Chicago Testing Laboratory, Inc.
30W114 Butterfield Road, Warrenville, IL 60555 p 630.393.2851 f 630.393.2857
w chicagotestinglab.com e info@chicagotestinglab.com
Testing • Inspection • Training • Consulting • Research • Geotechnical
Founded 1912

November 1, 2024

Robert T. Boro, P.E.
Senior Project Manager
HBM Engineering Group, LLC
4415 Harrison Street, Suite 231
Hillside, IL 60162

Re: Geotechnical Memorandum #1
Overhead Sign (OHS) Structures
IDOT PTB 204-012 WO 3
IDOT Contract 62W87
I-94, 159th Street to the Little Calumet River
Dolton, Illinois

CTL Project No. 24F763

Dear Mr. Boro,

Chicago Testing Laboratory, Inc. (CTL) completed a geotechnical investigation for the proposed US 6 to NB I-94 (OHS Structures, Signs 7 and 8) for IDOT Contract 62W87 along I-94 from 159th Street to the Little Calumet River in Dolton, Illinois. The purpose of the investigation was to obtain subsurface soil samples to characterize and determine the soil properties, determine the groundwater conditions, and provide analysis and recommendations for the proposed improvements. Appendix A shows the Site Location Map with the contract limits.

1.0 Project Information

Based on the preliminary information provided by HBM Engineering Group (HBM), the proposed project will include removal of an existing structure and replacing it with a new cantilever sign structure (SN: 1C016I094R070.7, Sign 7), at Station 481+82; and removal of an existing structure near Station 508+95 and replacing it with a new span OHS structure (SN: 1S016I094R071. Sign 8). The surrounding area includes urban properties throughout the project site. Based on the HBM's provided Design Plans (Appendix D), Sign 7 will have the standard drilled shaft foundation, and Sign 8 (Span OHS) is planned to have standard spread footing type foundation on one end and the standard drilled shaft foundation type on the other end.

2.0 Subsurface Exploration

This section describes the subsurface exploration and laboratory testing programs completed as part of this project. The subsurface investigation program was performed, according to applicable IDOT and AASHTO manuals and procedures.

2.1 Subsurface Site Investigation

The subsurface investigation was conducted on October 10, 2024, which included advancing three (3) soil borings to a depth of 40 feet below ground surface (bgs) for the proposed improvements. The boring locations were selected by CTL, with approval from HBM, and completed in the field based on site conditions and accessibility. Elevations of the boring locations were estimated using the provided plan and profiles and internet resources. Table 1 below presents a summary of the soil boring completed.

Table 1: Summary of Soil Borings

Boring	Location	Elevation (ft MSL)	Depth (ft)
OSB-7-1	Sign 7, STA 482+55, 90.00ft RT	597.0	40
OSB-8-1	Sign 8, STA 508+65, 90.00ft RT	596.5	40
OSB-8-2	Sign 8, STA 508+65, 10.00ft LT	593.0	40

The soil borings were conducted by GeoServices, a subcontracted drilling firm, under the field supervision by a CTL engineer using a truck mounted Mobile B-57 drill rig equipped with 2-1/4-inch I.D. hollow stem augers and an automatic hammer. Soil sampling was performed according to AASHTO T206 “Penetration Test and Split Barrel Sampling of Soils” using the Standard Penetration Test (SPT, ASTM D1556). In this procedure, a 2-inch O.D. split barrel or split spoon sampler is driven 18 inches into undisturbed soil using a 30-inch drop of a 140-pound hammer. The number of hammer drops (blow counts) is recorded in 6-inch intervals for each sample collected. The number of blow counts to advance the sampler the final 12 inches is called the SPT “N-value”. The N-values are shown on the Soil Boring Logs (Appendix C).

Soil samples were obtained with the split barrel sampler at 2.5-foot intervals to the boring termination depths. A CTL field technician inspected, visually classified, and logged the soil samples throughout the subsurface exploration. Unconfined compressive strength values (Qu) of the cohesive soils encountered during the subsurface investigation were obtained in the field using a calibrated Rimac compressive tester in according to IDOT procedures or using a Pocket Penetrometer when the soil sample is small or disturbed. Representative soil samples from each sampling interval were collected, placed in sealed glass jars, and returned to the laboratory for further evaluation and testing.

2.2 Laboratory Testing Program

All soil samples collected during the subsurface exploration were inspected in the laboratory to verify the field classifications. A laboratory testing program was conducted on the soils encountered to characterize and determine the engineering properties for the design of the proposed improvements. Moisture Contents (AASHTO T265) were performed on all soil samples.

Based on the laboratory test results, soil samples were classified using the Illinois Division of Highways (IDH) classification systems. The laboratory and field test results are shown on the Soil Boring Logs (Appendix C).

2.3 General Subsurface Conditions

General subsurface conditions are described below and are grouped based on similar soils encountered throughout the proposed improvements.

Generally, Boring OSB-7-1 (at Sign 7) encountered near surface materials consisting of 3 inches of topsoil, underlain by a 12-ft thick fill material consisting of 18 inches of brown and gray, moist silty sand, with N-value of 28 and 8.8% moisture; 4 ft of silty clay with Qu of 2 tsf and 13.5% moisture; 2 ft of loam with N-value of 7 and 12.1% moisture; and 4 ft of stiff silty clay with Qu of 1.9 tsf and 14.4% moisture. The fill material is underlain by alternating soils of very loose, moist sandy loam and stiff to very stiff silty clay soils (Qu values between 1.3 and 2. tsf and moisture between 14.8% and 23%, to the boring termination.

Borings OSB-8-1 and OSB-8-2 (at Sign 8) encountered similar subsurface soil conditions, except for the near surface materials; Boring OSB-8-1 encountered 12 inches of topsoil, whereas Boring OSB-8-2 encountered 5-inch asphalt underlain by 10-inch concrete pavement. Generally, in both borings, the near surface materials are underlain by 5 to 12 ft thick loose to medium dense, brown and grey, moist to very wet, sandy loam, with N-value between 0 and 5, and moisture between 25% and 70%. The sandy loam is underlain by 6 to 9 ft of very loose, very wet, brown and grey, silty clay with Qu of 2 tsf and 13.5% moisture. Stiff to very stiff and hard, grey silty clay layer with Qu of 1.9 to 5 tsf, and moisture of 14% to 20%, was encountered at 12 ft depth in Boring OSB-8-1 and 17 ft depth in Boring OSB-8-2 to the boring termination.

Detailed descriptions of the soil borings are provided in Appendix C (Soil Boring Logs) which provides specific conditions encountered at each soil boring location. The stratifications shown on the soil boring logs represent the conditions only at the actual soil boring location and represents the approximate boundary between subsurface materials; however, the actual transition may be gradual.

2.4 Groundwater Conditions

Water level measurements were taken in the soil borings when water was encountered while drilling and after the completion of the soil borings. In both borings, OSB-8-1 and OSB-8-2, groundwater was encountered during drilling at 7 and 8 ft depths, respectively, but was not observed after completing the borings. The borings were not left open to collect delayed water readings after leaving the site due to safety concerns.

3.0 Geotechnical Analysis and Recommendations

This section provides the geotechnical analysis and recommendations for the proposed roadway reconstruction based on the results of the field exploration and laboratory testing.

3.1 Seismic Analyses

Table 2 below provides a summary of the seismic parameters. Based on the soil boring data and the seismic analyses (Appendix E), the Site Class C is recommended. Although the project site is considered to be in a low seismic area, the very loose, wet sand layer in Borings OSB-8-1 and OSB-8-2 might be considered a liquefiable layer and would cause a negative skin friction in the shaft foundation design.

Table 3: Seismic Parameters

Soil Site Class	Seismic Performance Zone (SPZ)	0.2 Second Spectral Response Acceleration (S_{DS})	1.0 Second Spectral Response Acceleration (S_{D1})
C	1	0.121	0.066

3.2 Foundation Recommendations

For the cantilever sign structure (Sign 7), the standard drilled shaft depth (17 ft) shown on the plans is adequate since the weighted average Qu value of the soils down to 21 ft (ignoring the top 4 ft due to frost and ignoring the intermittent loose sandy loam and loam layers) is 1.26 tsf which meets the minimum required 1.25 tsf.

For the span sign structure (Sign 8), the depths of drilled shafts (16.5 ft) shown on the plan is not adequate, and thus the foundation dimensions should be based on the specific design, using the recommended soil parameters for axial and lateral resistances in Tables 3 and 4, respectively, based on AASHTO LRFD Design for drilled shafts.

Table 3: LRFD Soil Parameters for Axial Resistance – Borings OSB-8-1 & OSB-8-2

Depth bgs (feet)	Soil Description	Avg. Qu (tsf)	Friction Angle, ϕ (deg)	Estimated Bearing Resistance (ksf)			Est. Unit Avg Side Resistance (ksf)	
				Service	Resistance Factor	Factored	Compression[1]	Tension (uplift)[2]
1-8	Loose to Med Dense, moist Sandy Loam	0	30	n/a	n/a	n/a	0.14	0.11
8-17	V. Loose, wet Loam	0	28	n/a	n/a	n/a	0.19	0.15
14-36	Stiff to V. Stiff	1.7	0	15.3	0.4	6.1	0.78	0.60
36-40	Hard Silty Clay	4.2	0	37.8	0.4	15.1	1.93	1.48

1. Compression resistance factor of 0.45 for clay and 0.55 for sand
2. Uplift resistance factor of 0.35 for clay and 0.45 for sand

Table 4: LRFD Soil Parameters for Lateral Resistance – Borings OSB-8-1 & OSB-8-2

Depth-bgs (ft)	Soil Description	Avg. Qu (tsf)	Friction Angle, ϕ (deg)	Lateral Modulus of Subgrade Reaction, k (pci)	Strain (ε_{50})
1-8	Loose to Med Dense, moist Sandy Loam	0	30	75	n/a
8-17	V. Loose, wet Loam	0	28	70	n/a
14-36	Stiff to V. Stiff	1.7	0	500	0.007
36-40	Hard Silty Clay	4.2	0	1235	0.005

3.3 Drilled Shaft Construction Recommendations

The drilled shaft construction should be completed in accordance with Section 516, Drilled Shafts, in the IDOT Standard Specification for Road and Bridge Construction. Temporary casing and wet drilled shaft construction methods are anticipated to be necessary at the Sign 8 shaft foundations, from the top down to a 17-ft depth on both sides of the span OHS structures, to avoid "blow up" and cave ins of the loose and very loose sandy loam layers.

4.0 Professional Disclaimer

This report was prepared on the basis of the project information supplied by the client and is intended only for use on this project. This report was prepared by interpreting the data from the soil borings and field tests made within the project limits and from the results of the laboratory tests obtained from the samples taken. The report gives a representative, but not exhaustive, picture of the project subsurface conditions. The geotechnical engineer warrants that the findings, recommendations, specifications, and professional advice given within this report have been prepared using generally accepted professional engineering practices. The recommendations provided in the report are specific to the project described herein and are based on the information obtained from the soil boring locations within the proposed roadway improvements. Changes involving the proposed roadway alignment and wall structures, from those enumerated within this report, should be submitted for our review to evaluate our recommendations.

Chicago Testing Laboratory, Inc. (CTL) appreciates the opportunity to work with you on this project and look forward to serving as your Geotechnical Engineering Consultant on this project during construction or future projects. We would be pleased to discuss any questions you have about the contents of this report.

Respectfully Submitted,
CHICAGO TESTING LABORATORY, INC.

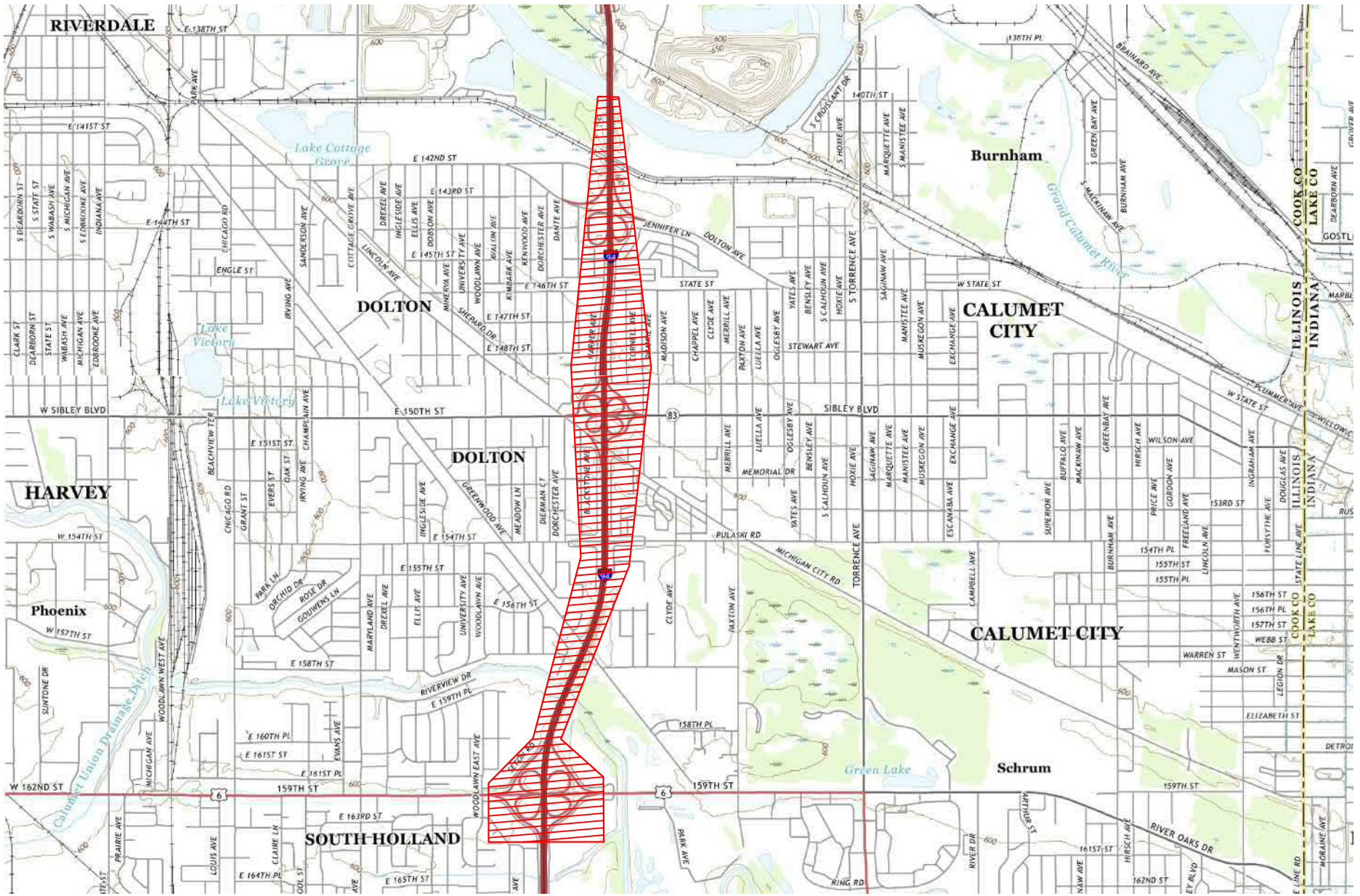
Jeffrey Rothamer, P.E.
Director of Technical Services

Riyad Wahab, PhD, P.E.
Senior Geotechnical Engineer

Attachments - Appendix A: Site Location Map
Appendix B: Boring Location Plan
Appendix C: Soil Boring Logs
Appendix D: Design Plans (HBM)
Appendix E: Seismic Analyses

APPENDIX A

SITE LOCATION MAP



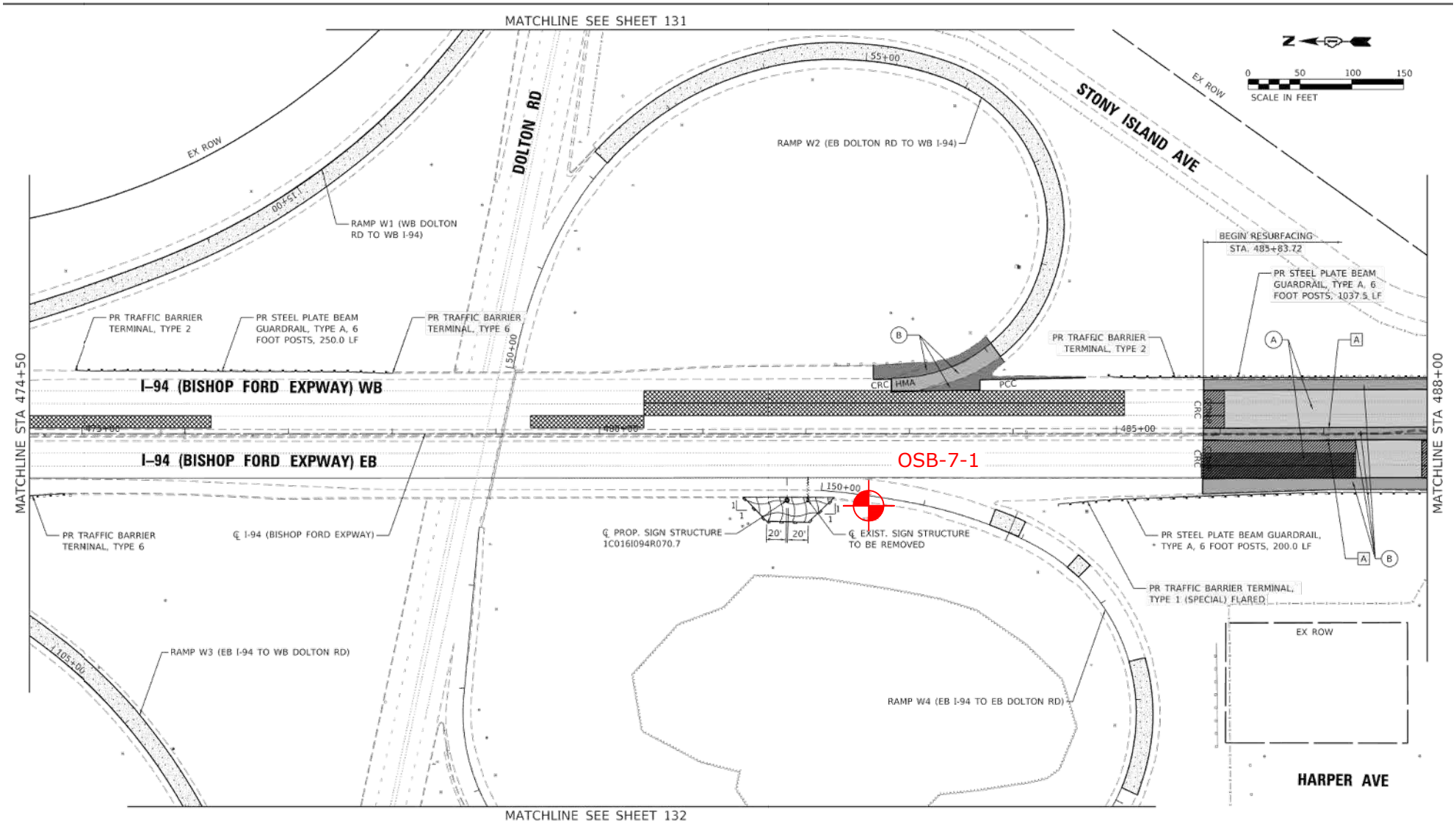
CHICAGO TESTING LABORATORY, INC.
30W114 BUTTERFIELD ROAD
WARRENVILLE, IL 60555
PHONE: (630) 393-2851
FAX : (630) 393-2857

DRAWN BY:	JAR
CHECKED BY:	RW
SCALE:	NTS
DATE:	10/16/24

SITE LOCATION MAP
PTB 204-012 WO3
IDOT 62W87 OVERHEAD SIGNS
DOLTON, ILLINOIS

APPENDIX B

BORING LOCATION PLAN

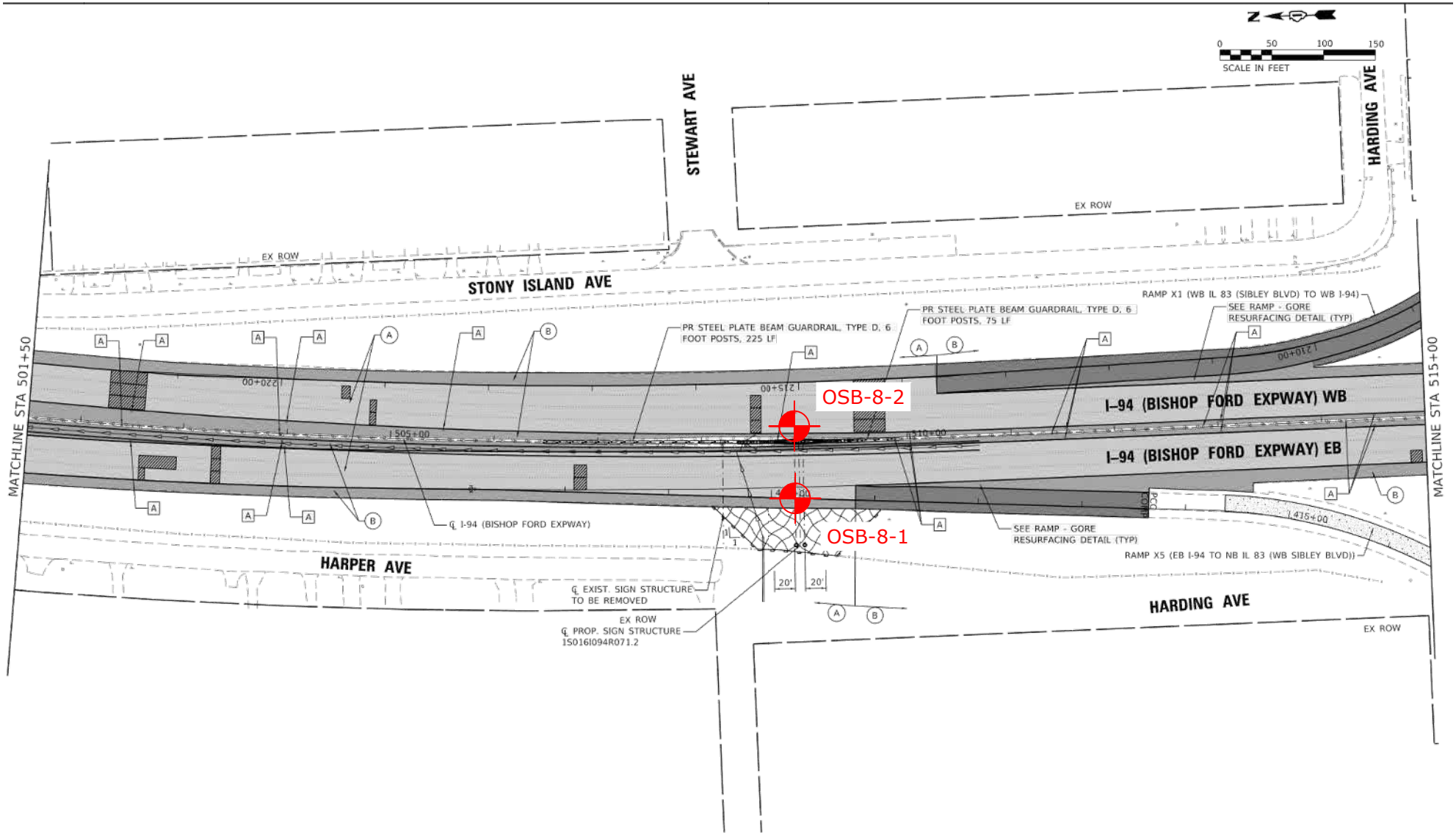


BORING LOCATION

CHICAGO TESTING LABORATORY, INC.
30W114 BUTTERFIELD ROAD
WARRENVILLE, IL 60555
PHONE: (630) 393-2851
FAX : (630) 393-2857

DRAWN BY:	CHECKED BY:	SCALE:	DATE:
JAR	RW	NTS	10/16/24

BORING LOCATION PLAN (1 OF 2)
PTB 204-012 WO3
IDOT 62W87 OVERHEAD SIGNS
DOLTON, ILLINOIS



BORING LOCATION

CHICAGO TESTING LABORATORY, INC.
30W114 BUTTERFIELD ROAD
WARRENVILLE, IL 60555
PHONE: (630) 393-2851
FAX : (630) 393-2857

DRAWN BY:	CHECKED BY:	SCALE:	DATE:
JAR	RW	NTS	10/16/24

BORING LOCATION PLAN (2 OF 2)
PTB 204-012 WO3
IDOT 62W87 OVERHEAD SIGNS
DOLTON, ILLINOIS

APPENDIX C

SOIL BORING LOGS

Illinois Department of Transportation
Division of Highways
Chicago Testing Laboratory, Inc

SOIL BORING LOG

Date 10/10/24

ROUTE FAI RTE 94 (I-94 Bishop Ford Expy) **DESCRIPTION** Overhead Sign 7 **LOGGED BY** KL

SECTION 2019-180-RS&T **LOCATION** NE 1/4, **SEC.** 11, **TWP.** 36N, **RNG.** 25E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. Sign 7
Station 481+82.03

BORING NO. OSB-7-1
Station 482+55
Offset 90.00ft RT
Ground Surface Elev. 597.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
3 inches of Topsoil	596.75			
Brown and Gray, Moist FILL: SILTY SAND		9		
	595.00	13		8.8
Brown and Gray, Moist FILL: SILTY CLAY		15		
		3		
		3	2.0	13.5
	-5	3	P	
	591.00			
Brown, Moist FILL: LOAM		2		
		3		12.1
		4		
	589.00			
Brown and Gray, Moist FILL: SILTY CLAY		4		
		7	1.9	14.4
	-10	4	B	
		6		
	585.00	7		9.2
Very Loose Brown, Moist SANDY LOAM (SM)		4		
	583.00	1		
Stiff Gray, Moist SILTY CLAY (CL/ML)		1	1.5	21.5
	-15	1	P	
	581.00			
Very Loose Gray, Wet LOAM (SC-SM)		0		
	580.00	0		22.8
		2		
Stiff to Very Stiff Gray, Moist SILTY CLAY trace gravel (CL/ML)		2		
		3	1.7	23.0
	-20	4	B	

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Very Stiff Gray, Moist SILTY CLAY trace gravel (CL/ML) *(continued)*		3		
		5	1.7	14.8
		6	B	
		2		
		5	1.3	20.5
	-25	5	B	
		3		
		5	1.7	20.9
		7	B	
		3		
		6	1.7	21.0
	-30	6	B	
		3		
		5	1.7	20.4
	-35	7	B	
		4		
		8	2.1	19.0
	557.00 -40	9	B	

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Chicago Testing Laboratory, Inc

SOIL BORING LOG

Date 10/10/24

ROUTE FAI RTE 94 (I-94 Bishop Ford Expy) DESCRIPTION Overhead Sign 8 LOGGED BY KL

SECTION 2019-180-RS&T LOCATION NE 1/4, SEC. 11, TWP. 36N, RNG. 25E, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. Sign 8
Station 508+94.88

BORING NO. OSB-8-1
Station 508+95
Offset 65.00ft RT
Ground Surface Elev. 592.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 584.0 ft ▼
Upon Completion None ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				12 inches of Topsoil
				591.00
	5			Loose to Medium Dense
	4		17.3	Brown, Moist
	4			SANDY LOAM (SM)
	3			
	6		21.6	
-5	6			
				586.00
	5			Very Loose
	4		24.9	Gary, Wet
	1			LOAM (SC-SM)
▼				
	0			
	0		67.8	
-10	1			
	0			
				580.00
	1		22.1	Stiff to Very Stiff
	1			Gray, Moist
				SILTY CLAY trace gravel (CL/ML)
	4			
	5	2.5	17.2	
-15	5	B		
	3			
	4	1.7	18.6	
	4	B		
	3			
	3	1.5	18.8	
-20	4	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Stiff to Very Stiff
				Gray, Moist
	3			SILTY CLAY trace gravel (CL/ML)
				(continued)
	4	1.3	21.6	
	6	B		
	3			
	5	1.3	20.2	
-25	5	B		
	3			
	4	1.7	20.6	
	5	B		
	3			
	5	1.3	19.5	
-30	6	B		
	4			
	7	1.9	15.5	
-35	8	B		
				554.00
	8			Hard
				Gray, Moist
	13	4.2	13.6	SILTY CLAY LOAM trace gravel
-40	15	B		
				552.00

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation

Division of Highways
Chicago Testing Laboratory, Inc

SOIL BORING LOG

Date 10/1/24

ROUTE FAI RTE 94 (I-94 Bishop Ford Expy) **DESCRIPTION** Overhead Sign 8 **LOGGED BY** JAR

SECTION 2019-180-RS&T **LOCATION** NE 1/4, **SEC.** 11, **TWP.** 36N, **RNG.** 25E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. Sign 8
Station 508+94.88

BORING NO. OSB-8-2
Station 508+95
Offset 10.00ft LT
Ground Surface Elev. 593.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 585.0 ft ▼
Upon Completion None ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				5 inches of Asphalt Pavement 592.58
				10 inches of Concrete Pavement 591.75
	5			Loose to Medium Dense Brown and Gray, Wet SANDY LOAM (SM)
	9		22.7	
	9			
	5			589.00
-5	4		21.0	Loose to Medium Dense Gray, Wet SANDY LOAM (SM)
	5			
	6			
	9		27.1	
	7			585.00 ▼
	1			Very Loose Gray, Wet LOAM (SC-SM)
	1		67.3	
-10	1			
	1			
	1		70.1	
	1			
	0			
	0		42.5	
-15	0			
	0			
	0	1.0	38.5	576.00
	3	B		Stiff Gray, Moist SILTY CLAY trace gravel (CL/ML)
	3			
	4	1.7	22.1	
-20	5	B		
	3			Stiff Gray, Moist SILTY CLAY trace gravel (CL/ML) *(continued)*
	4	1.7	20.7	
	5	B		
	3			
-25	4	1.9	21.4	
	6	B		
	2			
	4	1.7	21.0	
	6	B		
	3			
-30	4	1.9	20.7	
	6	B		
	5			560.00
	8	3.3	13.4	Very Stiff to Hard Gray, Moist SILTY CLAY LOAM trace gravel (CL/ML)
-35	11	B		
	8			
	17	5.0	12.9	
-40	27	B		553.00

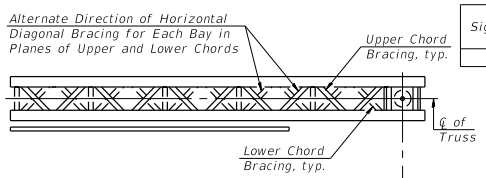
End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

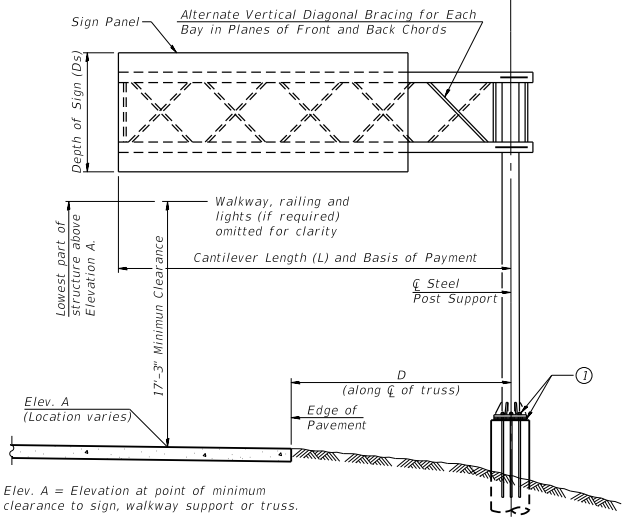
APPENDIX D

DESIGN PLANS (HBM)

Sign #	Structure Number	Station	Design Truss Type	Cantilever Length (L)	Elev. A	Dim. D	Ds	Total Sign Area
7	1C016I094R070.7	481+82.03	II-C-A	28' - 0"	599.71	13' - 10 1/8"	8' - 6"	127.5



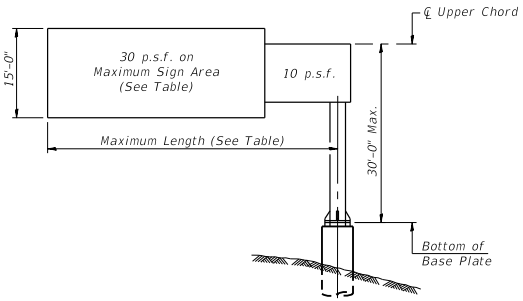
TYPICAL PLAN
(Walkway not shown)



Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

TYPICAL ELEVATION
Looking in Direction of Traffic

Truss Type	Maximum Sign Area	Maximum Length
I-C-A	170 Sq. Ft.	25 Ft.
II-C-A	340 Sq. Ft.	30 Ft.
III-C-A	400 Sq. Ft.	40 Ft.



DESIGN WIND LOADING DIAGRAM
Parameters shown are basis for I.D.O.T. Standards Installations not within dimensional limits shown require special analysis for all components.

Sign support structures may be subject to damaging vibrations and oscillations when sign panels are not in place during erection or maintenance of the structure. To avoid these vibrations and oscillations, consideration should be given to attaching temporary blank sign panels to the structure.

Note:
Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

(1) After adjustments to level truss and insure adequate vertical clearance, all top and leveling nuts shall be tightened against the base plate with a minimum torque of 200 lb.-ft. Stainless steel mesh shall then be placed around the perimeter of the base plate. Secure to base plate with stainless steel banding.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

WALKWAY: Walkway grating, walkway brackets, handrails, lighting, and associated components shown in these plans on the traffic side of the sign structure/sign panel will not be installed with Contract 62W87. The truss grating and maintenance walkway behind the sign panel will be included with Overhead Sign Structure - Cantilever, Type II-C-A (36" X 5'-6")

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES:
Field Units
f'c = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

WELDING: All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 and D1.2 Structural Welding Codes (Steel and Aluminum) and the Standard Specificiations.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W*. Stainless steel for shims, sleeves and handhole covers shall be ASTM A240, Type 302 or 304, or another alloy suitable for exterior exposure and acceptable to the Engineer.
The steel pipe and stiffening ribs at the base plate for the column shall have a minimum longitudinal Charpy V-Notch (CVN) energy of 15 lb.-ft. at 40° F. (Zone 2) before galvanizing.

FASTENERS FOR ALUMINUM TRUSSES: All bolts noted as "high strength" must satisfy the requirements of AASHTO M164 (ASTM A325), or approved alternate, and must have matching lock nuts. Threaded studs for splices (if Members interfere) must satisfy the requirements of ASTM A449, ASTM A193, Grade B7, or approved alternate, and must have matching lock nuts. Bolts and lock nuts not required to be high strength must satisfy the requirements of ASTM A307. All bolts and lock nuts must be hot dip galvanized per AASHTO M232. The lock nuts must have nylon or steel inserts. A stainless steel flat washer conforming to ASTM A240 Type 302 or 304, is required under both head and nut or under both nuts where threaded studs are used. High strength bolt installation shall conform to Article 505.04 (f) (2)d of the IDOT Standard Specifications for Road and Bridge Construction. Rotational capacity ("ROCAP") testing of bolts will not be required.

U-BOLTS AND EYEBOLTS: U-Bolts and Eyebolts must be produced from ASTM A276 Type 304, 304L, 316 or 316L, Condition A, cold finished stainless steel, or an equivalent material acceptable to the Engineer. All nuts for U-Bolts and Eyebolts must be lock nuts equivalent to ASTM A307 with nylon or steel inserts and hot dip galvanized per AASHTO M232. A stainless steel flat washer conforming to ASTM A240, Type 302 or 304, is required under each U-Bolt and Eyebolt lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Concrete Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
Overhead Sign Structure - Cantilever, Type II-C-A (36" X 5'-6")	Foot	28
Drilled Shaft Concrete Foundations	Cu Yd	7.4
Remove Overhead Sign Structure - Cantilever	Each	1

STATE OF ILLINOIS
MOUSSA A. ISSA
081-005738
CHICAGO, ILLINOIS
LICENSED STRUCTURAL ENGINEER

Signed _____
Dr. Moussa A. Issa, S.E. IL. Lic. No. 081-005738
Expires 11-30-2026

Date _____ For Sheets 0HSS1-01 thru 0HSS1-09.

0SC-A-1 2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

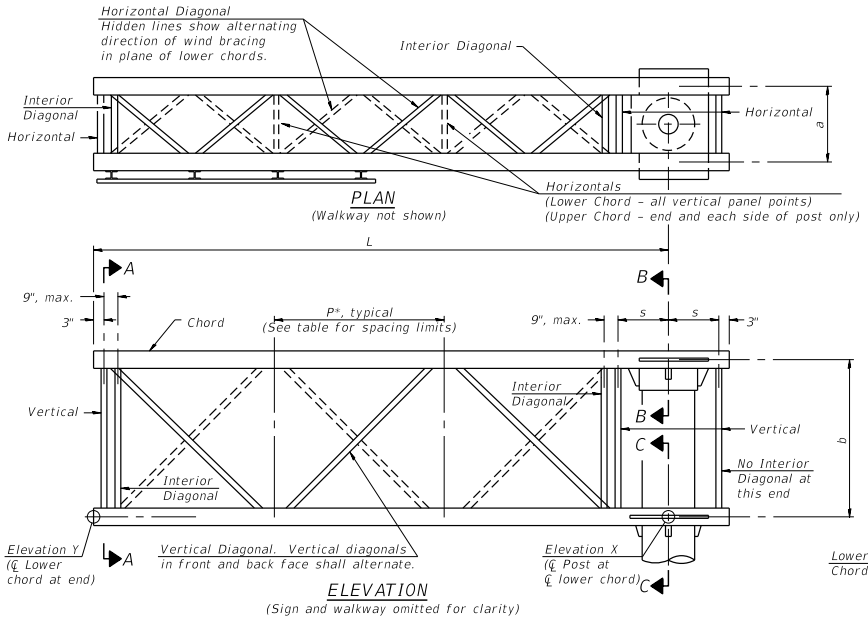
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

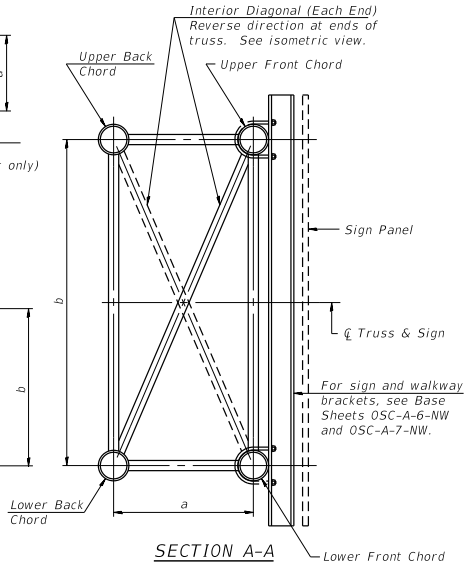
CANTILEVER SIGN STRUCTURES - GENERAL PLAN & ELEV.
ALUMINUM TRUSS & STEEL POST

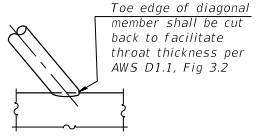
SHEET 0HSS1-01 OF 0HSS1-09SHEETS

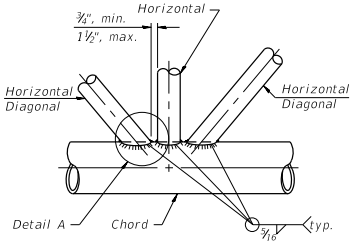
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	311
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

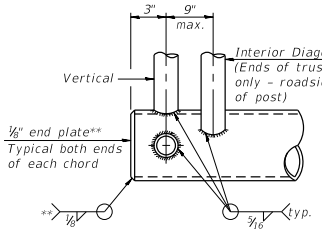
MODEL: Default
FILE NAME: \\homepw11\cs01\PCS_pdf_work_dir\16811143e_31\C016I094R070.7-62K3-SHT-SignDet01.dgn
10/3/2024 3:37:47 PM



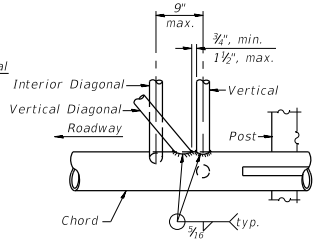








** Contractor may alternatively use standard aluminum drive-fit cap to close ends. ½" Ø Drain hole in end plate / drive-fit cap.



TYPICAL TRUSS UNIT

For Section B–B and Section C–C, see Base Sheet 0SC-A-3.

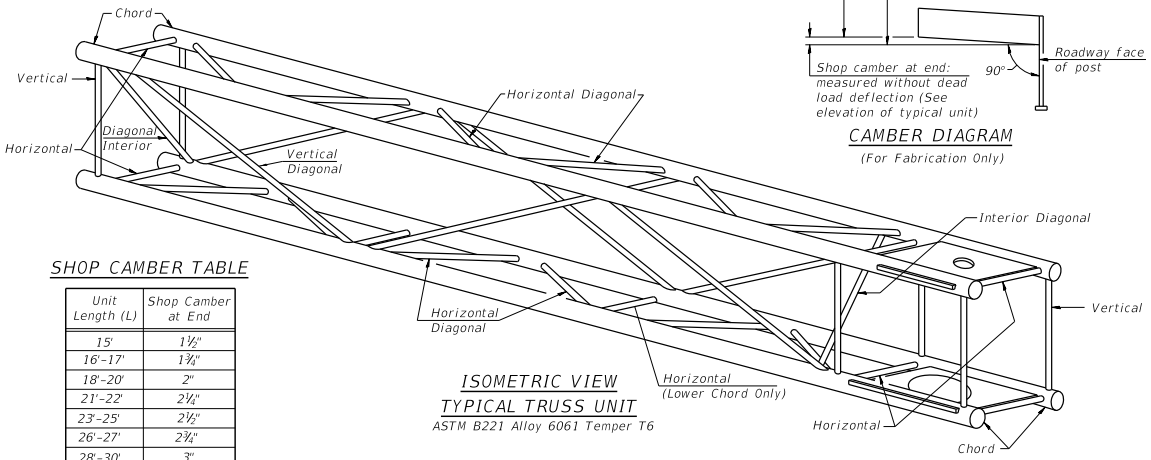
Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

TRUSS UNIT TABLE

Truss Type	Dimension "a"	Dimension "b"	Dimension "s"	Limits for Panel Spacing (P)*	Up. & Low. Chord O.D.	Up. & Low. Chord Wall	Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals O.D.	Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals Wall
I–C–A	24"	54"	16"	36" min. to 48" max.	5"	5/16"	2½"	5/16"
II–C–A	36"	66"	21"	42" min. to 54" max.	6½"	5/16"	3¼"	5/16"
III–C–A (35' Max.)	36"	84"	21"	48" min. to 66" max.	7"	⅜"	3½"	⅜"
III–C–A (>35' to 40')	36"	84"	21"	48" min. to 66" max.	8"	⅜"	3½"	⅜"

$$*P = \frac{L - s - 3"}{\#\ Panels}$$

Sign #	Structure Number	Station	Truss Type	Design Length (L)	Number of Panels Per Unit	Panel Length (P)*
7	1C016I094R070.7	481+82.03	II–C–A	28' – 0"	6	4' – 4"



SHOP CAMBER TABLE

Unit Length (L)	Shop Camber at End
15'	1½"
16'–17'	1¾"
18'–20'	2"
21'–22'	2¼"
23'–25'	2½"
26'–27'	2¾"
28'–30'	3"
31'–32'	3¼"
33'–35'	3½"
36'–37'	4"
38'–40'	4½"

0SC-A-2

2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

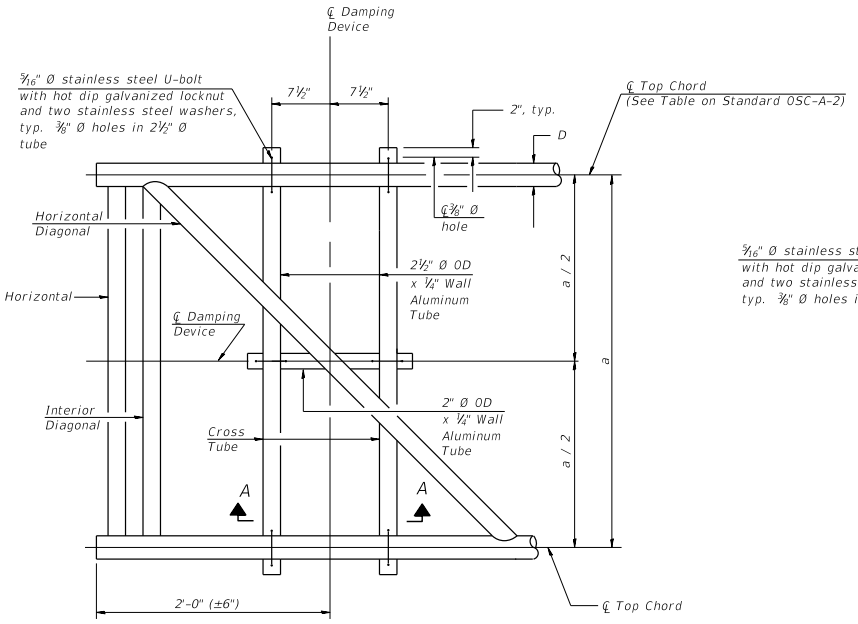
CANTILEVER SIGN STRUCTURES - TRUSS DETAILS
ALUMINUM TRUSS & STEEL POST

SHEET OHSS1-02 OF OHSS1-09SHEETS

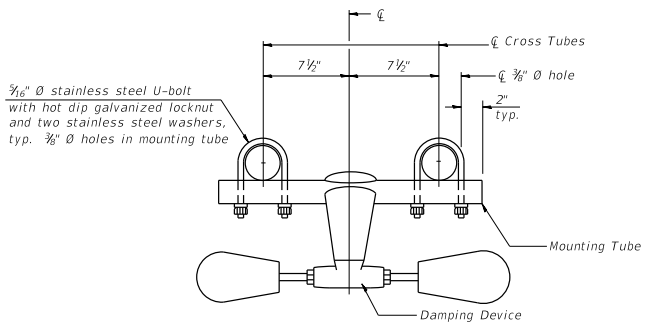
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	312
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\1681114361_a1\C016I094R070.7-62K3-SHT-SignDet02.dgn

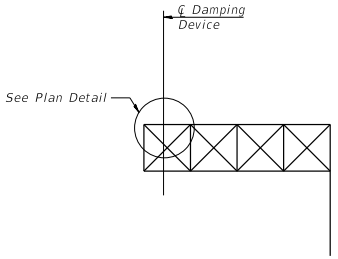
10/3/2024 3:37:44 PM



PLAN DETAIL



TRUSS DAMPING DEVICE CONNECTION DETAIL



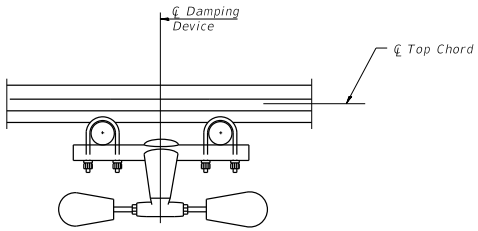
ELEVATION

Aluminum Cantilever Sign Structure

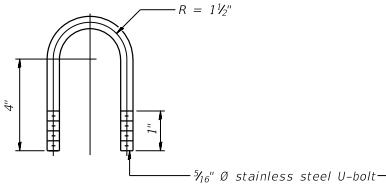
GENERAL NOTES

Damper: One damper per truss. (31 lbs. Stockbridge-Type Aluminum-29" minimum between ends of weights)

Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6

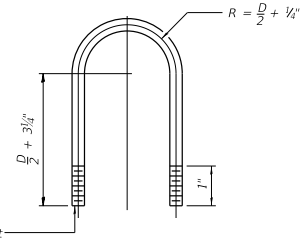


SECTION A-A



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL

(Typical)



TOP CHORD TO CROSS TUBE U-BOLT DETAIL

(Typical)

0SC-A-D 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

HBM ENGINEERING GROUP, LLC

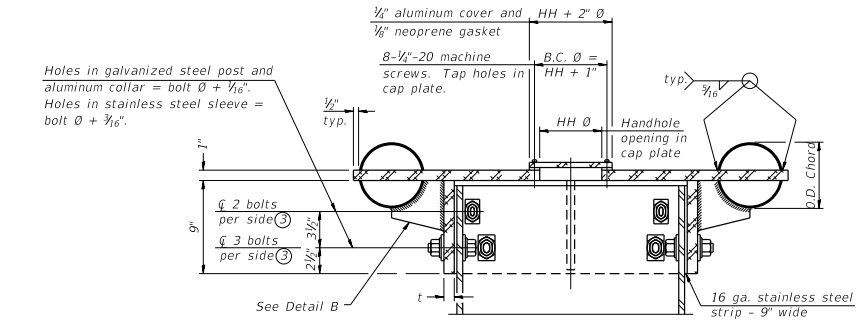
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURE
DAMPING DEVICE

SHEET OHSS1-03 OF OHSS1-09SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	313
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

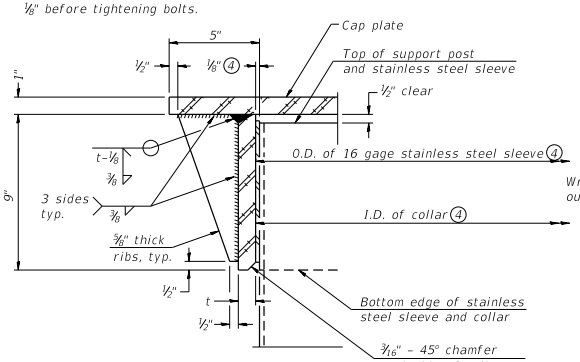
MODEL: Default
FILE NAME: \\homepw\11ts\01IICS_pdf_work_dir\168111436_51C0168094R070.7-62K3-SHT-SignDet03.dgn
10/3/2024 3:37:46 PM



SECTION B–B

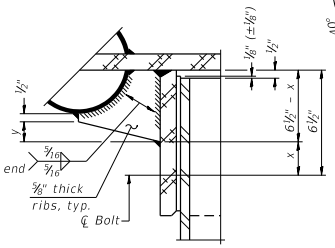
Bolts, washers (including contoured washers), and locknuts shall be stainless steel.

(4) Collar I.D. shall be manufactured to correspond to O.D. of actual galvanized post and stainless steel sleeve plus ⅛" (±1/16"). Maximum gap between post and collar at any location equals ⅛" before tightening bolts.



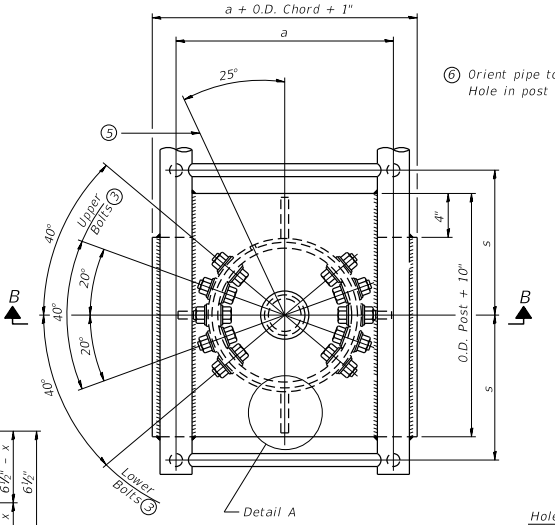
DETAIL A

(Two locations)



DETAIL B

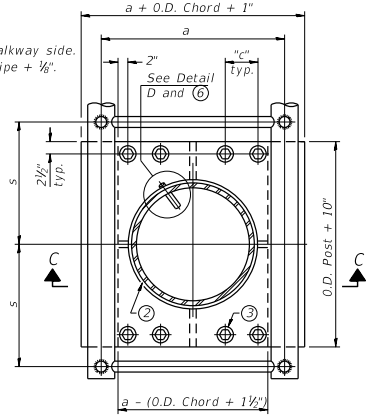
Two locations
(For details not shown, see Detail C)



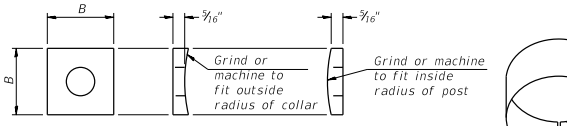
PLAN VIEW – TOP OF COLUMN

(5) Optional full penetration weld in collar.
(Two locations maximum....(180° apart)....X-ray or UT 100%)

(6) Orient pipe toward walkway side. Hole in post = O.D. pipe + ⅛".

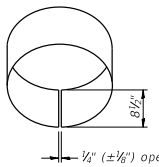


SECTION THRU POST ABOVE LOWER CHORDS



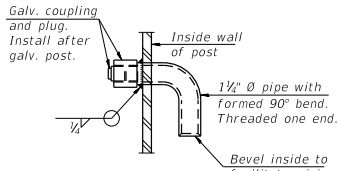
CONTOURED WASHERS

Bolt Size	Contoured Washers	
	Hole Dia.	B
⅞"	1"	2½"
1"	1⅛"	3"
1¼"	1⅜"	3¼"

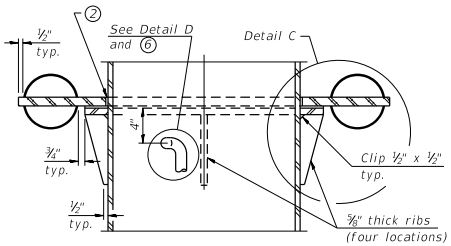


DETAIL OF STAINLESS STEEL SLEEVE

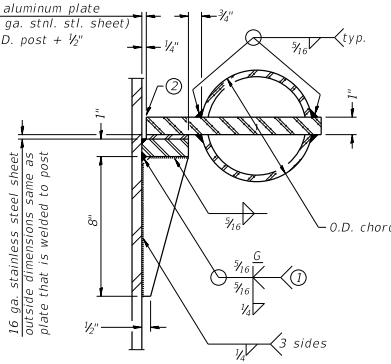
Weld to post after galvanizing.
(Prepare post surface to insure tight, uniform fit and allow welding.)
Welds to be 1½" long at 6" cts. along top edge and at ¼" opening.



DETAIL D



SECTION C–C



DETAIL C

Truss Type	Post Size	Upper & Lower Connection Bolt Diameter (3)	Lower Juncture Bolt Spacing Dimension "c" (3)	Opening in Cap Plate "HH"	Collar Thickness (t)	Side Ribs	
						x	y
I-C-A	16" Ø (83#/')	⅞"	3¼"	8"	⅝"	1¾"	2¼"
II-C-A	24" Ø (125#/')	1"	3½"	12"	⅞"	2"	1¼"
III-C-A (35' max.)	24" Ø (125#/')	1¼"	3½"	12"	⅞"	2"	1"
III-C-A (>35' to 40')	24" Ø (171#/')	1¼"	3½"	12"	⅞"	2"	1"

(1) Grind top if required to fully seat aluminum plate and stainless steel sheet.

(2) After tightening lower connection bolts, fill gap with non-hardening, silicone caulk suitable for exterior exposure and acceptable to the Engineer. Cost is included in Overhead Sign Structure Cantilever.

(3) Upper and lower connection bolts in collar and bolts at lower chord connection shall be high strength with matching locknuts. Connection bolts shall have 2 stainless steel flat washers each.

OSC-A-3 2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

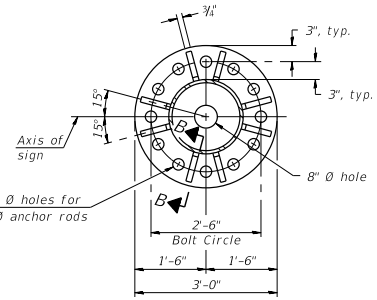
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES - JUNCTURE DETAILS
ALUMINUM TRUSS & STEEL POST

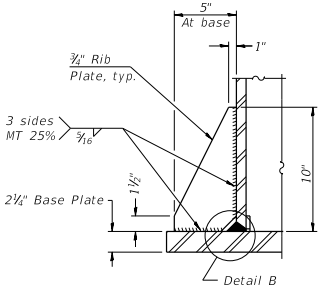
SHEET OHSS1-04 OF OHSS1-09 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	314
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

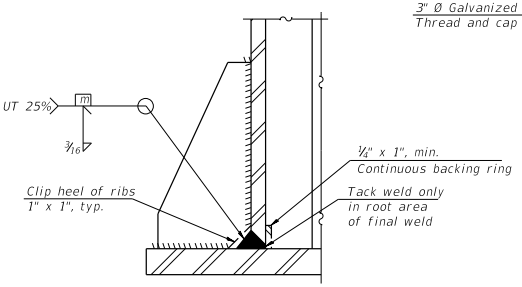
MODEL: Default
FILE NAME: \\homepw\11ts\01ICS_pdf_work_dir\168311436_61C0168094R070.7-62K3-5HT-SignDet04.dgn
10/3/2024 3:37:48 PM



SECTION A-A

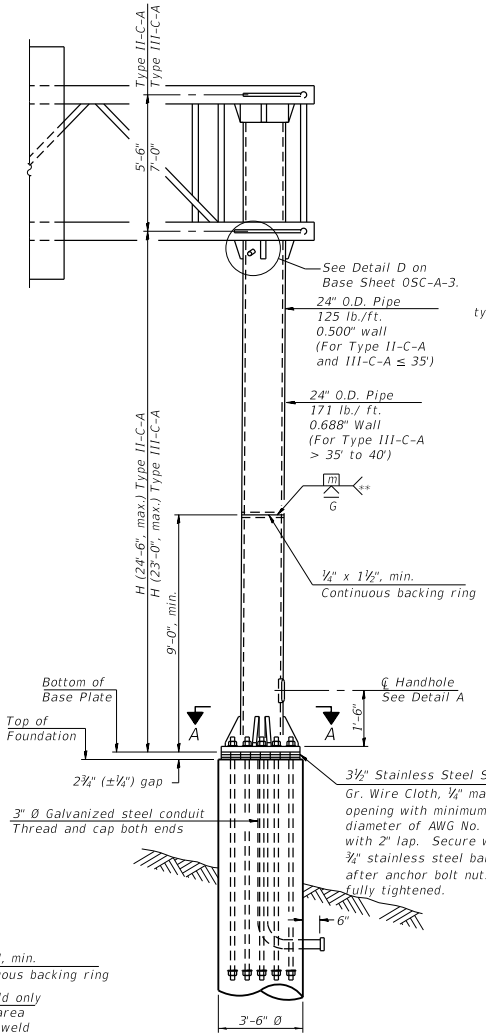


SECTION B-B



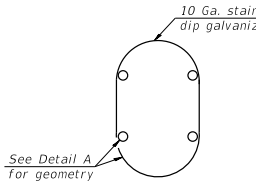
DETAIL B

(Typical rib)

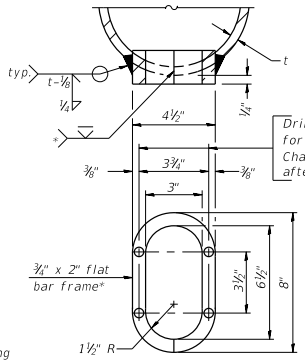


FRONT ELEVATION

For Foundation Details see Base Sheet 0SC-A-9.



HANDHOLE COVER

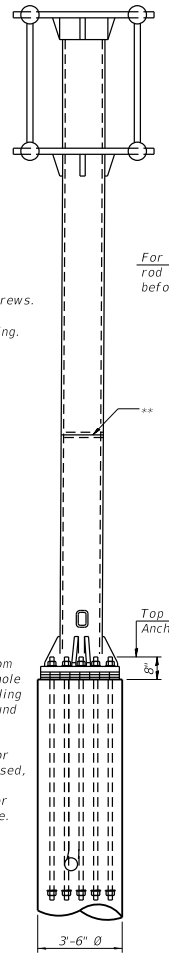


Provide 8" x 4½" cover. Outside corners = 2¼" radius. Provide 4-5/16" Ø holes in cover for ¼" - 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

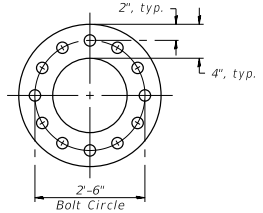
DETAIL A

* Bent bars may be butt welded top and bottom or bottom only. In lieu of fabricated handhole frame as shown, may cut from 2" plate (rolling direction vertical). All cut faces to be ground to ANSI Roughness of 500μ in or less.

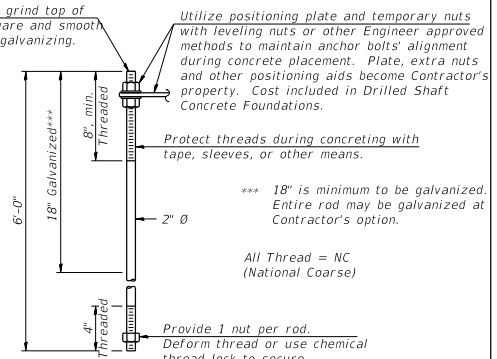
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION



SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize the upper 18" (minimum***) and associated AASHTO M291, Grade A, C or DH heavy hex nuts and hardened washers per AASHTO M232. No welding shall be permitted on rods. Provide a nut at bottom, a hexagon locknut and washer above base plate and a leveling nut and washer below base plate. Nuts shall each be tightened with 200 lb.-ft. minimum torque against base plate. Before or after threading, but before galvanizing, each anchor rod shall be ultrasonically tested (UT) by a Level II or III inspector, qualified in accord with ANSI guidelines, to insure no rejectable flaws exist in the upper 18" (tension criteria). Cost of testing included in Drilled Shaft Concrete Foundations.

Sign #	Structure Number	Station	H
7	1C016I094R070.7	481+82.03	20' - 9 5/8"

Note: "H" based on 15'-0" or actual sign height, whichever is greater.

0SC-A-5 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

HBM ENGINEERING GROUP, LLC

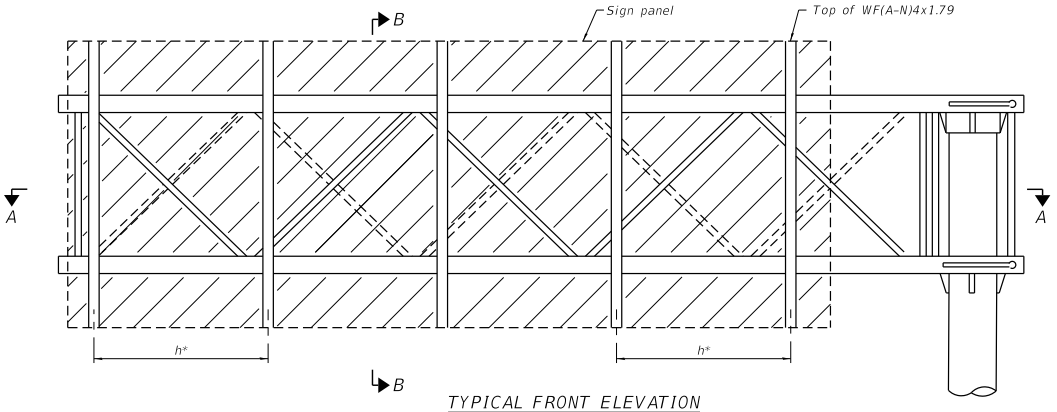
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES - TYPE II-C-A & III-C-A
TRUSS SUPPORT POST - ALUMINUM TRUSS & STEEL POST

SHEET OHSS1-05 OF OHSS1-09SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	315
		CONTRACT NO. 62W87		
		ILLINOIS	FED. AID PROJECT	

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\168111438_7\1C016I094R070.7-62K3-SHT-SignDet05.dgn
10/3/2024 3:38:30 PM

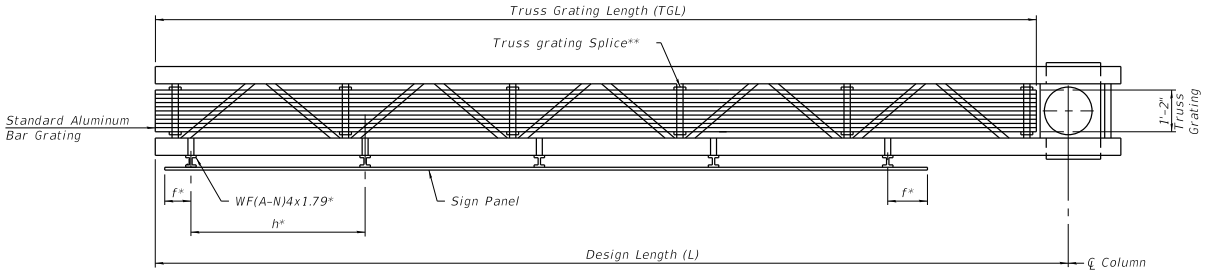


TYPICAL FRONT ELEVATION

BRACKET TABLE

WF(A-N)4x1.79 ASTM B308, Alloy 6061-T6		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Sign #	Structure Number	Station	TGL
7	1C016I094R070.7	481+82.03	26' - 6"



SECTION A-A

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6"\right)$$

* Space sign brackets WF(A-N)4x1.79 for efficiency and within limits shown:

f = 12" maximum, 4" minimum (End of sign to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign support brackets, WF(A-N)4x1.79

** Use and location of grating splices are optional, based on lengths needed and material availability.

Notes:
For details of sign placement, sign brackets, truss gratings, grating splices, and Section B-B, see Base Sheet OSC-A-7-NW.
Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in Overhaed Sign Structure Cantilever.
Truss grating dimensions are nominal and may vary (width ½"±, depth ½"±) based on available standard widths.

OSC-A-6-NW 4-1-2020

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -
	CHECKED - JMI	REVISED -
PLOT SCALE =	DRAWN - MI, LAB	REVISED -
PLOT DATE =	CHECKED - 8/16/2024	REVISED -

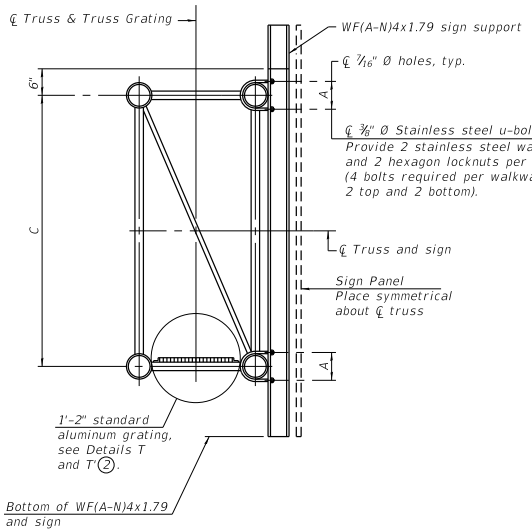
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES - ALUMINUM WALKWAY
DETAILS - ALUMINUM TRUSS & STEEL POST

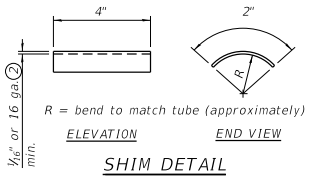
SHEET OHSS1-06 OF OHSS1-09SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	316
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\16811143b_B\1C016I094R070.7-62K3-SHT-SignDet06.dgn
10/3/2024 3:38:15 PM

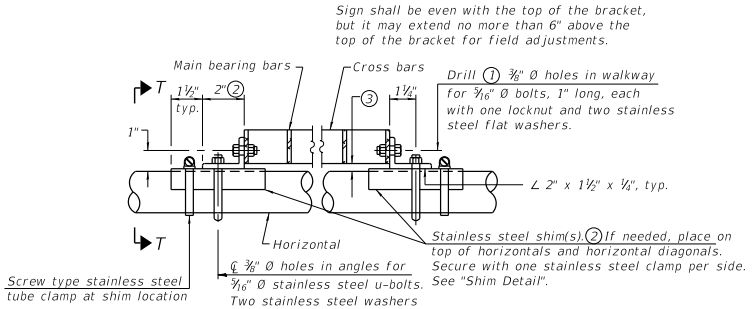


SECTION B-B



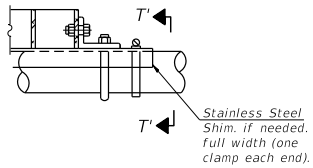
SHIM DETAIL

1. Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.
2. Stainless steel shims shall be placed as shown in Detail T if needed to compensate for alignment variations between horizontal and diagonal pipes beyond adjustment provided by angles. Thicker shims may be used subject to shims performing properly.
3. Tube to grating gap may vary from 0 to ½", max. to align walkway, allow for camber, etc.



DETAIL T

(Continuous Truss grating)



DETAIL T'

(Truss grating splice)

Details not shown same as Detail T.
Alternate materials may be used subject to the Engineer's review and approval.

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars (MBB) shall be 3/16" x 1½" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.

Cross bars (CB) shall be 3/16" x 1½" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

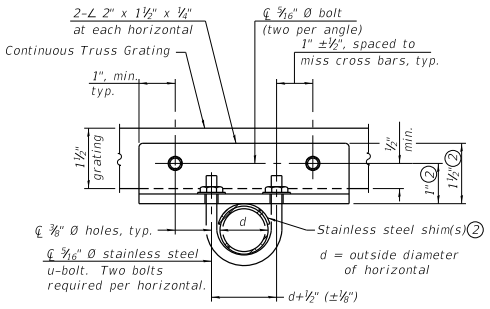
OR

Aluminum Grating with modified "t" sections for main bearing bars shall meet the following requirements:

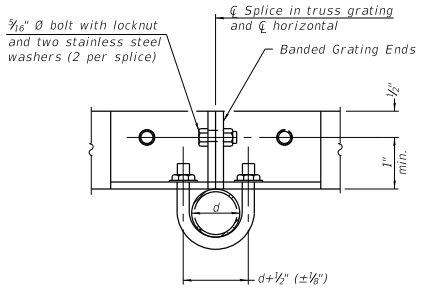
Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.³ per bar, a depth of 1½", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

Sign #	Structure Number	Station	A	C
7	1C0161094R070.7	481+82.03	7 1/2"	5' - 6"



SECTION T-T



SECTION T'-T'

OSC-A-7-NW 4-1-2020

HBM ENGINEERING GROUP, LLC	USER NAME =	DESIGNED - JMI	REVISED -
		CHECKED - JMI	REVISED -
	PLOT SCALE =	DRAWN - MI, LAB	REVISED -
	PLOT DATE =	CHECKED - 8/16/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

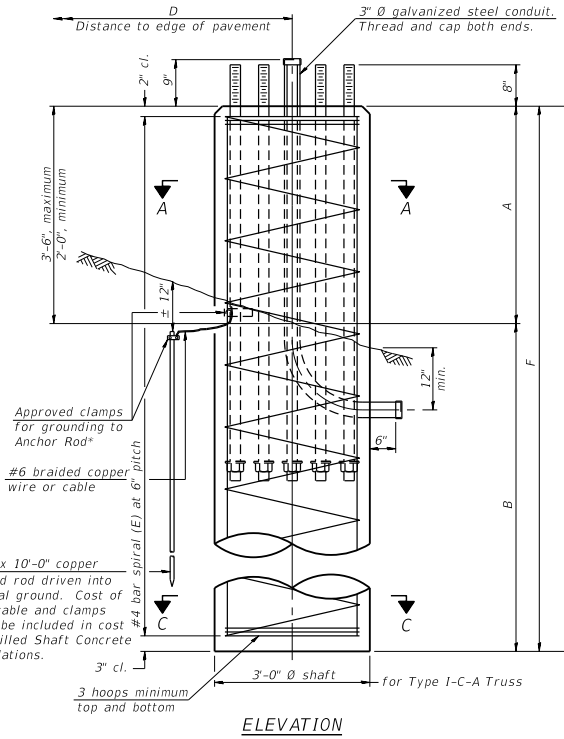
CANTILEVER SIGN STRUCTURES - WALKWAY DETAILS
ALUMINUM TRUSS & STEEL POST

SHEET OHSS1-07 OF OHSS1-09SHEETS

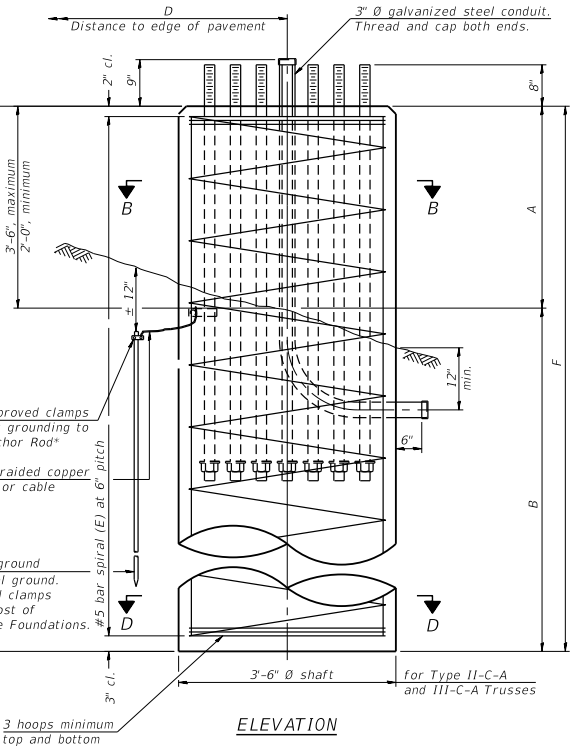
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	317
		CONTRACT NO. 62W87		
		ILLINOIS	FED. AID PROJECT	

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\161811143\e_9\1C0161094R070.7-62K3-SHT-SignDet07.dgn
10/3/2024 3:38:24 PM

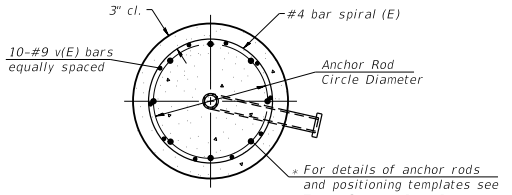
* Grind anchor rod to bright finish at ground clamp location before installing clamp.



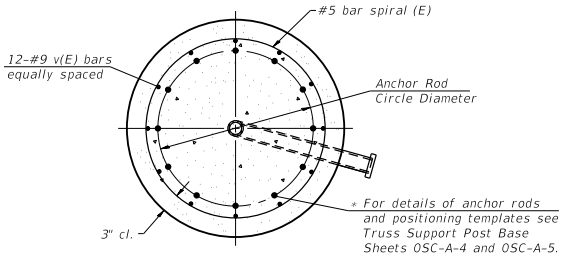
ELEVATION



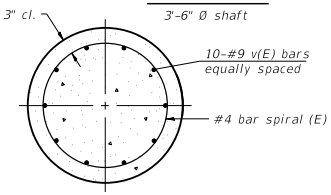
ELEVATION



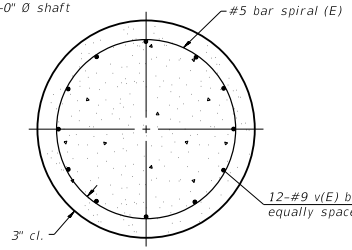
SECTION A-A
3'-0" Ø shaft



SECTION B-B
3'-6" Ø shaft



SECTION C-C
3'-0" Ø shaft



SECTION D-D
3'-6" Ø shaft

NOTES:

The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown in the Foundation Data Table will be the result of site specific designs.

If the conditions encountered are different than those indicated, the Contractor shall notify the Engineer to determine if the foundation dimensions need to be modified. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Concrete Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in "Drilled Shaft Concrete Foundation".

FOUNDATION DESIGN TABLE

Truss Type	Post Base Sheet	Maximum Cantilever Length (ft)	Maximum Total Sign Area (sq ft)	Shaft Diameter (in)	"B" Depth (ft)	Anchor Rods No.	Anchor Rods Diameter (in)	Anchor Rod Circle Diameter (in)
I-C-A	0SC-A-4	25	170	3.0	16.0	8	2	22
II-C-A	0SC-A-5	30	170	3.5	17.0	12	2	30
II-C-A	0SC-A-5	30	340	3.5	21.5	12	2	30
III-C-A	0SC-A-5	35	170	3.5	19.0	12	2	30
III-C-A	0SC-A-5	35	250	3.5	22.5	12	2	30
III-C-A	0SC-A-5	35	400	3.5	26.5	12	2	30
III-C-A	0SC-A-5	40	400	3.5	32.0	12	2	30

Sign #	Structure Number	Station	Truss Type	Shaft Diameter	Elevation Top	Elevation Bottom	Qu	A	B	F	Class DS Concrete Cubic Yards
7	1C016I094R070.7	481+82.03	II-C-A	3' - 6"	601.93	581.43		3' - 6"	17' - 0"	20' - 6"	7.4

0SC-A-9 2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES - DRILLED SHAFT
ALUMINUM TRUSS & STEEL POST

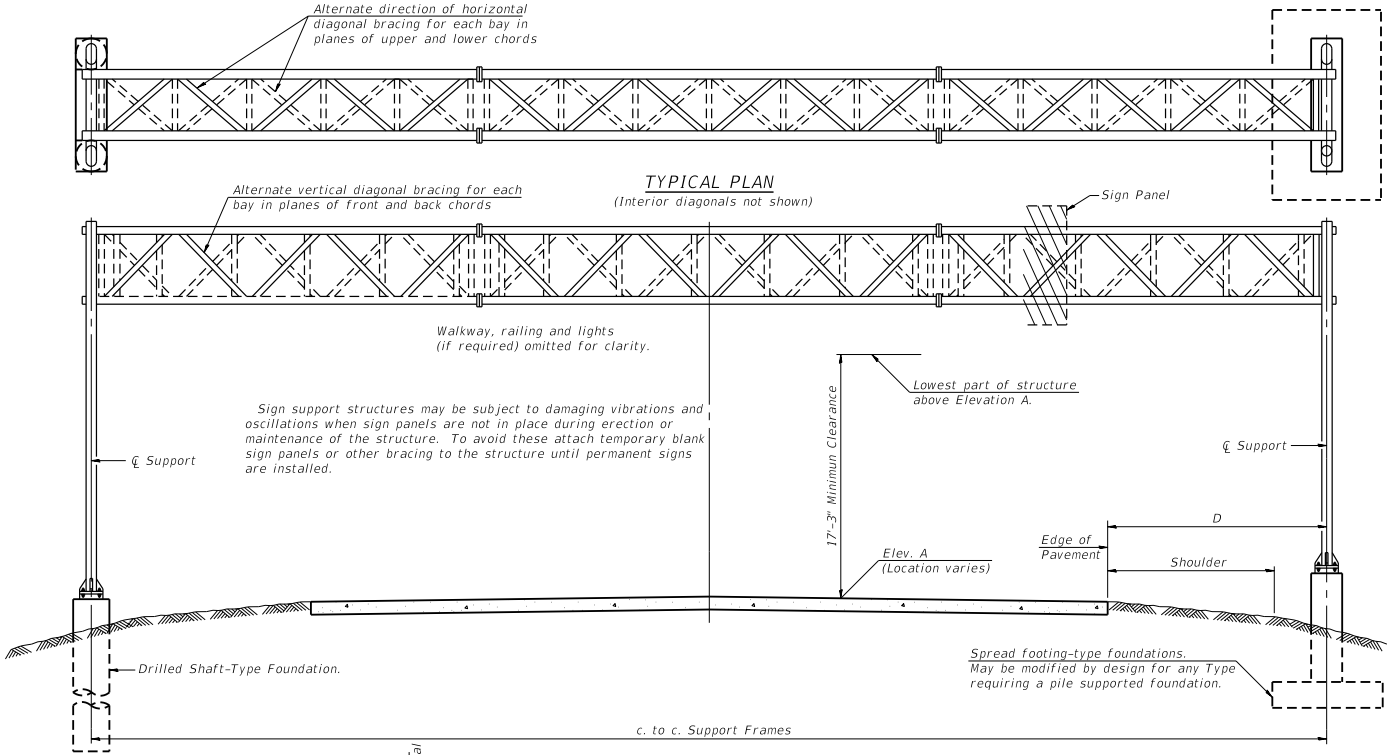
SHEET OHSS1-08 OF OHSS1-09 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	586	318
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw\11ts\01IC5_pdf_work_dir\16811143e_10\1C016I094R070.7-62K63-SHT-SignDet08.dgn

10/3/2024 3:38:32 PM

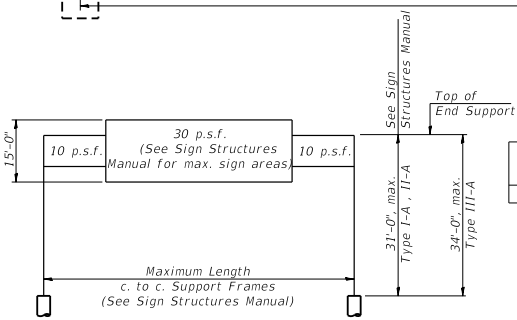
BORING LOGS TO BE INCLUDED IN FINAL SUBMITTAL



TYPICAL PLAN
(Interior diagonals not shown)

TYPICAL ELEVATION
(Looking at Face of Signs**)

Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards and Sign Manual Tables. Installations not within dimensional limits shown require special analysis for all components.

Sign #	Structure Number	Station	Design Truss Type	c. to c. Supports	Elev. A	Dim. D	Height of Tallest Sign	Total Sign Area (Sq. Ft.)
8	1S016I094R071.2	508+94.88	Type I-A	100' - 0"	593.44	43' - 10 1/2"	12'-6"	481.25

**Looking upstation for structures with signs both sides.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

STATE OF ILLINOIS
MOUSSA A. ISSA
081-005738
CHICAGO, ILLINOIS
ILLINOIS STRUCTURAL ENGINEER

Signed _____
Dr. Moussa A. Issa, S.E. IL. Lic. No. 081-005738
Expires 11-30-2026

Date _____ For Sheets OHSS2-01 thru OHSS2-12.

WALKWAY: Walkway grating, walkway brackets, handrails, lighting, and associated components shown in these plans on the traffic side of the sign structure/sign panel will not be installed with Contract 62W87. The truss grating and maintenance walkway behind the sign panel will be included with Overhead Sign Structure - Span, Type I-A (4'-0" X 4'-6")

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES:
Field Units
$f'c$ = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

WELDING: All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 and D1.2 Structural Welding Codes (Steel and Aluminum) and the Standard Specifications.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53. All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W*. Stainless steel for shims, sleeves and handhole covers shall be ASTM A240, Type 302 or 304, or another alloy suitable for exterior exposure and acceptable to the Engineer.
The steel pipe and stiffening ribs at the base plate for the column shall have a minimum longitudinal Charpy V-Notch (CVN) energy of 15 lb.-ft. at 40° F. (Zone 2) before galvanizing.

FASTENERS FOR ALUMINUM TRUSSES: All bolts noted as "high strength" must satisfy the requirements of AASHTO M164 (ASTM A325), or approved alternate, and must have matching lock nuts. Threaded studs for splices (if Members interfere) must satisfy the requirements of ASTM A449, ASTM A193, Grade B7, or approved alternate, and must have matching lock nuts. Bolts and lock nuts not required to be high strength must satisfy the requirements of ASTM A307. All bolts and lock nuts must be hot dip galvanized per AASHTO M232. The lock nuts must have nylon or steel inserts. A stainless steel flat washer conforming to ASTM A240 Type 302 or 304, is required under both head and nut or under both nuts where threaded studs are used. High strength bolt installation shall conform to Article 505.04 (f) (2)d of the IDOT Standard Specifications for Road and Bridge Construction. Rotational capacity ("ROCAP") testing of bolts will not be required.

U-BOLTS AND EYEBOLTS: U-Bolts and Eyebolts must be produced from ASTM A276 Type 304, 304L, 316 or 316L, Condition A, cold finished stainless steel, or an equivalent material acceptable to the Engineer. All nuts for U-Bolts and Eyebolts must be lock nuts equivalent to ASTM A307 with nylon or steel inserts and hot dip galvanized per AASHTO M232. A stainless steel flat washer conforming to ASTM A240, Type 302 or 304, is required under each U-Bolt and Eyebolt lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Concrete Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Concrete Foundations and Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
Overhead Sign Structure - Span, Type I-A (4'-0" X 4'-6")	Foot	100
Drilled Shaft Concrete Foundations	Cu Yd	25.1
Remove Overhead Sign Structure - Span	Each	1

OS-A-1 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 7/29/2024	REVISED -	

HBM ENGINEERING GROUP, LLC

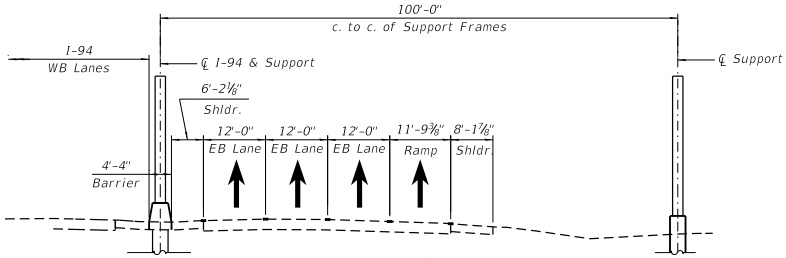
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES - GENERAL PLAN & ELEVATION - ALUMINUM TRUSS & STEEL SUPPORTS

SHEET OHSS2-01 OF OHSS2-12 SHEETS

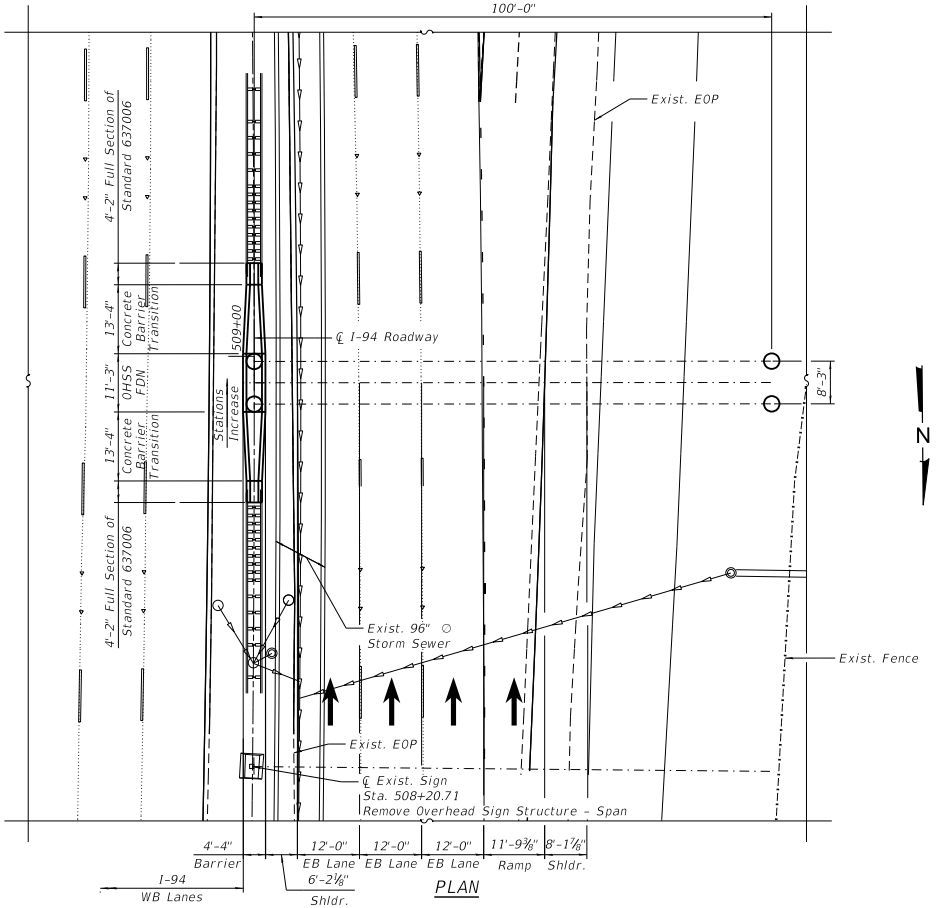
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR. 24	COOK	598	320
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homeow11\cs01\ICS_pdf_work_dir\1682\1440_2150160094R071.1+62K3-SHT-SignDet01.dgn
10/3/2024 3:39:43 PM



ELEVATION

(Looking at Face of Signs)



PLAN

NOTES:

1. Stations that are shown are with respect to the I-94 centerline.
2. The Contractor shall locate ℄ and top of existing storm sewer in the vicinity of the proposed foundation prior to drilling or pouring the proposed foundation. The Contractor shall inform the Engineer of any discrepancy between the plans and existing conditions.

LEGEND

- Exist. Storm Sewer
- Exist. Catch Basin
- Exist. Manhole

MODEL: Default
FILE NAME: \\homepw\11ts01\IC5_pdf_work_dir\1682\144\0_27\1501609480\71.1-62K53-SHT-SignDet01A.dgn
10/3/2024 3:41:06 PM

HBM ENGINEERING GROUP, LLC

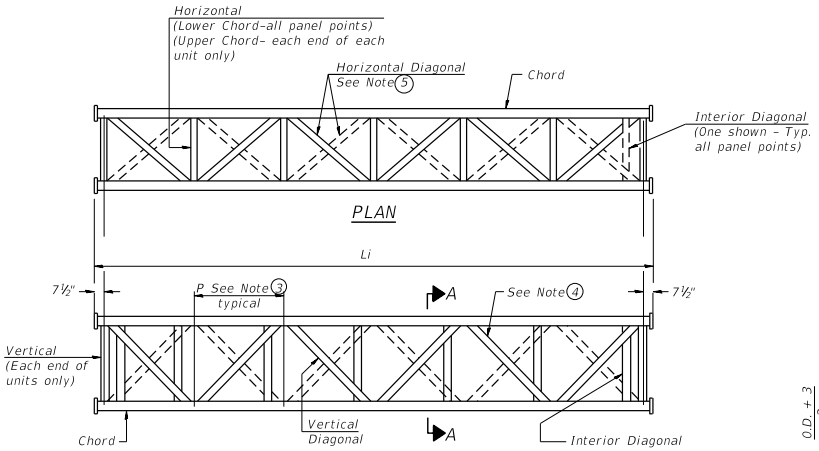
USER NAME =	DESIGNED - JMI	REVISED -
	CHECKED - JMI	REVISED -
PLOT SCALE =	DRAWN - MI, LAB	REVISED -
PLOT DATE =	CHECKED - 8/16/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
GENERAL PLAN & ELEVATION

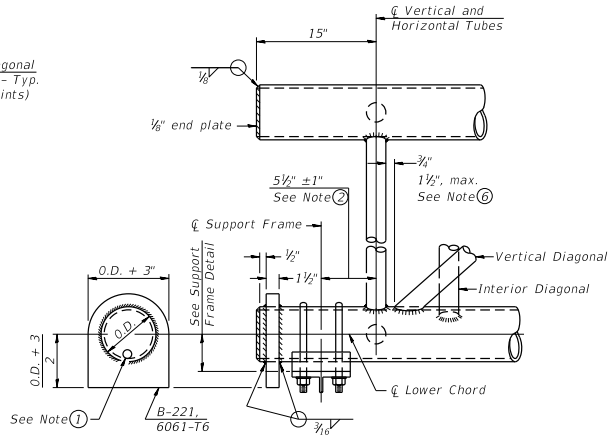
SHEET OHSS2-02 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	321
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

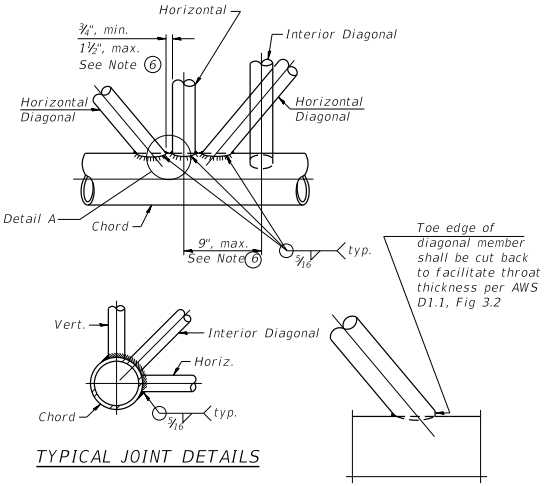


ELEVATION
TYPICAL INTERIOR UNIT

Even number of panels/interior unit required.

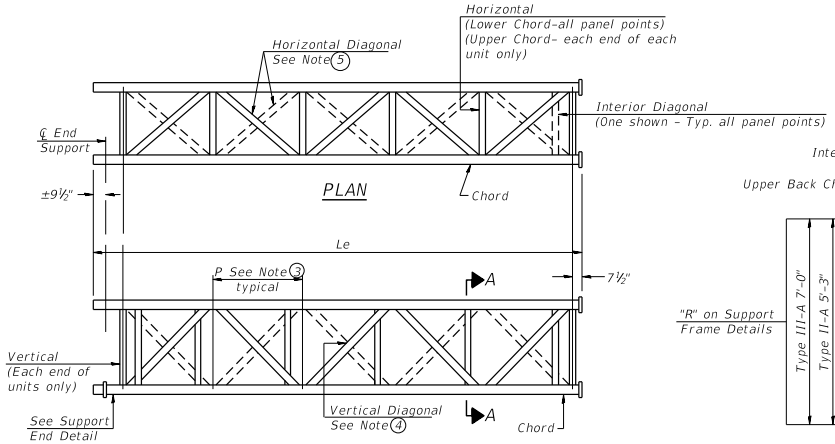


SUPPORT END DETAIL FOR EXTERIOR UNIT



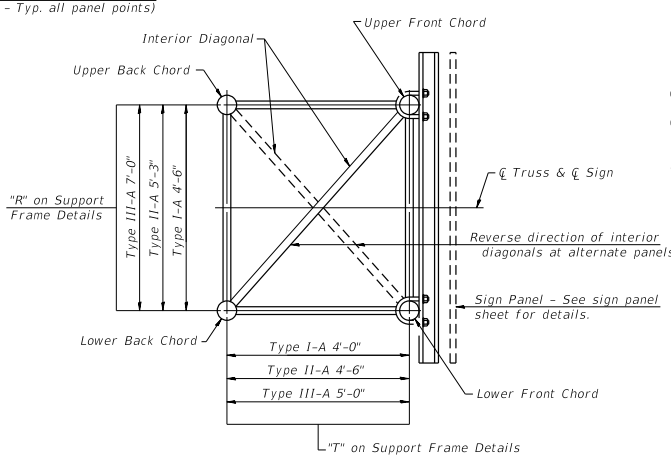
TYPICAL JOINT DETAILS

DETAIL A



ELEVATION
TYPICAL EXTERIOR UNIT

Even or odd number of panels/exterior units allowed.



SECTION A-A

1. Contractor may alternatively use standard aluminum drive-fit cap to close end. ½" Ø drain hole in end plate/drive-fit cap. (Typ. at ends of all chords)
2. 5½" end dimension may vary by ±1" to provide uniform panel spacing (P).
3. Panel spacing (P) shall be uniform for entire truss and between 4'-0" and 5'-0" for Type I-A or 4'-0" and 5'-6" for Types II-A and III-A.
4. Vertical Diagonals in front and back face shall alternate.
5. Hidden lines show wind bracing alternates direction between planes of top and bottom chords.
6. All diagonals shall be detailed for minimum offset from the panel point based on the following: Offset shall be such as to provide a ¾" minimum to 1½" maximum clearance between any diagonal and any horizontal or vertical member, and to provide clearance for U-bolt connections of signs or walkway brackets.

0S-A-2 2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -
	CHECKED - JMI	REVISED -
PLOT SCALE =	DRAWN - MI, LAB	REVISED -
PLOT DATE =	CHECKED - 8/16/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES - ALUMINUM TRUSS
DETAILS FOR TRUSS TYPES I-A, II-A AND III-A

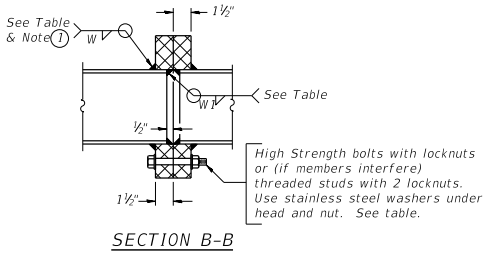
SHEET OHSS2-03 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	322
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw\11ts\01IKS_pdf_work_dir\16821440_a1501606948071,1-42K33-SHT-SignDet02.dgn
10/3/2024 3:39:35 PM

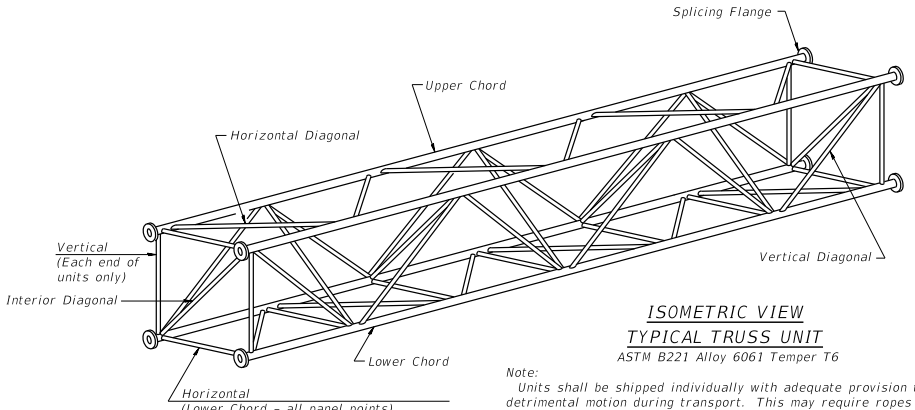
TRUSS UNIT TABLE

Sign #	Structure Number	Station	Design Truss Type	Exterior Units (2)			Interior Unit				Upper & Lower Chord		Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals		Camber at Midspan	Splicing Flange					
				No. Panels Per Unit	Unit Lgth. (Le)	Panel Lgth.(P)	No. Req'd	No. Panels per Unit	Unit Lgth. (Li)	Panel Lgth. (P)	O.D.	Wall	O.D.	Wall		Bolts		Weld Sizes		A	B
																No./Splice	Dia.	W	W1		
8	1S016I094R0712	508+94.88	Type I-A	7	35' - 8 1/2"	4' - 10"	1	6	30' - 3"	4' - 10"	5 1/2"	5/16"	2 1/2"	5/16"	3 1/4"	6	7/8"	3/8"	1/4"	9 1/4"	12 1/4"



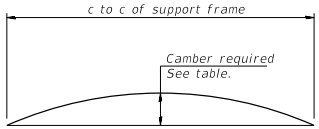
SECTION B-B

(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.

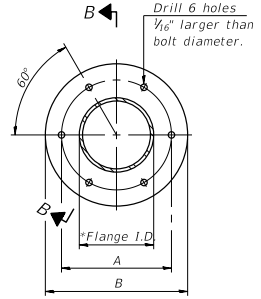


ISOMETRIC VIEW
TYPICAL TRUSS UNIT
ASTM B221 Alloy 6061 Temper T6

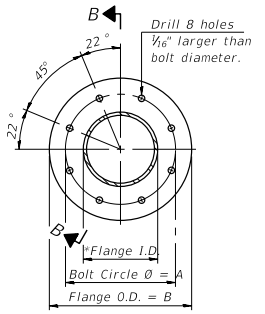
Note:
Units shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The Contractor is responsible for maintaining the configuration and protection of the units.



CAMBER DIAGRAM
Camber curve shown is theoretical. Actual camber attained by slope changes at splices between units.



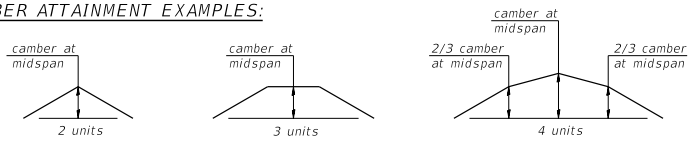
TRUSS TYPES I-A, II-A, & III-A



TRUSS TYPES II-A & III-A

SPLICING FLANGES
ASTM B221, Alloy 6061-T6
or ASTM B209, Alloy 6061-T651
*To fit O.D. of Chord with maximum gap of 1/16".

CAMBER ATTAINMENT EXAMPLES:



Camber shown is for fabrication only, measured with truss fully supported. (No-load condition)

0S4-A-2 2-17-2017

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

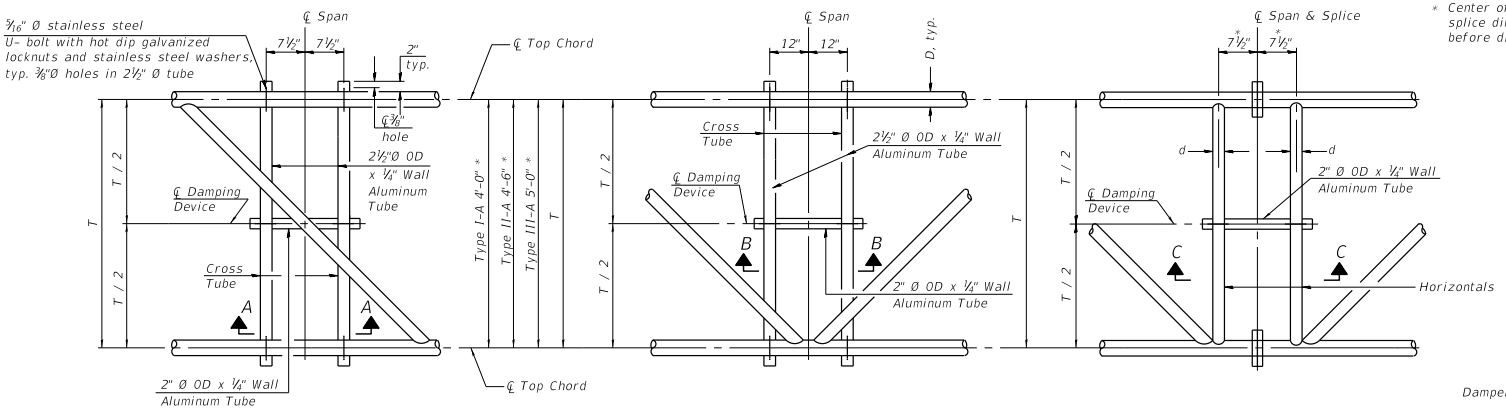
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES - ALUMINUM TRUSS DETAILS FOR TRUSS TYPES I-A, II-A AND III-A

SHEET OHSS2-04 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	323
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\1682\1440_5\1501I6094R071.1+62K33+SHT+SignDet03.dgn
10/3/2024 3:39:59 PM



* Center of horizontal to center of splice dimension may vary. Verify before drilling holes in mounting tube.

PLAN DETAIL "A"
℄ Span between Panel Points

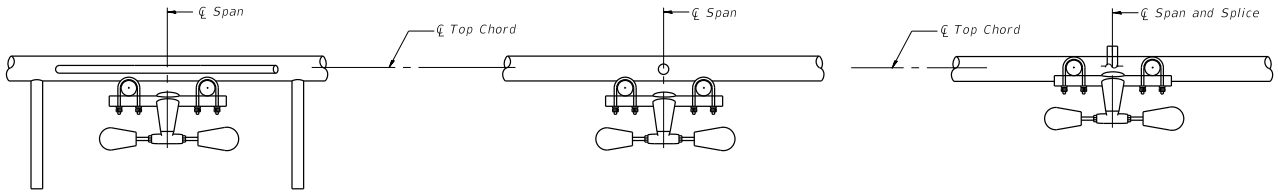
PLAN DETAIL "B"
℄ Span at Panel Point

PLAN DETAIL "C"
℄ Span at ℄ Chord Splice

NOTES

Damper: One damper per truss. (31 lbs. minimum Stockbridge-Type Aluminum – 29" minimum between ends of weights) Cost included in Overhead Sign Structure...

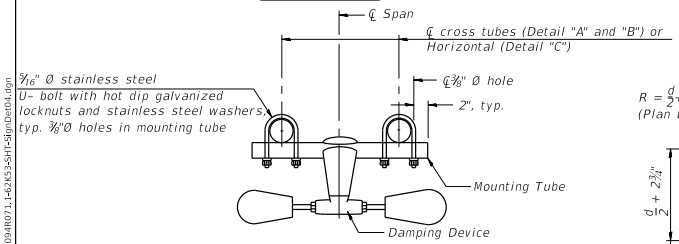
Materials: Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6. Cost included in Overhead Sign Structure...



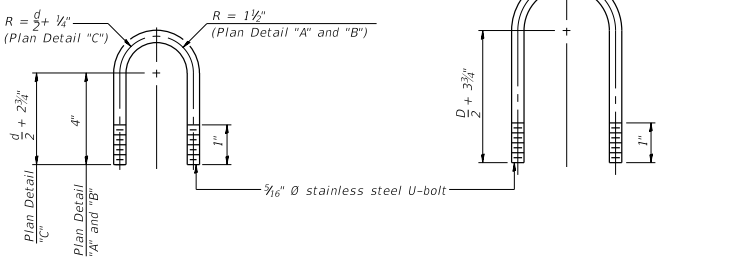
SECTION A-A

SECTION B-B

SECTION C-C

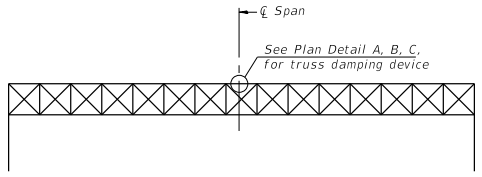


TRUSS DAMPING DEVICE CONNECTION DETAIL
(Typical)



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL
(Typical)

TOP CHORD TO CROSS TUBE U-BOLT DETAIL
(Typical – Detail "A" and "B")



ELEVATION
Aluminum Overhead Sign Truss

OS-A-D 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

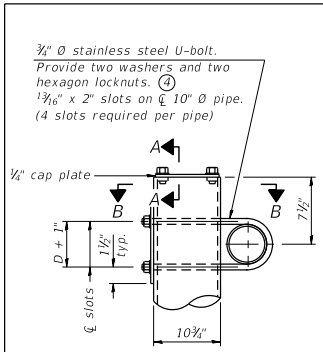
HBM ENGINEERING GROUP, LLC

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

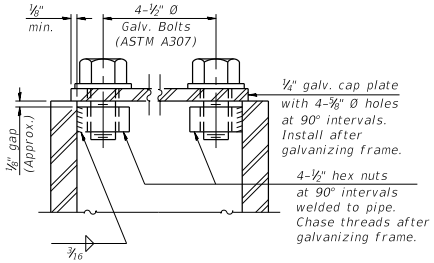
OVERHEAD SIGN STRUCTURE
DAMPING DEVICE
SHEET OHSS2-05 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	324
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\1682\1440_615016094R071.1+62K33+SHT+SignDet04.dgn
10/3/2024 3:40:22 PM

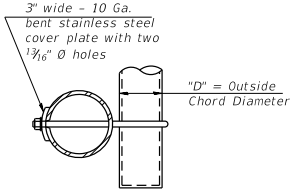


DETAIL A

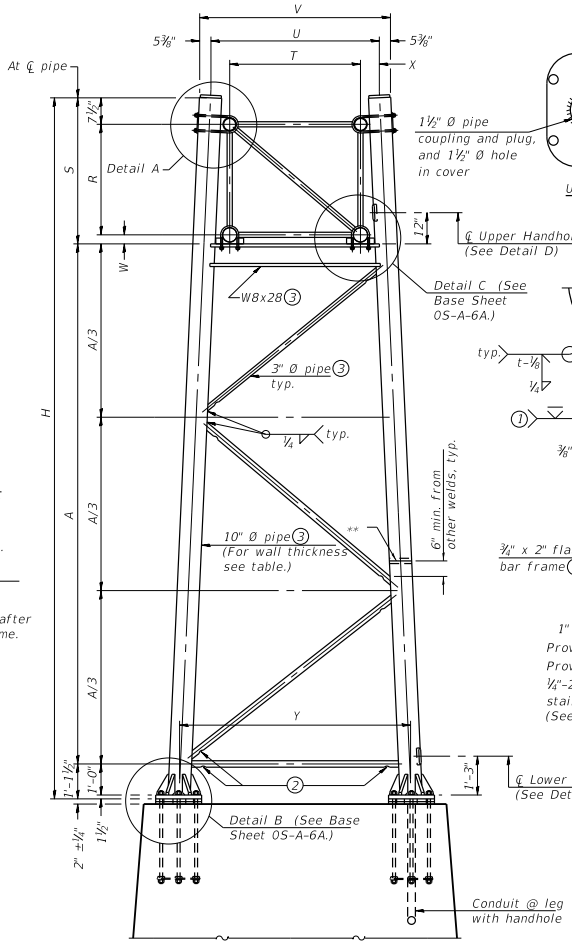


SECTION A-A

As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.

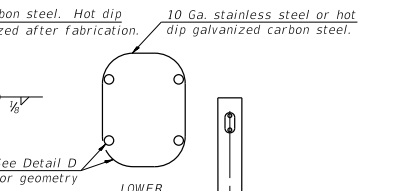


SECTION B-B

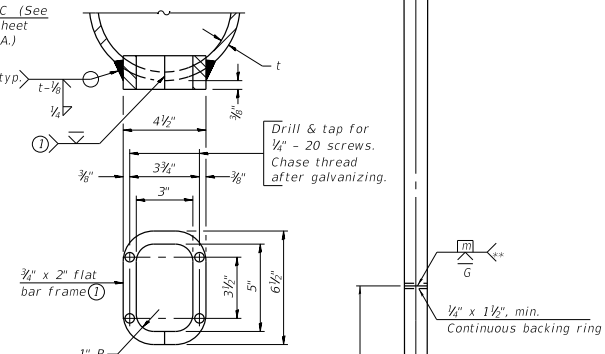


For Foundation Details, see base sheet 0S-F3 (Spread Footing) or 0S4-F3 (Drilled Shaft).

SIDE ELEVATION



HANDHOLE COVERS



DETAIL D

END ELEVATION

Support Design Loads: See Base Sheet 0S-A-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

1. In lieu of fabricated handhole frame as shown, may cut from 2" plate (rolling direction vertical). All cut faces to be ground to ANSI Roughness of 500μ in or less.
2. Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.
3. Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet 0S-A-1.
4. See General Notes for fasteners.
5. Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.
6. "H" based on 15'-0" or actual sign height, whichever is greater.

10" Ø PIPE TRUSS SUPPORT FRAME

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Truss Type	Dimensions							
	R	S	T	U	V	W	X	Y
I-A	4'-6"	5'-5½"	4'-0"	5'-6"	6'-4¾"	4"	9"	8'-3"
II-A (5)	5'-3"	6'-3¼"	4'-6"	6'-1"	6'-11¾"	4¾"	9½"	8'-3"

Sign #	Structure Number	Station	Support Left	Support Right	Truss Type	Pipe Wall Thickness	H (6)	A
8	1S016I094R071.2	508+94.88	X		Type I-A	0.279	25' - 7"	19' - 0"
				X		0.279	28' - 1 1/8"	21' - 6 1/8"

0S-A-6 2-17-2017

HBM ENGINEERING GROUP, LLC

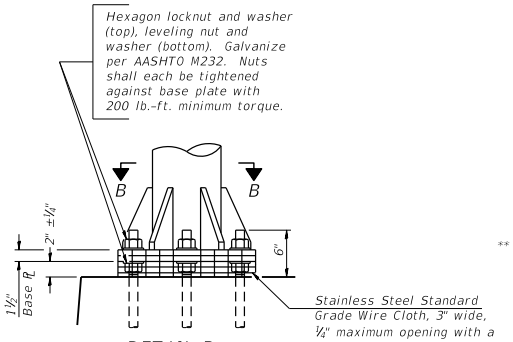
USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR ALUMINUM TRUSS
SHEET OHSS2-06 OF OHSS2-12 SHEETS

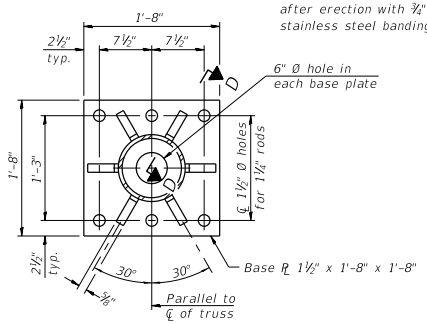
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	325
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\1682\1440_3\1S016I094R071.1+62K33+SHT+SignDet05.dgn
10/3/2024 3:39:49 PM

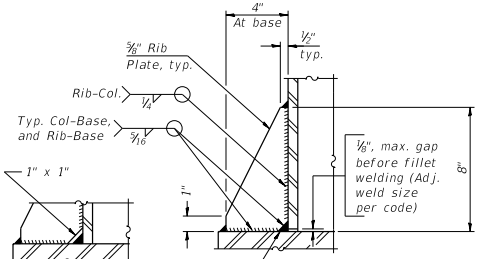


DETAIL B

Ribs shall be cut to fit slope of pipe.

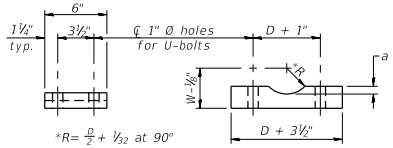


SECTION B-B



** Alternate detail if welding col. to base plate first, then snip inside corner of ribs. Terminate weld on rib ¼" from snip.

SECTION D-D



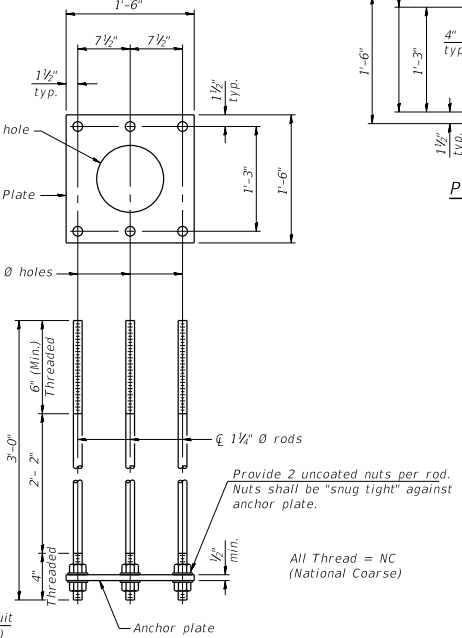
*R= D/2 + ½ at 90°

D = Outside Diameter of Chord. For W, see Base Sheet OS-A-6.

SADDLE SHIM DETAIL

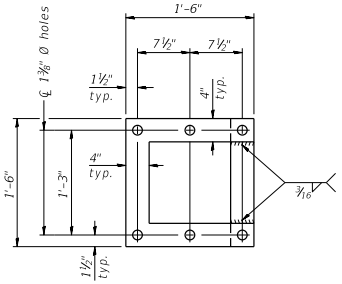
ASTM B26 Alloy 356-F
or
ASTM B209 Alloy 6061-T651
(4 required per sign truss)

Truss Chord Nominal Dia.	a
5"	¾"
5½"	13/16"
6"	⅞"
6½"	15/16"
7"	1"

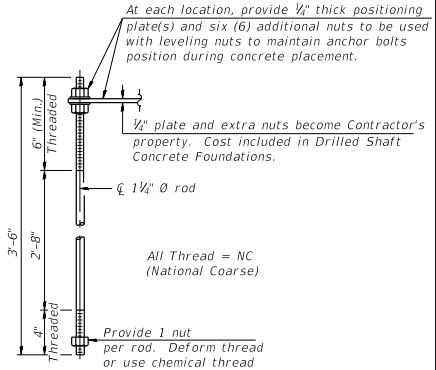


ANCHOR ROD DETAIL

Spread Footing Foundation



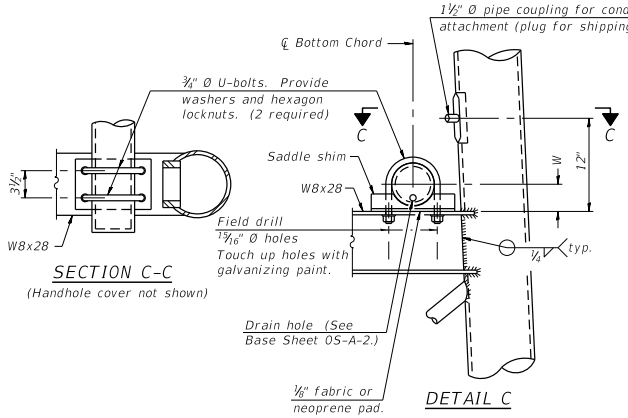
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12" minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)

DETAIL C

10" Ø PIPE SUPPORT FRAME DETAILS

OS-A-6A 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

HBM ENGINEERING GROUP, LLC

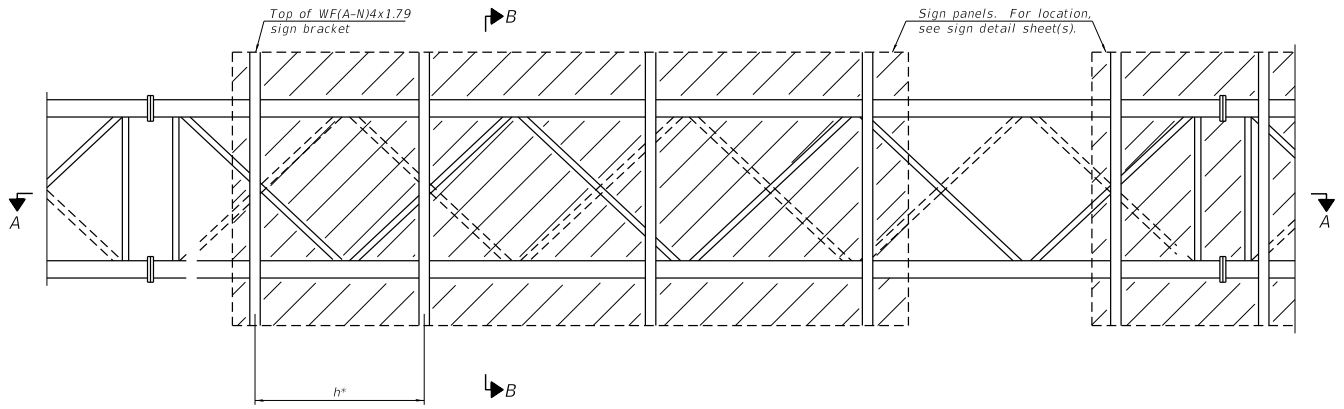
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME DETAILS - ALUMINUM TRUSS

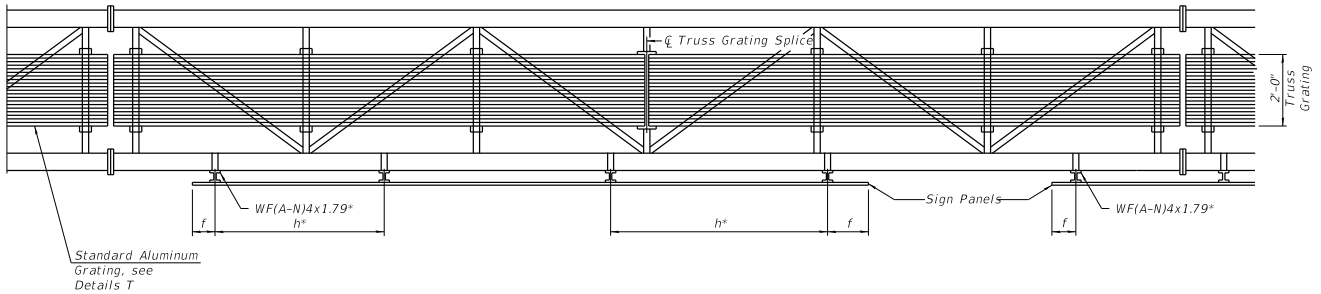
SHEET OHSS2-07 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	326
		CONTRACT NO. 62W87		
		ILLINOIS	FED. AID PROJECT	

MODEL: Default
FILE NAME: \\homepw\11ts\01ICS_pdf_work_dir\168214410_7\15016094R071.1+62K33+SHT+Sign0et06.dgn
10/3/2024 3:40:27 PM



TYPICAL FRONT ELEVATION



SECTION A-A

Place all sign brackets as close to panel points as practical.

BRACKET TABLE

WF(A-N)4x1.79 ASTM B308, Alloy 6061-T6		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

* Space sign brackets WF(A-N)4x1.79 for efficiency and within limits shown:

f = 12" maximum, 4" minimum (End of sign to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign support brackets, WF(A-N)4x1.7

Notes:
For Detail T and Section B-B, see Base Sheet OS-A-10-NW.
Truss grating to facilitate inspection shall run full length (center to center of support frames) 12"± on overhead trusses. Cost of truss grating is included in "Overhead Sign Structure".
Truss Grating width dimensions are nominal and may vary ½"± based on available standard widths.

OS-A-9-NW 4-1-2020

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -
	CHECKED - JMI	REVISED -
PLOT SCALE =	DRAWN - MI, LAB	REVISED -
PLOT DATE =	CHECKED - 8/16/2024	REVISED -

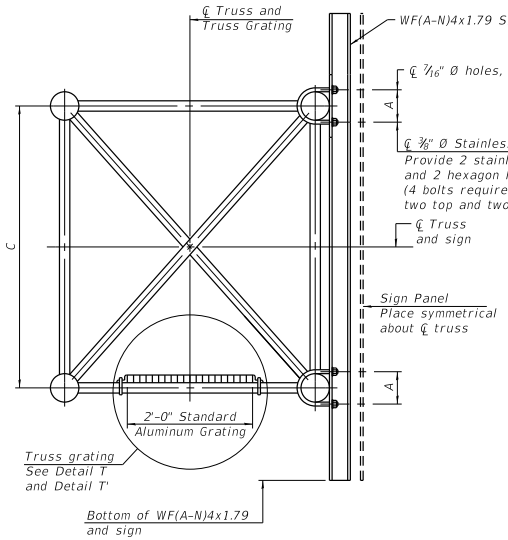
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
ALUMINUM WALKWAY DETAILS

SHEET OHSS2-08 OF OHSS2-12 SHEETS

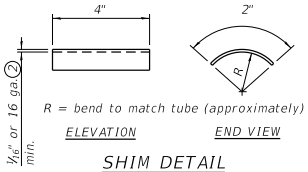
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	327
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\168214410_B150160948071.1+62K33+SHT+SignDet07.dgn
10/3/2024 3:40:14 PM



Sign shall be even with the top of the bracket, but it may extend no more than 6" above the top of the bracket for field adjustments.

SECTION B-B



SHIM DETAIL

1. Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.
2. Stainless steel shims shall be placed as shown in Detail T *if needed* to compensate for alignment variations between horizontal and diagonal pipes beyond adjustment provided by angles. Thicker shims may be used subject to shims performing properly.
3. Tube to grating gap may vary from 0 to ½", max. to align walkway, allow for camber, etc.

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars shall be 3/16" x 1½" on 1 3/16" centers and conform to ASTM B221 Alloy 6061-T6.

Cross bars shall be 3/16" x 1½" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

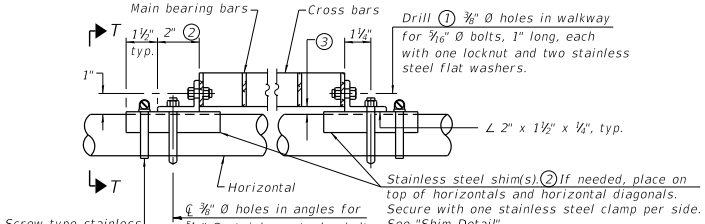
OR

Aluminum Grating with modified "t" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.³ per bar, a depth of 1½", spaced on 1 3/16" centers.

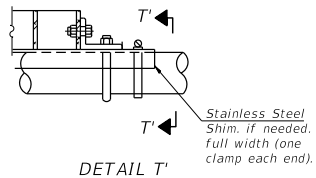
Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

Sign #	Structure Number	Station	A	C
8	1S016I094R071.2	508+94.88	6 1/2"	4' - 6"



DETAIL T

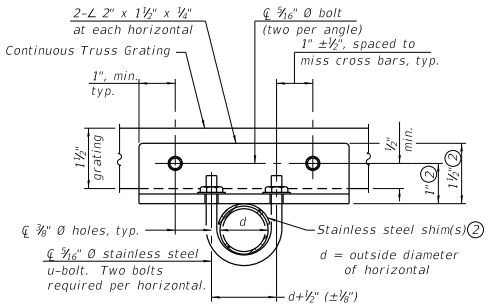
(Continuous Truss grating)



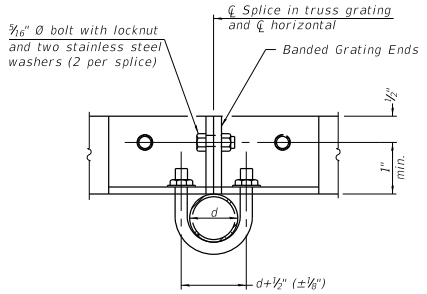
DETAIL T'

(Truss grating splice)

Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.



SECTION T-T



SECTION T'-T'

OS-A-10-NW 4-1-2020

HBM ENGINEERING GROUP, LLC	USER NAME =	DESIGNED - JMI	REVISED -
		CHECKED - JMI	REVISED -
	PLOT SCALE =	DRAWN - MI, LAB	REVISED -
	PLOT DATE =	CHECKED - 8/16/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

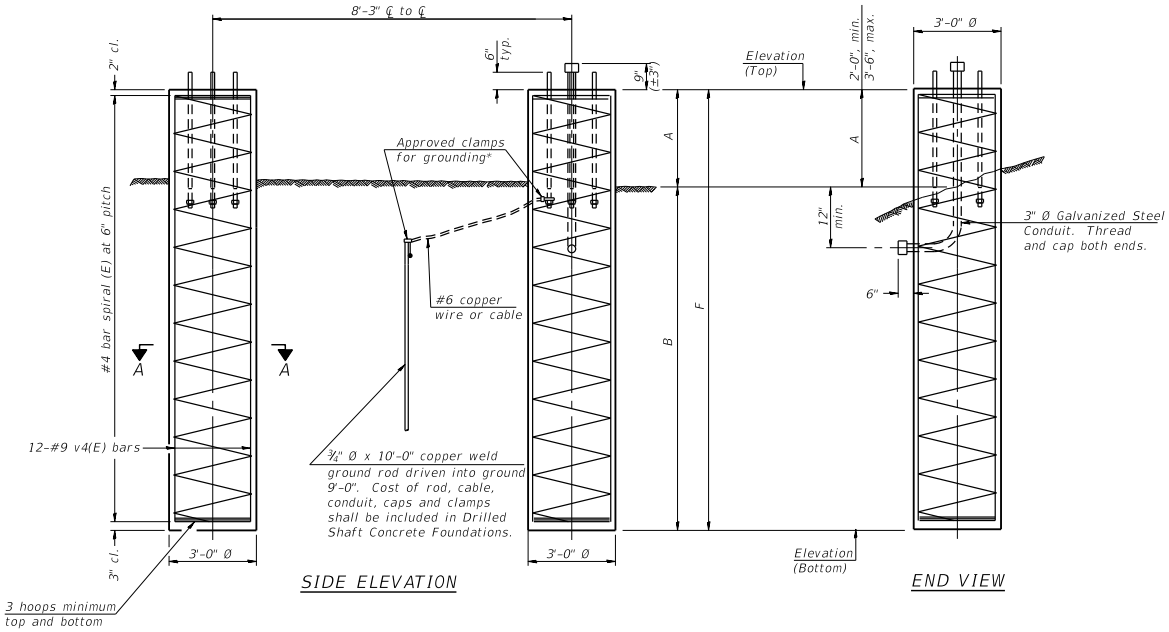
OVERHEAD SIGN STRUCTURES
ALUMINUM WALKWAY DETAILS

SHEET OHSS2-09 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	328
		CONTRACT NO. 62W87		
		ILLINOIS	FED. AID PROJECT	

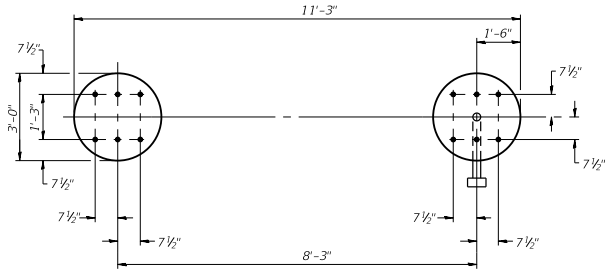
MODEL: Default
FILE NAME: \\homepw11\cs01\ICS_pdf_work_dir\1682\1440_10\1S016I094R071.1-62K53-SHT-SignDet08.dgn

10/3/2024 3:40:34 PM



SIDE ELEVATION

END VIEW



PLAN

For anchor rod size and placement, see Support Frame Detail Sheet.

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
v4(E)	24	#9	F less 5"	———
#4 bar spiral (E) - see Side Elevation				

NOTES:

The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown will be the result of site specific designs.

If the conditions encountered are different than those indicated, the Contractor shall notify the Engineer to determine if the foundation dimensions need to be modified. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

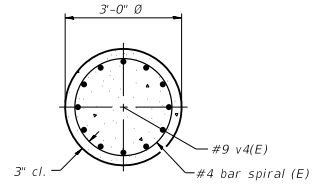
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Concrete Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



SECTION A-A

DETAILS FOR 10" Ø SUPPORT FRAME TYPE I-A or II-A TRUSS

Sign #	Structure Number	Station	Left Foundation					Right Foundation					Class DS Concrete (Cu. Yds.)
			Elevation Top	Elevation Bottom	A	B	F	Elevation Top	Elevation Bottom	A	B	F	
8	1S016I094R071.2	508+94.88	-	-	-	-	-	594.05	574.05	3' - 6"	16' - 6"	20' - 0"	10.6

0S4-F3 2-17-2017

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

HBM ENGINEERING GROUP, LLC

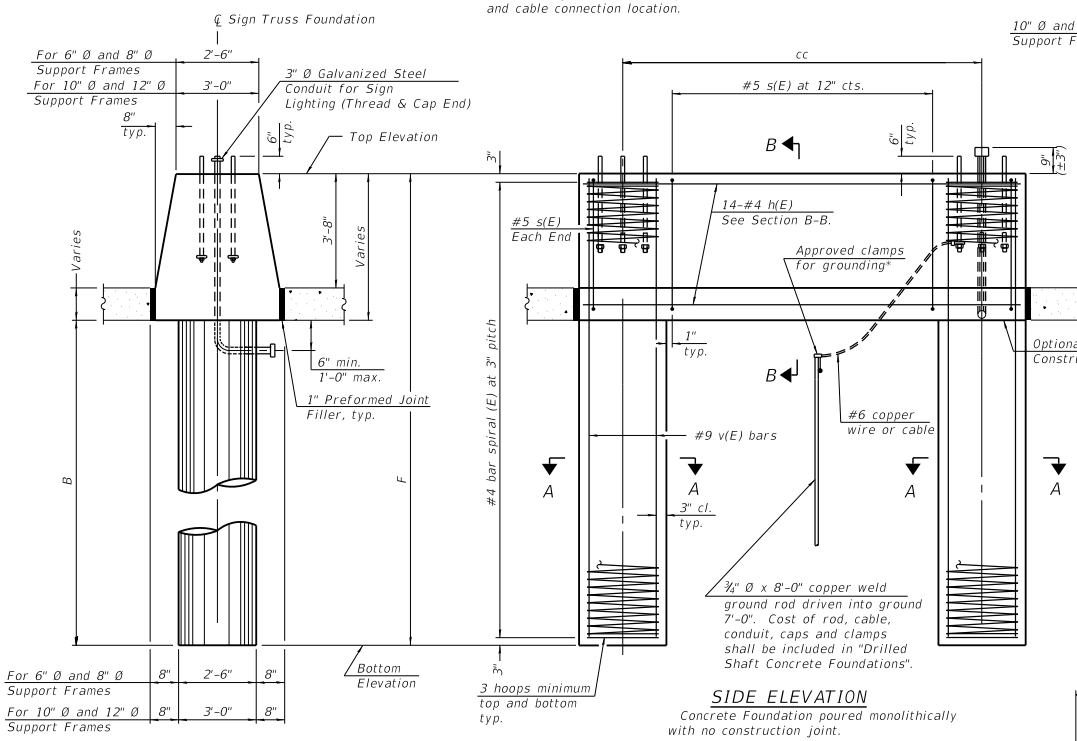
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
DRILLED SHAFT DETAILS

SHEET OHSS2-10 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	329
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

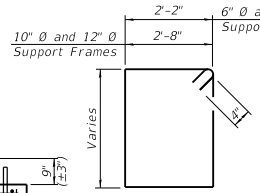
MODEL: Default
FILE NAME: \\homepw\11ts\01ICS_pdf_work_dir\1682\1440_1115016094R071.1-62K53-SHT-SignDet09.dgn
10/3/2024 3:40:48 PM



END VIEW

SIDE ELEVATION

Concrete Foundation poured monolithically with no construction joint.



BAR s(E)

NOTES:

The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown will be the result of site specific designs.

If the conditions encountered are different than those indicated, the Contractor shall notify the Engineer to determine if the foundation dimensions need to be modified. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Concrete Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.

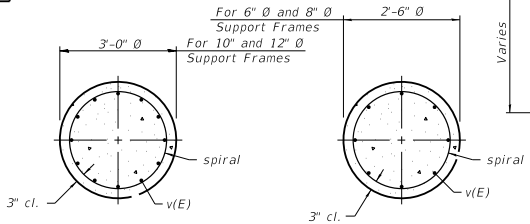
BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
h(E)	14	#4	M less 4"	
s(E)	Varies	#5	Varies	□
v(E)	16	#9	F less 0'-5"	
v(E)	24	#9	F less 0'-5"	
#4(E) bar spiral. See Side Elevation				

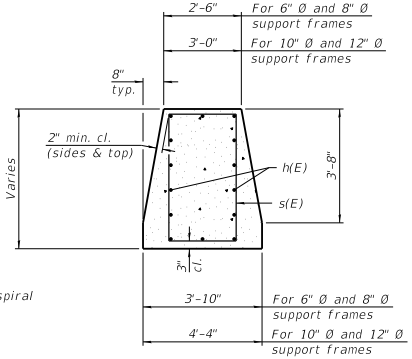
6" Ø and 8" Ø Support Frame

10" Ø and 12" Ø Support Frame

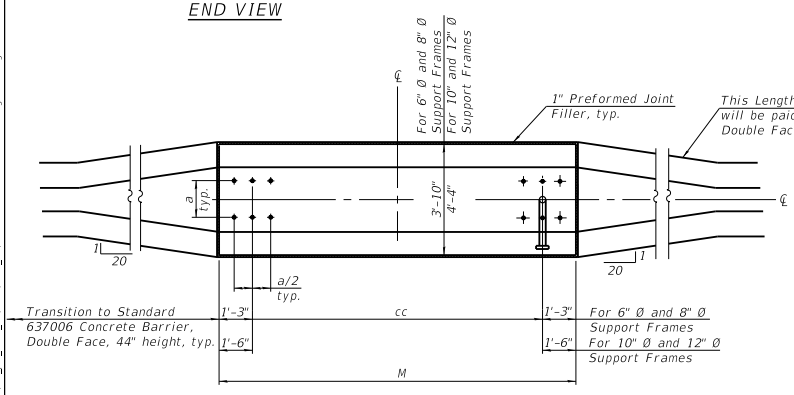
Pipe Support Frames	cc	M	a	a/2
6" Ø	7'-0"	9'-6"	0'-11"	5½"
8" Ø	7'-6"	10'-0"	1'-1½"	6¾"
10" Ø	8'-3"	11'-3"	1'-3"	7½"
12" Ø	9'-0"	12'-0"	1'-6"	9"



SECTION A-A



SECTION B-B



PLAN

Sign #	Structure Number	Station	Left Foundation				Right Foundation				Class DS Concrete (Cu. Yds.)
			Elevation Top	Elevation Bottom	B	F	Elevation Top	Elevation Bottom	B	F	
8	1S016I094R071.2	508+94.88	596.56	574.89	16' - 6"	21' - 8"	-	-	-	-	14.5

0S4-MED 4-1-2020

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - JMI	REVISED -	
	CHECKED - JMI	REVISED -	
PLOT SCALE =	DRAWN - MI, LAB	REVISED -	
PLOT DATE =	CHECKED - 8/16/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
MEDIAN SUPPORT FOUNDATION DETAILS

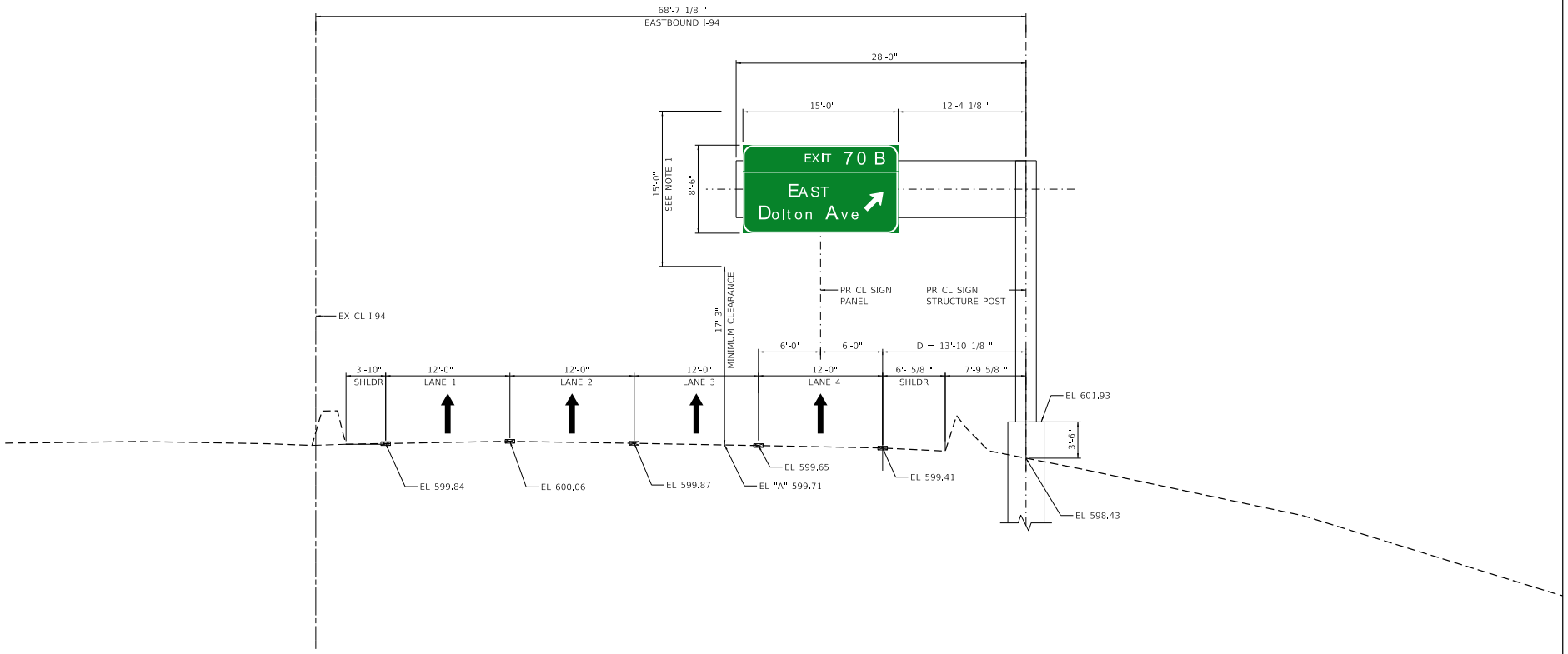
SHEET OHSS2-11 OF OHSS2-12 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	(42-B-11-1) BR, BJR 24	COOK	598	330
		CONTRACT NO. 62W87		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: \\homepw11ts01\IICS_pdf_work_dir\1682\1440_13\1S016I094R071.1-62K53-SHT-SignDet10.dgn

10/3/2024 3:40:43 PM

BORING LOGS TO BE INCLUDED IN FINAL SUBMITTAL



SIGN_7_STA_481+82.03_-_PROPOSED_SIGN_TRUSS_MOUNT
STRUCTURE NO. 1C016I094R070.7
LOOKING UPSTATION (EAST)

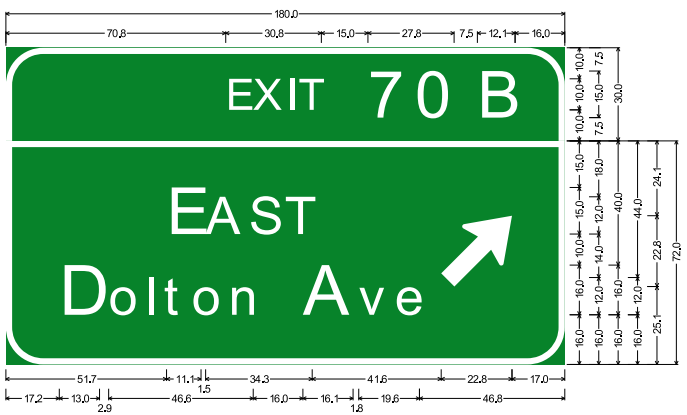
NOTE 1: THEORETICAL SIGN DESIGN HEIGHT (15')

MODEL: Default
FILE NAME: \\hbmepw11ics01\ICS_pdf_work_dir\16861472_1162K53-sht-OHSS1-001.dgn
10/3/2024 8:04:22 PM

HBM ENGINEERING GROUP, LLC

USER NAME = hbmepw11ics01$	DESIGNED - ADS	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	OVERHEAD SIGN STRUCTURES - SIGN PANEL ELEVATIONS SIGN 7 (1C016I094R070.7)
	DRAWN - ADS	REVISED -		
PLOT SCALE = 10.0000 ' / in.	CHECKED -	REVISED -		SHEET 1 OF 2 SHEETS
PLOT DATE = 10/3/2024	DATE - 8/16/2024	REVISED -		

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	2019-180-RS&T	COOK	586	307
		CONTRACT NO.	62WB7	
	ILLINOIS	FED. AID PROJECT		



12.0" Radius, 2.0" Border, White on Green;
"EXIT 70 B", E Mod 2K;

12.0" Radius, 2.0" Border, White on Green;
"EAST", E Mod 2K; "Dolton Ave", E Mod 2K; Standard Arrow Custom 29.3" X 18.3" 45°;
Table of letter and object lefts

E 70.8	X 79.6	I 90.4	T 94.2	7 116.6	0 131.8	B 151.9
E 51.7	A 64.3	S 78.2	T 89.8	↗ 140.2		
D 17.2	o 33.1	l 45.0	t 50.9	o 59.9	n 71.7	A 95.7	v 113.6	e 125.3

STRUCTURE	1C016I094R070.7
WIDTH x HEIGHT	15'-0" x 8'-6"
BORDER WIDTH	2"
CORNER RADIUS	12"
MOUNTING	OVERHEAD
BACKGROUND	TYPE: REFLECTIVE - ZZ
	COLOR: GREEN
LEGEND/BORDER	TYPE: REFLECTIVE - ZZ
	COLOR: WHITE

SIGN_7_STA_481+82.03_–_PROPOSED_SIGN_TRUSS_MOUNT

1C016I094R070.7

MODEL: Default
FILE NAME: \\hbmepw11ics01\ICS_pdf_work_dir\16861472_4162\53-sht-OHSS1-002.dgn
10/3/2024 8:04:11 PM

HBM ENGINEERING GROUP, LLC

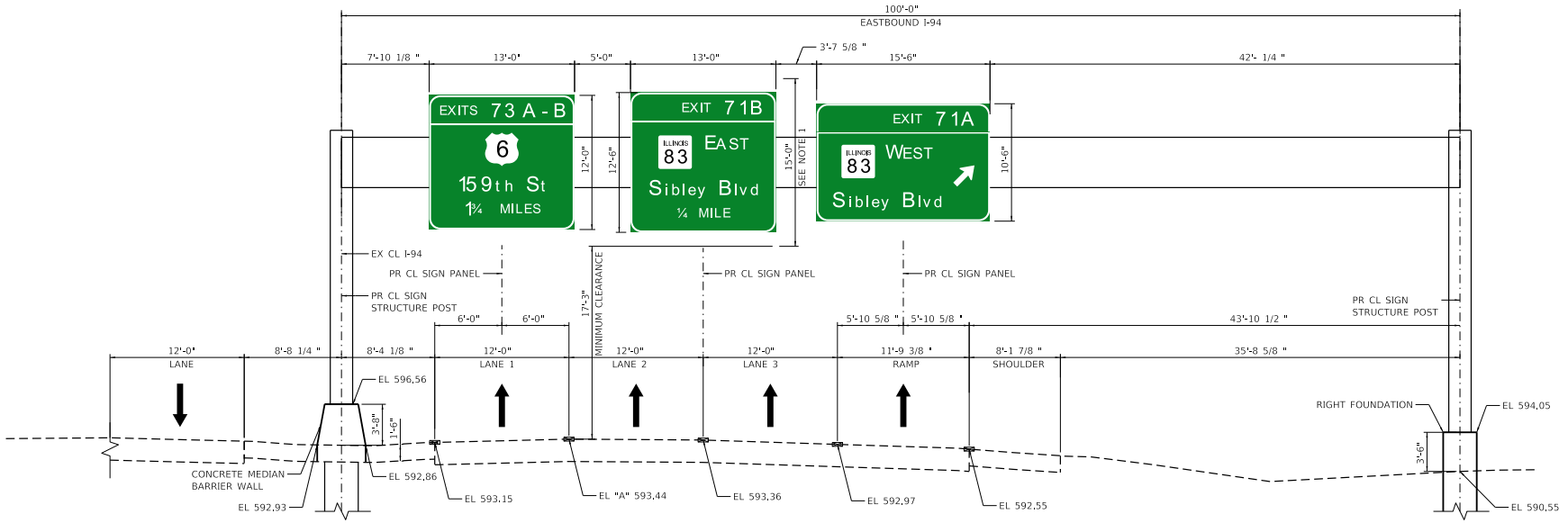
USER NAME = hbmepw11ics01$		DESIGNED - ADS		REVISED -	
		DRAWN - ADS		REVISED -	
PLOT SCALE = 10.0000 ' / in.		CHECKED -		REVISED -	
PLOT DATE = 10/3/2024		DATE - 8/16/2024		REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES - SIGN PANEL DETAILS
SIGN 7 (1C016I094R070.7)

SHEET 1 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	2019-180-RS&T	COOK	586	309
		CONTRACT NO.	62W82	
		ILLINOIS	FED. AID PROJECT	



SIGN_8_STA_508+94.88_-_PROPOSED_SIGN_TRUSS_MOUNT

STRUCTURE NO. 1S016I094R071.2

LOOKING UPSTATION (EAST)

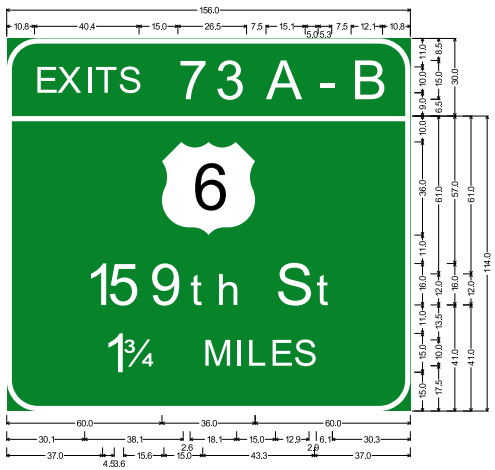
NOTE 1: THEORETICAL SIGN DESIGN HEIGHT (15')

MODEL: Default
FILE NAME: \\hbmepw11ics01\ICS_pdf_work_dir\16861472_2162K53-sht-OHS522-001.dgn
10/3/2024 8:04:10 PM

HBM ENGINEERING GROUP, LLC

USER NAME = hbmepw11ics01$	DESIGNED - ADS	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	OVERHEAD SIGN STRUCTURES - SIGN PANEL ELEVATIONS SIGN 8 (1S016I094R071.1)
	DRAWN - ADS	REVISED -		
PLOT SCALE = 10.0000 ' / in.	CHECKED -	REVISED -		SHEET 2 OF 2 SHEETS
PLOT DATE = 10/3/2024	DATE - 8/16/2024	REVISED -		

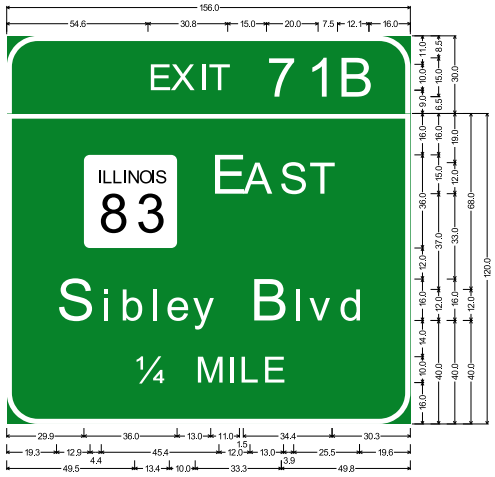
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	2019-180-RS&T	COOK	586	308
		CONTRACT NO.	62WB7	
	ILLINOIS	FED. AID PROJECT		



12.0" Radius, 2.0" Border, White on Green;
"EXITS 73 A - B", E Mod 2K;

12.0" Radius, 2.0" Border, White on Green;
"159th St", E Mod 2K; "1¾ MILES", E Mod 2K;
Table of letter and object lefts

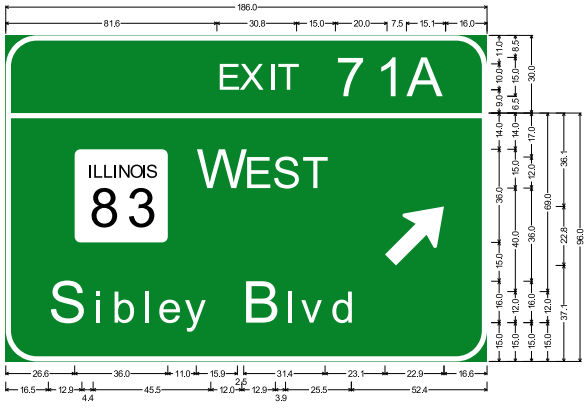
E 10.8	X 19.5	I 30.4	T 34.1	S 43.0	7 66.1	3 80.5	A 100.3	- 120.4	B 133.1
■ 60.0									
1 30.1	5 38.9	9 55.3	t 70.9	h 81.0	S 103.9	t 119.6			
1 37.0	¼ 45.1	M 75.8	I 87.9	L 92.6	E 101.6	S 110.9			



12.0" Radius, 2.0" Border, White on Green;
"EXIT 71B", E Mod 2K;

12.0" Radius, 2.0" Border, White on Green;
"EAST", E Mod 2K; "Sibley Blvd", E Mod 2K; "¼ MILE", E Mod 2K;
Table of letter and object lefts

E 54.6	X 63.4	I 74.3	T 78.0	7 100.4	1 115.9	B 127.9			
■ 29.9	E 78.9	A 91.4	S 105.4	T 116.9					
S 19.3	I 36.5	b 43.8	l 55.4	e 61.5	y 71.9	B 94.0	I 110.9	v 116.8	d 128.4
¼ 49.5	M 72.9	I 85.0	L 89.8	E 96.8					



12.0" Radius, 2.0" Border, White on Green;
"EXIT 71A", E Mod 2K;

12.0" Radius, 2.0" Border, White on Green;
"WEST", E Mod 2K; "Sibley Blvd", E Mod 2K; Standard Arrow Custom 29.3" X 18.3" 45°;
Table of letter and object lefts

E 81.6	X 90.4	I 101.3	T 105.0	7 127.4	1 142.9	A 154.9			
■ 26.6	W 73.6	E 92.0	S 103.0	T 114.5	↗ 146.6				
S 16.5	I 33.8	b 41.0	l 52.6	e 58.8	y 69.0	B 91.3	I 108.1	v 114.0	d 125.6

STRUCTURE	1S016I094R071.1
WIDTH x HEIGHT	13'-0" x 12'-0"
BORDER WIDTH	2"
CORNER RADIUS	12"
MOUNTING	OVERHEAD
BACKGROUND	TYPE: REFLECTIVE - ZZ
	COLOR: GREEN
LEGEND/BORDER	TYPE: REFLECTIVE - ZZ
	COLOR: WHITE

STRUCTURE	1S016I094R071.1
WIDTH x HEIGHT	13'-0" x 12'-6"
BORDER WIDTH	2"
CORNER RADIUS	12"
MOUNTING	OVERHEAD
BACKGROUND	TYPE: REFLECTIVE - ZZ
	COLOR: GREEN
LEGEND/BORDER	TYPE: REFLECTIVE - ZZ
	COLOR: WHITE

STRUCTURE	1S016I094R071.1
WIDTH x HEIGHT	15'-6" x 10'-6"
BORDER WIDTH	2"
CORNER RADIUS	12"
MOUNTING	OVERHEAD
BACKGROUND	TYPE: REFLECTIVE - ZZ
	COLOR: GREEN
LEGEND/BORDER	TYPE: REFLECTIVE - ZZ
	COLOR: WHITE

SIGN_2_STA_508+94.88_-_PROPOSED_SIGN_TRUSS_MOUNT

STRUCTURE NO. 1S016I094R071.1

HBM ENGINEERING GROUP, LLC

USER NAME =	hbmsepw11ics01$	DESIGNED -	ADS	REVISED -	
		DRAWN -	ADS	REVISED -	
PLOT SCALE =	10.0000 ' / in.	CHECKED -		REVISED -	
PLOT DATE =	10/3/2024	DATE -	8/16/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES - SIGN PANEL DETAILS
SIGN 8 (1S016I094R071.1)

SHEET 2 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
94	2019-180-RS&T	COOK	586	310
		CONTRACT NO. 62WB7		
	ILLINOIS FED. AID PROJECT			

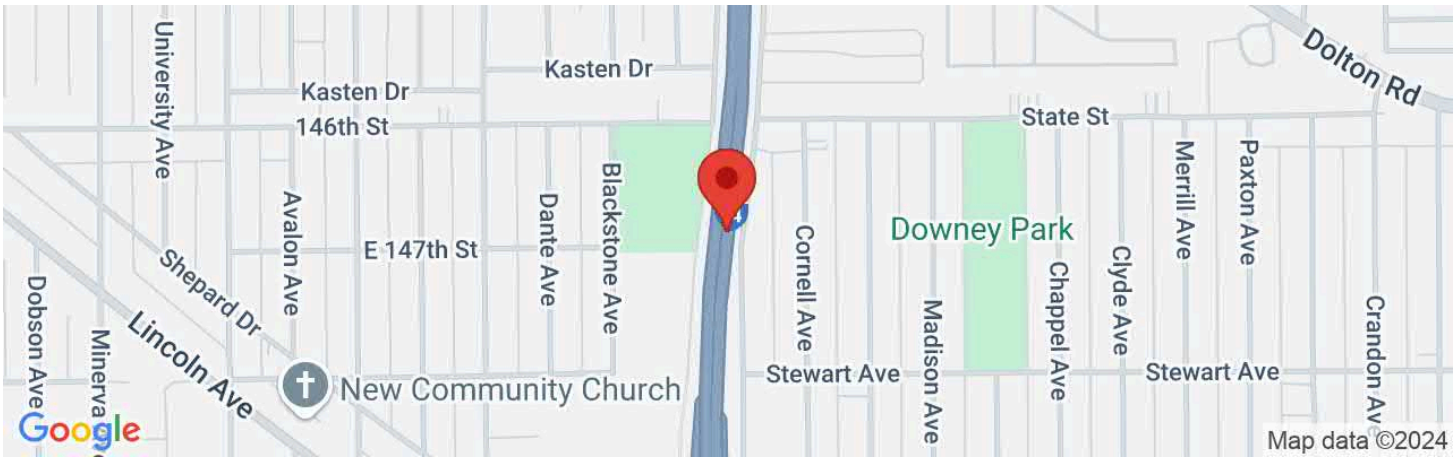
APPENDIX E

SEISMIC ANALYSES

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

PTB204-012 WO3 IDOT 62W87

Latitude, Longitude: 41.62836086, -87.57869244



Date	10/29/2024, 9:36:16 AM
Design Code Reference Document	ASCE7-16
Risk Category	I
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S_S	0.121	MCE_R ground motion. (for 0.2 second period)
S_1	0.066	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.157	Site-modified spectral acceleration value
S_{M1}	0.099	Site-modified spectral acceleration value
S_{DS}	0.105	Numeric seismic design value at 0.2 second SA
S_{D1}	0.066	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	A	Seismic design category
F_a	1.3	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.06	MCE_G peak ground acceleration
F_{PGA}	1.3	Site amplification factor at PGA
PGA_M	0.078	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	0.121	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.127	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.066	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.075	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)

Type	Value	Description
PGA_{UH}	0.06	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.953	Mapped value of the risk coefficient at short periods
C_{R1}	0.883	Mapped value of the risk coefficient at a period of 1 s
C_V	0.7	Vertical coefficient

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====IDOT 62W87 I-94 OHS Structures

Substructure 1

Base of Substruct. Elev. (or ground surf for bents)	593	ft.
Pile or Shaft Dia.	14	inches
Boring Number	OSB-7-1	
Top of Boring Elev.	597	ft.
Approximate Fixity Elev.	586	ft.

Individual Site Class Definition:

N (bar): 10 (Blows/ft.) Soil Site Class E
N_{ch} (bar): NA (Blows/ft.) NA
s_u (bar): 1.74 (ksf) Soil Site Class D <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	594.5	2.50	28		
	592.0	2.50	6	2.00	B
	589.5	2.50	7		B
	587.0	2.50	11	1.90	B
1.5	584.5	2.50	11		B
4.0	582.0	2.50	2	1.50	B
6.5	579.5	2.50	2		B
9.0	577.0	2.50	7	1.70	
11.5	574.5	2.50	11	1.70	
14.0	572.0	2.50	10	1.30	
16.5	569.5	2.50	12	1.70	
19.0	567.0	2.50	12	1.70	
24.0	562.0	5.00	12	1.70	
29.0	557.0	5.00	17	2.10	
100.0	486.0	71.00	17	2.10	

Substructure 2

Base of Substruct. Elev. (or ground surf for bents)	588	ft.
Pile or Shaft Dia.	14	inches
Boring Number	OSB-8-1	
Top of Boring Elev.	592	ft.
Approximate Fixity Elev.	581	ft.

Individual Site Class Definition:

N (bar): 18 (Blows/ft.) Soil Site Class D
N_{ch} (bar): NA (Blows/ft.) NA
s_u (bar): 3.1 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	589.5	2.50	8		
	587.0	2.50	12		B
	584.5	2.50	5		
	582.0	2.50	1		
1.5	579.5	2.50	2		B
4.0	577.0	2.50	10	2.50	
6.5	574.5	2.50	8	1.70	
9.0	572.0	2.50	7	1.50	
11.5	569.5	2.50	10	1.30	
14.0	567.0	2.50	10	1.30	
16.5	564.5	2.50	9	1.70	
19.0	562.0	2.50	11	1.30	
24.0	557.0	5.00	15	1.90	B
29.0	552.0	5.00	28	4.20	
100.0	481.0	71.00	28	4.20	

Substructure 3

Base of Substruct. Elev. (or ground surf for bents)	589	ft.
Pile or Shaft Dia.	14	inches
Boring Number	OSB-8-2	
Top of Boring Elev.	593	ft.
Approximate Fixity Elev.	582	ft.

Individual Site Class Definition:

N (bar): 13 (Blows/ft.) Soil Site Class E
N_{ch} (bar): NA (Blows/ft.) NA
s_u (bar): 3.51 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	590.5	2.50	18		B
	588.0	2.50	9		
	585.5	2.50	16		B
	583.0	2.50	2		
1.5	580.5	2.50	2		
4.0	578.0	2.50	0		B
6.5	575.5	2.50	3	1.00	
9.0	573.0	2.50	9	1.70	
11.5	570.5	2.50	9	1.70	
14.0	568.0	2.50	10	1.90	
16.5	565.5	2.50	10	1.70	
19.0	563.0	2.50	10	1.90	B
24.0	558.0	5.00	19	3.30	
29.0	553.0	5.00	44	5.00	
100.0	482.0	71.00	44	5.00	

Substructure 4

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Global Site Class Definition: Substructures 1 through 3

N (bar): 14 (Blows/ft.) Soil Site Class E
N_{ch} (bar): (Blows/ft.) NA, H < 0.1*H (Total)
s_u (bar): 2.79 (ksf) Soil Site Class C <----Controls