TIME PRACTICAL, NOT TO EXCEED A 4 HR. MAX. AND SCHEDULED DURING OFF PEAK HOURS TO MINIMIZE DELAY TO VEHICLE TRAFFIC.
2. THE PAVEMENT CUT IS TO BE CUT WITH A CONCRETE SAW TO NEAT LINES AND LOOSE MATERIAL REMOVED. THE CUT SHOULD BE CLEAN AND DRY WHEN THE SEALING COMPOUND IS PLACED.
3. THE LEAD-IN WIRES ARE TO BE TWISTED A MINIMUM OF TWO TURNS PER FOOT AND REMAIN UNDISTURBED AFTER THE LOOP HAS BEEN TUNED.
4. EACH LOOP IS TO BE RETURNED TO CONTROLLER VIA ONE PAIR OF UNSPLICED SHIELDED LEAD-IN WIRES. MULTIPLE, TWISTED LEADS TO MORE THAN ONE LOOP IN SINGLE LEAD RUN SAW SLOT ARE NOT PERMISSIBLE.
5. ALL LOOPS TO PENETRATE CURB IN A SEPERATE CONDUIT

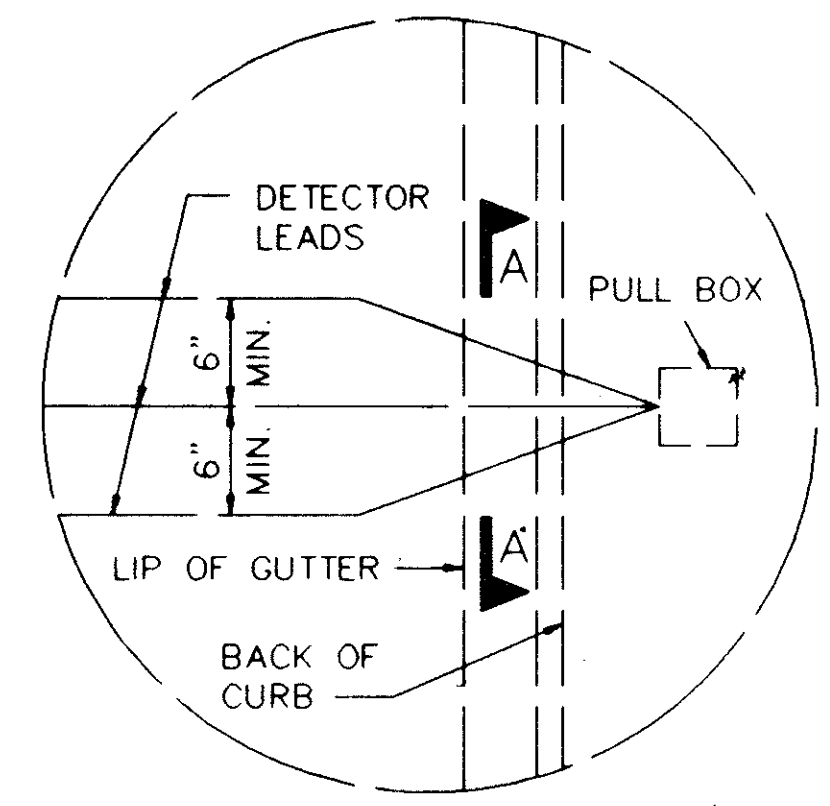


- NOTES:**
1. CONTRACTOR TO PROVIDE INDIVIDUAL SAWED CHANNELS THRU CURB & GUTTER FOR EACH WIRE LOOP.
  2. SPLICE IN PULL BOX'S SHALL BE SOLDERED AND WEATHER SEALED.

**PLAN**

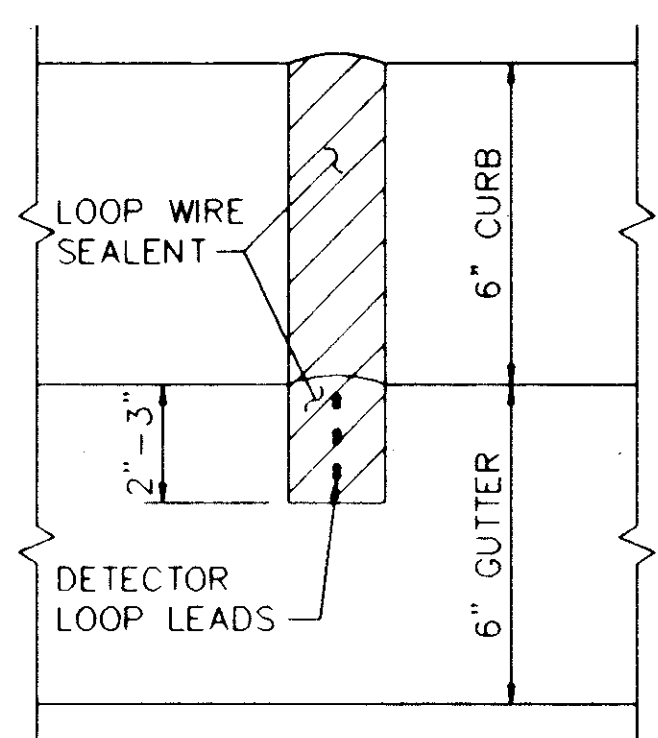


**SECTION A-A**

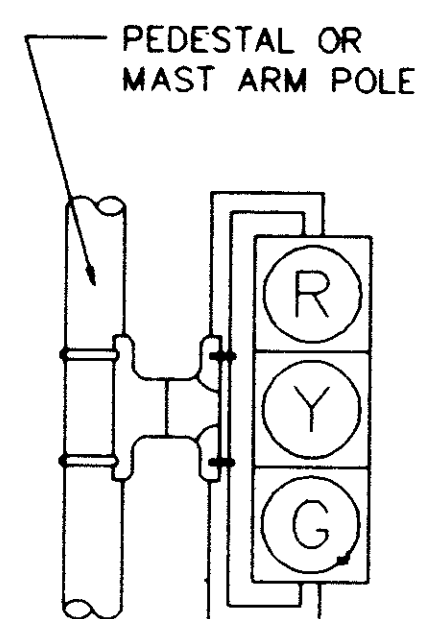


**DETAIL A**

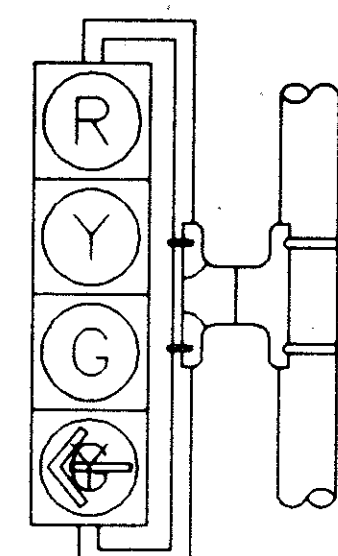
**VEHICLE LOOP DETECTOR LAYOUT**



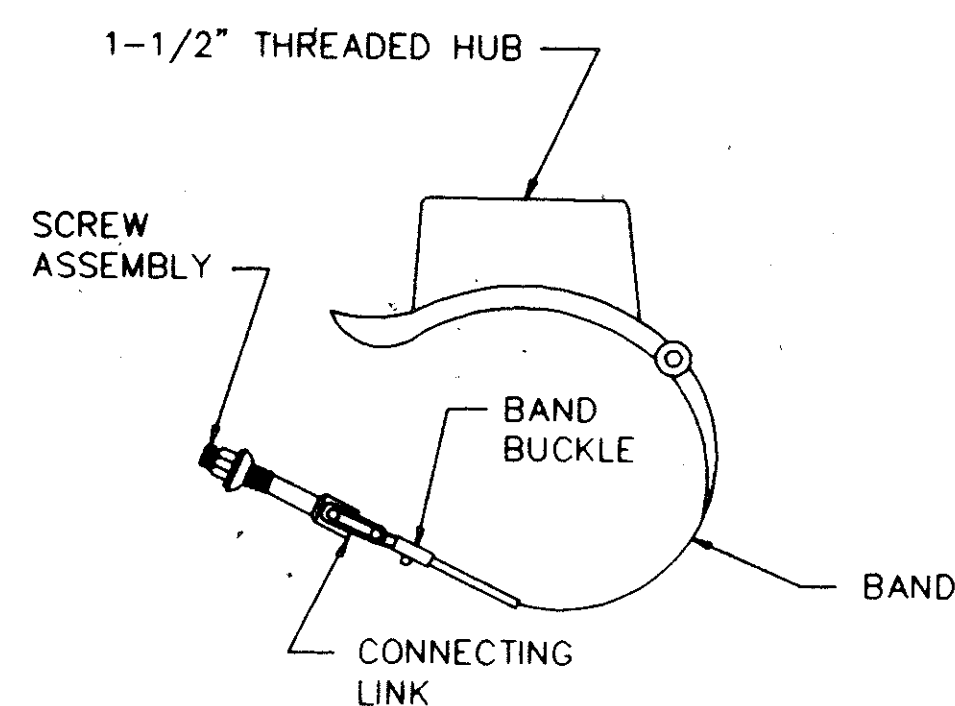
**SECTION A-A**



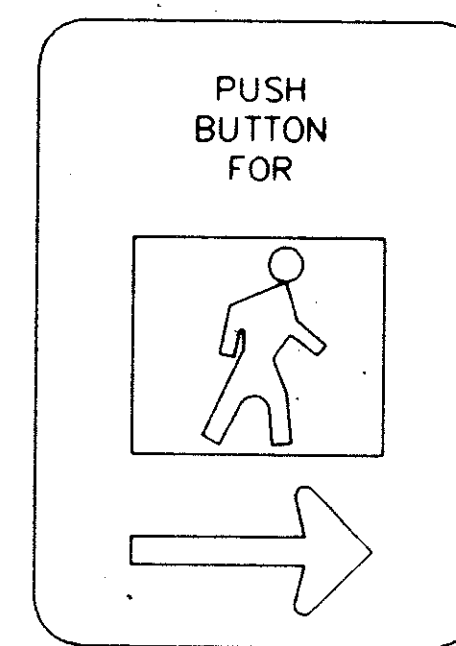
V3



V4LT (RT)

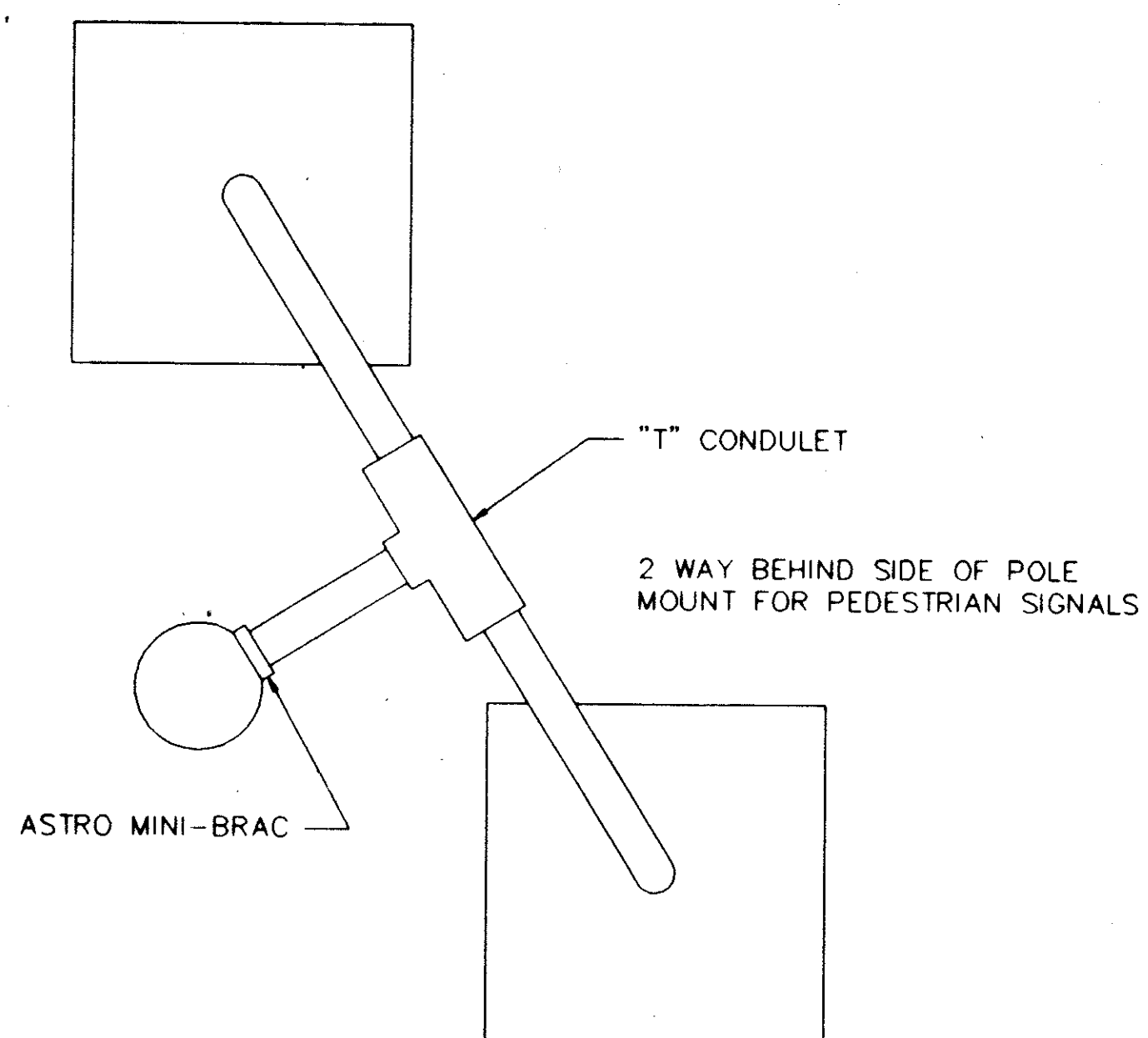


ASTRO MINI-BRAC



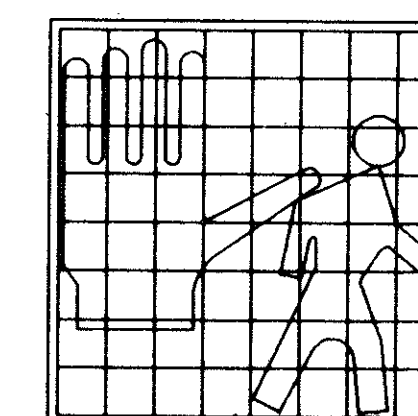
SIGN R10-4b  
9" x 12"

PEDESTRIAN PUSH BUTTON  
SIGN DETAILS



UPPER & LOWER ARMS  
IDENTICAL

PEDESTRIAN SIGNAL HEAD MOUNTING  
FOR TWO PEDESTRIAN SIGNAL HEADS



PEDESTRIAN SIGNAL HEAD IDENTIFICATION

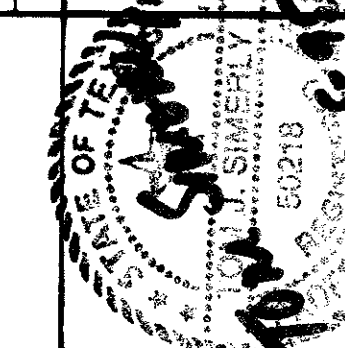
NOTES :

1. ALL SIGNAL HEAD LENSES SHALL BE 12" IN DIAMETER.
2. VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH "ASTRO-BRACS" AND APPROPRIATE TUBING, PAINTED BLACK. ALL SIGNALS TO BE BLACK, ALL LENSES TO BE GLASS.
3. ALL VISORS SHALL BE TUNNEL VISORS.
4. ALL POLE MOUNTED VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
5. ALL SIGNAL HEADS WILL BE PROVIDED WITH BLACK 5" POLYCARBONATE VACUUM FORMED BACKPLATES.
6. ALL WIRING FOR VEHICLE AND PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
7. ALL DAMPING DEVICES SHALL BE 18" TO 2' WIDE BY 4' IN LENGTH.
8. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ON THIS SHEET.
9. SYMBOLIZED MESSAGE HEIGHT SHALL BE 10 INCHES MINIMUM.
10. PROVIDE DURO TEST 135 WATT SAVER LAMPS IN VEHICLE SIGNALS.
11. PROVIDE DURO TEST 60 WATT SAVER LAMPS IN PEDESTRIAN SIGNALS.

No.	Date	Revisions	App.



Barton-Aschman  
Associates, Inc.

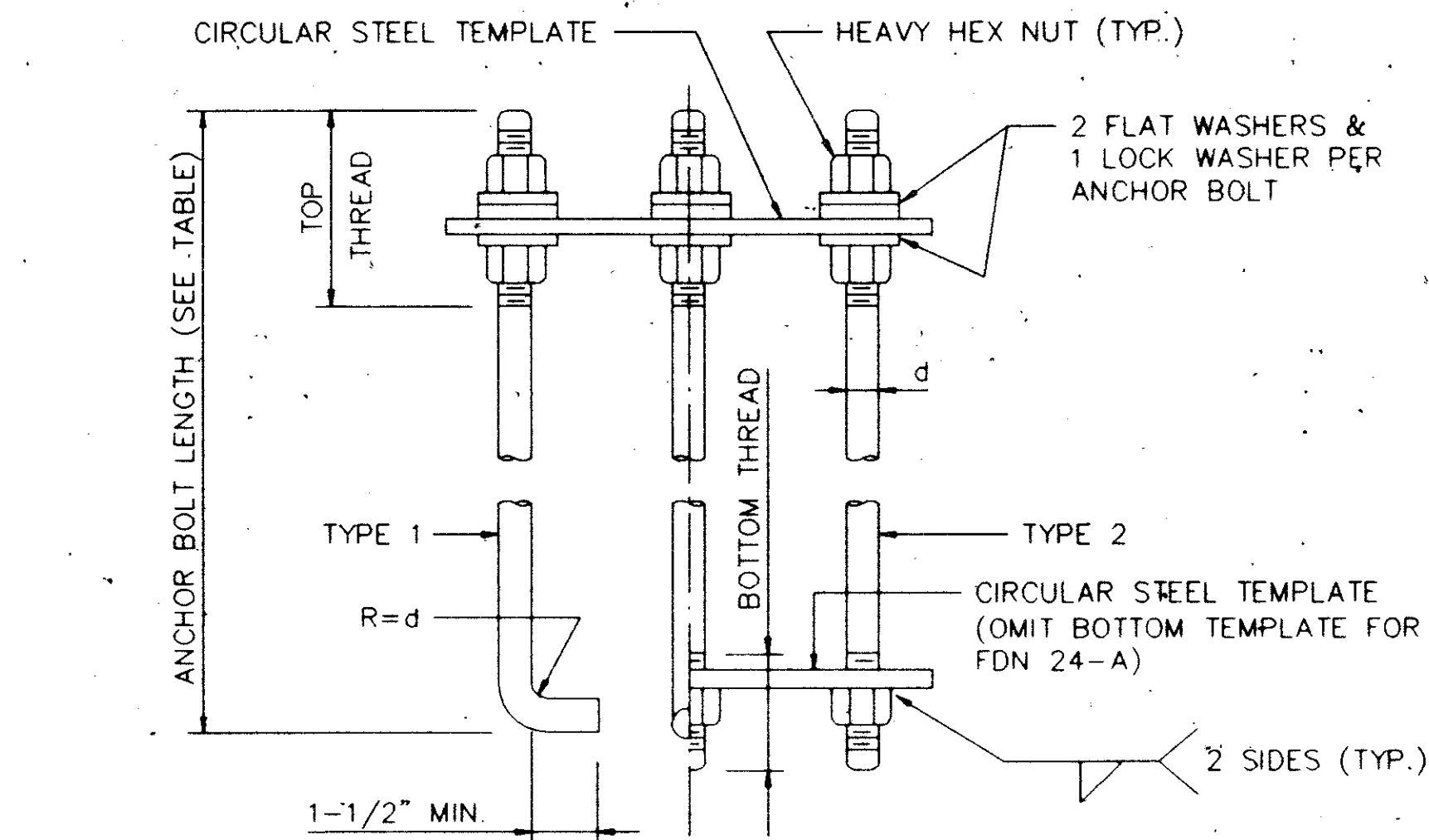
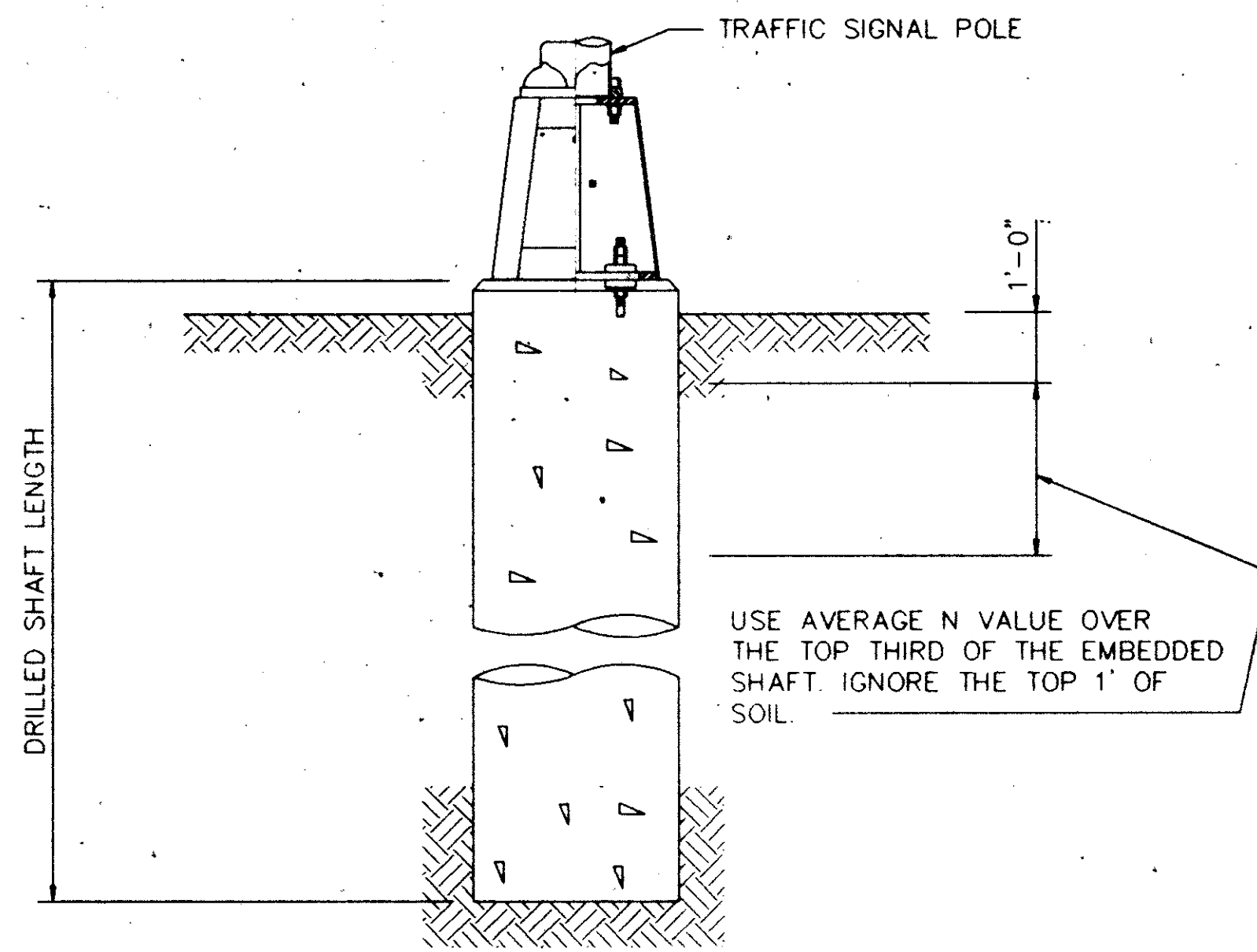


TRAFFIC SIGNAL HEAD IDENTIFICATION

Scale: V-  
Designed by:  
Drawn by:  
Checked by: TJS  
Approved by: TJS  
Project No. 664003.01000  
Date: 6/6/95

SHEET  
4

OF  
9



HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

**ANCHOR BOLT ASSEMBLY**

ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIAMETER	BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	-	12-3/4"	7-1/8"	5-5/8"
1-1/2"	3'-4"	6"	2"	17"	10"	7"
1-3/4"	3'-10"	7"	2-1/4"	19"	11-1/8"	7-3/4"
2"	4'-3"	8"	2-1/2"	21"	12-1/2"	8-1/2"

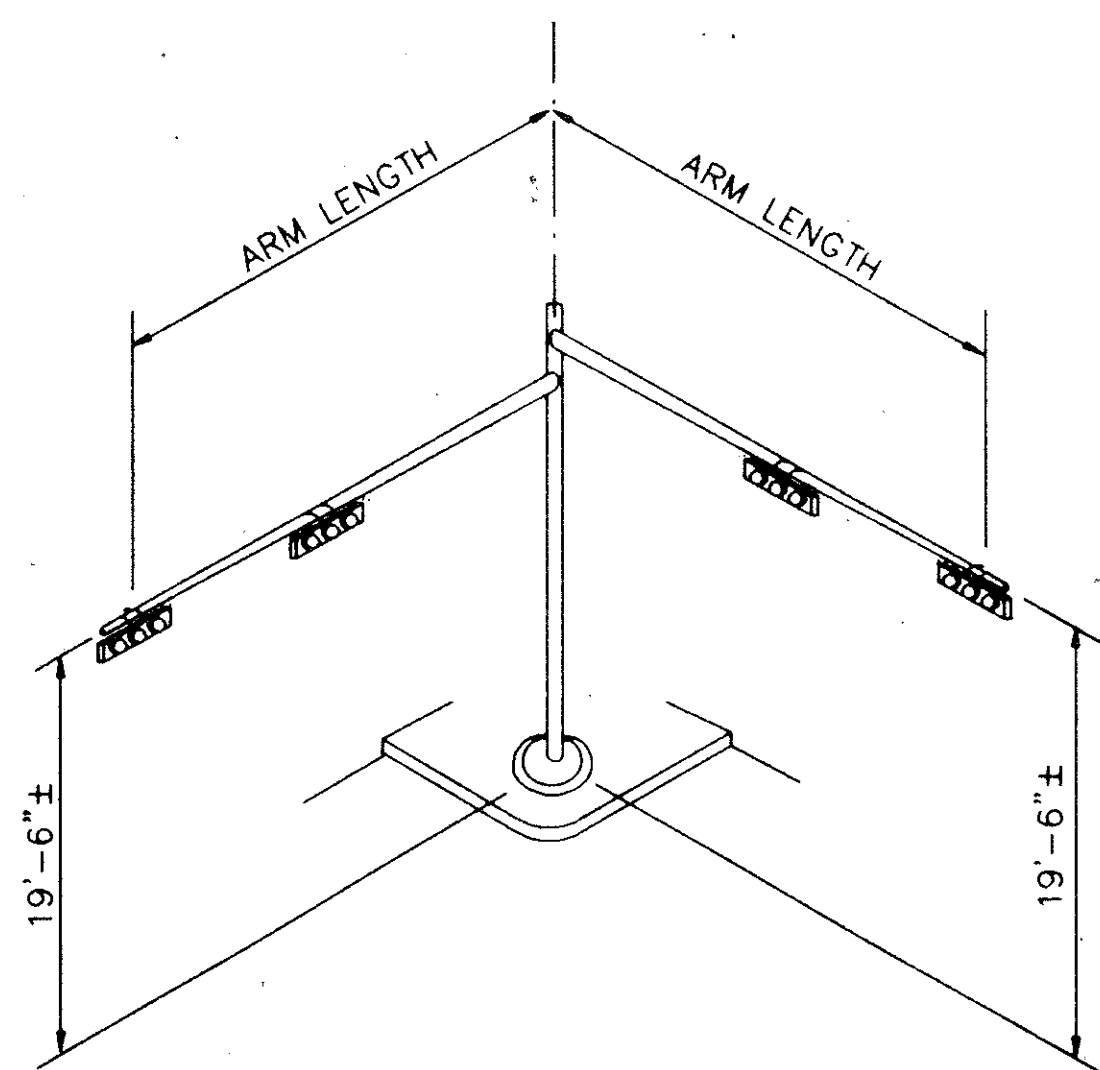
\* MINIMUM DIMENSIONS GIVEN, LONGER BOLTS ARE ACCEPTABLE.

**INSTALLATION PROCEDURE :**

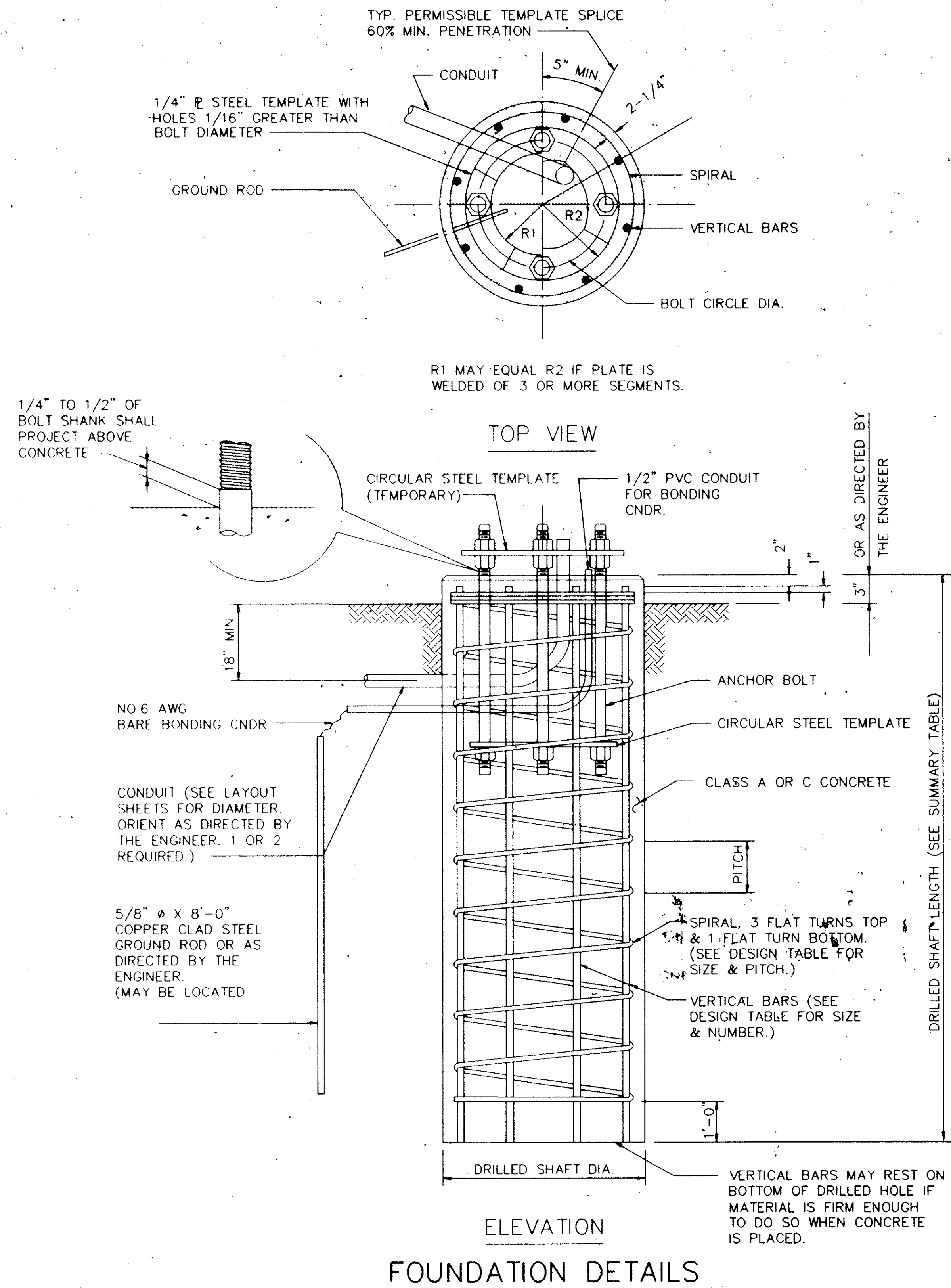
THREADS OF ANCHOR BOLTS SHALL BE COATED WITH PIPE JOINT COMPOUND PRIOR TO INSTALLATION OF UPPER NUTS WHEN ERECTING POLE. AFTER POLE IS PLUMBED AND IN PERMANENT ALIGNMENT, THE EXPOSED THREADS OF PAINTED BOLTS SHALL BE CLEANED AND AN ADDITIONAL COATING OF ZINC-RICH PAINT APPLIED TO SEAL THE BOLT THREAD-NUT JOINT.

**NOTES :**

- (1) ANCHOR BOLT DESIGN DEVELOPS THE FOUNDATION CAPACITY GIVEN UNDER FOUNDATION DESIGN LOADS.
- (2) FOUNDATION DESIGN LOADS ARE THE ALLOWABLE MOMENTS AND SHEARS AT THE BASE OF THE STRUCTURE.
- (3) FOUNDATIONS MAY BE LISTED SEPARATELY OR GROUPED ACCORDING TO SIMILARITY OF LOCATION AND TYPE. QUANTITIES ARE FOR THE CONTRACTOR'S INFORMATION ONLY.
- (4) FIELD PENETROMETER READINGS AT A DEPTH OF APPROXIMATELY 3 TO 5 FEET MAY BE USED TO ADJUST SHAFT LENGTHS.
- (5) IF ROCK IS ENCOUNTERED, THE DRILLED SHAFT SHALL EXTEND A MINIMUM OF TWO DIAMETERS INTO SOLID ROCK.
- (6) DECIMAL LENGTHS IN DESIGN TABLE ARE TO ALLOW INTERPOLATION FOR OTHER PENETROMETER VALUES. ROUND TO NEAREST FOOT FOR ENTRY INTO SUMMARY TABLE.



**TYPICAL MAST ARM ASSEMBLY**



App. \_\_\_\_\_

Revisions \_\_\_\_\_

No. \_\_\_\_\_ Date \_\_\_\_\_

**Barton-Aschman Associates, Inc.**

**TRAFFIC SIGNAL POLE FOUNDATIONS**

Date: 6/6/95

Scale: V - \_\_\_\_\_

Designed by: \_\_\_\_\_

Drawn by: \_\_\_\_\_

Checked by: TJS

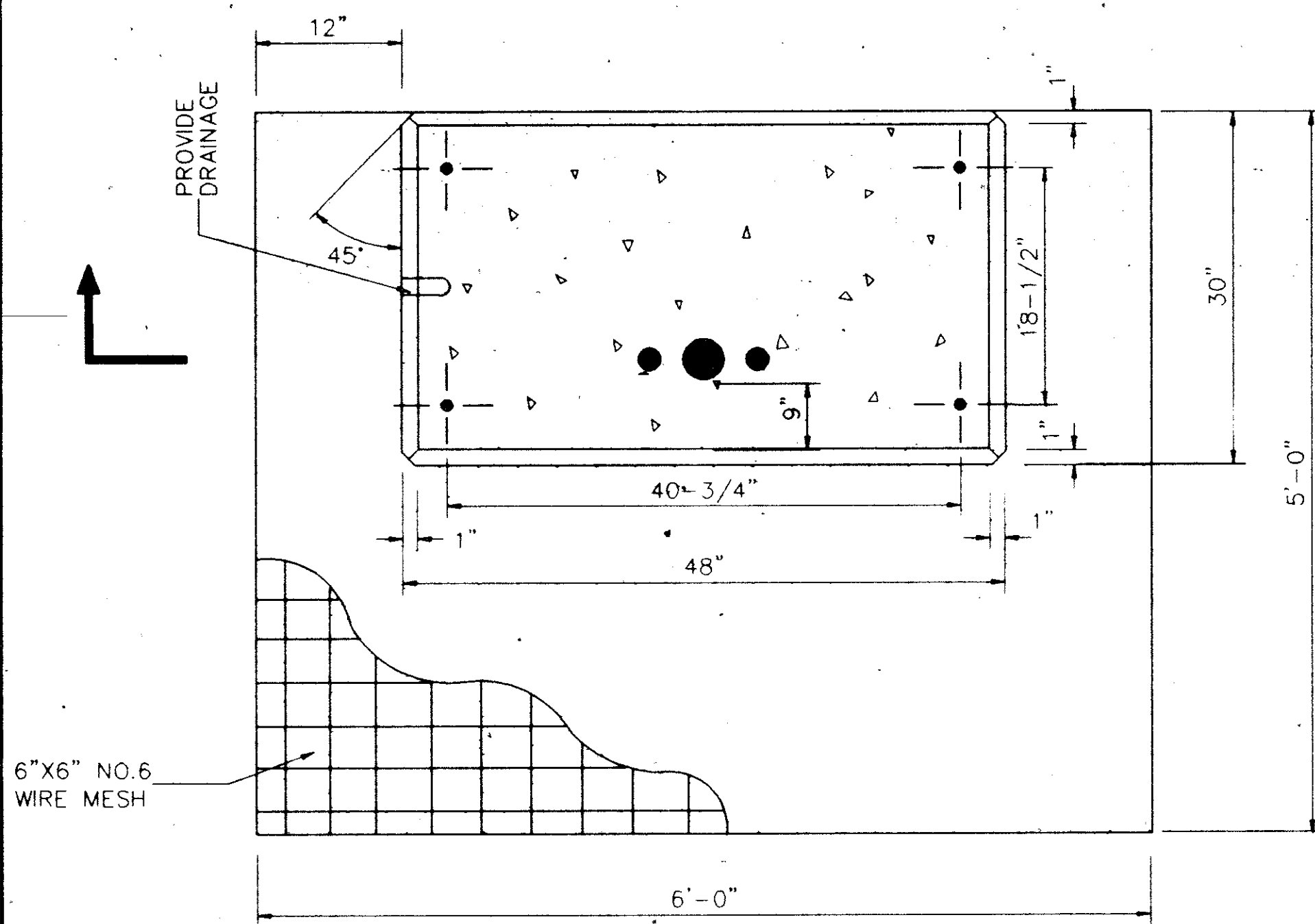
Approved by: TJS

Project No. 664003.01000

SHEET 5

OF 9

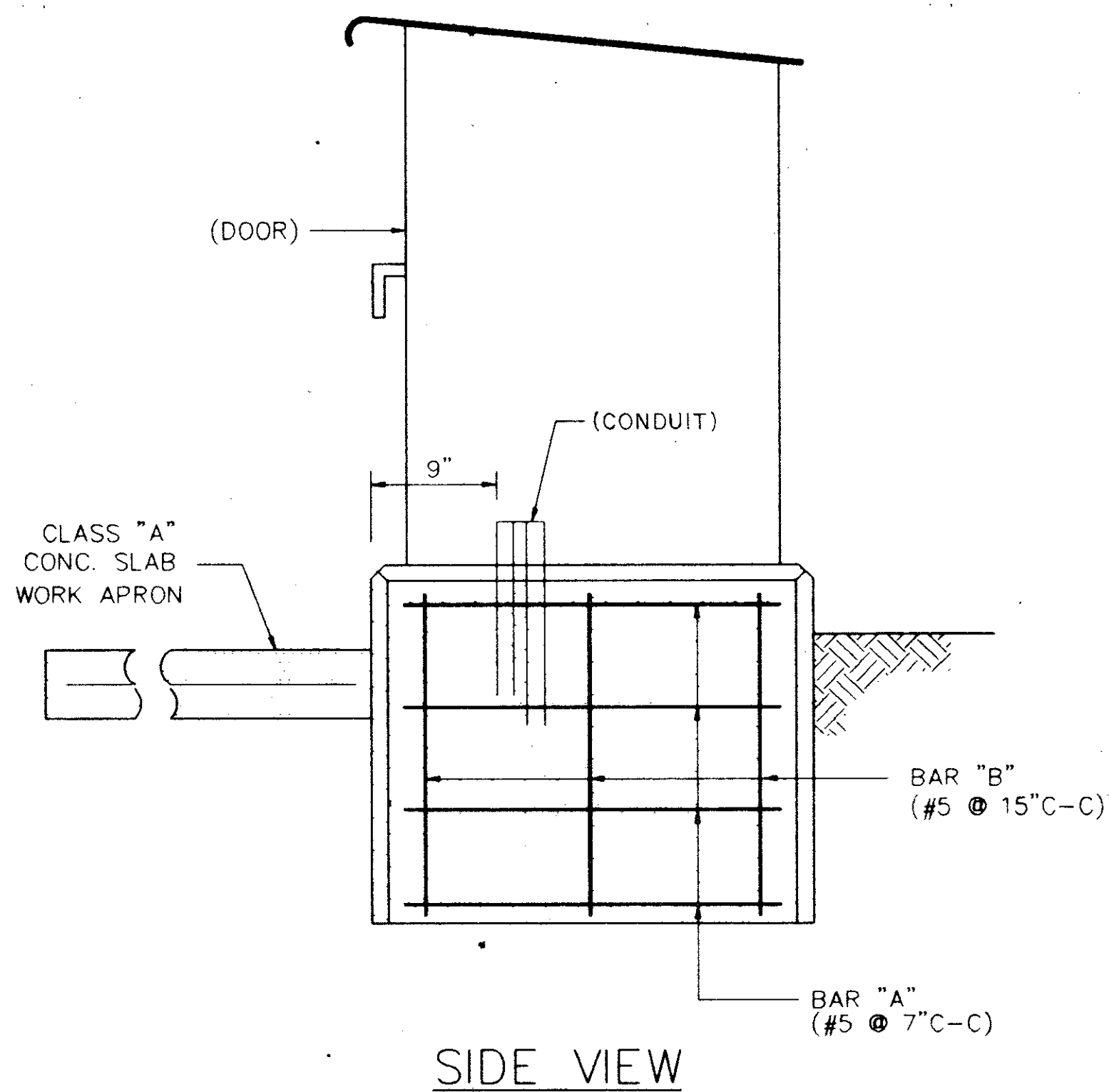




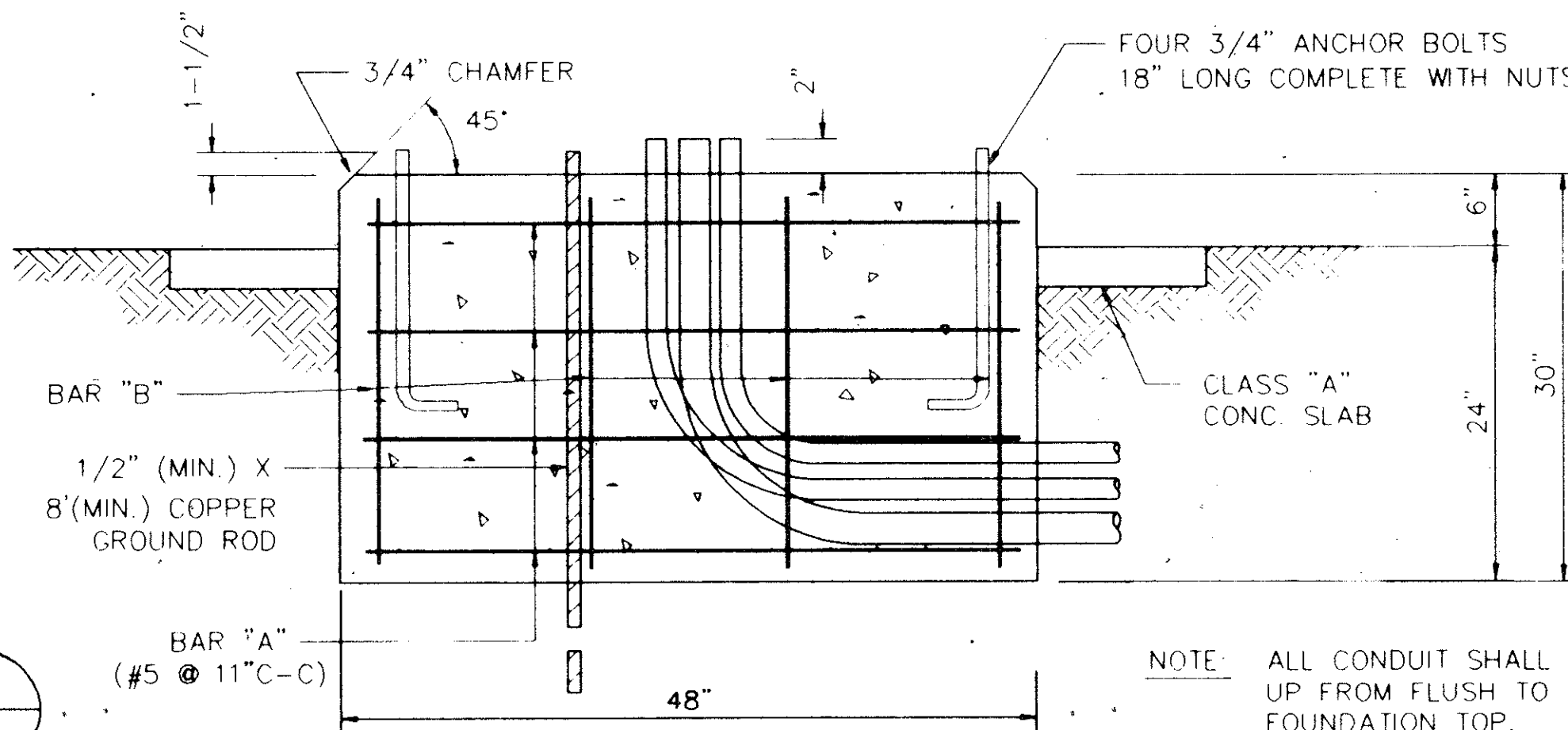
TOP VIEW

CONTROLLER FOUNDATION

DETAIL 1



SIDE VIEW



ELEVATION

SECTION A

NOTE: ALL CONDUIT SHALL BE STUBBED UP FROM FLUSH TO 2" MAX. ABOVE FOUNDATION TOP.

LOCATION / IDENTIFICATION	AVG. N blows/ft	FDN TYPE	NO. (ea.)	DRILLED SHAFT LENGTH (FEET)			
				24-A	30-A	30-B	36-A
				POLE T-1	-	-	-
POLE T-2	-	-	-		11'		
POLE T-3	-	-	-				15'
POLE T-4	-	-	-		11'		
TOTAL DRILLED SHAFT LENGTHS						44'	

FOUNDATION DESIGN TABLE

FDN. TYPE	DRILLED SHAFT DIA.	REINFORCING STEEL		DRILLED SHAFT LENGTH - feet			ANCHOR BOLT DESIGN				FOUNDATION DESIGN LOAD		TYPICAL APPLICATION
		VERT. BARS	SPIRAL & PITCH	TEXAS CONE	PENETROMETER, N	blows/ft	ANCHOR BOLT DIA.	Fy (ksi)	BOLT CIRCLE DIA.	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
24-A	24"	4-#5	#2at12"	5.7	5.3	4.5	3/4"	36	12-3/4"	1	10	1	PEDESTAL POLE, PEDESTAL MOUNTED CONTROLLER.
30-A	30"	8-#7	#3at9"	11.3	10.3	8.0	1-1/2"	55	17"	2	87	3	MAST ARM ASSEMBLY (SEE SELECTION TABLE)
30-B	30"	8-#9	#3at9"	13.2	11.9	9.0	1-3/4"	55	19"	2	131	5	MAST ARM ASSEMBLY (SEE SELECTION TABLE) 30' STRAIN POLE WITH OR WITHOUT LUMINAIRE.
36-A	36"	12-#9	#3at9"	15.2	13.6	10.4	2"	55	21"	2	190	7	MAST ARM ASSEMBLY (SEE SELECTION TABLE) STRAIN POLE TALLER THAN 30' & STRAIN POLE WITH MAST ARM.

		FDN 30-A	FDN 30-B	FDN 36-A		
80 MPH DESIGN WIND SPEED	MAXIMUM SINGLE ARM LENGTH	36'	48'			
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' x 24'				
		28' x 28'				
		32' x 28'	32' x 32'	36' x 36'		
100 MPH DESIGN WIND SPEED	MAXIMUM SINGLE ARM LENGTH	24'	36'	44'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' x 24'	44' x 28'	44' x 36'		
		28' x 28'				
		32' x 24'	32' x 32'	36' x 36'		
				40' x 36'		
					44' x 36'	

EXAMPLES :

- FOR 80MPH DESIGN WIND SPEED, FOUNDATION 30-A CAN SUPPORT UP TO A 32' ARM WITH ANOTHER ARM UP TO 28'.
- FOR 100MPH DESIGN WIND SPEED, FOUNDATION 30-B CAN SUPPORT A SINGLE 36' MAST ARM.

GENERAL NOTES :

DESIGN CONFORMS TO 1975 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS AND INTERIM REVISIONS THERETO.

CONCRETE SHALL BE CLASS C.  
 THREADS FOR ANCHORE BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS OF UNIFIED NATIONAL COARSE THREAD SERIES EXCEPT FOR A19387 BOLTS WHICH SHALL HAVE 8 PITCH THREAD SERIES. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES. GALVANIZED NUTS SHALL BE TAPPED AFTER GALVANIZING.  
 ANCHOR BOLTS THAT ARE 1" IN DIAMETER OR LESS SHALL CONFORM TO ASTM A36. ANCHOR BOLTS LARGER THAN 1" IN DIAMETER SHALL CONFORM TO SPECIAL SPECIFICATION A36M55 OR ASTM A19387 OR A687; GALVANIZE OR COAT WITH ZINC-RICH PAINT A MINIMUM OF THE UPPER 14 INCHES OF ALL ANCHORE BOLTS UNLESS OTHERWISE NOTED. NUTS FOR ANCHOR BOLTS SHALL CONFORM TO ASTM A563 Gr A OR BETTER HEAVY HEX. EXPOSED NUTS SHALL BE GALVANIZED OR COATED WITH ZINC-RICH PAINT. WASHERS SHALL BE GALVANIZED. TEMPLATES AND EMBEDDED NUTS NEED NOT BE GALVANIZED.

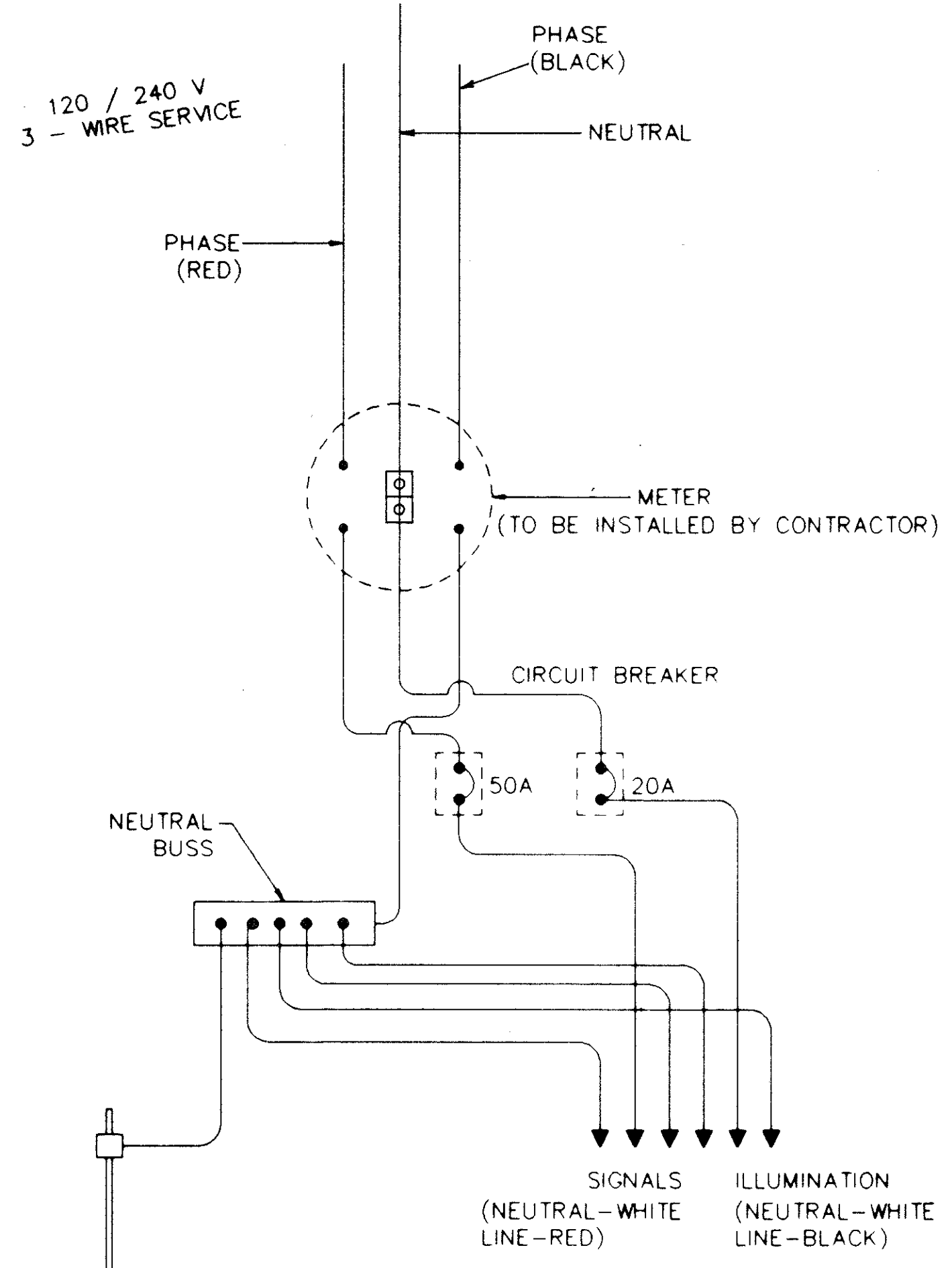
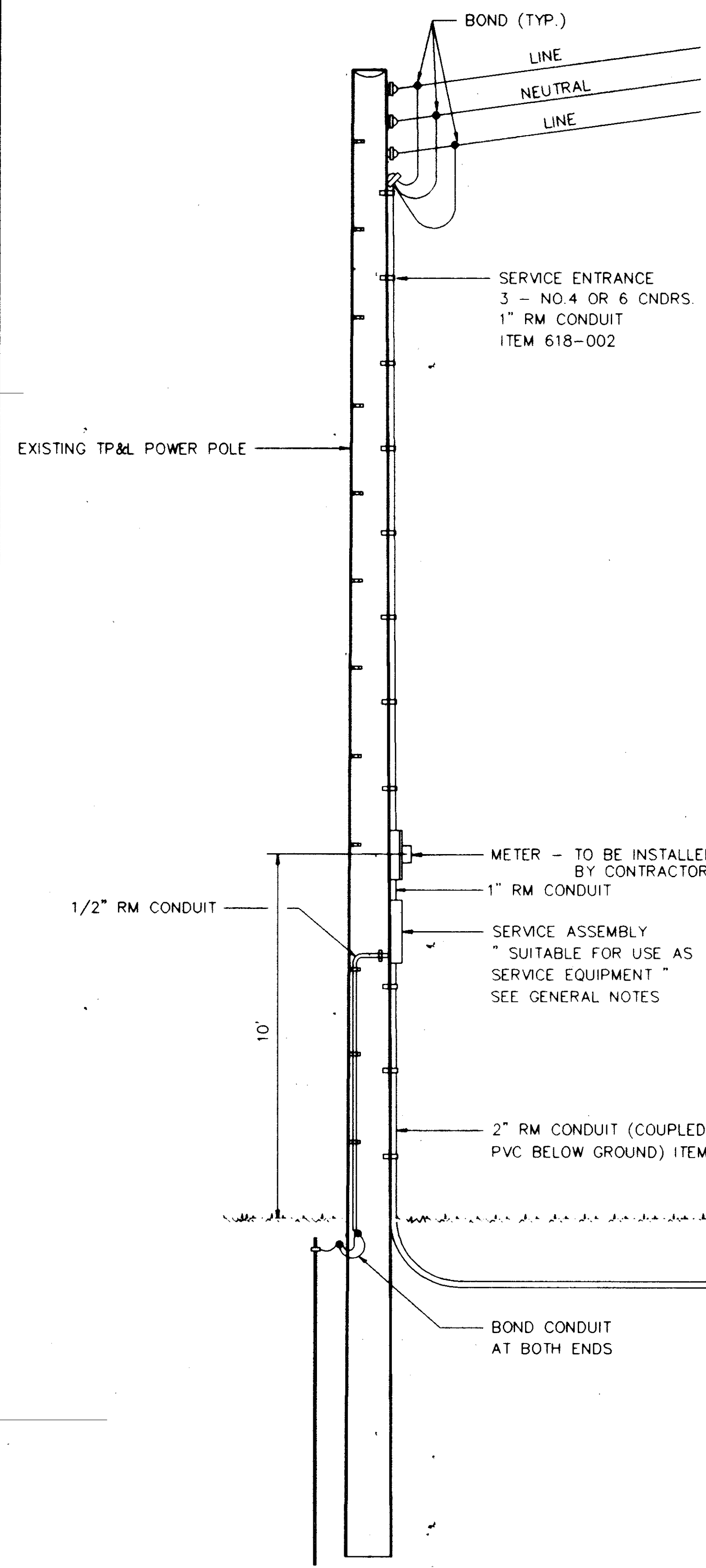
Barton-Aschman Associates, Inc.

FOUNDATION SUMMARY

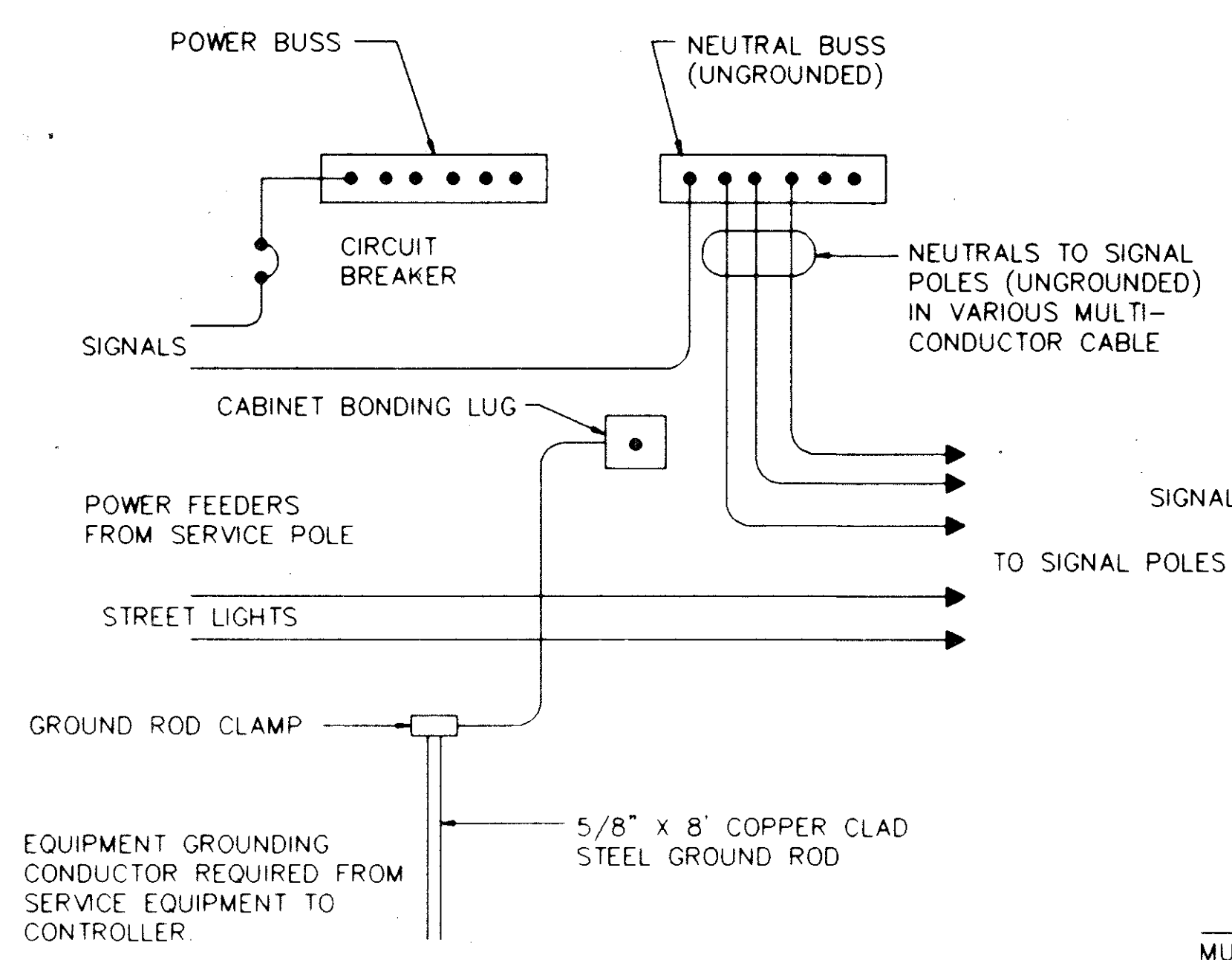
SHEET 6 OF 9

Scale: 1/4" = 1'-0"  
 Date: 5/15/95  
 Designed by:  
 Drawn by:  
 Checked by: TJS  
 Approved by: TJS  
 Project No. 664003.01000

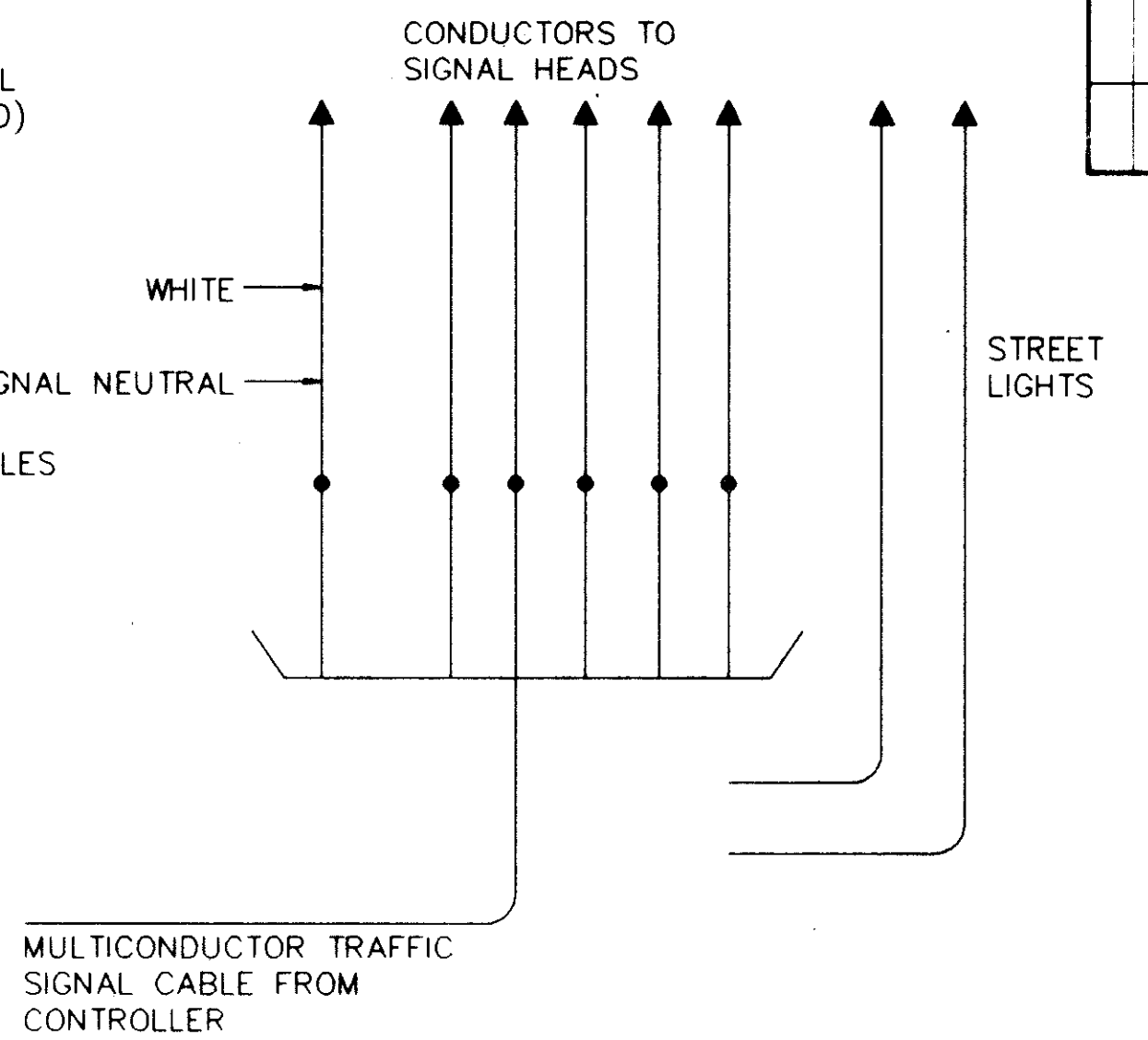




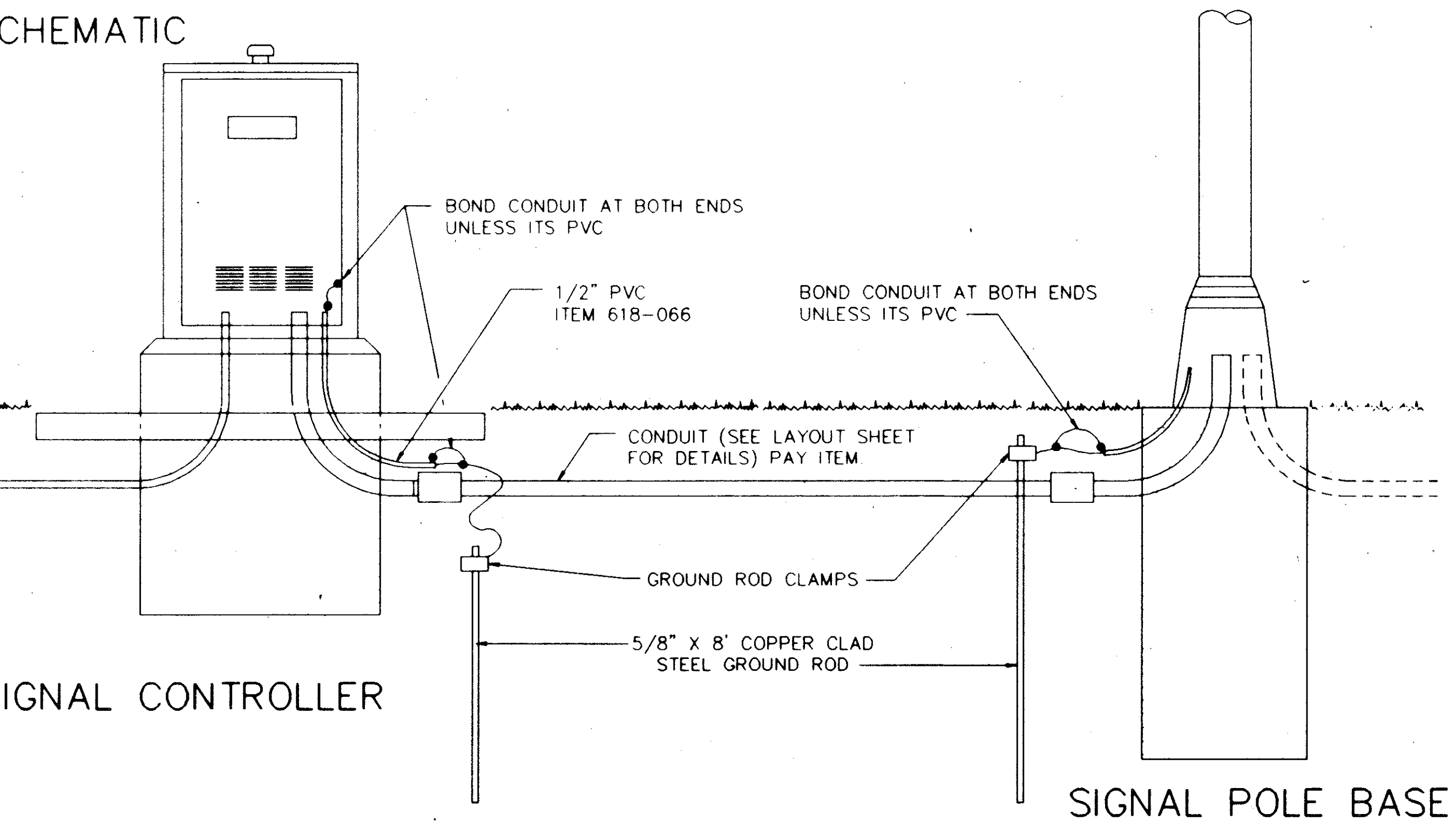
SERVICE ASSEMBLY SCHEMATIC



CONNECTIONS AT SIGNAL CONTROLLERS



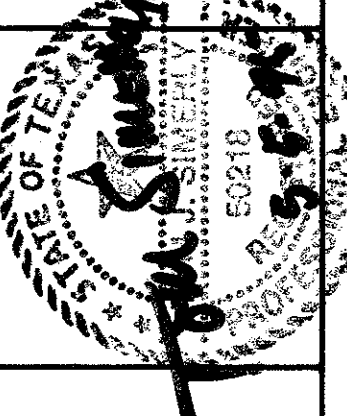
CONNECTIONS AT POLE BASE



SIGNAL CONTROLLER

SIGNAL POLE BASE

No.	Date	Revisions	App.

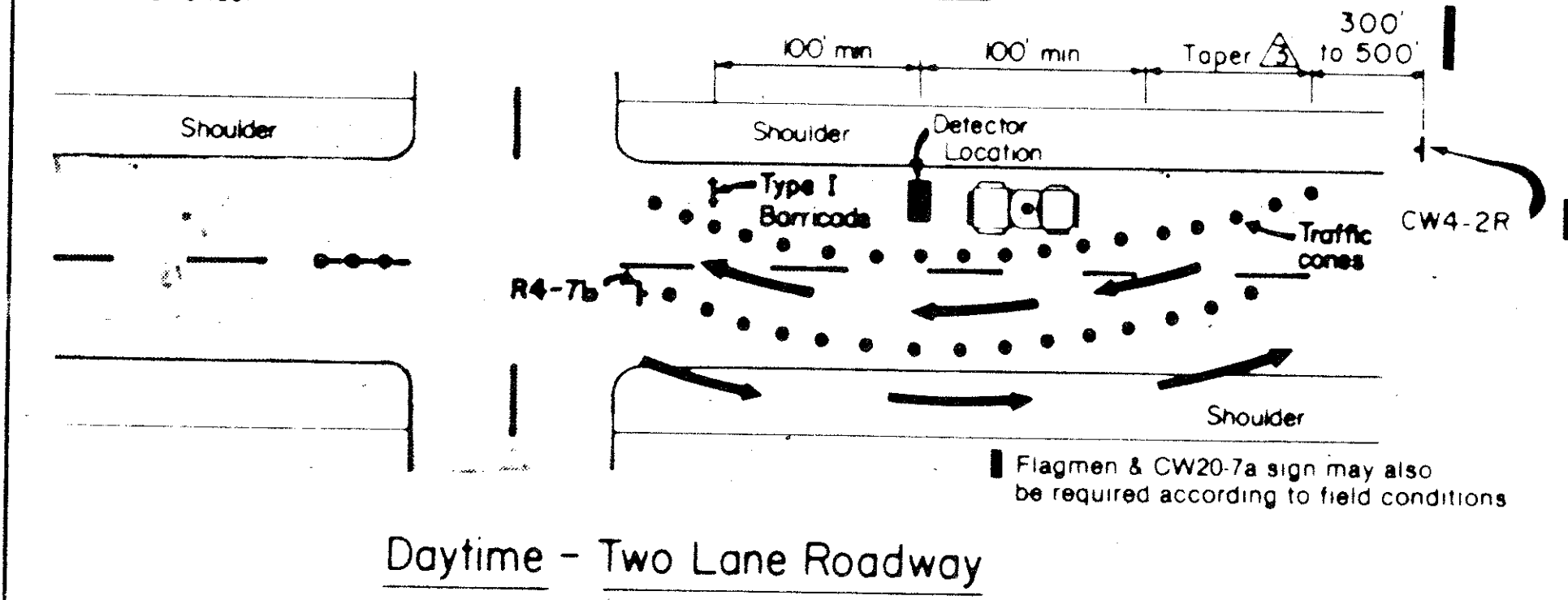
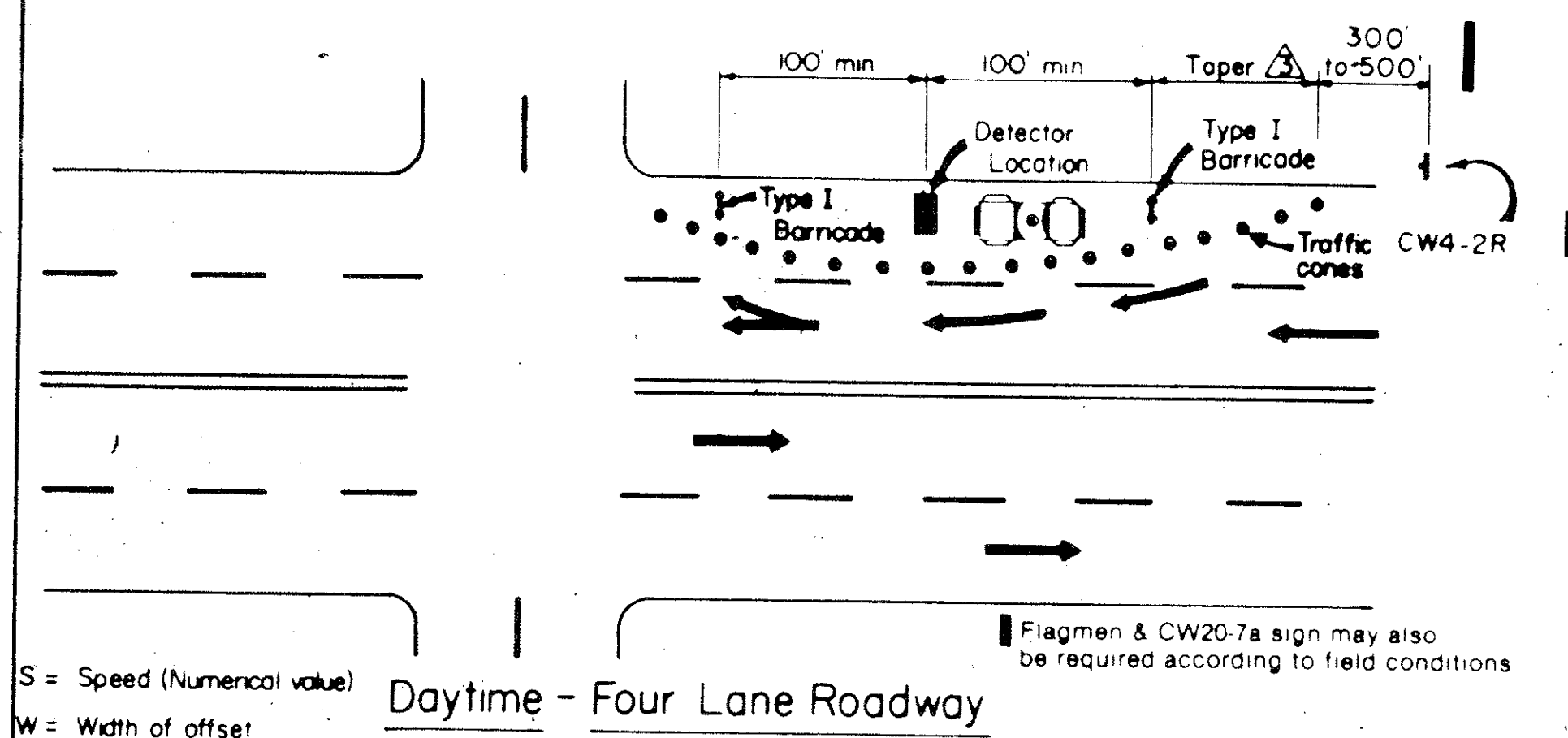


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SERVICE POLE AND GROUNDING DETAILS

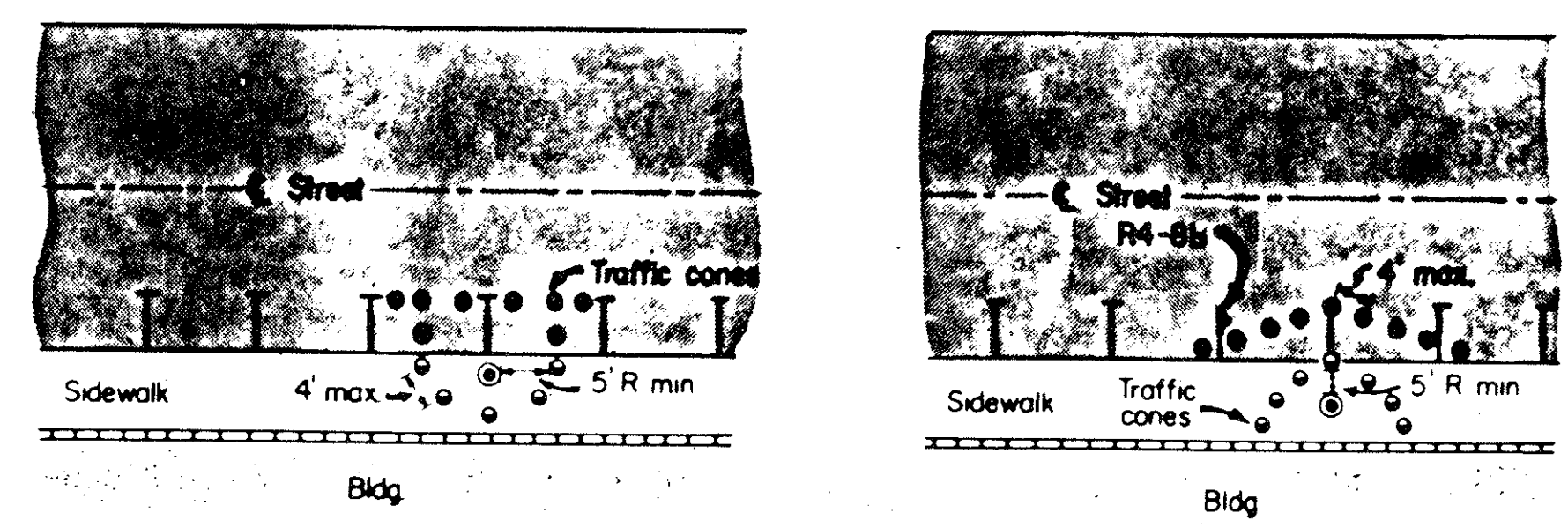
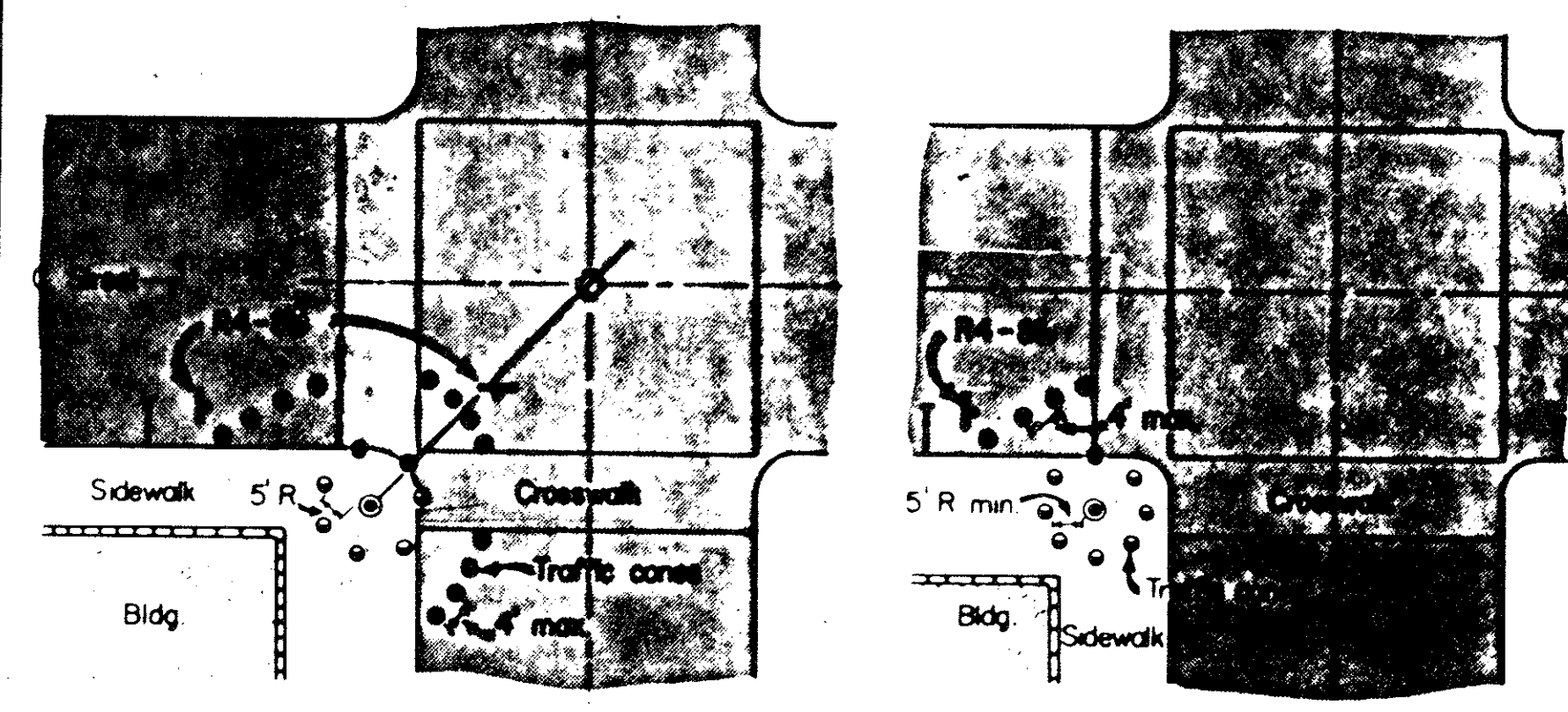
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 Date: 6/5/85  
 Designed by:  
 Drawn by:  
 Checked by: TJS  
 Approved by: TJS  
 Project No. 654003.01000





**TYPICAL DETECTOR INSTALLATION**

At Night—1. Steady burn lamps for delineation instead of cones.  
2. Flashers on barricades.



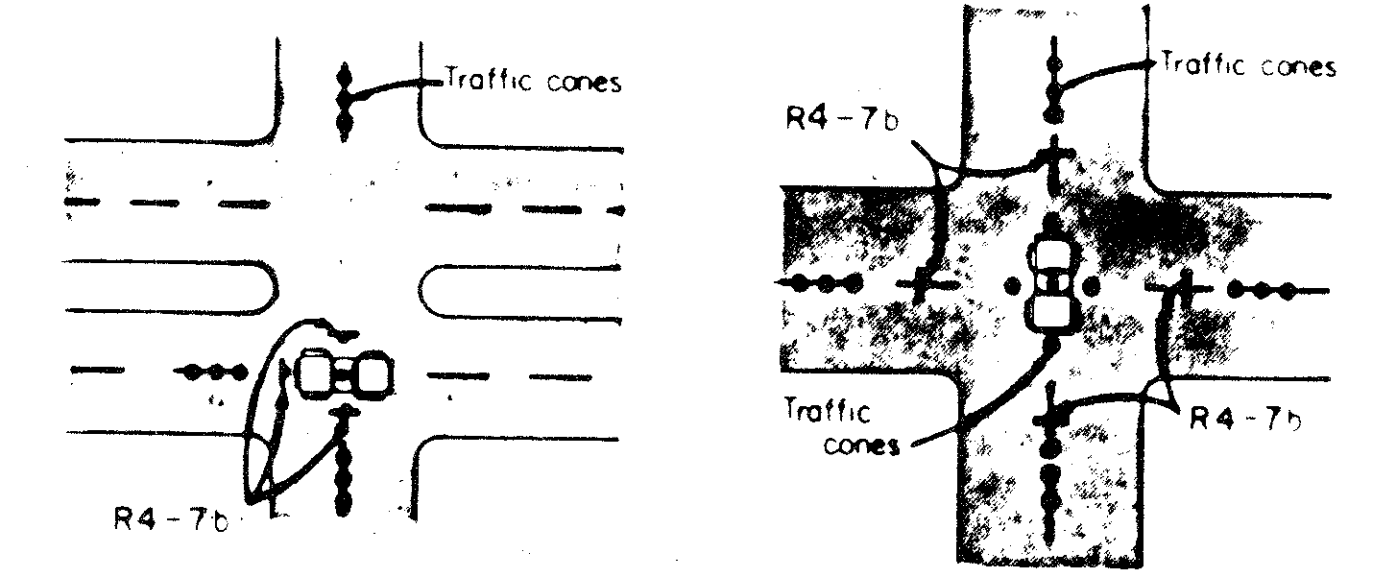
**TYPICAL RESTRICTED PEDESTRIAN MOVEMENTS**

Where pedestrian movements are anticipated at night, all holes, trenches or other hazardous areas shall be adequately protected by use of barricades, lights or other protective devices.

**TYPICAL TAPER LENGTH (L)**

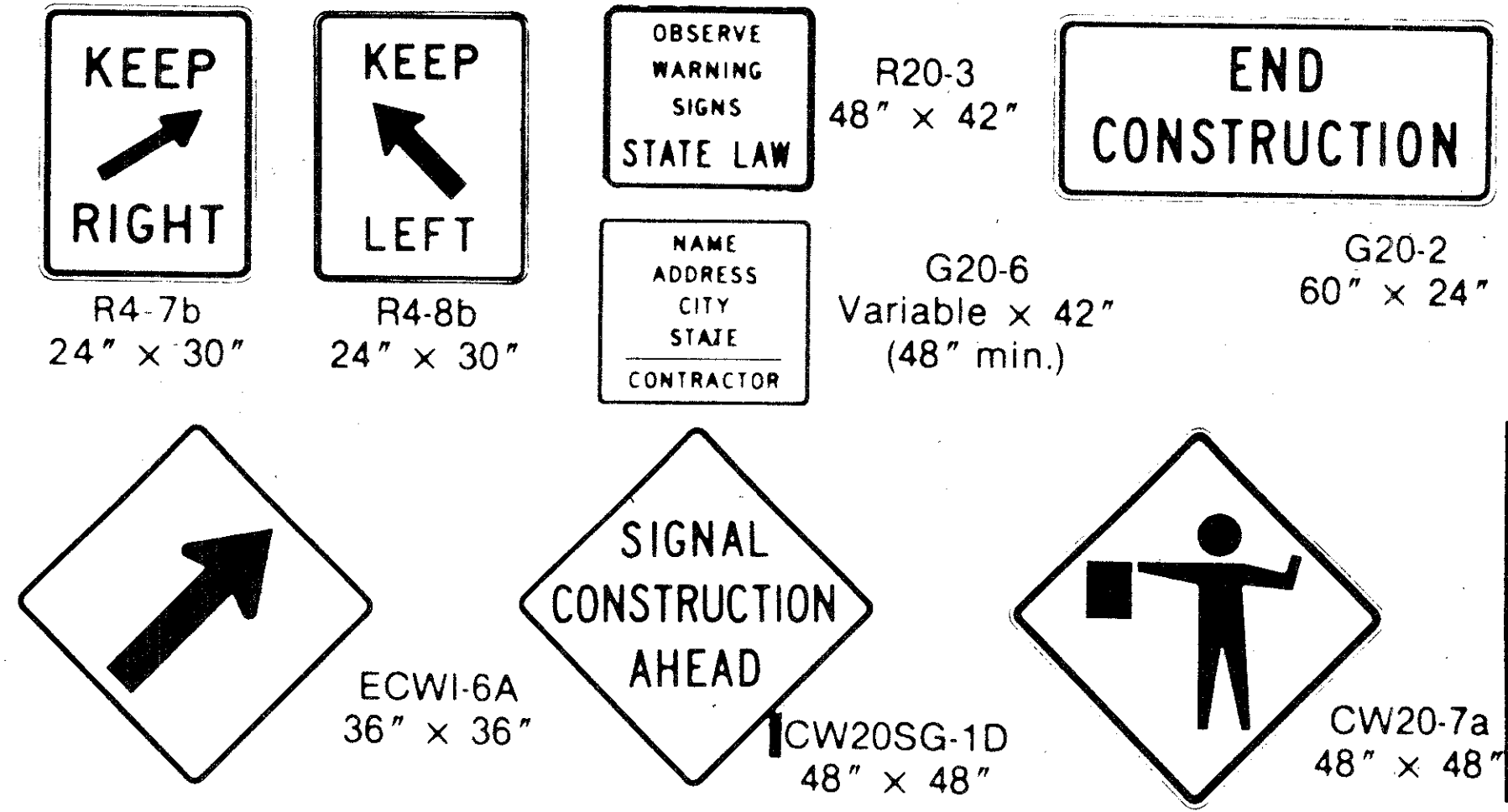
Posted Speed	Formula	Minimum	Maximum
10	10	10	12
15	15	15	18
20	20	20	24
25	25	25	30
30	30	30	36
35	35	35	42
40	40	40	48
45	45	45	54
50	50	50	60
55	55	55	66
60	60	60	72

85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. TAPER LENGTHS HAVE BEEN ROUNDED OFF.

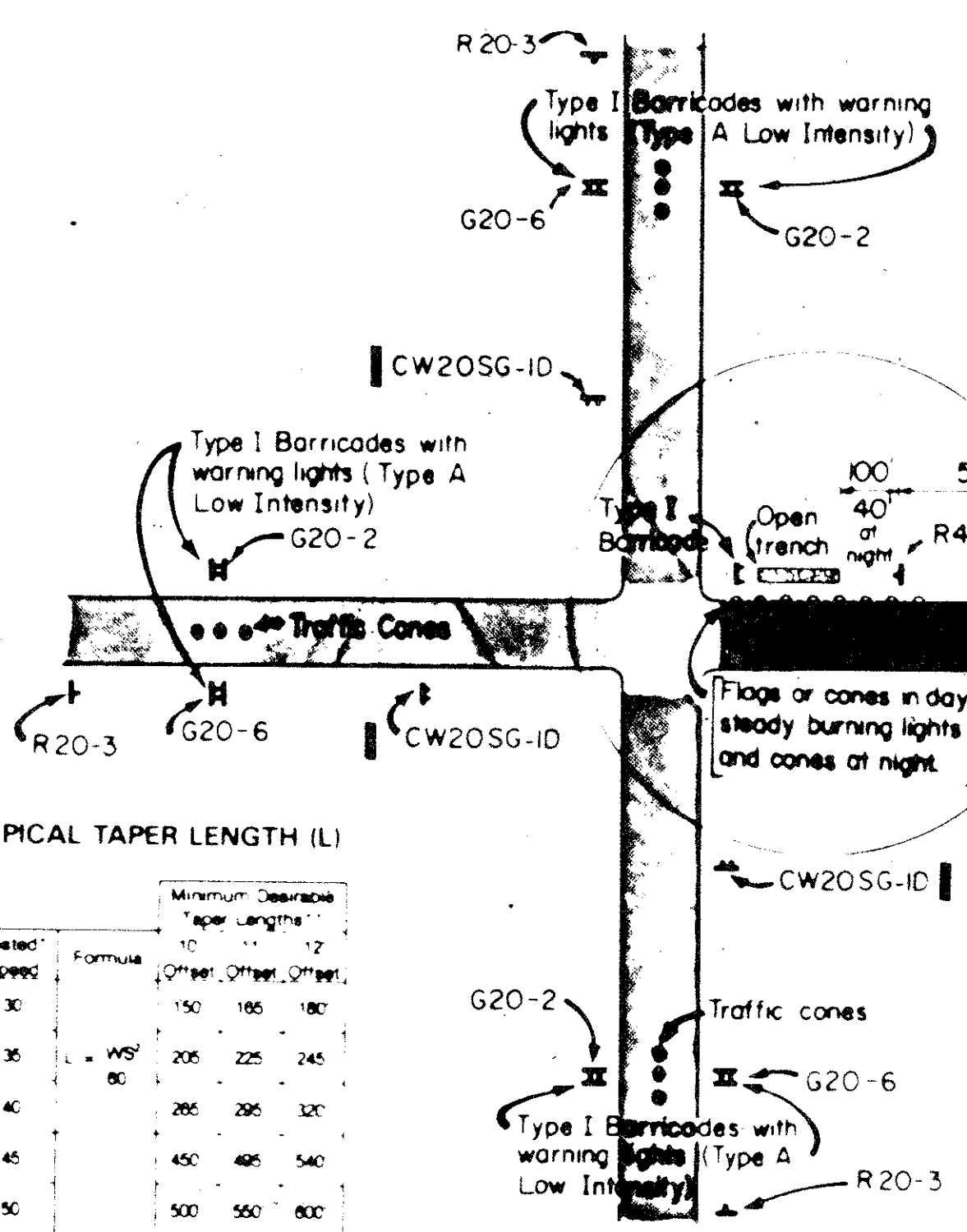


**TYPICAL HANGING SIGNAL INSTALLATIONS**

NOTES:  
1. Flagmen & CW20-7a sign may also be required according to field conditions.  
2. Use vehicle equipped with yellow rotating beacon or strobe.



**TYPICAL SIGNS USED IN TRAFFIC SIGNAL CONSTRUCTION AREAS**

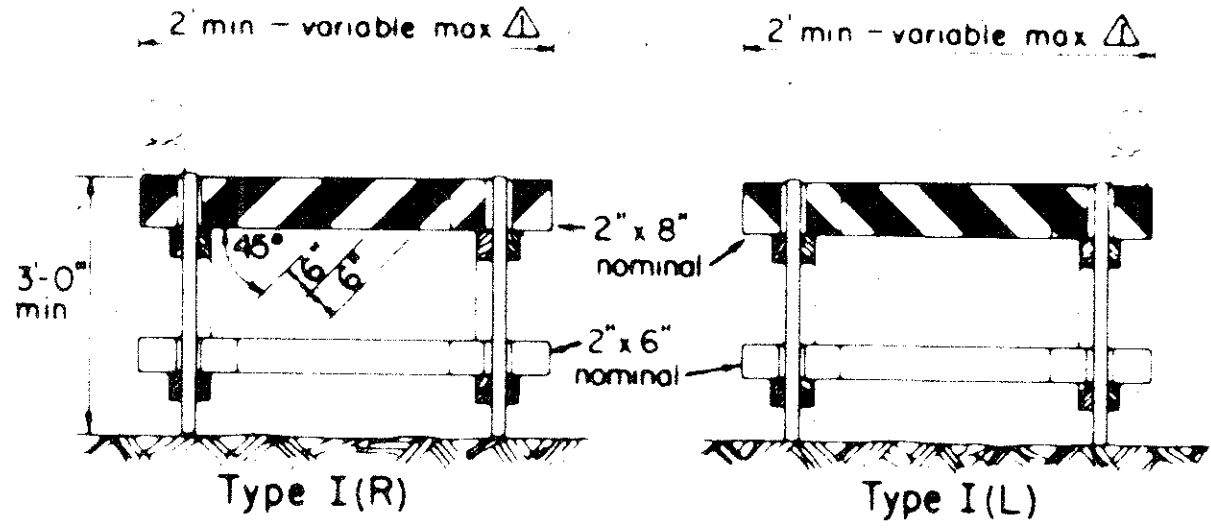


NOTE: For several closely adjoining intersections on the same project, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. If this is the case, see details elsewhere in the plans for advance signing requirements.

\* Distance varies with speed of traffic. Distance can be less than shown in urban areas.

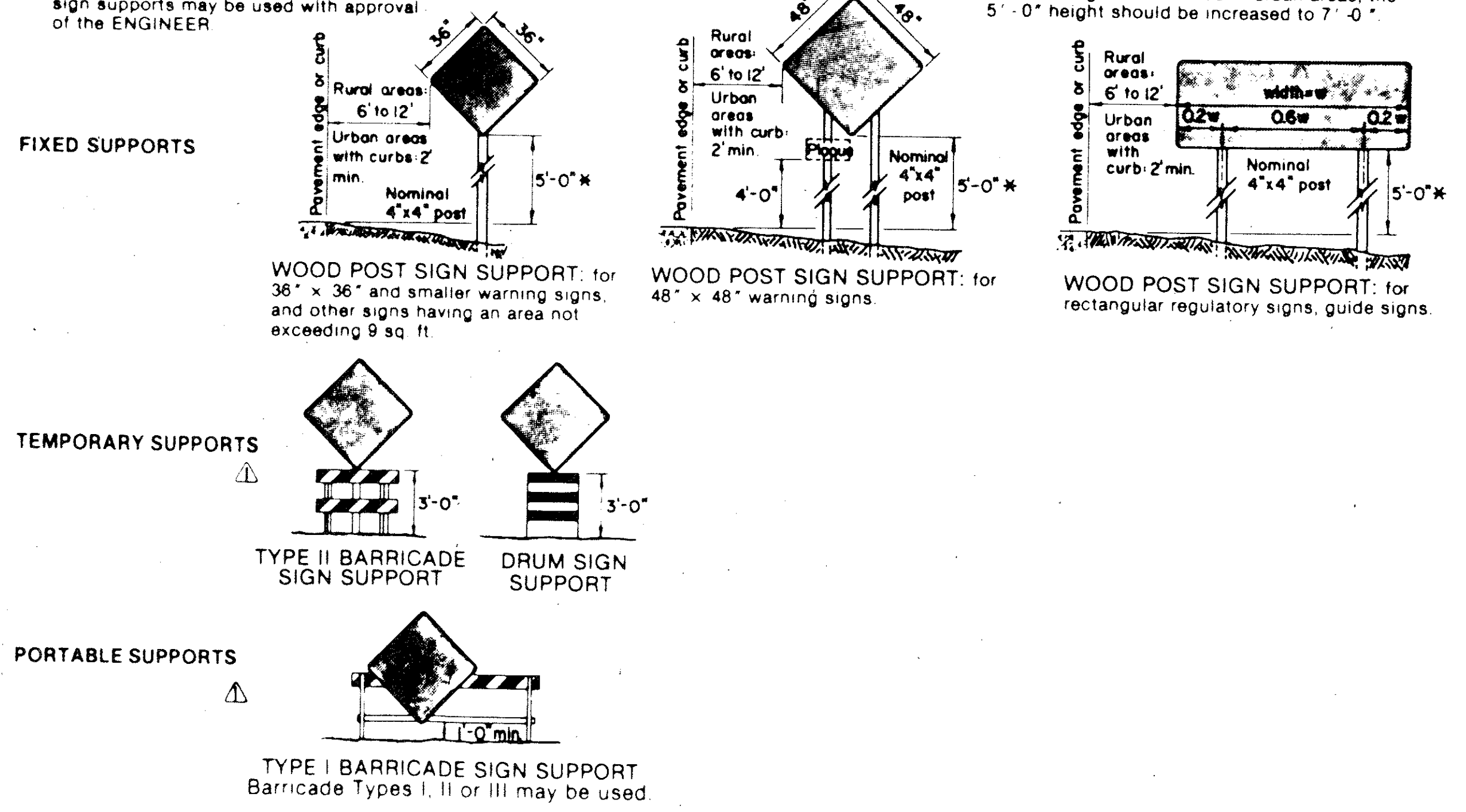
\*\* Change to Type I Barricades with arrows at night.

**SIGNING IN ADVANCE OF CONSTRUCTION AND POSSIBLE SIGNING NEAR WORK AREA**



**TYPE I BARRICADES**

**TYPICAL SIGN SUPPORTS**



**GENERAL NOTES**  
ReflectORIZED signs shall be constructed of retro-reflective sheeting in conformance with project specifications and shall be maintained to meet the appearance, color and reflectivity requirements of those specifications. Paints and coloration of signs shall be equal to the Department's standards. Signs shall comply with the general requirements specified in the "Standard Specifications for Construction of Highways, Streets and Bridges" in effect at the time of contract award.  
All traffic control devices shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways." Contractors shall furnish a copy of a certification from the manufacturer of the lights that the warning lights meet the requirements of the ITE Standard for Flashing and Steady Burn Warning Lights as contained in the latest edition of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."  
All signs shown have black letters and borders on a reflective orange background except the R20-3, R4-7b, R4-8b, and G20-6 signs which have a reflective white background.  
Signs 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 on this sheet or as approved by the Engineer. The bottom of the sign shall be a minimum of one (1) foot above the pavement sign. Signs required for nighttime usage should not normally be mounted on temporary supports, except when approved by the Engineer. 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 limits 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 on this sheet or as approved by the Engineer. Signs erected on temporary supports should be at a minimum height of three (3) feet. Signs erected on fixed supports should be at a minimum height of five (5) feet in rural areas and seven (7) feet in urban areas and other rural locations where sight distance obstructions are present. Regardless of the type of support used, regulatory signs should not be erected at height less than the 5- or 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 footing.  
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.  
For additional information and guidelines on barricades and construction signs see the Texas Manual on Uniform Traffic Control Devices.  
Signing shown is typical and may be adjusted to fit field conditions by the Engineer.  
No more than two signs shall be placed on a barricade.  
Where a sign is to be mounted on a barricade, the barricade length should not be less than the horizontal dimension of the sign. If lights are also to be mounted on the barricade, the barricade should not be less than the sign width plus about 12" for each light to be attached. Barricades of a greater length than the above will be satisfactory.  
The advance signs and barricades shall be in place when signal construction operations are in progress. The contractor may remove the advance signs and barricades when there are no construction operations underway if permitted elsewhere in the plans. Any obstructions or hazards at the work area shall be clearly marked and delineated at all times.