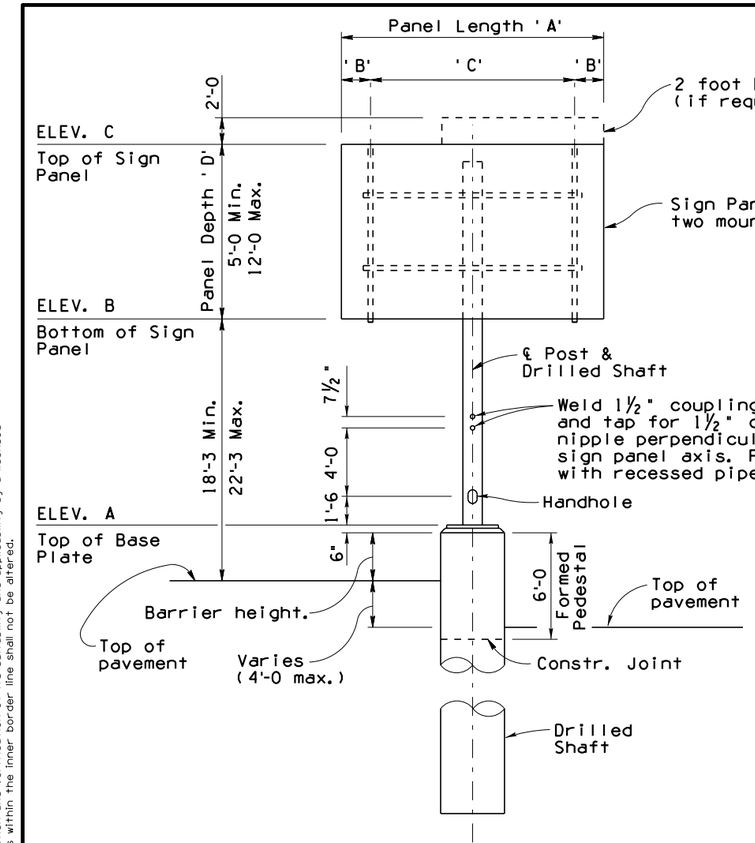
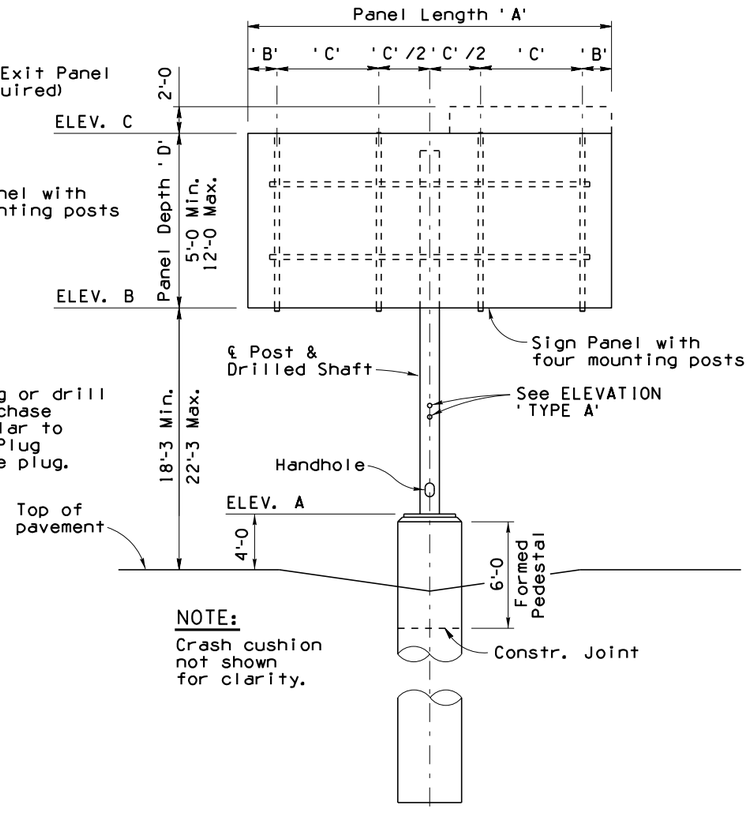


ELEVATION 'TYPE A'

Shown with median barrier



ELEVATION 'TYPE B'

Shown without median barrier

		Dimensions			Nominal Pipe Dia. inches	Pipe Wall thickness inches
		'A'	'B'	'C'		
Type A	2 Mounting Posts	8'-0	1'-6	5'-0	14	0.938
		9'-0	1'-9	5'-6	14	0.938
		10'-0	2'-0	6'-0	14	0.938
		11'-0	2'-0	7'-0	14	0.938
		12'-0	2'-3	7'-6	14	0.938
		13'-0	2'-6	8'-0	14	0.938
Type B	4 Mounting Posts	14'-0	1'-0	4'-0	16	1.031
		15'-0	1'-0	4'-4	16	1.031
		16'-0	1'-0	4'-8	16	1.031
		17'-0	1'-0	5'-0	16	1.031
		18'-0	1'-0	5'-4	16	1.031
		19'-0	1'-0	5'-8	16	1.031
		20'-0	1'-6	5'-8	16	1.031
		21'-0	1'-6	6'-0	20	0.750
		22'-0	1'-6	6'-4	20	0.750
		23'-0	1'-6	6'-8	20	0.750
		24'-0	1'-6	7'-0	20	0.750
		25'-0	2'-0	7'-0	20	0.750

WELDING NOTES:

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1-88, as modified by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges, 1996. All other welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5-96 Bridge Welding Code. All welding shall be continuous unless noted otherwise. All butt welds shall be full penetration using prequalified welding procedures and shall be tested by ultrasonic testing.
All butt welds shall be ground flush, full width. Grinding striations shall be parallel to length of member.

The Column to base plate weld shall be tested by ultrasonic testing.

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition.

Design Specifications -
AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Edition of 1994.

All concrete shall be Class "S".

Reinforcing steel shall conform to ASTM Specification A615 (Grade 60).

Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.

Stresses:
Class "S" concrete ..... f'c = 3500 psi
Grade 60 reinforcing steel ..... fs = 24000 psi
Structural steel ..... fs = 20000 psi

All bolts shall conform to ASTM Specification A325. All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Wind Loading: 80 MPH Velocity.

All Tubular Structural Frame Pipes shall be welded or seamless steel pipes and shall conform to ASTM Specifications:

A53,	Grade B,	Type E or S
A252,	Grade 2,	Type E or S
A106,	Grade B,	Type S only
API5L,	Grade B,	Type E or S
API5LX,	Grade X42	Type E or S

Project Plans shall provide an elevation view of each sign structure with location (station and offset), ELEV. A, ELEV. B, ELEV. C, and Sign panel dimensions ('A', and 'D').

See Project Plans for length and location of exit panels, if required.

Dimensions shall not be scaled from drawings.

PAY ITEM NOTES:

Pay Item for sign structure foundation includes the drilled shaft and the formed pedestal on drilled shaft and the anchor bolt assembly.

Item No. 6060163
SIGN STRUCTURE (MEDIAN)(TWO SIDED)
Measure: Each

Item No. 6060239
FOUNDATION FOR SIGN STRUCTURE (MEDIAN)
Measure: Each

Note to Designer:
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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	4-00
2	Pay Item No. & Bid Item No. change	SJH	11-04
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

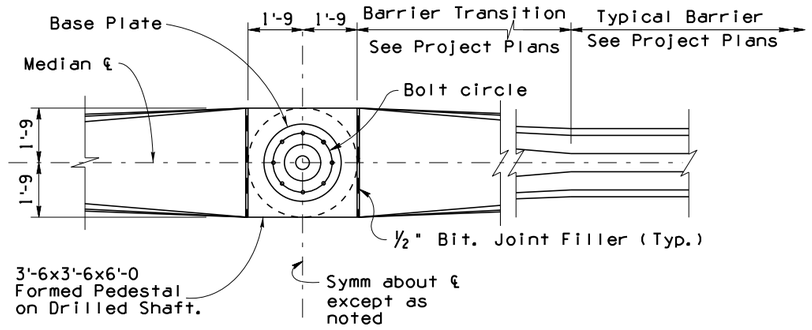
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

MEDIAN SIGN STRUCTURE (TWO SIDED)
ELEVATION & NOTES

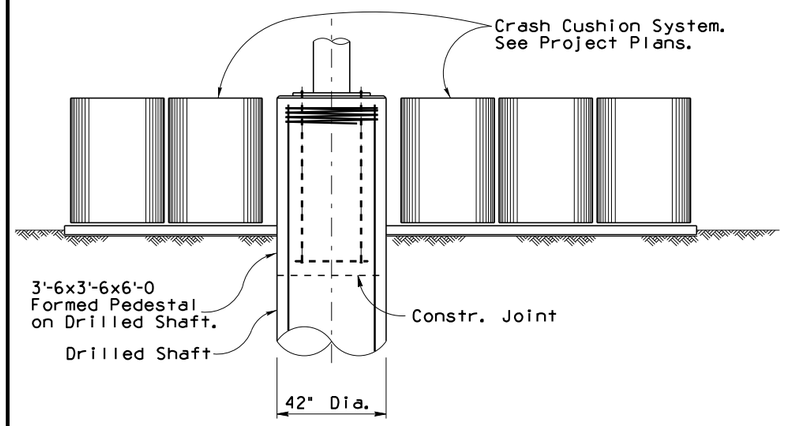
ROUTE | LOCATION | DRAWING NO. SD 9.01(1 of 5)

TRACS NO. | ___ OF ___

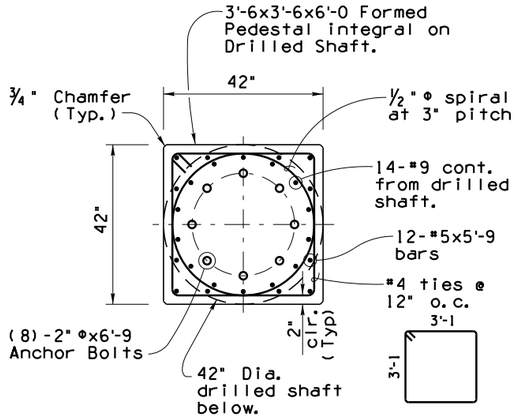
22-APR-2019 14:11 G:\9750\SD_Sheets\sd901-1_0116.dgn



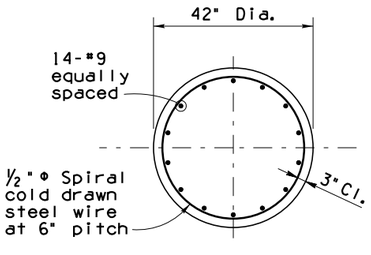
PLAN WITH BARRIER



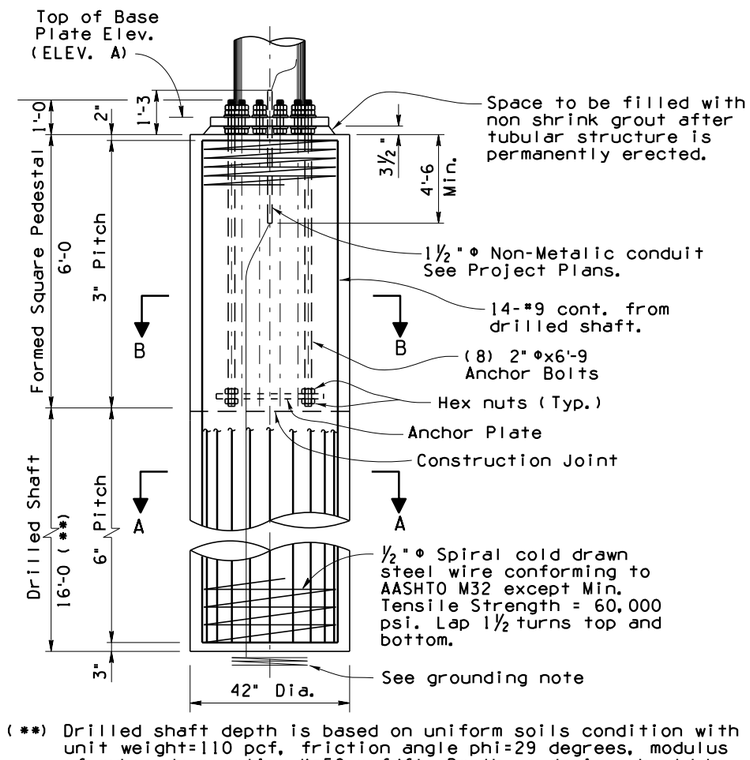
ELEVATION WITHOUT BARRIER



SECTION B-B

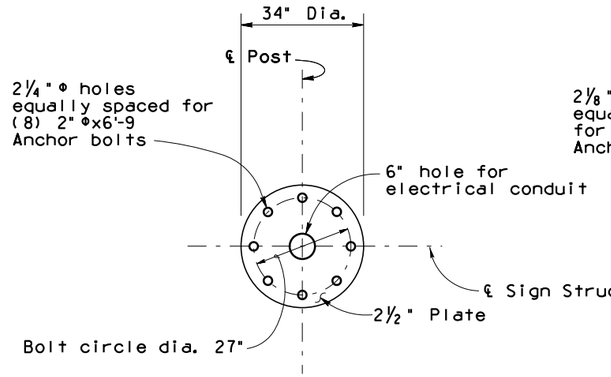


SECTION A-A

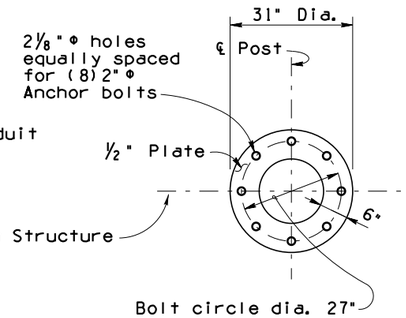


(**) Drilled shaft depth is based on uniform soils condition with unit weight=110 pcf, friction angle phi=29 degrees, modulus of subgrade reaction K=50 psf/ft. Depth or design should be revised by the Project Engineer of Record for weaker soils or rock embedment, and shown in the project plans.

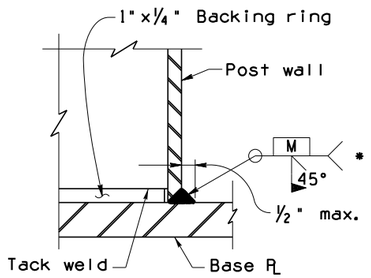
FOUNDATION DETAILS



BASE PLATE DETAIL



ANCHOR PLATE DETAIL



POST TO BASE ℄ WELD DETAIL

* Preheat as per AWS reqm't.

NOTE:

All anchor bolts shall conform to ASTM A36 Specifications. The upper 1'-0 shall be threaded and the upper 1'-2 galvanized in accordance with the requirements of ASTM A153. Anchor bolts made of rods shall have 1'-0 thread at bottom with double nuts for anchor plate.

Provide 2 Hardened Steel washers, 2 Hex nuts and one leveling nut for each bolt. At final position of post all top and bottom nuts of anchor bolts shall be wrench tightened against base plate.

Drilled shaft shall be class 'S' concrete and placed against undisturbed material or compacted embankment.

Provide bolt template during installation of anchor bolts. the bolt template shall be fabricated of ¼" thick (min.) steel plate, similar to anchor plate details, and both the bolt template and the anchor plate shall be drilled to match base plate.

A 25 ft. coil of no. 4 AWG bare copper conductor shall be installed before concrete is poured and connected to pole grounding screw in the hand hole.

Note to Designer:
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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SMH	4-00
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (TWO SIDED) FOUNDATION DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.01(2 OF 5)
TRACS NO.	___ OF ___

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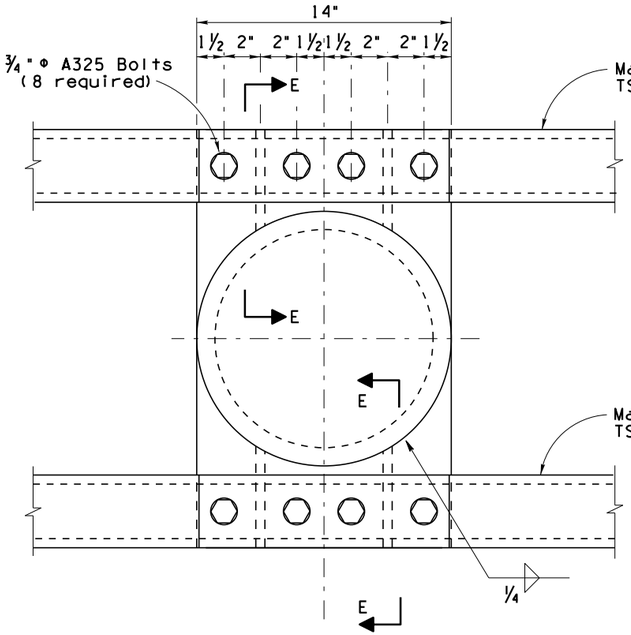
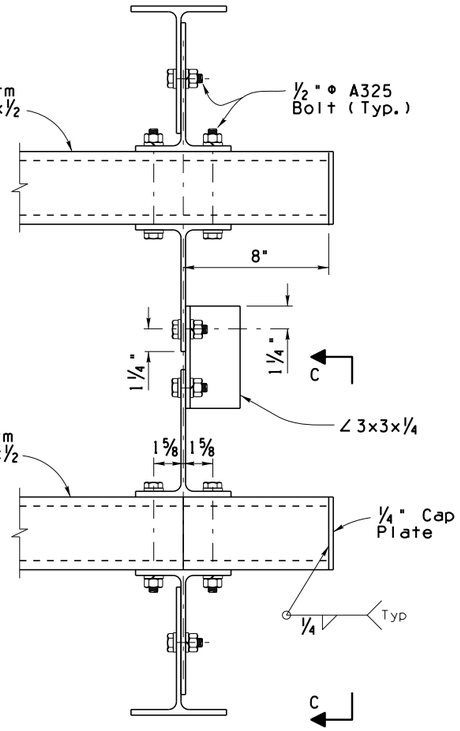
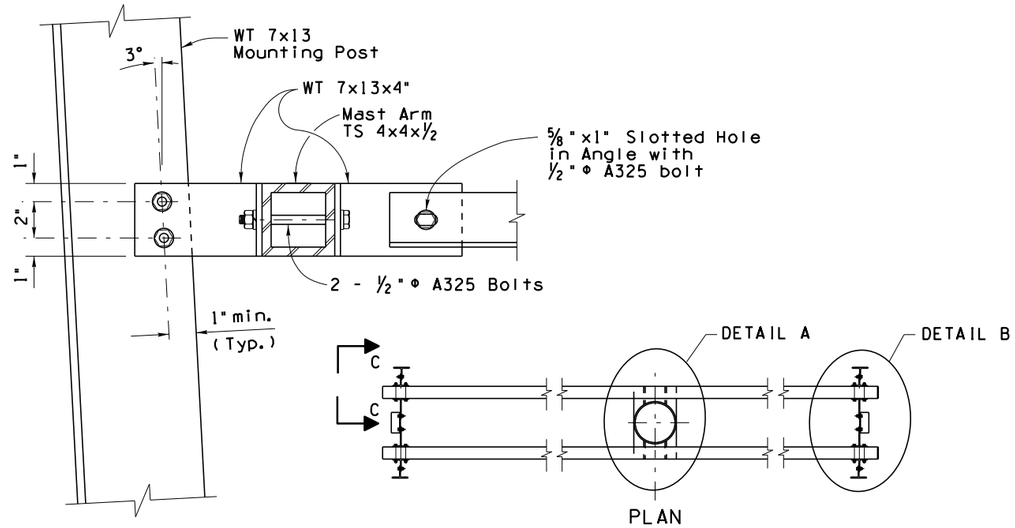
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	4-00
2			
3			
4			



DETAIL A

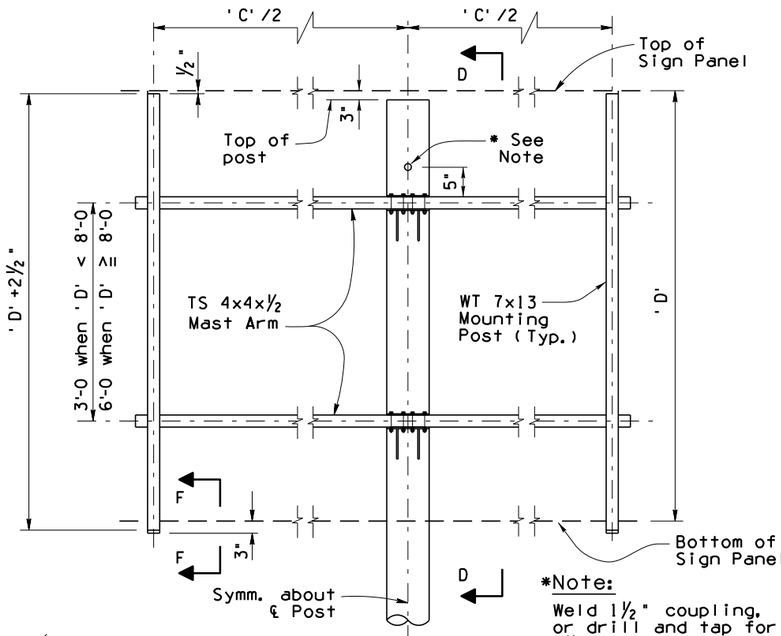


DETAIL B



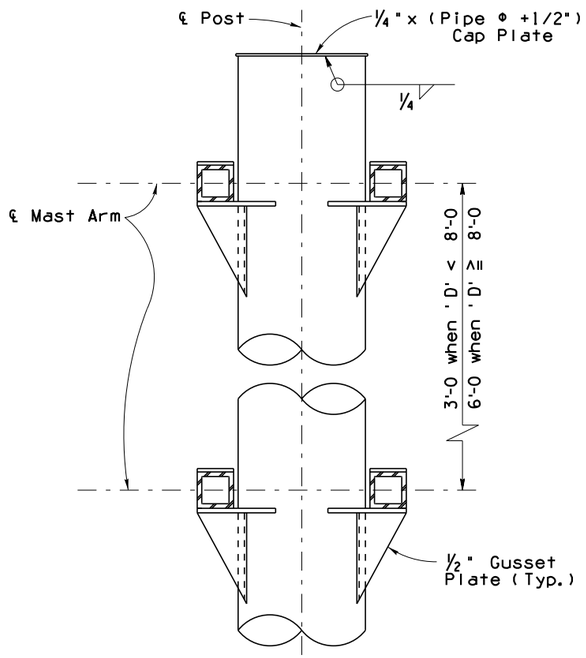
SECTION C-C

PLAN

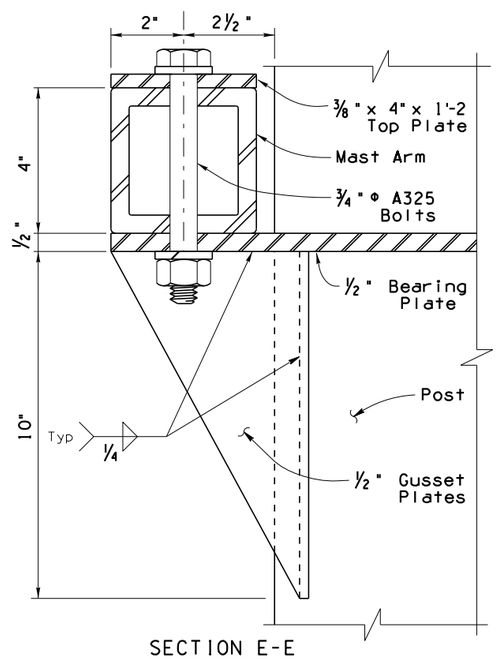


ELEVATION
(Sign Mount Assembly)

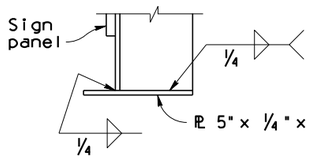
*Note:
Weld 1½" coupling, or drill and tap for 1½" chase nipple both sides. Plug with recessed pipe plug.



SECTION D-D



SECTION E-E

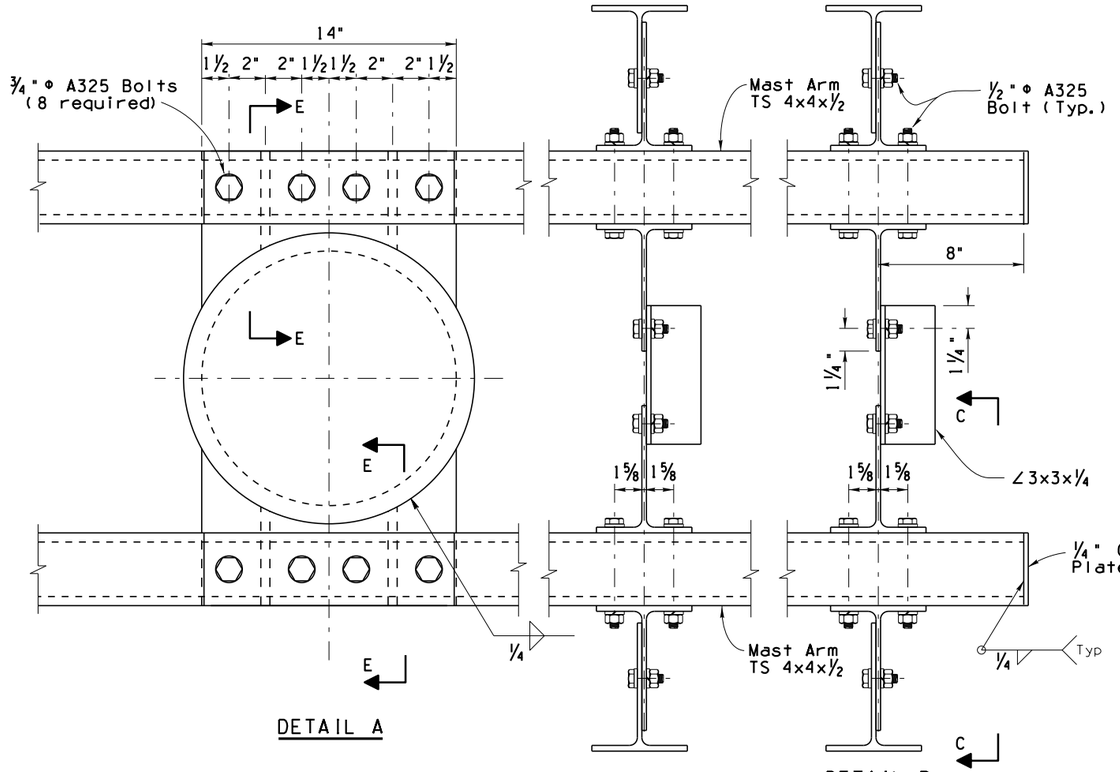


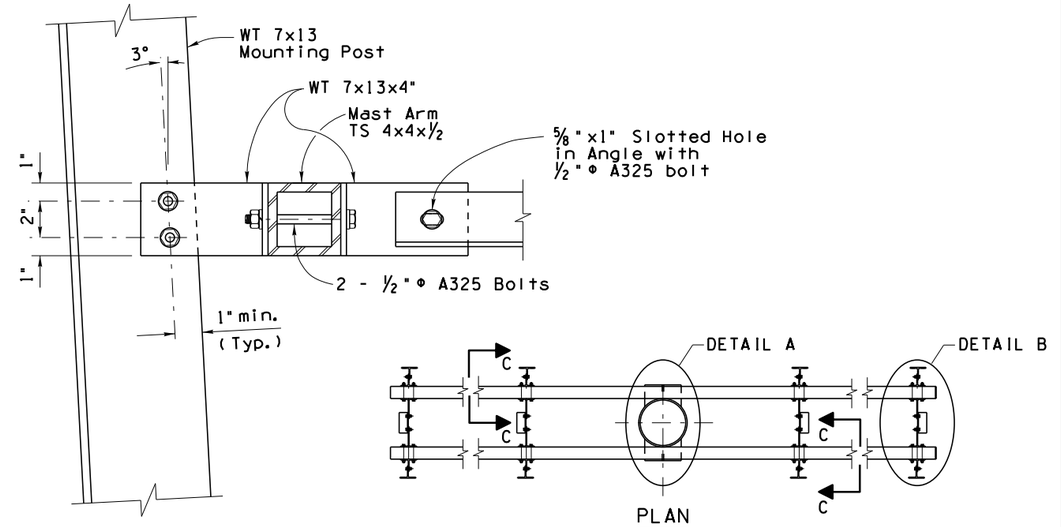
VIEW F-F

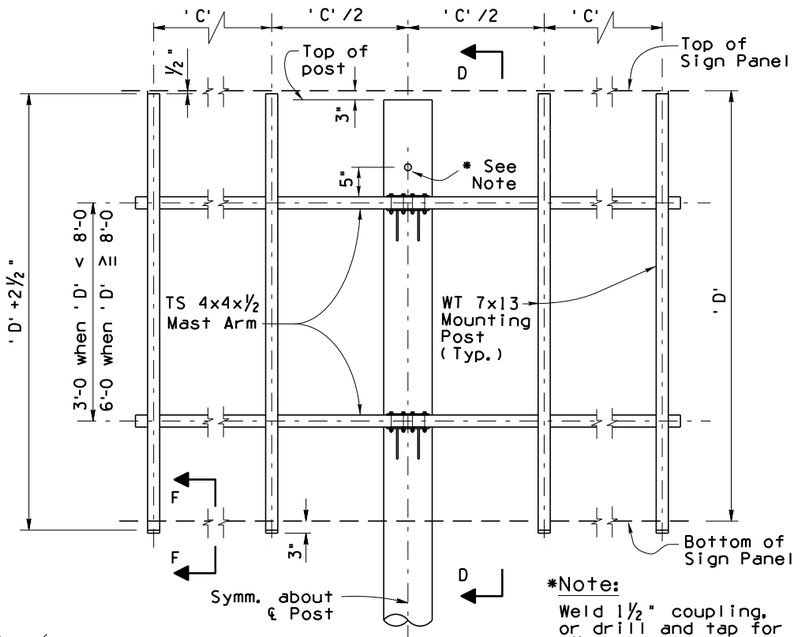
TYPE A FRAME

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (TWO SIDED) TYPE A SIGN MOUNT ASSEMBLY
ROUTE / LOCATION	DRAWING NO. SD 9.01(3 of 5)
TRACS NO.	___ OF ___

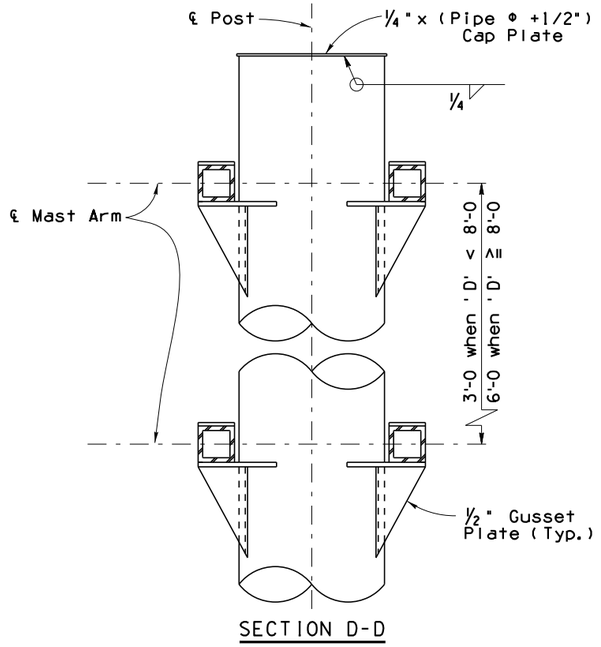
22-APR-2019 14:11 G:\9750\SD_Sheets\sd901-3_0116.dgn

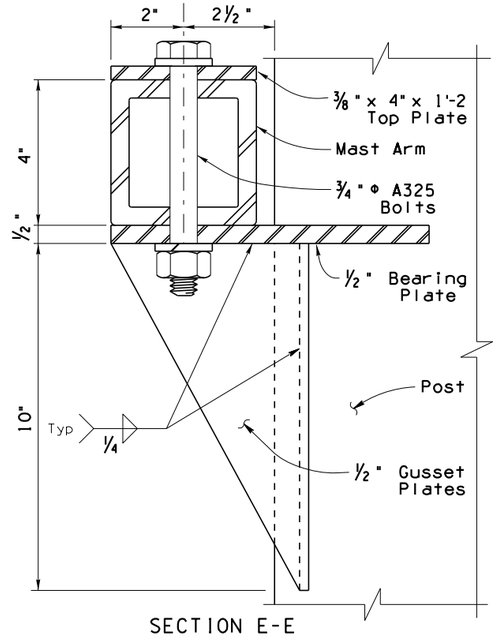


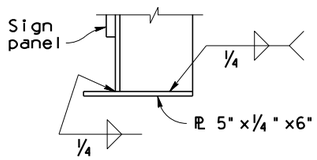




*Note:
Weld 1½" coupling, or drill and tap for 1½" chase nipple both sides. Plug with recessed pipe plug.







TYPE B FRAME

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
Shafi U. Hasan	
APPROVED FOR DISTRIBUTION Jean A. Nehme	MEDIAN SIGN STRUCTURE (TWO SIDED) TYPE B SIGN MOUNT ASSEMBLY
ROUTE / LOCATION	DRAWING NO. SD 9.01(4 of 5)
TRACS NO.	___ OF ___

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	4-00
2			
3			
4			

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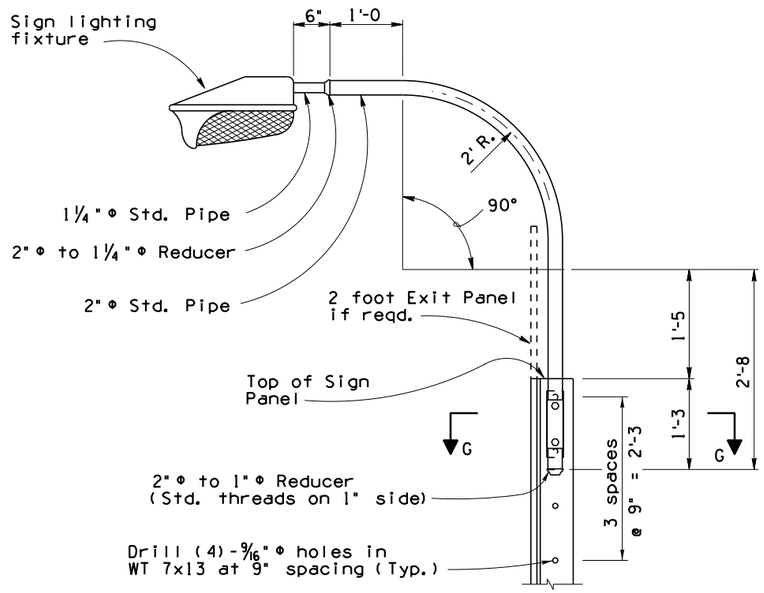
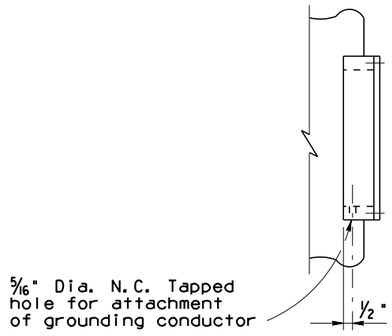
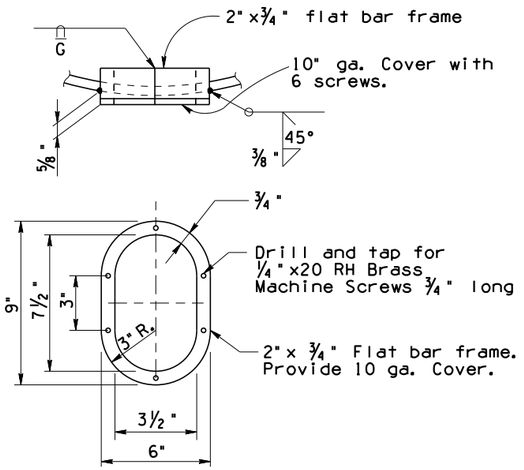
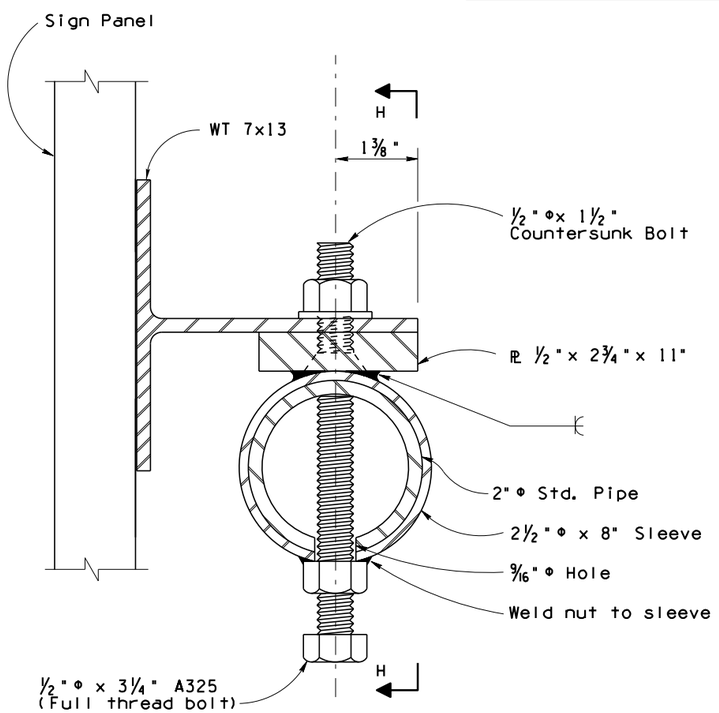


OVERHEAD LIGHT SUPPORT DETAIL

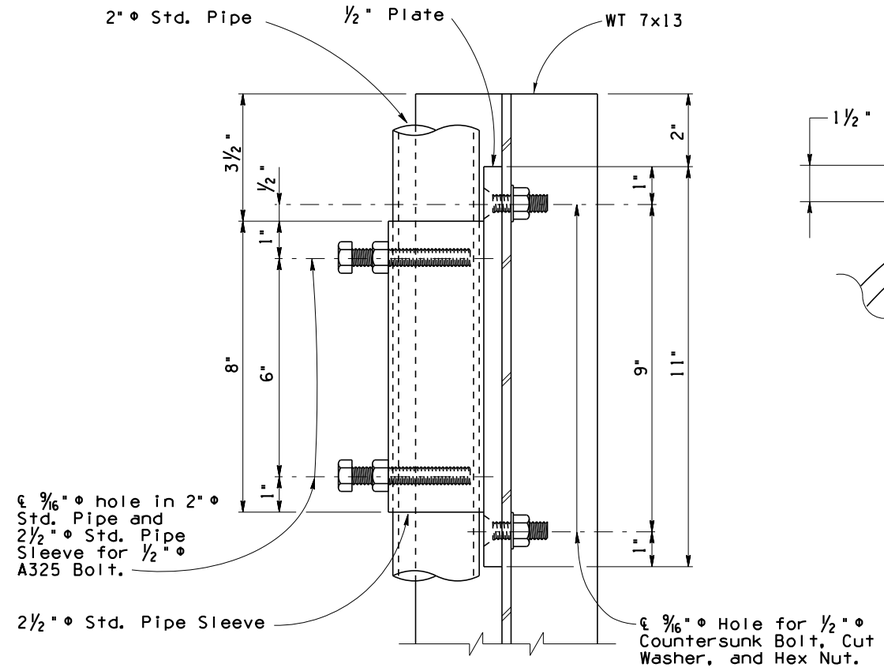




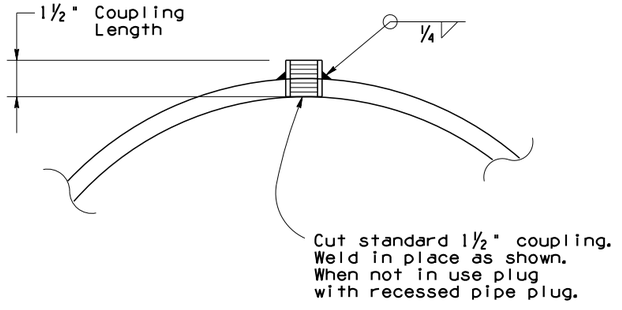
HANDHOLE & COVER DETAILS



SECTION G-G



ELEVATION H-H



COUPLING DETAIL

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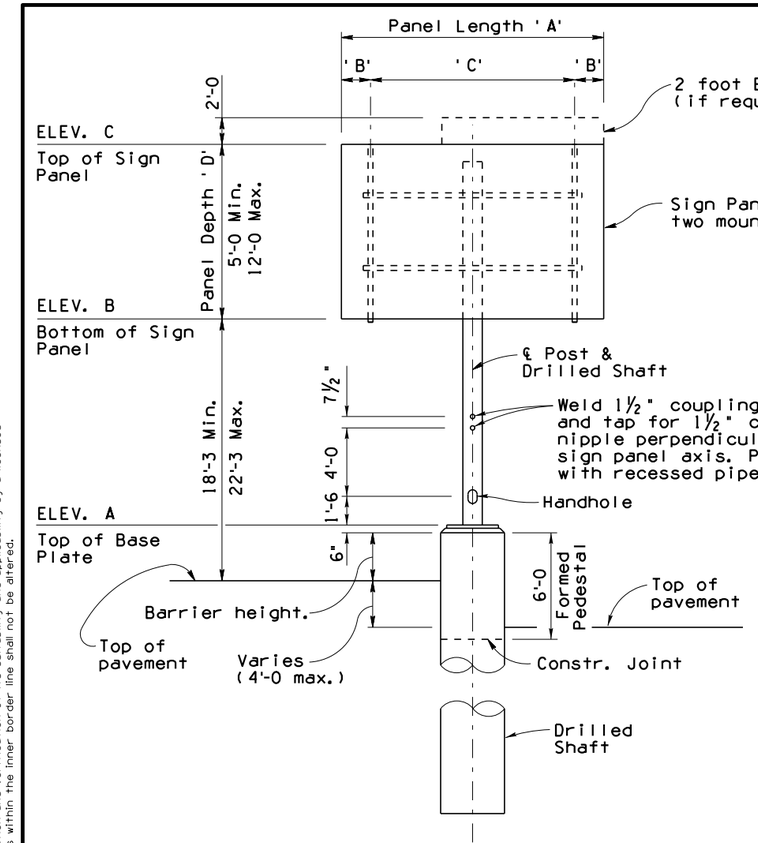
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	4-00
2			
3			
4			

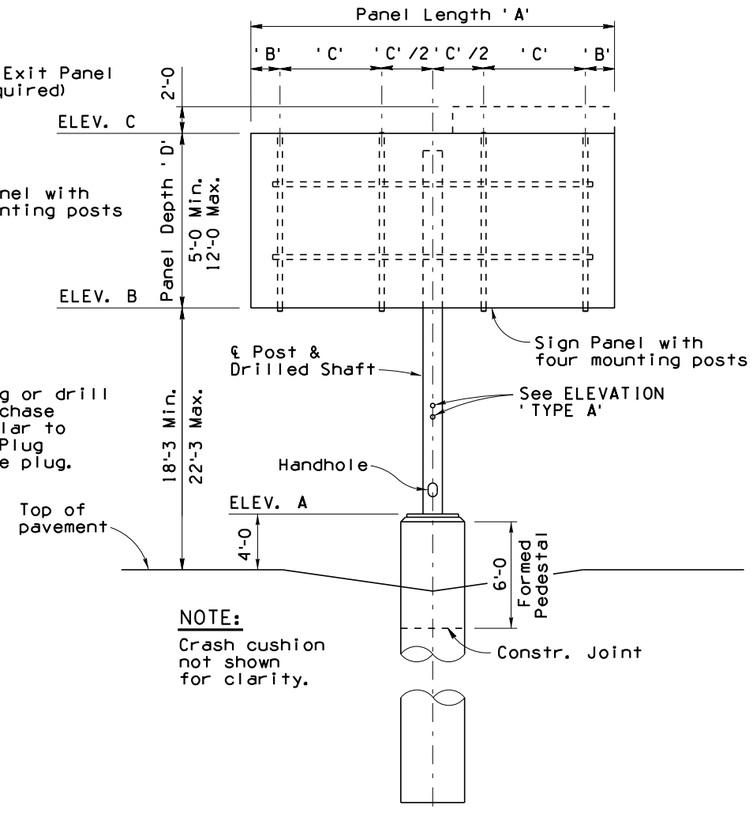
DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (TWO SIDED) LIGHT SUPPORT AND MISC. DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.01(5 of 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd901-5_0116.dgn



ELEVATION 'TYPE A'

Shown with median barrier



ELEVATION 'TYPE B'

Shown without median barrier

		Dimensions			Nominal Pipe Dia. inches	Pipe Wall thickness inches
		'A'	'B'	'C'		
Type A	2 Mounting Posts	8'-0	1'-6	5'-0	14	0.938
		9'-0	1'-9	5'-6	14	0.938
		10'-0	2'-0	6'-0	14	0.938
		11'-0	2'-0	7'-0	14	0.938
		12'-0	2'-3	7'-6	14	0.938
		13'-0	2'-6	8'-0	14	0.938
Type B	4 Mounting Posts	14'-0	1'-0	4'-0	16	1.031
		15'-0	1'-0	4'-4	16	1.031
		16'-0	1'-0	4'-8	16	1.031
		17'-0	1'-0	5'-0	16	1.031
		18'-0	1'-0	5'-4	16	1.031
		19'-0	1'-0	5'-8	16	1.031
		20'-0	1'-6	5'-8	16	1.031
		21'-0	1'-6	6'-0	20	0.750
		22'-0	1'-6	6'-4	20	0.750
		23'-0	1'-6	6'-8	20	0.750
		24'-0	1'-6	7'-0	20	0.750
		25'-0	2'-0	7'-0	20	0.750

WELDING NOTES:

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1-88, as modified by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges, 1996. All other welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5-96 Bridge Welding Code. All welding shall be continuous unless noted otherwise. All butt welds shall be full penetration using prequalified welding procedures and shall be tested by ultrasonic testing.
All butt welds shall be ground flush, full width. Grinding striations shall be parallel to length of member.

The Column to base plate weld shall be tested by ultrasonic testing.

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition.

Design Specifications -
AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Edition of 1994.

All concrete shall be Class "S".

Reinforcing steel shall conform to ASTM Specification A615 (Grade 60).

Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.

Stresses:
Class "S" concrete ..... f'c = 3500 psi
Grade 60 reinforcing steel ..... fs = 24000 psi
Structural steel ..... fs = 20000 psi

All bolts shall conform to ASTM Specification A325. All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Wind Loading: 80 MPH Velocity.

All Tubular Structural Frame Pipes shall be welded or seamless steel pipes and shall conform to ASTM Specifications:

A53,	Grade B,	Type E or S
A252,	Grade 2,	Type E or S
A106,	Grade B,	Type S only
API5L,	Grade B,	Type E or S
API5LX,	Grade X42	Type E or S

Project Plans shall provide an elevation view of each sign structure with location (station and offset), ELEV. A, ELEV. B, ELEV. C, and Sign panel dimensions ('A', and 'D').

See Project Plans for length and location of exit panels, if required.

Dimensions shall not be scaled from drawings.

PAY ITEM NOTES:

Pay Item for sign structure foundation includes the drilled shaft and the formed pedestal on drilled shaft and the anchor bolt assembly.

Item No. 6060162
SIGN STRUCTURE (MEDIAN) (ONE SIDED)
Measure: Each

Item No. 6060239
FOUNDATION FOR SIGN STRUCTURE (MEDIAN)
Measure: Each

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	4-00
2	Pay Item No. & Bid Item No. change	SJH	11-04
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

MEDIAN SIGN STRUCTURE (ONE SIDED)
ELEVATION & NOTES

ROUTE | LOCATION | DRAWING NO. SD 9.02(1 of 5)

TRACS NO. | ___ OF ___

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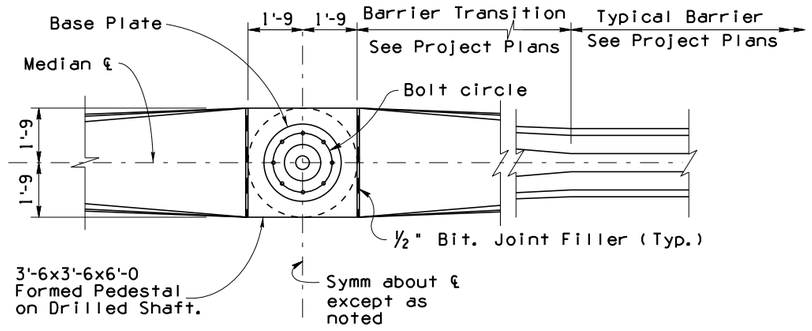
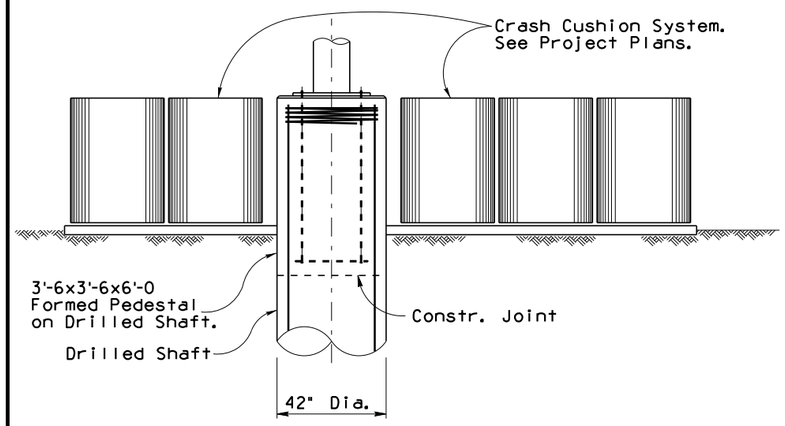


PLAN WITH BARRIER



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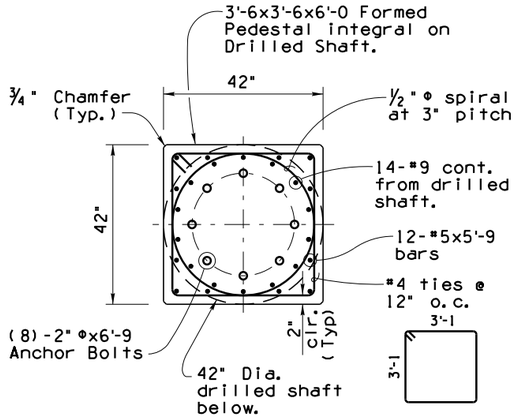
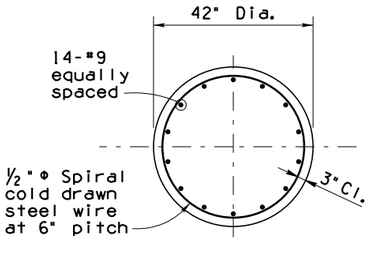
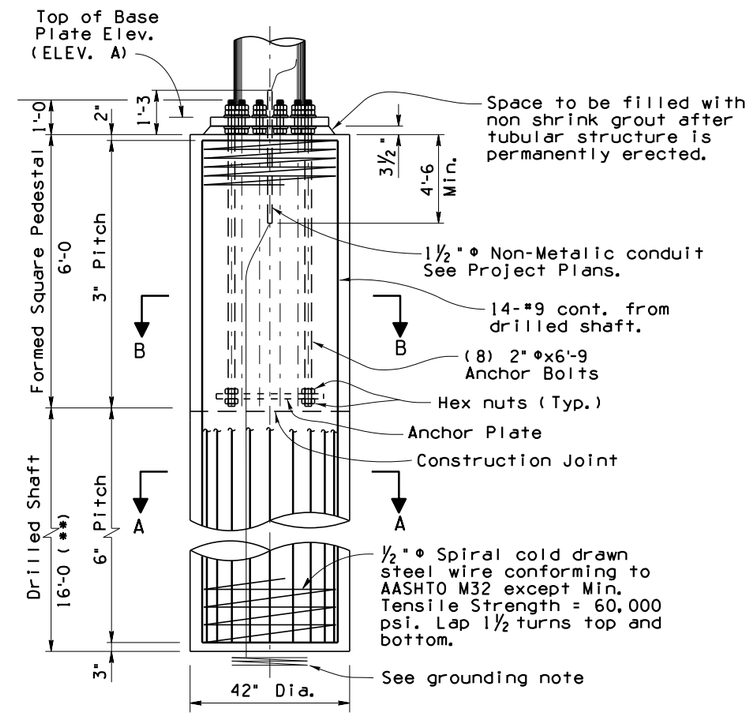


SECTION B-B

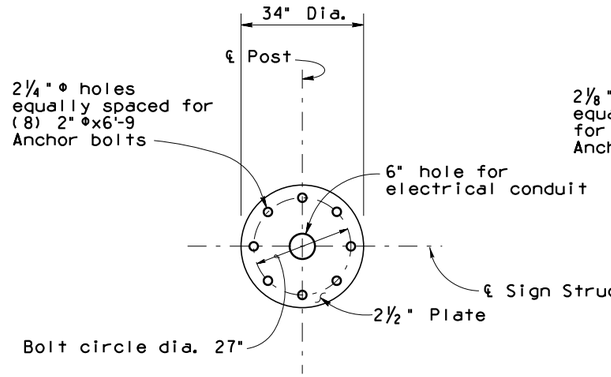


SECTION A-A

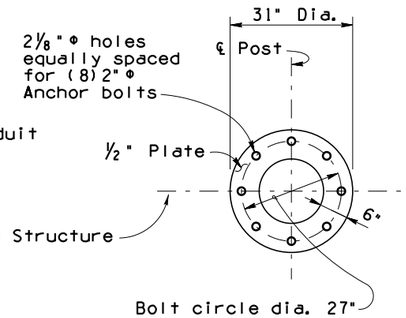


(**) Drilled shaft depth is based on uniform soils condition with unit weight=110 pcf, friction angle phi=29 degrees, modulus of subgrade reaction K=50 psf/ft. Depth or design should be revised by the Project Engineer of Record for weaker soils or rock embedment, and shown in the project plans.

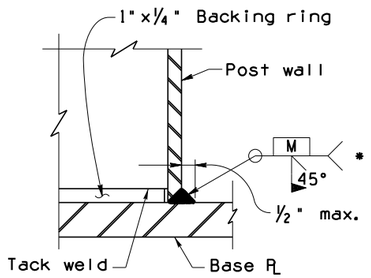
FOUNDATION DETAILS



BASE PLATE DETAIL



ANCHOR PLATE DETAIL



POST TO BASE ℄ WELD DETAIL

* Preheat as per AWS reqm't.

NOTE:

All anchor bolts shall conform to ASTM A36 Specifications. The upper 1'-0 shall be threaded and the upper 1'-2 galvanized in accordance with the requirements of ASTM A153. Anchor bolts made of rods shall have 1'-0 thread at bottom with double nuts for anchor plate.

Provide 2 Hardened Steel washers, 2 Hex nuts and one leveling nut for each bolt. At final position of post all top and bottom nuts of anchor bolts shall be wrench tightened against base plate.

Drilled shaft shall be class 'S' concrete and placed against undisturbed material or compacted embankment.

Provide bolt template during installation of anchor bolts. the bolt template shall be fabricated of ¼" thick (min.) steel plate, similar to anchor plate details, and both the bolt template and the anchor plate shall be drilled to match base plate.

A 25 ft. coil of no. 4 AWG bare copper conductor shall be installed before concrete is poured and connected to pole grounding screw in the hand hole.

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SMH	5-00
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (ONE SIDED) FOUNDATION DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.02(2 OF 5)
TRACS NO.	___ OF ___

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1	Original Issue	SJH	5-00
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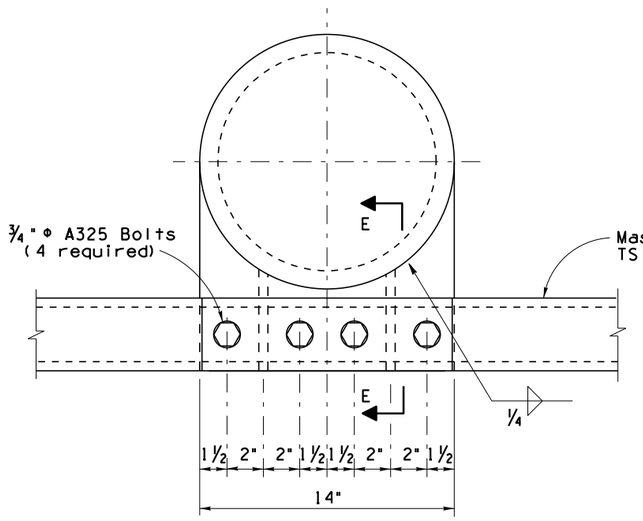
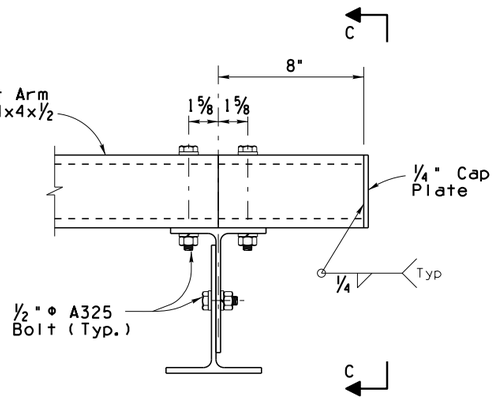
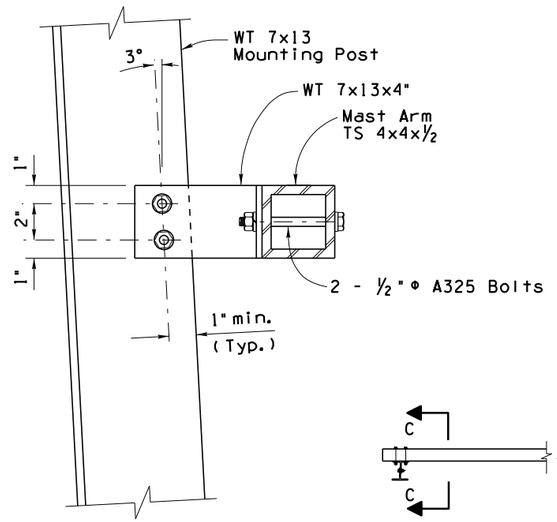


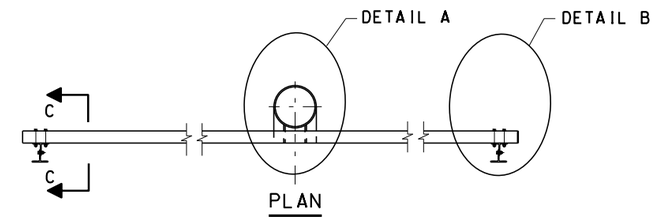
DETAIL A



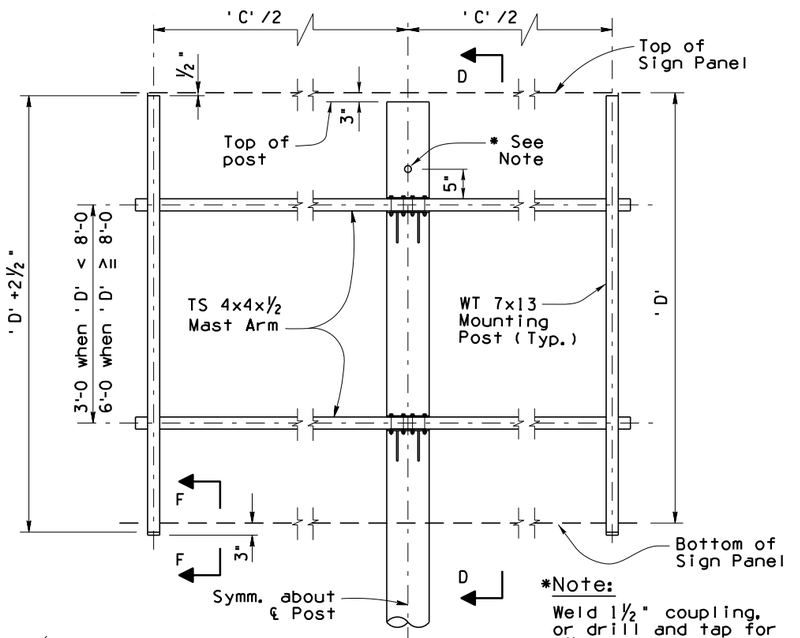
DETAIL B



SECTION C-C

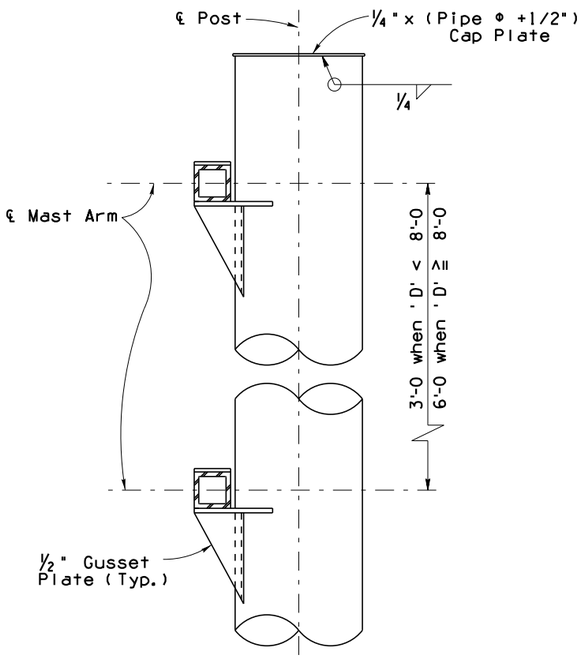


PLAN

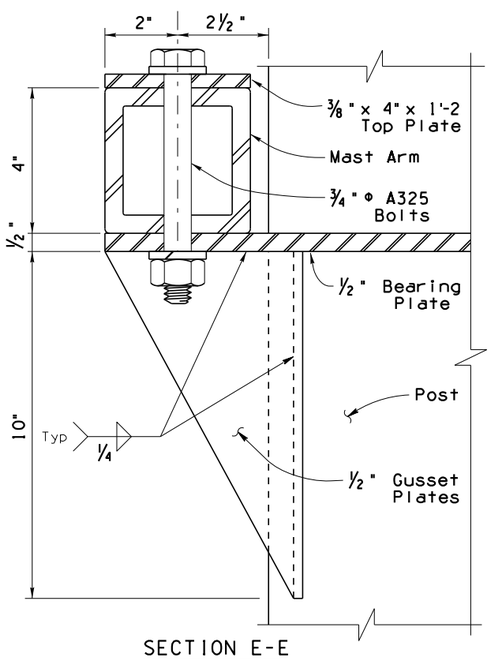


ELEVATION
(Sign Mount Assembly)

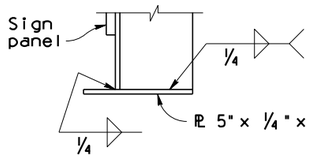
*Note:
Weld 1½" coupling, or drill and tap for 1½" chase nipple. Plug with recessed pipe plug.



SECTION D-D



SECTION E-E



VIEW F-F

TYPE A FRAME

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (ONE SIDED) TYPE A SIGN MOUNT ASSEMBLY
ROUTE / LOCATION	DRAWING NO. SD 9.02(3 of 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd902-3.0116.dgn

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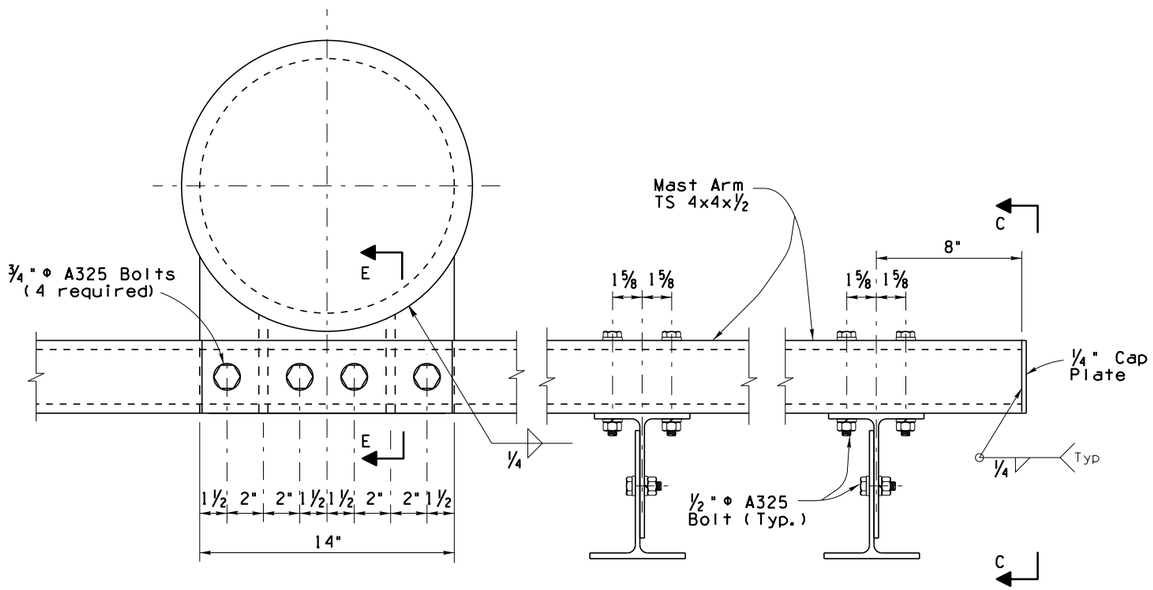
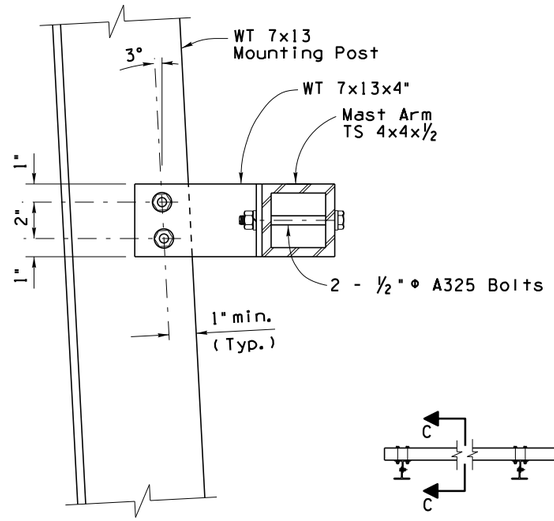
4			

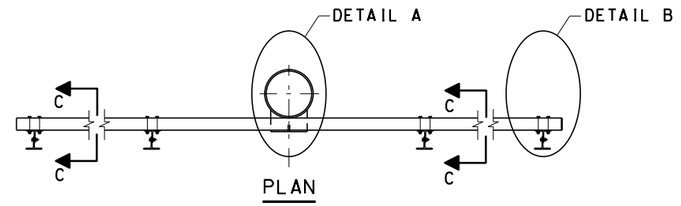


DETAIL A

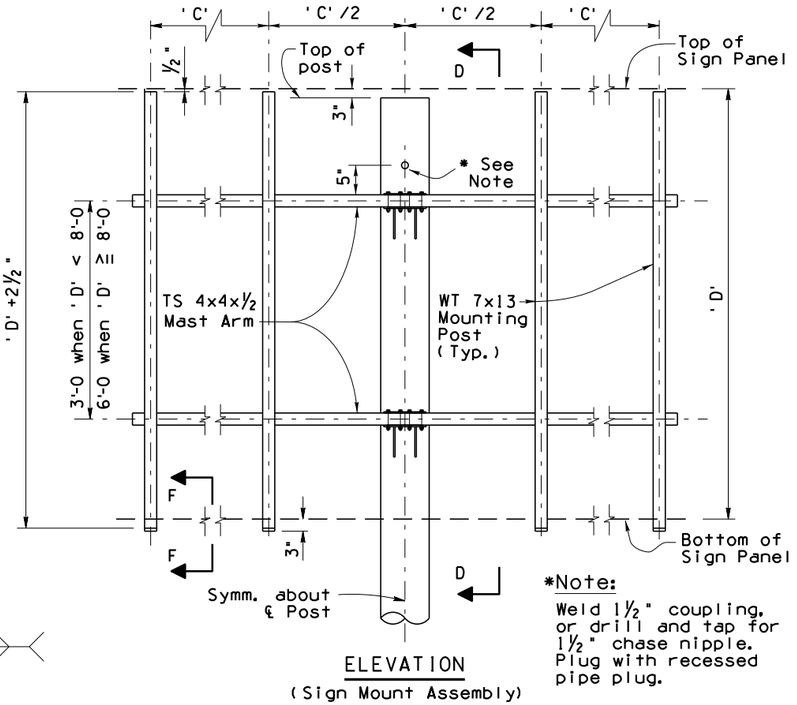
DETAIL B



SECTION C-C

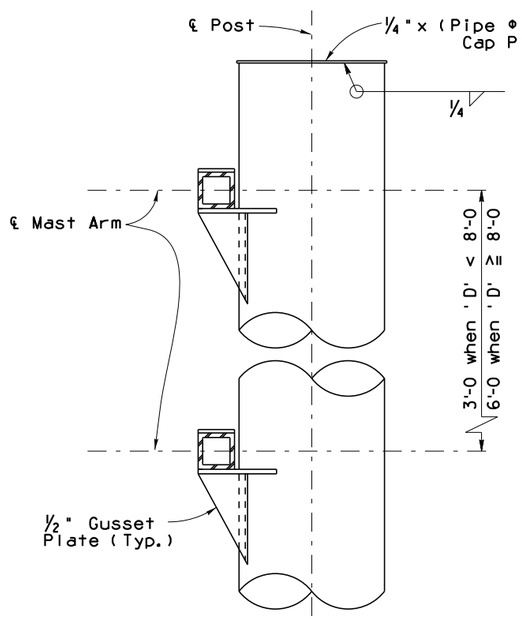


PLAN

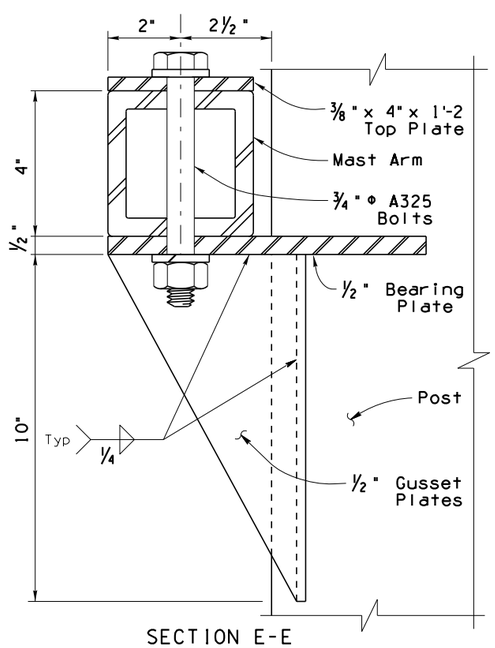


ELEVATION
(Sign Mount Assembly)

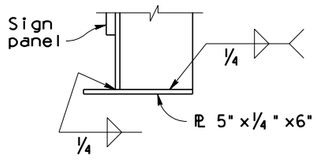
*Note:
Weld 1½" coupling, or drill and tap for 1½" chase nipple. Plug with recessed pipe plug.



SECTION D-D



SECTION E-E

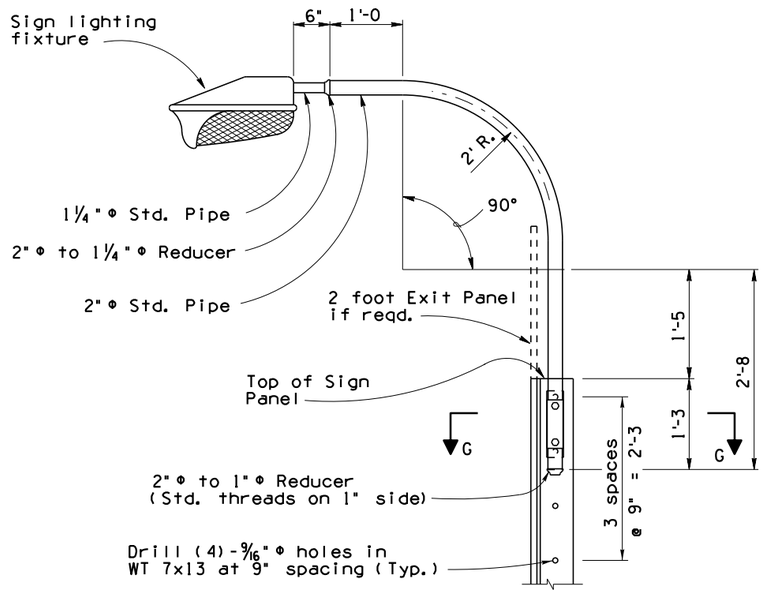


VIEW F-F

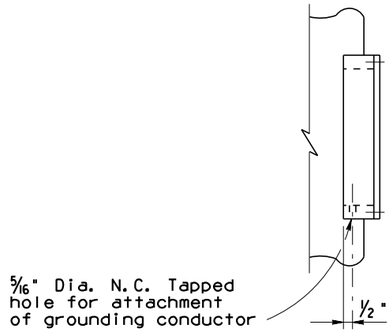
TYPE B FRAME

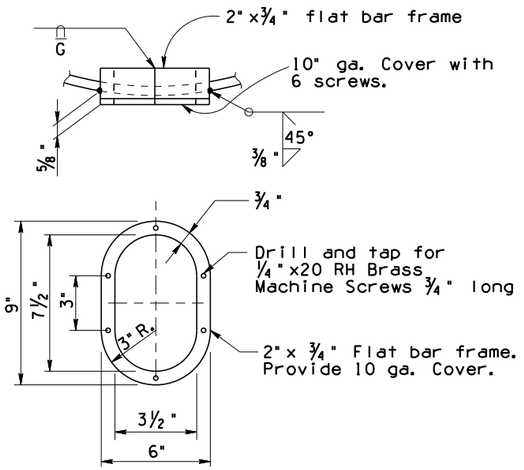
DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (ONE SIDED) TYPE B SIGN MOUNT ASSEMBLY
ROUTE / LOCATION	DRAWING NO. SD 9.02(4 of 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd902-4_0116.dgn

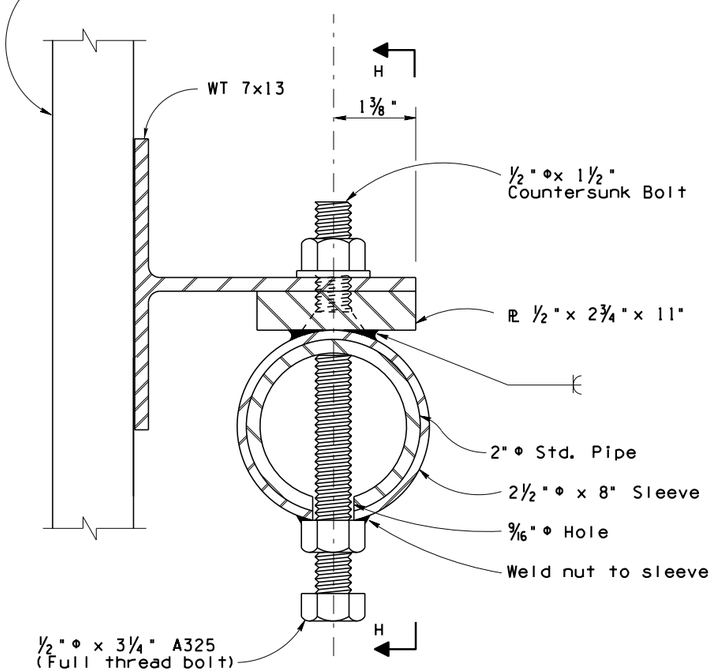


OVERHEAD LIGHT SUPPORT DETAIL

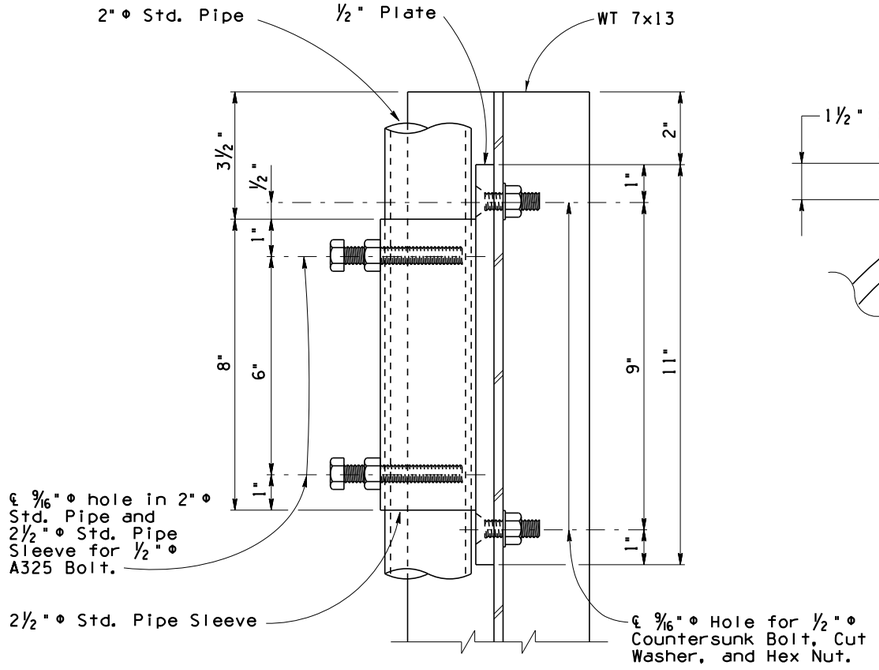




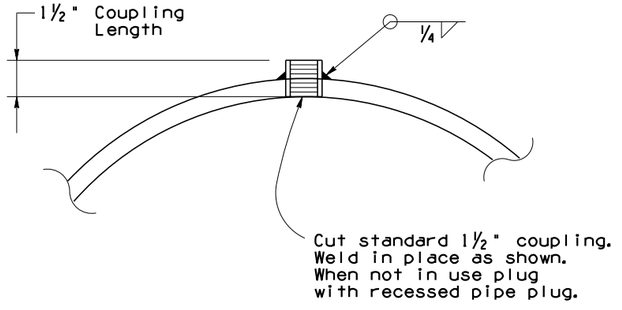
HANDHOLE & COVER DETAILS



SECTION G-G



ELEVATION H-H



COUPLING DETAIL

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1	Original Issue	SJH	5-00
2			
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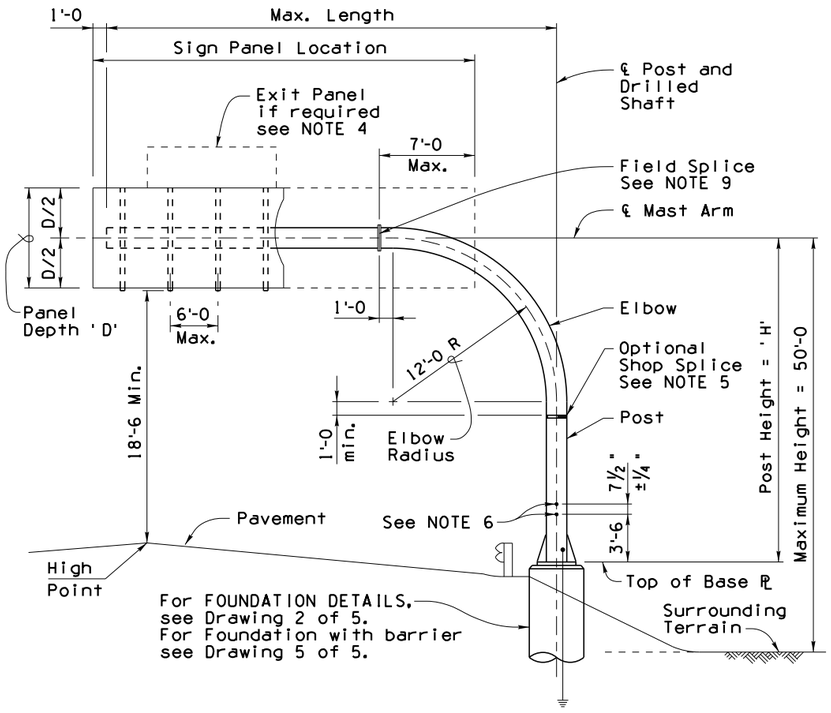
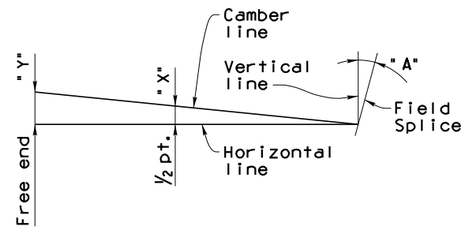
DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	MEDIAN SIGN STRUCTURE (ONE SIDED) LIGHT SUPPORT AND MISC. DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.02(5 of 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd902-5_0116.dgn



TUBULAR CANTILEVER SIGN STRUCTURE ELEVATION



CAMBER DIAGRAM

TYPE	Post Height (Ft)	CAMBER "X"	CAMBER "Y"	"A"
1C	0-5	⅞"	1⅝"	0° 20' 00"
	5.1-10	1"	2"	0° 24' 30"
	10.1-15	1⅛"	2¼"	0° 29' 00"
2C	0-5	⅞"	1½"	0° 18' 00"
	5.1-10	1"	1¾"	0° 22' 00"
	10.1-15	1⅛"	2⅛"	0° 26' 00"
3C	0-5	⅝"	1⅛"	0° 13' 30"
	5.1-10	¾"	1⅜"	0° 16' 30"
	10.1-15	⅞"	1⅝"	0° 20' 00"
4C	0-5	1⅝"	3"	0° 25' 00"
	5.1-10	1⅞"	3½"	0° 30' 00"
	10.1-15	2⅛"	4⅛"	0° 35' 30"

1. The camber shown is required to be built into mast arm. Members shall be erected so that camber is provided above the horizontal line thru the field splice.
2. The calculated camber provides for deflections due to dead loads of tubular cantilever structure and dead loads due to sign panels and attachments. For post heights between 0'-0 and 15'-0 values of "A", "X", and "Y" shall be interpolated.
3. The pipe flange of mast arm shall be perpendicular to its longitudinal axis. The pipe flange of elbow shall be tilted from the vertical line at the angle given in the table.

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 5th Edition 2010.

All tubular structural cantilever pipe shall be welded or seamless steel pipe and shall conform to ASTM Specification (Fy = 35,000 psi):

A-53	Grade B,	Type E or S
A252	Grade 2,	Type E or S
A106	Grade B,	Type S only
API 5L	Grade B,	Type E or S
API 5LX	Grade X42,	Type E or S

All other Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.

All bolts shall conform to ASTM Specification A325. All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1, latest Edition. All welding shall be continuous unless noted otherwise. All butt welds shall be full penetration using prequalified welding procedures and shall be tested by ultrasonic testing. All butt welds shall be ground flush, full width. Grinding striations shall be parallel to the length of member.

All other welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5 Bridge Welding Code, latest Edition.

The Column to base plate weld (WELD DETAIL A) and pipe flange to elbow and mast arm welds (WELD DETAIL C) shall be tested by ultrasonic testing.

All Concrete shall be Class "S" (f'c = 3500 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

Dimensions shall not be scaled from drawings.

TUBULAR CANTILEVER DATA FOR SIGN PANEL SUPPORT											
TUBULAR CANTILEVER				PIPE WALL THICKNESS (INCHES)			SIGN PANEL		PAYMENT ITEMS		
									CANTILEVER SIGN STRUCTURE		FOUNDATION	
Frame Type	Max. Length	Max. Post Height 'H'	Nominal Pipe Dia.	Post	Elbow	Mast Arm	Max. Area Sq. Ft.	Max. Depth 'D'	Item Number	Measurement	Item Number	Measurement
1C	33'-0	28'-0	16"	1.219	1.219	0.500	92	12'	6060131	Ea	6060254	Ea
2C	33'-0	28'-0	18"	1.156	1.156	0.625	151	12'	6060132	Ea	6060255	Ea
3C	33'-0	28'-0	20"	1.280	1.280	0.625	245	12'	6060133	Ea	6060256	Ea
4C	43'-0	28'-0	22"	1.125	1.125	0.875	186	10'	6060134	Ea	6060257	Ea

OVERHEAD SIGN NOTES:

1. Wind Loading: 90 MPH Velocity.
2. Maximum Height: 50'-0 from average surrounding terrain to the center of the sign panel (Regardless of post height). The Tubular Cantilever has been designed for site conditions which are level and neither elevated above the average surrounding terrain by more than the 50'-0 height shown nor supported on a bridge.
3. The maximum sign panel overlap onto elbow shall not exceed 7'-0 from field splice.
4. The sum of the sign panel area plus the exit panel area shall not exceed the maximum area shown in the table All signs shall be placed within Sign Panel Location.
5. The Optional Shop Splice may not be used when the splice location is less than 5'-0 above the top of base plate. Shop splice of pipe sections (other than shown) are not permitted without prior approval.
6. Drill and tap for 1½" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic.
7. If the tubular cantilever structure is erected as one unit, the pipe assembly shall be adequately suspended to avoid distortions.
8. During sign erection the post shall be raked as necessary with the use of leveling nuts to make the sign panel level. See Traffic Signing Plans for specific locations and elevations.
9. The Field Splice surfaces shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1⅜" radius around each bolt.
10. Provide electrical grounding at pole foundations per ADOT Standard Specification Sect. 732-3.03.

Drilled shaft location and top of drilled shaft elevation shall be field verified by the Contractor prior to fabrication of post.

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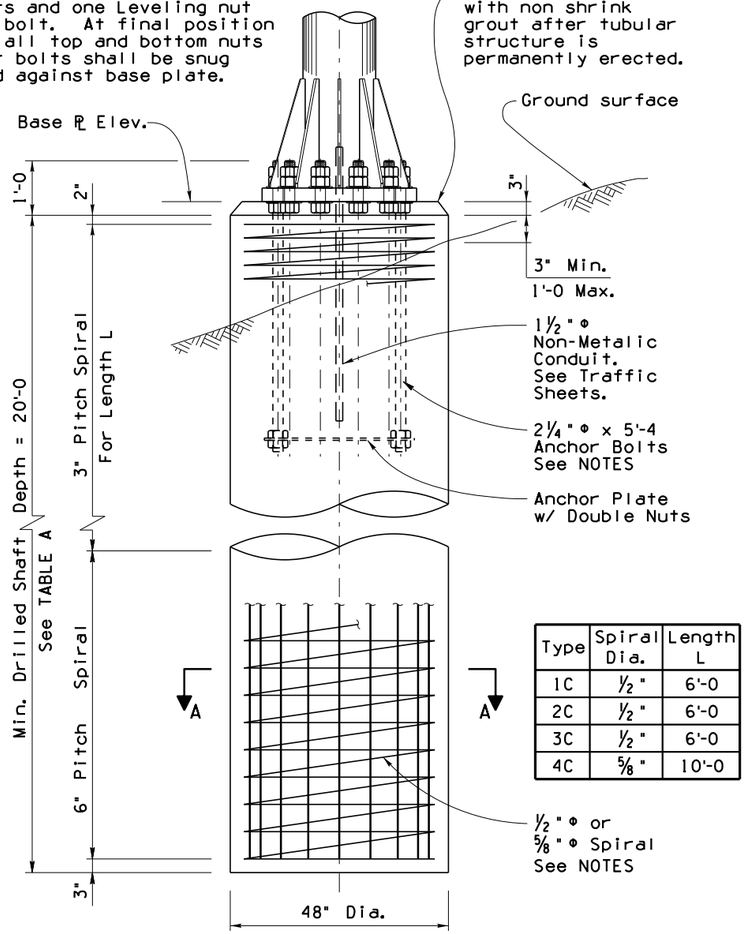
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	TUBULAR SIGN STRUCTURES TUBULAR CANTILEVER GENERAL PLAN
ROUTE / PROJECT NO. / FA NO.	DRAWING NO. SD 9.10 (1 of 5)
LOCATION	SHEET NO. OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd910-1_0116.dgn

NOTE:

Provide 2 Hardened Steel washers, 2 Hex nuts and one Leveling nut for each bolt. At final position of post, all top and bottom nuts of anchor bolts shall be snug tightened against base plate.

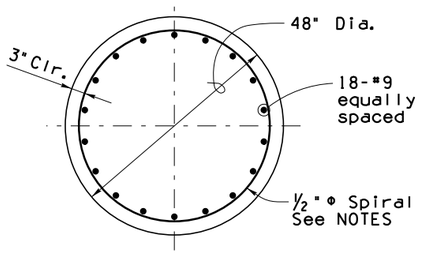


Type	Spiral Dia.	Length L
1C	½"	6'-0
2C	½"	6'-0
3C	½"	6'-0
4C	⅝"	10'-0

ELEVATION

TABLE A	
Max. Slope	'X'
8:1	0'
6:1	1'
4:1	2'
2:1	4'
1½:1	5'
1:1	8'

Drilled Shaft Depth shall be adjusted for ground slope. Add value of 'X' in TABLE A to the Min. Drilled Shaft Depth to obtain the total length of shaft.

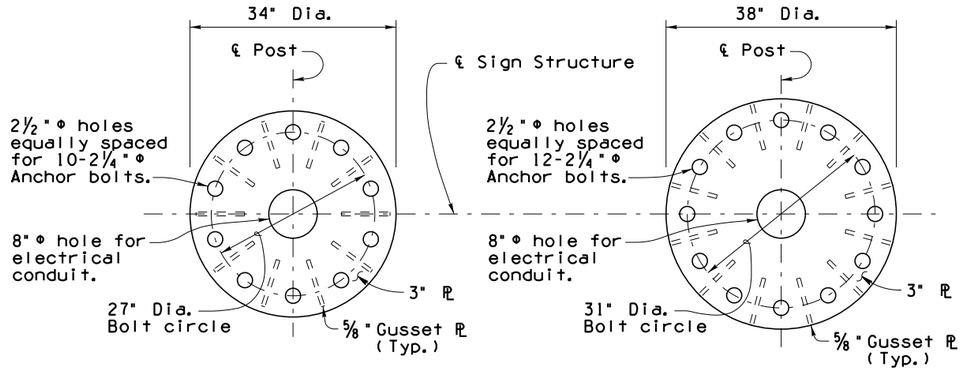


SECTION A-A

DRILLED SHAFT DETAILS

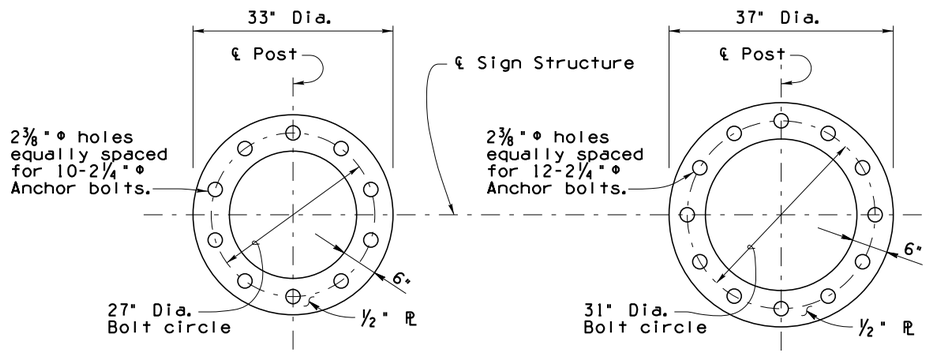
NOTE:

Gusset plates shall be placed perpendicular to base plate and post face and centered between anchor bolt holes.



16" & 18" Post Dia. 20" & 22" Post Dia.

BASE PLATE DETAILS



16" & 18" Post Dia. 20" & 22" Post Dia.

ANCHOR PLATE DETAILS

NOTES:

All anchor bolts shall conform to ASTM F1554 Grade 55 Specifications. The upper 1'-2 and lower 6" shall be threaded. The upper 1'-8 shall be galvanized in accordance with the requirements of ASTM A153.

Provide bolt template during installation of anchor bolts. The bolt template shall be fabricated of ¼" thick (Min.) steel plate, similar to anchor plate details, and shall be match drilled to each base plate.

Drilled shaft concrete shall be class 'S ' and shall be placed within undisturbed material or compacted embankment. Top of drilled shaft shall be formed to 1'-0 below ground surface. Compacted backfill shall be in place prior to erecting post.

½"Φ or ⅝"Φ Spiral shall be cold drawn steel wire conforming to AASHTO M32 except Min. Tensile Strength = 60,000 psi. Lap 1½ turns at top and bottom of spiral.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.M.H.	3-11
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR CANTILEVER
FOUNDATION DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.10 (2 of 5)
LOCATION			SHEET NO. OF

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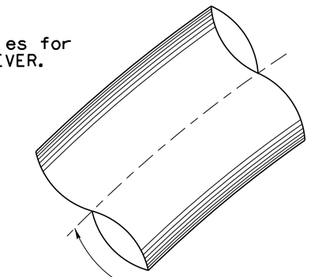
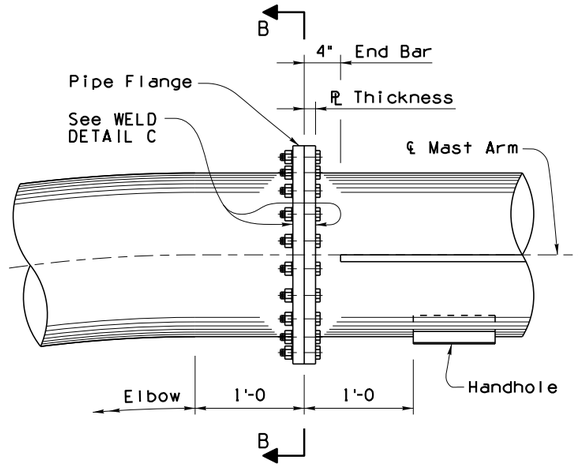
Field Splice					
Frame Type	Pipe Dia.	℄ Dia.	℄ Thickness	No. of Bolts	B.C. Dia.
1C	16"	22"	1¼"	22	19½"
2C	18"	24"	1⅜"	26	21½"
3C	20"	26"	1⅜"	29	23½"
4C	22"	28"	1½"	31	25½"

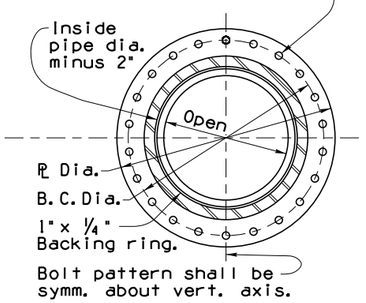
NOTE:
Provide handholes for TUBULAR CANTILEVER. See HANDHOLE & COVER DETAILS.



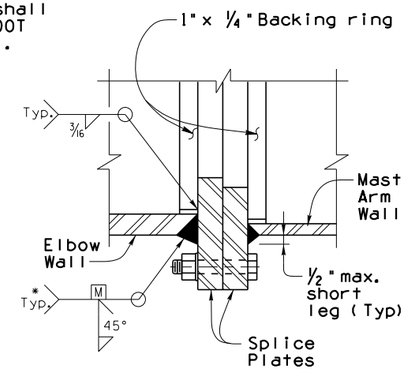


FIELD SPLICE

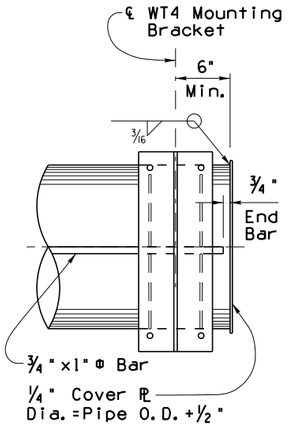
¾" Φ ATSM A325 bolts equally spaced. Bolt hole dia. = 15/16". Torque bolts to a tension of 28K. All A325 bolts shall be installed in accordance with ADOT Standard Specification 604-2.03(c). See table for other details.



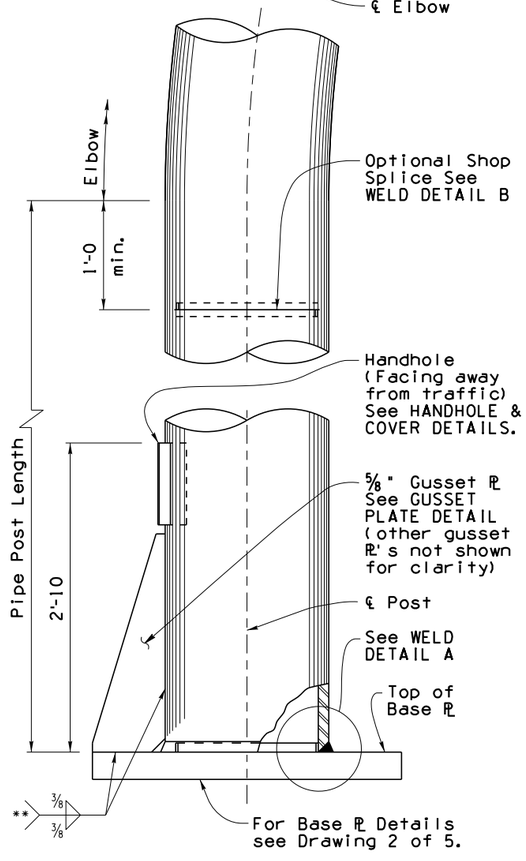
SECTION B-B



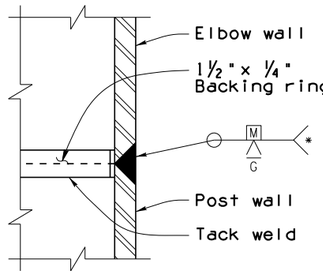
WELD DETAIL C



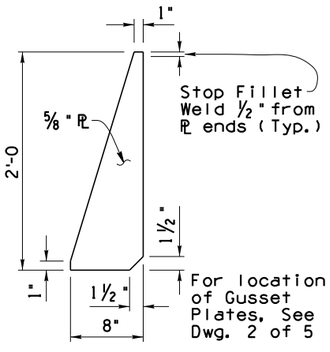
MAST ARM END DETAIL



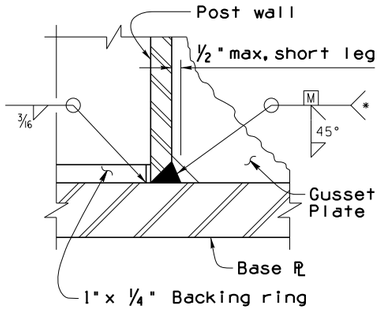
POST BASE ELEVATION



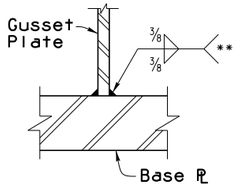
WELD DETAIL B



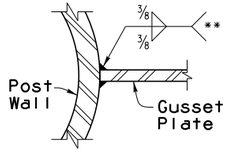
GUSSET PLATE DETAIL



WELD DETAIL A

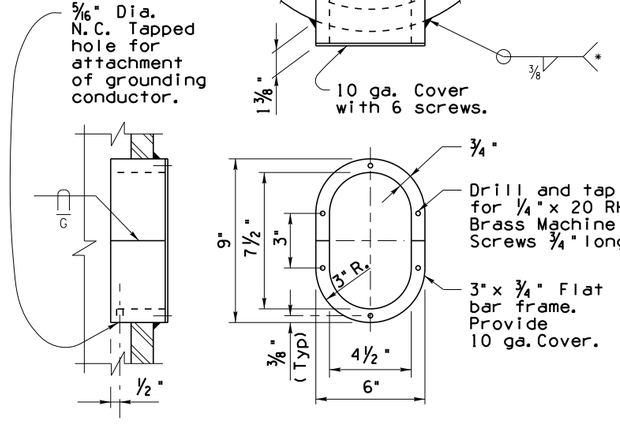


To Base Plate



To Post Wall

GUSSET PLATE WELDS



HANDHOLE & COVER DETAILS

* Preheat per AWS requirements.

** Stop Fillet Weld ½" from ℄ ends.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

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DESIGN APPROVED: Shafi U. Hasan

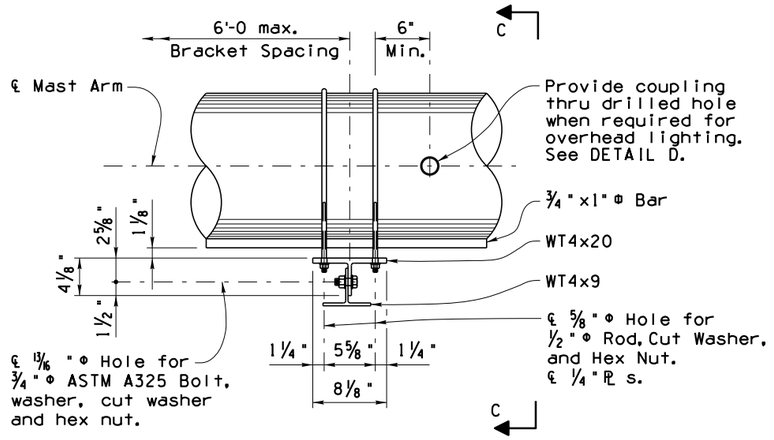
APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR CANTILEVER
POST AND MAST ARM DETAILS

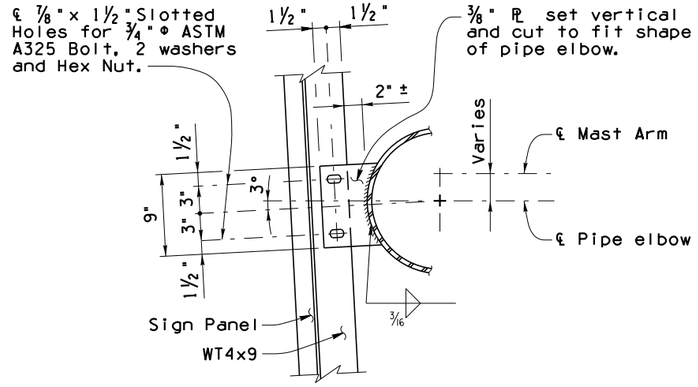
ROUTE	PROJECT NO.	F.A. NO.	DRAWING NO.
			SD 9.10 (3 of 5)
LOCATION			SHEET NO. OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd910-3_0116.dgn



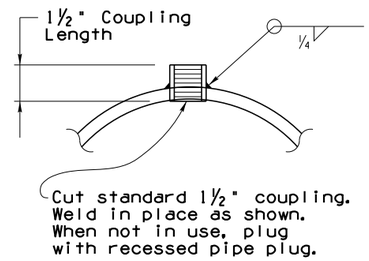
PLAN

SIGN MOUNTING BRACKET

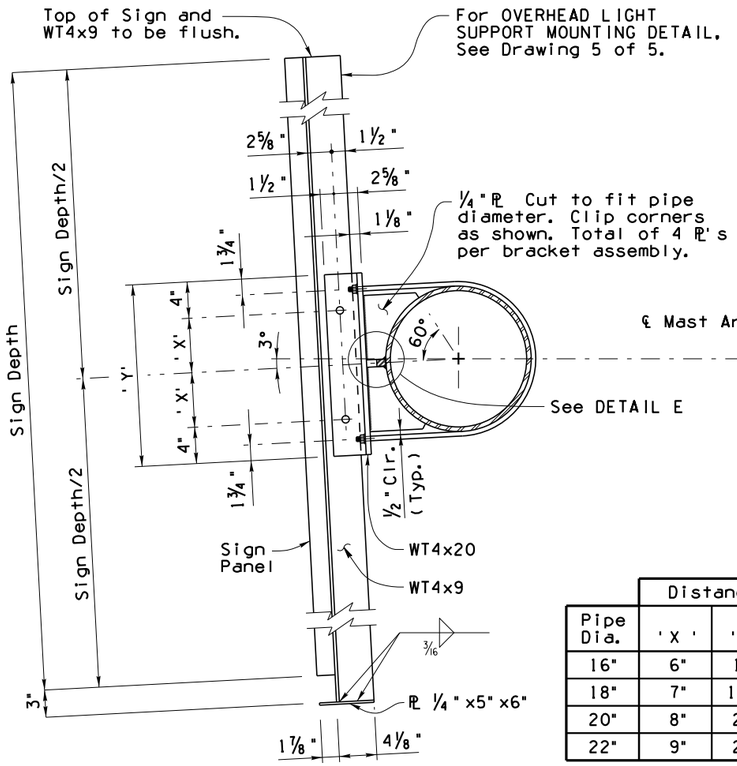


ELEVATION

SIGN MOUNTING BRACKET AT ELBOW

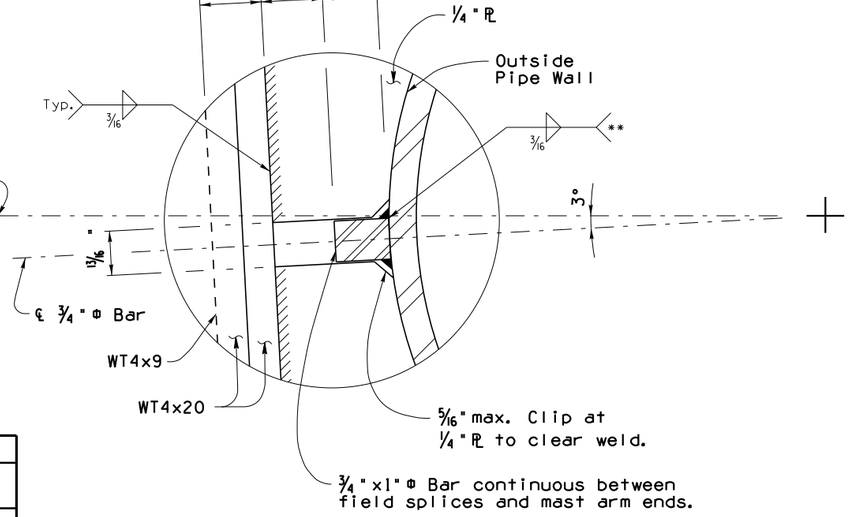


DETAIL D



ELEVATION C-C

Pipe Dia.	Distance 'X'	Distance 'Y'
16"	6"	1'-8
18"	7"	1'-10
20"	8"	2'-0
22"	9"	2'-2



** Discontinue weld for 3 in. at shop splice location. See Dwg. 3 of 5.

DETAIL E

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

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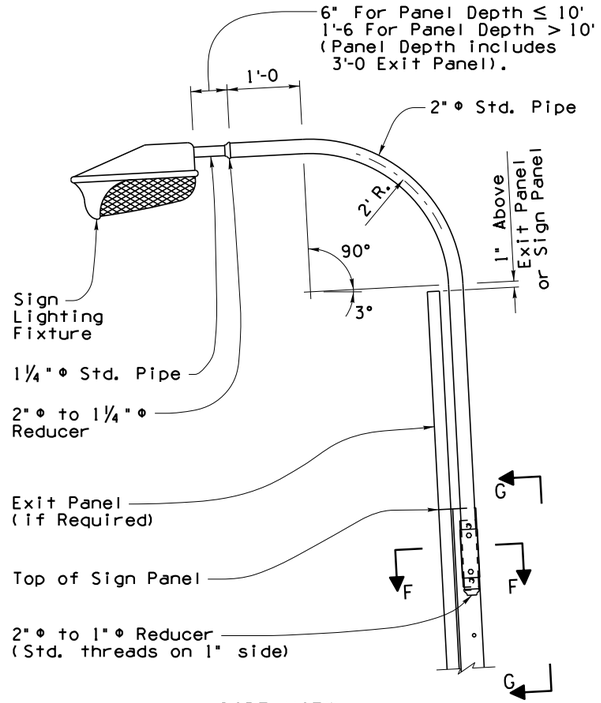
APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR CANTILEVER
SIGN SUPPORT DETAILS

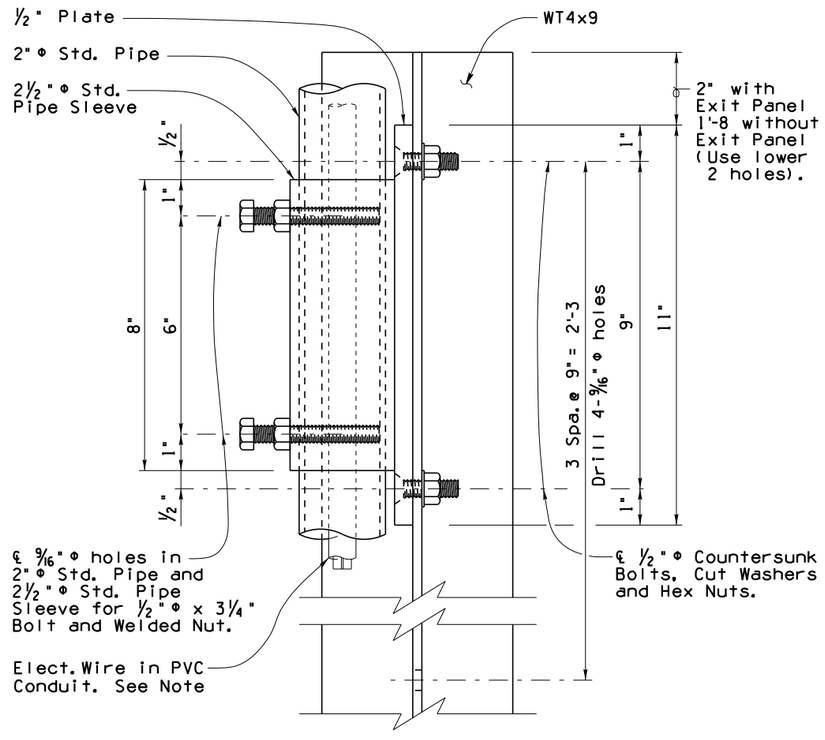
ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.10 (4 of 5)
LOCATION			SHEET NO. 0F

22-APR-2019 14:11 G:\9750\SD_Sheets\sd910-4_0116.dgn

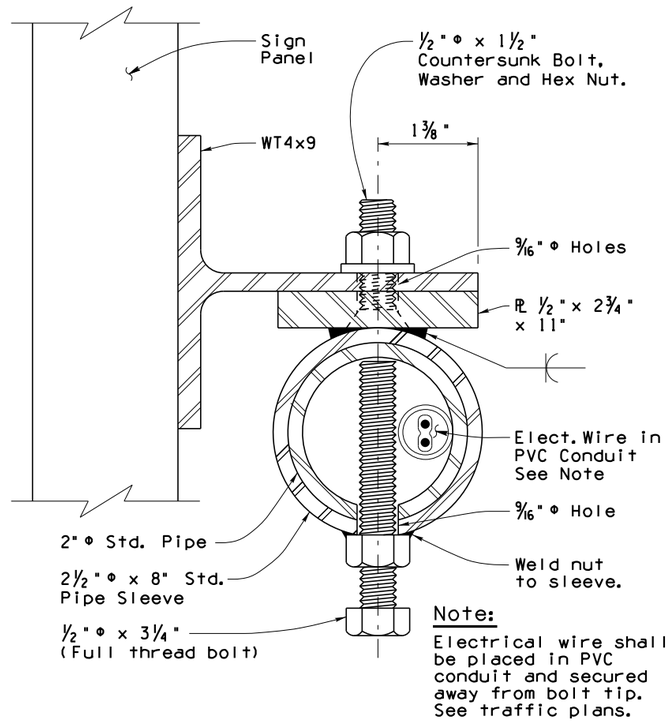


SIDE VIEW

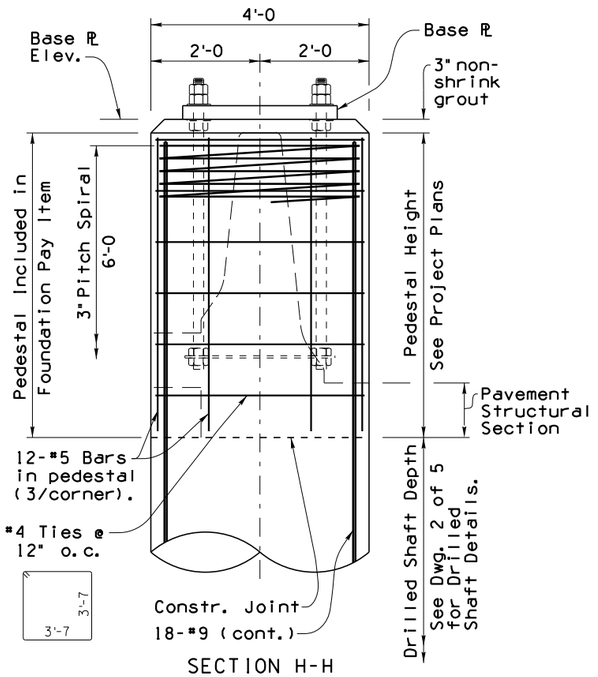
OVERHEAD LIGHT SUPPORT MOUNTING DETAIL



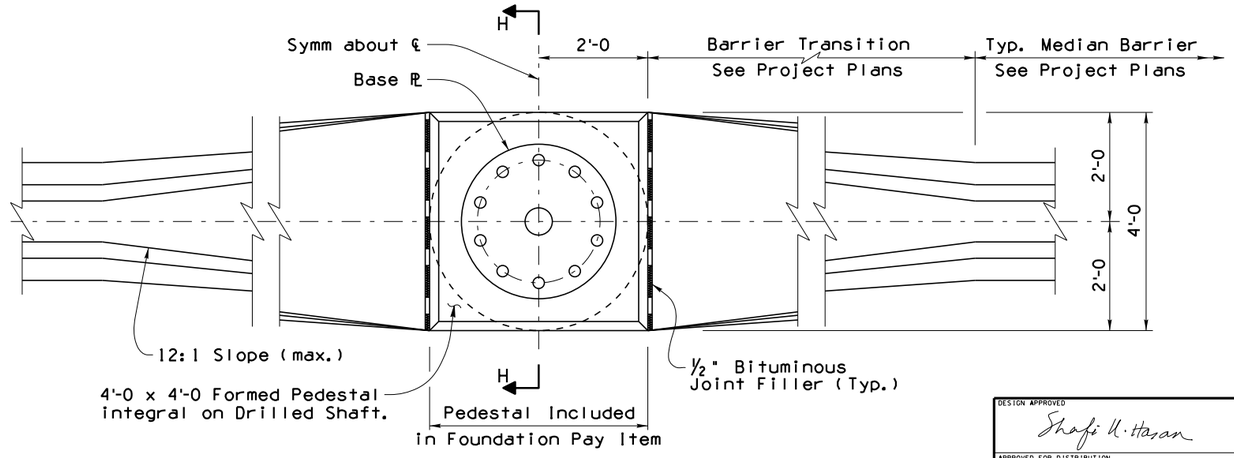
ELEVATION G-G



SECTION F-F



SECTION H-H



PLAN

TUBULAR POST ON BARRIER PEDESTAL

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

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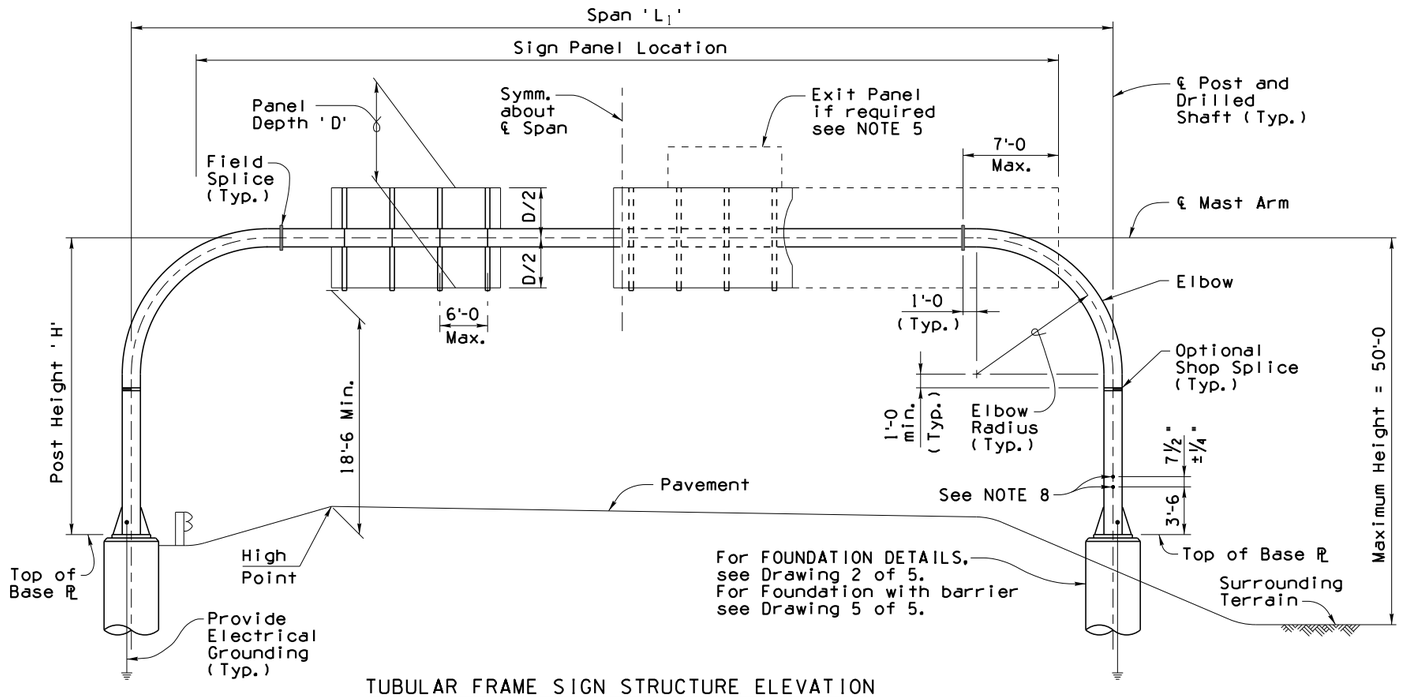
APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR CANTILEVER
LIGHT SUPPORT DETAILS

ROUTE	PROJECT NO.	F.A. NO.	DRAWING NO.
			SD 9.10 (5 of 5)
LOCATION			SHEET NO.
			OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd910-5_0116.dgn



TUBULAR FRAME SIGN STRUCTURE ELEVATION

TUBULAR FRAME DATA FOR SIGN PANEL SUPPORT												
TUBULAR FRAME					PIPE WALL THICKNESS (INCHES)			SIGN PANEL		PAYMENT ITEMS		
										BRIDGE SIGN STRUCTURE		FOUNDATIONS	
Frame Type	Frame Span 'L1'	Nominal Pipe Dia.	90° Elbow Radius	Max. Post Height 'H'	Post	Elbow	Mast Arm	Max. Area Sq. Ft.	Max. Depth 'D'	Item Number	Measurement	Item Number	Measurement
1F	20'-70'	12"	10'-0	28'-0	1.312	1.312	1.000	250	8'	6060045	Ea	6060075	Ea
2F	41'-70'	16"	10'-0	30'-0	1.219	1.219	0.500	690	12'	6060046	Ea	6060076	Ea
3F	71'-110'	20"	12'-0	30'-0	1.280	1.280	0.625	920	12'	6060047	Ea	6060078	Ea
4F	111'-142'	22"	12'-0	30'-0	1.125	1.125	0.875	920	12'	6060048	Ea	6060079	Ea

OVERHEAD SIGN NOTES:

1. Wind Loading: 90 MPH Velocity
2. Maximum Height: 50'-0 from average surrounding terrain to the ℄ of the mast arm (Regardless of post height). The Tubular Overhead has been designed for site conditions which are level and neither elevated above the average surrounding terrain by more than the 50'-0 height shown nor supported on a bridge.
3. Maximum difference between post heights for an individual frame = 5'-0.
4. The maximum sign panel overlap onto elbow shall not exceed 7'-0 from field splice.
5. The sum of the sign panel area plus the exit panel area shall not exceed the maximum area shown in table. All signs shall be placed within Sign Panel Location.
6. For Standard pipe mast arms with lengths greater than 60'-0 an optional field splice will be permitted at the third points of mast arm length to facilitate hauling operations.
7. The Optional Shop Splice may not be used when the splice location is less than 5'-0 above the top of base plate. Shop splice of pipe sections (other than shown) are not permitted without prior approval.
8. Drill and tap for 1½" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. Install nipples on shoulder posts only.
9. Before any portion of the tubular frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame in the no load condition is equal to (± ½ inch) the field measured span length between foundations.
10. If the tubular frame is erected as one unit the frame shall be adequately suspended to avoid distortions or changes in span length between base plates.
11. The Field Splice surfaces shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1⅜" radius around each bolt.
12. Provide electrical grounding at pole foundations per ADOT Standard Specification Sect. 732-3.03.

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 5th Edition 2010.

All tubular structural frame pipe shall be welded or seamless steel pipe and shall conform to ASTM Specification (Fy = 35,000 psi):

A-53	Grade B,	Type E or S
A252	Grade 2,	Type E or S
A106	Grade B,	Type S only
API 5L	Grade B,	Type E or S
API 5LX	Grade X42,	Type E or S

All other Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.

All bolts shall conform to ASTM Specification A325. All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1, latest Edition. All welding shall be continuous unless noted otherwise. All butt welds shall be full penetration using prequalified welding procedures and shall be tested by ultrasonic testing. All butt welds shall be ground flush, full width. Grinding striations shall be parallel to the length of member.

All other welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5 Bridge Welding Code, latest Edition.

The Column to base plate weld (WELD DETAIL A) shall be tested by ultrasonic testing.

All Concrete shall be Class "S" (f'c = 3500 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

Dimensions shall not be scaled from drawings.

Drilled shaft locations and top of drilled shaft elevations shall be field verified by the Contractor prior to fabrication of posts.

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1.	Original Issue	J.R.P.	6-01
2.	Correction of Type IF Span	S.U.H.	8-02
3.	General Update	S.U.H.	3-11
4.			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR FRAME
GENERAL PLAN

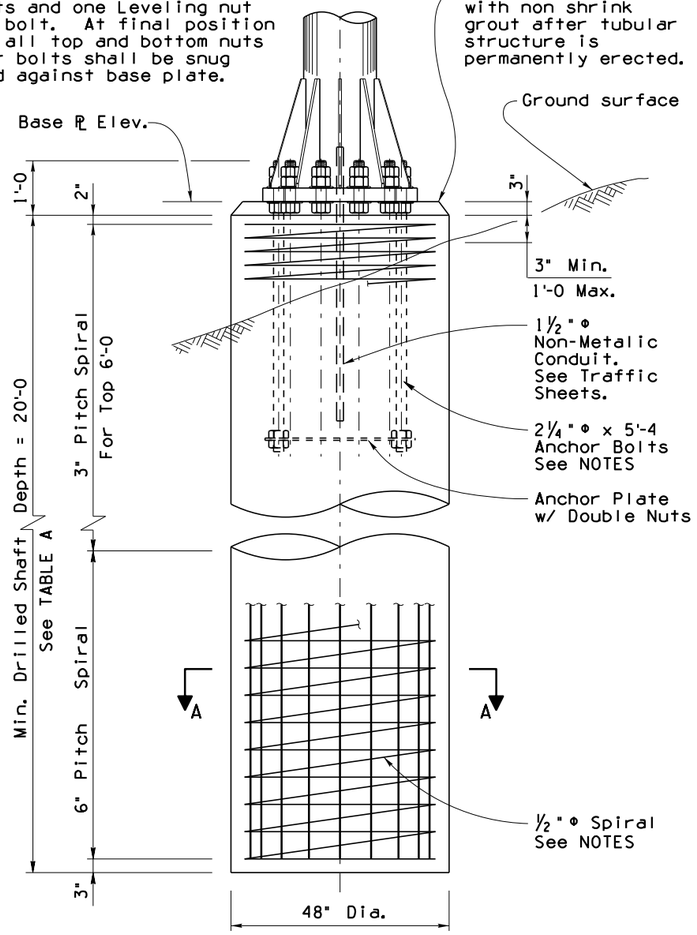
ROUTE | PROJECT NO. | F.A. NO. | DRAWING NO. SD 9.20 (1 of 5)

LOCATION | SHEET NO. OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd920-1_0116.dgn

NOTE:

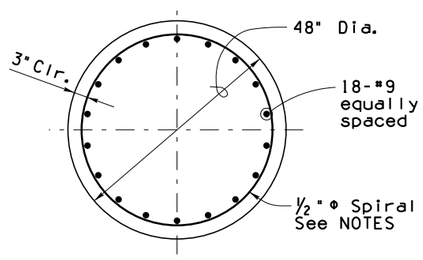
Provide 2 Hardened Steel washers, 2 Hex nuts and one Leveling nut for each bolt. At final position of post, all top and bottom nuts of anchor bolts shall be snug tightened against base plate.



ELEVATION

TABLE A	
Max. Slope	'X'
8:1	0'
6:1	1'
4:1	2'
2:1	4'
1½:1	5'
1:1	8'

Drilled Shaft Depth shall be adjusted for ground slope. Add value of 'X' in TABLE A to the Min. Drilled Shaft Depth to obtain the total length of shaft.

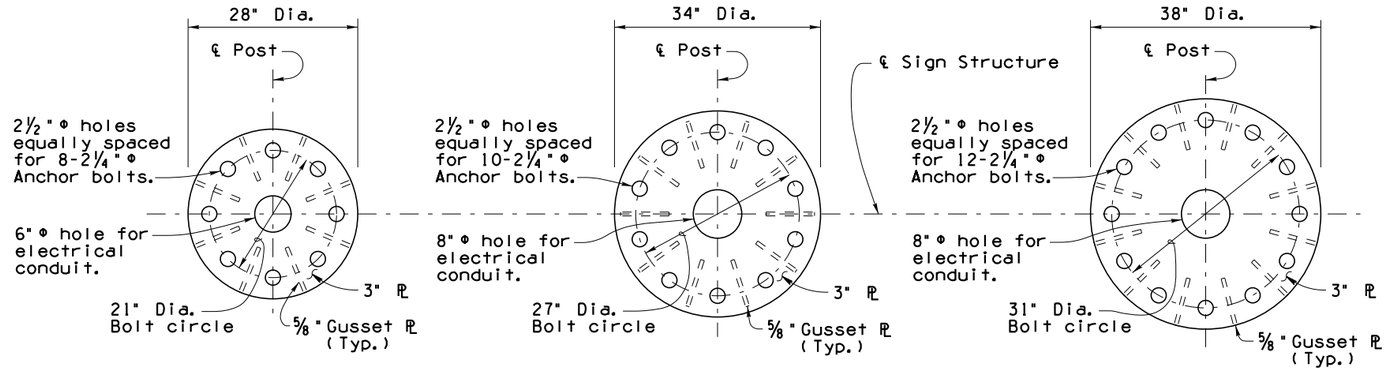


SECTION A-A

DRILLED SHAFT DETAILS

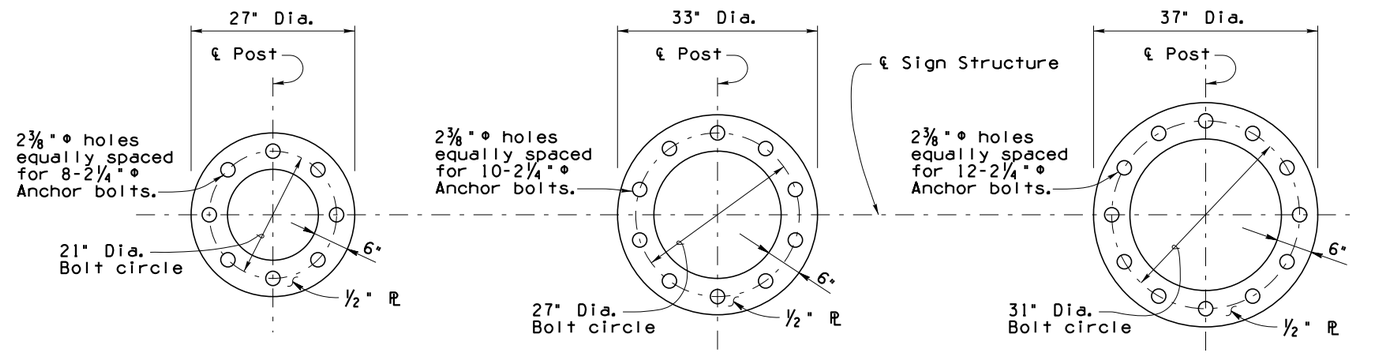
NOTE:

Gusset plates shall be placed perpendicular to base plate and post face and centered between anchor bolt holes.



12" Post Dia. | 16" Post Dia. | 20" & 22" Post Dia.

BASE PLATE DETAILS



12" Post Dia. | 16" Post Dia. | 20" & 22" Post Dia.

ANCHOR PLATE DETAILS

NOTES:

All anchor bolts shall conform to ASTM F1554 Grade 55 Specifications. The upper 1'-2 and lower 6" shall be threaded. The upper 1'-8 shall be galvanized in accordance with the requirements of ASTM A153.

Provide bolt template during installation of anchor bolts. The bolt template shall be fabricated of ¼" thick (Min.) steel plate, similar to anchor plate details, and shall be match drilled to each base plate.

Drilled shaft concrete shall be class 'S' and shall be placed within undisturbed material or compacted embankment. Top of drilled shaft shall be formed to 1'-0 below ground surface. Compacted backfill shall be in place prior to erecting post.

½"Φ Spiral shall be cold drawn steel wire conforming to AASHTO M32 except Min. Tensile Strength = 60,000 psi. Lap 1½ turns at top and bottom of spiral.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.M.H.	3-11
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR FRAME
FOUNDATION DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.20 (2 of 5)
LOCATION			SHEET NO. OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd920-2.0116.dgn

Note to Designer:
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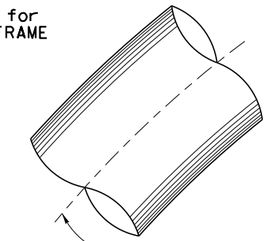
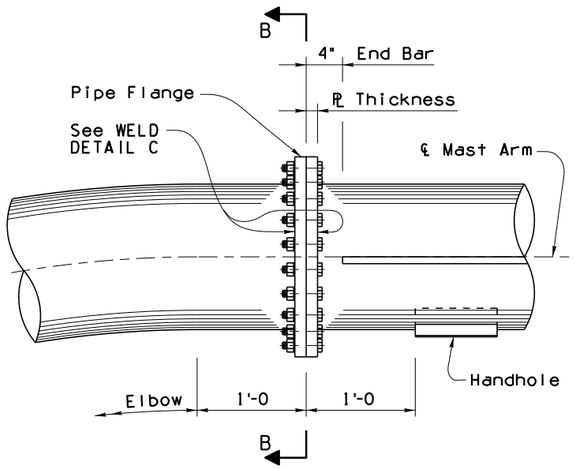
Field Splice					
Frame Type	Pipe Dia.	℄ Dia.	℄ Thickness	No. of Bolts	B.C. Dia.
1F	12"	18"	1"	16	15½"
2F	16"	22"	1¼"	22	19½"
3F	20"	26"	1⅜"	29	23½"
4F	22"	28"	1½"	31	25½"

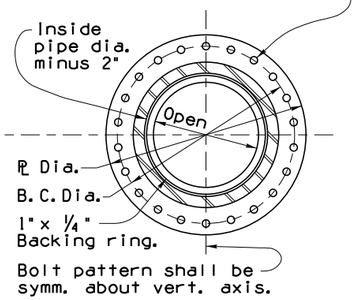
NOTE:
Provide handholes for TUBULAR OVERHEAD FRAME on one side only. For HANDHOLE & COVER DETAILS See Dwg. 4 of 5.



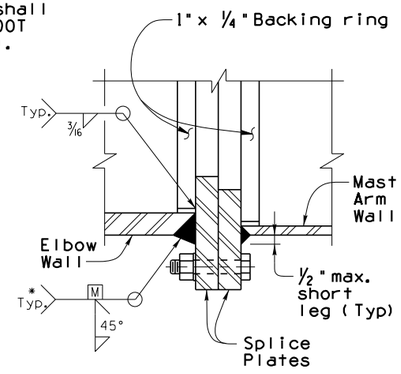


FIELD SPLICE

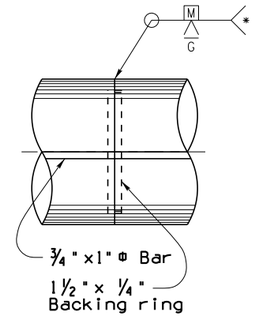
¾" Φ ATSM A325 bolts equally spaced. Bolt hole dia.= 13/16". Torque bolts to a tension of 28K. All A325 bolts shall be installed in accordance with ADOT Standard Specification 604-2.03(c). See table for other details.



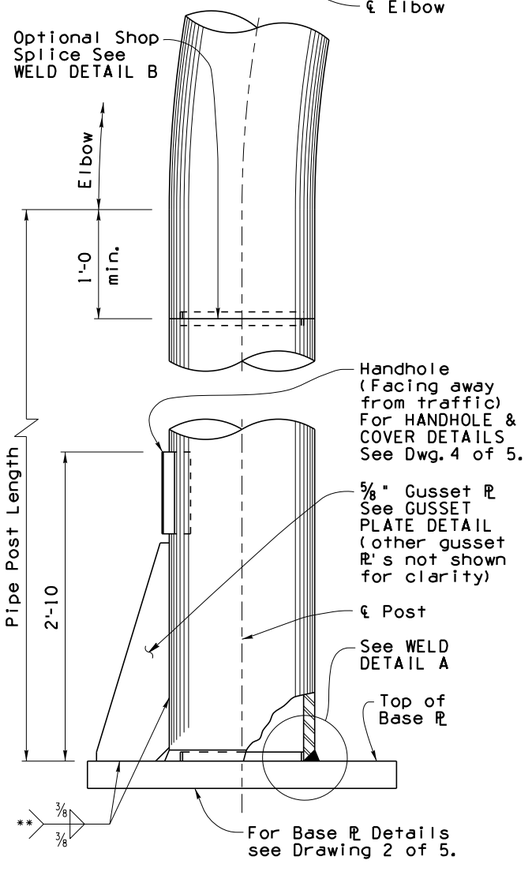
SECTION B-B



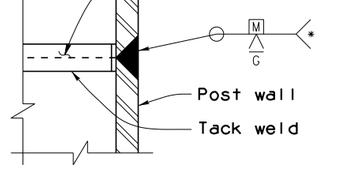
WELD DETAIL C



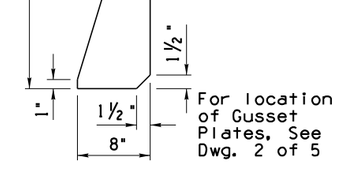
SHOP SPLICE



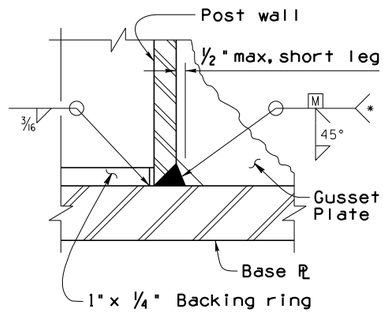
POST BASE ELEVATION



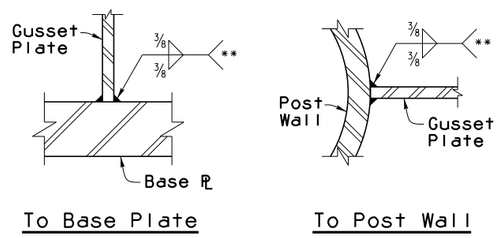
WELD DETAIL B



GUSSET PLATE DETAIL

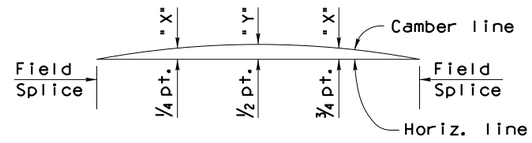


WELD DETAIL A



To Base Plate | To Post Wall

GUSSET PLATE WELDS



CAMBER DIAGRAM

Camber shown is required to be built into horizontal members. Members shall be erected so that camber is provided above the Horizontal line.

TUBULAR FRAME CAMBER (INCHES)											
Frame Type	1F	1F	2F	2F	2F	3F	3F	3F	4F	4F	4F
Span	40'-0	70'-0	46'-0	58'-0	70'-0	82'-0	94'-0	106'-0	118'-0	130'-0	142'-0
"X"	¾"	2"	½"	1"	1½"	1¾"	2½"	3½"	4"	6"	7¾"
"Y"	1½"	2½"	¾"	1¼"	2"	2¼"	3½"	4¾"	6"	8¼"	11¼"

Calculated camber provides for deflections due to dead load of tubular structure and dead loads due to sign panels and attachments. For spans other than shown, interpolate for "X" and "Y" dimensions.

* Preheat per AWS requirements.

** Stop Fillet Weld ½" from ℄ ends.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

Note to Designer:
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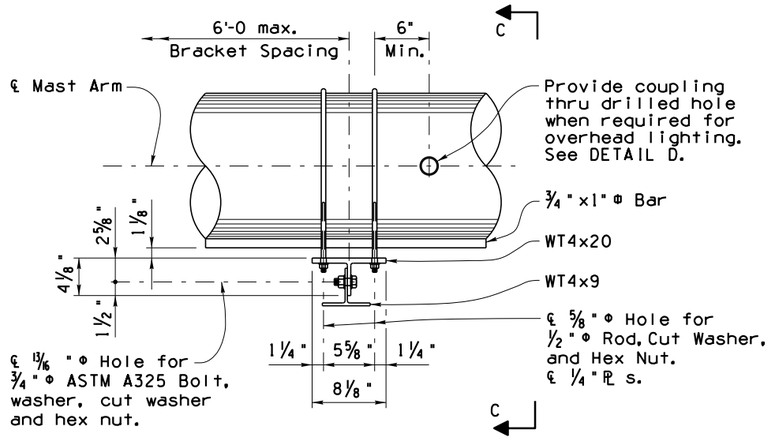
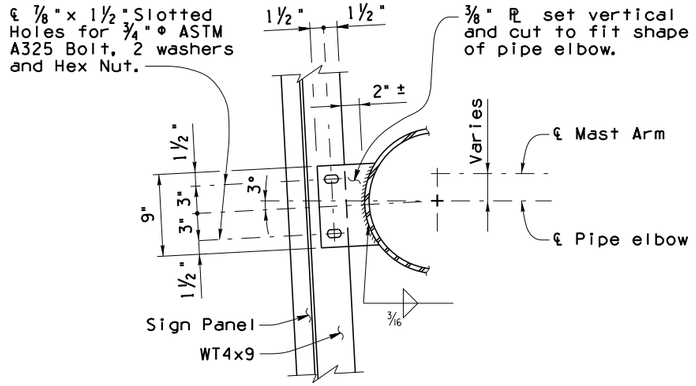
DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	TUBULAR SIGN STRUCTURES TUBULAR FRAME POST AND MAST ARM DETAILS
ROUTE / PROJECT NO. / F.A. NO.	DRAWING NO. SD 9.20 (3 of 5)
LOCATION	SHEET NO. OF

22-APR-2019 14:11 G:\9750\SD_Sheets\sd920-3_0116.dgn



PLAN

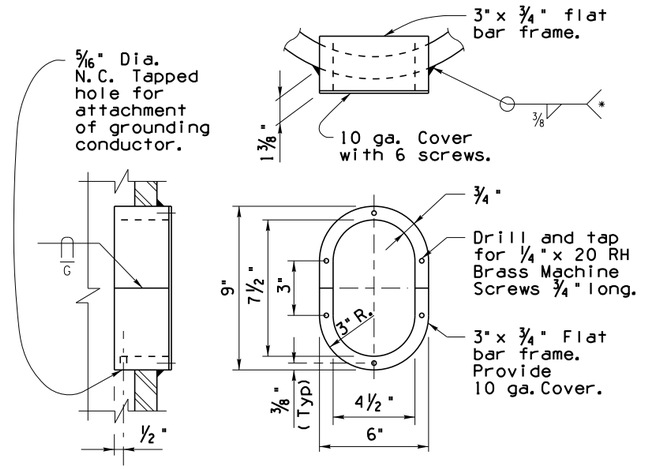
SIGN MOUNTING BRACKET



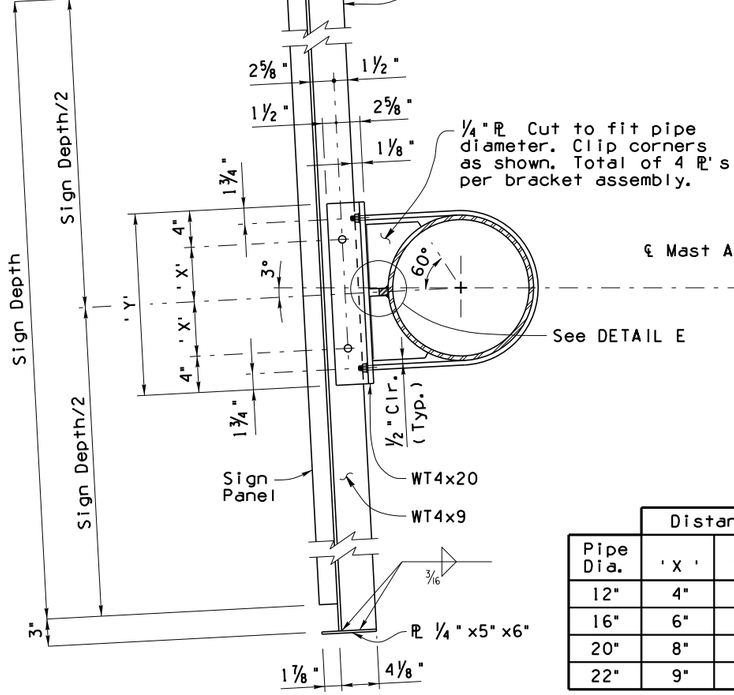
ELEVATION

SIGN MOUNTING BRACKET AT ELBOW

* Preheat per AWS requirements.

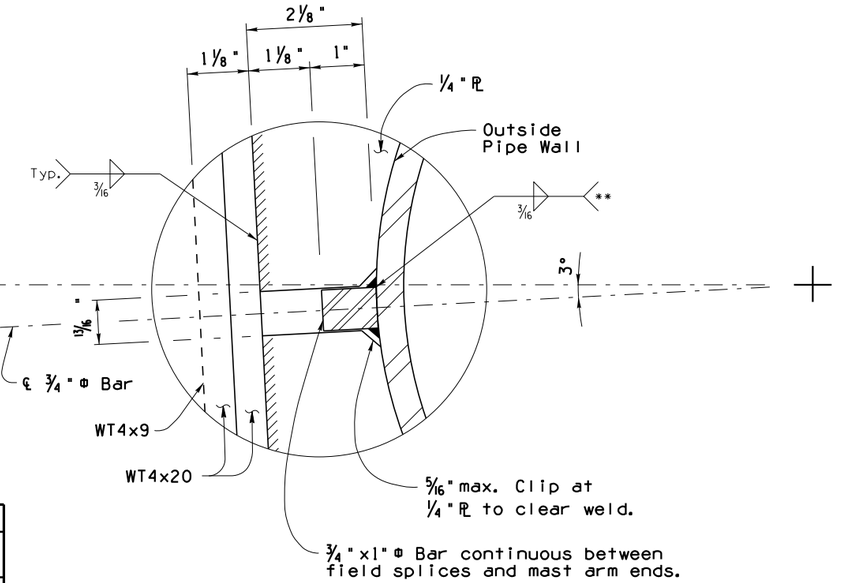


HANDHOLE & COVER DETAILS



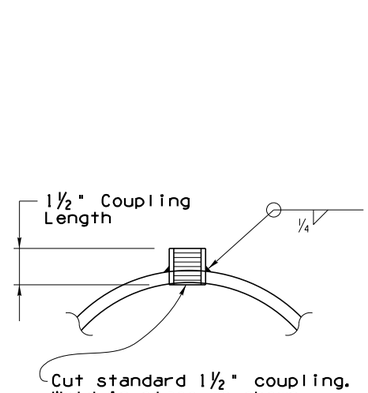
ELEVATION C-C

Pipe Dia.	Distance 'X'	Distance 'Y'
12"	4"	1'-4
16"	6"	1'-8
20"	8"	2'-0
22"	9"	2'-2



** Discontinue weld for 3 in. at shop splice location. See Dwg. 3 of 5.

DETAIL E



DETAIL D

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-06
2	General Update	S.U.H.	3-11
3			
4			

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APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR FRAME
SIGN SUPPORT DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.20 (4 of 5)
LOCATION			SHEET NO. 0F

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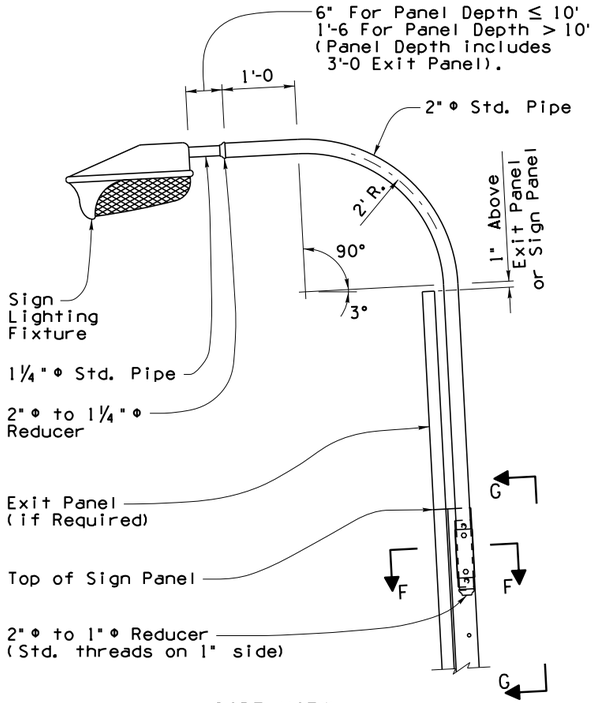
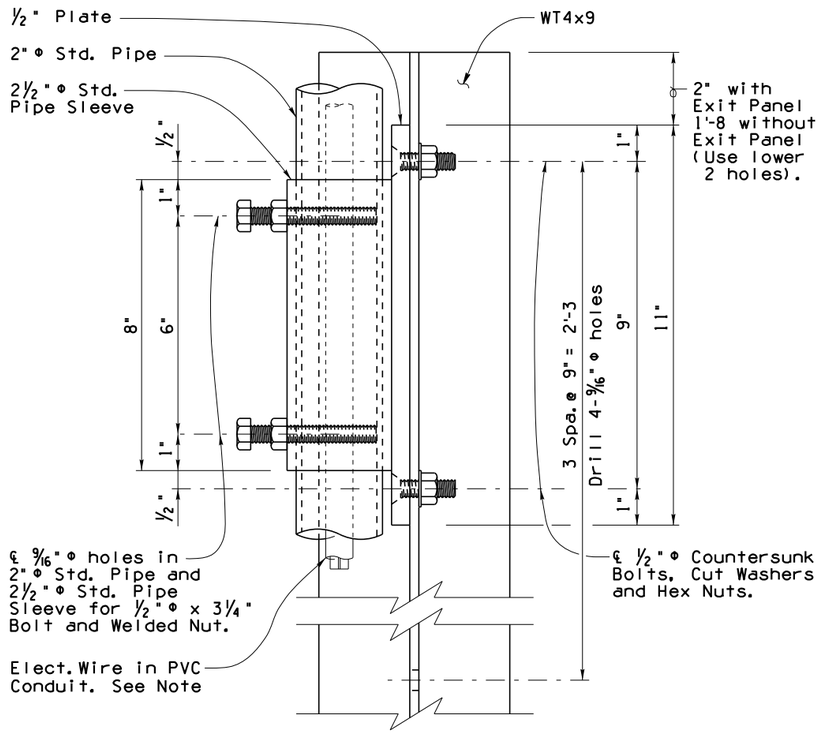
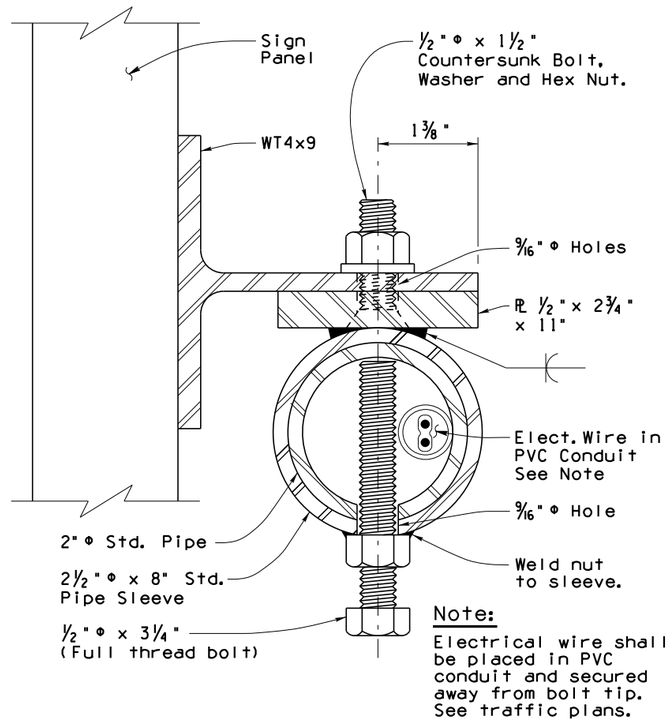


SIDE VIEW

OVERHEAD LIGHT SUPPORT MOUNTING DETAIL

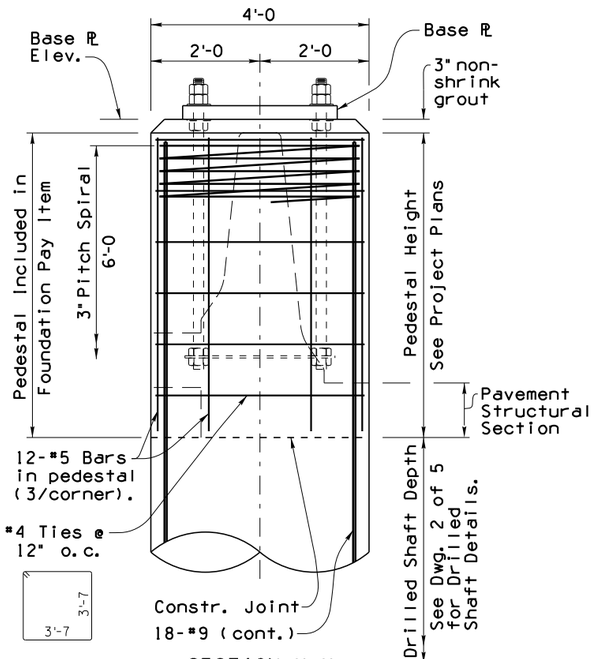


ELEVATION G-G

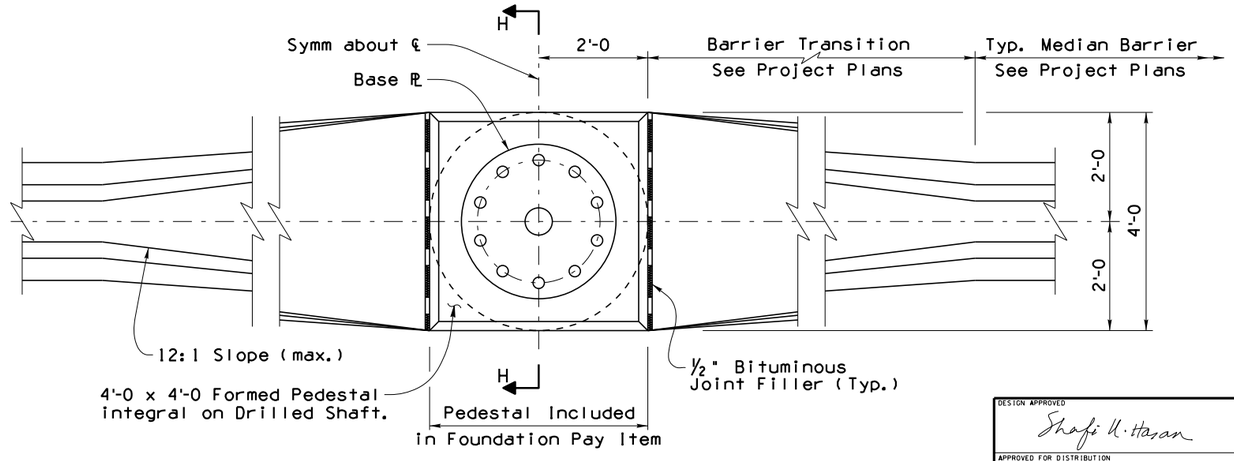


Note:
Electrical wire shall be placed in PVC conduit and secured away from bolt tip. See traffic plans.

SECTION F-F



SECTION H-H



PLAN

TUBULAR POST ON BARRIER PEDESTAL

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	J.R.P.	6-01
2	General Update	S.U.H.	3-11
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

TUBULAR SIGN STRUCTURES
TUBULAR FRAME
LIGHT SUPPORT AND MISC. DETAILS

ROUTE	PROJECT NO.	F.A. NO.	DRAWING NO.
			SD 9.20 (5 of 5)
LOCATION			SHEET NO.
			OF

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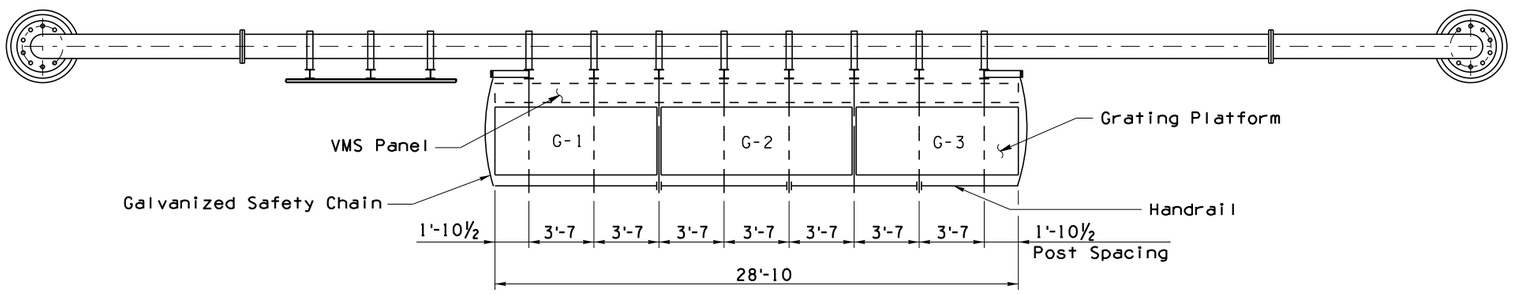
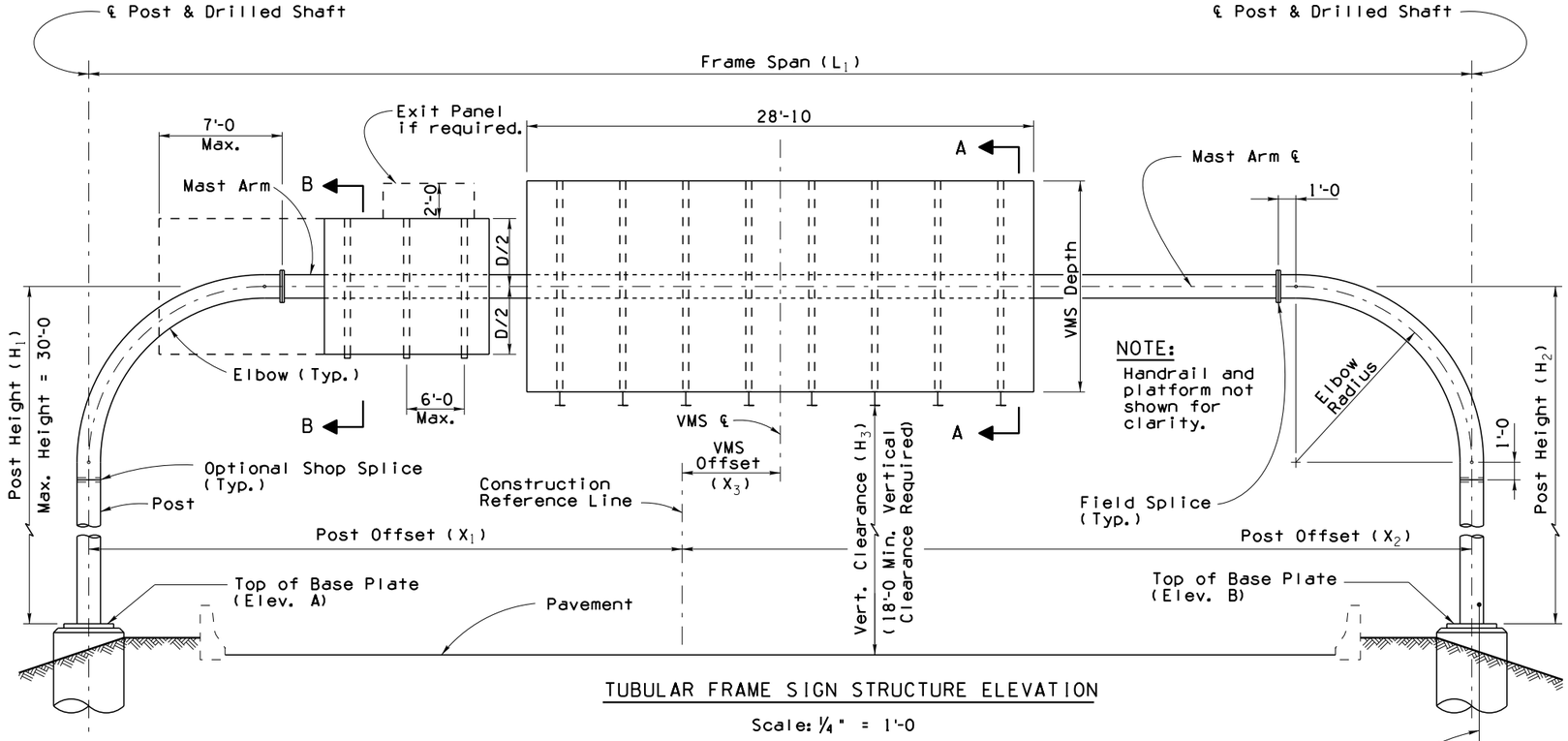


PLAN



TUBULAR FRAME SIGN STRUCTURE ELEVATION

Scale: ¼" = 1'-0

NOTE:
Handrail and platform not shown for clarity.

VMS DESCRIPTION

Depth = 9'-2
Length = 28'-10
Weight = 3000 lbs.

TUBULAR FRAME DATA FOR VMS PANEL SUPPORT								
TYPE	TUBULAR FRAME			PIPE WALL THICKNESS (INCHES)			Max. Sign Depth D*	Max. Sign Area Sq. Ft. **
	Frame Span L_1	Nominal Pipe Dia.	90° ELBOW RADIUS	Post	Elbow	Mast Arm		
1F	20' -40'	12"	10'-0	1.312	1.312	1.000		VMS
2F	41' -70'	16"	10'-0	1.219	1.219	0.500	12'	VMS+400
3F	71' -110'	20"	12'-0	1.280	1.280	0.625	12'	VMS+560
4F	111' -142'	22"	12'-0	1.125	1.125	0.875	12'	VMS+560

* For additional traffic sign panels.
** Includes 2'-0 Exit Panel.

NOTE:
See SD 9.50 Sheet (2 of 5) for SECTION A-A.
See SD 9.50 Sheet (3 of 5) for SECTION B-B.
For General Notes see SD 9.20(1 of 5)
For Camber Diagram see SD 9.20(3 of 5)
For Foundation Details see SD 9.20(2 of 5).
(Provide 8½ inch diameter hole in center of column base plate to accommodate conduits)
For Frame and Handhole Details see SD 9.20(3 of 5).
For Sign Support Details see SD 9.20(4 of 5).
For Overhead Light Details see SD 9.20(5 of 5).

OVERHEAD SIGN NOTES:

Wind loading: 80 MPH Velocity.

Maximum Height: 50'-0 from original ground to center of sign panel (Regardless of post height).

The maximum sign panel overlap onto elbow shall not exceed 7'-0 from field splice.

Drill and tap for 1½" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. Install nipples on shoulder posts only.

Maximum difference between post heights for an individual frame = 5'-0.

For Standard pipe mast arms with lengths greater than 60'-0, an optional field splice will be permitted at the third points of mast arm length to facilitate hauling operations.

Before any portion of the tubular frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame in the no load condition is equal to (±½ inch) the field measured span length between foundations.

If the tubular frame is erected as a unit, the frame shall be adequately suspended during installation to avoid distortions or changes in span length between base plates.

Provide electrical grounding at pole foundation per ADOT Standard Specification Sect. 732-3.03.

Drilled shaft locations and top of drilled shaft elevations shall be field verified by the Contractor prior to fabrication of posts.

NOTE:
Project drawings shall provide the following site specific VMS frame information on VMS location sheets:

VMS FRAME SUMMARY TABLE	
VMS NO.:	VERTICAL CLEARANCE, H_3:
ROUTE:	TOP OF BASE PLATE, ELEV. A:
MILE POST:	TOP OF BASE PLATE, ELEV. B:
STATION:	POST OFFSET, X_1:
FRAME SPAN, L_1:	POST OFFSET, X_2:
HEIGHT, H_1:	VMS OFFSET, X_3:
HEIGHT, H_2:	

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	7-99
2	Add Catwalk, Vert. Clearance	SJH	1-00
3	Remove harness, drip pan, widen grating, enlarge base Pl. hole	SJH	7-00
4	Type and SD 9.20 Reference	SJH	8-02

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: J. Daniel Dano

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

VARIABLE MESSAGE SIGN
TUBULAR FRAME
PLAN & ELEVATION

ROUTE | LOCATION | DRAWING NO. SD 9.50(1 OF 5)

TRACS NO. | ___ OF ___

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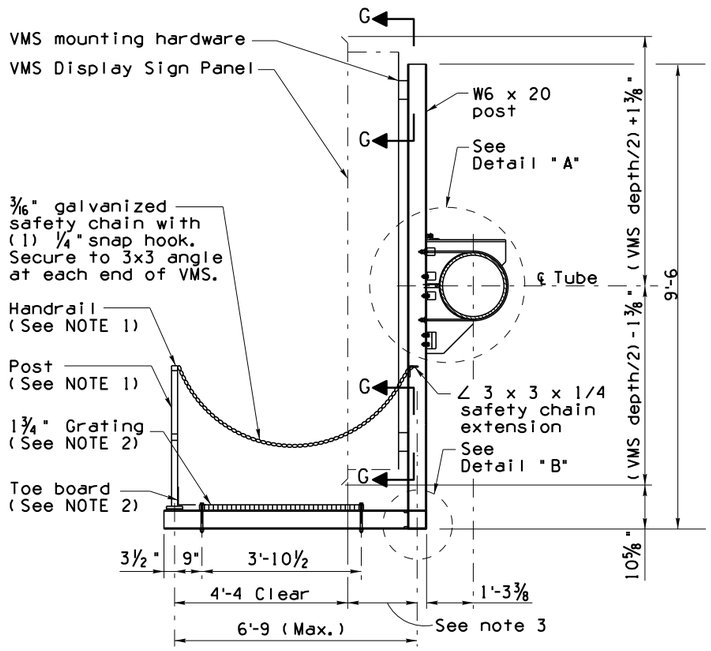
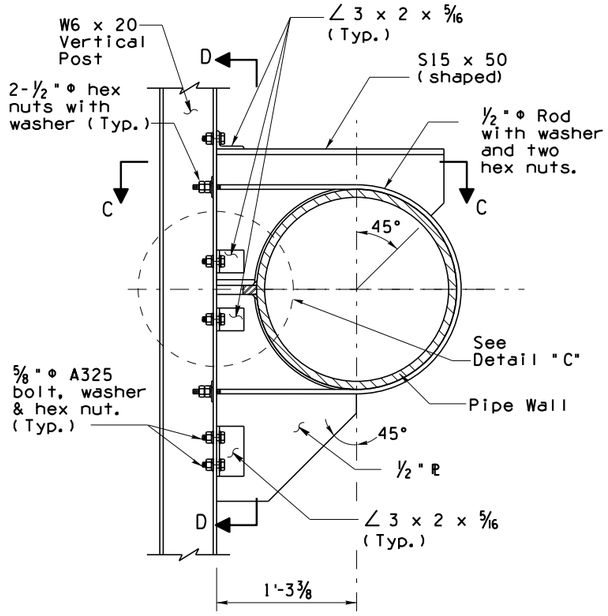
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1.	Original Issue	SJH	7-99
2.	Add Catwalk	SJH	1-00
3.	Remove harnass, drip pan, widen grating, enlarge base Pl., hole	SJH	7-00
4.	Frame Type and SD 9.20 reference	SJH	8-02



SECTION A-A



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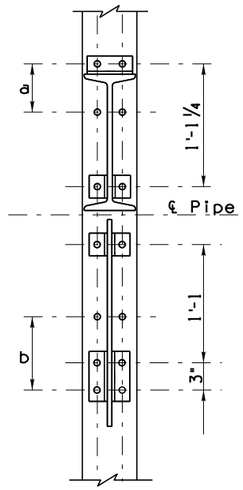
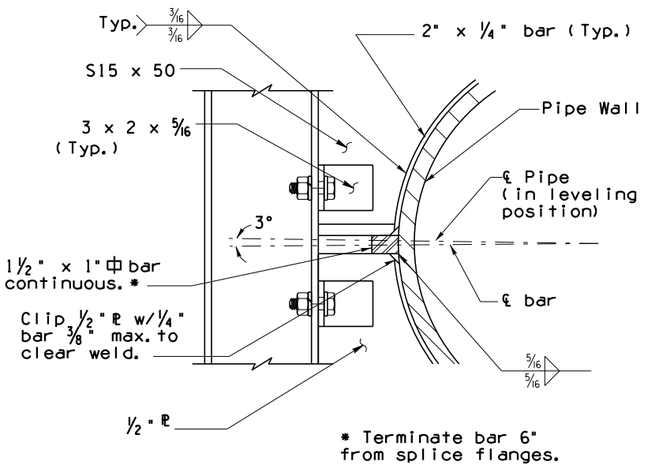


SECTION D-D



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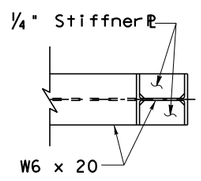
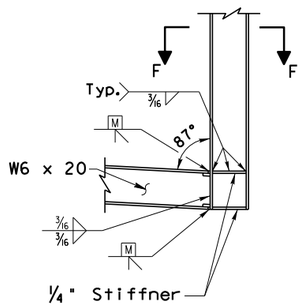


SECTION F-F



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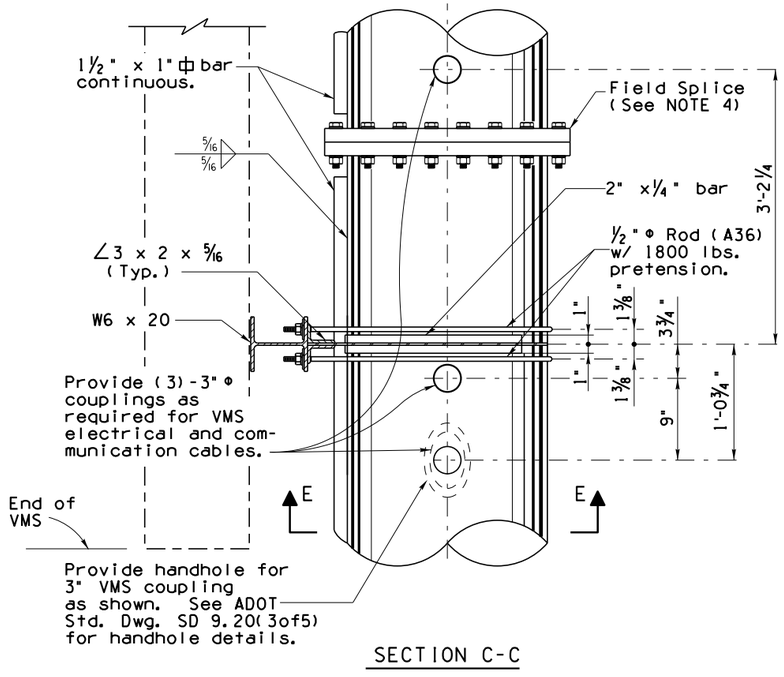
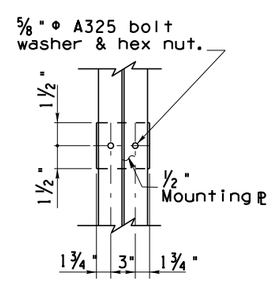
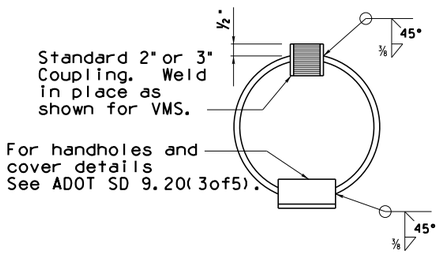


SECTION C-C



SECTION G-G



SECTION E-E

Frame Type	Nominal Pipe Dia.	R	a	b
1F	12"	6 3/8"	10 1/16"	12 11/16"
2F	16"	8"	8 7/16"	11 1/16"
3F	20"	10"	6 7/16"	9 1/16"
4F	22"	11"	5 7/16"	8 1/16"

NOTE:

1. See SD 9.50 Sheet 4 of 5 for handrail, post and hinge details.
2. See SD 9.50 Sheet 5 of 5 for grating and toeboard details.
3. Dimensions to be determined from VMS sign manufacturer. Grating shall extend under face of VMS sign panel.
4. Optional mast arm field splice, if any, shall not interfere with VMS panel supports, handhole or coupling locations.

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: J. Daniel Dorn

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

VARIABLE MESSAGE SIGN TUBULAR FRAME MOUNTING DETAILS

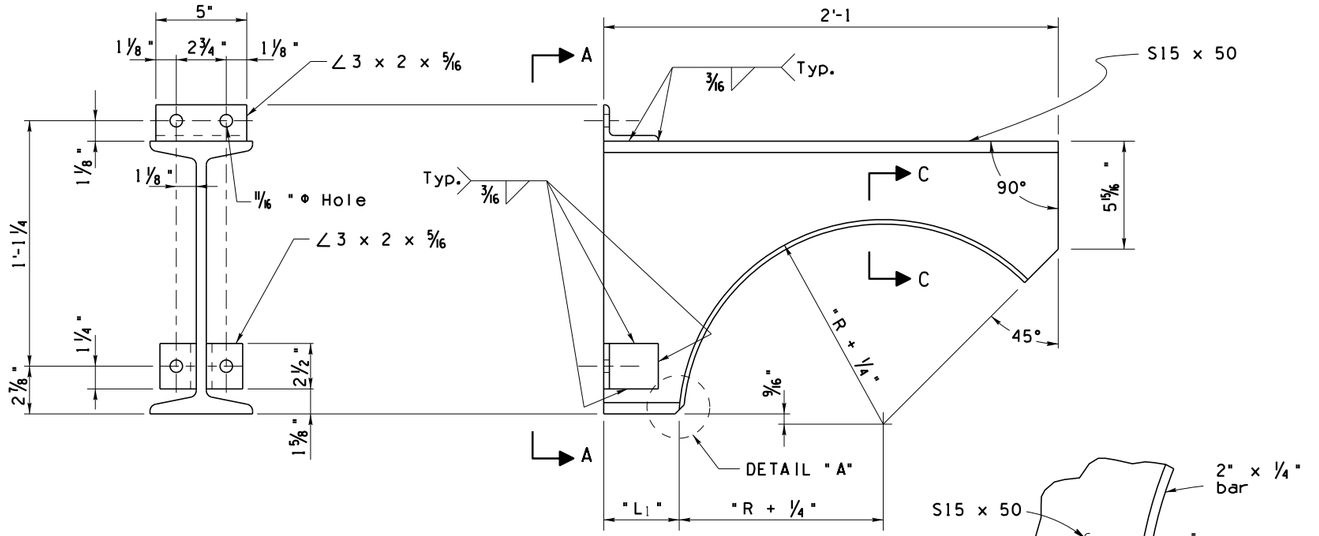
ROUTE | LOCATION

DRAWING NO. SD 9.50(2 of 5)

TRACS NO.

___ OF ___

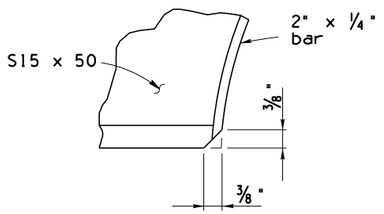
22-APR-2019 14:11 G:\9750\SD_Sheets\sd950-2_0116.dgn



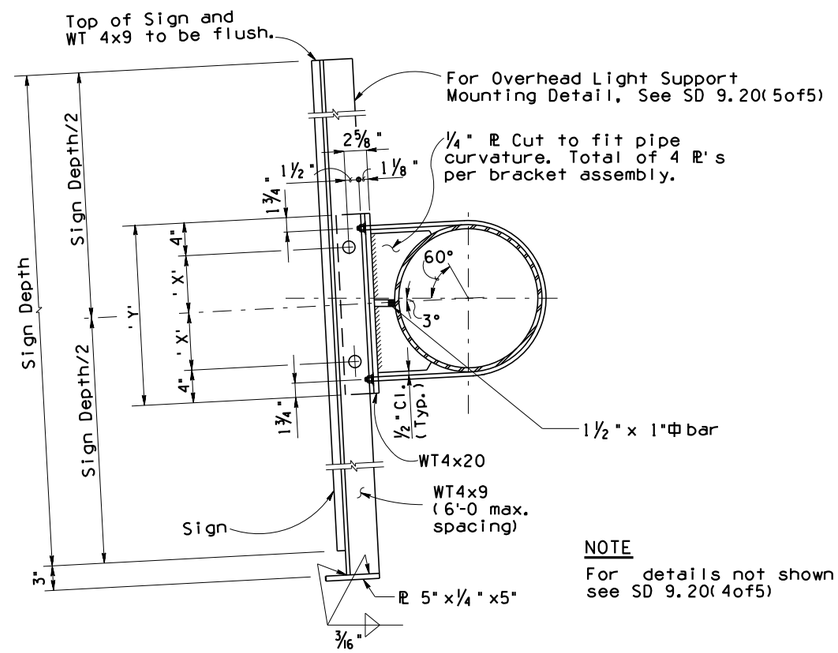
VIEW A-A

Sign Support Mounting - Upper Bracket

UPPER BRACKET



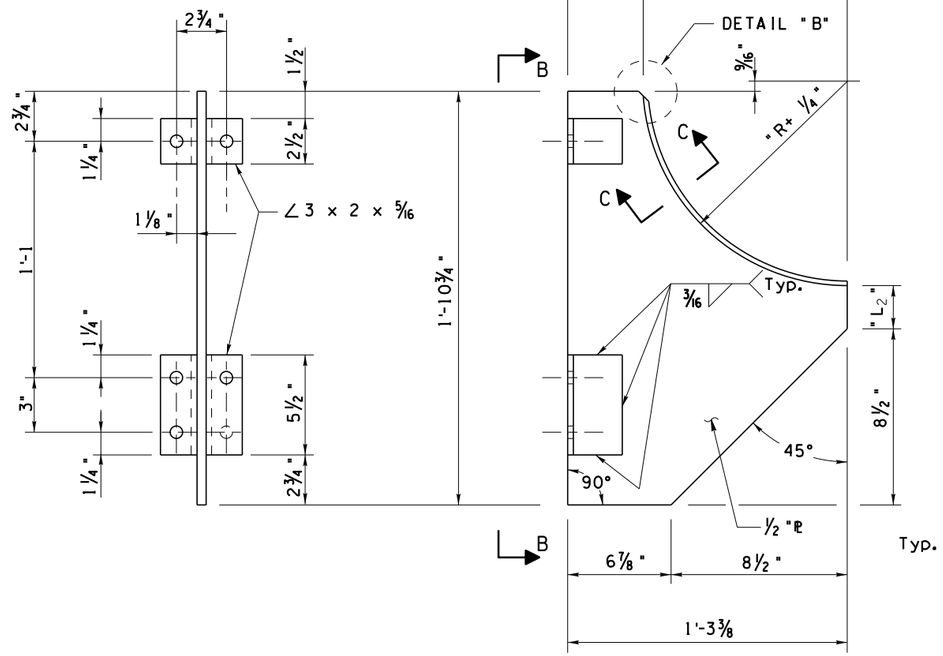
DETAIL "A"



SECTION B-B

NOTE

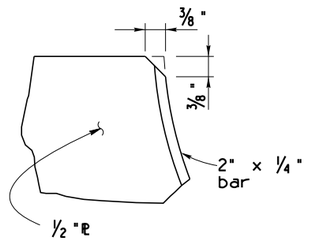
For details not shown see SD 9.20(4of5)



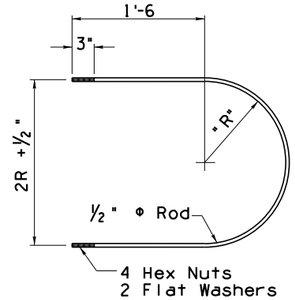
VIEW B-B

Sign Support Mounting - Lower Bracket

LOWER BRACKET



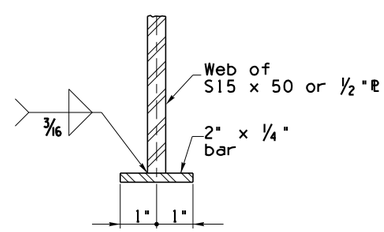
DETAIL "B"



SIGN SUPPORT U-BOLT

	Distance	
Pipe O.D.	'X'	'Y'
12¾"	4⅜"	1'-4¾"
16"	6"	1'-8
20"	8"	2'-0
22"	9"	2'-2

Frame Type	Nominal Pipe Dia.	R	L_1	L_2
1F	12"	6⅜"	8¾"	8 3/16"
2F	16"	8"	7⅛"	6 9/16"
3F	20"	10"	5⅛"	4 9/16"
4F	22"	11"	4⅛"	3 9/16"



SECTION C-C

Note to Designer:
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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1.	Original Issue	SJH	7-99
2.	Add Catwalk	SJH	1-00
3.	Remove harness, drip pan, widen grating, enlarge base Pl., hole	SJH	7-00
4.	Frame Type and SD 9.20 reference	SJH	8-02

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: J. Daniel Dana

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

VARIABLE MESSAGE SIGN TUBULAR FRAME MOUNTING & SIGN BRACKET DETAILS

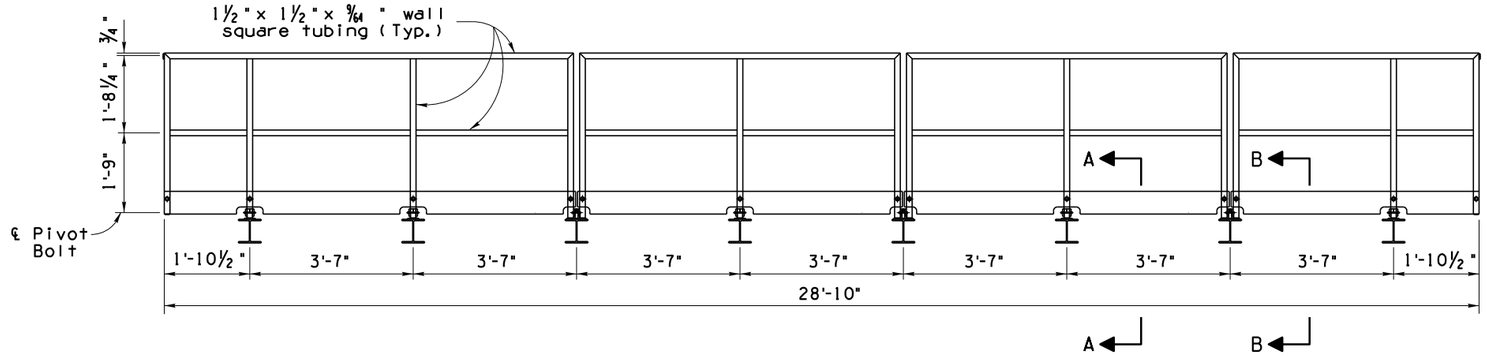
ROUTE | LOCATION

DRAWING NO. SD 9.50(3 of 5)

TRACS NO.

___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd950-3_0116.dgn

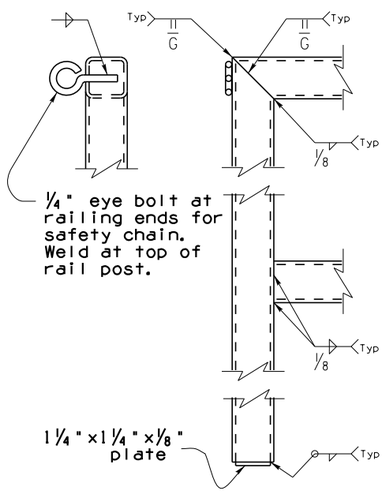


HANDRAIL ELEVATION

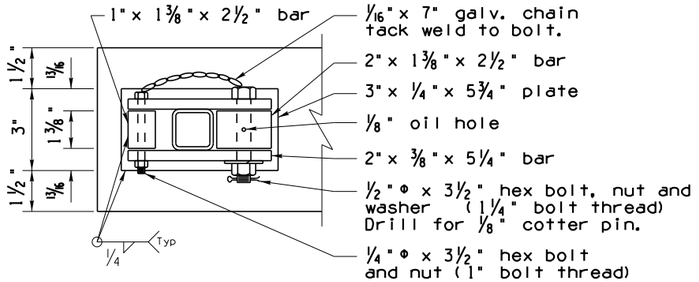
Scale: ⅝" = 1'-0"

NOTE:

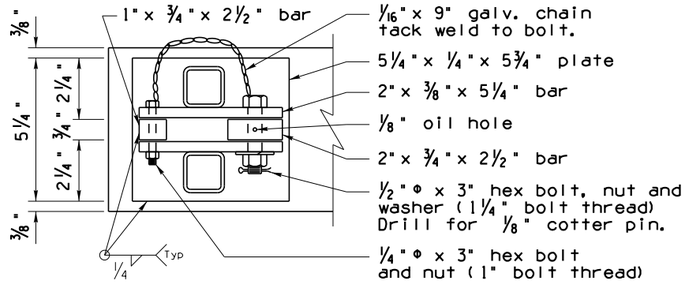
Handrail to be 1½" x 1½" x 5/64 " square steel tubing weighing 2.70 plf.



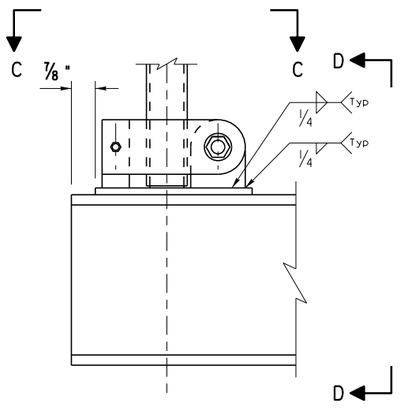
HANDRAIL WELD DETAILS



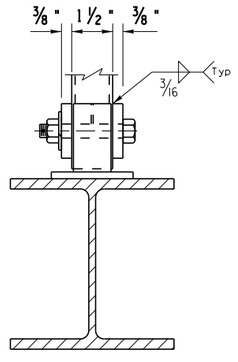
SECTION C-C
(Single Post)



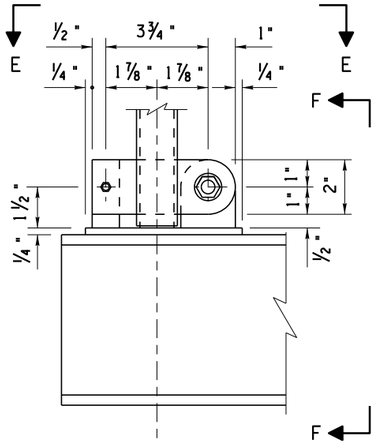
SECTION E-E
(Dual Post)



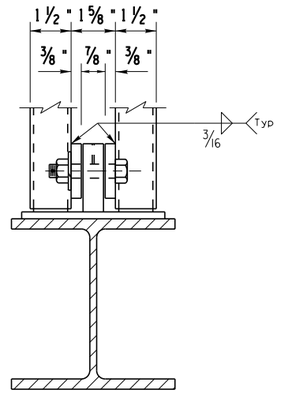
SECTION A-A
(Single Post)



SECTION D-D
(Single Post)



SECTION B-B
(Dual Post)



SECTION F-F
(Dual Post)

NOTE:

Provide ⅝" Φ holes for ½" Φ pivot bolts and ⅜" Φ holes for ¼" Φ lock bolts.

Note to Designer:
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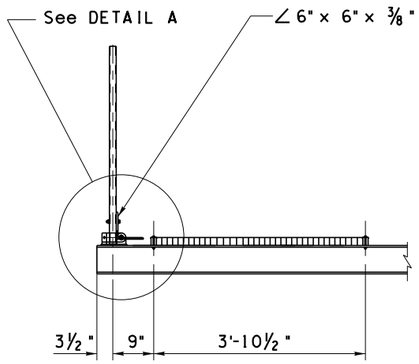
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original issue	SJH	1-00
2	Remove harness, drip pan, widen grating, enlarge base PL, hole	SJH	7-00
3			
4			

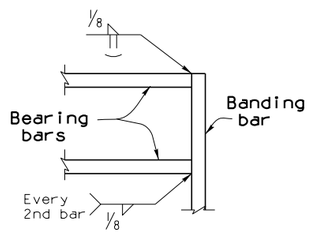
DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: J. Daniel Dawn	VARIABLE MESSAGE SIGN CATWALK HANDRAIL DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.50(4 OF 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd950-4_0116.dgn

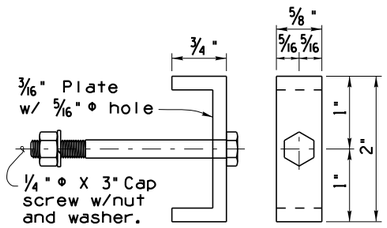


PARTIAL SECTION OF VMS CATWALK

Scale: ¾" = 1'-0"



DETAIL B

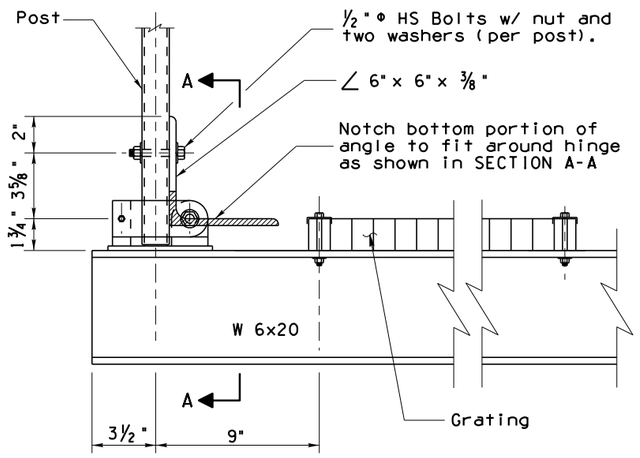


GRATING CLIP

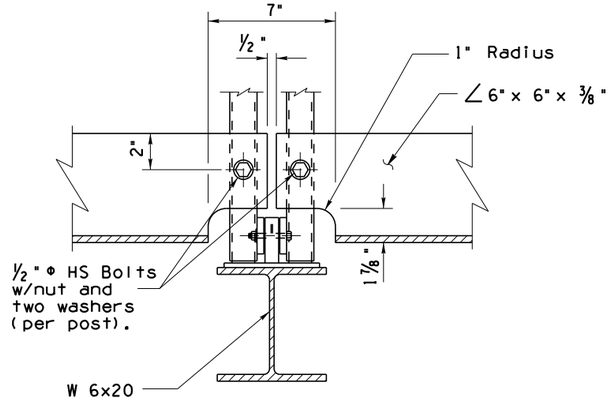
NOTE:

Welded grating to be Irving Type IWA or approved equal. 1¾" x ⅜" bearing bars at 1⅞" centers and cross bars at 4" centers. All grating to have 1¾" x ⅜" banding bars at both ends. Weld bearing bars to banding bars with ⅛" fillet weld one side every second bar and as shown in detail B. All grating to be straight and true after fabrication.
See table below for grating dimensions.

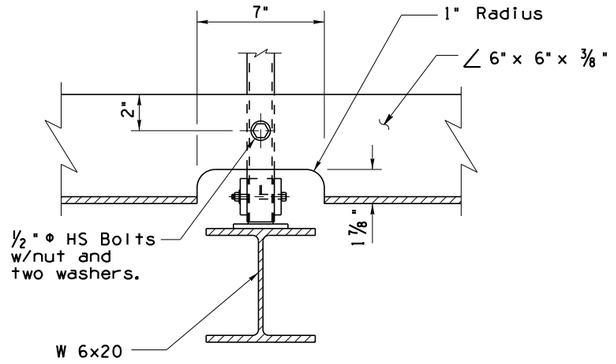
GRATING DIMENSIONS		
Grate No.	Length	Width
G-1	9'-0	3'-11 11/16
G-2	10'-8½	3'-11 11/16
G-3	9'-0	3'-11 11/16



DETAIL A



SECTION A-A
(Dual Posts)



SECTION A-A
(Single Post)

Note to Designer:
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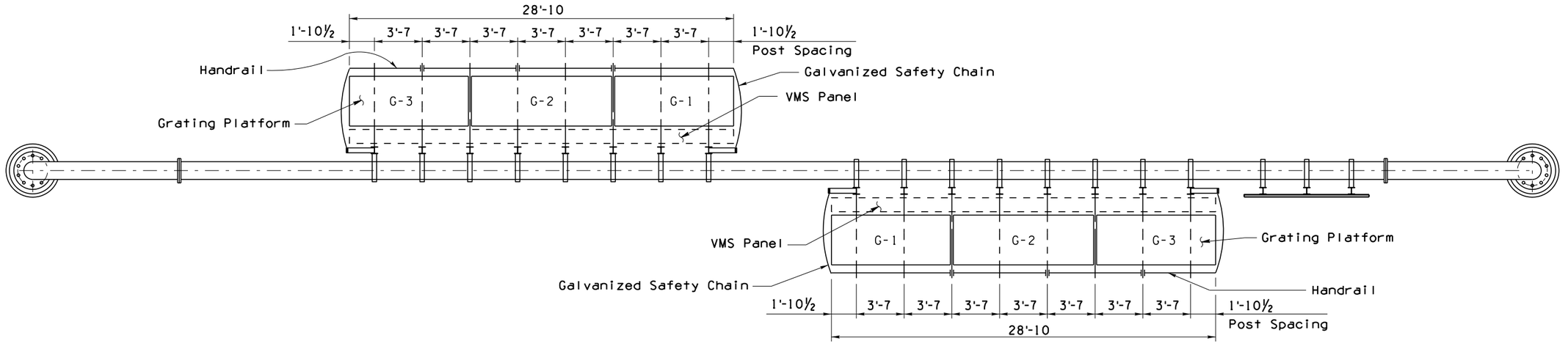
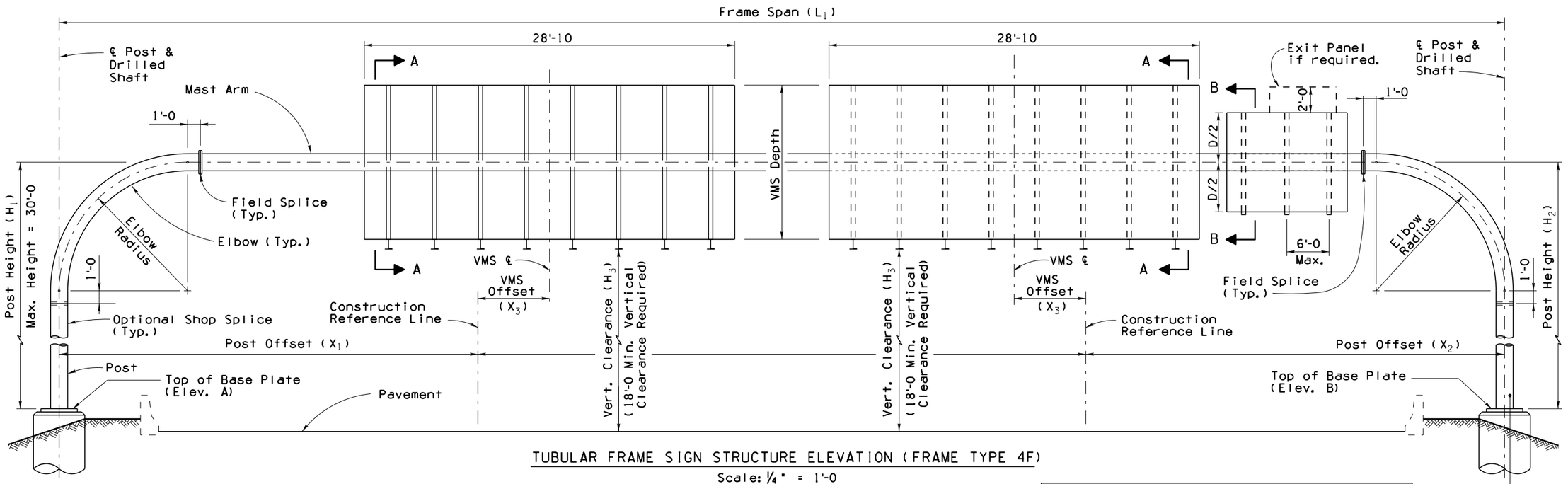
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	1-00
2	Remove harness, drip pan, widen grating, enlarge base PL, hole	SJH	7-00
3			
4			

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: J. Daniel Dawn	VARIABLE MESSAGE SIGN CATWALK MISCELLANEOUS DETAILS
ROUTE / LOCATION	DRAWING NO. SD 9.50(5 OF 5)
TRACS NO.	___ OF ___

22-APR-2019 14:11 G:\9750\SD_Sheets\sd950-5_0116.dgn



PLAN



TUBULAR FRAME SIGN STRUCTURE ELEVATION (FRAME TYPE 4F)

Scale: ¼" = 1'-0

Drilled shaft locations and top of drilled shaft elevations shall be field verified by the Contractor prior to fabrication of posts.

NOTE:

1. Tubular frame structure TYPE 4F SD 9.20 shall be used for support of Dual VMS panels on a single tubular frame.
2. See SD9.50(1of5) Sheet 1 of 5 for overhead sign notes.
3. VMS frame summary table should be included in the project drawings (VMS Location/Elevation Sheet) with location dimensions (H_1, H_2, ... X_2, X_3).
4. Maximum traffic sign panel area should not exceed 260 square feet, with two VMS panels mounted on tubular frame.

VMS DESCRIPTION

Depth = 9'-2
Length = 28'-10
Weight = 3000 lbs.

NOTE:

See SD 9.50 (2 of 5) for SECTION A-A.
See SD 9.50 (3 of 5) for SECTION B-B.
For General Notes see SD 9.20(1 of 5).
For Camber Diagram see SD 9.20(3 of 5).
For Foundation Details see SD 9.20(2 of 5).
(Provide 8½ inch diameter hole in center of column base plate to accommodate conduits)
For Frame and Handhole Details see SD 9.20(3 of 5)
For Sign Support Details see SD 9.20(4 of 5).
For Overhead Light Details see SD 9.20(5 of 5).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SJH	7-99
2	Remove Harness, drip pan, widen grating, enlarge base Pl., hole	SJH	7-00
3	Reference to SD 9.20 and SD 9.50	SJH	8-02
4			

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: J. Daniel Dawn	DUAL VARIABLE MESSAGE SIGN TUBULAR FRAME
ROUTE / LOCATION	DRAWING NO. SD 9.51
TRACS NO.	___ OF ___

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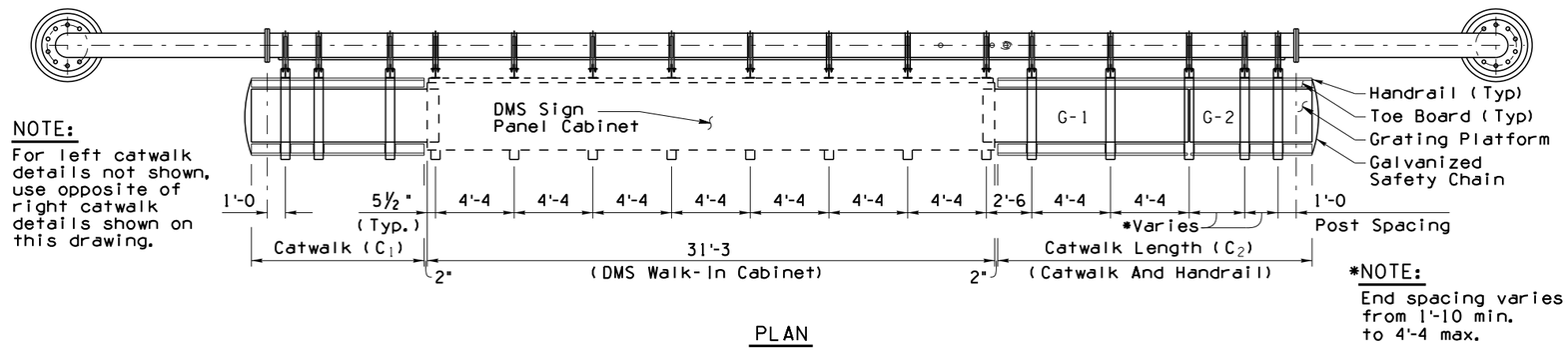
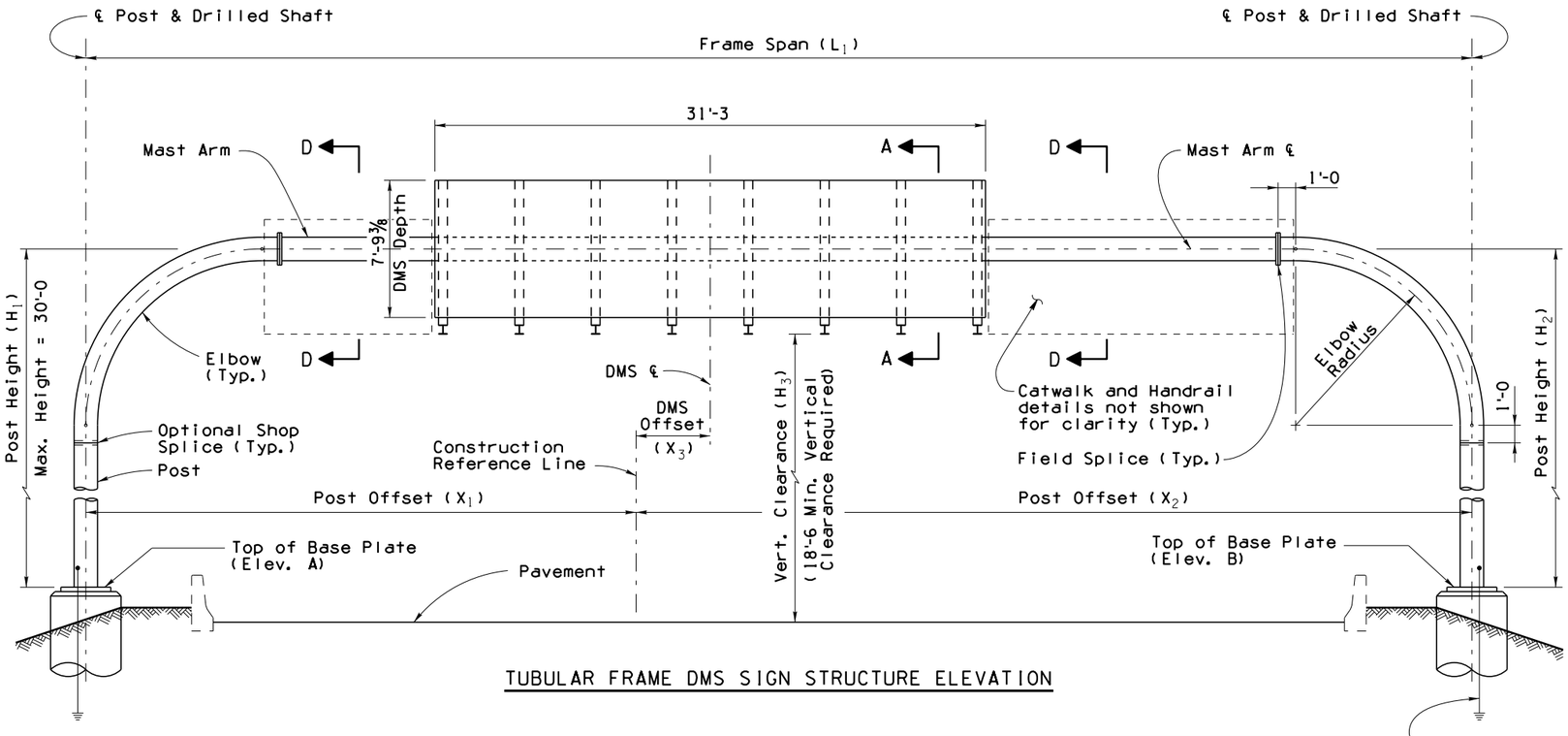


PLAN



TUBULAR FRAME DMS SIGN STRUCTURE ELEVATION

DMS CABINET DESCRIPTION:

Depth = 7'-9⅜ Length = 31'-3
Width = 3'-8½ Weight = 4500 lbs.

TUBULAR FRAME DATA FOR DMS CABINET SUPPORT						
TUBULAR FRAME				PIPE WALL THICKNESS (INCHES)		
Frame Type	Frame Span L_1	Nominal Pipe Dia.	90° Elbow Radius	Post	Elbow	Mast Arm
2F	56'-70'	16"	10'-0	1.219	1.219	0.500
3F	71'-110'	20"	12'-0	1.280	1.280	0.625
4F	111'-142'	22"	12'-0	1.125	1.125	0.875

Drilled shaft locations and top of drilled shaft elevations shall be field verified by the Contractor prior to fabrication of posts.

NOTE:

See SD 9.52 (2 of 5) for SECTION A-A.
See SD 9.52 (3 of 5) for SECTION D-D.
For General Notes see SD 9.20 (1 of 5).
For Foundation Details see SD 9.20 (2 of 5).
(Provide 9 inch diameter hole in center of column base plate to accommodate conduits).
For Frame and Handhole Details see SD 9.20 (3 of 5).
For Camber Diagram see SD 9.20 (3 of 5).
For DMS Camber Table see SD 9.52 (4 of 5).

OVERHEAD DMS NOTES:

Wind loading: 80 MPH Velocity.

Maximum Height: 50'-0 from average surrounding terain to the ℄ of mast arm and sign panel (Regardless of post height).

Maximum difference between post heights for an individual frame = 5'-0.

Additional sign attachment to the tubular frame is not allowed.

For Standard pipe mast arms with lengths greater than 60'-0, an optional field splice will be permitted at the third points of mast arm length to facilitate hauling operations.

The Optional Shop Splice may not be used when the splice location is less than 7'-0 above the top of base plate.

Drill and tap for 1½" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. Install nipples on shoulder posts only.

Before any portion of the tubular frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame in the no load condition is equal to (±½ inch) the field measured span length between foundations.

If the tubular frame is erected as one unit, the frame shall be adequately suspended during installation to avoid distortions or changes in span length between base plates.

The Field Splice surfaces shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1⅜" radius around each bolt.

All tubular steel, plates, DMS sign supports, catwalks, bolts, nuts and washers shall be galvanized in accordance with General Notes.

Provide electrical grounding at pole foundations per ADOT Standard Specification Sect. 732-3.03.

NOTE:

Project drawings shall provide the following site specific DMS frame information on each DMS location sheet:

DMS FRAME SUMMARY TABLE	
DMS NO.:	VERTICAL CLEARANCE, H_3:
ROUTE:	TOP OF BASE PLATE, ELEV. A:
MILE POST:	TOP OF BASE PLATE, ELEV. B:
STATION:	POST OFFSET, X_1:
FRAME SPAN, L_1:	POST OFFSET, X_2:
HEIGHT, H_1:	DMS OFFSET, X_3:
HEIGHT, H_2:	CATWALK LENGTH, C_1:
	CATWALK LENGTH, C_2:

Note to Designer:
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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SUH	05-07
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DYNAMIC MESSAGE SIGN
TUBULAR FRAME
PLAN & ELEVATION

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.52 (1 of 5)
LOCATION			SHEET NO. OF

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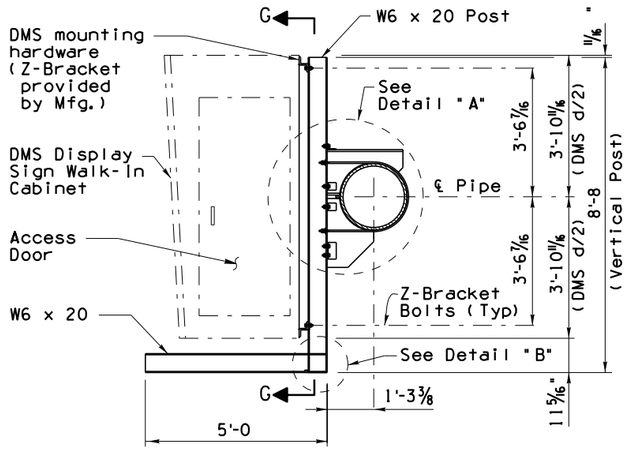
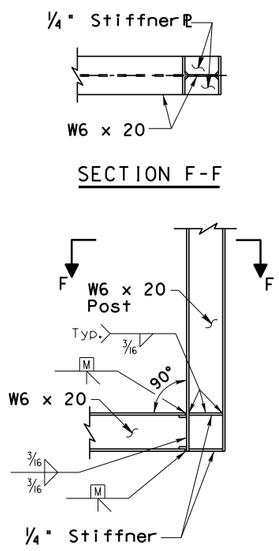
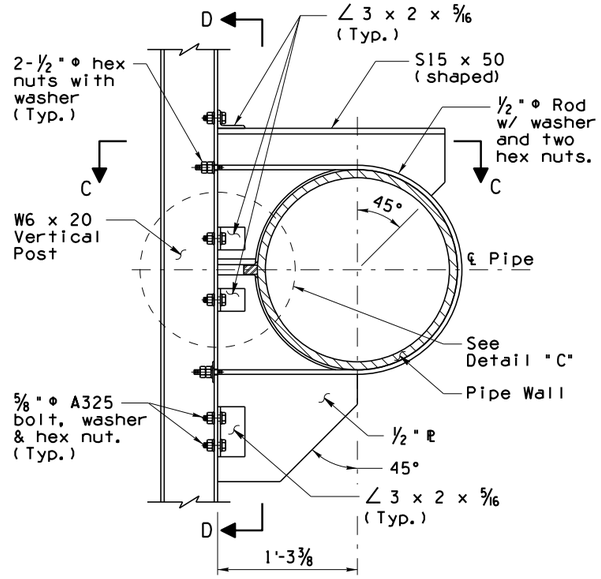


SECTION A-A

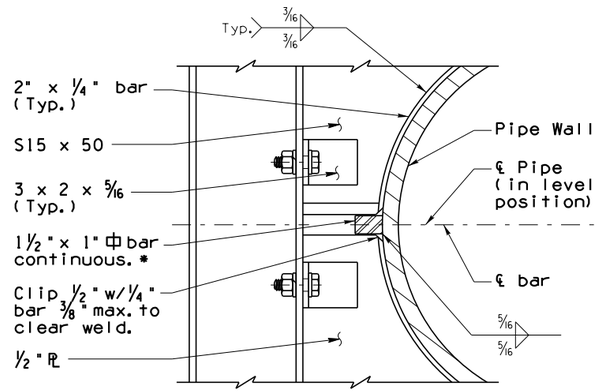


SECTION F-F

DETAIL "B"



DETAIL "A"

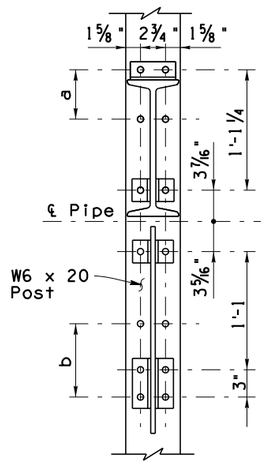


DETAIL "C"

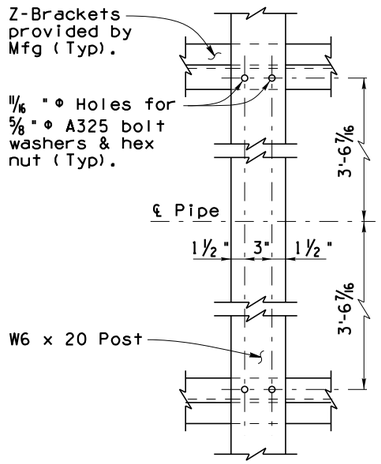
* Terminate bar 6" from splice flanges.

NOTE:

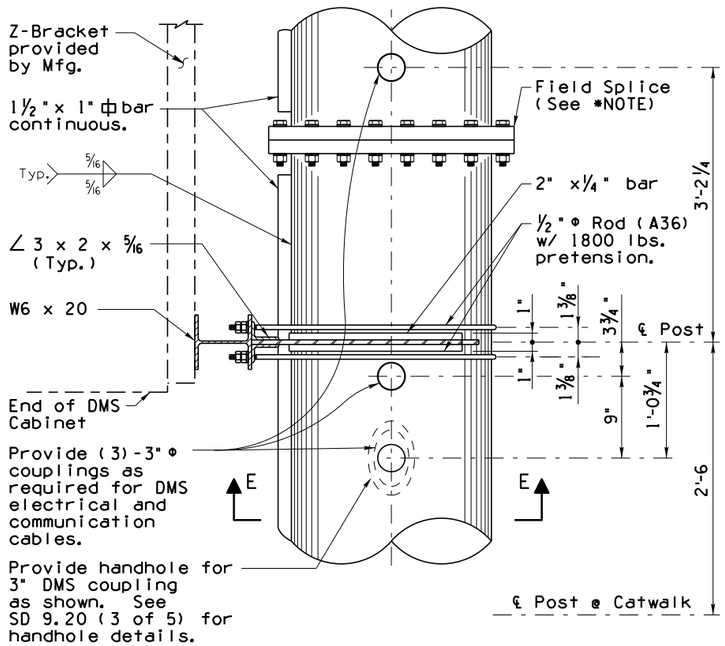
See Table for 'a' and 'b' dimensions.



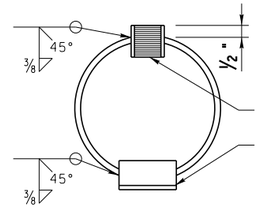
SECTION D-D



SECTION G-G



SECTION C-C



Standard 2" or 3" Coupling. Weld in place as shown for DMS Wiring.

For handhole and cover details, See SD 9.20 (3 of 5).

SECTION E-E

*NOTE:

Optional mast arm field splice, if any, shall not interfere with DMS cabinet supports, handhole or coupling locations.

Frame Type	Nominal Pipe Dia.	a	b
2F	16"	8 7/16"	11 11/16"
3F	20"	6 7/16"	9 11/16"
4F	22"	5 7/16"	8 11/16"

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SUH	05-07
2			
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Shafi U. Hasan

APPROVED FOR DISTRIBUTION
Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DYNAMIC MESSAGE SIGN TUBULAR FRAME MOUNTING DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.52 (2 of 5)
LOCATION			SHEET NO. 0F

22-APR-2019 14:11 G:\9750\SD_Sheets\sd952-2_0116.dgn

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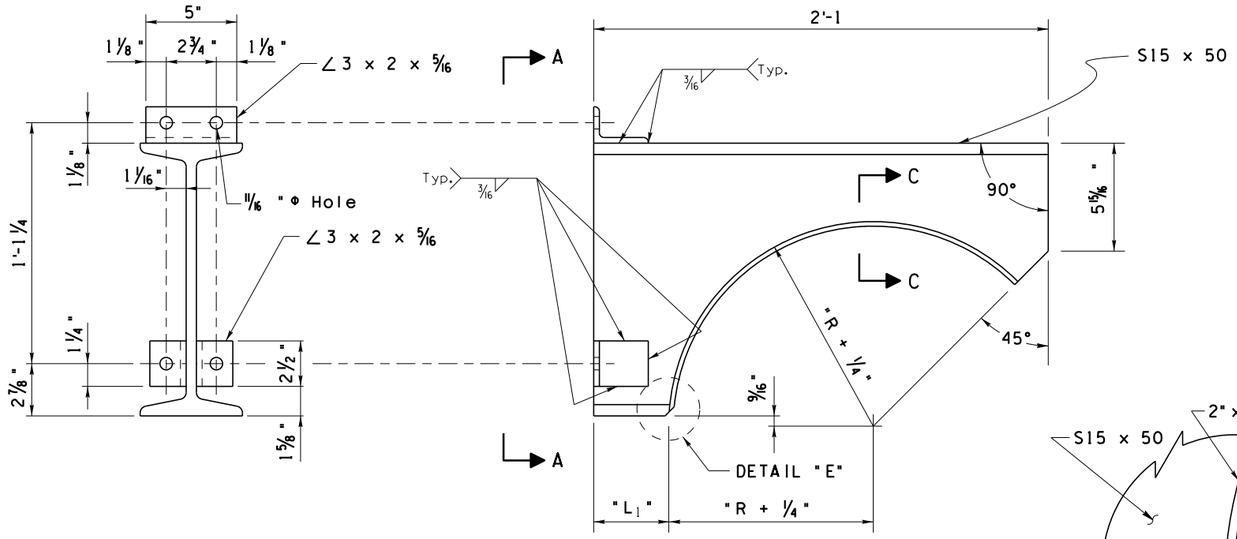
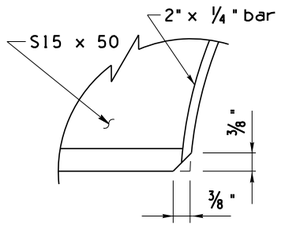
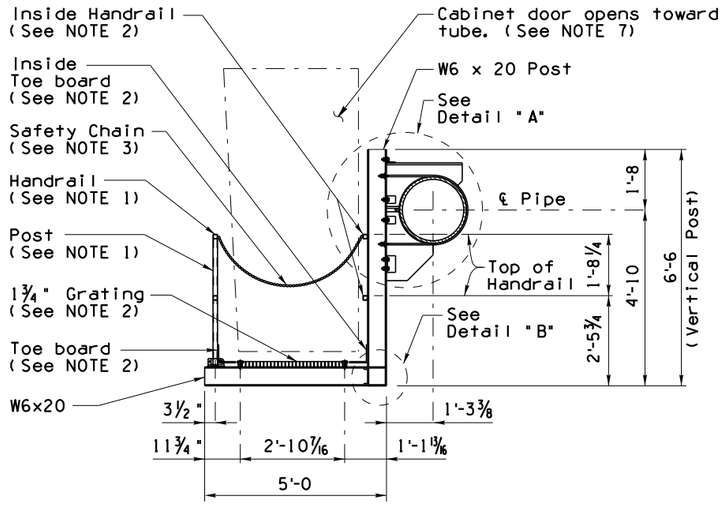


VIEW A-A
(Upper Mounting Bracket)

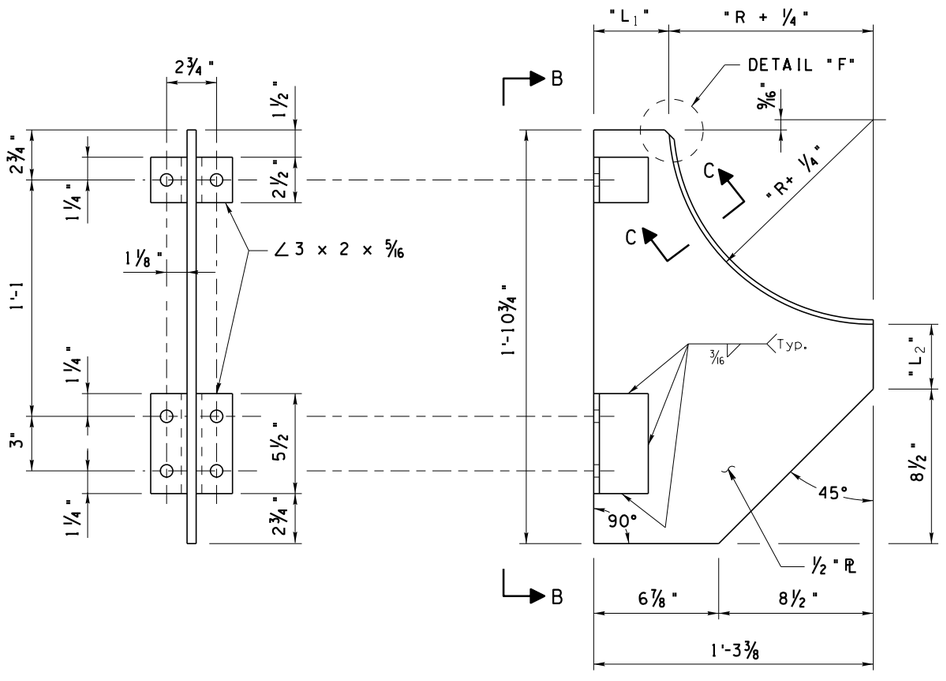
UPPER BRACKET



DETAIL "E"

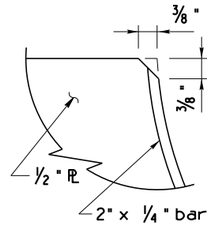


SECTION D-D



VIEW B-B
(Lower Mounting Bracket)

LOWER BRACKET



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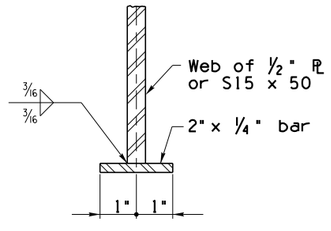
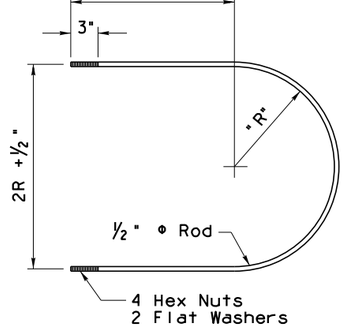


SECTION C-C



DMS SUPPORT U-BOLT

NOTE:

1. See SD 9.52 (4 of 5) for handrail, post and hinge details.
2. See SD 9.52 (5 of 5) for inside handrails, grating and toeboard details.
3. 3/16" galvanized safety chain with (1) ¼" snap hook at end of both catwalks.
4. See SD 9.52 (2 of 5) for Detail "A".
5. See SD 9.52 (2 of 5) for Detail "B".
6. Optional mast arm field splice, if any, shall not interfere with catwalk supports.
7. Cabinet door hinges shall be located at tube side to allow for railing movement with door open.

Frame Type	Nominal Pipe Dia.	R	L_1	L_2
2F	16"	8"	7⅛"	6 9/16"
3F	20"	10"	5⅛"	4 9/16"
4F	22"	11"	4⅛"	3 9/16"

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

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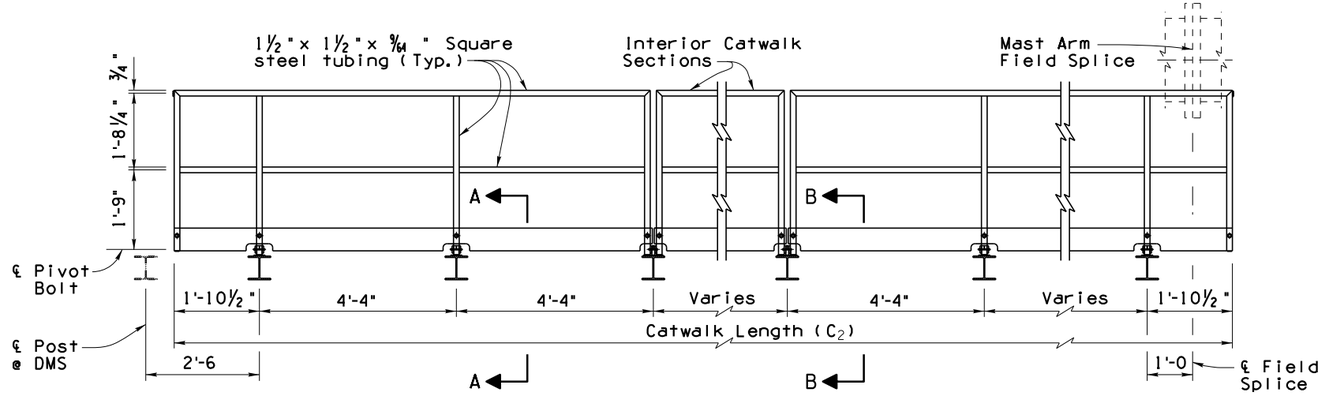
BRIDGE GROUP STRUCTURE DETAIL

DYNAMIC MESSAGE SIGN
TUBULAR FRAME
MOUNTING DETAILS

ROUTE	PROJECT NO.	F.A. NO.	DRAWING NO.
			SD 9.52 (3 of 5)
LOCATION			SHEET NO. OF

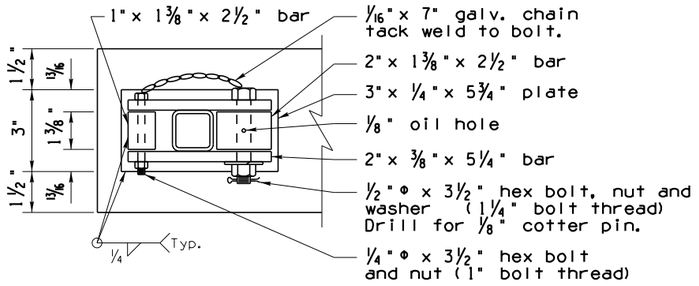
22-APR-2019 14:12 G:\9750\SD_Sheets\sd952-3_0116.dgn



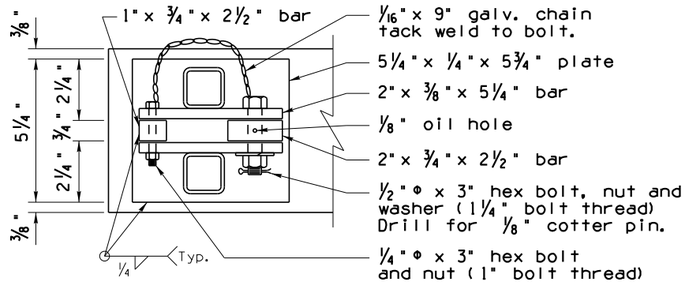
HANDRAIL ELEVATION
(Rt. Side Shown, Lt. Side Opposite)

DMS TUBULAR FRAME CAMBER (INCHES)								
Frame Type	2F	2F	3F	3F	3F	4F	4F	4F
Span	56'-0	70'-0	82'-0	94'-0	106'-0	118'-0	130'-0	142'-0
"X"	1"	1½"	1¾"	2½"	3½"	4"	6"	7¾"
"Y"	1¼"	2"	2¼"	3½"	4¾"	6"	8¼"	11¼"

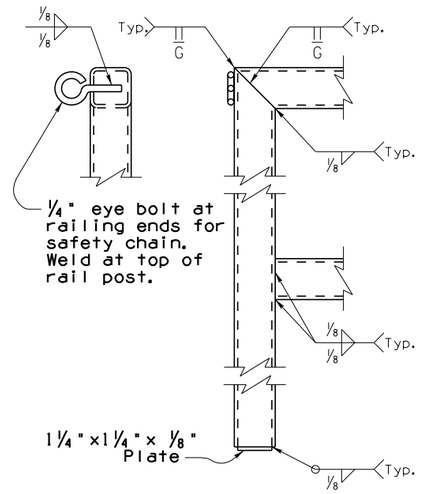
Calculated camber provides for deflections due to dead load of tubular structure and dead loads of DMS cabinet, catwalks and attachments. For spans other than shown, interpolate for "X" and "Y" dimensions.
See SD 9.20 (3 of 5) for CAMBER DIAGRAM and camber notes.



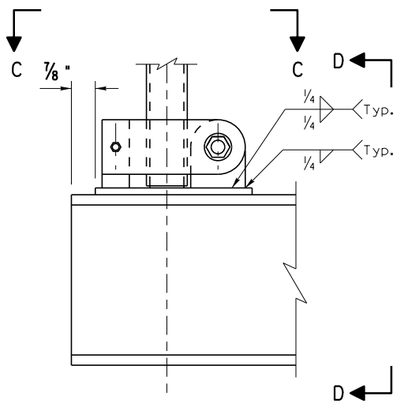
SECTION C-C
(Single Post)



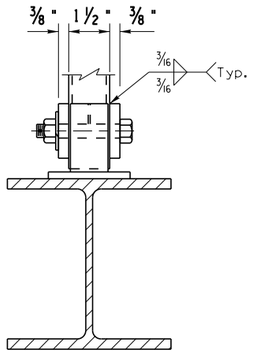
SECTION E-E
(Dual Post)



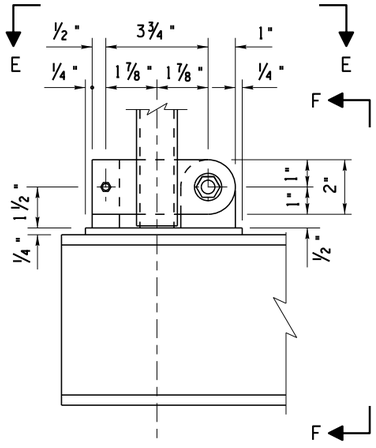
HANDRAIL WELD DETAILS



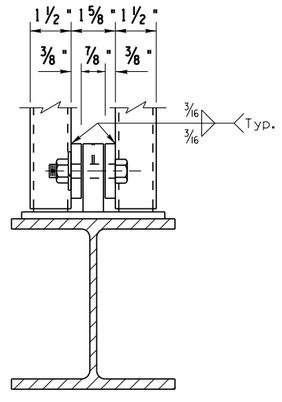
SECTION A-A
(Single Post)



SECTION D-D
(Single Post)



SECTION B-B
(Dual Post)



SECTION F-F
(Dual Post)

NOTES:

Handrails shall extend from end of DMS cabinet to mast arm field splice as shown for both catwalks. Maximum support post spacing shall be 4'-4. Minimum support post spacing shall be 1'-10. Maximum three spaces per rail section. Minimum two support posts per rail section. Minimum catwalk length = 5'-7.

Handrail to be 1½" x 1½" x 5/16" square steel tubing weighing 2.70 plf.

Provide eye bolts at ends of top handrails for 3/16" galvanized safety chain with (1) ¼" snap hook per catwalk end.

Provide ⅝" Φ holes for ½" Φ pivot bolts and ⅜" Φ holes for ¼" Φ lock bolts.

See SD 9.52 (5 of 5) for inside handrails, grating and toeboard details.

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SAH	05-07
2			
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DESIGN APPROVED
Shafi U. Hasan

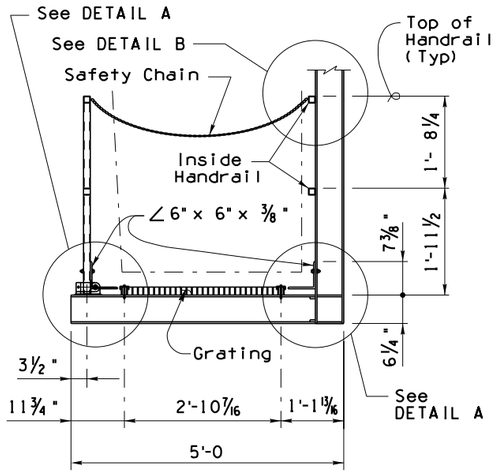
APPROVED FOR DISTRIBUTION
Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

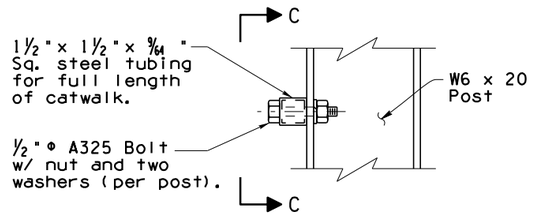
DYNAMIC MESSAGE SIGN
CATWALK
HANDRAIL DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.52 (4 of 5)
LOCATION			SHEET NO. OF

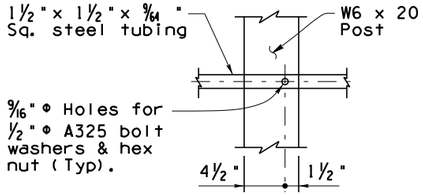
22-APR-2019 14:12 G:\9750\SD_Sheets\sd952-4_0116.dgn



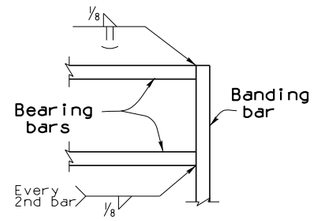
PART. SECTION OF DMS CATWALK



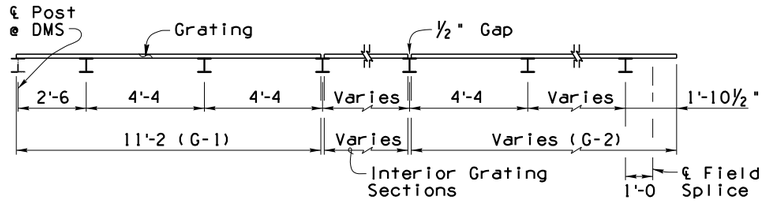
DETAIL B



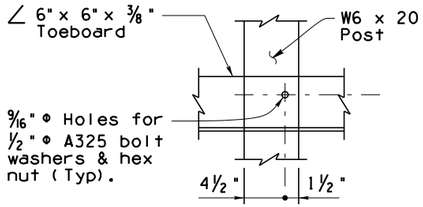
SECTION C-C



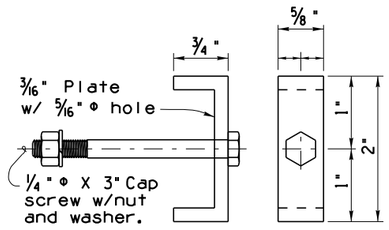
DETAIL C



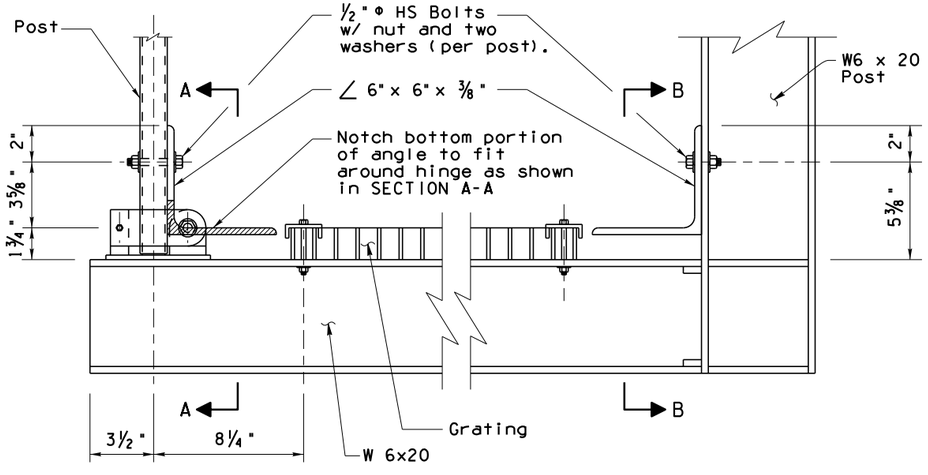
GRATING ELEVATION
(Lt. Side Shown, Rt. Side Opposite)



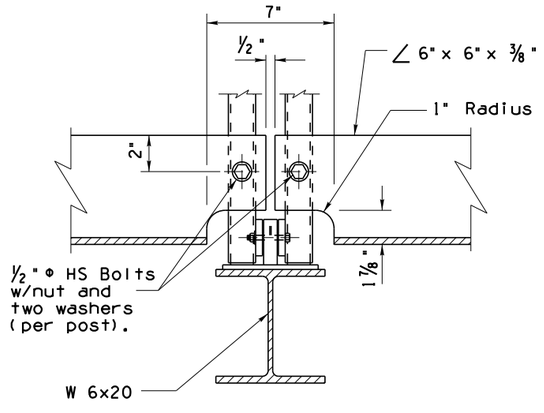
SECTION B-B



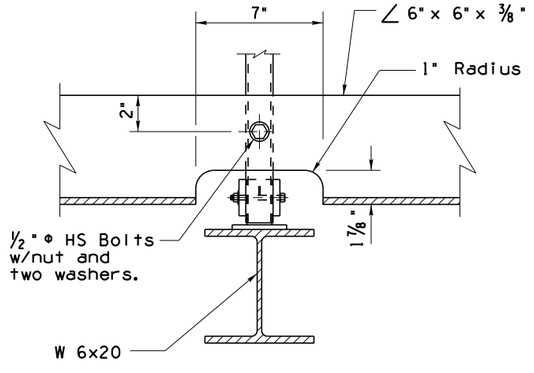
GRATING CLIP



DETAIL A



SECTION A-A
(Dual Posts)



SECTION A-A
(Single Post)

NOTE:

Welded grating shall meet the standard requirements of ANSI/NAAMM MGB 531-00. Grating shall be 1 3/4" x 3/16" bearing bars at 1 3/16" centers and cross bars at 4" centers.
All grating to have 1 3/4" x 3/16" banding bars at both ends.
Weld bearing bars to banding bars with 1/8" fillet weld, one side every second bar and as shown in Detail C.
All grating to be straight and true after fabrication.
Grating shall be galvanized.
See Table for grating dimensions:

GRATING DIMENSIONS		
Grate No.	Length	Width
G-1	11'-2	2'-11 13/16
Interior	Varies**	2'-11 13/16
G-2	Varies*	2'-11 13/16

* Maximum length of G-2 is 10'-6.
** Use additional interior grating sections of 4'-3 1/2, 8'-7 1/2 or 12'-11 1/2 if required.

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1	Original Issue	SMH	05-07
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APPROVED FOR DISTRIBUTION: Jean A. Nehme

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DYNAMIC MESSAGE SIGN
CATWALK
MISCELLANEOUS DETAILS

ROUTE	PROJECT NO.	F.A. NO.	DRAWING NO.
			SD 9.52 (5 of 5)
LOCATION			SHEET NO. OF

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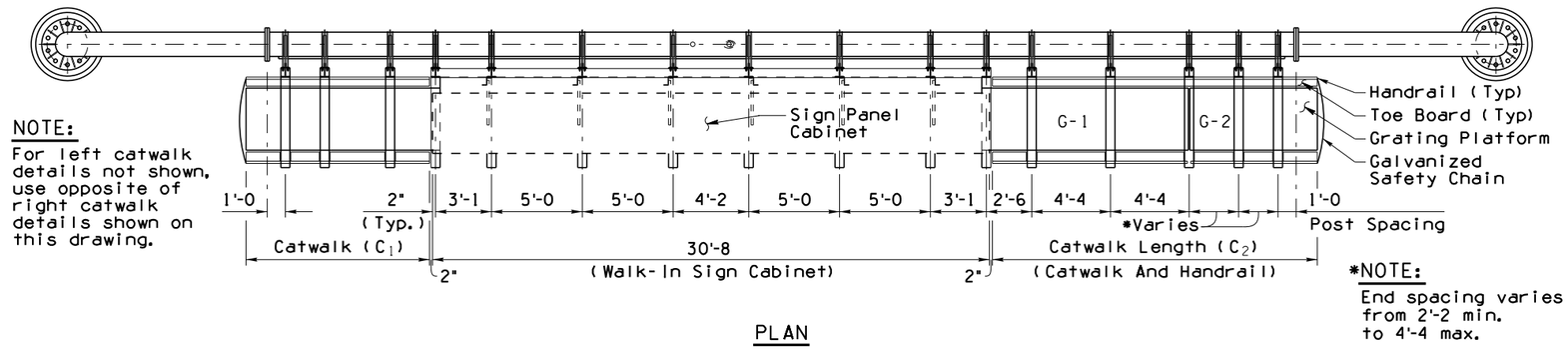
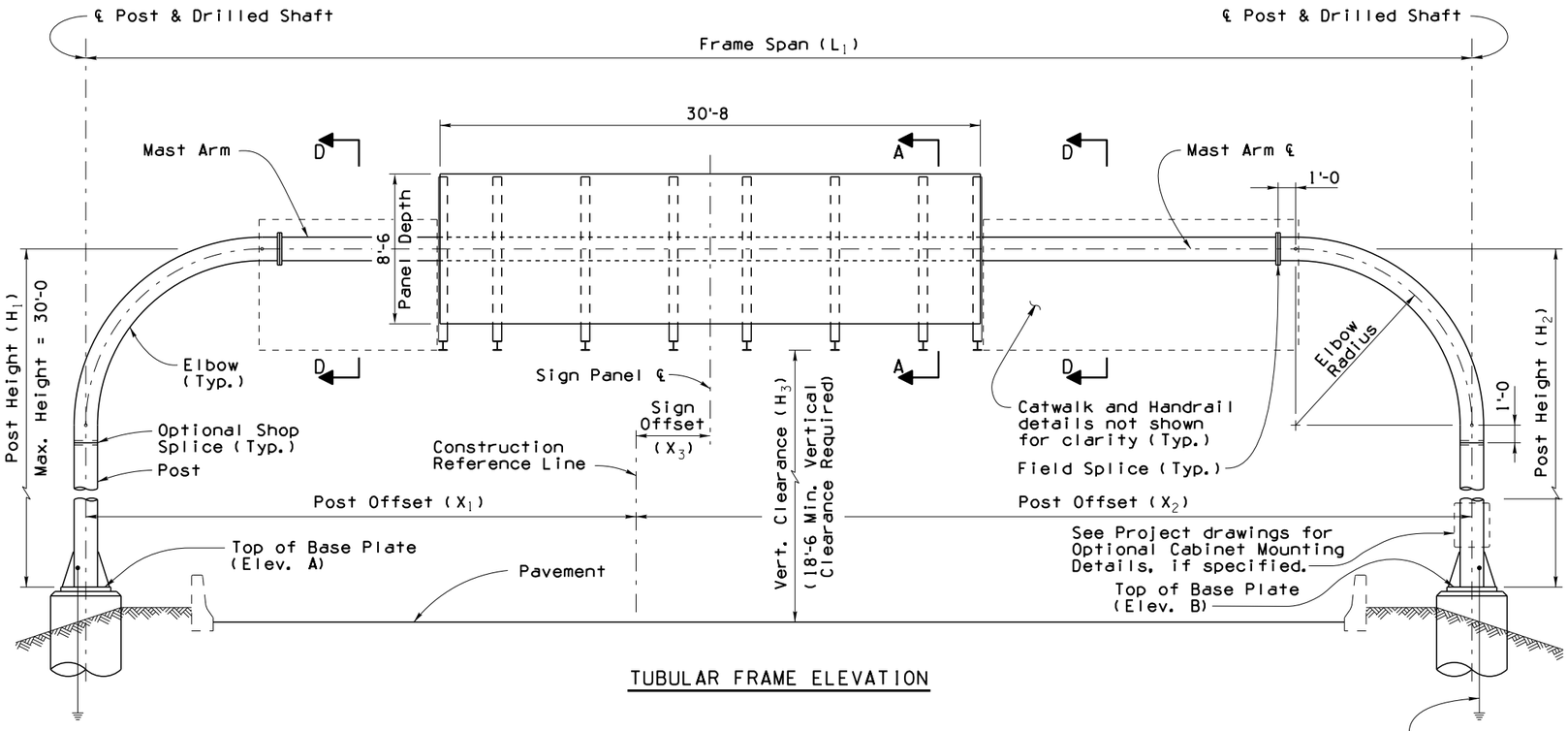


PLAN



TUBULAR FRAME ELEVATION

WALK-IN SIGN CABINET DESCRIPTION:

Depth = 8'-6 Length = 30'-8
Width = 3'-3¾ Weight = 4000 lbs.

TUBULAR FRAME DATA FOR SIGN CABINET SUPPORT						
TUBULAR FRAME				PIPE WALL THICKNESS (INCHES)		
Frame Type	Frame Span L_1	Nominal Pipe Dia.	90° Elbow Radius	Post	Elbow	Mast Arm
2F	56'-70'	16"	10'-0	1.219	1.219	0.500
3F	71'-110'	20"	12'-0	1.280	1.280	0.625
4F	111'-142'	22"	12'-0	1.125	1.125	0.875

Drilled shaft locations and top of drilled shaft elevations shall be field verified by the Contractor prior to fabrication of posts.

NOTE:
See SD 9.53 (2 of 5) for SECTION A-A.
See SD 9.53 (3 of 5) for SECTION D-D.
For General Notes see SD 9.20 (1 of 5).
For Foundation Details see SD 9.20 (2 of 5).
(Provide 9 inch diameter hole in center of column base plate to accommodate two 1½" Φ non-metallic conduits).
For Frame and Handhole Details see SD 9.20 (3 of 5).
For Camber Diagram see SD 9.20 (3 of 5).
For LED DMS Camber Table see SD 9.53 (4 of 5).

OVERHEAD SIGN NOTES:

Wind loading: 90 MPH Velocity.

Maximum Height: 50'-0 from average surrounding terain to the ℄ of mast arm and sign panel (Regardless of post height).

Maximum difference between post heights for an individual frame = 5'-0.

Additional sign attachment to the tubular frame is not allowed.

For Standard pipe mast arms with lengths greater than 60'-0, an optional field splice will be permitted at the third points of mast arm length to facilitate hauling operations.

The Optional Shop Splice may not be used when the splice location is less than 5'-0 above the top of base plate.

Drill and tap for 1½" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. Install nipples on shoulder posts only.

Before any portion of the tubular frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame in the no load condition is equal to (±½ inch) the field measured span length between foundations.

If the tubular frame is erected as one unit, the frame shall be adequately suspended during installation to avoid distortions or changes in span length between base plates.

The Field Splice surfaces shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1⅜" radius around each bolt.

All tubular steel, plates, sign supports, catwalks, bolts, nuts and washers shall be galvanized in accordance with General Notes.

Provide electrical grounding at pole foundations per ADOT Standard Specification Sect. 732-3.03.

NOTE:
Project drawings shall provide the following site specific frame and catwalk information on each LED Dynamic Message Sign location sheet:

FRAME AND CATWALK SUMMARY TABLE	
LED DMS NO.:	VERTICAL CLEARANCE, H_3:
ROUTE:	TOP OF BASE PLATE, ELEV. A:
MILE POST:	TOP OF BASE PLATE, ELEV. B:
STATION:	POST OFFSET, X_1:
FRAME SPAN, L_1:	POST OFFSET, X_2:
HEIGHT, H_1:	SIGN OFFSET, X_3:
HEIGHT, H_2:	CATWALK LENGTH, C_1:
TILT, T:	CATWALK LENGTH, C_2:

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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	D.B.B.	1-15
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DMS (VARIABLE TILT CABINET)
TUBULAR FRAME
PLAN & ELEVATION

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.53 (1 of 5)
LOCATION			SHEET NO. OF

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Note to Designer:
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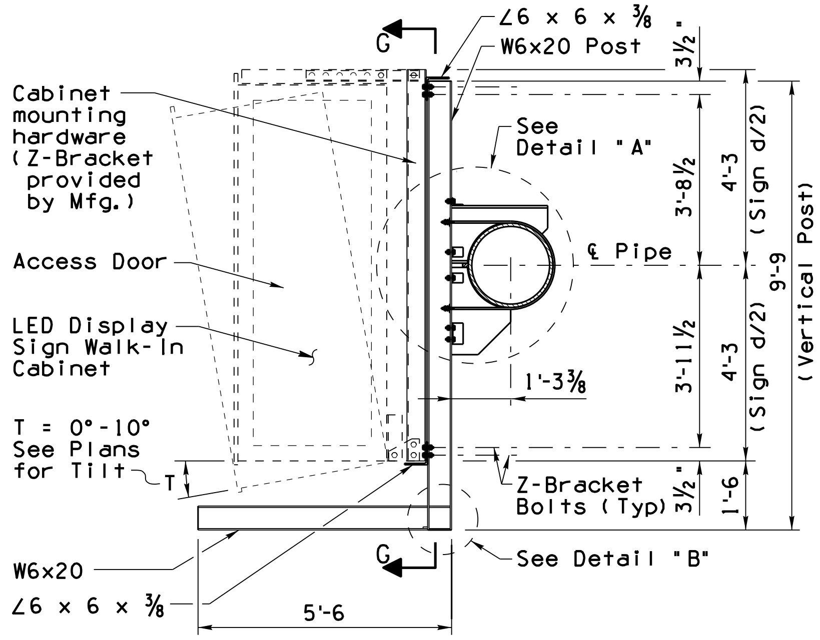
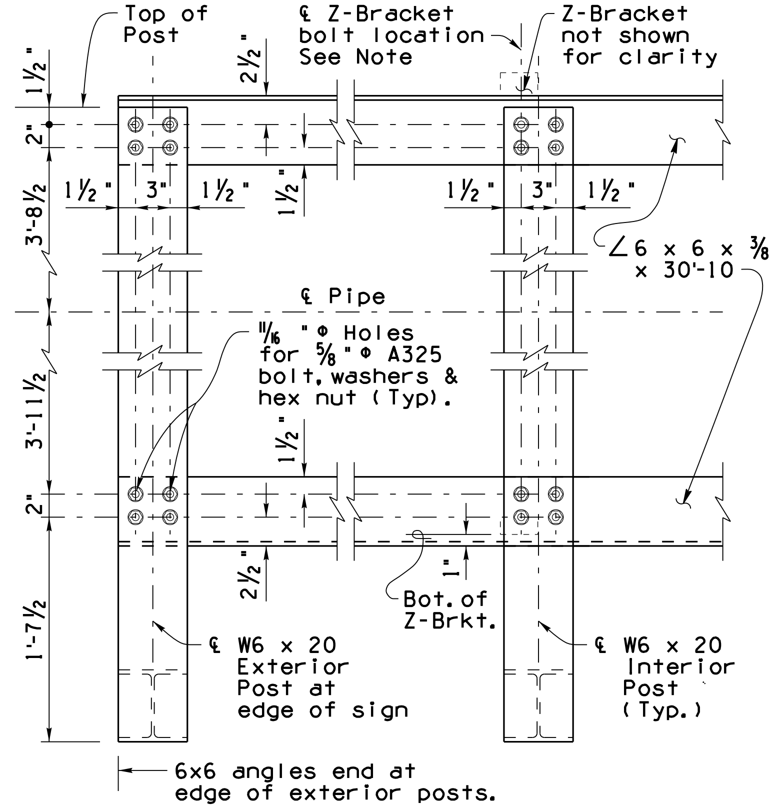
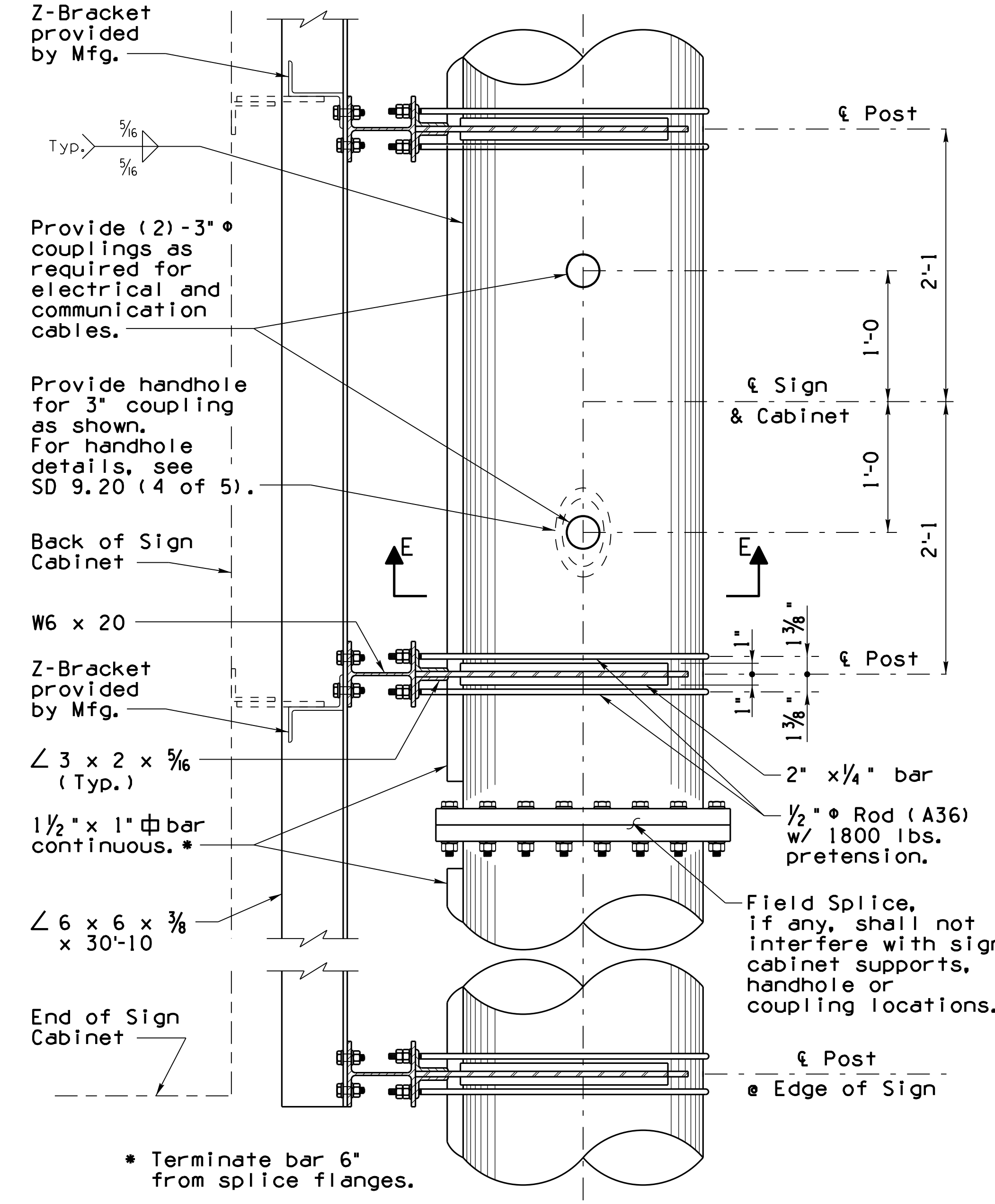


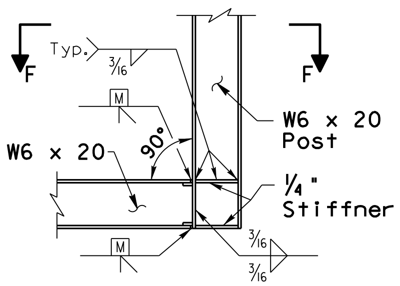
SECTION A-A



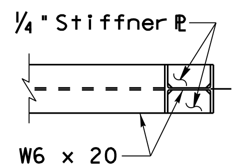
SECTION G-G



SECTION C-C



DETAIL "B"



SECTION F-F

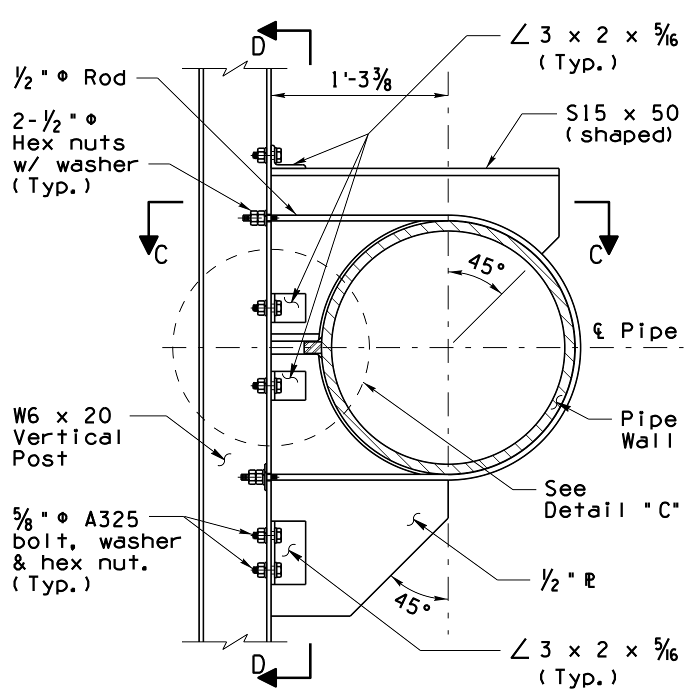
Frame Type	Nominal Pipe Dia.	a	b
2F	16"	8 7⁄16"	11 1⁄16"
3F	20"	6 7⁄16"	9 1⁄16"
4F	22"	5 7⁄16"	8 1⁄16"

Z-BRACKET NOTE:

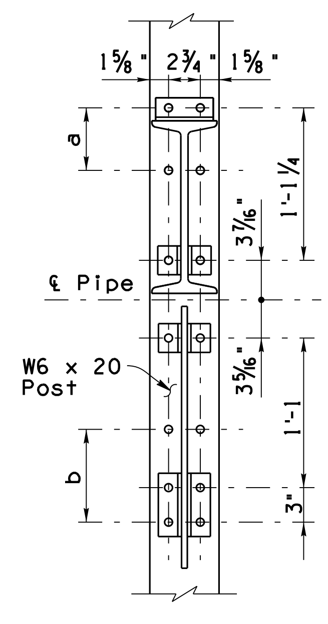
Mirror Z-Bracket bolt locations about vertical ℄ of sign.

Fabricator shall verify hole locations in Z flange prior to drilling holes in W6x20 post.

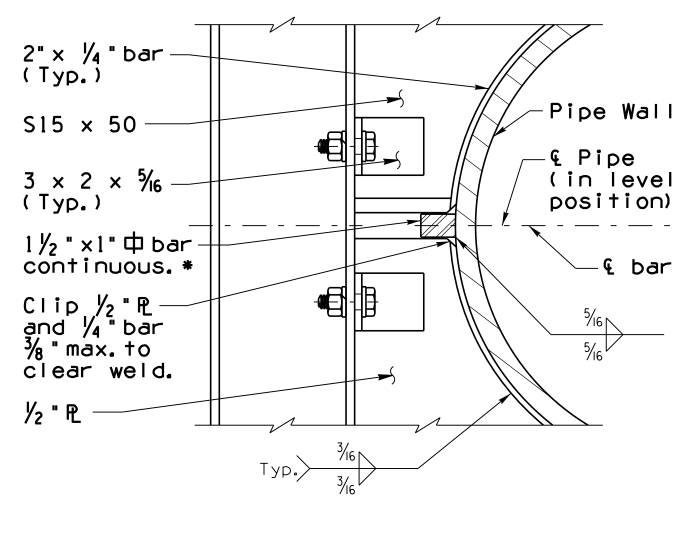
Barrier Tape shall be used at any point of contact between aluminum Z-Mounting Brackets (provided by manufacturer) and Steel Sign Supports. Tape shall be submitted to the Engineer for approval.



DETAIL "A"



SECTION D-D



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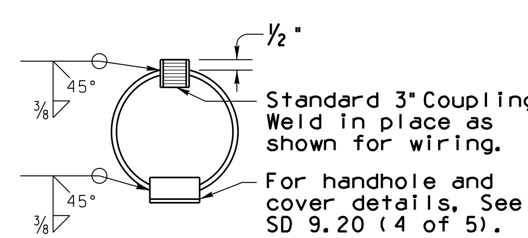

SECTION E-E

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DMS (VARIABLE TILT CABINET) TUBULAR FRAME MOUNTING DETAILS

DESIGN APPROVED	APPROVED FOR DISTRIBUTION	ROUTE	PROJECT NO.	FA NO.	DRAWING NO.	SHEET NO.
					SD 9.53 (2 of 5)	OF

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	D.B.B.	1-15
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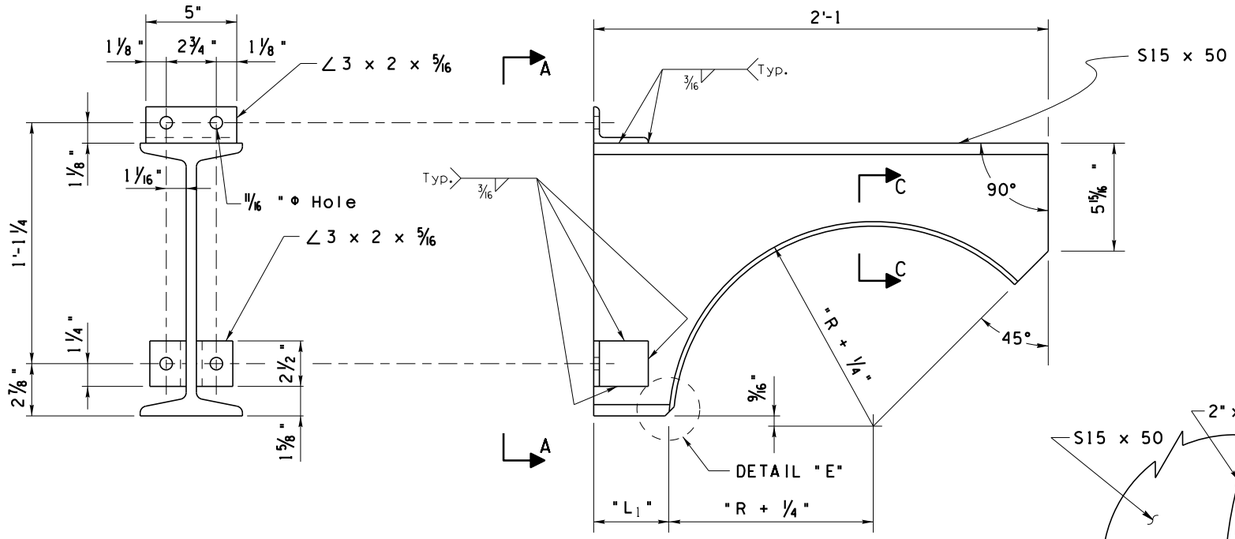
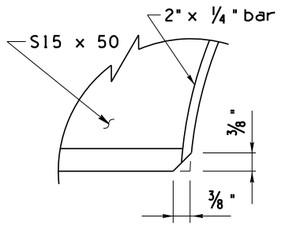
4			

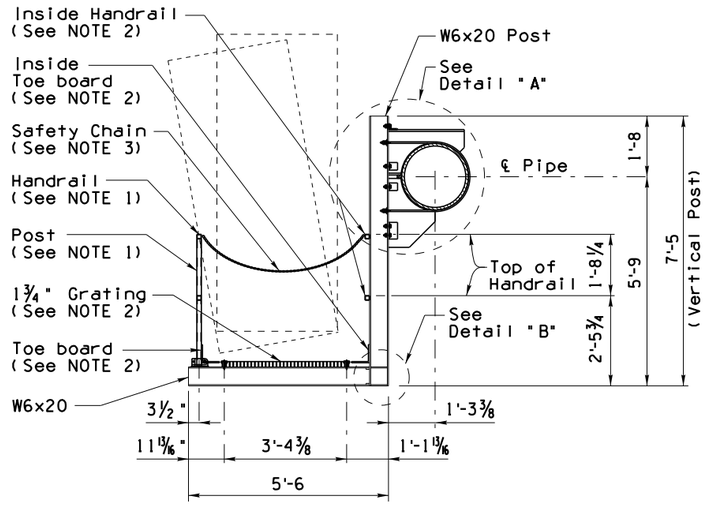


VIEW A-A
(Upper Mounting Bracket)

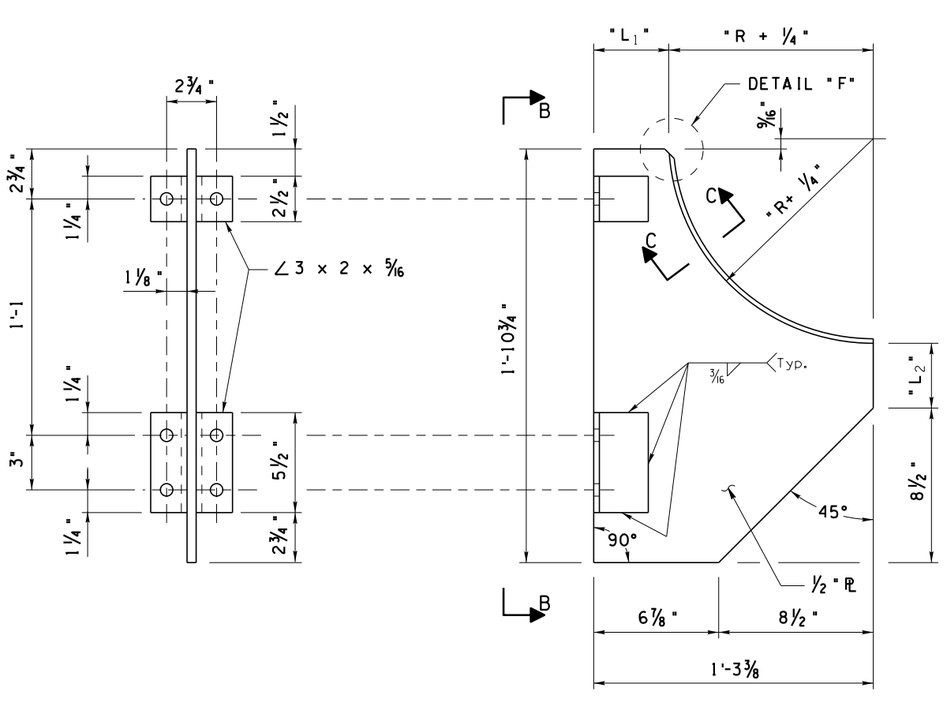
UPPER BRACKET



DETAIL "E"

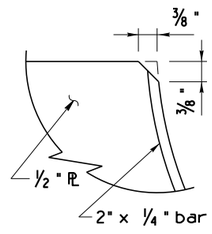


SECTION D-D

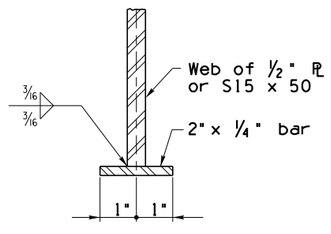


VIEW B-B
(Lower Mounting Bracket)

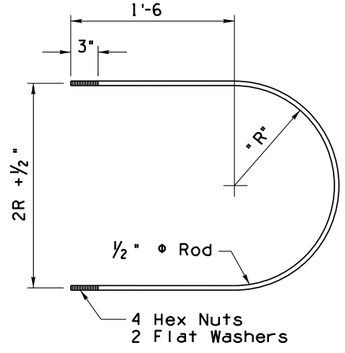
LOWER BRACKET



DETAIL "F"



SECTION C-C



BRACKET U-BOLT

NOTE:

1. See SD 9.53 (4 of 5) for handrail, post and hinge details.
2. See SD 9.53 (5 of 5) for inside handrails, grating and toeboard details.
3. 3/16" galvanized safety chain with (1) ¼" snap hook at end of both catwalks.
4. See SD 9.53 (2 of 5) for Detail "A".
5. See SD 9.53 (2 of 5) for Detail "B".
6. Optional mast arm field splice, if any, shall not interfere with catwalk supports.

Frame Type	Nominal Pipe Dia.	R	L_1	L_2
2F	16"	8"	7⅛"	6 9/16"
3F	20"	10"	5⅛"	4 9/16"
4F	22"	11"	4⅛"	3 9/16"

Note to Designer:
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NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	D.A.B.	1-15
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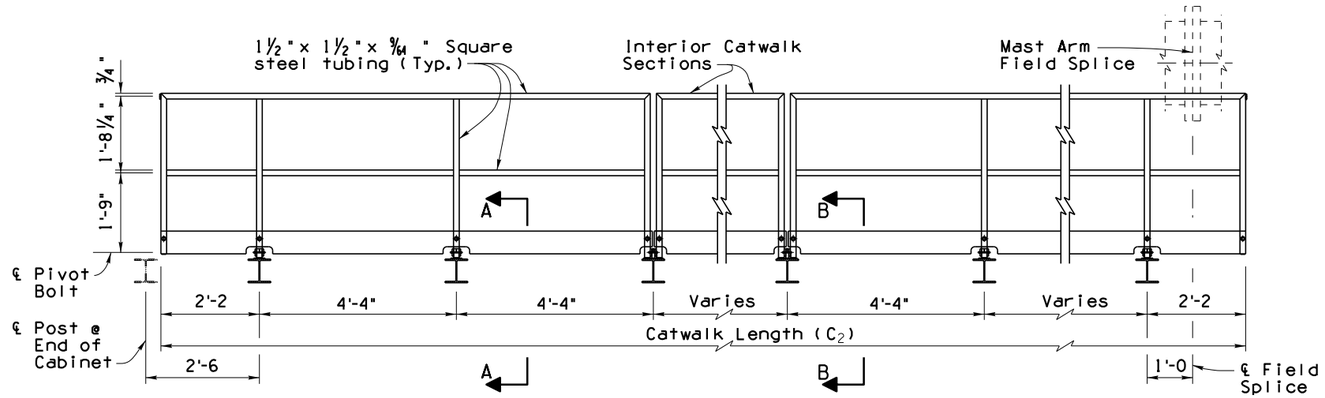
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DMS (VARIABLE TILT CABINET)
TUBULAR FRAME
MOUNTING DETAILS

ROUTE | PROJECT NO. | F.A. NO. | DRAWING NO. SD 9.53 (3 of 5)
LOCATION | SHEET NO. OF

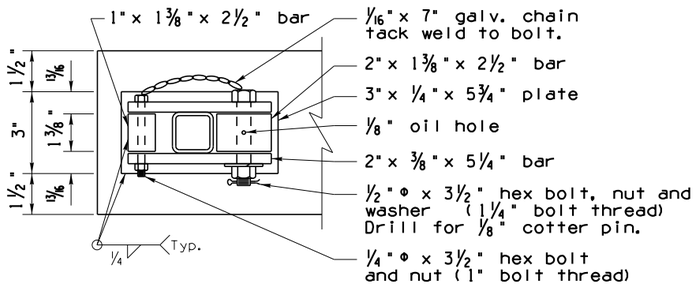
22-APR-2019 14:12 G:\9750\SD_Sheets\sd953-3_0116.dgn



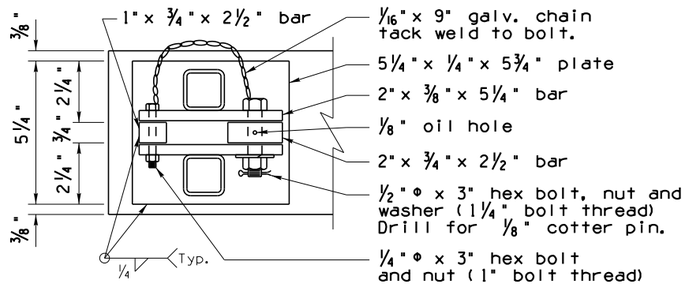
HANDRAIL ELEVATION
(Rt. Side Shown, Lt. Side Opposite)

LED DMS TUBULAR FRAME CAMBER (INCHES)								
Frame Type	2F	2F	3F	3F	3F	4F	4F	4F
Span	56'-0	70'-0	82'-0	94'-0	106'-0	118'-0	130'-0	142'-0
"X"	1"	1½"	1¾"	2½"	3½"	4"	6"	7¾"
"Y"	1¼"	2"	2¼"	3½"	4¾"	6"	8¼"	11¼"

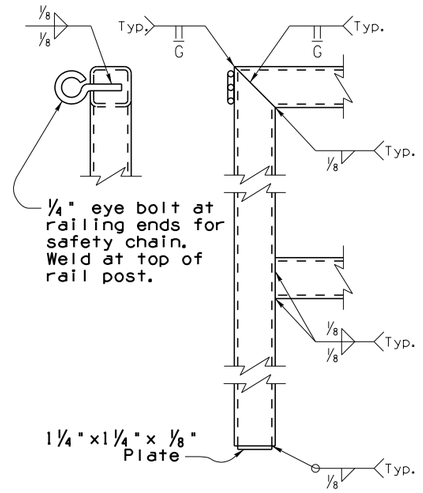
Calculated camber provides for deflections due to dead load of tubular structure and dead loads of sign cabinet, catwalks and attachments. For spans other than shown, interpolate for "X" and "Y" dimensions.
See SD 9.20 (3 of 5) for CAMBER DIAGRAM and camber notes.



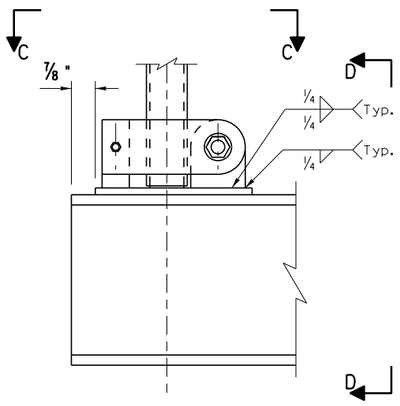
SECTION C-C
(Single Post)



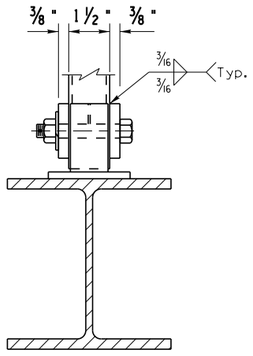
SECTION E-E
(Dual Post)



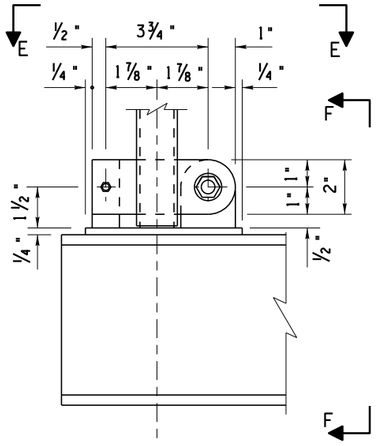
HANDRAIL WELD DETAILS



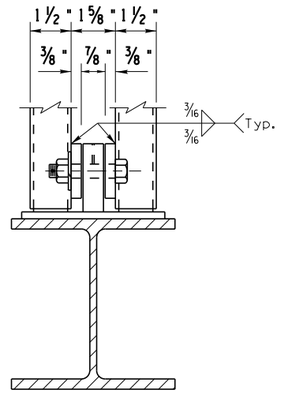
SECTION A-A
(Single Post)



SECTION D-D
(Single Post)



SECTION B-B
(Dual Post)



SECTION F-F
(Dual Post)

NOTES:

Handrails shall extend from end of sign cabinet to mast arm field splice as shown for both catwalks. Maximum support post spacing shall be 4'-4. Minimum support post spacing shall be 2'-2. Maximum three spaces per rail section. Minimum two support posts per rail section. Minimum catwalk length = 6'-6.

Handrail to be 1½" x 1½" x 9/64 " square steel tubing weighing 2.70 plf.

Provide eye bolts at ends of top handrails for 3/16" galvanized safety chain with (1) ¼" snap hook per catwalk end.

Provide ⅝"Φ holes for ½"Φ pivot bolts and ⅜"Φ holes for ¼"Φ lock bolts.

See SD 9.53 (5 of 5) for inside handrails, grating and toeboard details.

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1	Original Issue	D.B.B.	1-15
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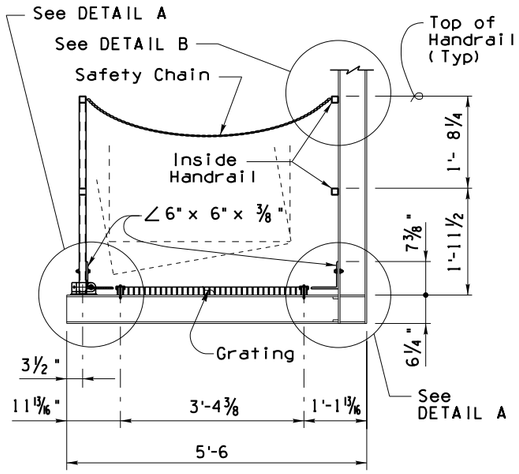
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

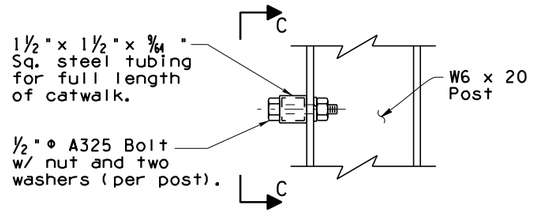
DMS (VARIABLE TILT CABINET)
CATWALK
HANDRAIL DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 9.53 (4 of 5)
LOCATION			SHEET NO. OF

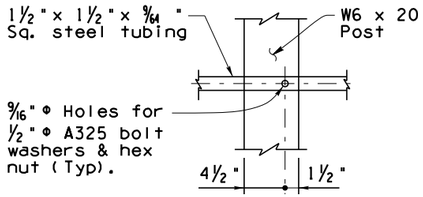
22-APR-2019 14:12 G:\9750\SD_Sheets\sd953-4_0116.dgn



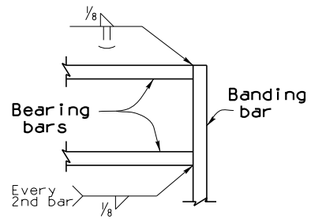
PART. SECTION OF CATWALK



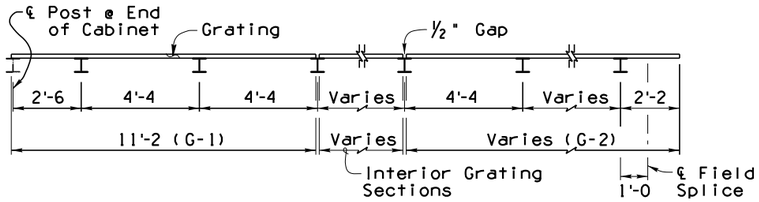
DETAIL B



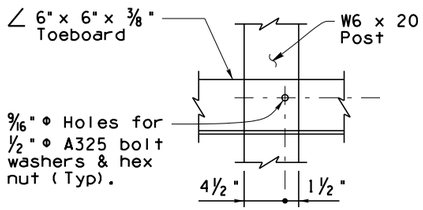
SECTION C-C



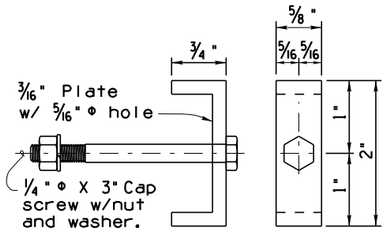
DETAIL C



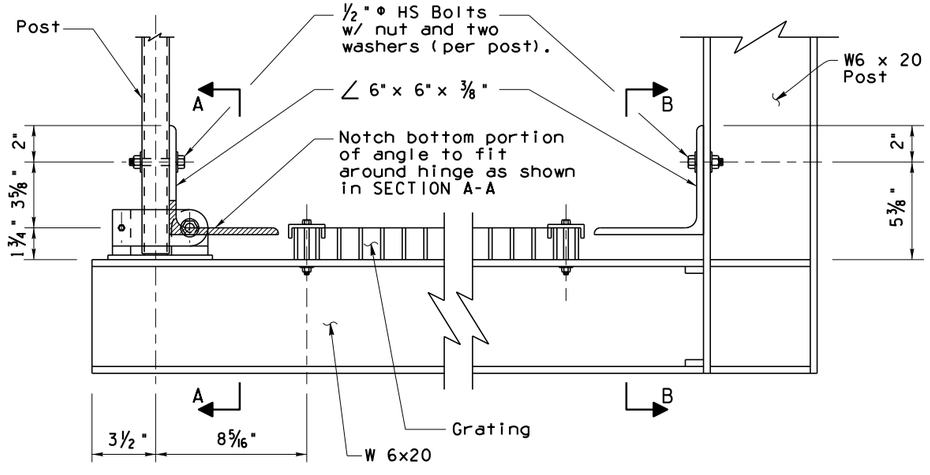
GRATING ELEVATION
(Rt. Side Shown, Lt. Side Opposite)



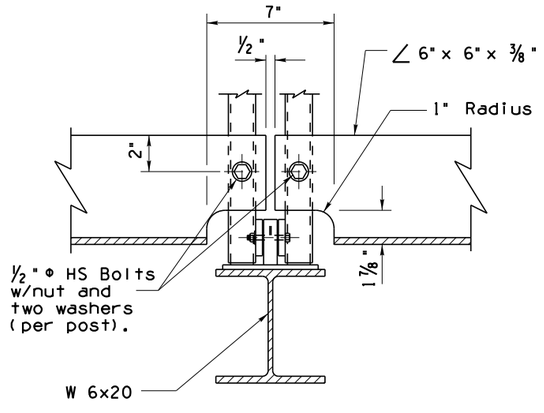
SECTION B-B



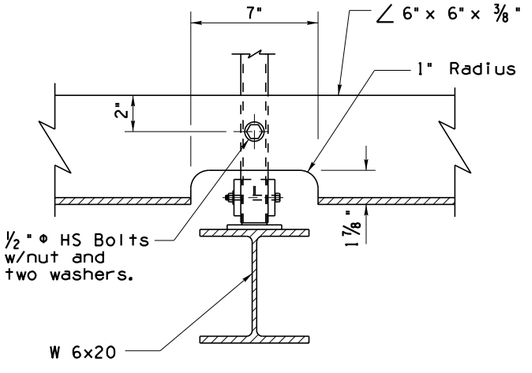
GRATING CLIP



DETAIL A



SECTION A-A
(Dual Posts)



SECTION A-A
(Single Post)

NOTE:

Welded grating shall meet the standard requirements of ANSI/NAAMM MGB 531-00. Grating shall be 1 3/4" x 3/16" bearing bars at 1 3/16" centers and cross bars at 4" centers.
All grating to have 1 3/4" x 3/16" banding bars at both ends.
Weld bearing bars to banding bars with 1/8" fillet weld, one side every second bar and as shown in Detail C.
All grating to be straight and true after fabrication.
Grating shall be galvanized.
See Table for grating dimensions:

GRATING DIMENSIONS		
Grate No.	Length	Width
G-1	11'-2	3'-5 3/4
Interior	Varies**	3'-5 3/4
G-2	Varies*	3'-5 3/4

* Maximum length of G-2 is 10'-9 1/2.
** Use additional interior grating sections of 4'-3 1/2, 8'-7 1/2 or 12'-11 1/2 if required.

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

DMS (VARIABLE TILT CABINET)
CATWALK
MISCELLANEOUS DETAILS

ROUTE	PROJECT NO.	F.A NO.	DRAWING NO.
			SD 9.53 (5 of 5)
LOCATION			SHEET NO. OF

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