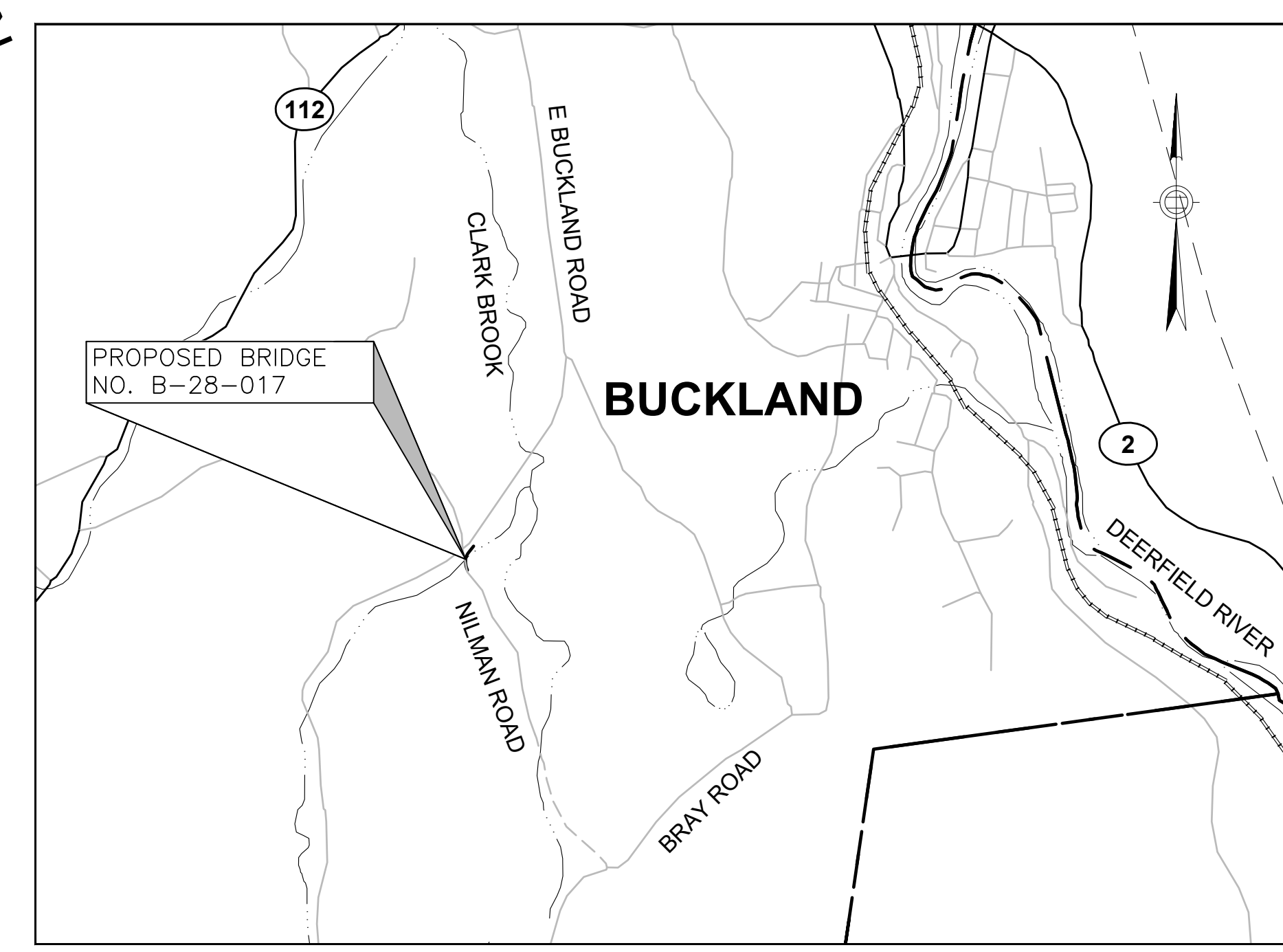


LOW POINT ELEV = 852.40
 LOW POINT STA = 6+53.73
 PVI STA = 6+14.16
 PVI ELEV = 850.27
 A.D. = 12.83%
 K = 13.25
 170' VC

KEY PLAN
 SCALE: 1" = 10'



LOCUS MAP
 SCALE: 1" = 2000'

**BUCKLAND
 NILMAN ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	1	11
PROJECT FILE NO.		N/A	

KEY PLAN, PROFILE AND INDEX

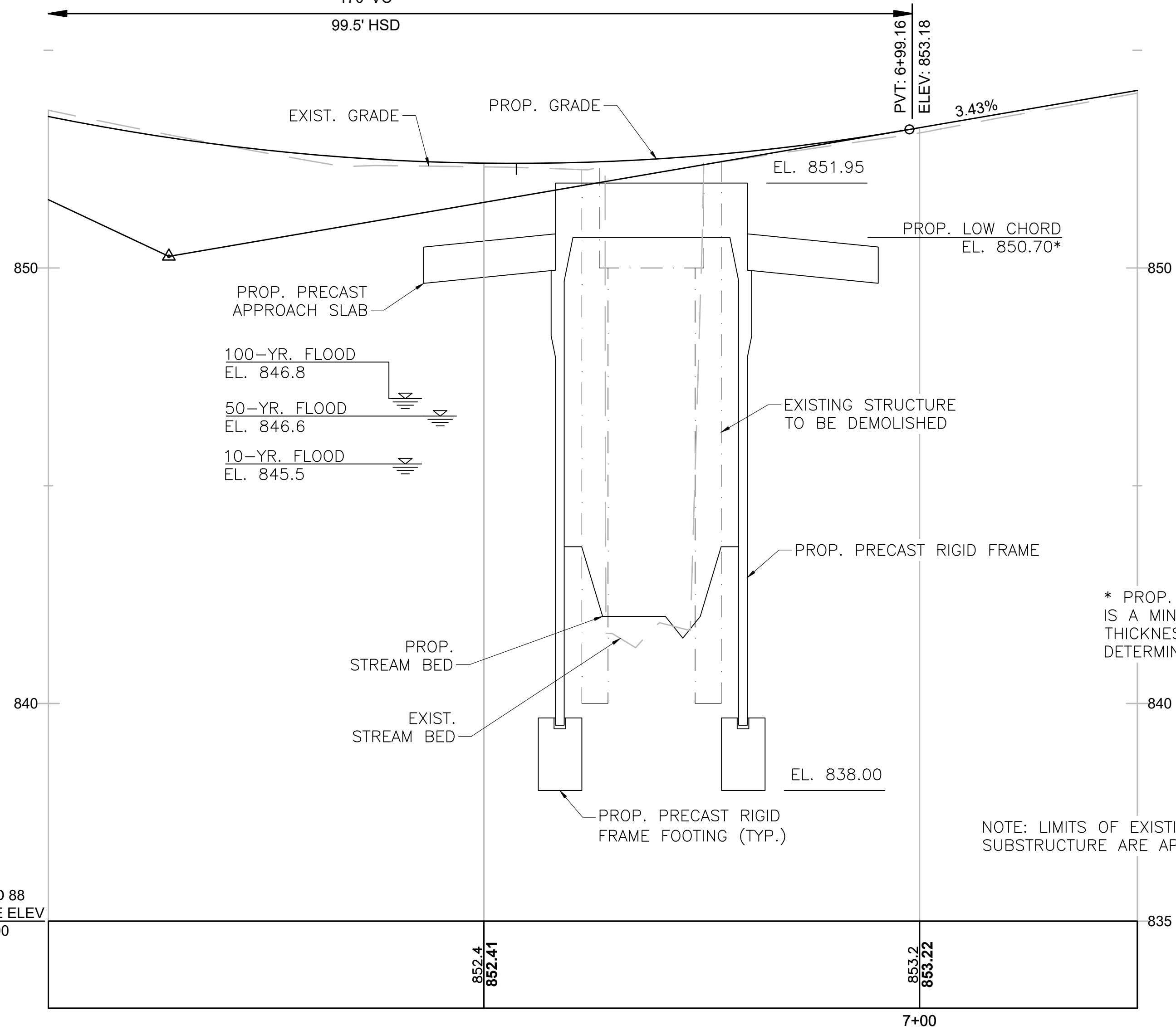
STRUCTURAL SHEETS INDEX:

- 1 KEY PLAN, PROFILE AND INDEX
- 2 GENERAL NOTES
- 3 BORING LOGS
- 4 GENERAL PLAN AND ELEVATION
- 5 LONGITUDINAL SECTION
- 6 FOUNDATION PLAN
- 7 WINGWALL ELEVATIONS AND SECTIONS
- 8 MISCELLANEOUS DETAILS
- 9 PRECAST DETAILS AND TOLERANCES
- 10 BRIDGE RAIL DETAILS
- 11 HIGHWAY GUARDRAIL TRANSITION

CHAPTER 85 SECTION 35 REVIEW AND APPROVAL

IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS, THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE STRUCTURE DENOTED ON THESE PLANS FOR REVIEW AND APPROVAL. THIS APPROVAL SHALL CONSTITUTE THE FINAL APPROVAL AS STIPULATED BY CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS.

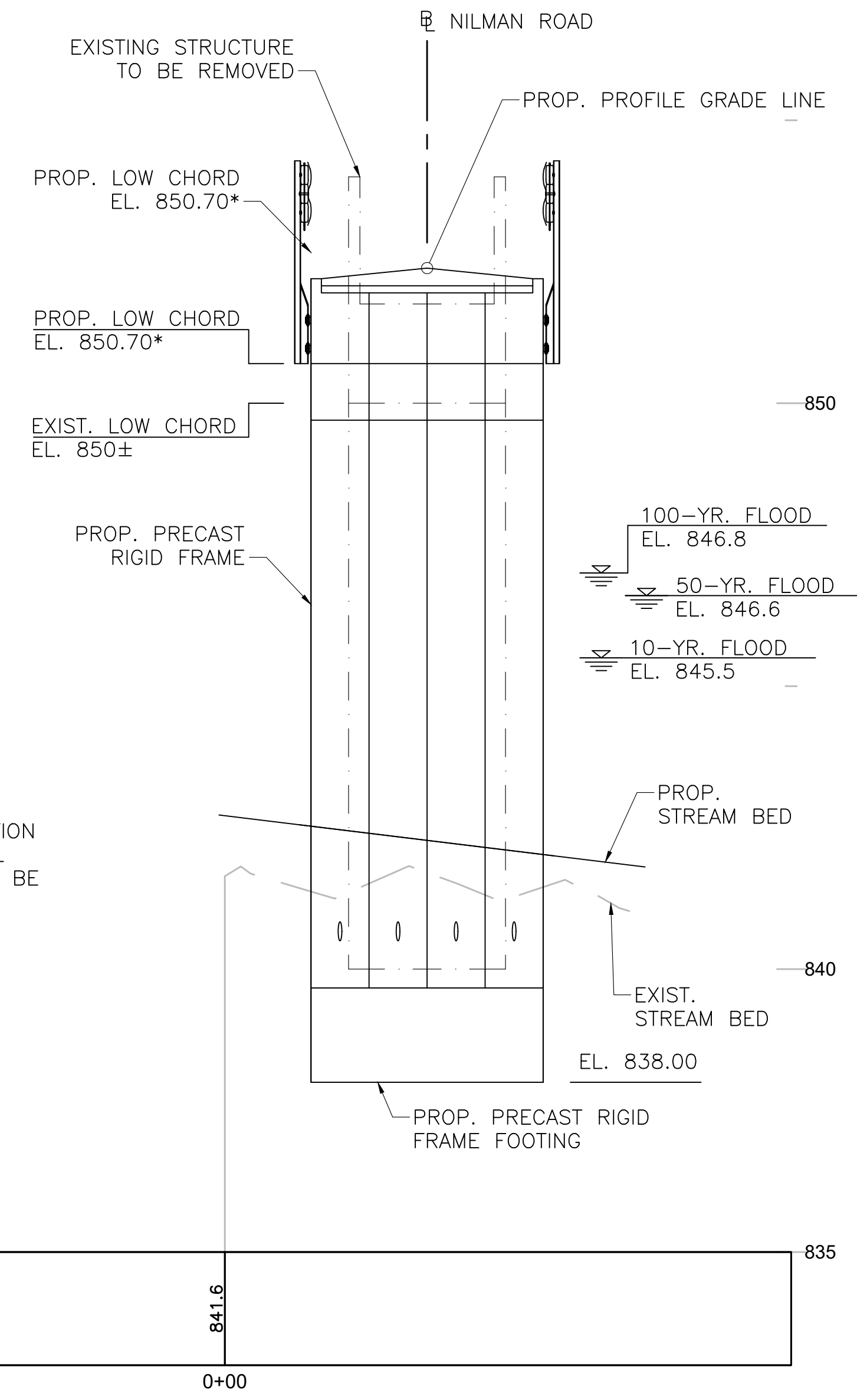
COMMONWEALTH OF MASSACHUSETTS
 MassDOT, Highway Division
 CONCEPTUAL DESIGN IS ACCEPTABLE
 TO MASSDOT FOR CONTRACTING
 STATE BRIDGE ENGINEER _____ DATE _____



PROFILE ALONG NILMAN ROAD
 HORIZONTAL SCALE: 1" = 10'
 VERTICAL SCALE: 1/2" = 1'-0"

* PROP. LOW CHORD ELEVATION IS A MINIMUM VALUE. ACTUAL THICKNESS OF TOP SLAB TO BE DETERMINED BY FABRICATOR.

NOTE: LIMITS OF EXISTING SUBSTRUCTURE ARE APPROXIMATE



PROFILE ALONG CLARK BROOK
 HORIZONTAL SCALE: 1" = 10'
 VERTICAL SCALE: 1/2" = 1'-0"

24-August-2020 ISSUED FOR CONSTRUCTION

vhb
 Vanasse Hangen Brustlin, Inc.
 101 Walnut St. P.O. Box 9151
 Watertown, MA 02472
 617.924.1770 FAX 617.924.2286

**PROPOSED BRIDGE
 BUCKLAND
 MASSACHUSETTS**
 NILMAN ROAD
 OVER CLARK BROOK

14397.00_BRK(KEY).DWG Plotted on 24-Aug-2020 11:47 AM N/A CHAPTER 85 REVIEW 24-AUGUST-2020

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH:

THE 2017 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS 8TH EDITION FOR HL-93 LOADING.

THE 2013 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION LRFD BRIDGE MANUAL.

THE 2011 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN WITH 2012 INTERIM REVISIONS.

BENCH MARKS:

- 1. SPIKE IN U.P. 1 N3042949.207, E315500.777, EL. 856.69
- 2. SPIKE IN U.P. 2 N3042785.145, E315440.490, EL. 854.10

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD88) OF 1988.

DATE:

TO BE PLACED ON THE FACE OF THE SOUTHEAST AND NORTHWEST WINGWALLS. A SHEET SHOWING SIZE AND CHARACTER OF NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF CONTRACT COMPLETION AS OF THE DATE THE FIRST WINGWALL IS CONSTRUCTED. BOTH WINGWALLS SHALL FEATURE THE SAME DATE.

SURVEY NOTEBOOK:

SURVEY PERFORMED BY SHERMAN & FRYDRYK, LLC.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

SEISMIC GROUND SHAKING HAZARD:

DESIGN SPECTRA:

- As = 0.072g
- Sds = 0.156g
- Sd1 = 0.068g

SITE CLASS = C

SEISMIC DESIGN CATEGORY (SDC) = A

GEOTECHNICAL REPORT:

REFER TO GEOTECHNICAL REPORT, DATED JANUARY 2019, PREPARED BY GEODESIGN INCORPORATED.

REINFORCEMENT:

REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED IN THE CONSTRUCTION DRAWINGS AND SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 GRADE 60. ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BAR	29"	36"
3. COATED BARS, COVER <3db, OR CLEAR SPACING <6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2, AND 3	35"	44"
6. CONDITION 2, AND 4	34"	43"

IF THE ABOVE BARS ARE SPACED 6 INCHES OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

CONSTRUCTION REQUIREMENTS AND PROCEDURES:

THE CONTRACTOR SHALL TAKE THE PROPER PRECAUTIONS TO ENSURE THE STABILITY AND SAFE PERFORMANCE OF ALL STRUCTURAL ELEMENTS DURING DEMOLITION AND CONSTRUCTION. REFER TO APPROVED DEMOLITION/ERECTION PLANS.

IF THERE ARE REVISIONS TO APPROVED PLANS, THE CONTRACTOR SHALL SUBMIT THESE CHANGES TO THE ENGINEER OF RECORD AND MASSDOT FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

CONTRACTOR SHALL DISPOSE OF ANY DEMOLITION DEBRIS, CONSTRUCTION DEBRIS, WOOD WASTES, CONTAMINATED SOILS, HAZARDOUS MATERIALS AND OTHER SPECIAL WASTES IN STRICT ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.

EXISTING CONDITIONS:

THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENTS AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADEQUACY AND ACCURACY THEREOF, AND SHALL NOT ORDER ANY MATERIAL OR COMMENCE ANY FABRICATION UNTIL HE HAS MADE THE REQUIRED MEASUREMENTS AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

UTILITIES:

THE CONTRACTOR SHALL LOCATE AND PROTECT FROM DAMAGE ALL EXISTING UTILITIES.

CONSTRUCTION JOINTS:

CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS.

CONCRETE:

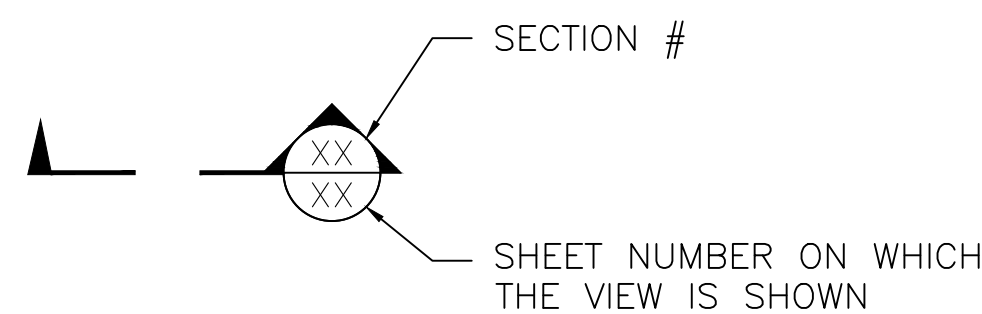
PRECAST STRIP FOOTINGS, WINGWALLS, WINGWALL FOOTINGS, APPROACH SLABS AND CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI, 3/4 IN, 610 CEMENT CONCRETE.

PRECAST RIGID FRAME SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI.

LOAD RATINGS:

FABRICATOR OR PRECAST RIGID FRAME MANUFACTURER SHALL SUBMIT LOAD RATING IN ACCORDANCE WITH THE 2013 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION LRFD BRIDGE MANUAL.

SECTION MARK:



**BUCKLAND
NILMAN ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	2	11
PROJECT FILE NO.		N/A	

GENERAL NOTES

HYDRAULIC DESIGN DATA

DRAINAGE AREA:	1.41	SQUARE MILES
DESIGN FLOOD DISCHARGE:	212	CUBIC FEET PER SECOND
DESIGN FLOOD FREQUENCY:	10	YEARS
DESIGN FLOOD VELOCITY:	7.4	FEET PER SECOND
DESIGN FLOOD ELEVATION:	845.5	FEET, NAVD

BASE (100-YEAR) FLOOD DATA

BASE FLOOD DISCHARGE:	446	CUBIC FEET PER SECOND
BASE FLOOD ELEVATION:	846.8	FEET, NAVD

DESIGN AND CHECK SCOUR DATA

DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY:	25	YEARS
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY:	50	YEARS

FLOOD OF RECORD

DISCHARGE:	UNKNOWN	CUBIC FEET PER SECOND
FREQUENCY (IF KNOWN):	100	YEARS
MAXIMUM ELEVATION:	UNKNOWN	FEET, NAVD
DATE:	AUGUST 1955	MONTH, YEAR

HISTORY OF ICE FLOES: NO
EVIDENCE OF SCOUR AND EROSION: YES, COLLAPSED WINGWALL

ESTIMATED QUANTITIES

(NOT GUARANTEED)

DESCRIPTION	QUANTITY	UNIT
DEMOLITION OF BRIDGE NO. B-28-017	1	LS
BRIDGE EXCAVATION	600	CY
CLASS B ROCK EXCAVATION	8	CY
GRAVEL BORROW FOR BRIDGE FOUNDATIONS	50	CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	250	CY
CONTROLLED DENSITY FILL - NON-EXCAVATABLE	3	CY
TEMPORARY SHORING	1	LS
CONTROL OF WATER, STRUCTURE NO. B-28-017	1	LS
BRIDGE STRUCTURE, BRIDGE NO. B-28-017	1	LS

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

24-August-2020	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

SHEET 2 OF 11 BRIDGE NO. B-28-017 (C69)

BORING B-1/1A
 STATION: 6+40
 OFFSET: 9.5' LEFT
 GROUND ELEVATION: 851'
 N: 3042841.17
 E: 315449.35

BORING B-2
 STATION: 7+00
 OFFSET: 12.0' LEFT
 GROUND ELEVATION: 852'
 N: 3042903.93
 E: 315473.00

BUCKLAND NILMAN ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	3	11
PROJECT FILE NO.		N/A	
BORING LOGS			

BORING LOG														
Project Name Nirman Road over Clark Brook Buckland, MA										Boring No.: B-1/1A				
Boring Company: QC/QA Laboratories, Inc.										Page No.: 1 of 2				
Form: John Leonhardt										File No.: 837-92				
GeoDesign Rep.: Dan Hooley										Checked By: JEW				
Date Started: December 10, 2018										Date Finished: December 11, 2018				
N. Coordinate: 3042841.17										E. Coordinate: 315449.35				
Ground Surface Elevation (feet): 851										Offset: 9				
Station: 6+40										Type: SS				
Casing: 4.0 in.										Sampler: 140 lbs.				
Date: 12/10/18										Depth Elev. (ft): 850.0				
Hammer Wt.: 140 lbs.										Notes: Wet sample, (Remark 2)				
Hammer Fall: 30 in.										Notes: Open hole (after 5 ft)				
Rig Type: CME 550X ATV										Notes: Open hole (after 5 ft)				
Hammer Type: Automatic										Notes: Open hole (after 5 ft)				
Sample Information														
Depth (ft)	Casing Blow Count	Type	Penetration (lb/in)	Recovery (min)	Depth (ft)	Blows / 6 inch Interval				Time (min)	Advance (ft)	Strata Description	Symbol	Sample Description
						0-6	6-12	12-18	18-24					
51	24	SS	8	0	11	5	4	3			Asphalt	S1) Loose, S1A (Top 3"): Ground Asphalt. S1B (Bottom 5"): Brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist.		
52	24	SS	6	2	2	11	18	7			Silty Gravelly Sand with Cobbles & Boulders (Possible Fill)	S2) Medium dense, whitish-brown fine to coarse Gravel (possible quartz cobble fragments), some fine to coarse Sand, little Silt, moist.		
53	24	SS	10	4	11	4	4	5				S3) Loose, orange brown fine to medium SAND, little Silt, moist/wet.		
54	24	SS	16	6	7	22	35	22				S4) Very dense, S4A (Top 8"): Brown fine to medium SAND, some Silt, moist/wet. S4B (Bottom 8"): Orange brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt, moist/wet.		
55	24	SS	13	9	11	14	26	38				S5) Dense, gray fine to coarse SAND and SILT, trace fine Gravel, moist/wet.		
56	24	SS	4	11	30	40	40	37			Glacial Till (With Inferred Cobbles & Boulders)	S6) Very dense, similar to S5.		
57	24	SS	24	15	14	29	31	39				S7) Very dense, S7A (Top 10"): Similar to S-5 with faint layering. S7B (Bottom 5"): Silty dark gray fine to coarse GRAVEL and fine to coarse SAND, trace Silt. (Possible weathered cobble or boulder.)		
58	24	SS	10	19	33	23	29	32				S8) Very dense, similar to S5, except trace fine to coarse Gravel.		
59	24	SS	13	24	25	27	24	31			Glacial Till (With Inferred Cobbles & Boulders) (Continued)	S9) Very dense, similar to S5.		
Bottom of Exploration at 26.0 ft														

EL. 846.0
 BOTTOM OF FOOTING
 EL. 838.00

BORING LOG														
Project Name Nirman Road over Clark Brook Buckland, MA										Boring No.: B-2				
Boring Company: QC/QA Laboratories, Inc.										Page No.: 1 of 2				
Form: John Leonhardt										File No.: 837-92				
GeoDesign Rep.: Dan Hooley										Checked By: JEW				
Date Started: December 11, 2018										Date Finished: December 11, 2018				
N. Coordinate: 3042903.93										E. Coordinate: 315473.00				
Ground Surface Elevation (feet): 852										Offset: 12				
Station: 7+00										Type: SS				
Casing: 4.0 in.										Sampler: 140 lbs.				
Date: 12/11/18										Depth Elev. (ft): 850.0				
Hammer Wt.: 140 lbs.										Notes: Wet sample (described)				
Hammer Fall: 30 in.										Notes: Wet sample (described)				
Rig Type: CME 550X ATV										Notes: See Remark 4				
Hammer Type: Automatic										Notes: See Remark 4				
Sample Information														
Depth (ft)	Casing Blow Count	Type	Penetration (lb/in)	Recovery (min)	Depth (ft)	Blows / 6 inch Interval				Time (min)	Advance (ft)	Strata Description	Symbol	Sample Description
						0-6	6-12	12-18	18-24					
81	24	SS	12	0	6	5	6	8				Silty Gravelly Sand (Possible Fill)	S1) Medium dense, brown fine to medium SAND, little Silt, little fine to coarse Gravel, moist.	
82	24	SS	11	2	5	7	7	4				S2) Medium dense, brown fine to medium SAND, some Silt, trace fine to coarse Gravel, wet.		
83	24	SS	11	4	4	8	7	7				S3) Medium dense, brown fine to medium SAND, little (-) Silt, trace fine Gravel, moist.		
84	24	SS	14	6	7	7	6	5				S4) Medium dense, brown fine to coarse SAND, some Silt, trace fine Gravel, moist/wet.		
85	24	SS	8	9	8	7	8	10				S5) Similar to S4, except some fine to coarse Gravel.		
86	24	SS	4	11	12	18	7	6				S6) Similar to S4.		
87	24	SS	7	14	4	4	5	6				S7) Loose, brown fine to coarse SAND, some Silt, little fine to coarse Gravel, moist/wet.		
88	24	SS	9	19	12	22	79	60*			Glacial Till	S8) Very dense, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist/wet.		
89	24	SS	12	24	28	49	43	36			Glacial Till (Continued)	S9) Very dense, brown fine to coarse SAND, little fine to coarse Gravel, little Silt, moist/wet.		
90	24	SS	10	29	45	100					Inferred Weathered Bedrock	S10) Refusal, gray fine to coarse SAND, some Silt, little fine to coarse Gravel (fracture, inferred weathered bedrock), moist.		
91	24	SS	9	34	78	60*						S11) Similar to S10.		
Bottom of Exploration at 35.3 ft														

- NOTES:**
- LOCATION OF BORINGS FOR PROPOSED BRIDGE SHOWN ON THE KEY PLAN THUS: B-1
 - BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
 - WATER LEVELS SHOWN ON THE BORING LOGS AND INDICATED THUS: WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
 - FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 3/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30", UNLESS OTHERWISE NOTED.
 - ALL BORINGS FOR PROPOSED BRIDGE WERE MADE IN DECEMBER 2018.
 - BORINGS WERE MADE BY QC/QA LABORATORIES, INC.
 - THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

COMMONWEALTH OF MASSACHUSETTS
 MassDOT, Highway Division
 CONCEPTUAL DESIGN IS ACCEPTABLE
 TO MASSDOT FOR CONTRACTING

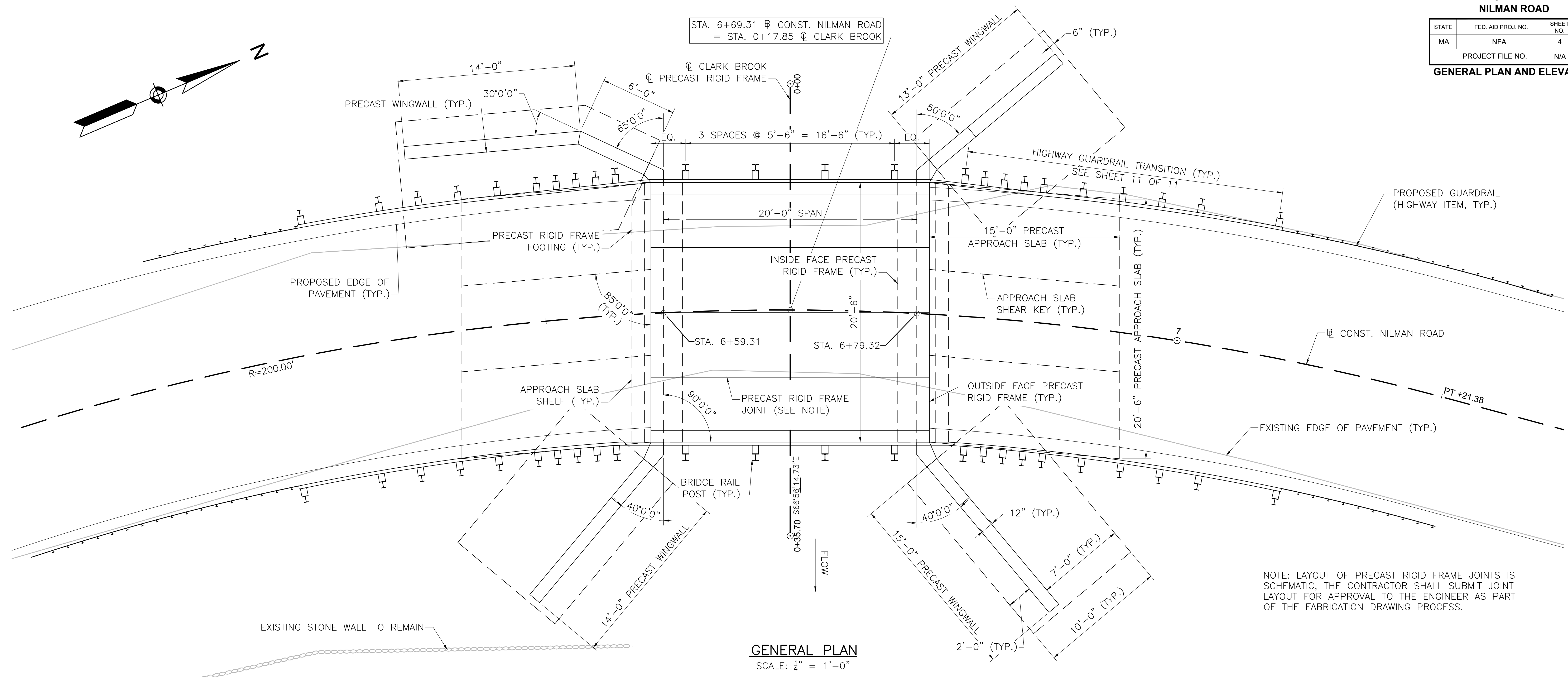
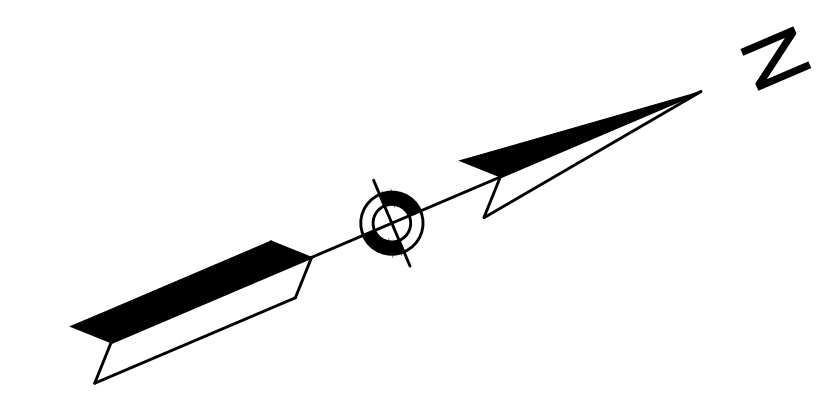
24-August-2020	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

14397.00_BORING.DWG Ploited on 24-Aug-2020 11:48 AM N/A CHAPTER 85 REVIEW 24-AUGUST-2020

**BUCKLAND
NILMAN ROAD**

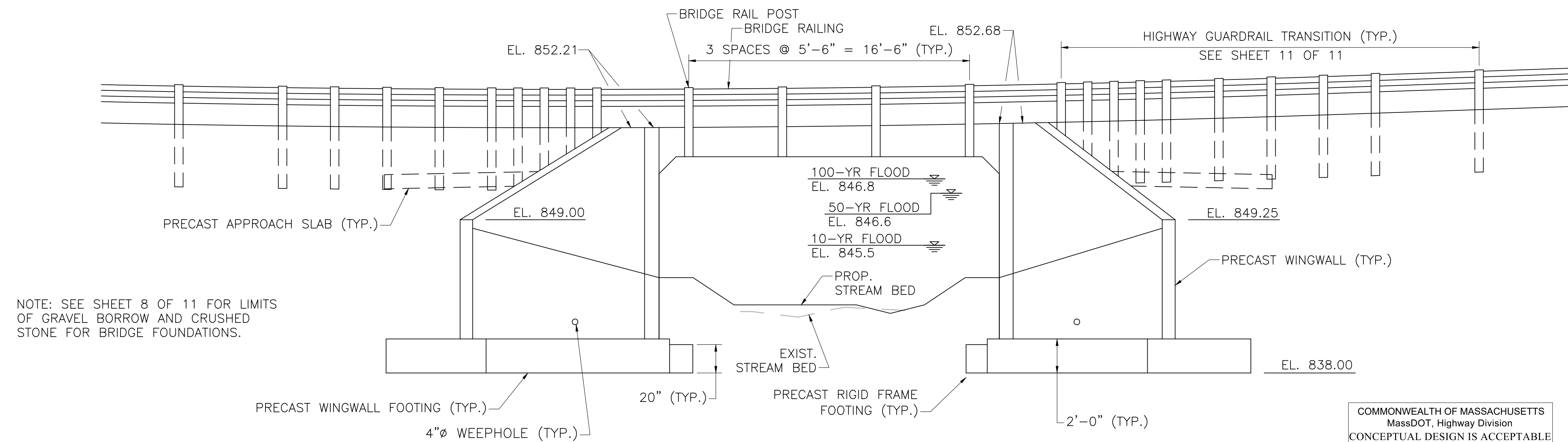
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	4	11
PROJECT FILE NO.		N/A	

GENERAL PLAN AND ELEVATION



GENERAL PLAN
SCALE: 1/4" = 1'-0"

NOTE: LAYOUT OF PRECAST RIGID FRAME JOINTS IS SCHEMATIC, THE CONTRACTOR SHALL SUBMIT JOINT LAYOUT FOR APPROVAL TO THE ENGINEER AS PART OF THE FABRICATION DRAWING PROCESS.



NOTE: SEE SHEET 8 OF 11 FOR LIMITS OF GRAVEL BORROW AND CRUSHED STONE FOR BRIDGE FOUNDATIONS.

ELEVATION
SCALE: 1/4" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

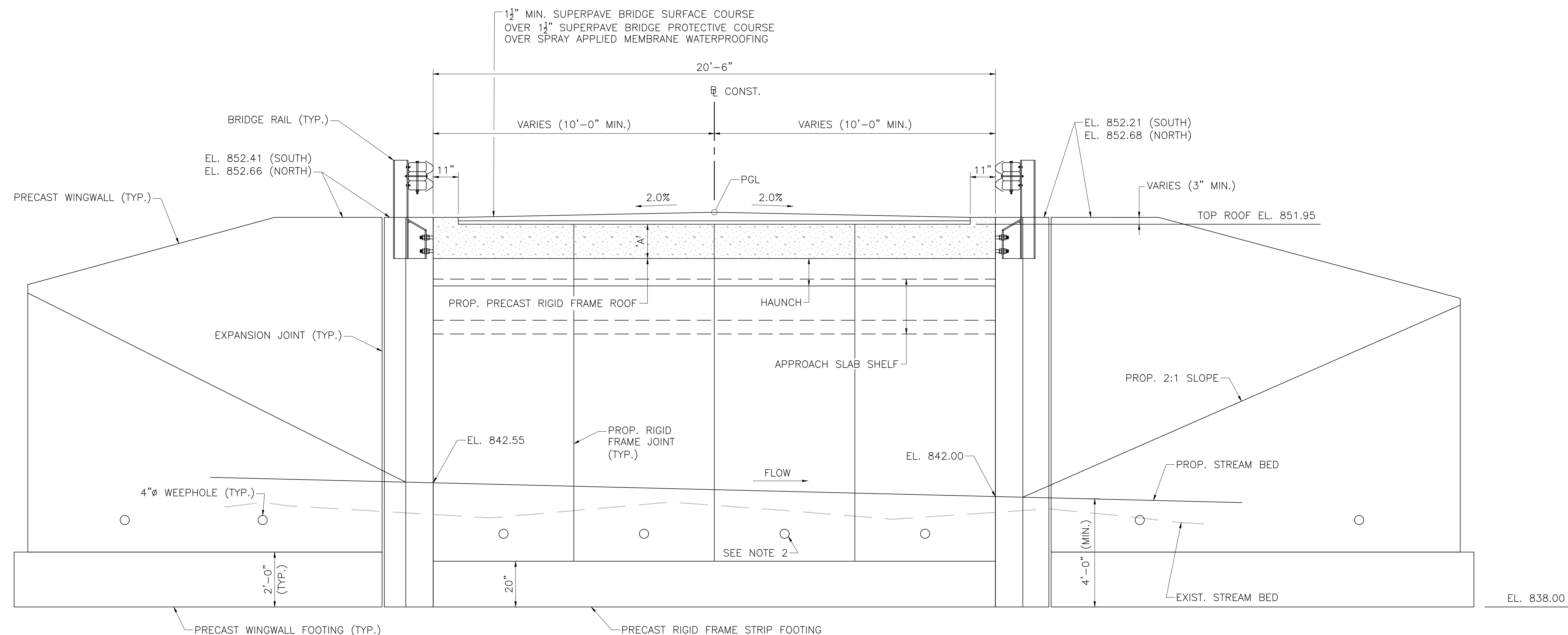
24-August-2020	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
	USE ONLY PRINTS OF LATEST DATE

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**BUCKLAND
NILMAN ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	5	11
PROJECT FILE NO.		N/A	

LONGITUDINAL SECTION



LONGITUDINAL SECTION

SCALE: 1/2" = 1'-0"

NOTES:

- 'A' = PRECAST RIGID FRAME ROOF THICKNESS TO BE DETERMINED BY FABRICATOR. MINIMUM THICKNESS = 12", MAXIMUM THICKNESS = 15".
- 4" Ø WEEP HOLES 10'-0" O.C. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.

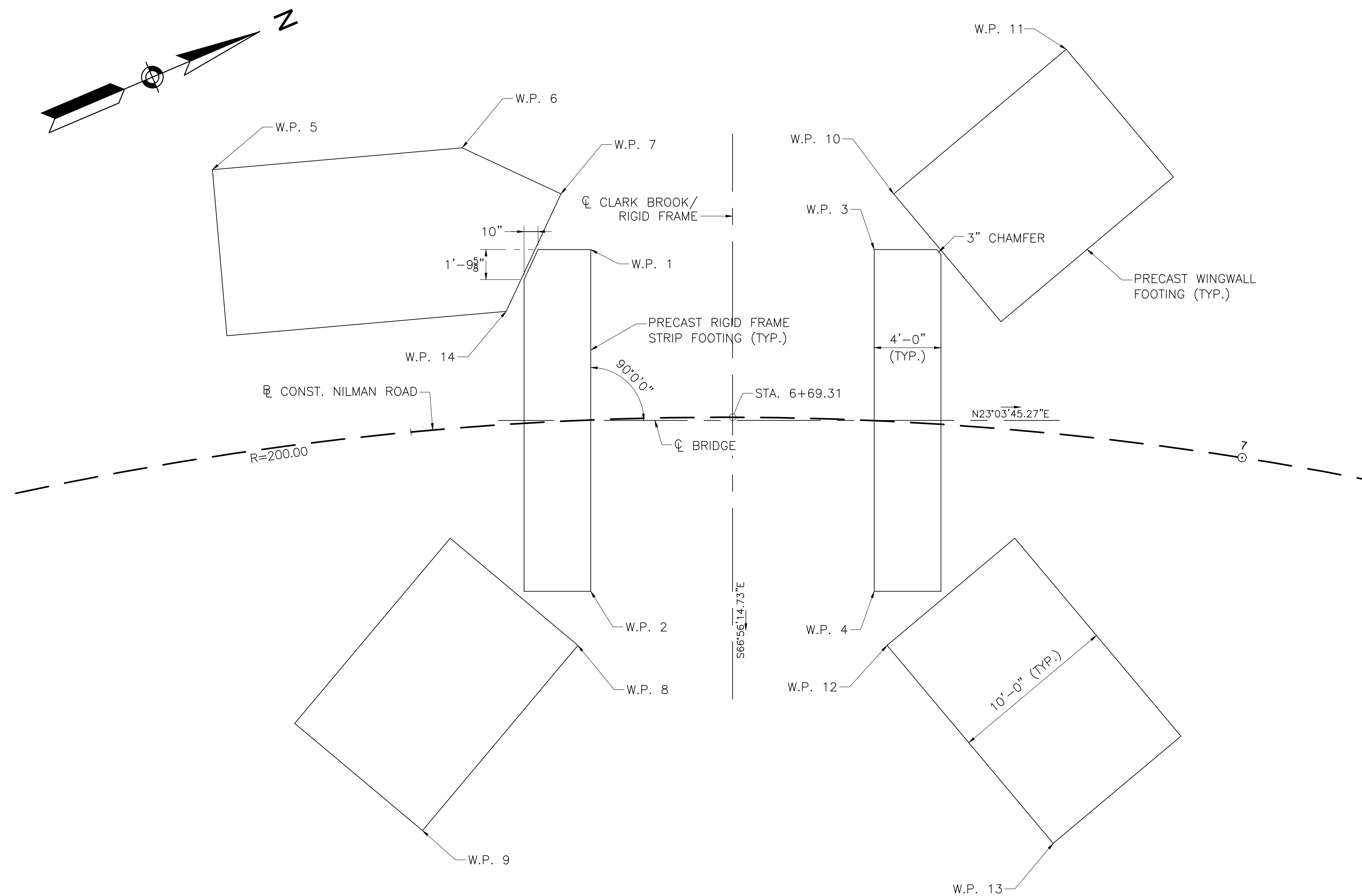
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
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TO MASSDOT FOR CONTRACTING

24-August-2020	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

**BUCKLAND
NILMAN ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	6	11
PROJECT FILE NO.		N/A	

FOUNDATION PLAN



WORKING POINTS				
W.P. #	STA.	OFFSET (FT)	NORTHING	EASTING
1	6+61.20	10.21 LT	3042865.505	315455.761
2	6+60.38	10.28 RT	3042857.474	315474.623
3	6+77.38	10.25 LT	3042881.146	315462.421
4	6+78.30	10.23 RT	3042873.116	315481.282
5	6+40.44	17.03 LT	3042846.506	315442.463
6	6+54.30	16.73 LT	3042860.801	315447.125
7	6+59.65	13.62 LT	3042865.169	315451.987
8	6+59.40	13.48 RT	3042855.494	315477.305
9	6+48.23	23.86 RT	3042842.567	315483.873
10	6+78.34	13.63 LT	3042883.531	315459.811
11	6+87.23	23.01 RT	3042896.446	315455.878
12	6+79.29	13.43 RT	3042872.555	315484.568
13	6+91.34	24.45 RT	3042877.071	315499.396
14	6+56.16	6.77 LT	3042859.386	315457.182

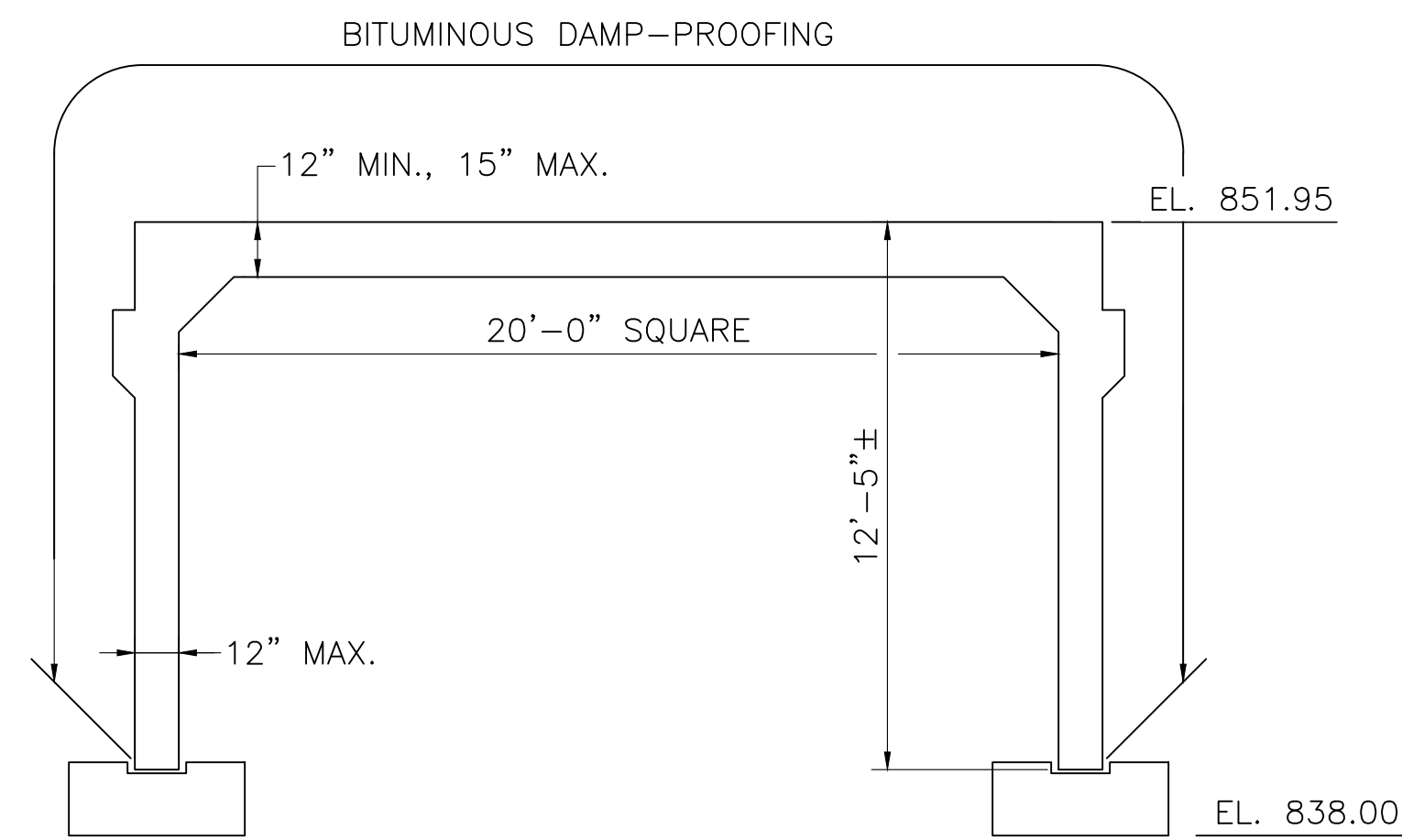
FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING
STATE BRIDGE ENGINEER _____ DATE _____

24-August-2020	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

14597.00_BR(FOUNDATION).DWG Plotted on 24-Aug-2020 11:48 AM N/A CHAPTER 85 REVIEW 24-AUGUST-2020

BUCKLAND NILMAN ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	8	11
PROJECT FILE NO.		N/A	
MISCELLANEOUS DETAILS			

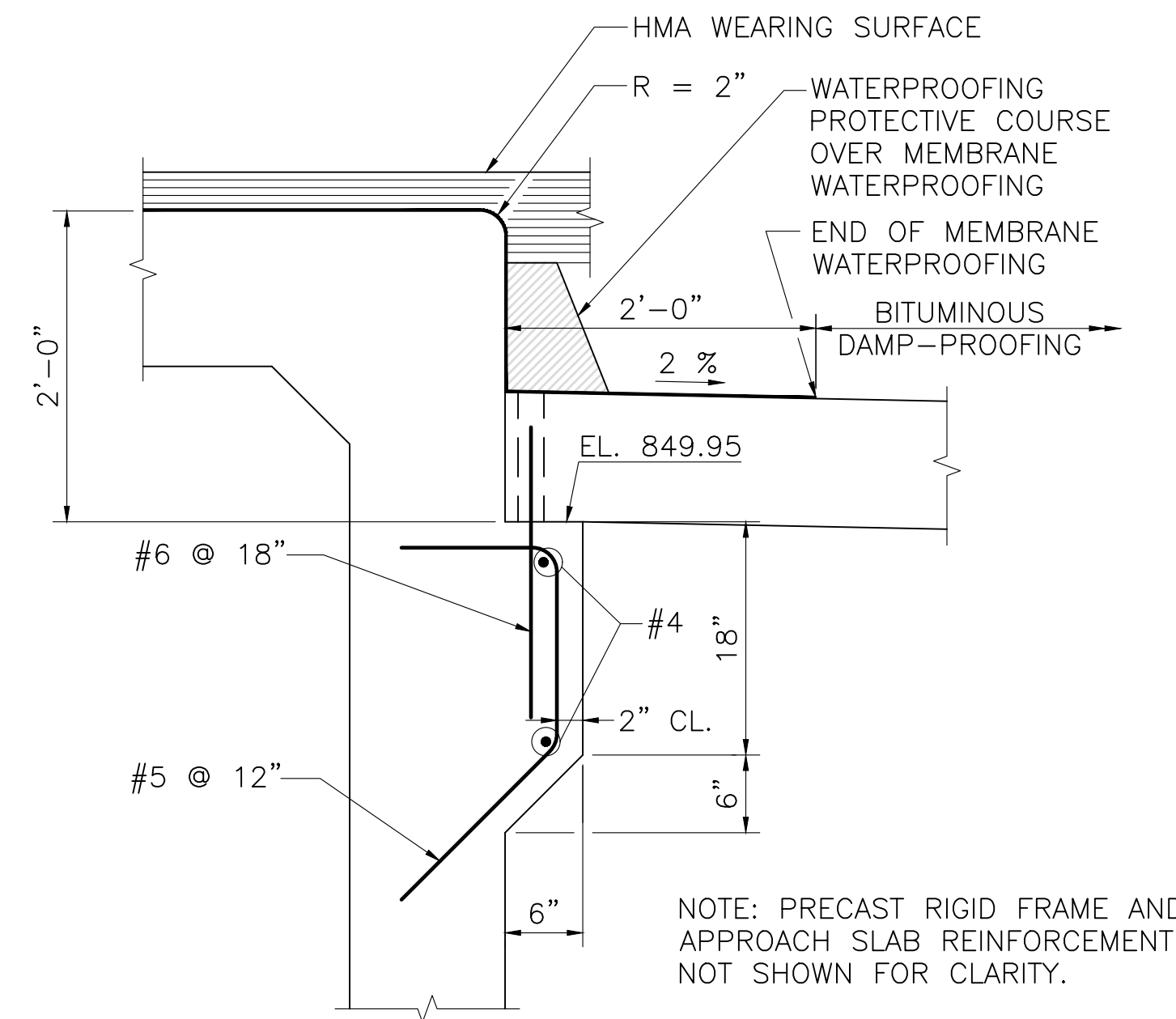


NOTES:

- 'A' TO BE DETERMINED BY FABRICATOR. MINIMUM = 12", MAXIMUM = 15"
- SEE APPROACH SLAB DETAIL FOR LIMITS OF WATERPROOFING.

CULVERT TYPICAL SECTION

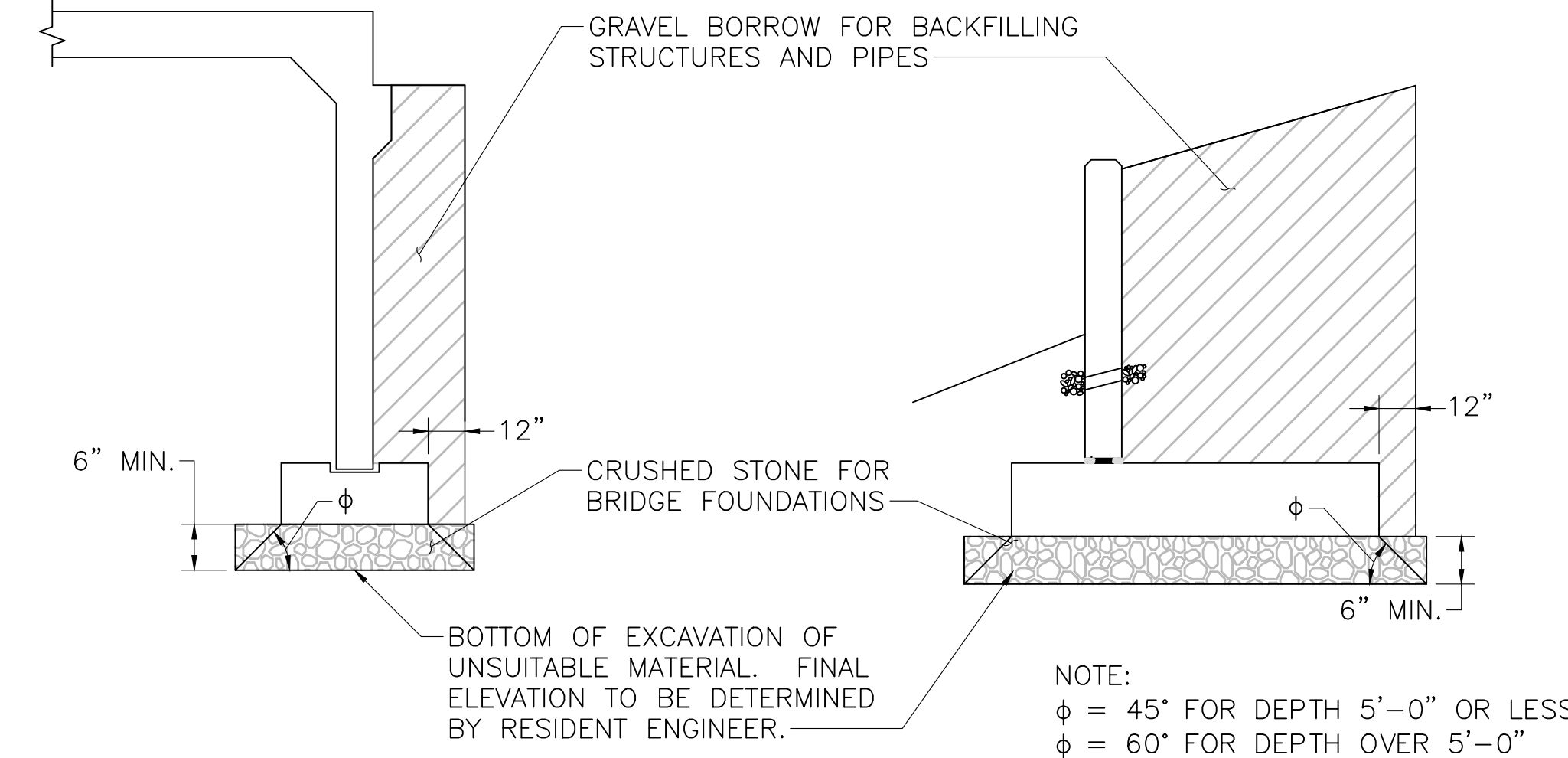
SCALE: 1/4" = 1'-0"



NOTE: PRECAST RIGID FRAME AND APPROACH SLAB REINFORCEMENT NOT SHOWN FOR CLARITY.

PRECAST APPROACH SLAB SHELF - DETAILS

SCALE: 1" = 1'-0"

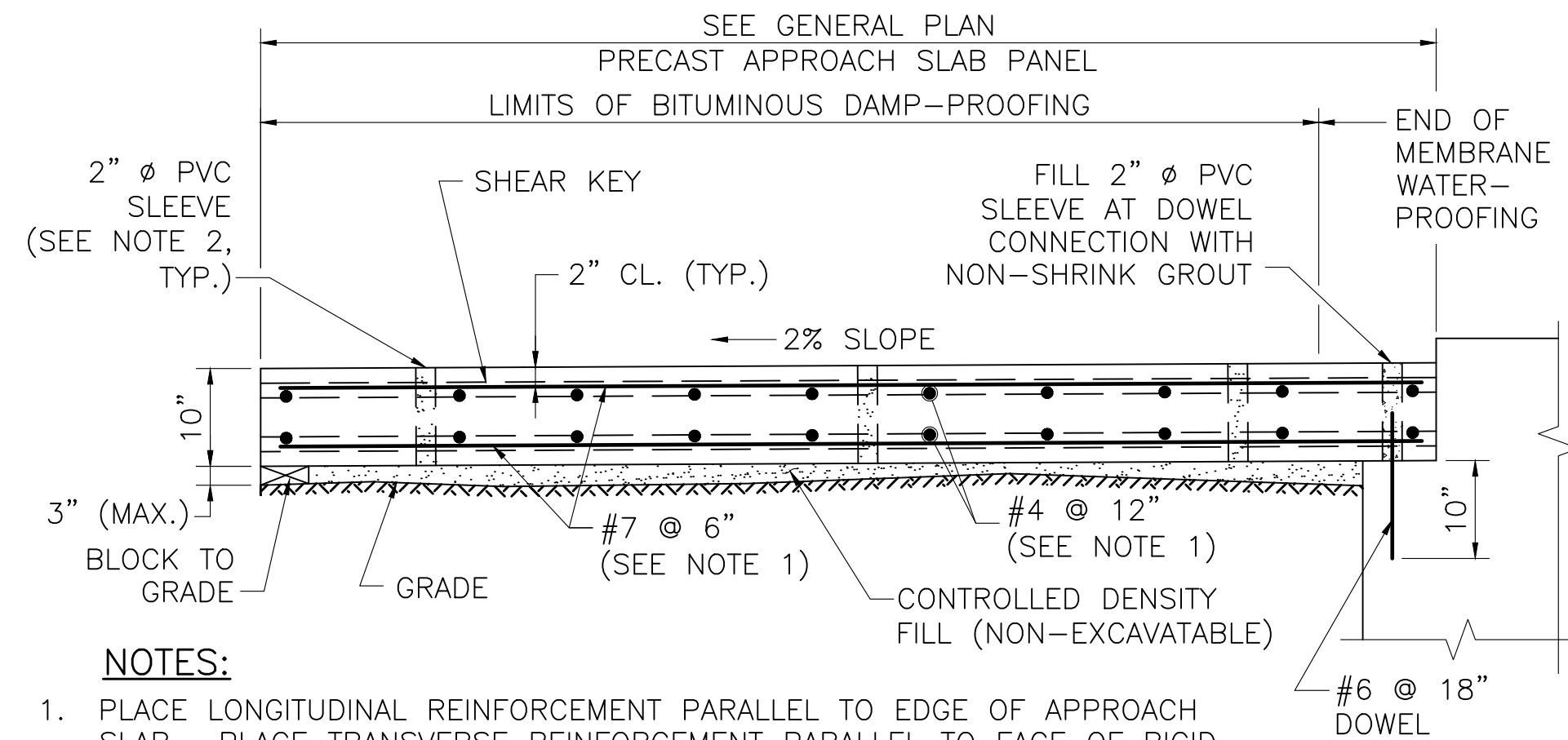


NOTE: CRUSHED STONE FOR BRIDGE FOUNDATIONS SHALL BE ENVELOPED IN NON-WOVEN GEOTEXTILE FABRIC.

PRECAST RIGID FRAME

PRECAST WINGWALL

LIMITS OF GRAVEL BORROW AND CRUSHED STONE
NOT TO SCALE

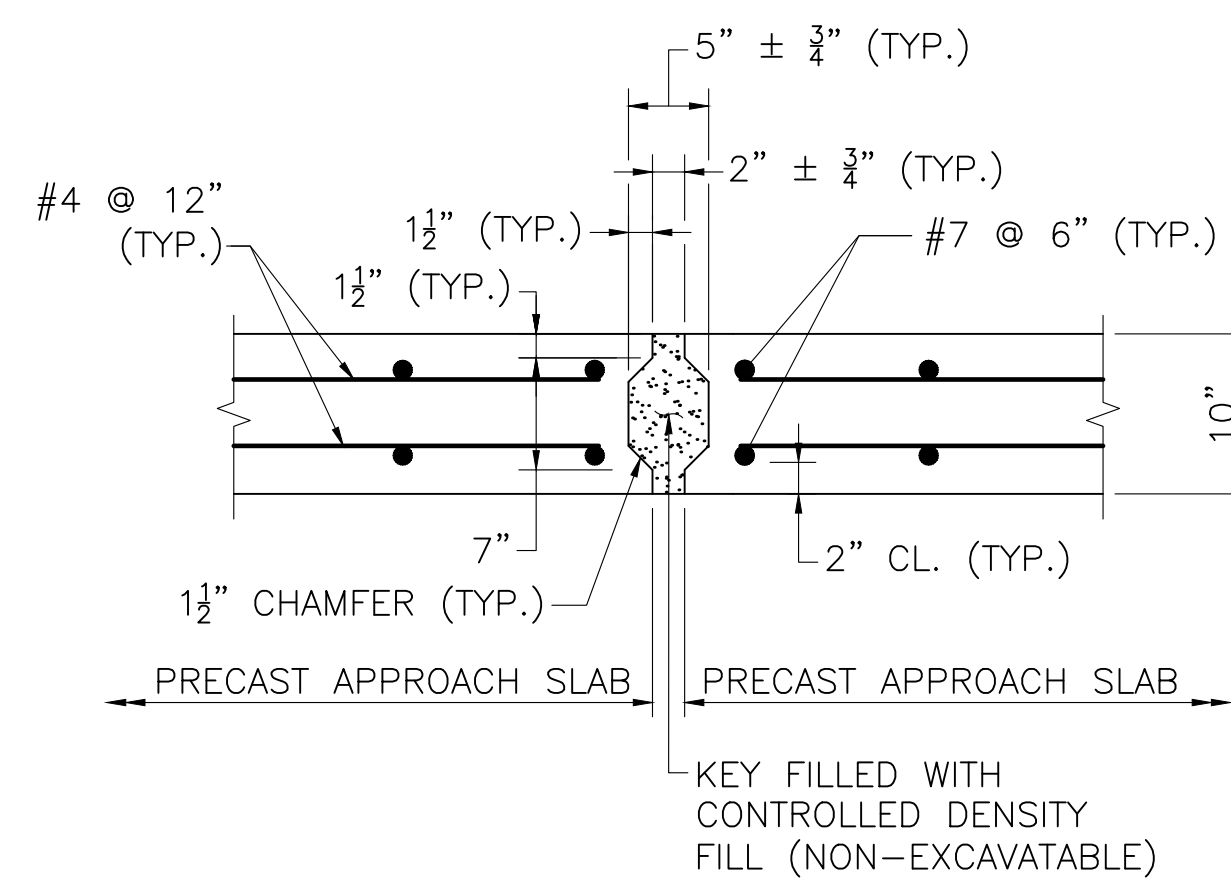


NOTES:

- PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO EDGE OF APPROACH SLAB. PLACE TRANSVERSE REINFORCEMENT PARALLEL TO FACE OF RIGID FRAME.
- PVC SLEEVES TO BE INCLUDED IN PRECAST APPROACH SLABS TO FACILITATE PLACEMENT OF CONTROLLED DENSITY FILL (NON-EXCAVATABLE).

PRECAST APPROACH SLAB

SCALE: 3/4" = 1'-0"

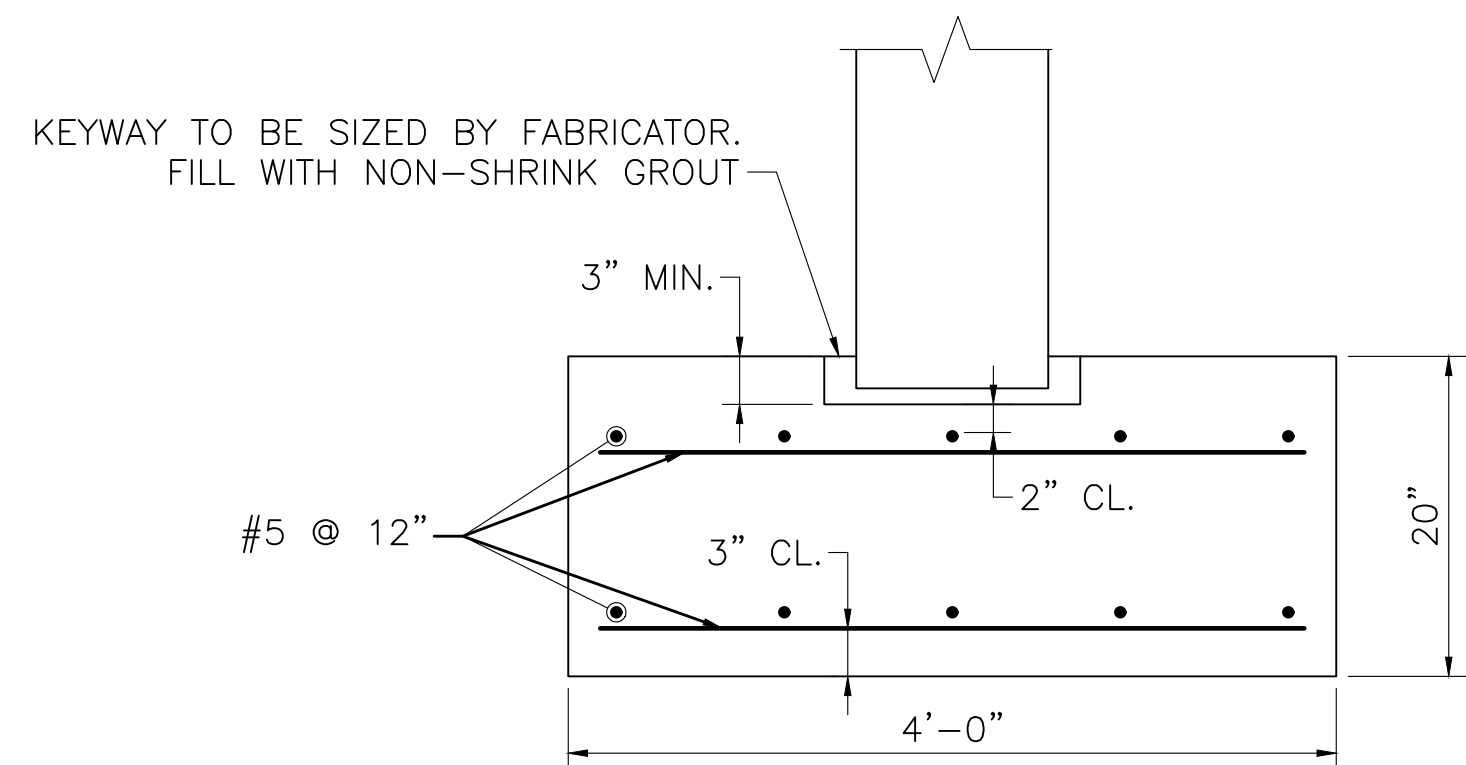


APPROACH SLAB SHEAR KEY DETAIL

SCALE: 3/4" = 1'-0"

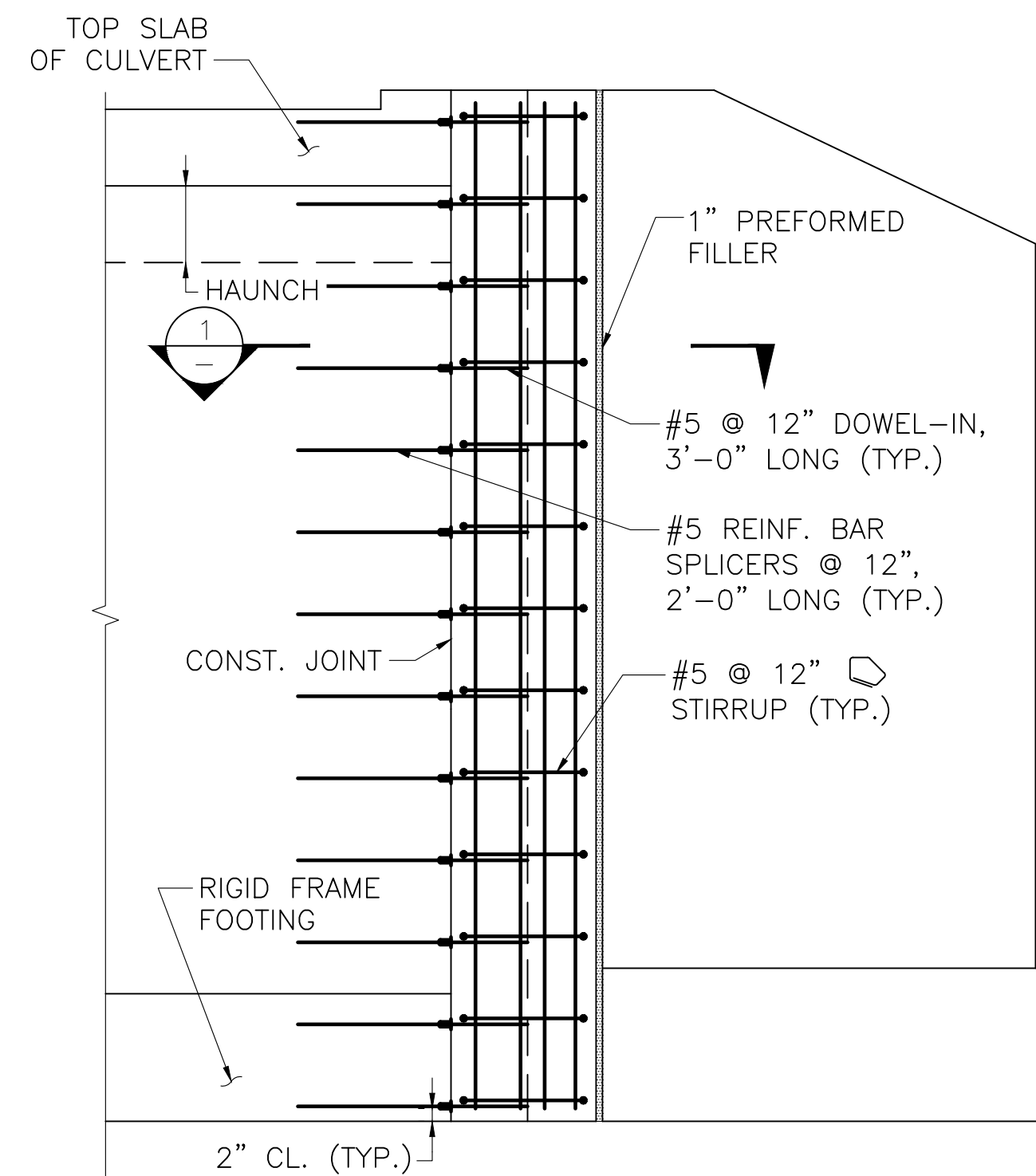
NOTES:

- THE FACTORED BEARING PRESSURE = 6.4 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
- FACTORED BEARING RESISTANCE = 7.0 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.



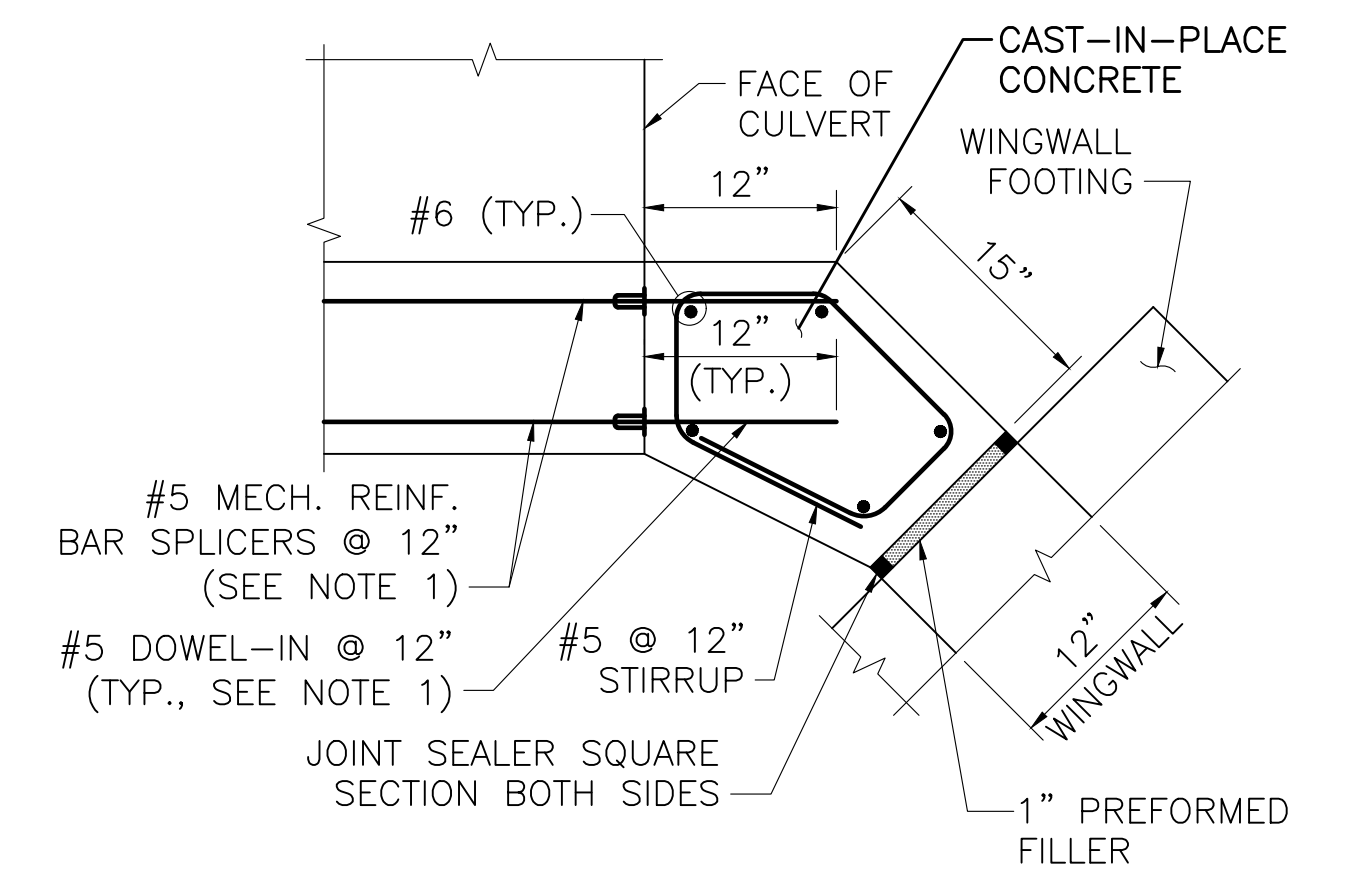
RIGID FRAME STRIP FOOTING DETAIL

SCALE: 1" = 1'-0"



SECTION AT WINGWALL

SCALE: 1/2" = 1'-0"



SECTION 1

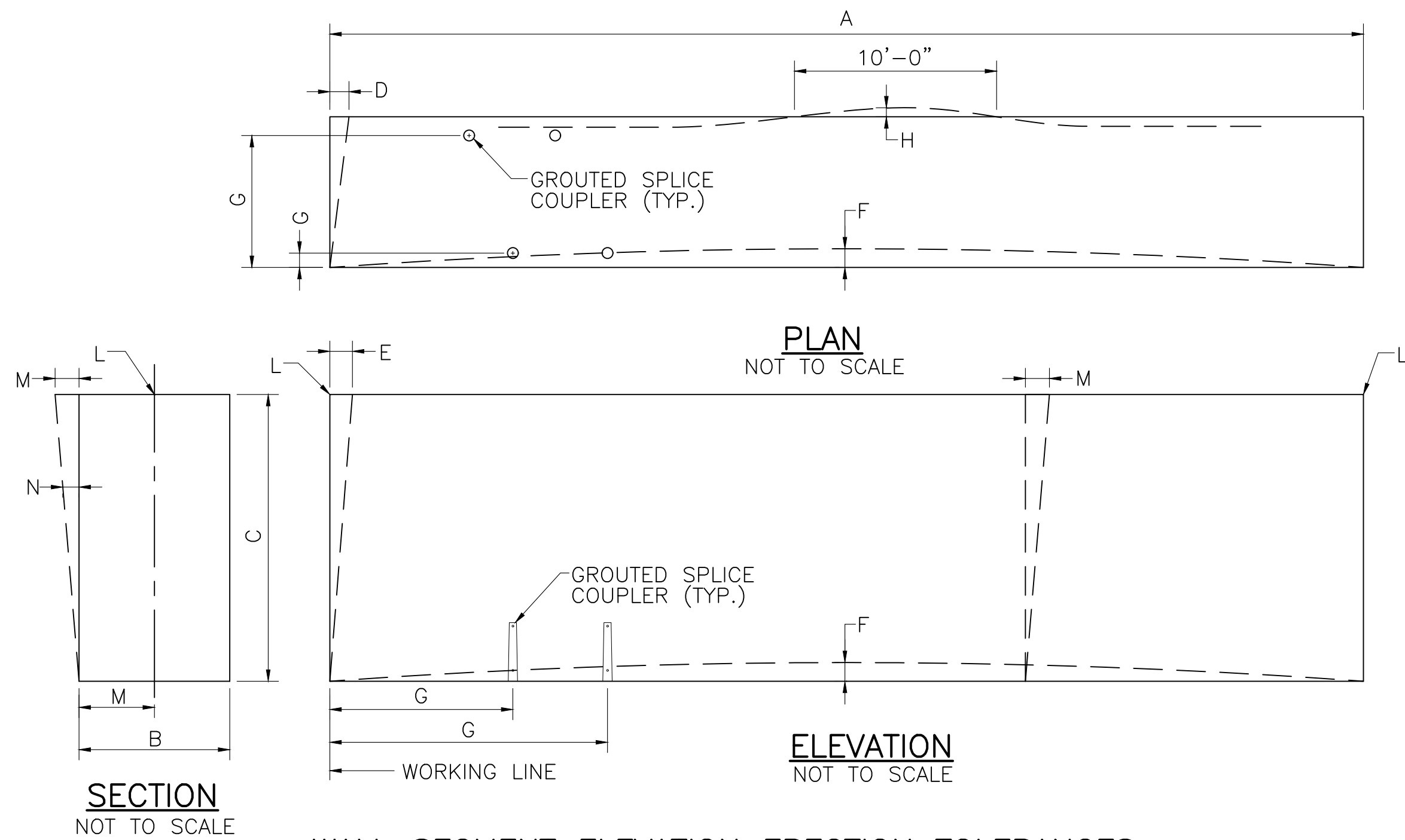
SCALE: 1" = 1'-0"

NOTES:

- THE CONTRACTOR MAY SUBSTITUTE #5 DOWELS, 3'-0" LONG, FOR MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS.
- CULVERT AND WINGWALL REINFORCEMENT IS NOT SHOWN FOR CLARITY.

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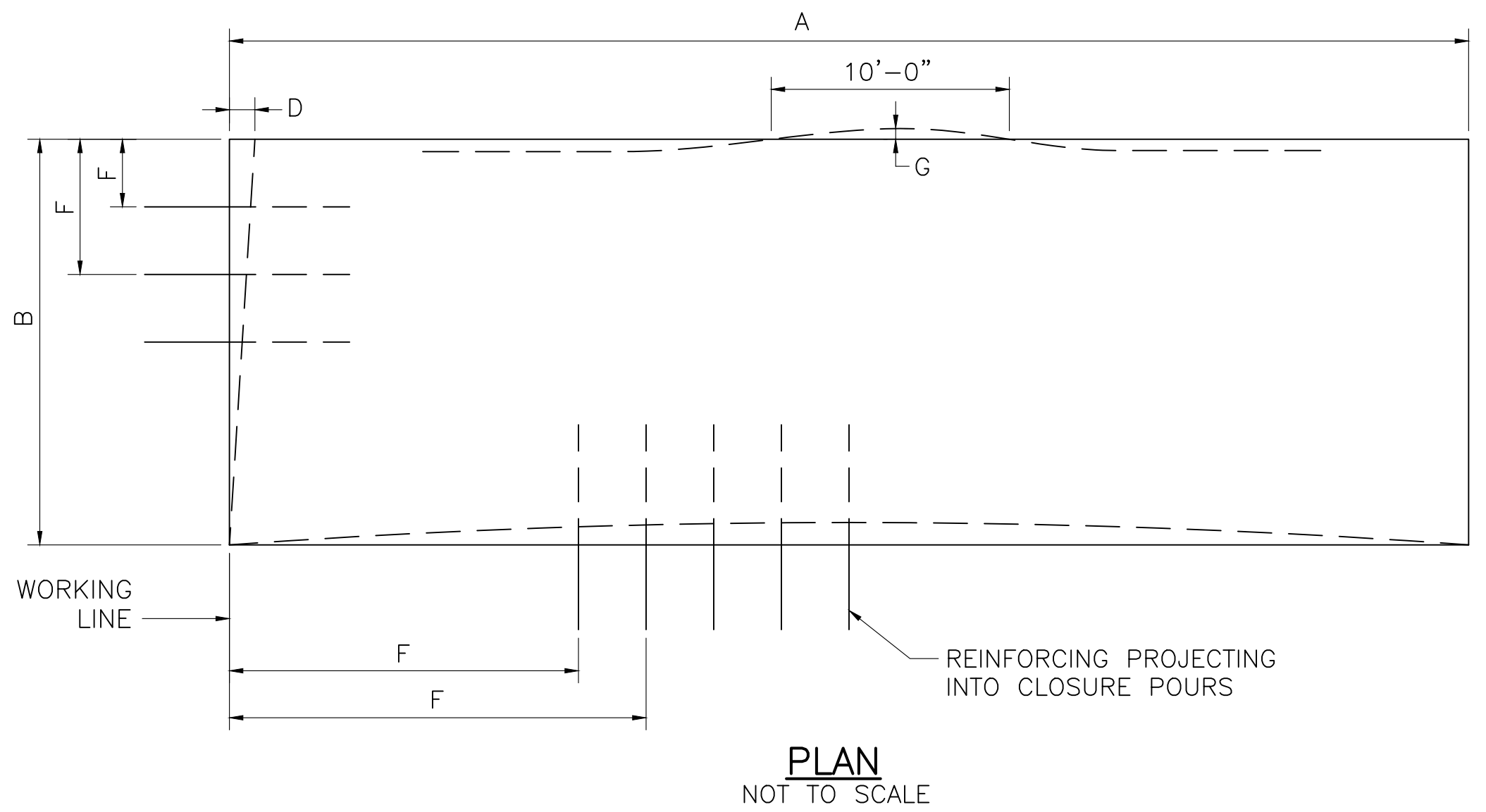


WALL SEGMENT ELEVATION ERECTION TOLERANCES

L	TOP ELEVATION FROM NOMINAL TOP ELEVATION	1/4"
M	MAXIMUM PLUMB VARIATION OVER HEIGHT OF PANEL	1/2"
N	PLUMB IN ANY 10 FEET OF PANEL HEIGHT	1/4"

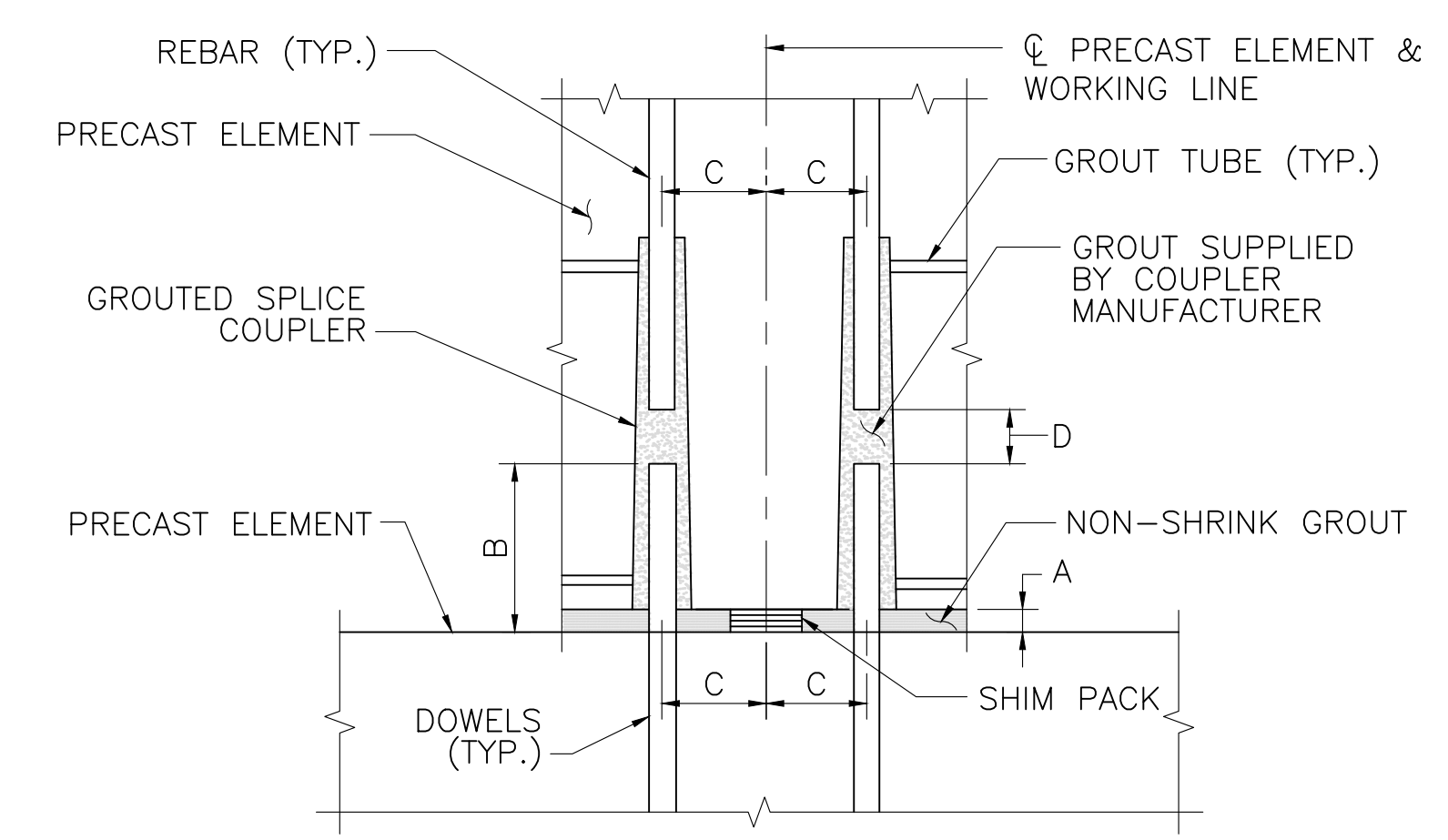
WALL SEGMENT FABRICATION TOLERANCES

A	LENGTH	±1/4"
B	WIDTH (OVERALL)	±1/4"
C	DEPTH (OVERALL)	±1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	±1/2"
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	±1/2"
F	SWEEP OVER MEMBER LENGTH	±3/8"
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A WORKING LINE	±1/4"
H	LOCAL SMOOTHNESS OF ANY SURFACE	±1/4" IN 10 FEET



APPROACH SLAB FABRICATION TOLERANCES

A	LENGTH (OVERALL)	±1/4"
B	WIDTH (OVERALL)	±1/4"
C	DEPTH (OVERALL)	±1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	±1/2"
E	SWEEP OVER MEMBER LENGTH	±3/8"
F	LOCATION OF PROJECTING REINFORCING MEASURED FROM A WORKING LINE	±1/2"
G	LOCAL SMOOTHNESS OF ANY SURFACE	±1/4" IN 10 FEET



NOTES:

- USE MATCHING TEMPLATES FOR THE LOCATION OF REINFORCEMENT AND GROUTED SPLICE COUPLER PLACEMENT WITHIN THE ELEMENTS TO CONTROL THE CRITICAL DIMENSION "C".
- CONSULT MANUFACTURER OF THE GROUTED SPLICE COUPLER FOR PROPER DIMENSIONS "B" AND "D" AND FOR TOLERANCES ON THESE AND ALL DIMENSIONS.
- BEFORE EXECUTING GROUTED SPLICE COUPLER ASSEMBLIES, ALWAYS SEEK INSTALLATION RECOMMENDATIONS FROM THE MANUFACTURER OF THE GROUTED SPLICE COUPLER USED.

GROUTED SPLICE COUPLER DETAILS
NOT TO SCALE

GROUTED SPLICE COUPLER TOLERANCES

A	SHIM PACK HEIGHT	1 1/4" ± 3/4"
B	DOWEL HEIGHT	CONSULT MANUFACTURER
C	LOCATION OF REINFORCING, GROUTED SPLICE COUPLER, AND DOWELS MEASURED FROM A WORKING LINE	±1/4"
D	GAP BETWEEN DOWELS AND REINFORCING	CONSULT MANUFACTURER

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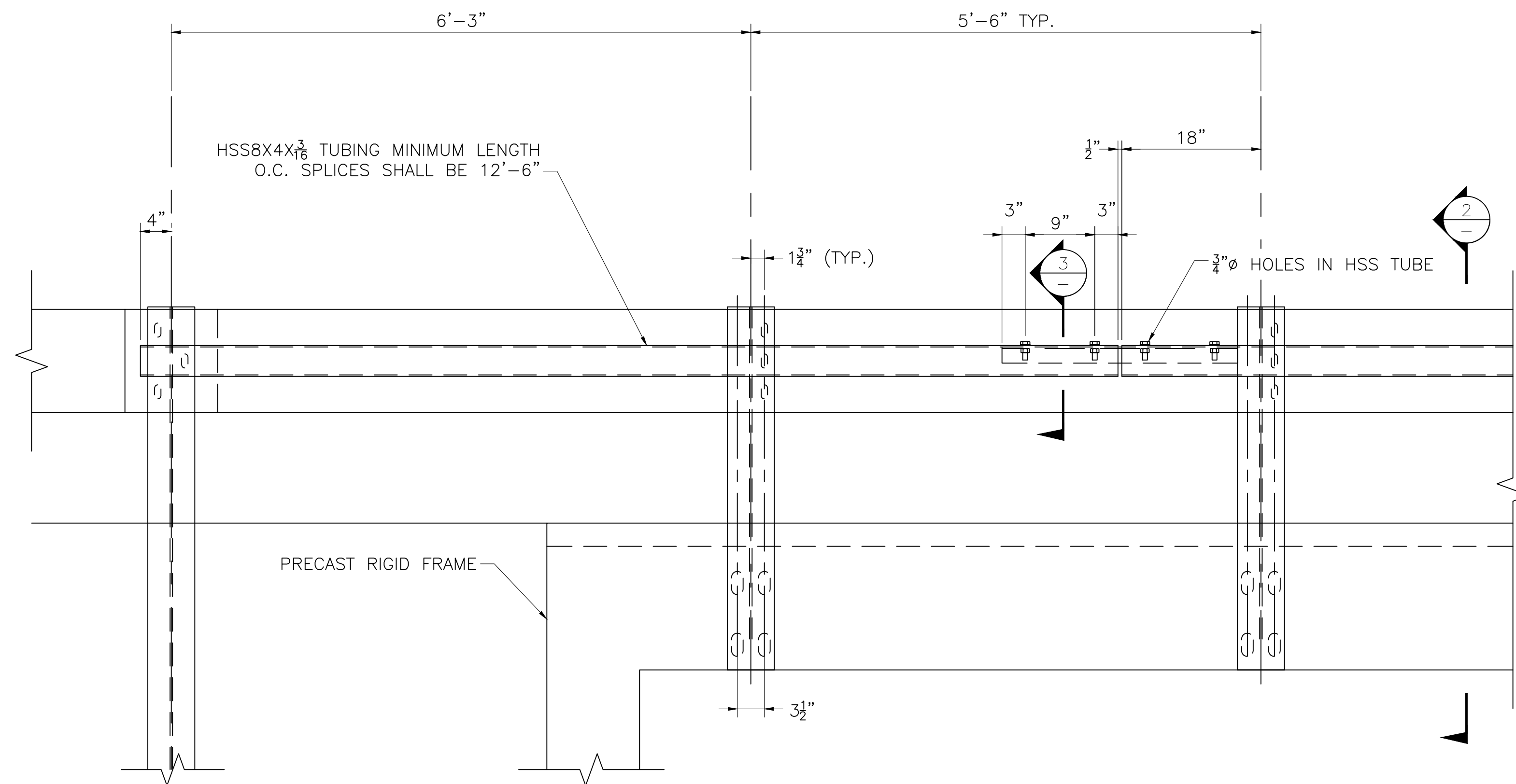
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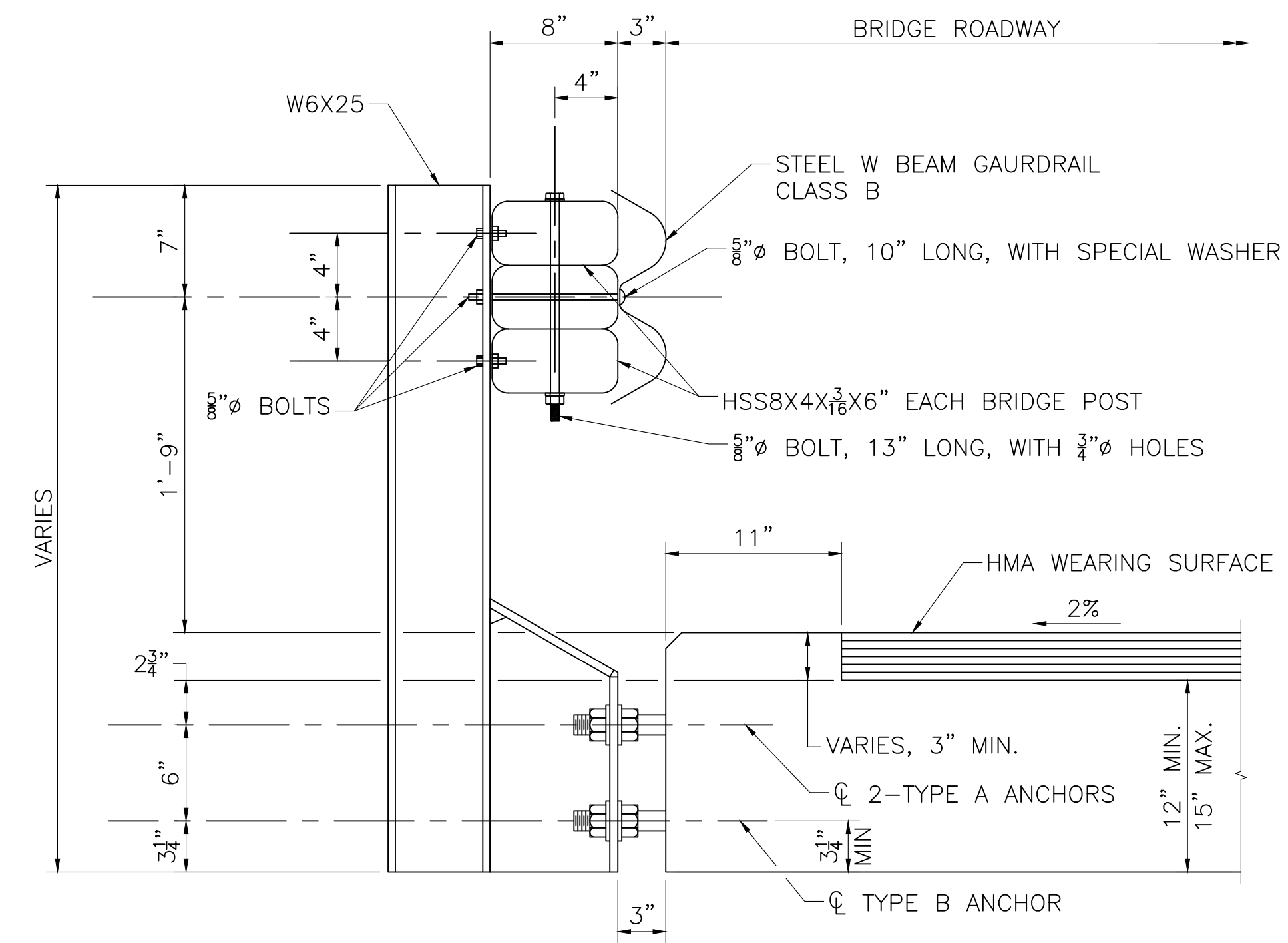
**BUCKLAND
NILMAN ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	10	11
PROJECT FILE NO.		N/A	

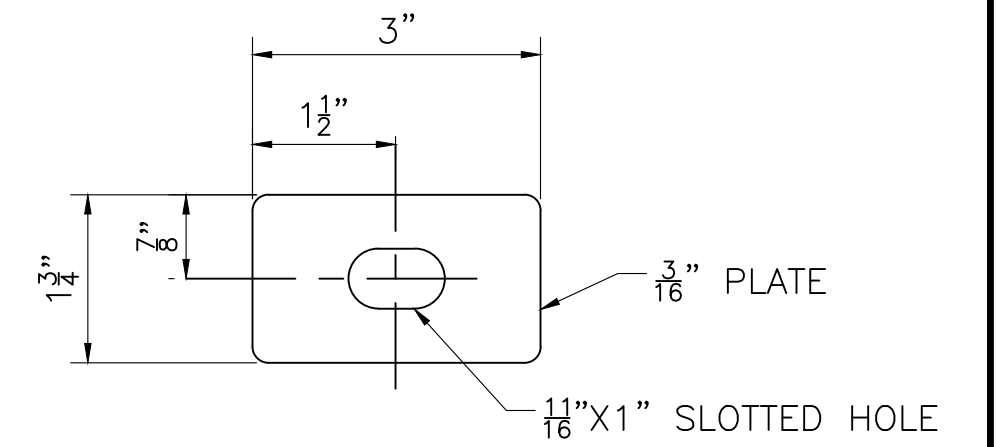
BRIDGE RAIL DETAILS



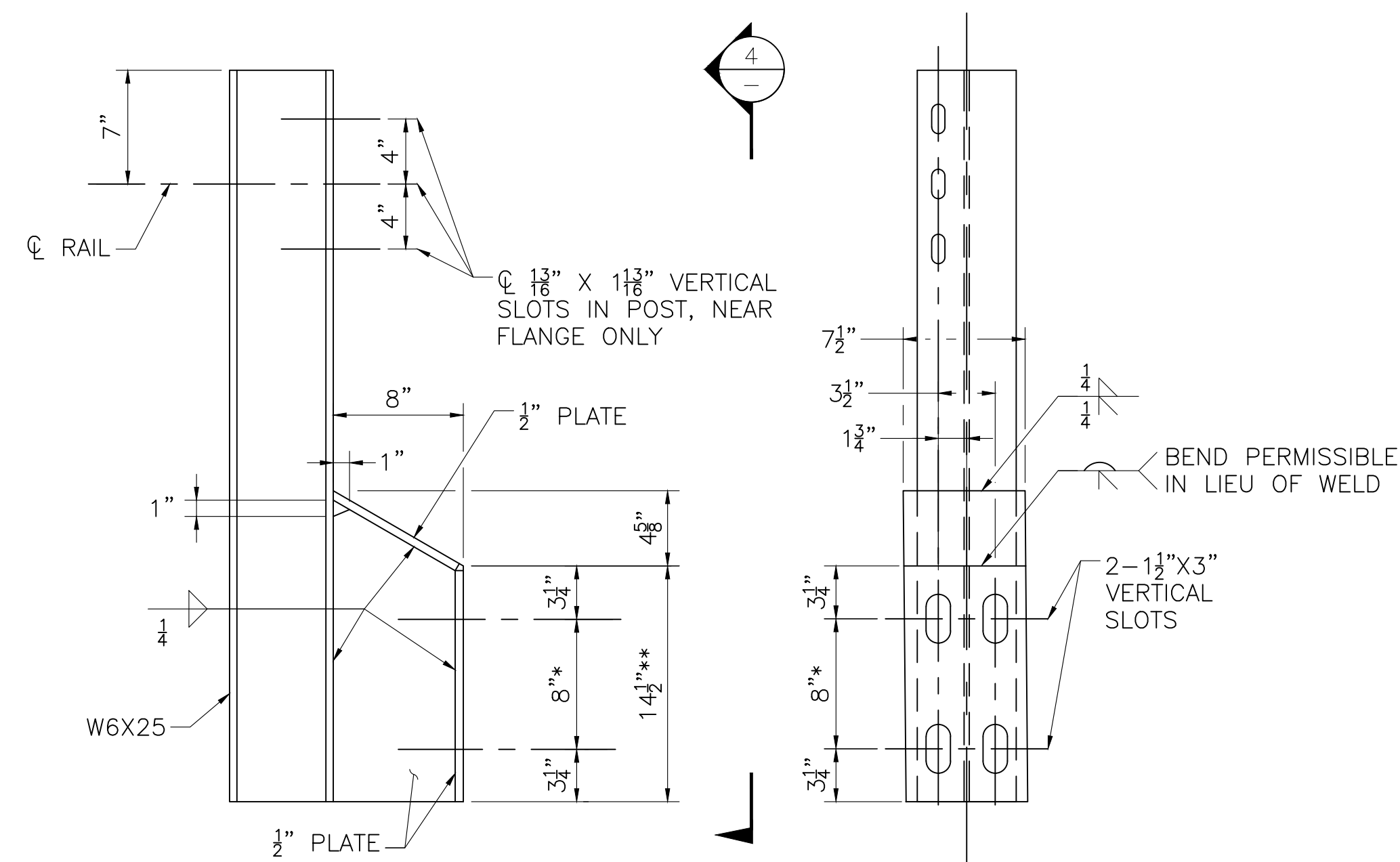
RAILING ELEVATION



SECTION 2

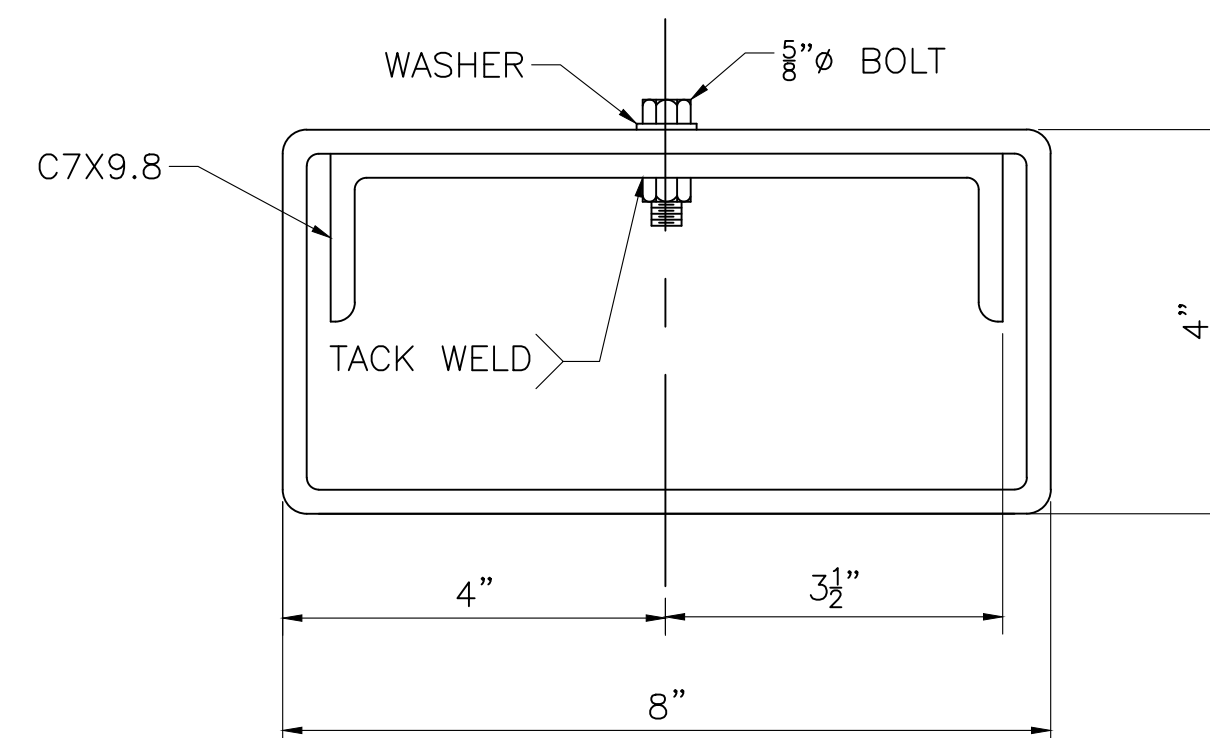


SPECIAL WASHER



POST DETAIL

VIEW 4



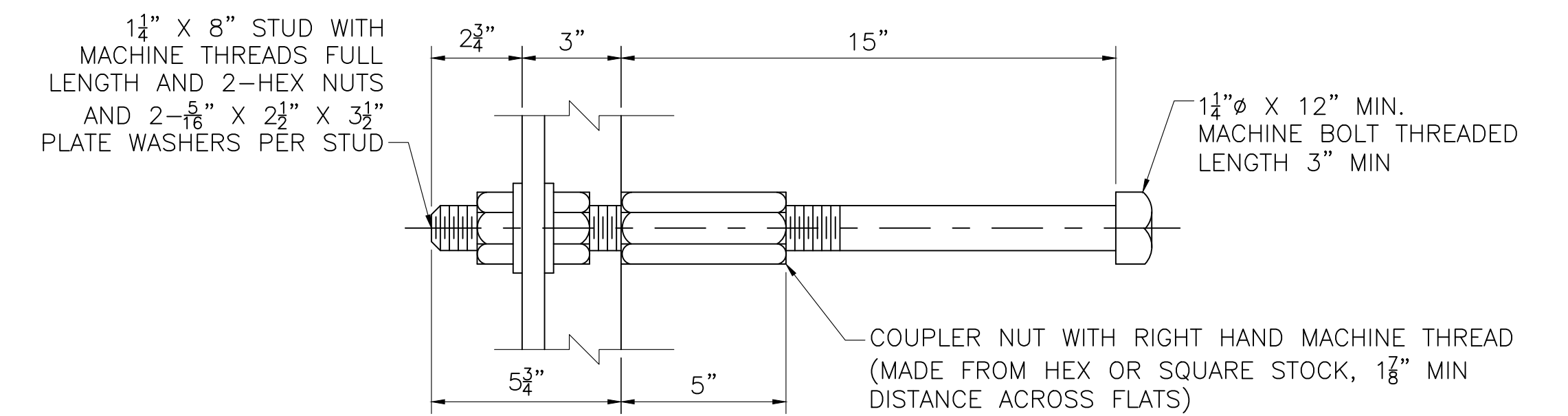
SECTION 3 SPLICE DETAIL

MATERIALS:

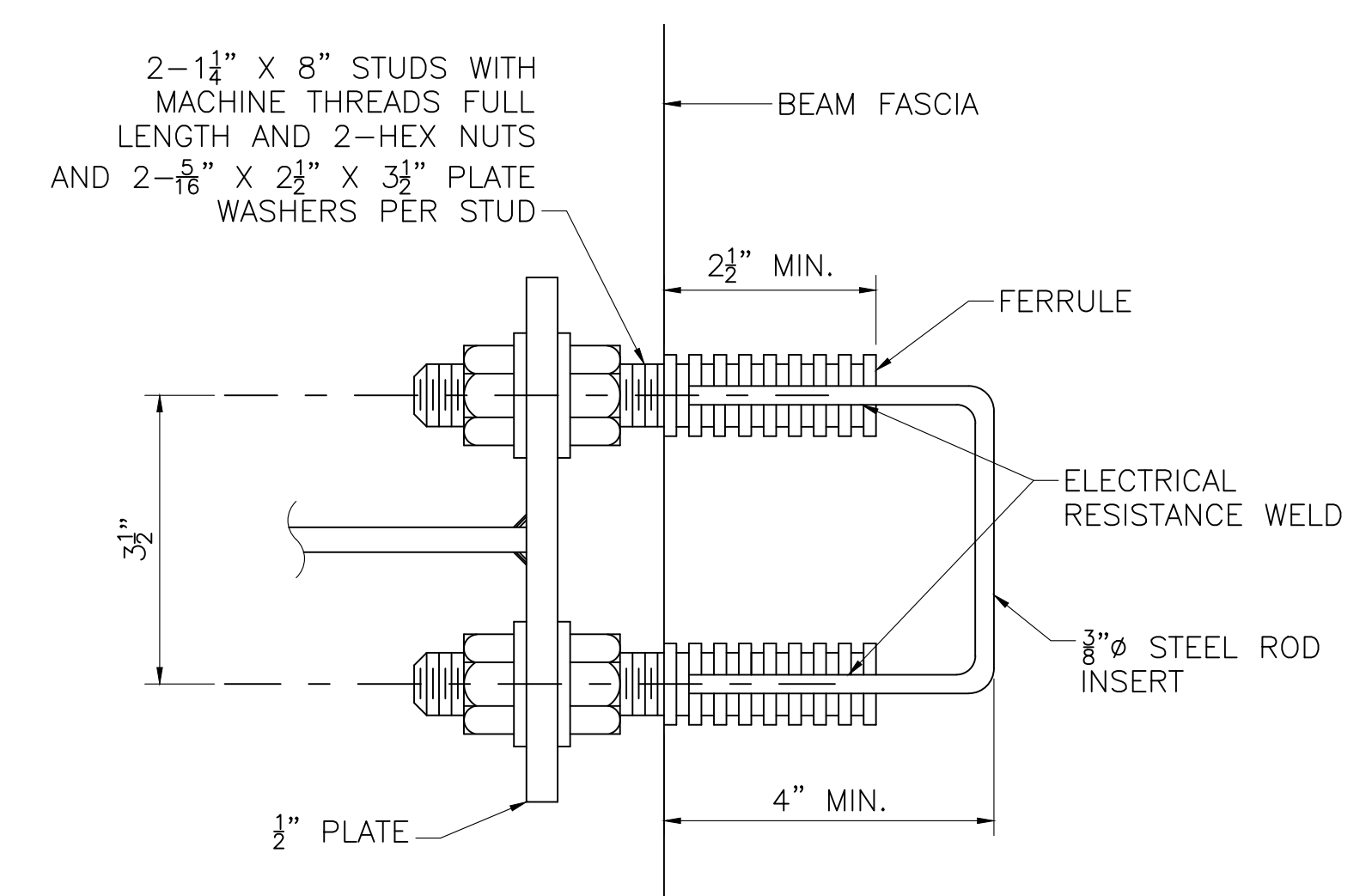
- STRUCTURAL STEEL TUBING _____ ASTM A 500 GRADE B GALVANIZED
- POSTS AND COMPONENTS _____ ASTM A 572 GRADE 50 GALVANIZED
- ANCHOR BOLTS _____ ASTM A 449, TYPE 1 GALVANIZED
- NUTS _____ ASTM A 563 DH GALVANIZED
- WASHERS _____ ASTM F436 GALVANIZED

NOTES:

1. PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/8".
2. ALL POSTS SHALL BE SET NORMAL TO GRADE.
3. SPLICES FOR THE STEEL BEAM GUARDRAIL SHALL LAP IN THE DIRECTION OF TRAFFIC.
4. FOR RADII LESS THAN 950 FEET, HSS8X4 TUBES SHALL BE SHOP BENT TO FIT THE APPLICABLE CURVE.
5. FERRULES SHALL BE I2L14 COLD DRAWN CARBON STEEL.
6. HOLES IN RAIL FOR RAIL TUBE ATTACHMENT MAY BE FIELD DRILLER. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
7. THIS RAILING MEETS THE REQUIREMENTS FOR A TL-2 SERVICE LEVEL.



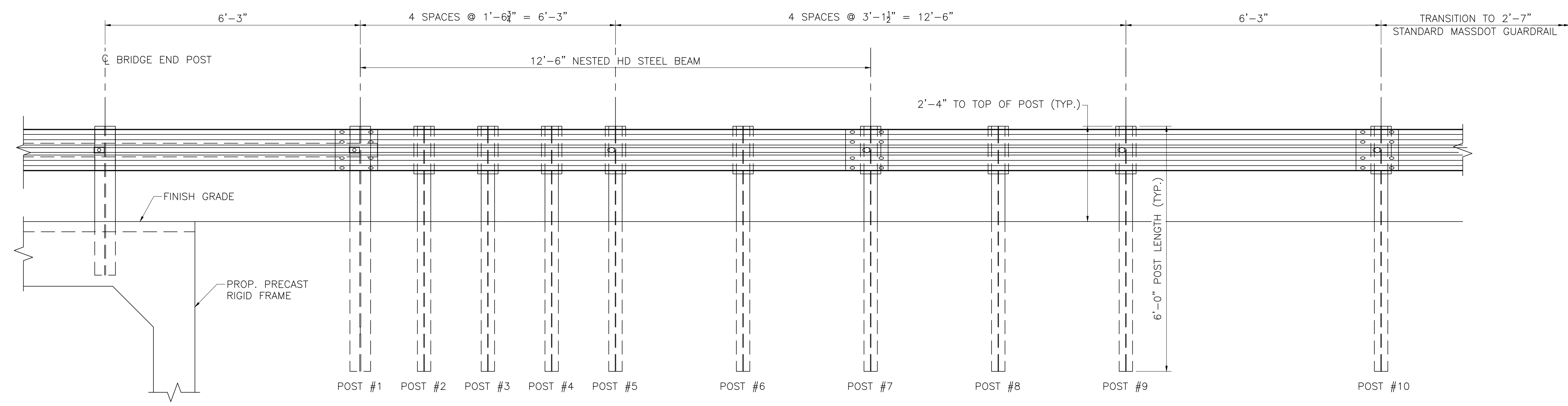
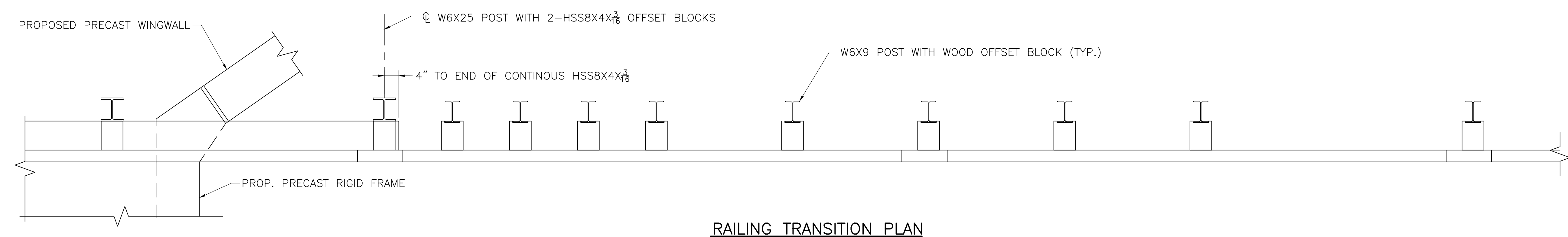
TYPE A ANCHOR DETAIL



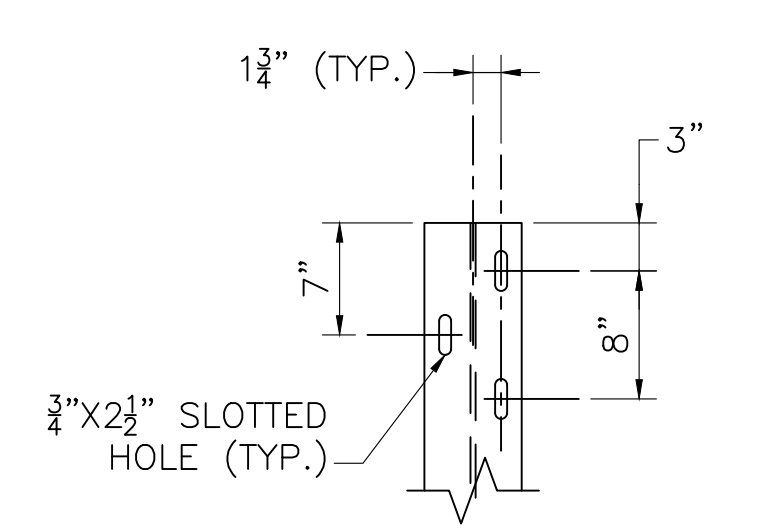
TYPE B ANCHOR DETAIL

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RAILING TRANSITION ELEVATION



POST 1 HOLE DETAIL

NOTES:

1. OFFSET BLOCKS SHALL BE RECESSED WOOD ONLY. STEEL OR PLASTIC OFFSET BLOCKS ARE NOT PERMITTED.
2. GUARDRAIL IS NOT ATTACHED TO POST NUMBERS 2-4, 6 AND 8. THERE SHALL BE NO GAP BETWEEN THE POSTS THAT ARE NOT ATTACHED TO THE RAIL. OFFSET BLOCKS SHALL BE ATTACHED TO POST WITH STANDARD POST BOLT.
3. POST MAY BE SET IN DRILLED HOLES OR DRIVEN TO GRADE.
4. THIS RAILING MEETS THE REQUIREMENTS FOR A NCHRP REPORT 350 TL-3 SERVICE LEVEL.

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