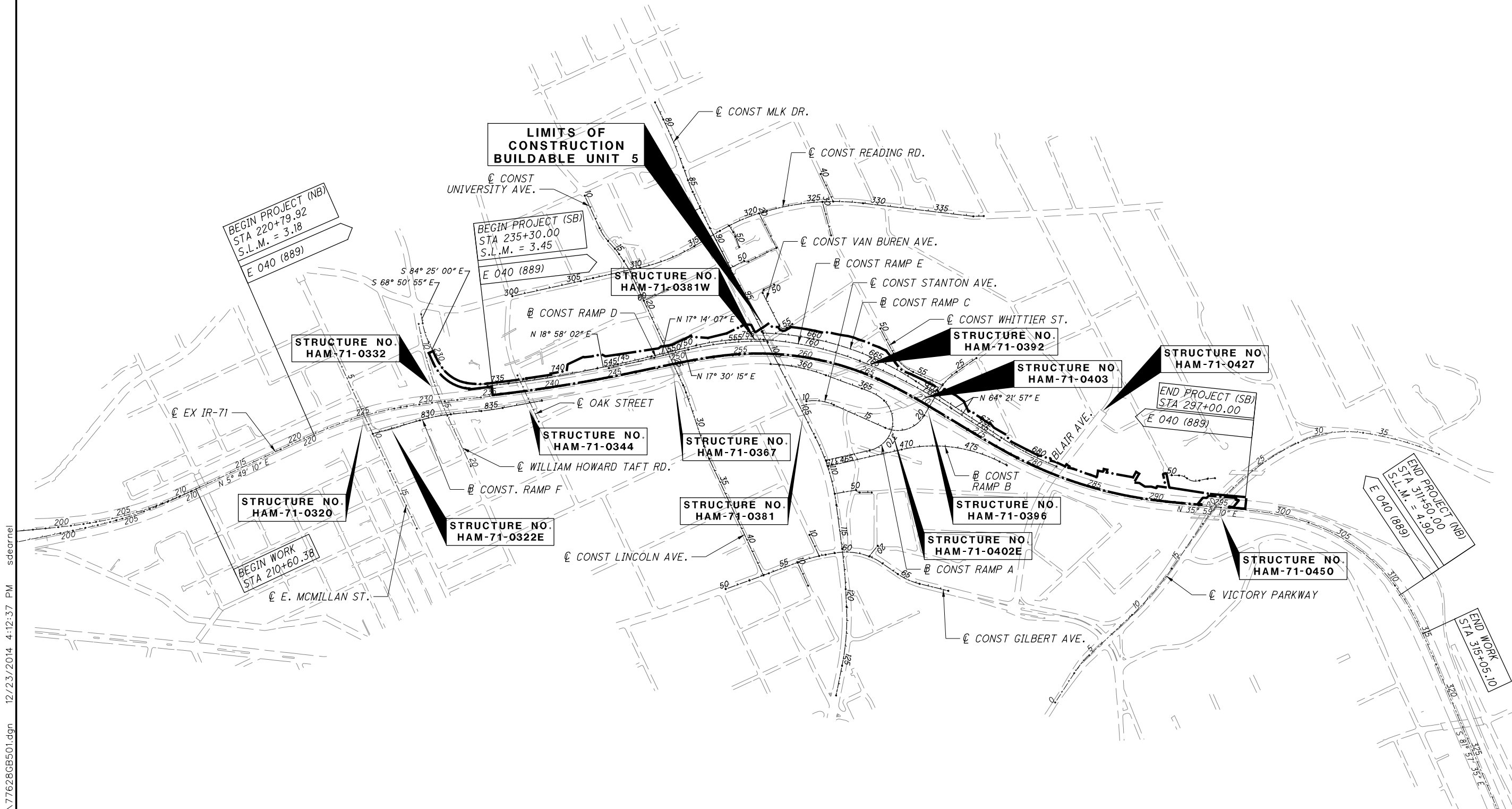


DESIGN BUILD
3/11/14

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0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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BUILDABLE UNIT 5 LOCATION PLAN

2
120

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EX IR-71

<div><div>CURVE DATA NO. 1</div><div>P.I.= Sta. 218+44.39 Δ = 0° 07' 59" (RT) Dc = 0° 07' 59" R = 43,061.55' T = 50.00' L = 100.00' E = 0.03' e_{max} = -0.047 PC Sta. 217+94.39 PCC Sta. 218+94.39</div></div>	<div><div>CURVE DATA NO. 2</div><div>P.I.= Sta. 219+44.40 Δ = 0° 40' 00" (RT) Dc = 0° 40' 00" R = 8,594.37' T = 50.00' L = 100.00' E = 0.15' e_{max} = -0.047 PCC Sta. 218+94.39 PCC Sta. 219+44.40</div></div>	<div><div>CURVE DATA NO. 3</div><div>P.I.= Sta. 220+44.40 Δ = 0° 56' 04" (RT) Dc = 0° 56' 04" R = 6,131.53' T = 50.00' L = 100.00' E = 0.20' e_{max} = -0.047 PCC Sta. 219+94.40 PCC Sta. 220+94.39</div></div>	<div><div>CURVE DATA NO. 7</div><div>P.I.= Sta. 225+19.86 Δ = 9° 00' 00" (RT) Dc = 2° 00' 00" R = 2,864.79' T = 225.46' L = 450.00' E = 8.86' e_{max} = -0.047 PCC Sta. 222+94.39 PCC Sta. 227+44.39</div></div>	<div><div>CURVE DATA NO. 8</div><div>P.I.= Sta. 227+69.39 Δ = 0° 57' 52" (RT) Dc = 1° 55' 44" R = 2,970.40' T = 25.00' L = 50.00' E = 0.11' e_{max} = -0.047 PCC Sta. 227+44.39 PCC Sta. 227+94.39</div></div>	<div><div>CURVE DATA NO. 9</div><div>P.I.= Sta. 228+19.39 Δ = 0° 50' 14" (RT) Dc = 1° 40' 28" R = 3,421.78' T = 25.00' L = 50.00' E = 0.09' e_{max} = -0.043 PCC Sta. 227+94.39 PCC Sta. 228+44.39</div></div>	<div><div>CURVE DATA NO. 20</div><div>P.I.= Sta. 260+28.03 Δ = 26° 40' 00" (RT) Dc = 2° 30' 00" R = 2,291.83' T = 543.17' L = 1,066.67' E = 63.49' e_{max} = -0.059 PCC Sta. 254+84.86 PCC Sta. 265+51.53</div></div>	<div><div>CURVE DATA NO. 21</div><div>P.I.= Sta. 265+76.53 Δ = 1° 12' 24" (RT) Dc = 2° 24' 48" R = 2,374.13' T = 25.00' L = 50.00' E = 0.13' e_{max} = -0.059 PCC Sta. 265+51.53 PCC Sta. 266+01.53</div></div>	<div><div>CURVE DATA NO. 22</div><div>P.I.= Sta. 266+76.55 Δ = 3° 10' 00" (RT) Dc = 2° 06' 40" R = 2,714.01' T = 75.02' L = 150.00' E = 1.04' e_{max} = -0.056 PCC Sta. 266+01.53 PCC Sta. 267+51.53</div></div>	<div><div>CURVE DATA NO. 23</div><div>P.I.= Sta. 268+26.53 Δ = 2° 01' 21" (RT) Dc = 1° 20' 54" R = 4,249.38' T = 75.01' L = 150.00' E = 0.66' e_{max} = -0.046 PCC Sta. 267+51.53 PCC Sta. 269+01.53</div></div>
<div><div>CURVE DATA NO. 4</div><div>P.I.= Sta. 221+44.40 Δ = 1° 27' 51" (RT) Dc = 1° 27' 51" R = 3,913.20' T = 50.00' L = 100.00' E = 0.32' e_{max} = -0.047 PCC Sta. 220+94.39 PCC Sta. 221+94.39</div></div>	<div><div>CURVE DATA NO. 5</div><div>P.I.= Sta. 222+19.39 Δ = 0° 50' 14" (RT) Dc = 1° 40' 28" R = 3,421.78' T = 25.00' L = 50.00' E = 0.09' e_{max} = -0.047 PCC Sta. 221+94.39 PCC Sta. 222+44.39</div></div>	<div><div>CURVE DATA NO. 6</div><div>P.I.= Sta. 222+69.40 Δ = 0° 57' 52" (RT) Dc = 1° 55' 44" R = 2,970.40' T = 25.00' L = 50.00' E = 0.11' e_{max} = -0.047 PCC Sta. 222+44.39 PCC Sta. 222+94.39</div></div>	<div><div>CURVE DATA NO. 10</div><div>P.I.= Sta. 228+94.39 Δ = 1° 27' 51" (RT) Dc = 1° 27' 51" R = 3,913.20' T = 50.00' L = 100.00' E = 0.32' e_{max} = -0.039 PCC Sta. 228+44.39 PCC Sta. 229+44.39</div></div>	<div><div>CURVE DATA NO. 11</div><div>P.I.= Sta. 229+94.39 Δ = 0° 56' 04" (RT) Dc = 0° 56' 04" R = 6,131.53' T = 50.00' L = 100.00' E = 0.20' e_{max} = -0.031 PCC Sta. 229+44.39 PCC Sta. 230+44.39</div></div>	<div><div>CURVE DATA NO. 12</div><div>P.I.= Sta. 230+94.39 Δ = 0° 40' 00" (RT) Dc = 0° 40' 00" R = 8,594.37' T = 50.00' L = 100.00' E = 0.15' e_{max} = -0.024 PCC Sta. 230+44.39 PCC Sta. 231+44.39</div></div>	<div><div>CURVE DATA NO. 24</div><div>P.I.= Sta. 269+76.53 Δ = 1° 26' 24" (RT) Dc = 0° 57' 36" R = 5,968.31' T = 75.00' L = 150.00' E = 0.47' e_{max} = -0.036 PCC Sta. 269+01.53 PCC Sta. 270+51.53</div></div>	<div><div>CURVE DATA NO. 25</div><div>P.I.= Sta. 271+26.53 Δ = 0° 17' 21" (RT) Dc = 0° 11' 34" R = 29,721.15' T = 75.00' L = 150.00' E = 0.09' e_{max} = -0.026 PCC Sta. 270+51.53 PT Sta. 272+01.53</div></div>	<div><div>CURVE DATA NO. 26</div><div>P.I.= Sta. 283+85.85 Δ = 26° 00' 00" (LT) Dc = 1° 45' 00" R = 3,274.04' Ls = 450.00' f s = 3° 56' 15" LT = 300.07' ST = 150.07' x = 449.79' y = 10.30' k = 224.96' p = 2.58' D c = 18° 07' 30" (LT) Lc = 1,035.71' Ts = 981.43' Es = 88.77' e_{max} = 0.042 TS Sta. 274+04.38 SC Sta. 278+54.38 CS Sta. 288+90.09 ST Sta. 293+40.09</div></div>	<div><div>CURVE DATA NO. 27</div><div>P.I.= Sta. 307+34.78 Δ = 62° 03' 15" (RT) Dc = 4° 00' 00" R = 1,432.39' Ls = 700.00' f s = 14° 00' 00" LT = 468.13' ST = 234.67' x = 695.83' y = 56.77' k = 349.30' p = 14.22' D c = 34° 03' 15" (RT) Lc = 851.35' Ts = 1,219.45' Es = 255.76' e_{max} = -0.083 TS Sta. 295+15.29 SC Sta. 302+15.29 CS Sta. 310+66.65 ST Sta. 317+66.65</div></div>
<div><div>CURVE DATA NO. 13</div><div>P.I.= Sta. 231+94.39 Δ = 0° 07' 59" (RT) Dc = 0° 07' 59" R = 43,061.55' T = 50.00' L = 100.00' E = 0.03' e_{max} = NC PCC Sta. 231+44.39 PT Sta. 232+44.39</div></div>	<div><div>CURVE DATA NO. 14</div><div>P.I.= Sta. 240+45.89 Δ = 5° 45' 00" (LT) Dc = 0° 28' 00" R = 12,277.67' T = 616.59' L = 1,232.14' E = 15.47' e_{max} = NC PC Sta. 234+29.30 PT Sta. 246+61.44</div></div>	<div><div>CURVE DATA NO. 15</div><div>P.I.= Sta. 249+09.86 Δ = 0° 17' 21" (RT) Dc = 0° 11' 34" R = 29,721.15' T = 75.00' L = 150.00' E = 0.09' e_{max} = -0.026 PCC Sta. 248+34.86 PCC Sta. 249+84.86</div></div>	<div><div>CURVE DATA NO. 16</div><div>P.I.= Sta. 250+59.86 Δ = 1° 26' 24" (RT) Dc = 0° 57' 36" R = 5,968.31' T = 75.00' L = 150.00' E = 0.47' e_{max} = -0.036 PCC Sta. 249+84.86 PCC Sta. 251+34.86</div></div>	<div><div>CURVE DATA NO. 17</div><div>P.I.= Sta. 252+09.87 Δ = 2° 01' 21" (RT) Dc = 1° 20' 54" R = 4,249.38' T = 75.01' L = 150.00' E = 0.66' e_{max} = -0.046 PCC Sta. 251+34.86 PCC Sta. 252+84.86</div></div>	<div><div>CURVE DATA NO. 18</div><div>P.I.= Sta. 253+59.88 Δ = 3° 10' 00" (RT) Dc = 2° 06' 40" R = 2,714.01' T = 75.02' L = 150.00' E = 1.04' e_{max} = -0.056 PCC Sta. 252+84.86 PCC Sta. 254+34.86</div></div>				
<div><div>CURVE DATA NO. 19</div><div>P.I.= Sta. 254+59.87 Δ = 1° 12' 24" (RT) Dc = 2° 24' 48" R = 2,374.13' T = 25.00' L = 50.00' E = 0.13' e_{max} = -0.059 PCC Sta. 254+34.86 PCC Sta. 254+84.86</div></div>									

RAMP C

<div><div>CURVE DATA NO. 31</div><div>P.I. Sta. 662+56.18 Δ = 31° 47' 38" (RT) Dc = 2° 29' 59" R = 2,292.00' T = 652.76' L = 1,271.85' E = 91.14' e_{max} = .040 PC Sta. 656+03.42 PT Sta. 668+75.27 DESIGN SSD = 360' MIN SSD = 604.91'</div></div>	<div><div>CURVE DATA NO. 32</div><div>P.I. Sta. 679+24.66 Δ = 11° 48' 23" (LT) Dc = 2° 25' 00" R = 2,370.86' T = 245.14' L = 488.54' E = 12.64' e_{max} = .039 PC Sta. 676+79.52 PT Sta. 681+68.06 DESIGN SSD = 425' MIN SSD = 551.84'</div></div>
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RAMP D

<div><div>CURVE DATA NO. 33</div><div>P.I. Sta. 546+43.53 Δ = 1° 20' 35" (LT) Dc = 0° 22' 03" R = 15,594.83' T = 182.80' L = 365.58' E = 1.07' e_{max} = N.C. PC Sta. 544+60.73 PT Sta. 548+26.31 DESIGN SSD = 360' MIN SSD = 1424.23'</div></div>	<div><div>CURVE DATA NO. 34</div><div>P.I. Sta. 554+16.92 Δ = 15° 00' 48" (RT) Dc = 2° 23' 50" R = 2,390.00' T = 314.94' L = 626.26' E = 20.66' e_{max} = .038 PC Sta. 551+01.98 PT Sta. 557+28.25 DESIGN SSD = 200' MIN SSD = 478.36'</div></div>
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RAMP E

<div><div>CURVE DATA NO. 35</div><div>P.I. Sta. 739+42.59 Δ = 4° 49' 55" (LT) Dc = 0° 40' 56" R = 8,400.00' T = 354.42' L = 708.42' E = 7.47' e_{max} = N.C. PC Sta. 735+88.18 PT Sta. 742+96.59 DESIGN SSD = 425' MIN SSD = 897.72'</div></div>	<div><div>CURVE DATA NO. 36</div><div>P.I. Sta. 745+96.39 Δ = 1° 43' 55" (LT) Dc = 0° 38' 12" R = 9,000.00' T = 136.04' L = 272.05' E = 1.03' e_{max} =N.C. PC Sta. 744+60.35 PT Sta. 747+32.40 DESIGN SSD = 425' MIN SSD = 929.24'</div></div>	<div><div>CURVE DATA NO. 37</div><div>P.I. Sta. 753+60.53 Δ = 17° 28' 46" (RT) Dc = 3° 16' 27" R = 1,750.00' T = 269.03' L = 533.88' E = 20.56' e_{max} = 0.047 PC Sta. 750+91.50 PCC Sta. 756+25.38 DESIGN SSD = 425' MIN SSD = 468.02'*</div></div>
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CURVE DATA NO. 38

<div><div>P.I. Sta. 760+17.48 Δ = 17° 30' 22" (RT) Dc = 2° 14' 59" R = 2,546.67' T = 392.11' L = 778.10' E = 30.01' e_{max} = 0.038 PCC Sta. 756+25.38 Pcc Sta. 764+03.48 DESIGN SSD = 425' MIN SSD = 468.02*</div></div>

CURVE DATA NO. 39

<div><div>P.I. Sta. 768+09.86 Δ = 12° 08' 42" (RT) Dc = 1° 30' 00" R = 3,820.00' T = 406.38' L = 809.72' E = 21.56' e_{max} = 0.028 PCC Sta. 764+03.48 PT Sta. 772+13.20 DESIGN SSD = 425' MIN SSD = 606.32'</div></div>
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EX RAMP TH

<div><div>CURVE DATA NO. 42</div><div>P.I. Sta. 228+00.85 Δ = 15° 34' 05" (LT) Dc = 10° 00' 00" R = 572.96' T = 78.32' L = 155.68' E = 5.33' e_{max} = 0.049 PC Sta. 227+22.53 PT Sta. 228+78.21</div></div>	<div><div>CURVE DATA NO. 43</div><div>P.I. Sta. 230+53.04 Δ = 9° 56' 41" (LT) Dc = 10° 00' 00" R = 572.96' T = 49.85' L = 99.45' E = 2.16' e_{max} = 0.049 PC Sta. 230+03.19 PCC Sta. 231+02.64</div></div>
<div><div>CURVE DATA NO. 44</div><div>P.I. Sta. 232+26.49 Δ = 44° 51' 54" (LT) Dc = 19° 05' 54" R = 300.00' T = 123.85' L = 234.91' E = 24.56' e_{max} = 0.049 PCC Sta. 231+02.64 PCC Sta. 233+37.55</div></div>	<div><div>CURVE DATA NO. 45</div><div>P.I. Sta. 234+19.32 Δ = 16° 14' 40" (LT) Dc = 10° 00' 00" R = 572.95' T = 81.77' L = 162.44' E = 5.81' e_{max} = 0.049 PCC Sta. 233+37.55 PT Sta. 235+00.00</div></div>

* SSD CALCULATED GRAPHICALLY FOR CURVES 37 AND 38
MINIMUM CLEARANCE AT MOMENT SLAB BARRIER AT STATION 757+01.98
** SSD CHECKED IN PROFILE GRAPHICALLY FOR CURVES 29
SIGHT LINE CLEARS TOP OF GUARDRAIL ON INSIDE OF CURVE

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UTILITIES

LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

ELECTRIC:

DUKE ENERGY
1000 MAIN ST. # 1000
CINCINNATI, OH 45202
PHONE: (513) 287-1416
DAVE BOSSE

FOR DISTRIBUTION
139 E. 4TH STREET, ROOM 467A
CINCINNATI, OH 45202
PHONE: (513) 287-3674 MOBILE: (513)-479-1886
AARON WRIGHT

FOR TRANSMISSION
139 E. 4TH STREET, ROOM 552A
CINCINNATI, OH 45202
PHONE: (513) 287-5791
MARK HELTZER

WATER:

GREATER CINCINNATI WATER WORKS
1600 GEST STREET
CINCINNATI, OH 45204
PHONE: (513) 557-5799
JON HUNSEDER

SANITARY SEWER:

METROPOLITAN SEWER DISTRICT
OF GREATER CINCINNATI
1600 GEST ST.
CINCINNATI, OH 45204
PHONE: (513) 557-7188
ROB FRANKLIN

FOR STORMWATER MANAGEMENT UTILITY
PHONE: (513) 244-1393
ANDREW STORER

PHONE: (513) 224-3904
CHERI BUSH

TELECOM:

DUKE ENERGY (TELECOM)
139 E. 4TH STREET
CINCINNATI, OH 45202
PHONE: (513) 287-2606
CHRIS GEE

MCI/VERIZON
120 RAVINE STREET
AKRON, OH 44303
PHONE: (330) 253-8267
ALLAN GUEST

CITY OF CINCINNATI-COMMUNICATION TECHNOLOGY SYSTEMS
PHONE: (513) 352-5350
EDDIE SELLON

FIBERTECH NETWORKS
10188 INTERNATIONAL BLVD.
CINCINNATI, OH,45246
PHONE: (585) 743-1775 MOBILE: (585)-626-8304
TIM TAYLOR

AT&T
591 SUNBURY RD.
DELAWARE, OH 43015
PHONE: (770) 316-5309
BILL HARKNESS

WINDSTREAM (FORMERLY KDL)
344 GEST ST.
CINCINNATI, OH 45203
PHONE: (330) 650-7663
DOUGLAS H. NELISSE

PHONE: (937) 725-5358
LEON TAYLOR

CINCINNATI BELL TELEPHONE
201 EAST FORTH STREET
CINCINNATI, OH 45202
PHONE: (513) 565-7043
MARK CONNER

PHONE: (513) 397-6541
MIKE WALLACE

PHONE: (513) 565-7163
TIM SEESTEDT

CABLE

TIME WARNER CABLE
SOUTHWEST OHIO
11252 CORNELL PARK DR.
CINCINNATI, OH 45242
PHONE: (513) 386-5483
JIM OREILLY

GAS

DUKE ENERGY - GAS
139 EAST 4TH ST, ROOM 460A
CINCINNATI, OH 45202
PHONE: (513) 287-2370
RALPH PFISTER

MISC.

ITS (FORMERLY ARTIMIS)
ODOT CENTRAL OFFICE OF TRAFFIC ENGINEERING
1980 WEST BROAD STREET
COLUMBUS, OH 43223
PHONE: (614) 466-2168
JASON M. YERAY

CITY OF CINCINNATI-DEPARTMENT OF TRANSPORTATION
ENGINEERING
801 PLUM ST. RM 450
CINCINNATI, OH 45202
PHONE: (513) 352-6249
JOHN BRAZINA

TRAFFIC
PHONE: (513) 352-3348
JEFFERY E. WILHOIT

TRAFFIC SIGNAL
PHONE: (513) 352-3730
LINDA KISER

WALNUT HILLS AREA COUNCIL
2640 KEMPER LN.
CINCINNATI, OH 45206
PHONE: (513) 861-3337
FRED ORTH

LIGHTING

OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 8 TRAFFIC DEPARTMENT
505 SOUTH SR 741
LEBANON, OH, 45036-9518
(513) 933-6607
MARC GRAKE, P.E.
MARC.GRAKE@DOT.STATE.OH.US

CITY OF CINCINNATI- STREET LIGHTING
PHONE: (513) 352-3737
ROY A. JONES P.E.

UTILITIES

THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED THROUGH UTILITY OWNERS AND ODOT.

CROSSINGS AND CONNECTIONS TO EXISTING PIPES AND UTILITIES

WHERE PLANS PROVIDE FOR A PROPOSED CONDUIT TO BE CONNECTED TO, OR CROSS OVER OR UNDER AN EXISTING SEWER OR UNDERGROUND UTILITY, THE CONTRACTOR SHALL LOCATE THE EXISTING PIPES OR UTILITIES BOTH AS TO LINE AND GRADE BEFORE STARTING TO LAY THE PROPOSED CONDUIT.

IF IT IS DETERMINED THAT THE ELEVATION OF THE EXISTING CONDUIT, OR EXISTING APPURTENANCE TO BE CONNECTED, DIFFERS FROM THE PLAN ELEVATION OR RESULTS IN A CHANGE IN THE PLAN CONDUIT SLOPE, THE DESIGNER SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OF ANY PORTION OF THE PROPOSED CONDUIT WHICH WILL BE AFFECTED BY THE VARIANCE IN THE EXISTING ELEVATIONS.

IF IT IS DETERMINED THAT THE PROPOSED CONDUIT WILL INTERSECT AN EXISTING SEWER OR UNDERGROUND UTILITY IF CONSTRUCTED AS SHOWN ON THE PLAN, THE DESIGNER SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OF ANY PORTION OF THE PROPOSED CONDUIT WHICH WOULD BE AFFECTED BY THE INTERFERENCE WITH AN EXISTING FACILITY.

PROPOSED DRAINAGE STRUCTURES

WHERE A 4 FOOT SECTION OF EXISTING CONDUIT IS CALLED OUT TO BE REMOVED AND REPLACED AT LOCATIONS OF PROPOSED DRAINAGE STRUCTURES, THIS WORK CAN BE NON PERFORMED IF THE STRUCTURE CAN BE INSTALLED PER CMS WITHOUT REMOVING THIS 4 FOOT SECTION.

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GENERAL NOTES

CALCULATED
CHECKED

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SURVEYING PARAMETERS

PRIMARY PROJECT CONTROL MONUMENTS GOVERN ALL POSITION-
ING ON ODOT PROJECTS. SEE PRIMARY PROJECT CONTROL
INFROMATION TABLE FOR PROJECT CONTROL INFORMATION.

USE THE FOLLOWING PROJECT CONTROL, VERTICAL POSITIONING,
AND HORIZONTAL POSITIONING PARAMETERS FOR ALL SURVEYING:

PROJECT CONTROL

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: NAVD 88
GEOID: GEOID03

HORIZONTAL POSITIONING

REFERENCE FRAME: NAD83 (CORS96)
ELLIPSOID: GRS80
MAP PROJECTION: LAMBERT CONIC CONFORMAL
COORDINATE SYSTEM: OHIO STATE PLANE, SOUTH
COMBINED SCALE FACTOR: 1.000087288
ORIGIN OF SCALE
EASTING, (X):0 NORTHING (Y):0

USE THE POSITIONING METHODS AND MONUMENT TYPE USED IN
THE ORIGINAL SURVEY TO RESTORE ALL MONUMENTS RELATED
TO PRIMARY PROJECT CONTROL THAT ARE DAMAGED OR
DESTROYED BY CONSTRUCTION ACTIVITIES. RESTORE THE
DAMAGED OR DESTROYED MONUMENTS IN ACCORDANCE WITH
SUPPLEMENTAL SPECIFICATION 823.

UNITS ARE IN U.S. SURVEY FEET. USE THE FOLLOWING
CONVERSION FACTOR: 1 METER = 3.280833333 U.S. SURVEY
FEET.

PRIMARY PROJECT CONTROL INFORMATION						
POINT NUMBER	GRID COORDINATES U.S. SURVEY FEET		SCALED COORDINATES U.S. SURVEY FEET		ORTHOMETRIC HEIGHT	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING	(ELEVATION)	
MN0001			421861.020	1405183.742	711.246	CMONS-1
MN0002			419506.051	1402486.637	794.565	CMONS-2
MN0003			419480.681	1403064.454	767.917	CMONS-3
MN0004			417075.290	1403451.574	817.315	CMONS-4
MN2057			416434.999	1403371.953	839.869	CMON-2057
MN6909			422187.463	1404766.163	710.005	CMON-6909

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GENERAL NOTES

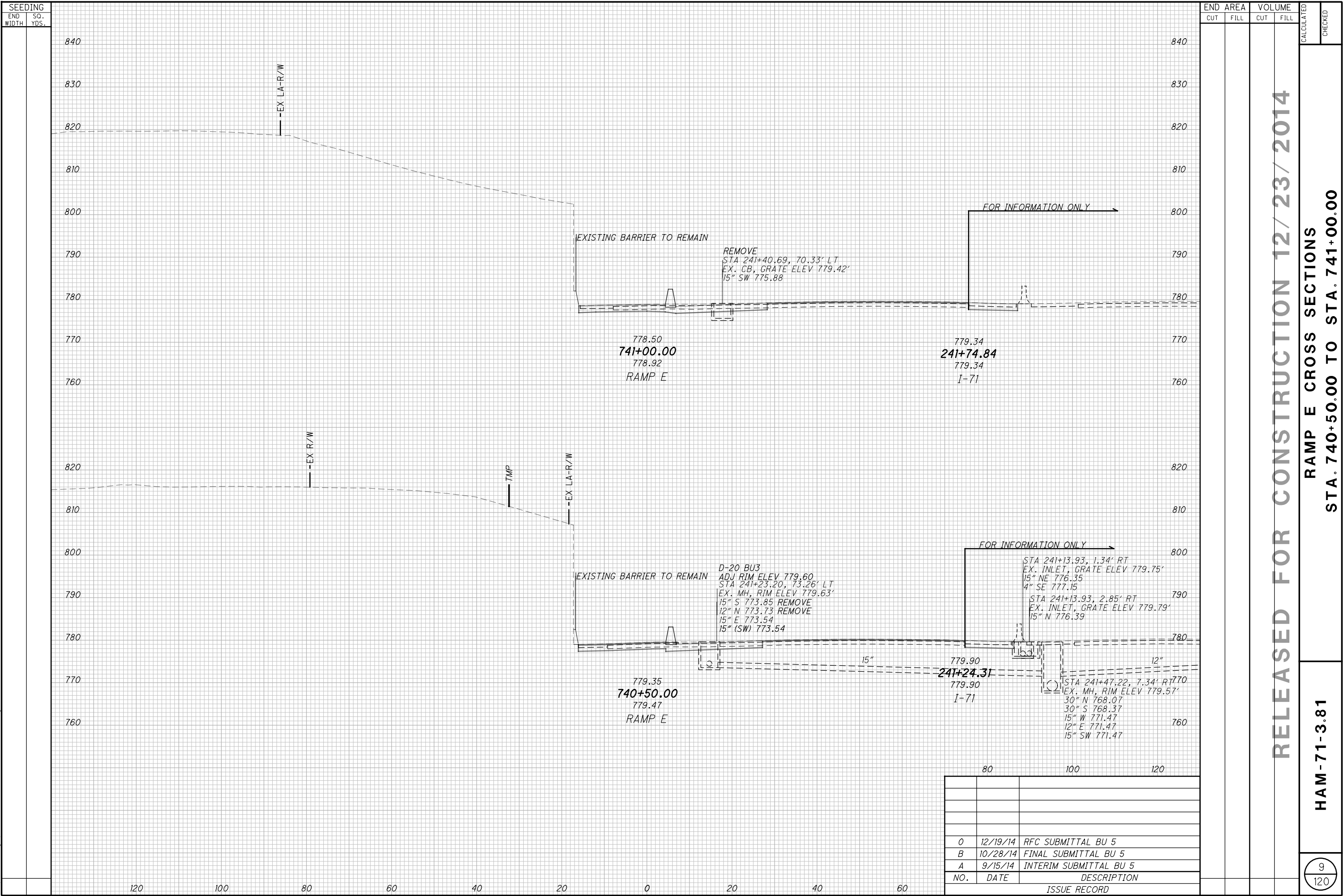
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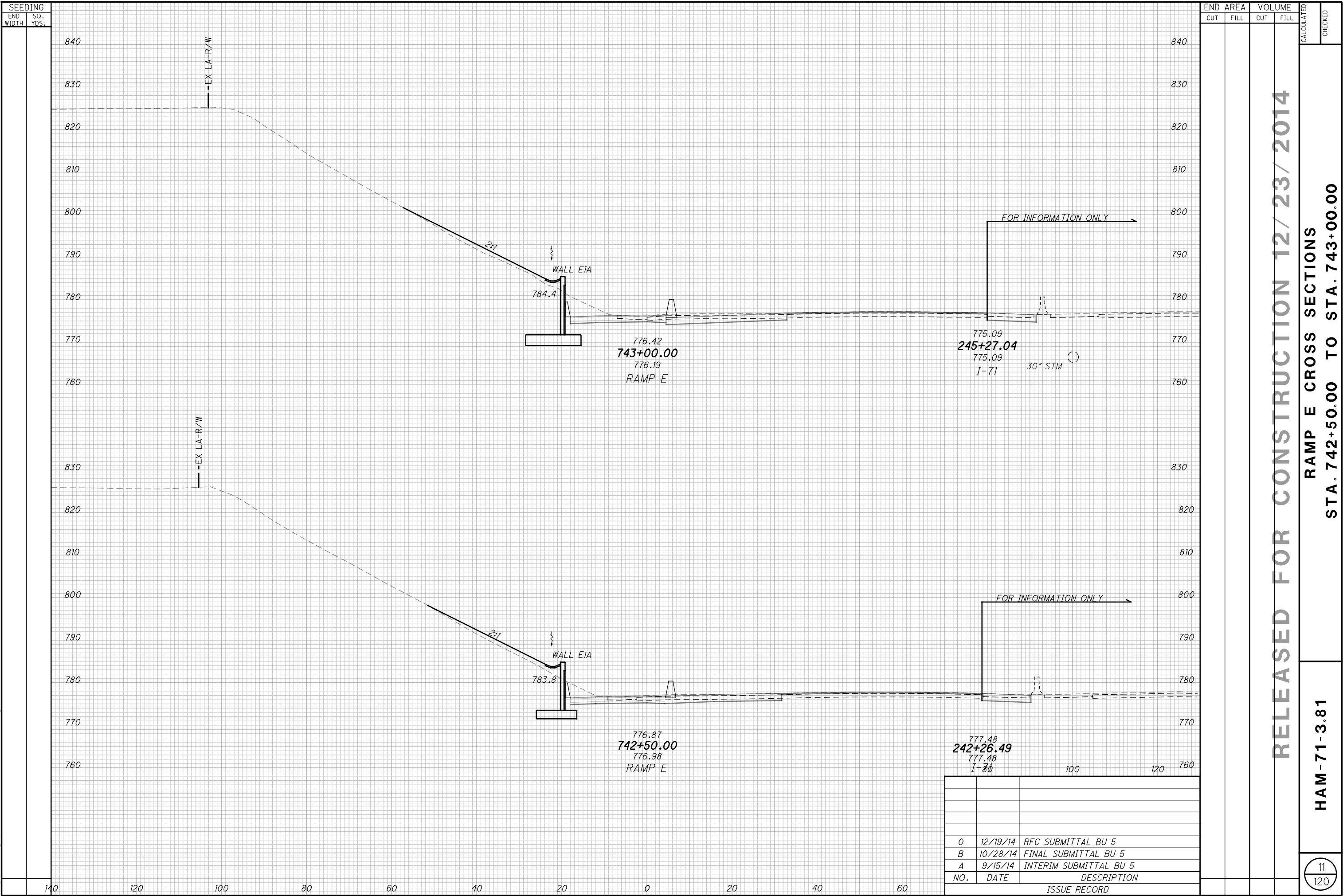
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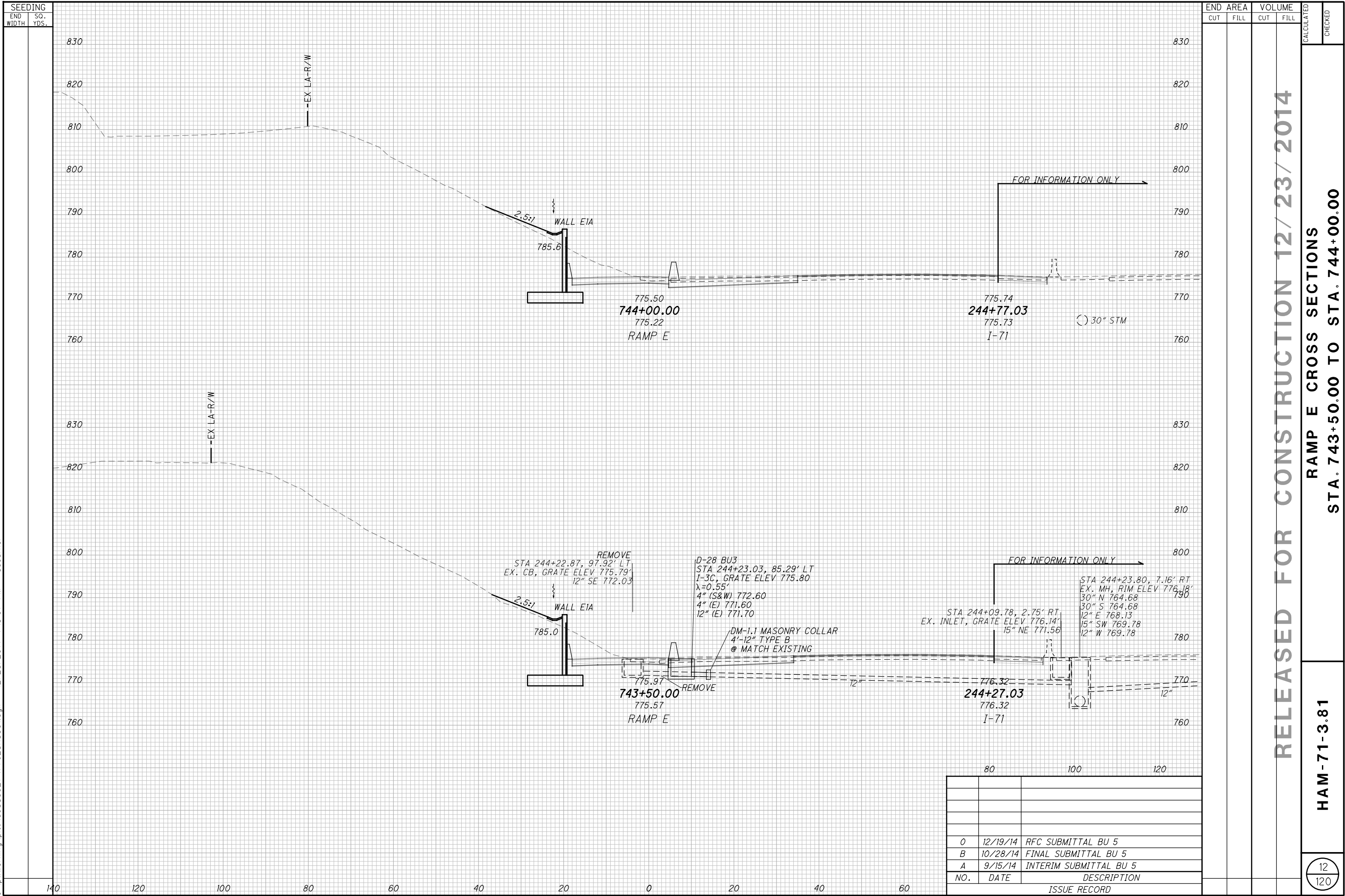




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END AREAVOLUME

CUT FILLCUT FILL

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RAMP E CROSS SECTIONS

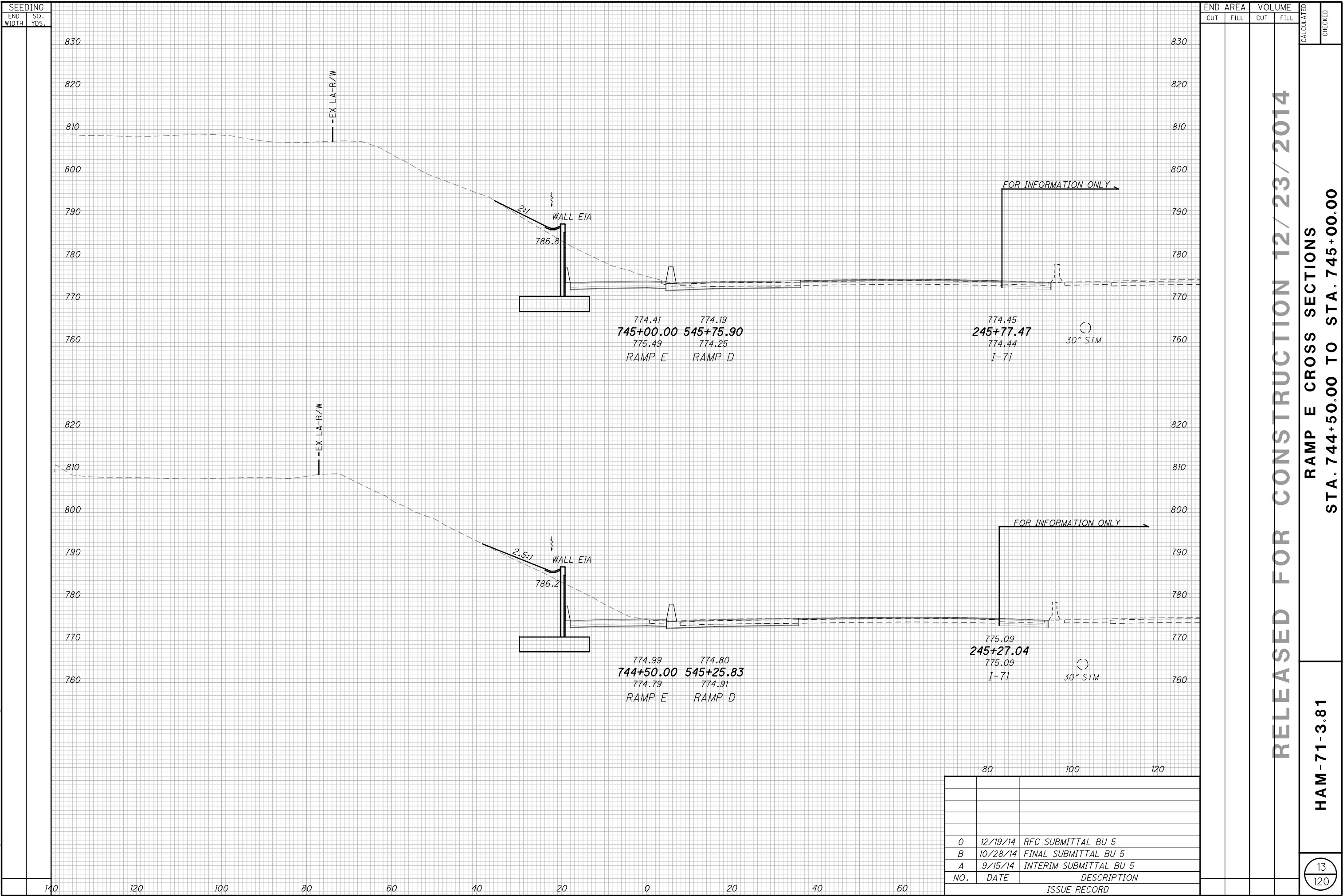
STA. 743+50.00 TO STA. 744+00.00

HAM-71-3.81

12

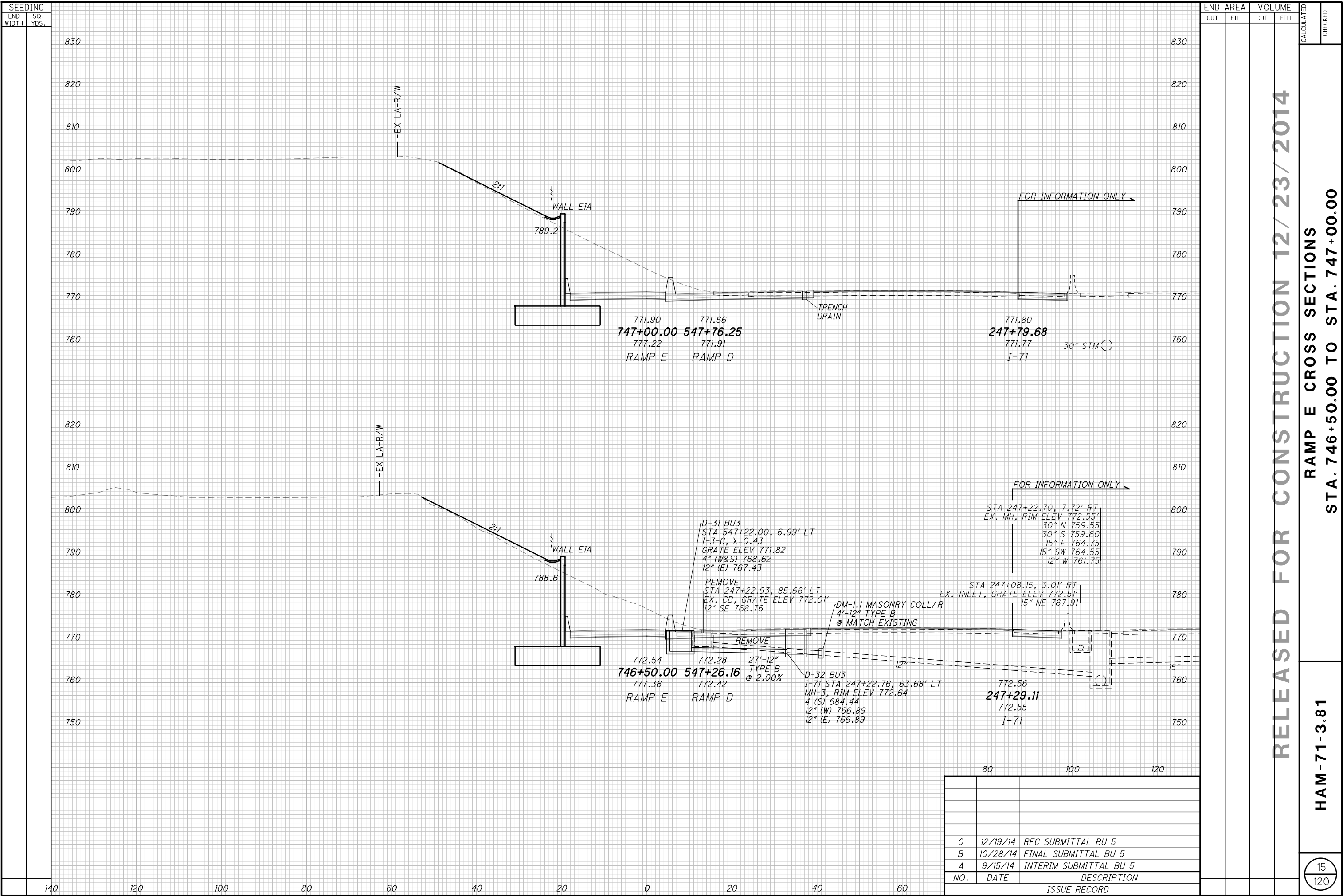
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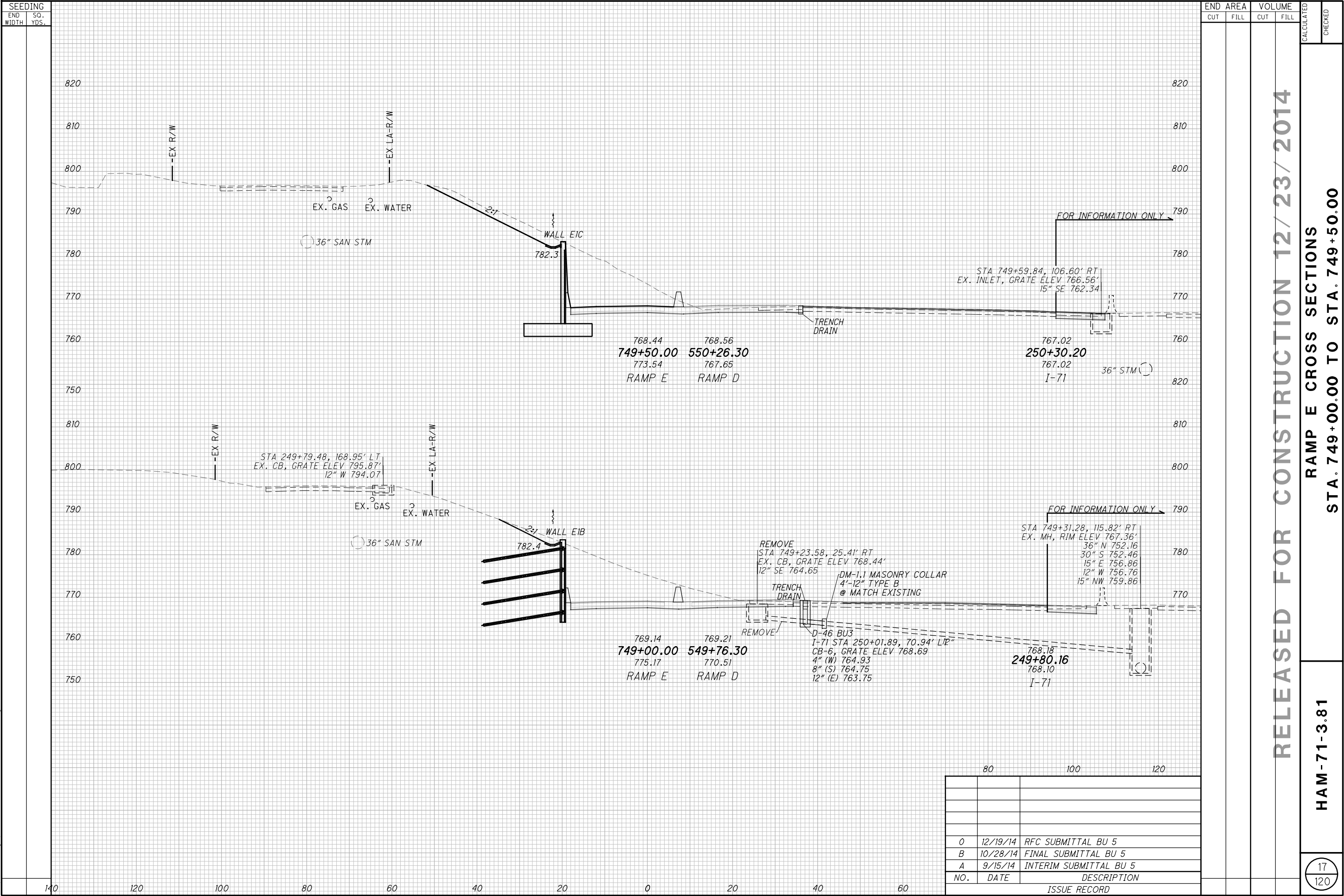
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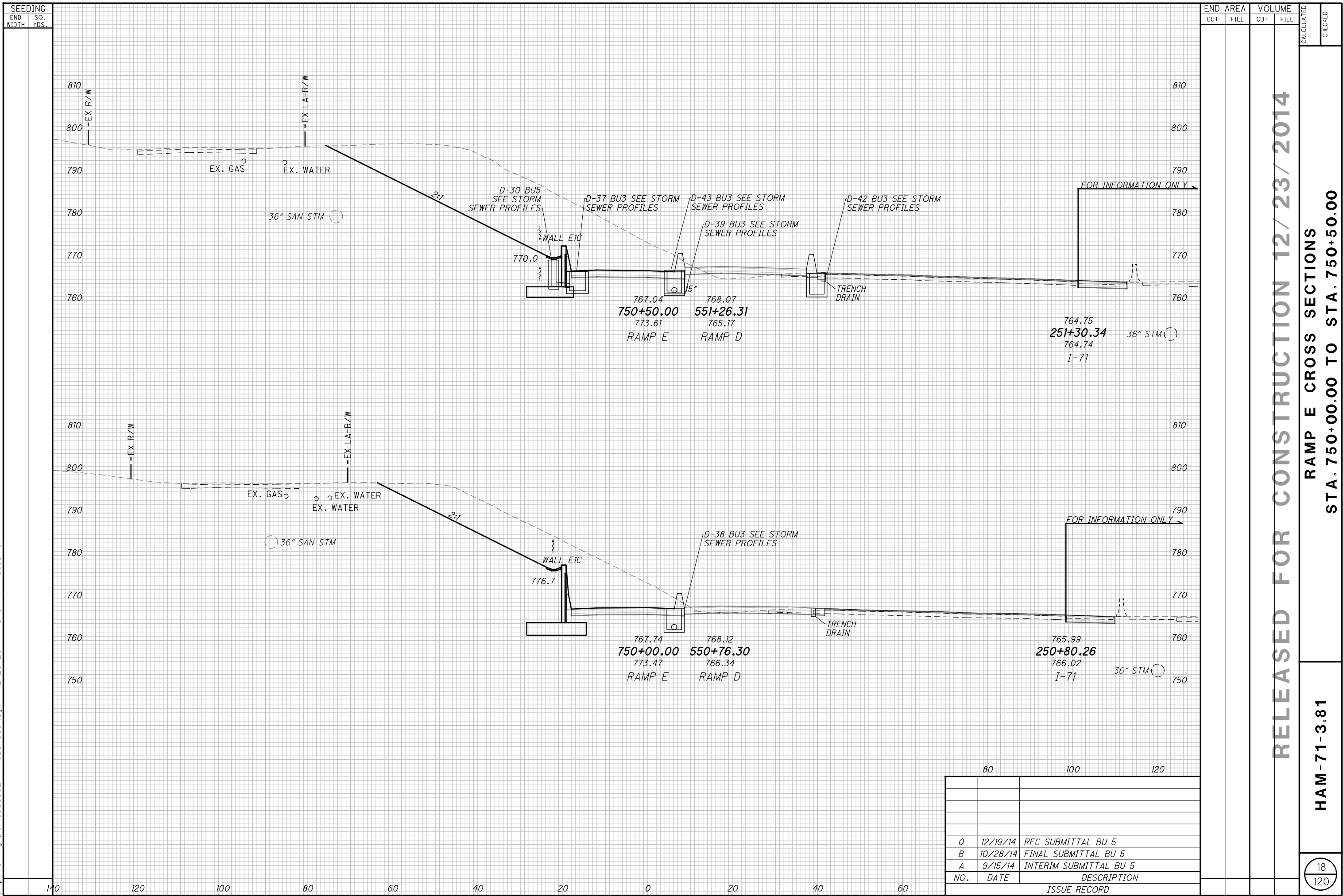


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RELEASED FOR CONSTRUCTION 12/ 23/ 2014

RAMP E CROSS SECTIONS
STA. 750+00.00 TO STA. 750+50.00

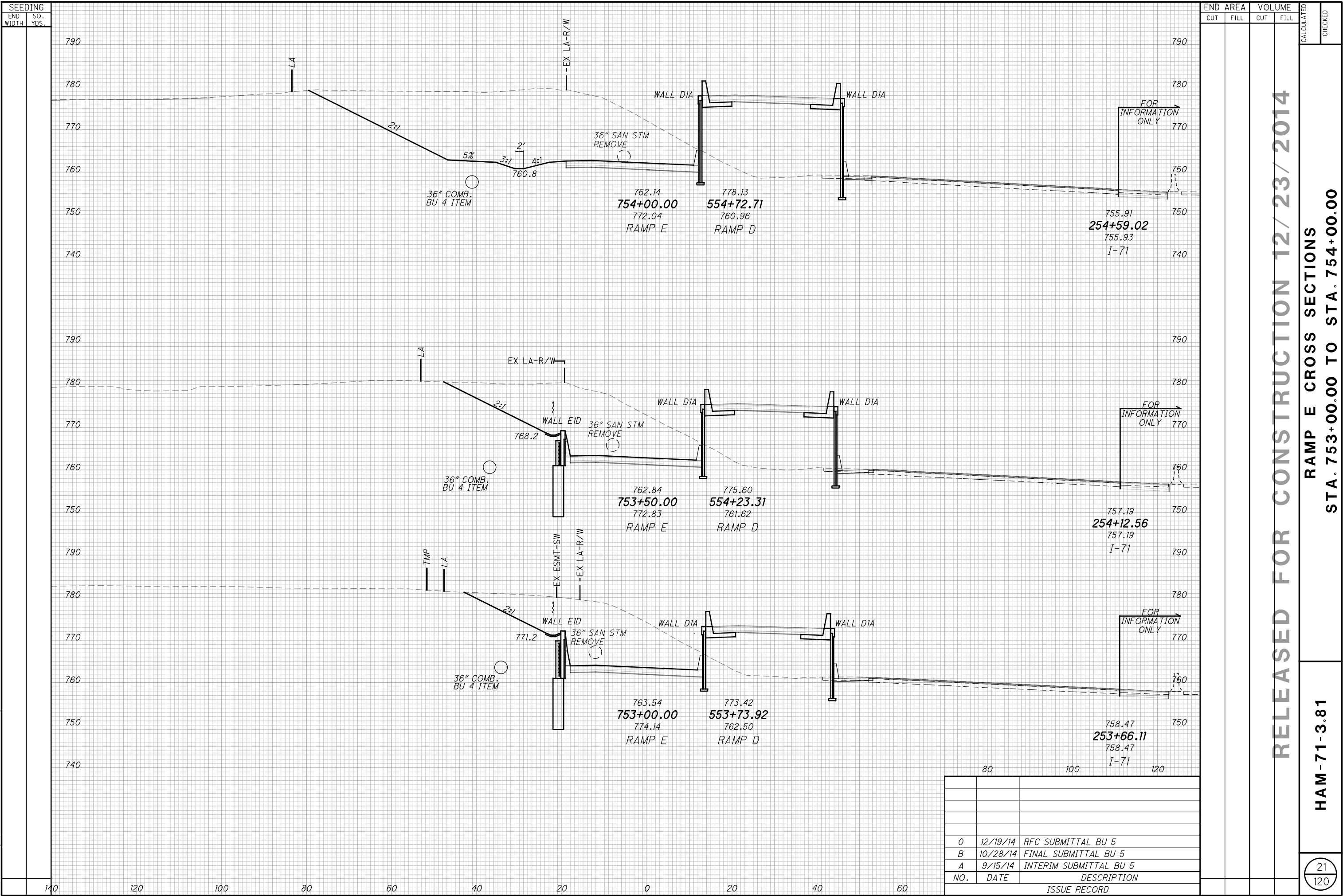
HAM-71-3.81

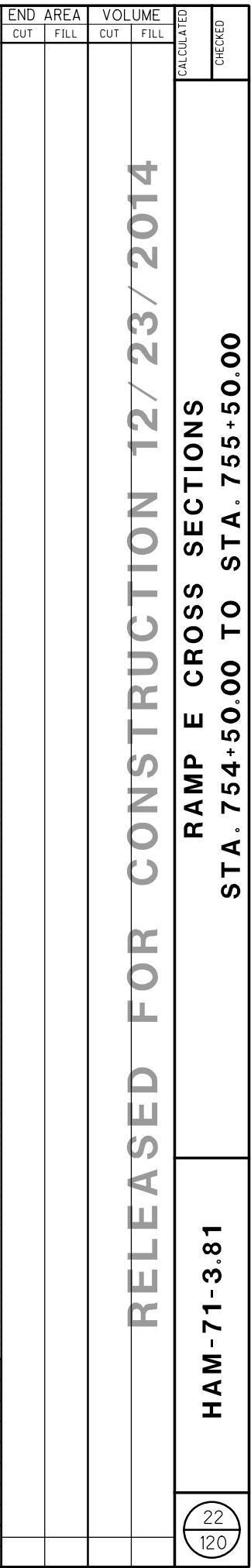
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120

19
120

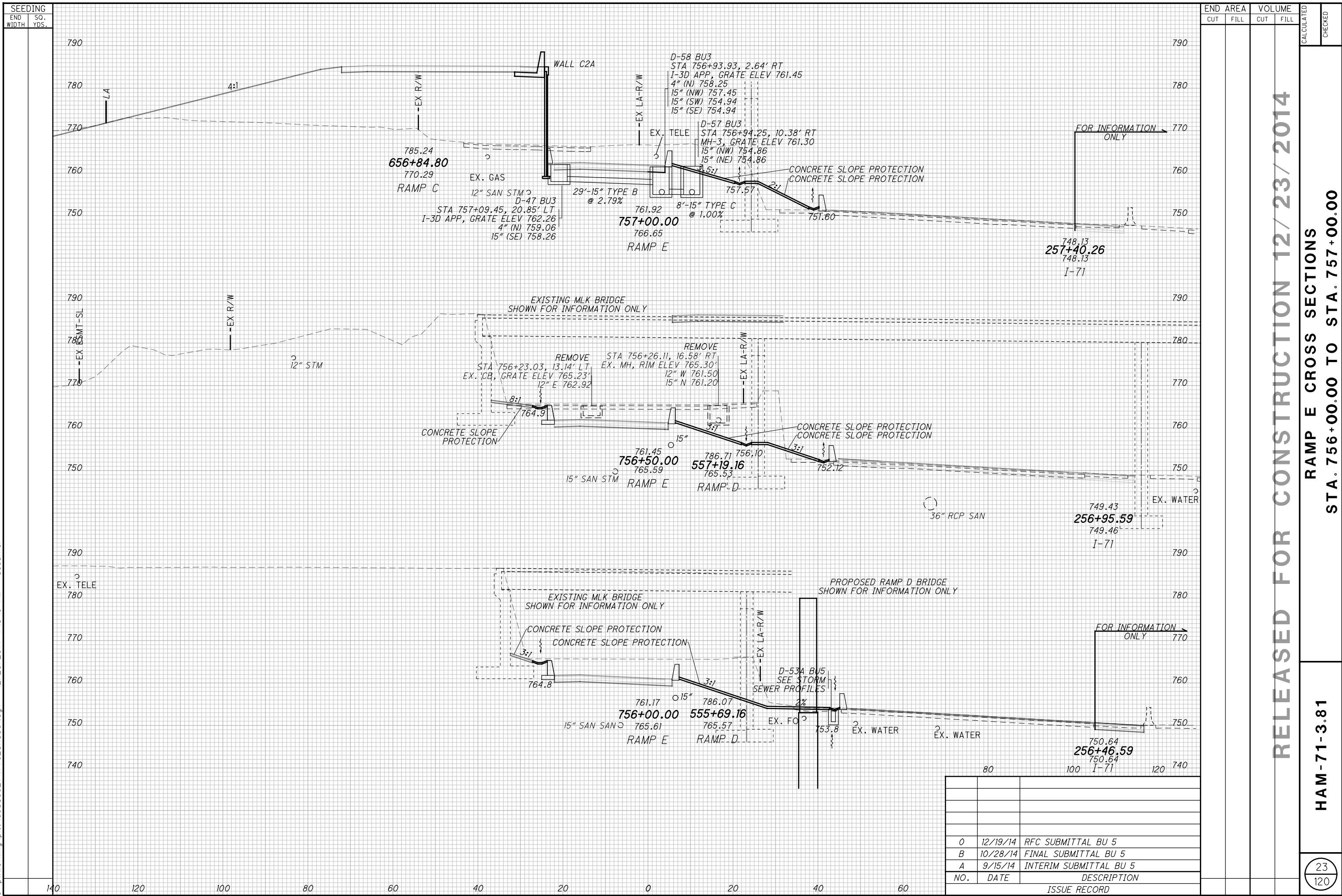
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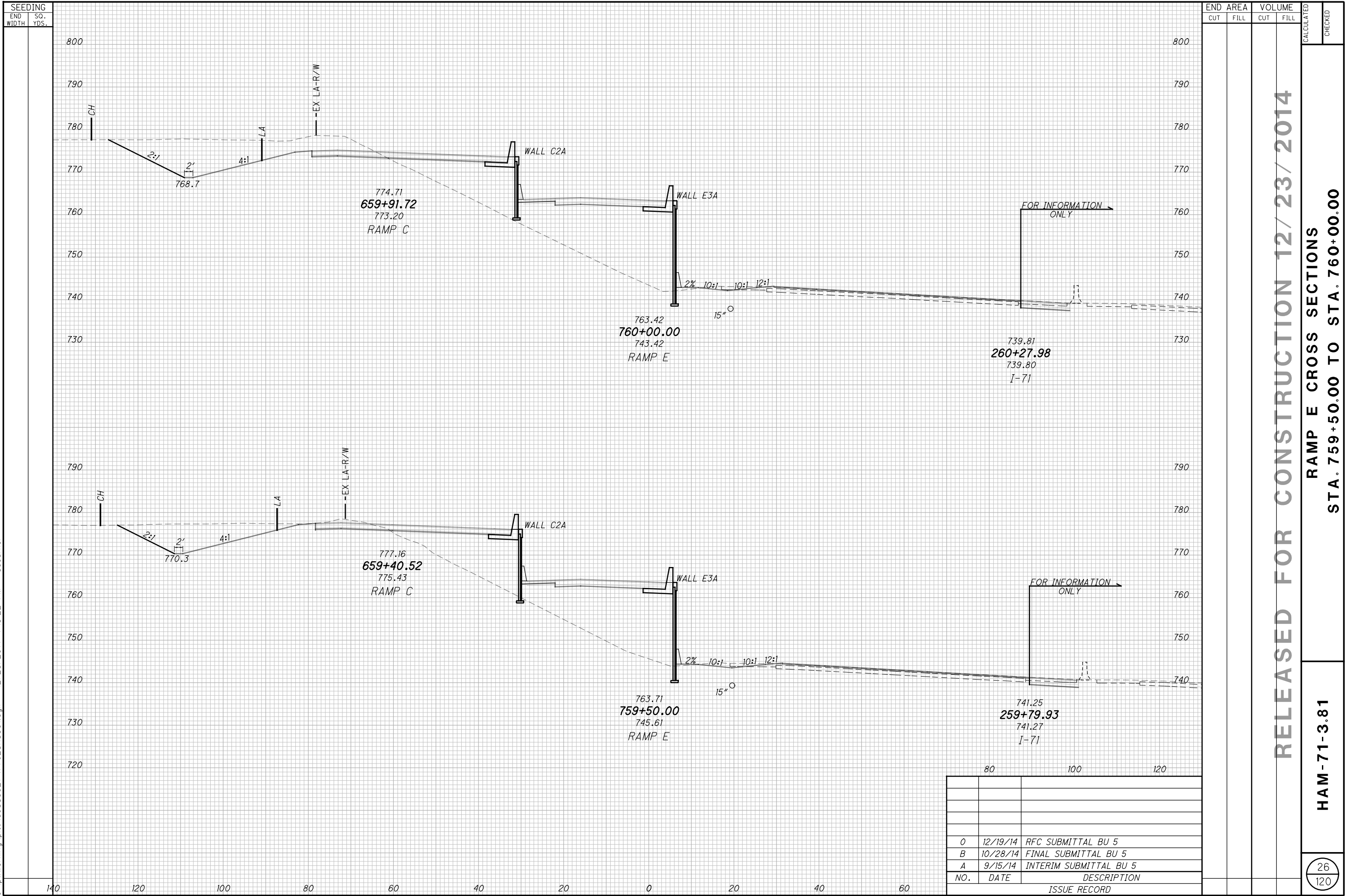
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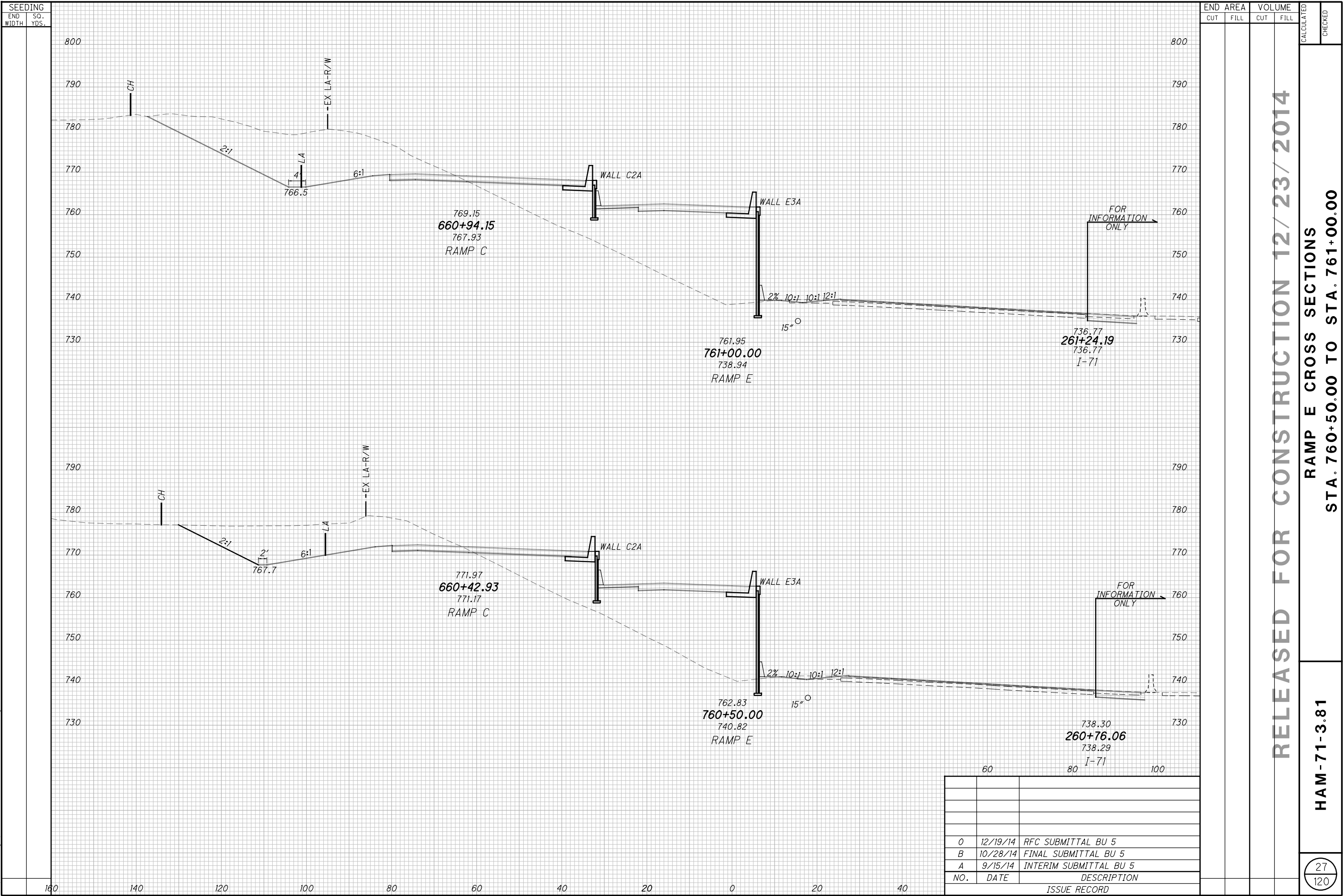
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STA. 757+50.00 TO STA. 758+00.00



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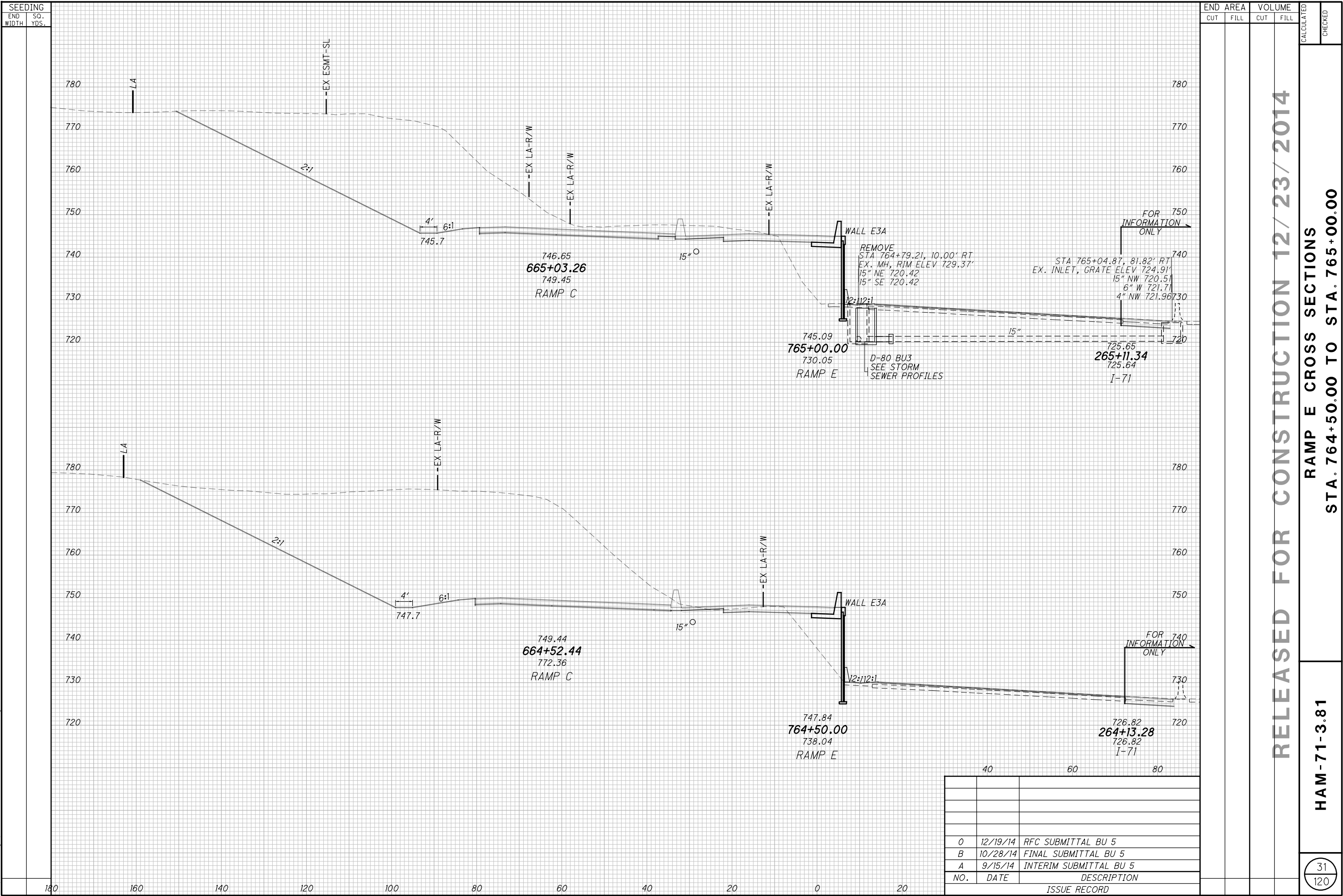


RAMP E CROSS SECTIONS
STA. 761+50.00 TO STA. 762+00.00

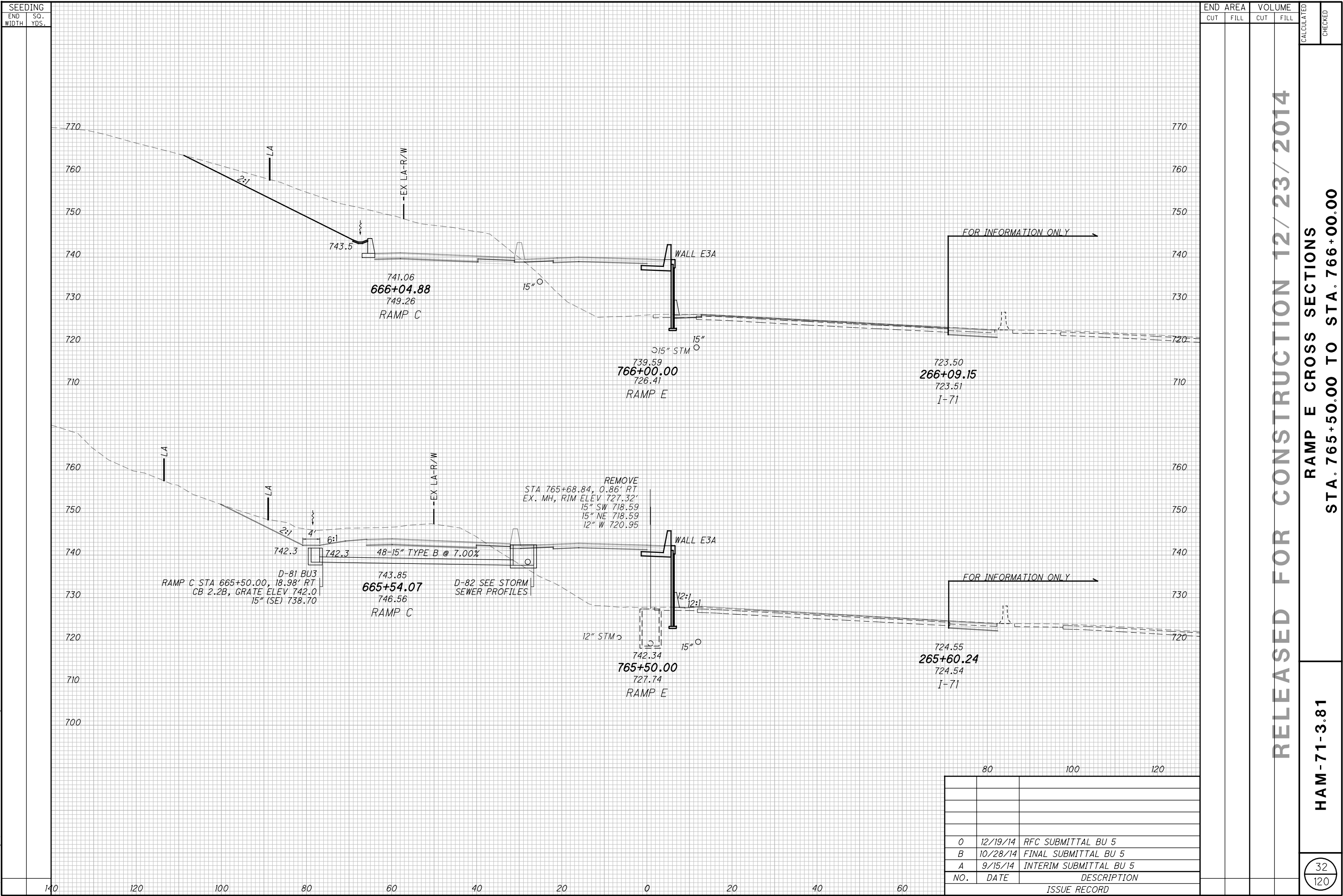


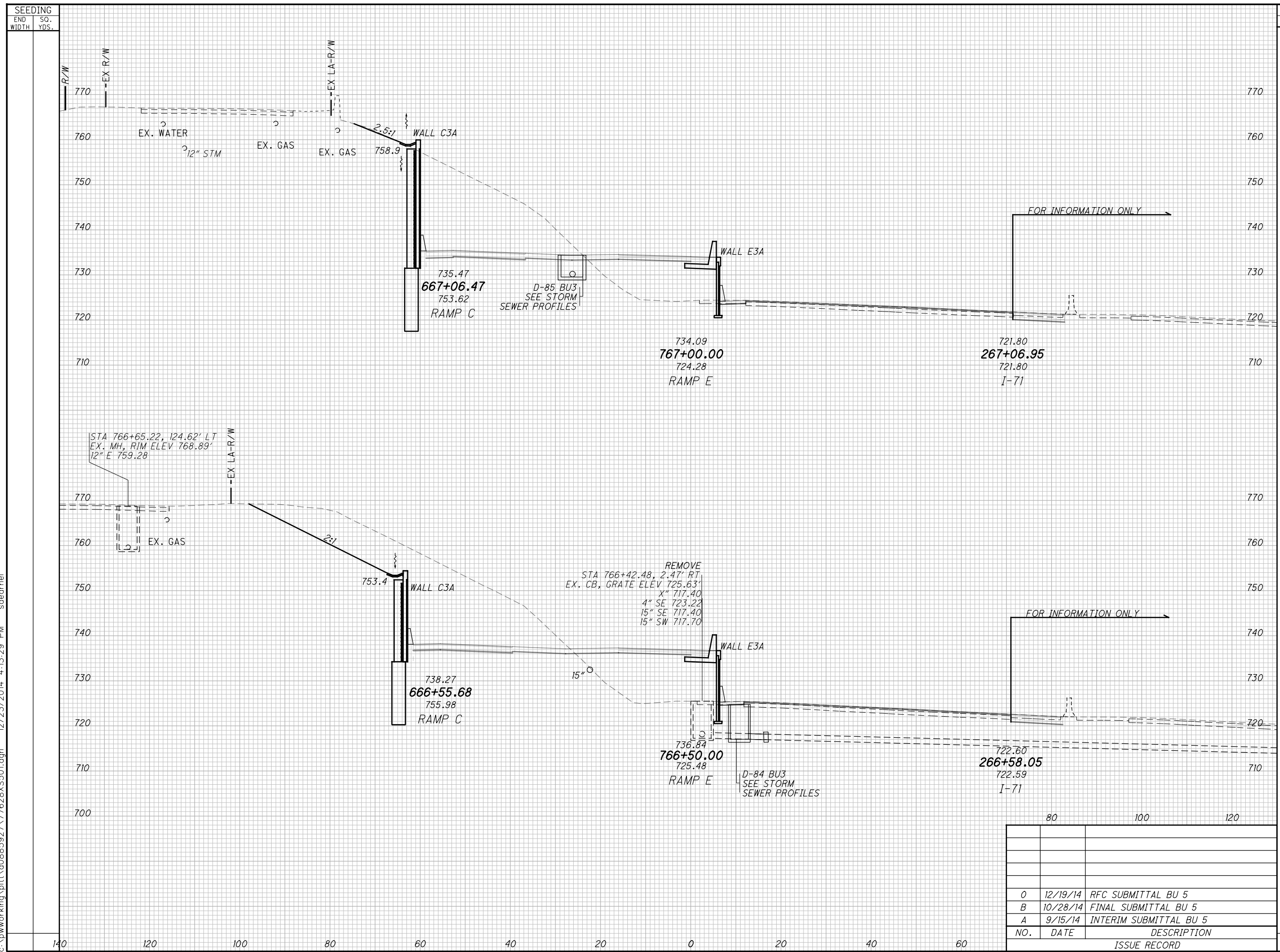
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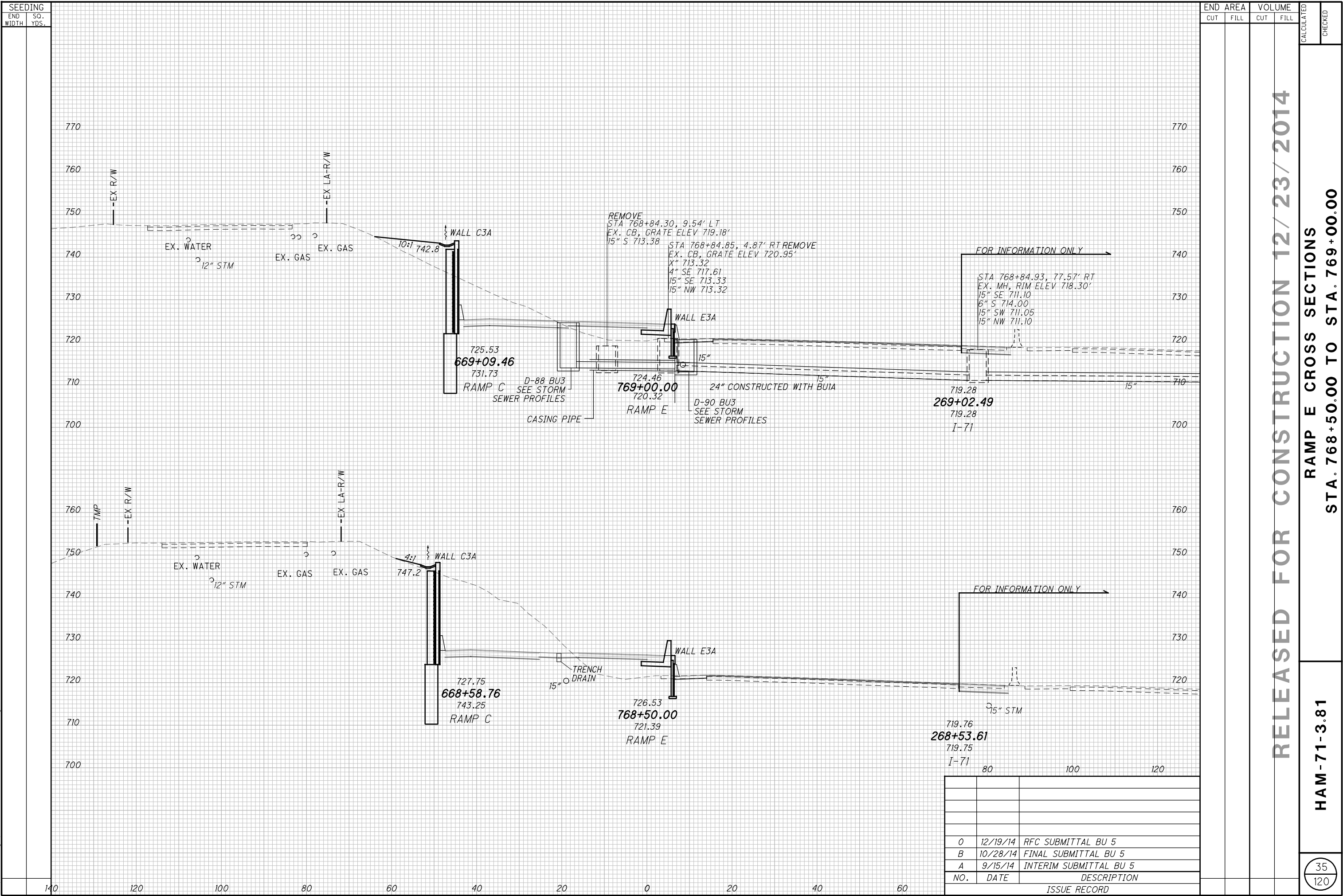


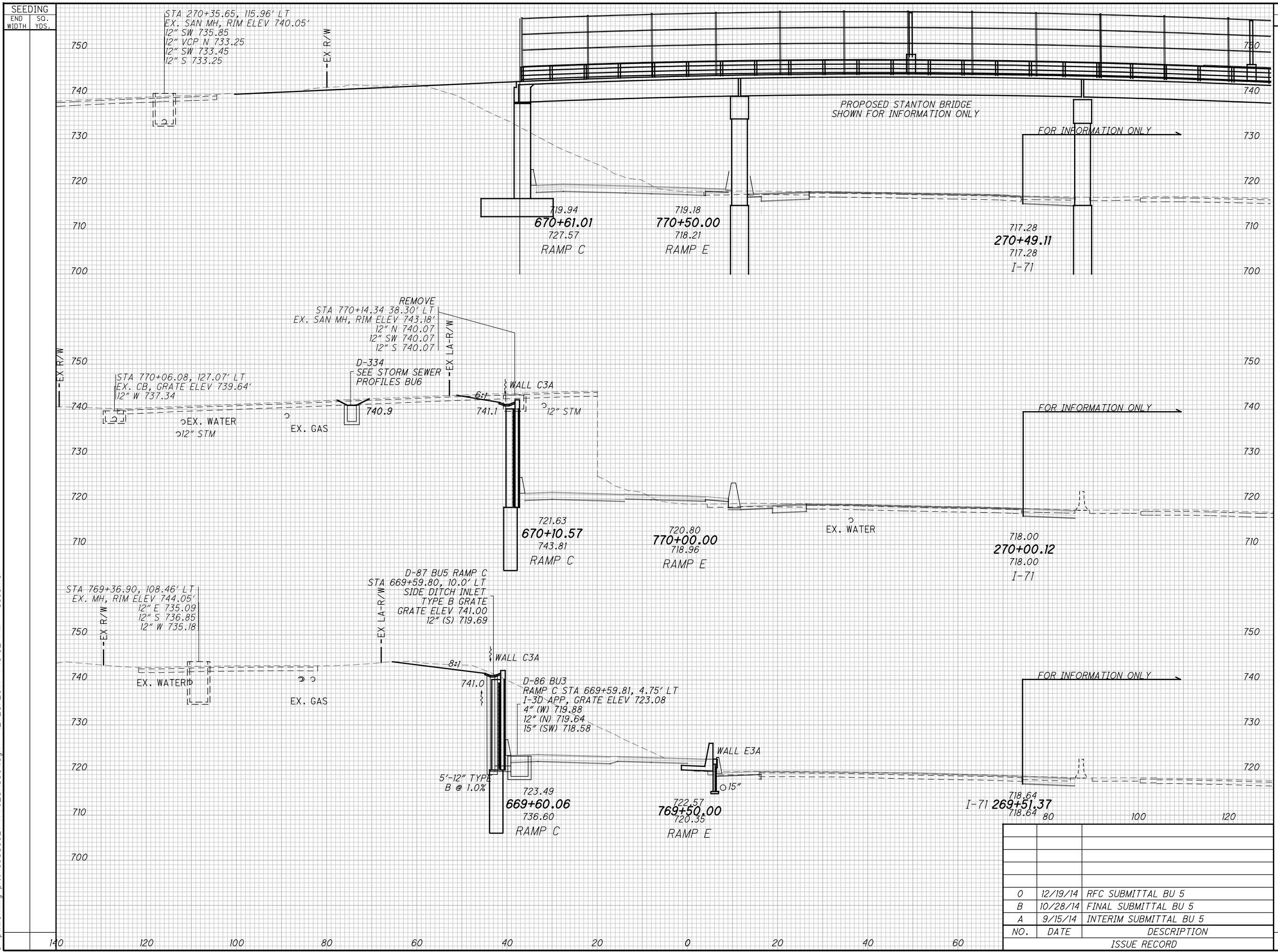


END		AREA		VOLUME	
CUT		FILL		CUT	
				FILL	
RELEASED FOR CONSTRUCTION 12/ 23/ 2014					
				CALCULATED	
				CHECKED	
HAM-71-3.81		RAMP E CROSS SECTIONS STA. 766+50.00 TO STA. 767+00.00			

34
120

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END AREA		VOLUME			
CUT	FILL	CUT	FILL		
RELEASED FOR CONSTRUCTION 12 / 23 / 2014					
36 120		HAM-71-3.81		CALCULATED	
		RAMP E CROSS SECTIONS			
		STA. 769+50.00 TO STA. 770+50.00		CHECKED	

$$\frac{37}{120}$$

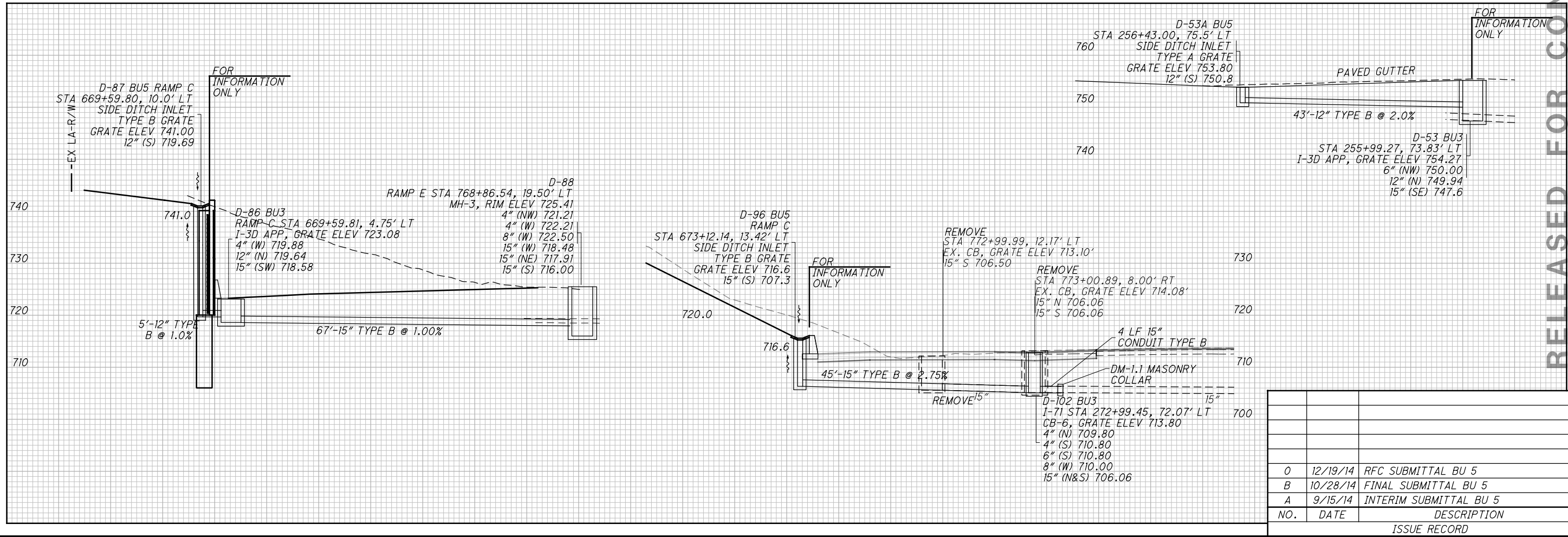
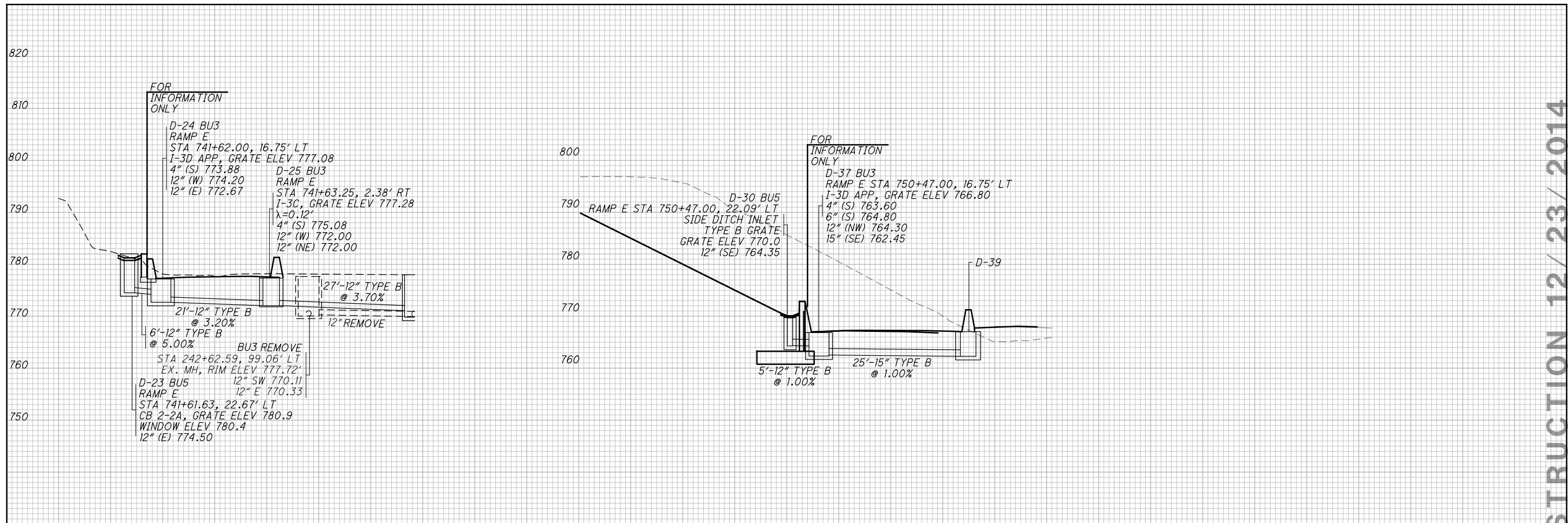
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120

$$\frac{39}{120}$$

$$\frac{40}{120}$$

$$\frac{41}{120}$$

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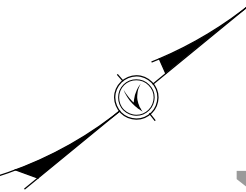
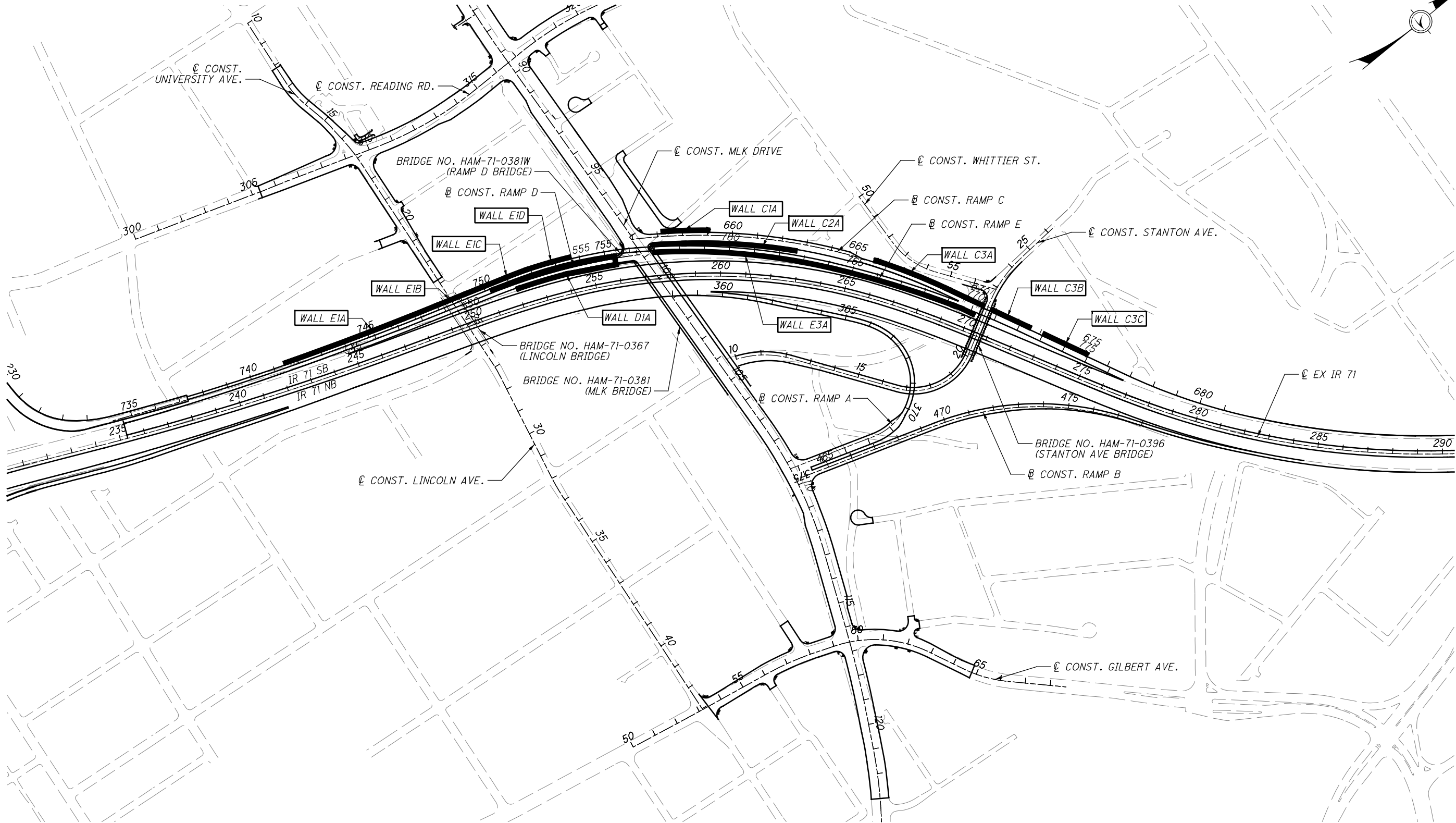
STORM SEWER PROFILES
IR-71

HAM-71-3.81

CALCULATED
KAG
CHECKED
JRM

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120

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RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

1/62

43
120

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RETAINING WALL SCHEMATIC PLAN

DESIGNED	DRAWN	REVIEWED	DATE
JML	JML	CHN	10/23/14
CHECKED	REVIS		
RBK			

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-964-7500



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GENERAL NOTES: RETAINING WALLS

STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS:

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWINGS:
SBR-1-13 DATED/REVISED 01/17/14

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATIONS:
800 DATED 01/17/14
840 DATED 01/17/14

AND TO THE FOLLOWING SUPPLEMENTS:
1073 DATED 04/16/10
1083 DATED 04/15/05

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 6TH EDITION-2012, INCLUDING THE 2013 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL, 2007.

DESIGN DATA:

CONCRETE CLASS QC1 WITH QC/QA - COMPRESSIVE STRENGTH
4.0 KSI (CIP FOOTING, CIP WALL FACING, CIP
COPING, MOMENT SLAB AND LEVELING PAD)
CONCRETE CLASS QC2 WITH QC/QA - COMPRESSIVE STRENGTH
4.5 KSI (PARAPET AND DRILLED SHAFT)
EPOXY COATED REINFORCING STEEL - MINIMUM YIELD
STRENGTH 60 KSI
STRUCTURAL STEEL - ASTM A709 GRADE 50 - YIELD
STRENGTH 50 KSI
STEEL PILES - CMS 711.01 AND ASTM A572 - YIELD
STRENGTH 50 KSI

MAINTENANCE OF TRAFFIC:

REFER TO THE PROJECT OVERALL MAINTENANCE OF TRAFFIC
PLANS FOR ADDITIONAL INFORMATION WITH RESPECT TO
MAINTENANCE OF TRAFFIC.

ITEM 512, SEALING OF CONCRETE SURFACES (NON-EPOXY):

ALL EXPOSED NEW CONCRETE SURFACES OF RETAINING WALLS
SHALL BE SEALED WITH A CLEAR NON-EPOXY SEALER.

ITEM 512, SEALING OF CONCRETE SURFACES, AS PER PLAN,
(PERMANENT GRAFFITI PROTECTION):

APPLY A CLEAR PERMANENT GRAFFITI COATING QUALIFIED
ACCORDING TO SUPPLEMENT 1083 THAT IS COMPATIBLE WITH
THE CONCRETE SEALER OVER WHICH IT IS APPLIED. APPLY
THE GRAFFITI COATING IN ACCORDANCE WITH THE
MANUFACTURER'S PRINTED INSTRUCTIONS.

AESTHETIC TREATMENT:

THE FINAL FACE OF ALL PROPOSED RETAINING WALLS ALONG
IR 71 AND ASSOCIATED RAMPS SHALL UTILIZE AN
ARCHITECTURAL CONCRETE FORM LINER, TO BE PROVIDED IN
A FUTURE BUILDABLE UNIT.

STANDARD ABBREVIATIONS:

APPRX. - APPROXIMATE	MIN. - MINIMUM
BOTT. - BOTTOM	NPCPP - NON-PERFORATED
BRG. - BEARING	CORRUGATED
C/C - CENTER TO CENTER	PLASTIC PIPE
CONST - CONSTRUCTION	OPT. - OPTIONAL
C.J. - CONSTRUCTION JOINT	O/O - OUT TO OUT
CPP - CORRUGATED	PEJF - PREFORMED EXPANSION
PLASTIC PIPE	JOINT FILLER
CLR. - CLEAR	PCPP - PERFORATED
DIA. - DIAMETER	CORRUGATED
E.F. - EACH FACE	PLASTIC PIPE
ELEV. - ELEVATION	R.A. - REAR ABUTMENT
EQ. - EQUAL	R.F. - REAR FACE
EX. - EXISTING	RT. - RIGHT
EXP. - EXPANSION	SHLD. - SHOULDER
F.A. - FORWARD ABUTMENT	SPA. - SPACING/SPACES
F.F. - FRONT FACE	T.&B. - TOP AND BOTTOM
LT. - LEFT	STA. - STATION
FIN. - FINISHED	TYP. - TYPICAL
MAX. - MAXIMUM	

0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

GENERAL NOTES
RETAINING WALLS

HAM-71-3.81
PID No. 77628

2 / 62

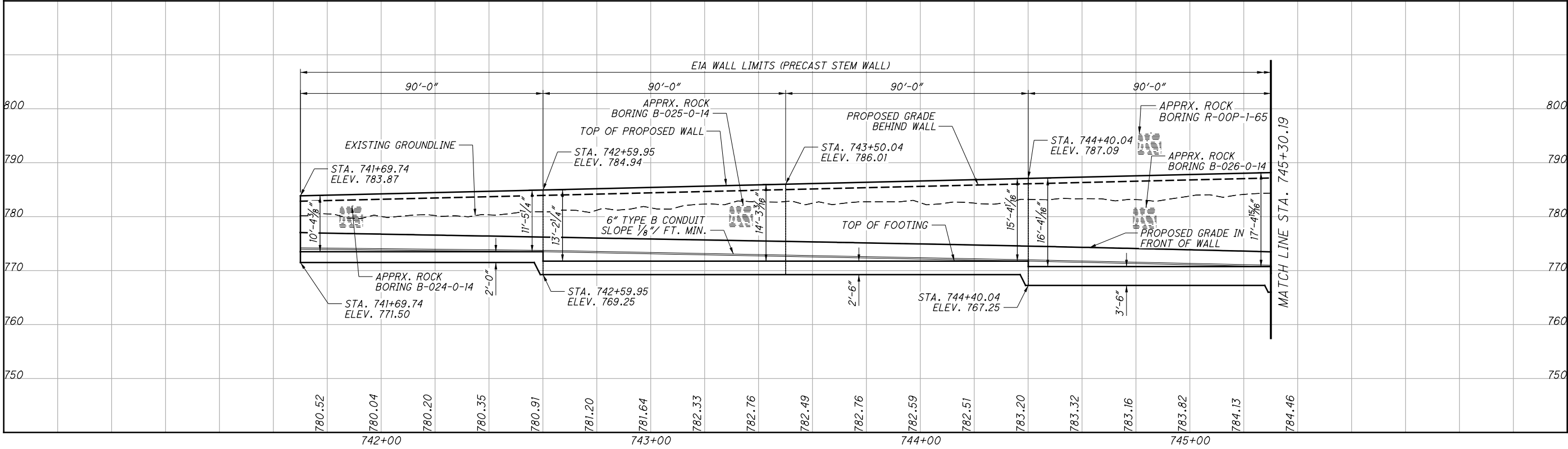
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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500



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EX. GROUND ELEV. AT
FRONT FACE OF WALL



ELEVATION

BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-024-0-14	741+89	36' LT.	782.0±
B-025-0-14	743+34	29' LT.	782.1±
B-026-0-14	744+84	28' LT.	781.8±
R-00P-1-65	744+86	91' LT.	795.5±

NOTES:

- REFER TO SHEET 3/20 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

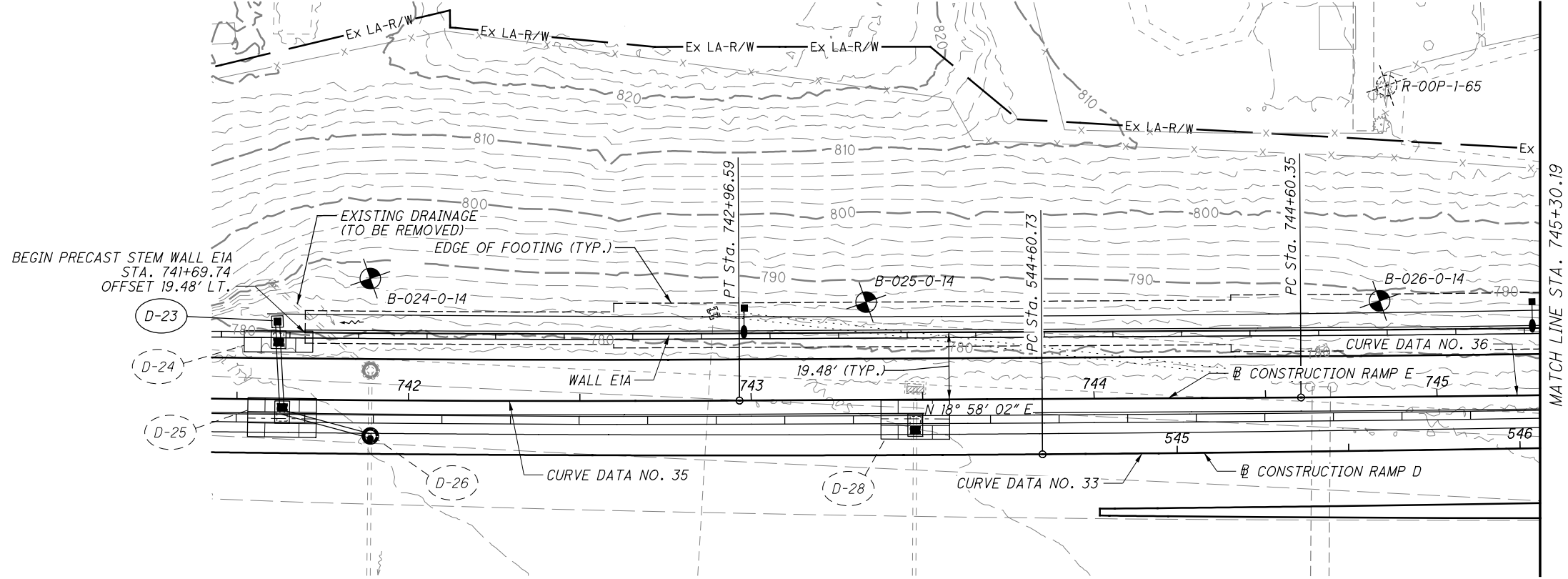
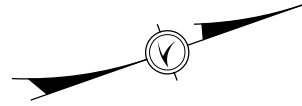
HAM-71-3.81
PID No. 77628

PLAN AND ELEVATION (SHEET 1 OF 3)
WALLS E1A, E1B, E1C, AND E1D

DESIGN AGENCY
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CINCINNATI, OHIO 45242
513-984-7500

DESIGNED	DRAWN	REVIEWED	DATE
JML	JML	CHN	10/23/14
CHECKED	REVISED		
RBK			

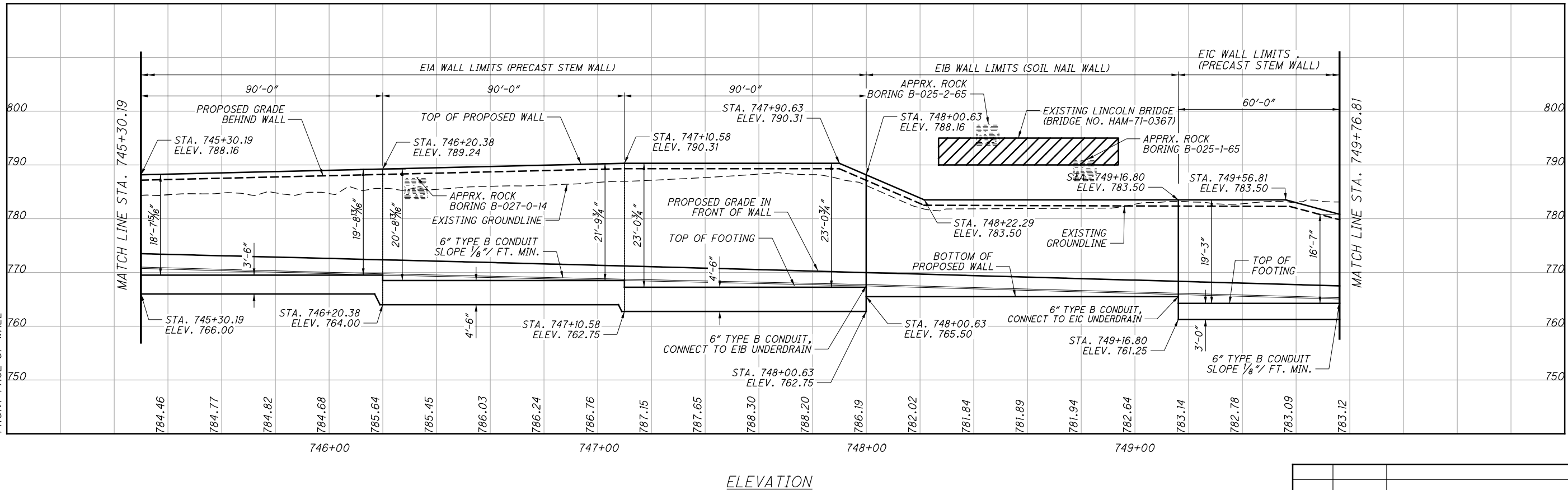
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PLAN

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EX. GROUND ELEV. AT
FRONT FACE OF WALL

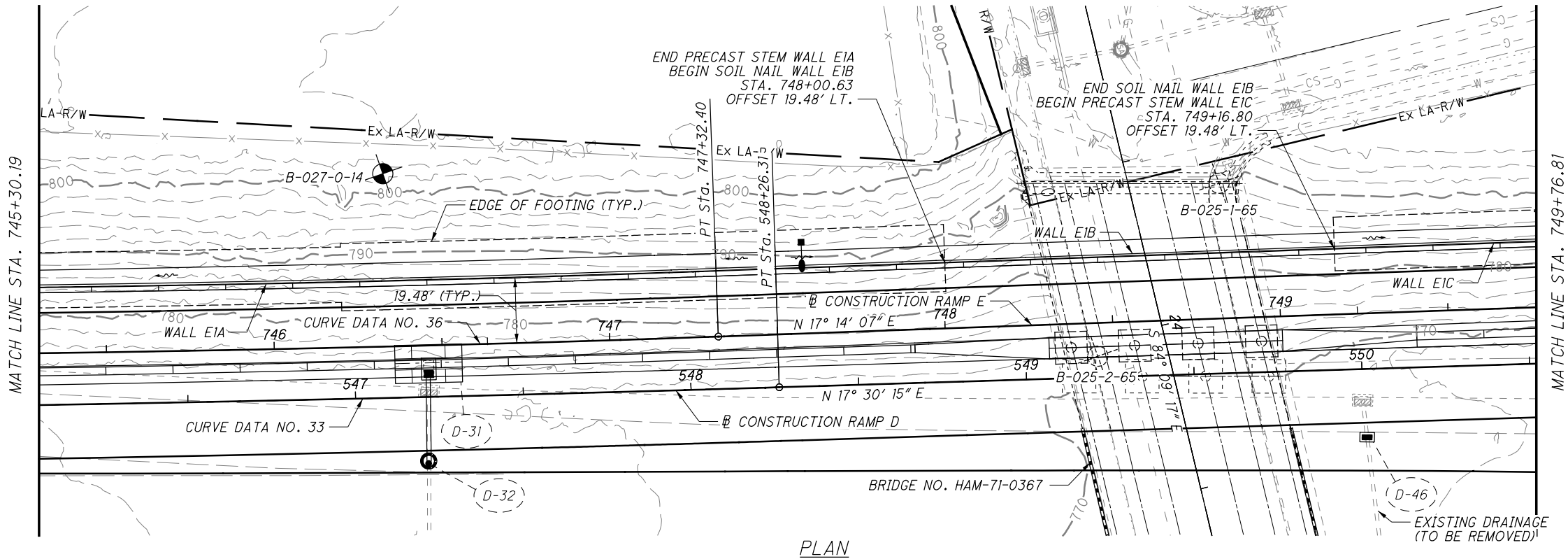


BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-027-0-14	746+34	52' LT.	787.7±
B-025-1-65	748+83	40' LT	791.0±
B-025-2-65	748+45	10' LT.	797.6±

NOTES:

- REFER TO SHEET 3/20 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		



PLAN

RELEASED FOR CONSTRUCTION 12/23/2014

PLAN AND ELEVATION (SHEET 2 OF 3)

WALLS EIA, EIB, EIC, AND EID

HAM-71-3.81

PID No. 77628

4

62

46

120

DESIGN AGENCY
HOR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

REVIEWED
CHN

DRAWN
JML

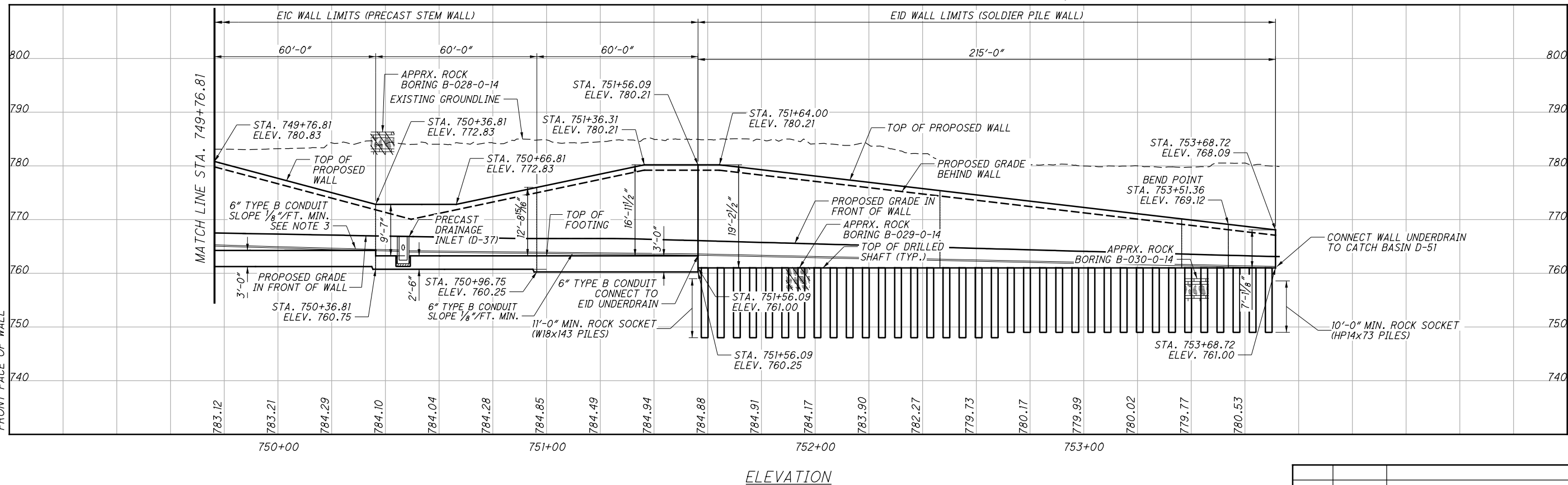
DESIGNED
JML

CHECKED
RBK

REVISED

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EX. GROUND ELEV. AT
FRONT FACE OF WALL

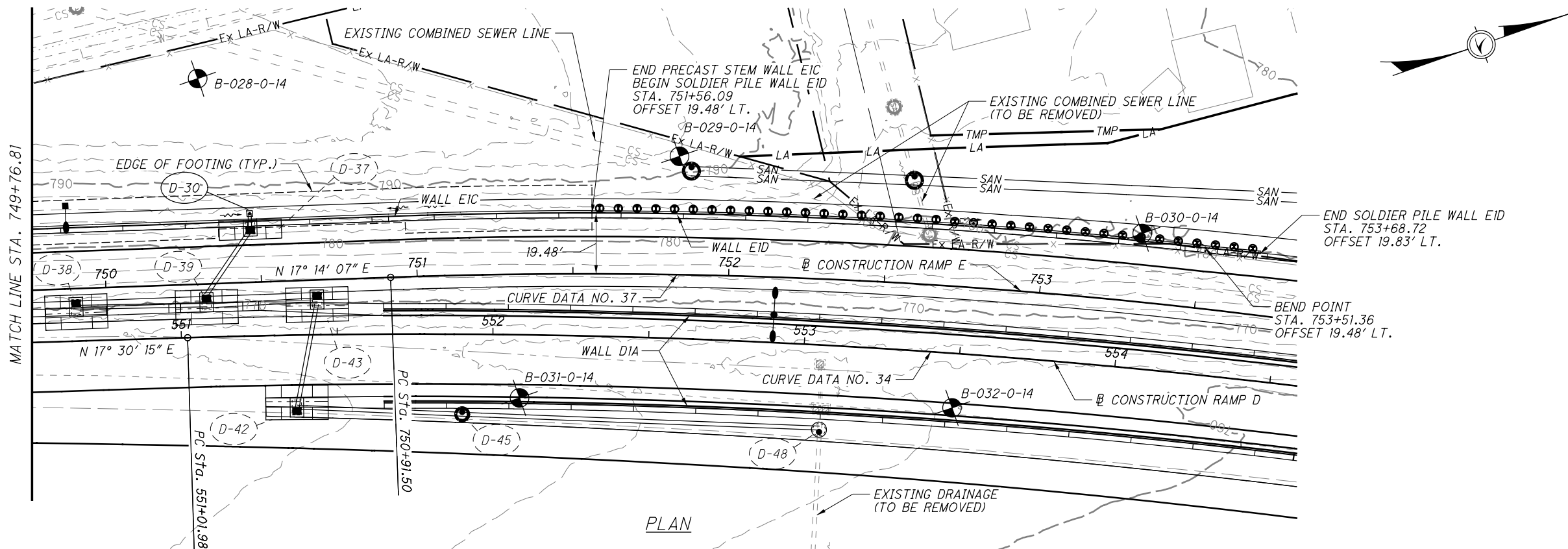


BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-028-0-14	750+32	66' LT.	786.3±
B-029-0-14	751+84	38' LT.	761.1±
B-030-0-14	753+31	22' LT.	759.0±

NOTES:

- REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.
- CONNECT WALL EIC UNDERDRAIN TO INLET D-37.
- STATION AND OFFSETS SHOWN AT FRONT FACE OF WALL.
- SEE SHEET 57/62 FOR PILE INFORMATION.
- THE ROCK SOCKETS ARE TO BEGIN AT THE TOP OF THE INTERBEDDED BROWN SHALE AND LIMESTONE, AND SHALL EXTEND INTO THE UNDERLYING INTERBEDDED GRAY SHALE AND LIMESTONE TO THE MINIMUM EMBEDMENT LENGTHS SHOWN.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		



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PLAN AND ELEVATION (SHEET 3 OF 3)
WALLS E1A, E1B, E1C, AND E1D

HAM-71-3.81
PID No. 77628

5/62

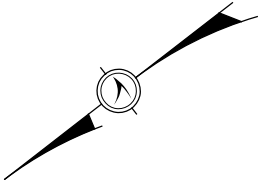
47
120

DESIGN AGENCY
HOR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

REVIEWED
CHN

DRAWN
JML
DESIGNED
JML
CHECKED
JPC/RBK



RELEASED FOR CONSTRUCTION 12/23/2014



 = MSE WALL BOUNDARY LIMITS

 = SETTLEMENT PLATFORM LOCATION (P#)

BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-035-0-14	757+05	13' LT.	731.4±

BORING LOCATIONS (RAMP C)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-036-0-14	658+05	20' LT.	733.9±
B-038-0-14	660+98	22' LT.	760.5±

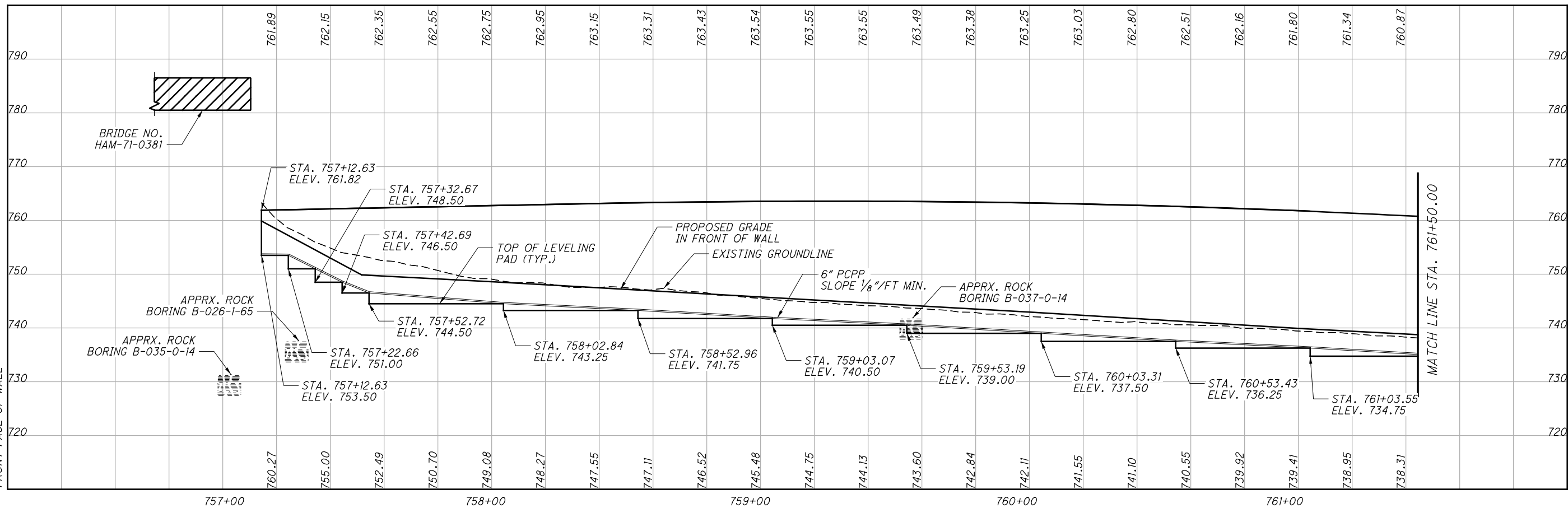
1. REFER TO SHEET 3/20 FOR BASELINE CURVE DATA.
2. VERTICAL SCALE IS EXAGGERATED FOR CLARITY.
3. CONNECT 6" DRAIN PIPE TO INLET D-75.
4. REFER TO SETTLEMENT PLATFORM NOTES ON SHEET 35/62 FOR THE SETTLEMENT PLATFORM LOCATIONS.
5. MSE WALL CIA BOUNDARY LIMITS OVERLAP MSE WALL C2A BOUNDARY LIMITS, THUS BEING A BACK-TO-BACK MSE WALL.

O	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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EX. GROUND ELEV. AT
FRONT FACE OF WALL

PROPOSED GUTTER
LINE ELEV.



ELEVATION

LEGEND:

= MSE WALL BOUNDARY LIMITS

BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-035-0-14	757+05	13' LT.	731.4±
B-037-0-14	759+59	8' RT.	741.9±
B-026-2-65	757+23	24' RT.	737.6±

NOTES:

- REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY
- REFER TO SHEET 45/62 FOR LIMITS OF STONE COLUMNS.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

HAM-71-3.81
PID No. 77628

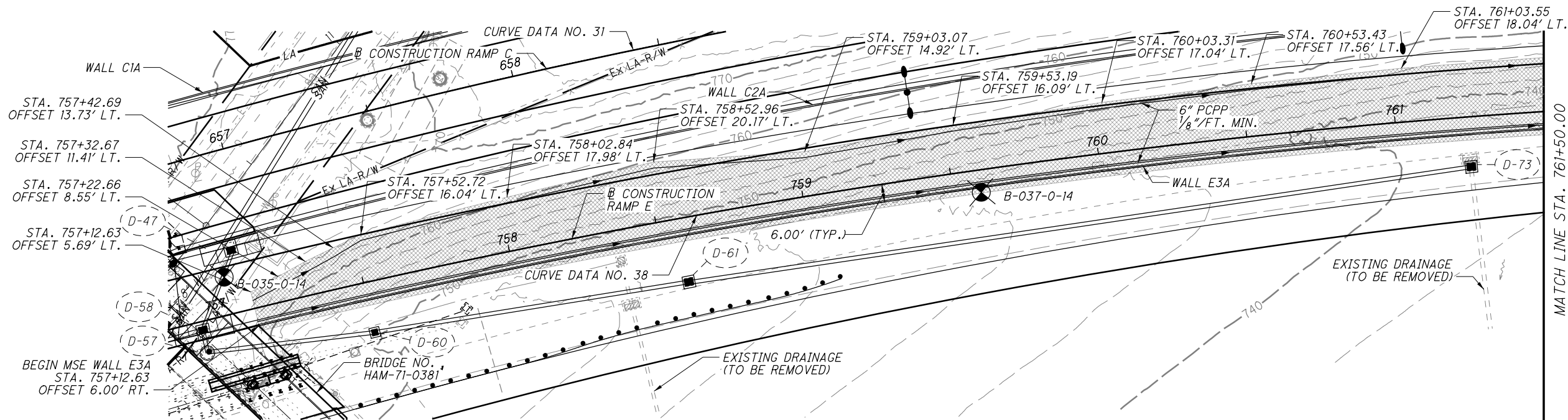
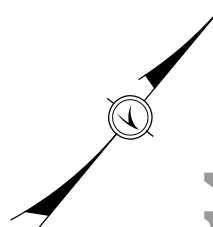
PLAN AND ELEVATION (SHEET 1 OF 3)
WALL E3A (MSE WALL)

DESIGNED	JML	CHECKED	DWW
DRAWN	JML	REVISED	
REVIEWED	CHN	DATE	10/23/14

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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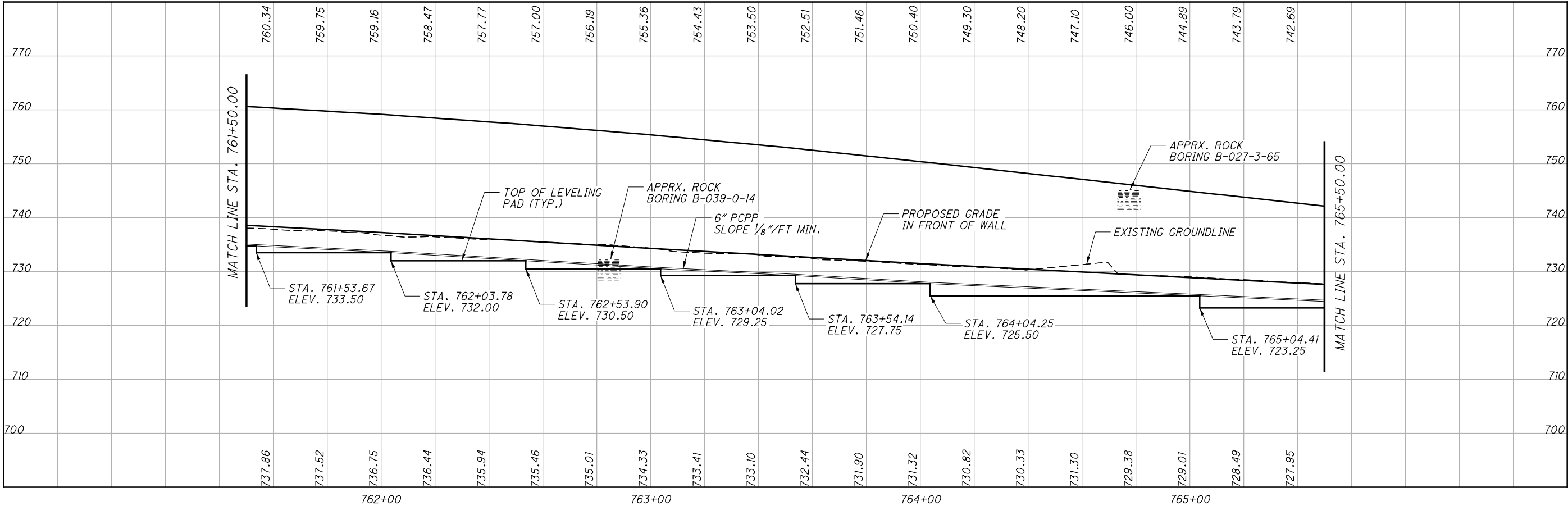


PLAN

MATCH LINE STA. 761+50.00

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EX. GROUND ELEV. AT
FRONT FACE OF WALL



ELEVATION

LEGEND:

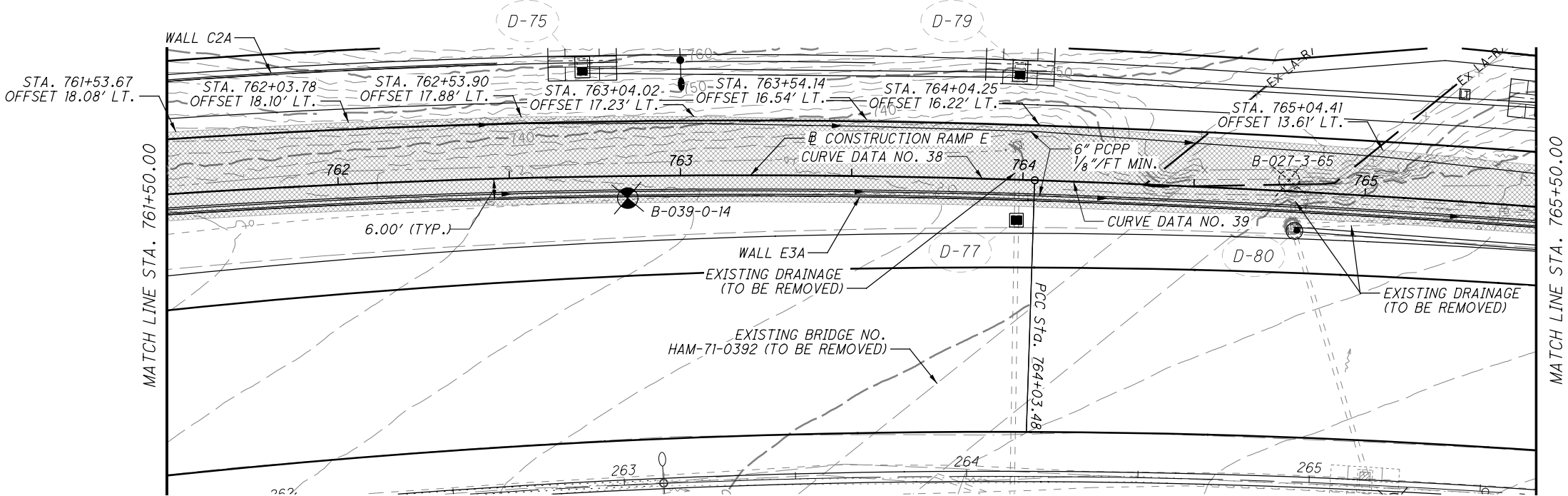
▨ = MSE WALL BOUNDARY LIMITS

BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-039-0-14	762+85	7' RT.	732.4±
B-027-3-65	764+77	3' RT.	745.2±

NOTES:

- REFER TO SHEET 3/20 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		



PLAN

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PLAN AND ELEVATION (SHEET 2 OF 3)

HAM-71-3.81
PID No. 77628

10/62

52
120

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9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DESIGNED
JML

DRAWN
JML

REVIEWED
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DATE
10/23/14

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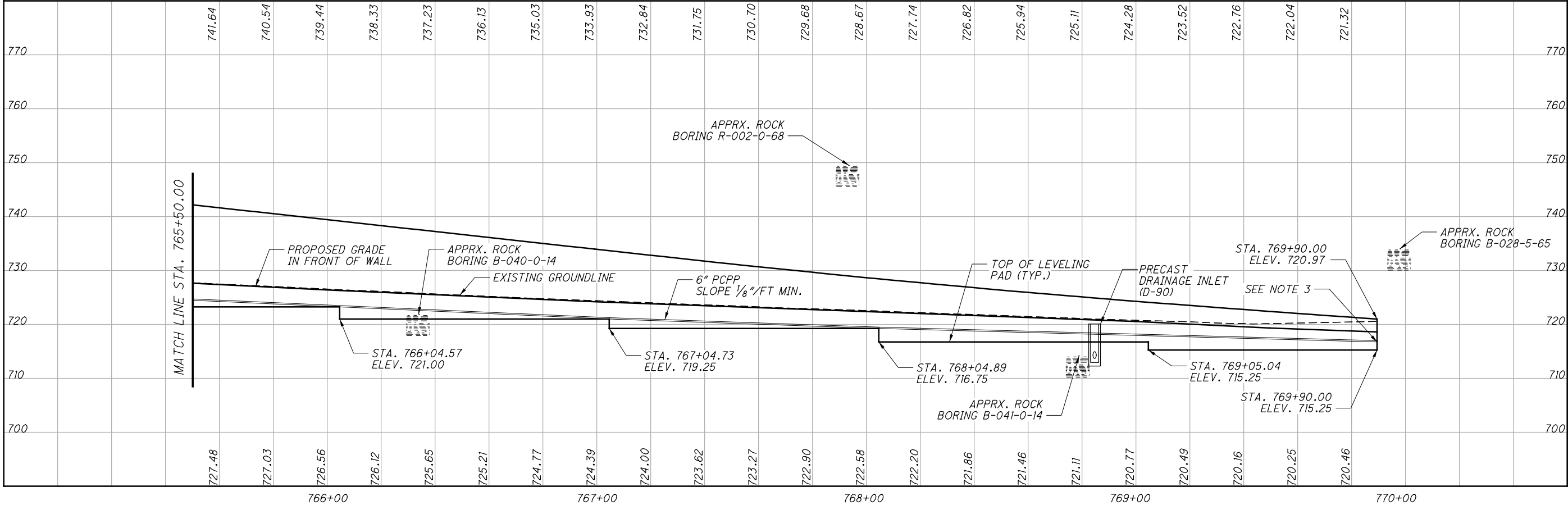
REVISIONS

REVISIONS

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EX. GROUND ELEV. AT
FRONT FACE OF WALL

PROPOSED GUTTER
LINE ELEV.



ELEVATION

LEGEND:

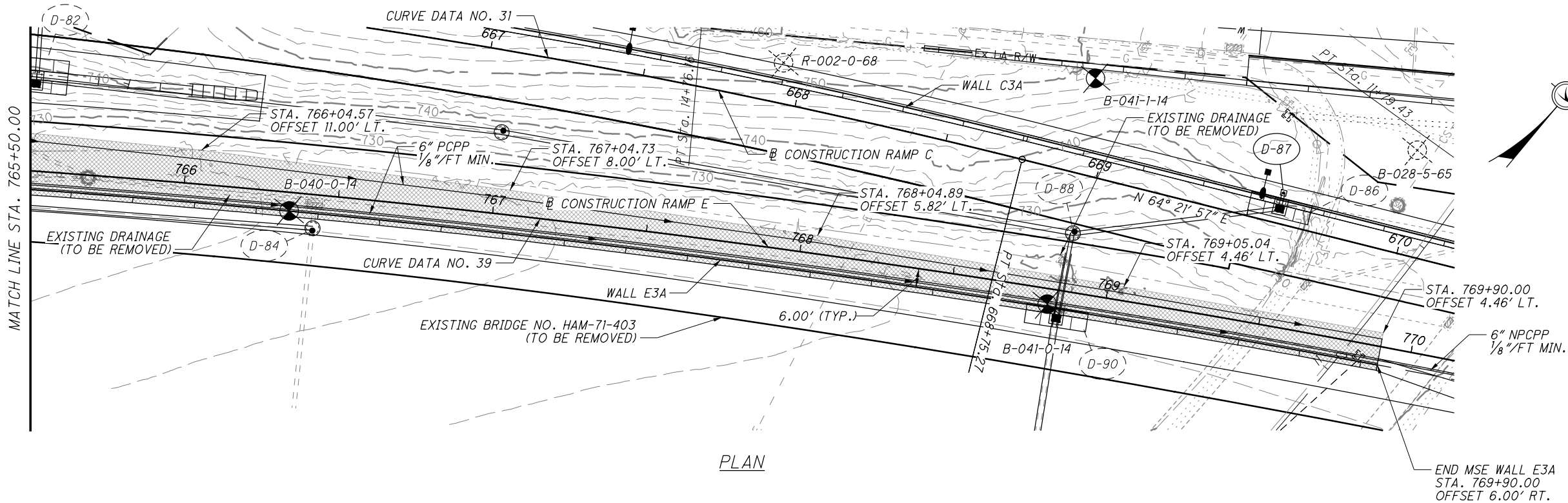
= MSE WALL BOUNDARY LIMITS

BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-040-0-14	766+35	6' RT.	721.9±
B-041-0-14	768+82	5' RT.	714.2±
B-028-5-65	769+90	65' LT.	733.9±
R-002-0-68	767+87	60' LT.	749.5±

NOTES:

1. REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.
2. VERTICAL SCALE IS EXAGGERATED FOR CLARITY.
3. CONNECT 6" DRAIN PIPE TO CATCH BASIN D-102.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		



PLAN

RELEASED FOR CONSTRUCTION 12/23/2014

PLAN AND ELEVATION (SHEET 3 OF 3)

WALL E3A (MSE WALL)

HAM-71-3.81
PID No. 77628

11/62

53
120

DESIGN AGENCY
HOR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

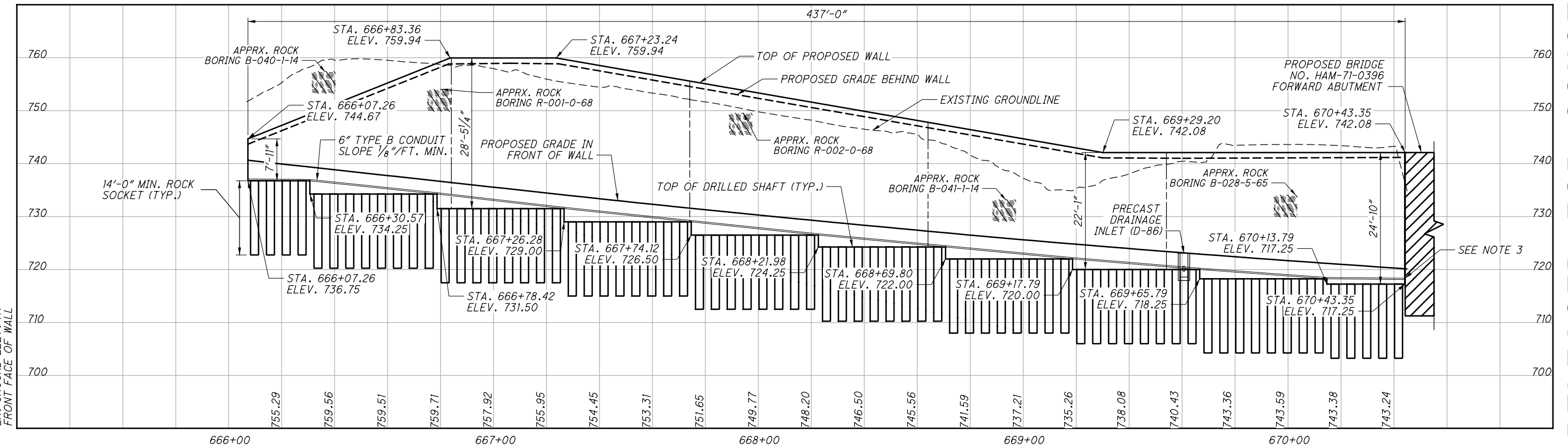
DATE
10/23/14

REVIEWED
CHN

DRAWN
JML
CHECKED
DWW

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EX. GROUND ELEV. AT
FRONT FACE OF WALL



BORING LOCATIONS (RAMP E)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-040-1-14	766+31	62' LT.	757.4±
B-041-1-14	768+85	70' LT.	733.2±
BORING LOCATIONS (RAMP C)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-028-5-65	669+98	34' LT.	733.9±
R-001-0-68	666+82	42' LT.	754.0±
R-002-0-68	667+93	13' LT.	749.5±

NOTES:

- REFER TO SHEET 3/20 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.
- CONNECT WALL C3A UNDERDRAIN TO WALL C3B UNDERDRAIN.
- STATION AND OFFSETS SHOWN AT FRONT FACE OF CONCRETE WALL FACING.

ELEVATION

- SEE SHEET 61/62 FOR PILE INFORMATION.
- THE ROCK SOCKETS SHALL EXTEND FROM THE PLANNED TOP OF DRILLED SHAFT TO A MINIMUM OF 14 FEET INTO INTERBEDDED GRAY SHALE AND LIMESTONE.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

12/62

54
120

PLAN AND ELEVATION
WALL C3A (SOLDIER PILE WALL)

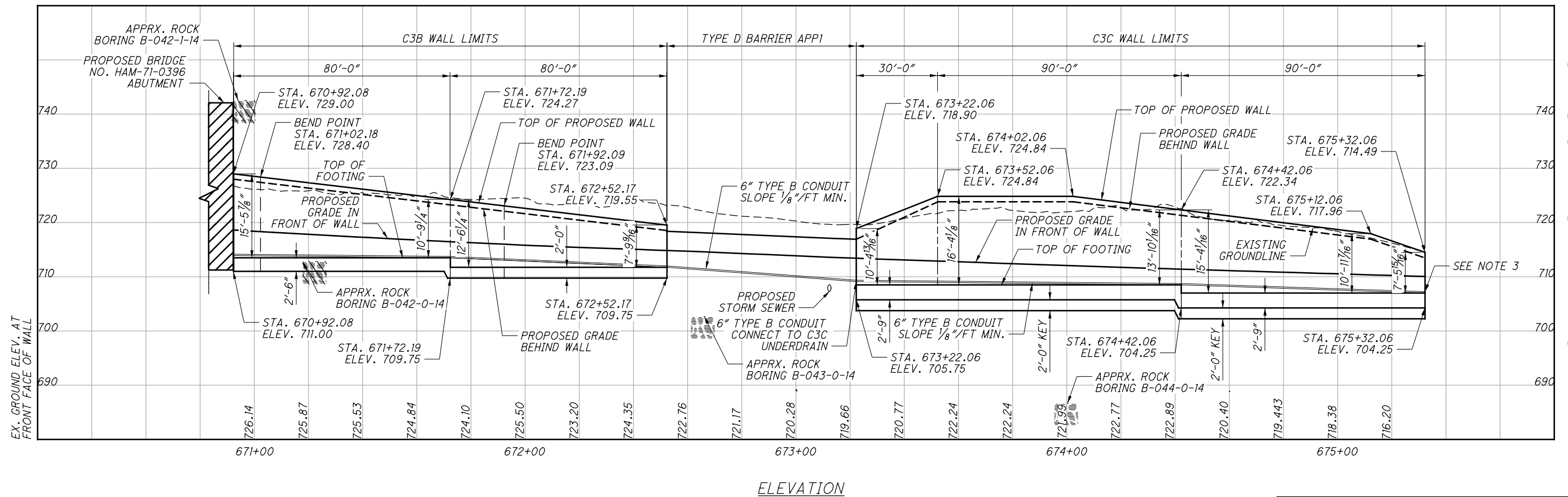
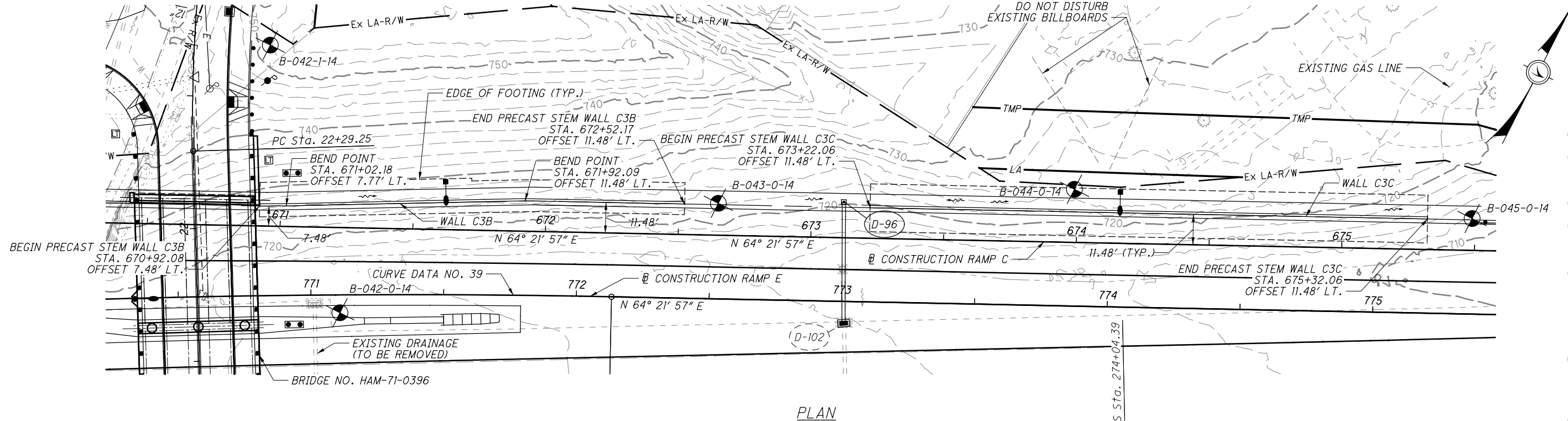
DESIGNED
JML
CHECKED
JPC

DRAWN
JML
REVISED

REVIEWED
CHN
DATE
10/23/14

DESIGN AGENCY
HOR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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BORING LOCATIONS (RAMP C)			
BORING	STATION	OFFSET	TOP OF ROCK ELEV.
B-042-0-14	671+23	32' RT.	712.8±
B-042-1-14	670+95	68' LT.	742.5±
B-043-0-14	672+65	12' LT.	702.7±
B-044-0-14	673+99	20' LT.	686.7±
B-045-0-14	675+49	12' LT.	N/A

NOTES:

- REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.
- VERTICAL SCALE IS EXAGGERATED FOR CLARITY.
- CONNECT WALL C3C UNDERDRAIN TO CATCH BASIN D-105.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

PLAN AND ELEVATION
WALLS C3B AND C3C (PRECAST WALLS)

DESIGNED JML
CHECKED RBK
DRAWN JML
REVIEWED CHN
DATE 10/23/14

DESIGN AGENCY
HDR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500
HDR

13/62

55
120

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GENERAL NOTES - PRECAST STEM WALLS

FOUNDATION BEARING RESISTANCE:

RETAINING WALL FOOTING, AS DESIGNED, PRODUCES THE FOLLOWING:

WALL	STATION		MAXIMUM SERVICE LOAD PRESSURE	MAXIMUM STRENGTH LOAD PRESSURE	FACTORED BEARING RESISTANCE
	FROM	TO			
RAMP C					
C3B	670+92.08	671+72.19	5.24 KSF	8.44 KSF	11.30 KSF
C3B	671+72.19	672+52.17	2.39 KSF	3.55 KSF	7.00 KSF
C3C	673+22.06	675+32.06	2.32 KSF	3.44 KSF	3.90 KSF
RAMP E					
E1A	741+69.74	748+00.63	6.61 KSF	10.57 KSF	13.80 KSF
E1C	749+16.80	751+56.09	5.85 KSF	9.44 KSF	13.80 KSF

GEOTECHNICAL PARAMETERS:

WALL C3B

SOIL FRICTION ANGLE = 30°
SOIL UNIT WEIGHT = 130 PCF
BACKSLOPE = 2:1

WALL C3C

SOIL FRICTION ANGLE = 30°
SOIL UNIT WEIGHT = 130 PCF
BACKSLOPE = 2:1
LIVE LOAD SURCHARGE = 270 PSF

WALL E1A

SOIL FRICTION ANGLE = 30°
SOIL UNIT WEIGHT = 135 PCF
BACKSLOPE = 2:1

WALL E1C

SOIL FRICTION ANGLE = 30°
SOIL UNIT WEIGHT = 135 PCF
BACKSLOPE = 2:1

FOOTINGS:

PLACE FOOTINGS AT THE ELEVATION SHOWN.

ITEM SPECIAL - STRUCTURE, MISC.: PRECAST WALL PANELS:

THIS WORK CONSISTS OF FURNISHING AND PLACING PRECAST WALL PANELS. SHOP DRAWINGS SHALL BE PROVIDED ACCORDING TO CMS 501.05.

MATERIALS:

PROVIDE CONCRETE ACCORDING TO CMS 511. PROVIDE EPOXY COATED REINFORCING STEEL ACCORDING TO CMS 709.

MANUFACTURE:

PROVIDE PRECAST CONCRETE FROM A PRECAST CONCRETE MANUFACTURER CERTIFIED UNDER SUPPLEMENT 1073.

WALL ERECTION:

PANELS ARE HANDLED BY MEANS OF A LIFTING DEVICE CONNECTED TO THE LIFTING INSERT WHICH IS CAST INTO THE UPPER EDGE OR BACK SIDE OF THE PANELS. ALL PANELS SHALL BE BRACED TO RESIST THE TEMPORARY CONSTRUCTION LOADS INCLUDING WIND LOADS, PRIOR TO FOOTING CONSTRUCTION.

FORM LINER:

PROVIDE AESTHETIC TREATMENTS TO THE CONCRETE SURFACES OF PRECAST STEM WALL AS SHOWN IN THE PLANS. FOR ADDITIONAL INFORMATION, SEE NOTE ON SHEET 2 / 62.

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

HAM-71-3.81

PID No. 77628

14 / 62

56

120

GENERAL NOTES

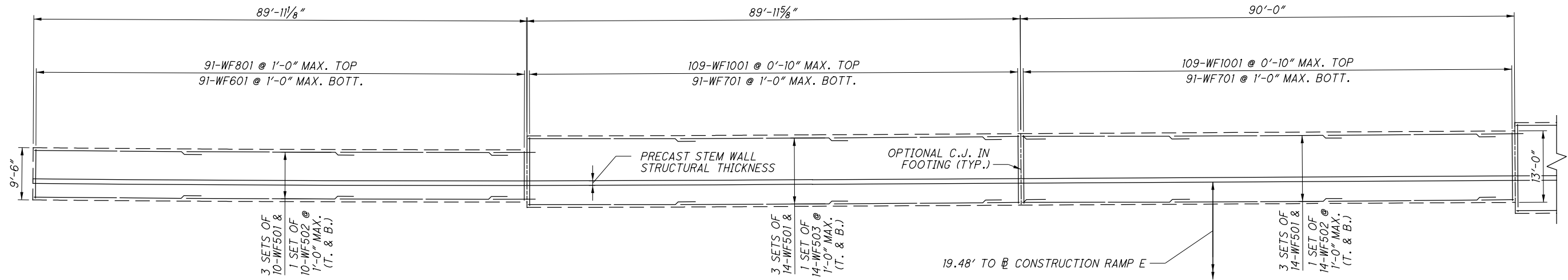
PRECAST STEM WALLS E1A, E1C, C3B AND C3C

DESIGN AGENCY

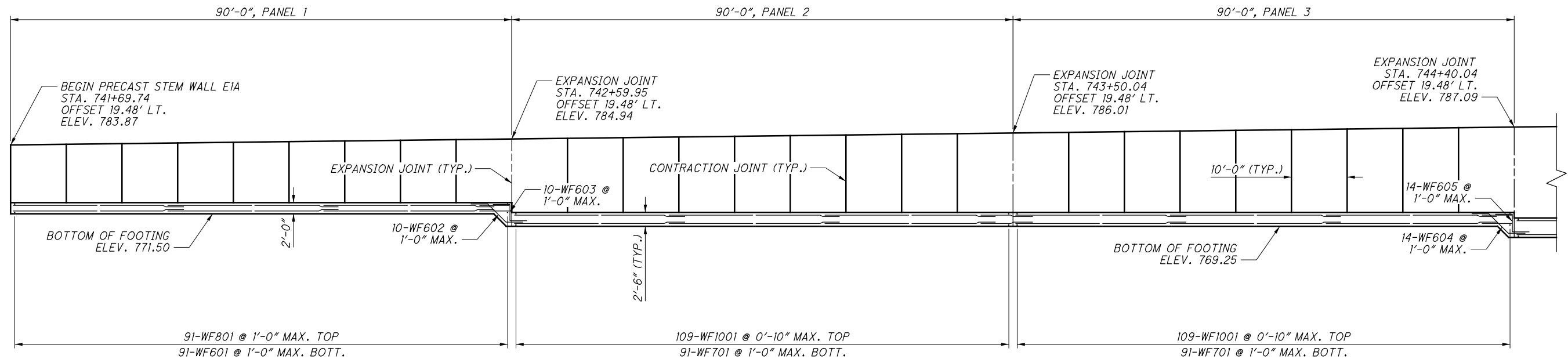
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9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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FOOTING PLAN



ELEVATION
(LOOKING NORTHWEST)

NOTES:

- DIMENSIONS IN ELEVATION VIEW ARE MEASURED ALONG FRONT FACE OF WALL.
- MIN. LAP FOR #5 BAR = 42".
- DIMENSIONS OF FOOTING IN PLAN VIEW ARE MEASURED ALONG HEEL FACE OF FOOTING.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

15 / 62

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120

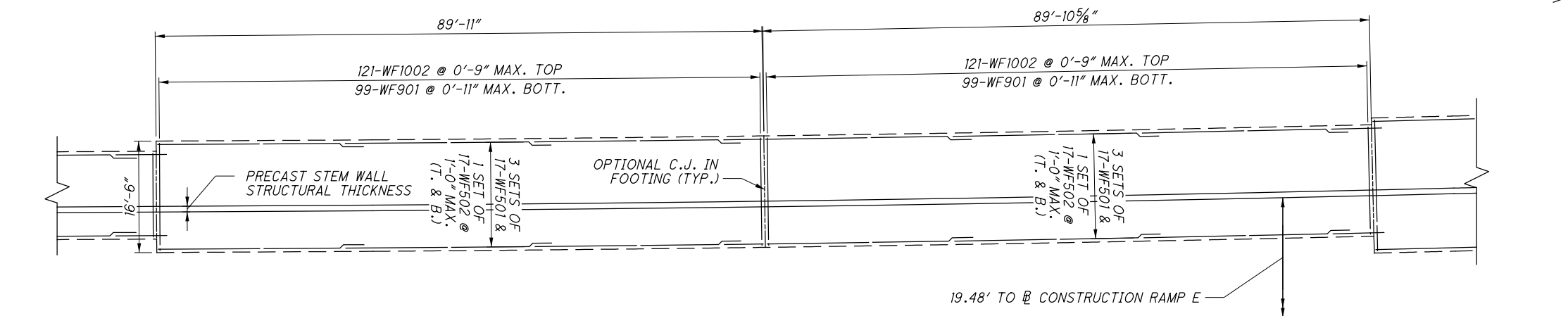
PRECAST STEM WALL DETAILS
WALL EIA FOOTING PLAN AND ELEVATION

DESIGNED	JML	CHECKED	RBK
DRAWN	JML	REVIEWED	CHN
DATE	10/23/14		

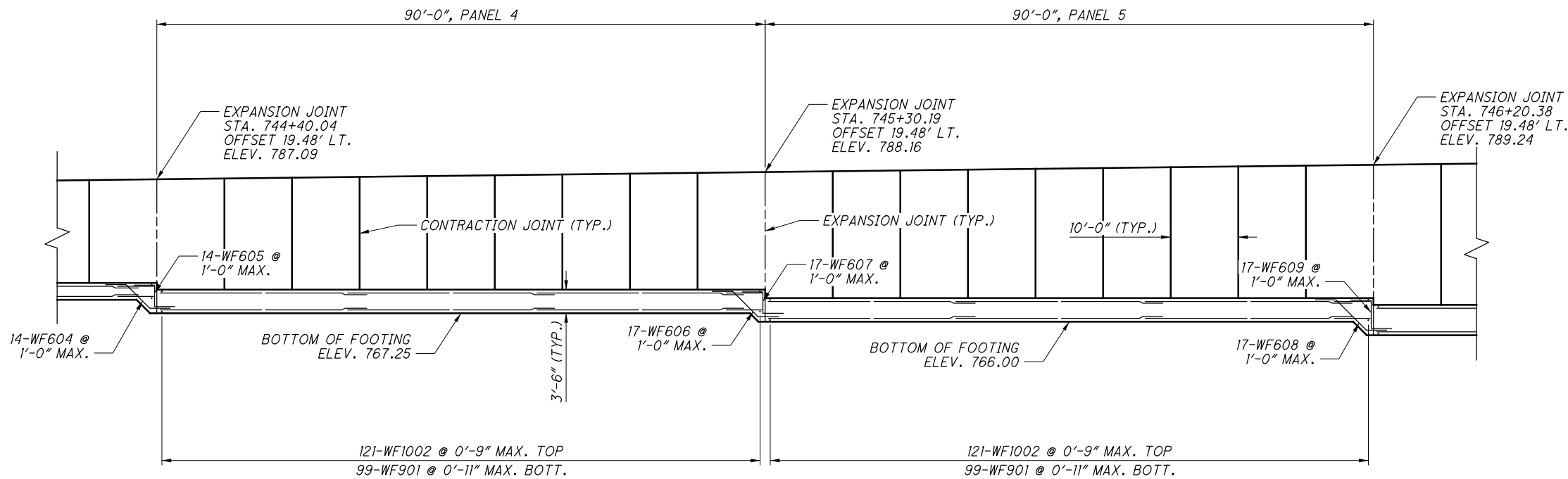
DESIGN AGENCY
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CINCINNATI, OHIO 45242
513-984-7500

HDR

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FOOTING PLAN



ELEVATION
(LOOKING NORTHWEST)

NOTES:

1. DIMENSIONS IN ELEVATION VIEW ARE MEASURED ALONG FRONT FACE OF WALL.
2. MIN. LAP FOR #5 BAR = 42".
3. DIMENSIONS OF FOOTING IN PLAN VIEW ARE MEASURED ALONG HEEL FACE OF FOOTING.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

16 / 62

58
120

PRECAST STEM WALL DETAILS
WALL EIA FOOTING PLAN AND ELEVATION

DESIGNED
JML

CHECKED
RBK

DRAWN
JML

REVISED

REVIEWED
CHN

DATE
10/23/14

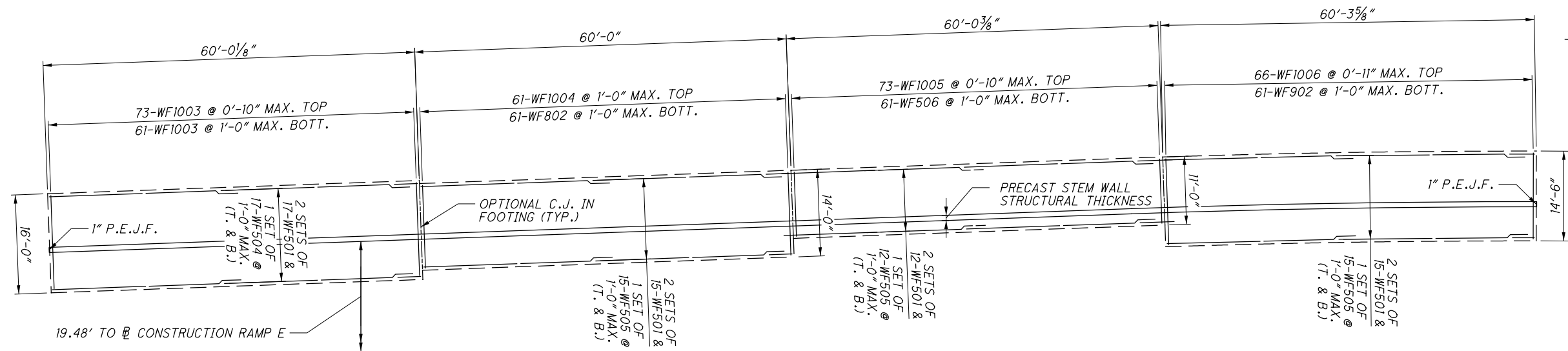
DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-384-7500

513-384-7500

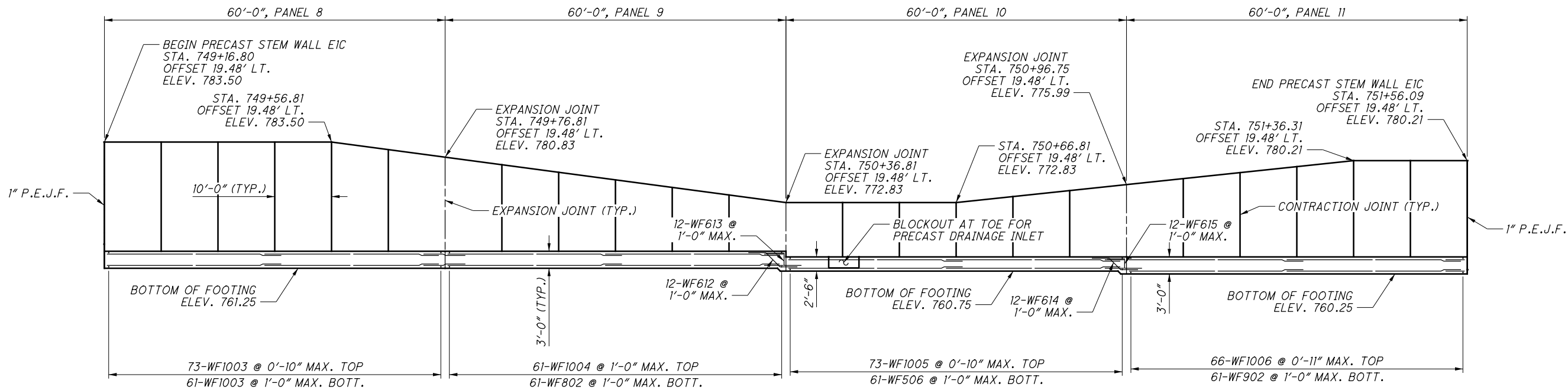
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		



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FOOTING PLAN



ELEVATION
(LOOKING NORTHWEST)

- NOTES:
- DIMENSIONS IN ELEVATION VIEW ARE MEASURED ALONG FRONT FACE OF WALL.
 - MIN. LAP FOR A #5 BAR = 42".
 - FIELD CUT BARS AROUND INLET BLOCKOUT TO MAINTAIN 3" CLEARANCE FROM FACE OF CONCRETE.
 - DIMENSIONS OF FOOTING IN PLAN VIEW ARE MEASURED ALONG HEEL FACE OF FOOTING.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

PRECAST STEM WALL DETAILS
WALL EIC FOOTING PLAN AND ELEVATION

HAM-71-3.81
PID No. 77628

18/62

60
120

DESIGN AGENCY
HDR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

REVIEWED
CHN

DRAWN
JML

DESIGNED
JML

CHECKED
RBK

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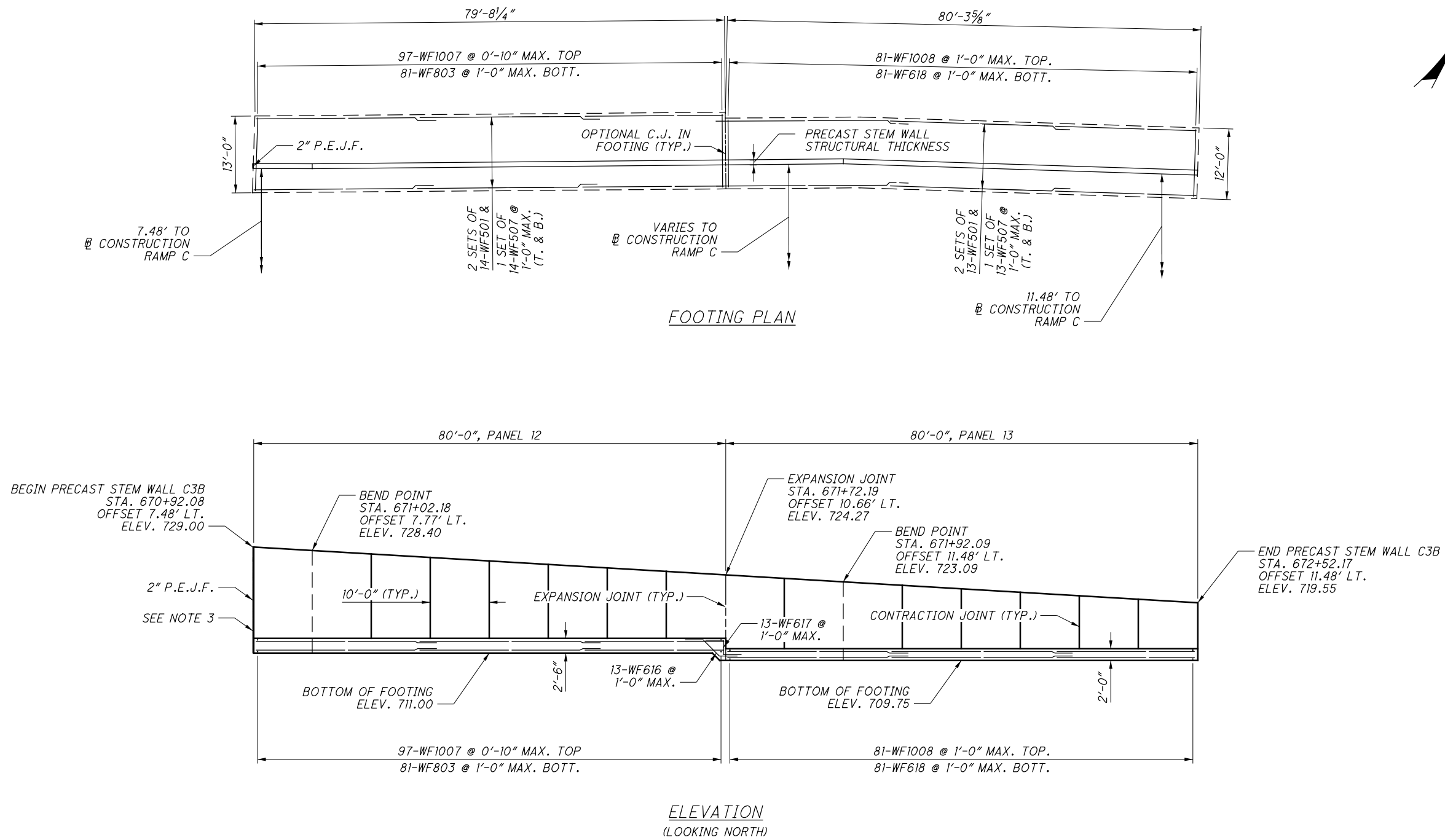
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NOTES:

1. DIMENSIONS IN ELEVATION VIEW ARE MEASURED ALONG FRONT FACE OF WALL.
2. MIN. LAP FOR A #5 BAR = 42".
3. 3'-0" WIDE, CENTERED ON JOINT, TYPE 2 WATERPROOFING, TOP OF FOOTING TO 6" BELOW FINISHED GRADE.
4. DIMENSIONS OF FOOTING IN PLAN VIEW ARE MEASURED ALONG HEEL FACE OF FOOTING.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

19/62

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120

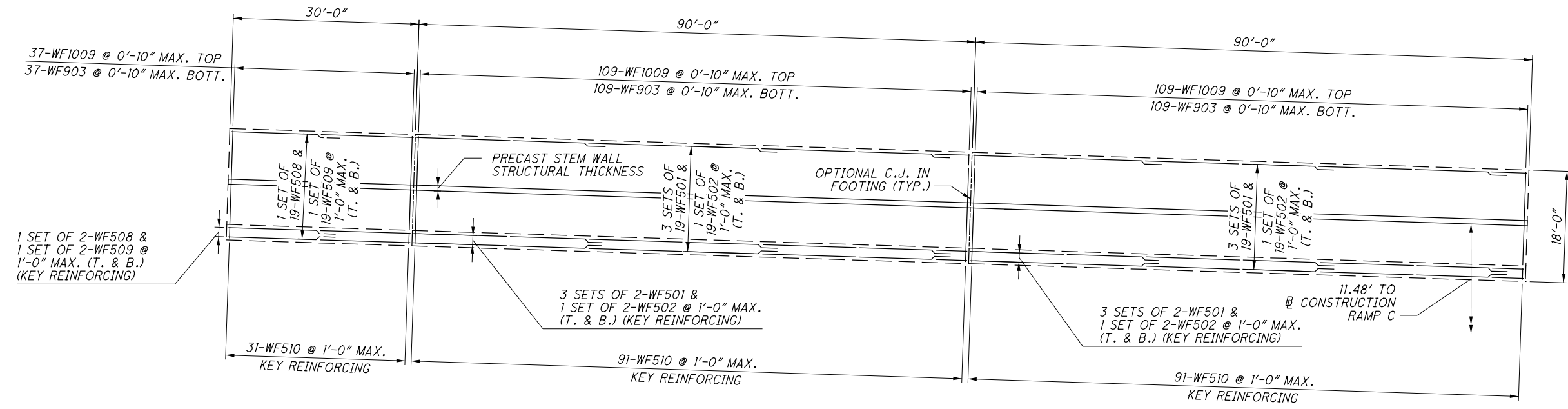
PRECAST STEM WALL DETAILS
WALL C3B FOOTING PLAN AND ELEVATION

DESIGNED	DRAWN	REVIEWED	DATE
JML	JML	CHN	10/23/14
CHECKED	REVISED		
RBK			

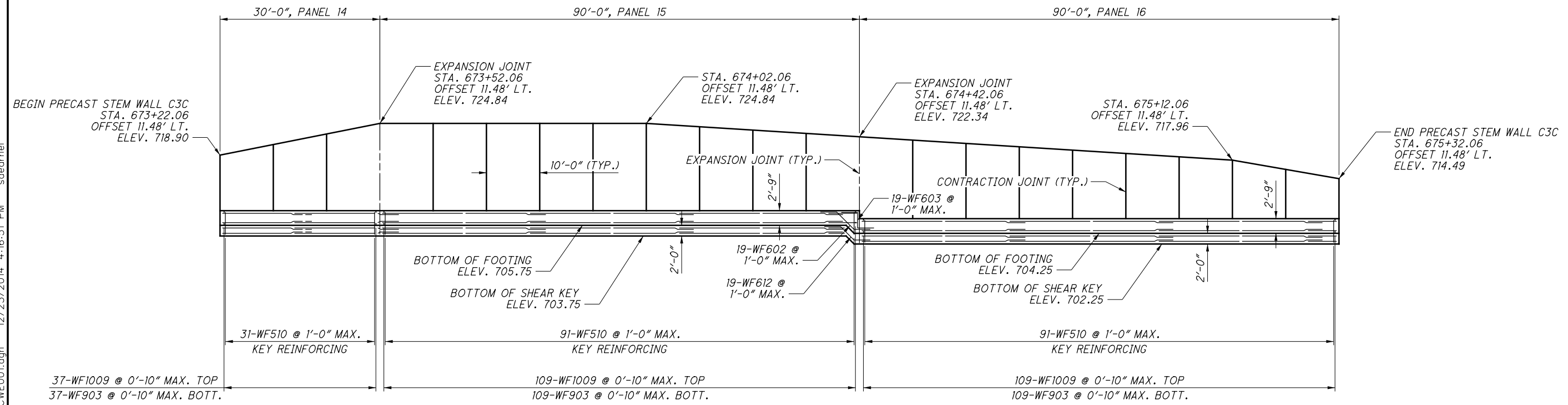
DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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FOOTING PLAN



ELEVATION
(LOOKING NORTH)

NOTES:

1. DIMENSIONS IN ELEVATION VIEW ARE MEASURED ALONG FRONT FACE OF WALL.
2. MIN. LAP FOR A #5 BAR = 42".
3. DIMENSIONS OF FOOTING IN PLAN VIEW ARE MEASURED ALONG HEEL FACE OF FOOTING.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

PRECAST STEM WALL DETAILS
WALL C3C FOOTING PLAN AND ELEVATION

HAM-71-3.81
PID No. 77628

20/62

62
120

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513-984-7500

DATE
10/23/14

REVIEWED
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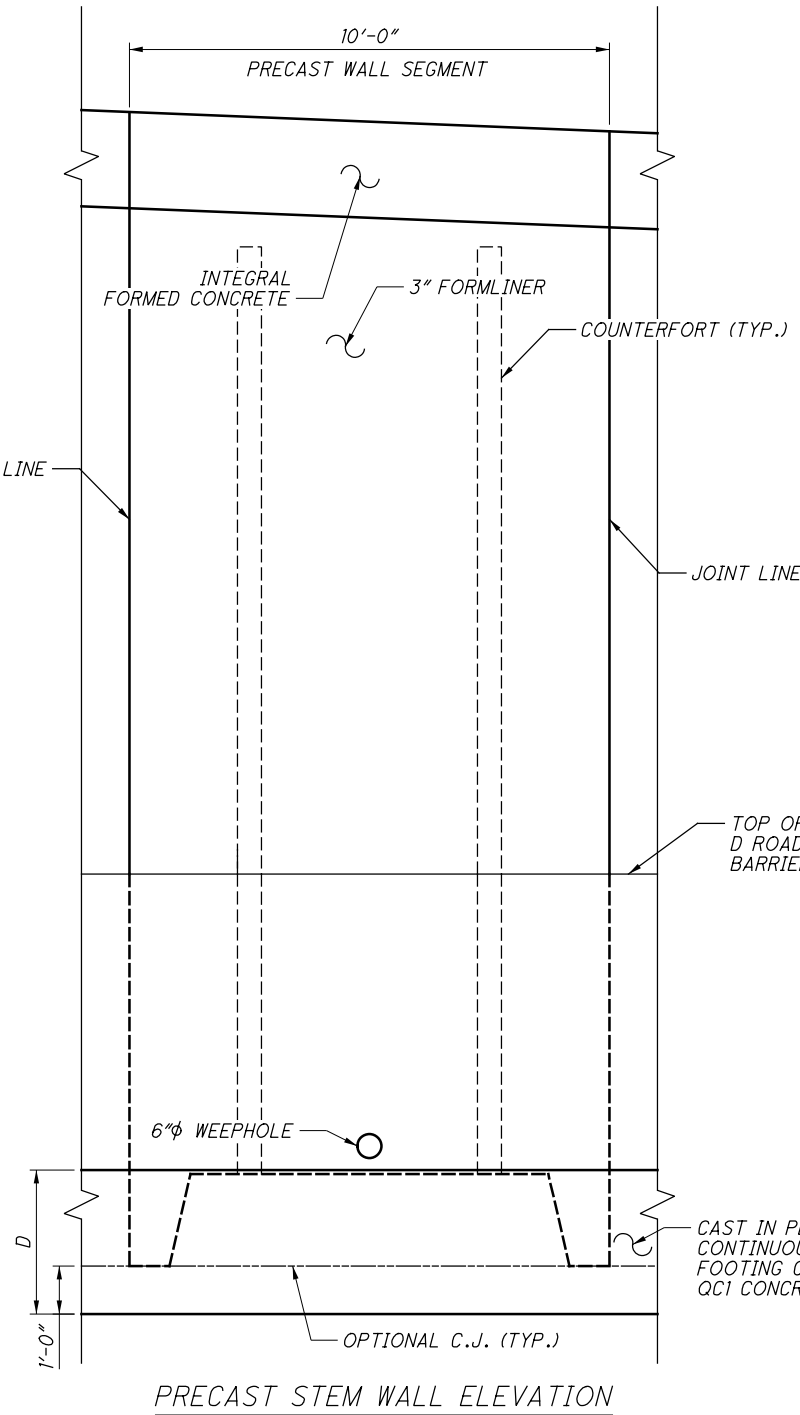
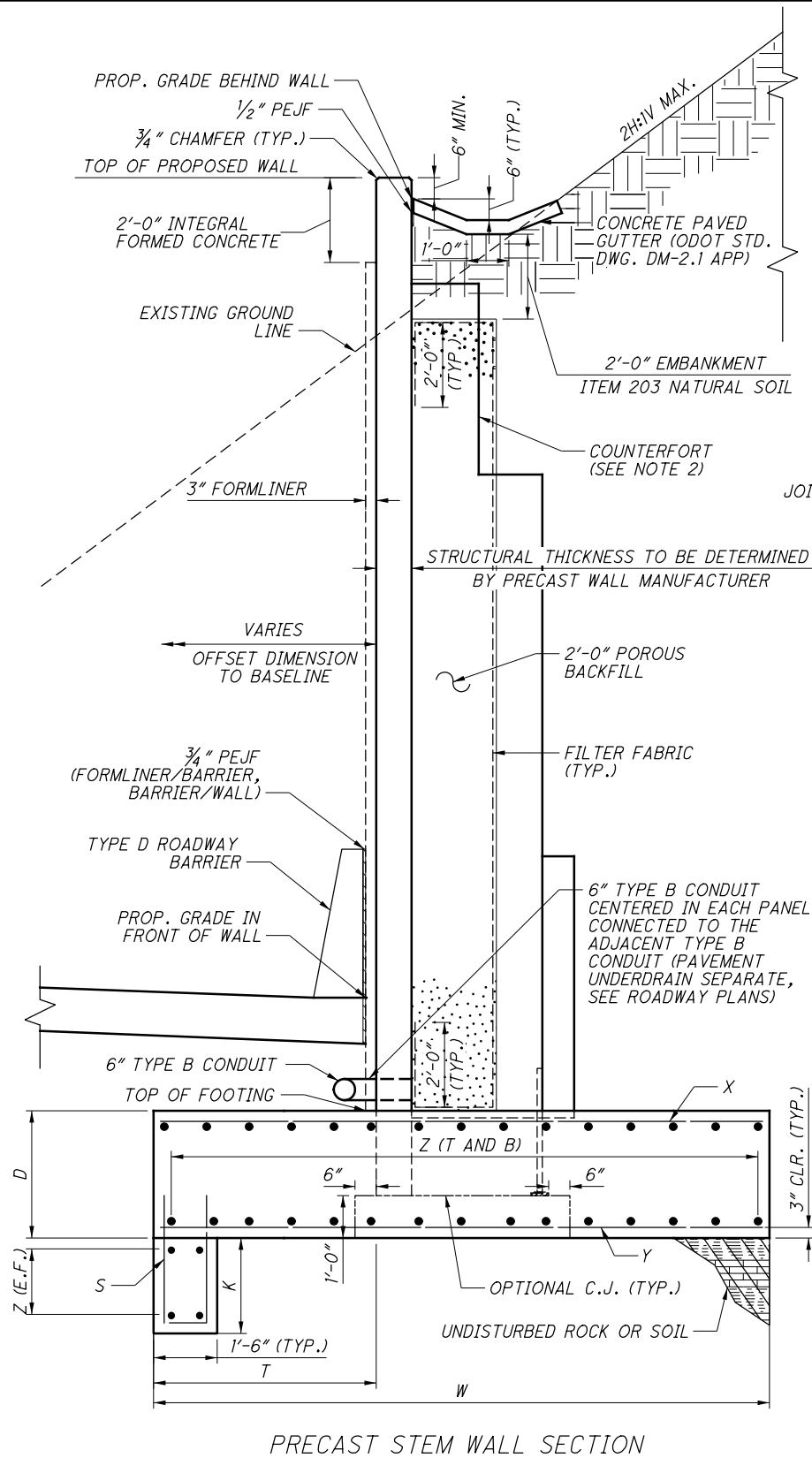
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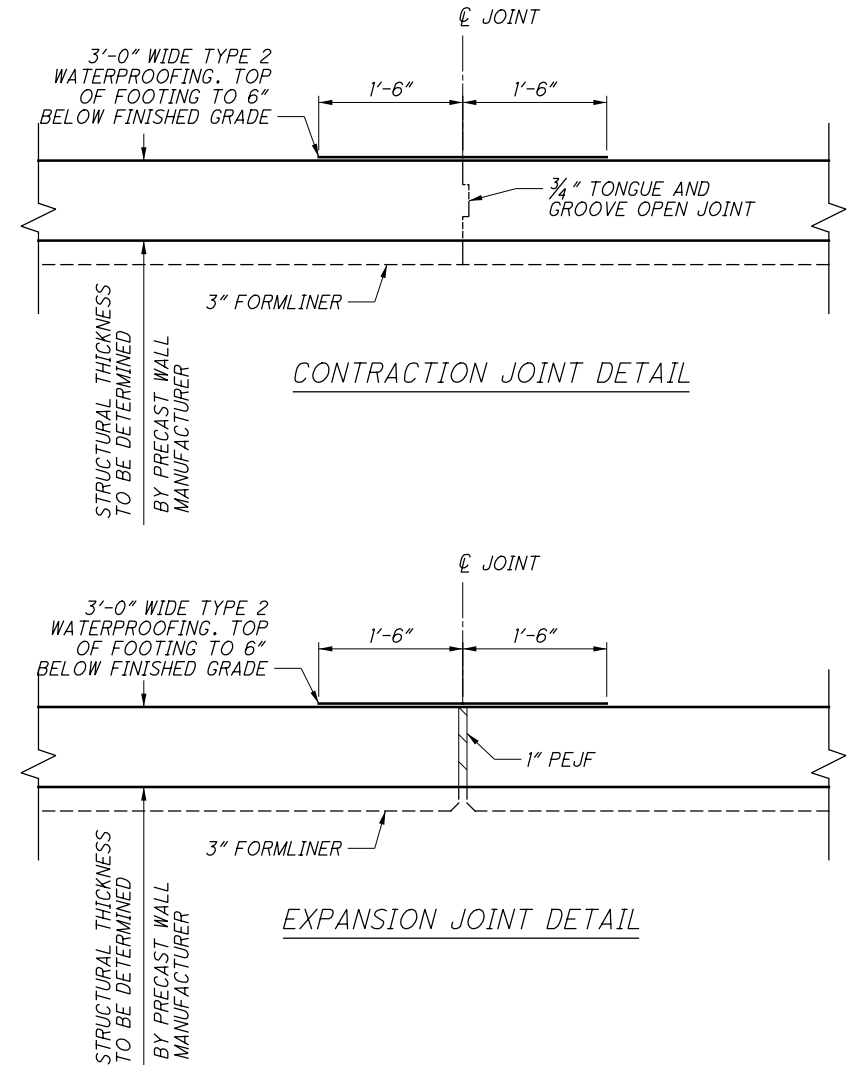
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PRECAST STEM WALL FOOTING DIMENSIONS							FOOTING REINFORCING			
WALL LETTER	FROM STA.	TO STA.	W	D	T	K	S	X	Y	Z
C3B	670+92.08	671+72.19	13.00'	2.50'	4.00'	0.00'	-	#10@10"	#8@12"	#5@12"
C3B	671+72.19	672+52.17	12.00'	2.00'	4.00'	0.00'	-	#10@12"	#6@12"	#5@12"
C3C	673+22.06	675+32.06	18.00'	2.75'	9.00'	2.00'	#5@12"	#10@10"	#9@10"	#5@12"
E1A	741+69.74	742+59.95	9.50'	2.00'	3.00'	0.00'	-	#8@12"	#6@12"	#5@12"
E1A	742+59.95	744+40.04	13.00'	2.50'	4.00'	0.00'	-	#10@10"	#7@12"	#5@12"
E1A	744+40.04	746+20.38	16.50'	3.50'	6.00'	0.00'	-	#10@9"	#9@11"	#5@12"
E1A	746+20.38	748+00.63	20.00'	4.50'	8.50'	0.00'	-	#11@10"	#11@10"	#5@12"
E1C	749+16.80	749+76.81	16.00'	3.00'	6.50'	0.00'	-	#10@10"	#10@12"	#5@12"
E1C	749+76.81	750+36.81	14.00'	3.00'	5.00'	0.00'	-	#10@12"	#8@12"	#5@12"
E1C	750+36.81	750+96.75	11.00'	2.50'	2.00'	0.00'	-	#10@10"	#5@12"	#5@12"
E1C	750+96.75	751+56.09	14.50'	3.00'	5.50'	0.00'	-	#10@11"	#9@12"	#5@12"



NOTES:

- FIELD ADJUST TRANSVERSE AND LONGITUDINAL REINFORCEMENT AS REQUIRED TO AVOID PRECAST PANEL LEGS.
- COUNTERFORT STEPS AND DIMENSIONS TO BE DETERMINED BY MANUFACTURER AND PROVIDED IN SHOP DRAWINGS.
- FILTER FABRIC SHOWN IN PRECAST STEM WALL SECTION REPRESENTS THE CONDITION BETWEEN COUNTERFORTS. AT PANEL JOINTS, PROVIDE ADDITIONAL FULL HEIGHT FILTER FABRIC (3'-0" WIDE MIN.) BETWEEN WALL PANELS AND POROUS BACKFILL.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

21/62

63
120

PRECAST STEM WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALLS E1A, E1C, C3B AND C3C)

DESIGNED	JML	CHECKED	RBK
DRAWN	JML	REVISED	
REVIEWED	CHN		
DATE	10/23/14		

DESIGN AGENCY
HOR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1500

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DESIGN SPECIFICATIONS:

THE SOIL NAIL WALL HAS BEEN DESIGNED IN ACCORDANCE WITH THE DESIGN PROCEDURES PRESENTED IN THE FHWA "GEOTECHNICAL ENGINEERING CIRCULAR NO. 7, SOIL NAIL WALLS", PUBLICATION NO. FHWA-IF-03-017. STRUCTURAL DESIGN OF ANY INDIVIDUAL WALL ELEMENTS NOT COVERED IN THE FHWA MANUAL HAVE BEEN DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS 12TH EDITION AND ALL INTERIM SPECIFICATIONS.

DESIGN SOIL PARAMETERS:

SOIL/ROCK TYPE	ULTIMATE FRICTION ANGLE (DEGREES)	ULTIMATE BOND STRESS (PSI)	UNIT WEIGHT (PCF)	ULTIMATE PULLOUT RESISTANCE LB/FT	ALLOWABLE PULLOUT RESISTANCE LB/FT
RESIDUUM	27	6	135	1350	675
INTERBEDDED SHALE AND LIMESTONE	35	18	150	4000	2000

DESIGN LOADING:

LIVE LOAD SURCHARGE (LS) = 0.25 KSF

DESIGN DATA:

CONCRETE CLASS QC1 - COMPRESSIVE STRENGTH 4.0 KSI (CIP WALL FACING)

SHOTCRETE - COMPRESSIVE STRENGTH 4 KSI

REINFORCING STEEL - MINIMUM YIELD STRENGTH 60 KSI (EPOXY COATED)

WELDED WIRE FABRIC (ASTM A185) - MINIMUM YIELD STRENGTH 60 KSI (PLAIN)

NAIL BAR, WASHERS, NUTS AND HEADED STUDS - MINIMUM YIELD STRENGTH 60 KSI

STRUCTURAL STEEL - ASTM A36 GRADE 36 - YIELD STRENGTH 36 KSI (BEARING PLATE)

NAIL GROUT - COMPRESSIVE STRENGTH 3 KSI

SOIL NAIL: AASHTO M31/ASTM A615 GRADE 60 DEFORMED BAR, CONTINUOUS WITHOUT SPLICES OR WELDS.
STRUCTURE STEEL: AASHTO M183/ASTM A36
HEAD STUDS: AASHTO A307

MATERIALS:

MATERIALS FOR SOIL NAIL STRUCTURES SHALL CONSIST OF THE FOLLOWING:

SOLID BAR NAIL TENDONS:
AASHTO M31/ASTM A615, GRADE 60. DEFORMED BAR, CONTINUOUS WITHOUT SPLICES OR WELDS, NEW, STRAIGHT, UNDAMAGED, EPOXY COATED. THREADED A MINIMUM OF 6 INCHES ON THE WALL ANCHORAGE END TO ALLOW PROPER ATTACHMENT OF BEARING PLATE AND NUT. THREADING MAY BE CONTINUOUS SPIRAL DEFORMED RIBBING PROVIDED BY THE BAR DEFORMATIONS (E.G. CONTINUOUS THREADBARS) OR MAY BE CUT INTO A REINFORCING BAR. IF THREADS ARE CUT INTO A REINFORCING BAR, PROVIDE THE NEXT LARGER BAR NUMBER DESIGNATION FROM THAT SHOWN ON THE PLANS.

FUSION BONDED EPOXY COATING:
ASTM A775. MINIMUM 0.016 INCH THICKNESS ELECTROSTATICALLY APPLIED. BEND TEST REQUIREMENTS ARE WAIVED. COATING AT THE WALL ANCHORAGE END OF EPOXY COATED BARS MAY BE OMITTED OVER THE LENGTH PROVIDED FOR THREADING THE NUT AGAINST THE BEARING PLATE.

CENTRALIZERS:
MANUFACTURED FROM SCHEDULE 40 PVC PIPE OR TUBE, STEEL OR OTHER MATERIAL NOT DETRIMENTAL TO THE NAIL STEEL (WOOD SHALL NOT BE USED); SECURELY ATTACHED TO THE NAIL BAR; SIZED TO POSITION THE NAIL BAR WITHIN 1 INCH OF THE CENTER OF THE DRILLHOLE; SIZED TO ALLOW TREMIE PIPE INSERTION TO THE BOTTOM OF THE DRILLHOLE; AND SIZED TO ALLOW GROUT TO FREELY FLOW UP THE DRILLHOLE.

NAIL GROUT:
NEAT CEMENT OR SAND/CEMENT MIXTURE WITH A MINIMUM 3-DAY COMPRESSIVE STRENGTH OF 1500 PSI AND A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI PER AASHTO T106/ASTM C109.

ADMIXTURES:
AASHTO M194/ASTM C494. ADMIXTURES WHICH CONTROL BLEED, IMPROVE FLOWABILITY, REDUCE WATER CONTENT AND RETARD SET MAY BE USED IN THE GROUT SUBJECT TO REVIEW AND ACCEPTANCE BY ODOT. ACCELERATORS ARE NOT PERMITTED. ADMIXTURES SHALL BE COMPATIBLE WITH THE GROUT AND MIXED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS

WELDED WIRE FABRIC:
AASHTO M55/ASTM A185.

REINFORCING BARS FOR SHOTCRETE FACING:
AASHTO M31/ASTM A615, GRADE 420, DEFORMED.

BEARING PLATES:
AASHTO M183/ASTM A36.

NUTS:
AASHTO M291, GRADE B, HEXAGONAL, FITTED WITH BEVELED WASHER OR SPHERICAL SEAT TO PROVIDE UNIFORM BEARING.

GEOCOMPOSITE DRAIN STRIP:
MIRADRAIN 6000, AMERDRAIN 500 OR APPROVED EQUAL.

MATERIALS HANDLING AND STORAGE:

STORE STEEL REINFORCEMENT ON SUPPORTS TO KEEP THE STEEL FROM CONTACTING THE GROUND. DAMAGE TO THE NAIL STEEL AS A RESULT OF ABRASION, CUTS, NICKS, WELDS, AND WELD SPLATTER SHALL BE CAUSE FOR REJECTION. DO NOT GROUND WELDING LEADS TO NAIL BARS. PROTECT NAIL STEEL FROM DIRT, RUST, AND OTHER DELETERIOUS SUBSTANCES PRIOR TO INSTALLATION. HEAVY CORROSION OR PITTING OF NAILS SHALL BE CAUSE FOR REJECTION. LIGHT RUST THAT HAS NOT RESULTED IN PITTING IS ACCEPTABLE. PLACE PROTECTIVE WRAP OVER ANCHORAGE END OF NAIL BAR TO WHICH BEARING PLATE AND NUT WILL BE ATTACHED TO PROTECT DURING HANDLING, INSTALLATION, GROUTING AND SHOTCRETING.

GENERAL NOTES - SOIL NAIL WALLS

MATERIALS HANDLING AND STORAGE (CONTINUED):

HANDLE AND STORE EPOXY COATED BARS IN A WAY THAT WILL PREVENT THEM FROM BEING DAMAGED BEYOND WHAT IS PERMITTED BY ASTM 3963. REPAIR DAMAGED EPOXY COATING IN ACCORDANCE WITH ASTM A775 AND THE COATER'S RECOMMENDATIONS USING AN EPOXY FIELD REPAIR KIT APPROVED BY THE EPOXY MANUFACTURER. REPAIRED AREAS SHALL HAVE A MINIMUM 012 INCH COATING THICKNESS.

SUBMITTALS:

AT LEAST 2 WEEKS PRIOR INITIATING THE SOIL NAIL WALL CONSTRUCTIONS, THE CONTRACTOR SHALL SUBMIT TO ODOT FOR REVIEW AND THEIR RECORDS.

- PROPOSED NAIL DRILLING METHODS AND EQUIPMENT INCLUDING DRILLHOLE DIAMETER PROPOSED TO ACHIEVE THE SPECIFIED PULLOUT RESISTANCE VALUES AND ANY VARIATION OF THESE ALONG THE WALL ALIGNMENT.
- NAIL GROUT MIX DESIGN INCLUDING:
 - TYPE OF PORTLAND CEMENT.
 - AGGREGATE SOURCE AND GRADATION.
 - PROPORTIONS OF MIX BY WEIGHT AND WATER/CEMENT RATIO.
 - MANUFACTURER, BRAND NAME AND TECHNICAL LITERATURE FOR PROPOSED ADMIXTURES.
 - COMPRESSIVE STRENGTH TEST RESULTS (PER AASHTO T106/ASTM C109) SUPPLIED BY A QUALIFIED INDEPENDENT TESTING LAB VERIFYING THE SPECIFIED MINIMUM 3-DAY AND 28-DAY GROUT COMPRESSIVE STRENGTHS. PREVIOUS TEST RESULTS FOR THE PROPOSED GROUT MIX COMPLETED WITHIN ONE YEAR OF THE START OF GROUTING MAY BE SUBMITTED FOR INITIAL VERIFICATION AND ACCEPTANCE OF THE REQUIRED COMPRESSIVE STRENGTHS AND START OF PRODUCTION WORK. DURING PRODUCTION, THE NAIL GROUT SHALL BE TESTED AT A FREQUENCY OF NO LESS THAN ONE TEST FOR EVERY 50 CUBIC YARDS OF GROUT PLACED, WITH THE GROUT CUBE TEST RESULTS PROVIDED TO ODOT WITHIN 24 HOURS OF TESTING.
- PROPOSED NAIL GROUT PLACEMENT PROCEDURES AND EQUIPMENT.
- SHOTCRETE MIX DESIGN INCLUDING:
 - TYPE OF PORTLAND CEMENT.
 - AGGREGATE SOURCE AND GRADATION.
 - PROPORTIONS OF MIX BY WEIGHT AND WATER-CEMENT RATIO.
 - MANUFACTURER, BRAND NAME, DOSAGE, AND TECHNICAL LITERATURE FOR PROPOSED ADMIXTURES.
 - PREVIOUS STRENGTH TEST RESULTS FOR THE PROPOSED SHOTCRETE MIX COMPLETED WITHIN ONE YEAR OF THE START OF SHOTCRETING MAY BE SUBMITTED FOR INITIAL VERIFICATION OF THE REQUIRED COMPRESSIVE STRENGTHS AT START OF PRODUCTION WORK.
- PROPOSED METHODS OF SHOTCRETE PLACEMENT AND OF CONTROLLING/MAINTAINING THE FACING ALIGNMENT, LOCATION AND SHOTCRETE THICKNESS.
- PROPOSED NAIL TESTING METHODS AND EQUIPMENT SETUP INCLUDING:
 - DETAILS OF THE JACKING FRAME AND APPURTENANT BRACING.
 - DETAILS SHOWING METHODS OF ISOLATING TEST NAILS DURING SHOTCRETE APPLICATION (I.E., METHODS TO PREVENT BONDING OF THE SOIL NAIL BAR AND THE SHOTCRETE FACING DURING TESTING).
 - DETAILS SHOWING METHODS OF PROVIDING THE TEMPORARY UNBONDED LENGTH AND OF GROUTING THE TEMPORARY UNBONDED LENGTH OF TEST NAILS AFTER COMPLETION OF TESTING.
 - EQUIPMENT LIST.

- IDENTIFICATION NUMBER AND CERTIFIED CALIBRATION RECORDS FOR EACH TEST JACK AND PRESSURE GAUGE AND LOAD CELL TO BE USED. JACK AND PRESSURE GAUGE SHALL BE CALIBRATED AS A UNIT. CALIBRATION RECORDS SHALL INCLUDE THE DATE TESTED, DEVICE IDENTIFICATION NUMBER, AND THE CALIBRATION TEST RESULTS AND SHALL BE CERTIFIED FOR AN ACCURACY OF AT LEAST 2 PERCENT OF THE APPLIED CERTIFICATION LOADS BY A QUALIFIED INDEPENDENT TESTING LABORATORY WITHIN 90 DAYS PRIOR TO SUBMITTAL.
- MANUFACTURER CERTIFICATES OF COMPLIANCE FOR THE SOIL NAIL CENTRALIZERS AND EPOXY COATING.
- CERTIFICATES OF COMPLIANCE, MANUFACTURERS' ENGINEERING DATA AND INSTALLATION INSTRUCTIONS FOR THE, GEOCOMPOSITE DRAIN STRIP, DRAIN GRATE, PVC DRAIN PIPING, AND ACCESSORIES.
- CERTIFICATES OF COMPLIANCE FOR BEARING PLATES AND NUTS.

UPON DELIVERY OF NAIL BARS TO THE PROJECT SITE, PROVIDE CERTIFIED MILL TEST RESULTS FOR NAIL BARS FROM EACH HEAT SPECIFYING THE ULTIMATE STRENGTH, YIELD STRENGTH, ELONGATION AND COMPOSITION.

EXISTING STRUCTURE VERIFICATION:

DETAILS AND DIMENSIONS SHOWN ON THESE PLANS PERTAINING TO THE EXISTING BRIDGE STRUCTURE CARRYING LINCOLN AVENUE OVER I-71 HAVE BEEN OBTAINED FROM PLANS OF THE EXISTING STRUCTURE AND FROM FIELD OBSERVATIONS AND MEASUREMENTS. CONSEQUENTLY, THEY ARE INDICATIVE OF THE EXISTING STRUCTURE AND THE PROPOSED WORK BUT THEY SHALL BE CONSIDERED TENTATIVE AND APPROXIMATE.

THE CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND VERIFYING THE LOCATIONS OF ALL KNOWN STRUCTURE FOUNDATIONS ADJACENT TO THE SOIL NAIL WALL. SOIL NAILS SHALL BE LOCATED SO THEY DO NOT CONFLICT WITH THESE FOUNDATIONS.

ITEM 511, CLASS QC1 CONCRETE, MISC.: CIP WALL FACING:

THIS ITEM OF WORK SHALL CONSIST OF CONSTRUCTING THE PERMANENT WALL FACING AND PROVIDING AESTHETIC TREATMENTS TO THE CONCRETE SURFACES OF SOIL NAIL WALL AS SHOWN IN THE PLANS.

FOR RELIEF THICKNESSES, LOCATIONS, LIMITS OF SURFACE FINISH PATTERNS AND FURTHER DETAILS, SEE AESTHETIC DETAILS ON SHEET 2/62.

UNLESS OTHERWISE SHOWN ON THE PLANS, ALL EXTERIOR CORNERS AND EDGES SHALL HAVE A 3/4" CHAMFER AND ALL INTERIOR CORNERS SHALL HAVE A 3/4" FILLET.

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B	10/28/14	FINAL SUBMITTAL BU 5
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DESIGN AGENCY
HDR ENGINEERING, INC.
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GENERAL NOTES

SOIL NAIL WALL E1B

HAM-71-3.81

PID No. 77628

23/62

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RETAINING WALL, MISC.: PERMANENT SOIL NAILS:

THIS WORK SHALL CONSIST OF EXCAVATION IN STAGED LIFTS, DRILLING OF THE SOIL NAIL HOLES TO THE SPECIFIED MINIMUM LENGTH, INSTALLING THE PERMANENT SOIL NAILS, AND THE MATERIALS NEEDED FOR THE SOIL NAIL INSTALLATION IN ACCORDANCE WITH THESE PLANS AND THE GENERAL NOTES. ALL NAIL DRILLED LENGTHS, DIAMETER, SPACING, AND BAR SIZES SHOWN ON THE PLANS ARE BASED ON ALLOWABLE PULLOUT RESISTANCES OF 675 LB/FT FOR SOIL AND 2000 LB/FT FORCE FOR BEDROCK.

THE SOIL NAIL LOCATIONS SHOWN ON SHEET [28/62] ARE CONSIDERED TO BE THE MINIMUM NUMBER OF SOIL NAILS NEEDED TO CONSTRUCT A STABLE WALL BASED ON THE SUBSURFACE CONDITIONS ENCOUNTERED AT THE TEST BORING LOCATIONS IN THE VICINITY OF WALL E1B. THESE SUBSURFACE SOIL CONDITIONS AT THE WALL LOCATION GENERALLY CONSIST OF VERY STIFF SILTY CLAY (A-6b) AND CLAY (A-7-6) OVER INTERBEDDED SHALE AND LIMESTONE BEDROCK. FOR ADDITIONAL INFORMATION REGARDING THE SUBSURFACE CONDITIONS AT THE WALL SITE, THE CONTRACTOR SHOULD REFER TO THE STRUCTURE FOUNDATION EXPLORATION SHEETS, WHICH ARE CONTAINED ELSEWHERE IN THE PROJECT PLANS. THE CONTRACTOR SHOULD NOTE THAT, AS THE TEST BORINGS SHOWN ON THESE SHEETS ARE OF AN EXPLORATORY NATURE, THE INFORMATION PROVIDED IS REPRESENTATIVE OF THE SUBSURFACE CONDITIONS ONLY AT THE LOCATIONS AND DEPTHS WHERE SUCH INFORMATION WAS OBTAINED. THERE IS NO EXPRESSED OR IMPLIED AGREEMENT THAT UNIFORMITY OF MATERIAL EXISTS BETWEEN THE EXPLORED LOCATIONS.

THE CONTRACTOR SHOULD REVIEW THE TEST BORING DATA AND BE AWARE OF LOCATION AND QUALITY OF THE BEDROCK, WHICH MAY REQUIRE ROTARY IMPACT STYLE EQUIPMENT TO ADVANCE THE NAIL HOLES.

THE CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING ALL KNOWN UTILITIES AND SHALL TAKE ALL PRECAUTIONS NECESSARY TO FULLY PROTECT THE UTILITY AND THE SERVICE.

THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING STABLE SLOPES ABOVE AND BELOW THE NAIL WALLS. HEAVY EQUIPMENT SHALL NOT BE ALLOWED ABOVE THE WALL DURING CONSTRUCTION OF THE WALL, WITH THE CONTRACTOR TO OBSERVE THE CONDITIONS OF THE SLOPE ABOVE WALL E1B ON A REGULAR BASIS DURING CONSTRUCTION FOR SIGNS OF GROUND MOVEMENT IN THE VICINITY OF THE WALL AND THE BRIDGE ABUTMENT. CORRECTIVE ACTIONS SHOULD BE PERFORMED AS NECESSARY TO STOP OR REPAIR ANY MOVEMENT THAT SHOULD ANY OCCUR.

GENERAL NOTES – SOIL NAIL WALLS (CONTINUED)

RETAINING WALL, MISC.: PERMANENT SOIL NAILS (CONTINUED):

EXCAVATION IN THE VICINITY OF THE WALL FACE REQUIRES SPECIAL CARE AND EFFORT COMPARED TO GENERAL EARTHWORK EXCAVATION. THE CONTRACTOR SHALL NOT OVEREXCAVATE THE ORIGINAL GROUND OR COMPACTED FILL BEHIND THE WALL BEYOND THE LIMITS SHOWN ON THE PLANS. GENERAL EARTHWORK EXCAVATION THAT WILL AFFECT THE SOIL NAIL WALLS SHALL NOT BE PERFORMED UNTIL AFTER THE SECOND ROW OF NAILS IS INSTALLED.

NO GENERAL EARTHWORK EXCAVATION CUTS STEEPER THAN 1H:1V SHALL BE MADE WITHIN 15’ IN FRONT OF THE SOIL NAIL WALLS WITHOUT APPROVAL OF THE GEOTECHNICAL ENGINEER OF RECORD.

THE CONTRACTOR IS RESPONSIBLE FOR SURVEY CONTROL POINTS FOR THE TOP OF WALL ALIGNMENT AND FOR SURVEY CONTROL AS EXCAVATION PROGRESSES AND THE NAILS INSTALLED IN ORDER TO ALLOW FOR CONSTRUCTION OF THE TEMPORARY SHOTCRETE FACING AND THE CIP WALL FACING TO THE SPECIFIED MINIMUM THICKNESSES AND TO THE LINE AND GRADE INDICATED IN THE PLANS.

EXCAVATION FOR THE WALL FACE SHALL BE PERFORMED USING PROCEDURES THAT:

- 1. PREVENT OVER EXCAVATION;
- 2. PREVENT GROUND LOSS, SWELLING, AIR SLACKING, OR LOOSENING;
- 3. PREVENT LOSS OF SUPPORT FOR COMPLETED PORTIONS OF THE WALL AND THE ADJACENT BRIDGE ABUTMENT;
- 4. PREVENT LOSS OF SOIL MOISTURE AT THE FACE;
- 5. PREVENT GROUND FREEZING.

WALL EXCAVATION SHALL PROCEED FROM THE TOP DOWN IN A HORIZONTAL STAGED EXCAVATION LIFT SEQUENCE WITH THE GROUND LEVEL FOR EACH LIFT EXCAVATED NO MORE THAN 2 FEET BELOW EACH NAIL ROW. THE EXISTING EMBANKMENT IN FRONT OF THE SOIL NAIL WALL SHALL BE EXCAVATED AT EACH STAGE TO FORM A WORKING BENCH TO SERVE AS A PLATFORM FOR THE DRILLING EQUIPMENT. THE BENCH SHALL BE WIDE ENOUGH TO PROVIDE A SAFE WORKING AREA FOR THE DRILL EQUIPMENT AND WORKERS. AT THE DBT’S OPTION, NAILS MAY BE DRILLED AND INSTALLED THROUGH A TEMPORARY STABILIZING BERM AS SHOWN ON THE PLANS FOR INSTALLATION OF THE SOIL NAILS. IF UTILIZED, DO NOT EXCAVATE THE STABILIZING BERM UNTIL THE NAIL GROUT HAS AGED FOR AT LEAST 24 HOURS. REMOVE HARDENED NAIL GROUT PROTRUDING FROM THE FINAL WALL EXCAVATION LINE MORE THAN 2” IN A MANNER THAT PREVENTS FRACTURING OF THE GROUT AT THE NAIL HEAD.

EXCAVATION TO THE NEXT LIFT SHALL NOT PROCEED UNTIL NAIL INSTALLATION, REINFORCED SHOTCRETE PLACEMENT, ATTACHMENT OF BEARING PLATES AND NUTS AND NAIL TESTING HAS BEEN COMPLETED AND ACCEPTED IN THE CURRENT LIFT. NAIL GROUT AND SHOTCRETE SHALL HAVE CURED FOR AT LEAST 72 HOURS OR ATTAINED AT LEAST THEIR SPECIFIED 3-DAY COMPRESSIVE STRENGTH BEFORE EXCAVATING THE NEXT UNDERLYING LIFT. EXCAVATING THE NEXT LIFT IN LESS THAN 72 HOURS WILL ONLY BE ALLOWED IF THE CONTRACTOR SUBMITS COMPRESSIVE STRENGTH TEST RESULTS, FROM TESTS PERFORMED BY A QUALIFIED INDEPENDENT TESTING LAB, VERIFYING THAT THE NAIL GROUT AND SHOTCRETE MIXES BEING USED WILL PROVIDE THE SPECIFIED 3-DAY COMPRESSIVE STRENGTHS IN THE LESSER TIME. TIME.

THE CONTRACTOR IS TO DETERMINE THE REQUIRED DRILLHOLE DIAMETER, DRILLING METHOD, GROUT COMPOSITION AND INSTALLATION METHOD NECESSARY TO ACHIEVE THE NAIL PULLOUT RESISTANCE(S) SPECIFIED ON SHEET [23/62] IN ACCORDANCE WITH LOAD TESTING ACCEPTANCE CRITERIA PRESENTED ON SHEET [27/62].

RETAINING WALL, MISC.: PERMANENT SOIL NAILS (CONTINUED):

NO DRILLING OR INSTALLATION OF PRODUCTION NAILS WILL BE PERMITTED IN ANY SOIL AND/OR ROCK UNIT UNTIL SUCCESSFUL VERIFICATION LOAD TESTING OF THE NAILS IS COMPLETED IN THAT UNIT AND APPROVED BY ODOT. INSTALL VERIFICATION TEST NAILS USING THE SAME EQUIPMENT, METHODS, NAIL INCLINATION AND DRILLHOLE DIAMETER AS PLANNED FOR THE PRODUCTION NAILS. PERFORM THE VERIFICATION LOAD TESTS PRIOR TO STARTING THE WALL EXCAVATION AND PRIOR TO INSTALLATION OF PRODUCTION NAILS IN THE SPECIFIC LIFT IN WHICH THE DESIGNATED VERIFICATION TEST NAILS ARE LOCATED. THE NUMBER AND LOCATION OF THE VERIFICATION TESTS ARE SHOWN ON SHEET[28/62]. VERIFICATION TEST NAILS MAY BE INSTALLED THROUGH EITHER THE EXISTING SLOPE FACE PRIOR TO START OF WALL EXCAVATION, DRILL PLATFORM WORK BENCH, STABILIZATION BERM OR INTO SLOT CUTS MADE FOR THE PARTICULAR LIFT IN WHICH THE VERIFICATION TEST NAILS ARE LOCATED.

INSTALL THE PRODUCTION SOIL NAILS BEFORE THE APPLICATION OF THE REINFORCED SHOTCRETE FACING. THE DRILL HOLES FOR THE SOIL NAILS ARE TO BE MADE AT THE LOCATIONS, ORIENTATIONS, AND LENGTHS SHOWN ON SHEETS [28/62] AND [29/62]. SELECT DRILLING EQUIPMENT AND METHODS SUITABLE FOR THE ANTICIPATED GROUND CONDITIONS. SELECT DRILLHOLE DIAMETER(S) REQUIRED TO DEVELOP THE SPECIFIED PULLOUT RESISTANCE AND TO ALSO PROVIDE A MINIMUM 1 INCH GROUT COVER OVER THE EPOXY COATED BARS. A MINIMUM REQUIRED DRILLHOLE DIAMETER IS SHOWN ON SHEET[30/62]; HOWEVER, IT IS THE CONTRACTOR RESPONSIBILITY TO DETERMINE THE FINAL DRILLHOLE DIAMETER(S) REQUIRED TO PROVIDE THE SPECIFIED PULLOUT RESISTANCE BASED ON THE VERIFICATION TESTING. USE OF DRILLING MUDS SUCH AS BENTONITE SLURRY TO ASSIST IN DRILL CUTTING REMOVAL IS NOT ALLOWED, BUT AIR MAY BE USED.

IMMEDIATELY SUSPEND OR MODIFY DRILLING OPERATIONS IF GROUND SUBSIDENCE IS OBSERVED, IF THE SOIL NAIL WALL IS ADVERSELY AFFECTED, OR IF ADJACENT STRUCTURES ARE DAMAGED FROM THE DRILLING OPERATION.

ALL SOIL NAIL LENGTHS AND BAR SIZES SHALL BE IN ACCORDANCE WITH THAT SHOWN IN THE SOIL NAIL SCHEDULE PRESENTED ON SHEET [27/62]. NO BAR COUPLES ARE ALLOWED UNLESS VERIFICATION TESTS INDICATE THAT LONGER NAILS ARE REQUIRED.

PROVIDE CENTRALIZERS SIZED TO POSITION THE BAR WITHIN 1 INCH OF THE CENTER OF THE DRILLHOLE. LOCATE CENTRALIZERS SO THEIR MAXIMUM CENTER-TO-CENTER SPACING DOES NOT EXCEED 8 FEET AND THAT THEY ARE WITHIN 2 FEET OF THE TOP AND BOTTOM OF THE DRILLHOLE. SECURELY ATTACH THE CENTRALIZERS TO THE BAR SO THEY WILL NOT SHIFT DURING HANDLING OR INSERTION INTO THE DRILL HOLE YET WILL STILL ALLOW TREMIE PIPE INSERTION TO THE BOTTOM OF DRILLHOLE AND ALLOW GROUT TO FLOW FREELY UP THE HOLE.

INSPECT EACH NAIL BAR BEFORE INSTALLATION AND REPAIR OR REPLACE DAMAGED BARS OR CORROSION PROTECTION. CHECK UNCASD DRILLHOLES FOR CLEANLINESS PRIOR TO INSERTION OF THE SOIL NAIL BAR. INSERT NAIL BARS WITH CENTRALIZERS INTO THE DRILL HOLE TO THE REQUIRED LENGTH WITHOUT DIFFICULTY AND IN A WAY THAT PREVENTS DAMAGE TO THE DRILL HOLE, BAR, OR CORROSION PROTECTION. DO NOT DRIVE OR FORCE PARTIALLY INSERTED SOIL NAILS INTO THE HOLE. REMOVE NAILS WHICH CANNOT BE FULLY INSERTED TO THE DESIGN DEPTH AND CLEAN THE DRILL HOLE TO ALLOW UNOBSTRUCTED INSTALLATION.

RETAINING WALL, MISC.: PERMANENT SOIL NAILS (CONTINUED):

NAIL LOCATION AND ORIENTATION TOLERANCES ARE:
A. NAIL HEAD LOCATION, DEVIATION FROM PLAN LOCATION; 6 INCHES IN ANY DIRECTION.
B. NAIL INCLINATION, DEVIATION FROM PLAN; + OR - 3 DEGREES.
THESE LOCATION TOLERANCES ARE APPLICABLE TO ONLY ONE NAIL AND NOT ACCUMULATIVE OVER LARGE WALL AREAS. SOIL NAILS WHICH DO NOT SATISFY THE SPECIFIED TOLERANCES SHOULD BE REPLACED AND ABANDONED NAIL DRILL HOLES BACKFILLED WITH TREMIED GROUT.

GROUT THE DRILLHOLE AFTER INSTALLATION OF THE NAIL BAR AND WITHIN 2 HOURS OF COMPLETION OF DRILLING. INJECT THE GROUT AT THE LOWEST POINT OF EACH DRILL HOLE THROUGH A GROUT TUBE. KEEP THE OUTLET END OF THE CONDUIT DELIVERING THE GROUT BELOW THE SURFACE OF THE GROUT AS THE CONDUIT IS WITHDRAWN TO PREVENT THE CREATION OF VOIDS AND TO PREVENT UNSTABLE SOIL OR GROUNDWATER FROM CONTAMINATING OR DILUTING THE GROUT. COMPLETELY FILL THE DRILLHOLE IN ONE CONTINUOUS OPERATION. COLD JOINTS IN THE GROUT COLUMN ARE NOT ALLOWED EXCEPT AT THE TOP OF THE TEST BOND LENGTH OF PROOF TESTED PRODUCTION NAILS. AT THE CONTRACTOR’S OPTION, THE GROUT TUBE MAY REMAIN IN THE HOLE PROVIDED IT IS FILLED WITH GROUT. GROUTING BEFORE INSERTION OF THE NAIL IS ALLOWED PROVIDED THE NAIL BAR IS IMMEDIATELY INSERTED THROUGH THE GROUT TO THE SPECIFIED LENGTH WITHOUT DIFFICULTY.

REMOVE THE GROUT AND NAIL IF GROUTING IS SUSPENDED FOR MORE THAN 30 MINUTES AND REPLACE WITH FRESH GROUT AND UNDAMAGED NAIL BAR.

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DESIGN AGENCY
HDR ENGINEERING, INC.
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GENERAL NOTES

SOIL NAIL WALL E1B

HAM - 71-3.81

PID No. 77628

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RETAINING WALL, TEMPORARY SHOTCRETE FACING, AND WALL DRAINAGE

THIS WORK SHALL CONSIST OF FURNISHING AND INSTALLING TEMPORARY SHOTCRETE CONSTRUCTION FACING AND WALL DRAINAGE ELEMENTS IN ACCORDANCE WITH THESE PLANS AND GENERAL NOTES. MATERIALS INCLUDE, BUT ARE NOT LIMITED TO, REINFORCING STEEL, CONNECTOR PLATES, AND NUTS FOR THE SHOTCRETE FACING AND GEOCOMPOSITE DRAIN STRIPS, CONNECTION PIPES, AND TOE DRAINS FOR THE WALL DRAINAGE.

THE WALL DRAINAGE SYSTEM SHALL CONSIST OF 2 FOOT PANELS OF GEOCOMPOSITE DRAIN STRIPS EMPTYING INTO A 6" DIAMETER PVC CONNECTOR PIPE LOCATED 12" ABOVE THE BOTTOM OF THE WALL, AND CONNECTED TO THE WALL TOE DRAIN. GEOCOMPOSITE DRAIN STRIPS SHALL BE PLACED AGAINST THE EXPOSED SOIL FACE AND FULLY COVERED BY THE SHOTCRETE FACING. GEOCOMPOSITE DRAIN STRIPS SHALL NOT BE USED TO CONTROL SURFACE DRAINAGE. THE GEOCOMPOSITE DRAIN STRIPS ARE TO BE CONTINUOUS, AND SPLICES MADE WITH A 12" MINIMUM OVERLAP.

DETAILS OF A TYPICAL WALL TOE DRAIN AND ASSOCIATED DRAIN GATE ARE SHOWN ON SHEET [31/62].

SHOTCRETE SHALL COMPLY WITH THE REQUIREMENTS OF ACI 506.2, "SPECIFICATIONS FOR MATERIALS, PROPORTIONING AND APPLICATION OF SHOTCRETE", EXCEPT AS OTHERWISE SPECIFIED. SHOTCRETE SHALL CONSIST OF AN APPLICATION OF ONE OR MORE LAYERS OF CONCRETE CONVEYED THROUGH A HOSE AND PNEUMATICALLY PROJECTED AT A HIGH VELOCITY AGAINST A PREPARED SURFACE.

SHOTCRETE MAY BE PRODUCED BY EITHER A WET-MIX OR DRY-MIX PROCESS. THE WET-MIX PROCESS CONSISTS OF THOROUGHLY MIXING ALL THE INGREDIENTS (EXCEPT ACCELERATING ADMIXTURES, BUT INCLUDING THE MIXING WATER) INTRODUCING THE MIXTURE INTO THE DELIVERY EQUIPMENT AND DELIVERING IT, BY POSITIVE DISPLACEMENT, TO THE NOZZLE. THE WET-MIX SHOTCRETE SHALL THEN BE AIR JETTED FROM THE NOZZLE AT HIGH VELOCITY ONTO THE SURFACE. THE DRY-MIX PROCESS CONSISTS OF SHOTCRETE WITHOUT MIXING WATER WHICH IS CONVEYED THROUGH THE HOSE PNEUMATICALLY WITH THE MIXING WATER INTRODUCED AT THE NOZZLE.

1. SHOTCRETE MIX DESIGN.
- A. AGGREGATE
- AGGREGATE FOR SHOTCRETE SHALL MEET THE STRENGTH AND DURABILITY REQUIREMENTS OF AASHTO M6/M80 AND THE FOLLOWING GRADATION REQUIREMENTS

SIEVE SIZE	PERCENT PASSING BY WEIGHT
12.5 MM	100
9.50 MM	90-100
4.75 MM	70-85
2.36 MM	50-70
1.18 MM	35-55
0.60 MM	20-35
0.30 MM	8-20
0.15 MM	2-10

GENERAL NOTES – SOIL NAIL WALLS (CONTINUED)

RETAINING WALL, TEMPORARY SHOTCRETE FACING, AND WALL DRAINAGE (CONTINUED):

- B. PROPORTIONING AND USE OF ADMIXTURES
- PROPORTION THE SHOTCRETE TO BE PUMPABLE WITH THE CONCRETE PUMP FURNISHED FOR THE WORK, WITH A CEMENTING MATERIALS CONTENT OF AT LEAST 24 POUNDS PER CUBIC FOOT AND WATER/CEMENT RATIO NOT GREATER THAN 0.45. THOROUGHLY MIX ANY ADMIXTURES INTO THE SHOTCRETE AT THE RATE SPECIFIED BY THE MANUFACTURER. ACCELERATORS, IF USED, SHALL BE COMPATIBLE WITH THE CEMENT USED, BE NON-CORROSIVE TO STEEL AND NOT PROMOTE OTHER DETRIMENTAL EFFECTS SUCH AS CRACKING OR EXCESSIVE SHRINKAGE. THE MAXIMUM ALLOWABLE CHLORIDE ION CONTENT OF ALL INGREDIENTS SHALL NOT EXCEED 0.10% WHEN TESTED TO AASHTO T260.

- C. AIR ENTRAINMENT
- AIR ENTRAINMENT IS REQUIRED FOR WET-MIX SHOTCRETE. THE AIR CONTENT MEASURED AT THE TRUCK SHALL BE BETWEEN 7 TO 10 PERCENT WHEN TESTED IN ACCORDANCE WITH AASHTO T152/ASTM C231. AIR ENTRAINMENT IS NOT REQUIRED IN DRY-MIX SHOTCRETE.

- D. STRENGTH AND DURABILITY REQUIREMENTS
- PROVIDE A SHOTCRETE MIX CAPABLE OF ATTAINING 2,000 PSI COMPRESSIVE STRENGTH IN 3 DAYS AND 4,000 PSI IN 28 DAYS. THE AVERAGE COMPRESSIVE STRENGTH OF EACH SET OF THREE TEST CORES EXTRACTED FROM TEST PANELS OR WALL FACE MUST EQUAL OR EXCEED 85 PERCENT OF THE SPECIFIED COMPRESSIVE STRENGTH, WITH NO INDIVIDUAL CORE LESS THAN 75 PERCENT OF THE SPECIFIED COMPRESSIVE STRENGTH, IN ACCORDANCE WITH ACI 506.2. THE BOILED ABSORPTION OF SHOTCRETE, WHEN TESTED IN ACCORDANCE WITH ASTM C642 AT 7 DAYS, SHALL NOT EXCEED 8.0 PERCENT.

- E. MIXING AND BATCHING
- AGGREGATE AND CEMENT MAY BE BATCHED BY WEIGHT OR BY VOLUME IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C94 OR AASHTO M241/ASTM C685. MIXING EQUIPMENT SHALL THOROUGHLY BLEND THE MATERIALS IN SUFFICIENT QUANTITY TO MAINTAIN PLACING CONTINUITY. THE SHOTCRETE SHALL COMPLY WITH AASHTO M157, AND BE BATCHED, DELIVERED, AND PLACED WITHIN 90 MINUTES OF MIXING.

2. FIELD QUALITY CONTROL FOR SHOTCRETE
- PRODUCTION TEST PANELS OR TEST CORES FROM THE WALL FACING ARE REQUIRED. THE DBT SHALL PROVIDE EQUIPMENT, MATERIALS, AND PERSONNEL AS NECESSARY TO OBTAIN THE SHOTCRETE CORES FOR TESTING INCLUDING CONSTRUCTION OF TEST PANEL BOXES, FIELD CURING REQUIREMENTS AND CORING, WITH THE COMPRESSIVE STRENGTH TESTING PERFORMED BY AN INDEPENDENT TESTING LAB. SHOTCRETE FINAL ACCEPTANCE WILL BE BASED ON THE 28-DAY STRENGTH OF 4000 PSI.

SHOTCRETE PRODUCTION WORK MAY COMMENCE UPON RECEIPT BY ODOT OF THE SHOTCRETE MIX DESIGN AND CONTINUE IF THE SPECIFIED STRENGTHS ARE OBTAINED. THE SHOTCRETE WORK SHALL BE SUSPENDED IF THE TEST RESULTS INDICATE THE SHOTCRETE DOES NOT SATISFY THE STRENGTH REQUIREMENTS. THE CONTRACTOR SHALL CHANGE ALL OR SOME OF THE FOLLOWING: THE MIX, THE CREW, THE EQUIPMENT, OR THE PROCEDURES, WITH THE CREW SHOOTING NEW TEST PANELS AND ADDITIONAL TESTING PERFORMED IN ORDER TO DEMONSTRATE THAT THE PANELS SATISFY THE SPECIFIED STRENGTH REQUIREMENTS BEFORE SHOTCRETE PRODUCTION WORK CAN RESUME.

RETAINING WALL, TEMPORARY SHOTCRETE FACING, AND WALL DRAINAGE (CONTINUED):

- A. PRODUCTION TEST PANELS.
- FURNISH AT LEAST ONE PRODUCTION TEST PANEL OR, IN LIEU OF PRODUCTION TEST PANELS, NINE 3-INCH DIAMETER CORES TAKEN FROM THE SHOTCRETE FACING, DURING THE FIRST PRODUCTION APPLICATION OF SHOTCRETE AND FOR EVERY 5,000 SQUARE FEET OF SHOTCRETE PLACED THEREAFTER. MAKE PRODUCTION TEST PANELS WITH MINIMUM FULL THICKNESS DIMENSIONS OF 18X18 INCHES SQUARE AND AT LEAST 4 INCHES THICK.

- B. TEST PANEL CURING, TEST SPECIMEN EXTRACTION AND TESTING.
- IMMEDIATELY AFTER SHOOTING, FIELD MOIST CURE THE TEST PANELS BY COVERING AND TIGHTLY WRAPPING WITH A SHEET OF MATERIAL MEETING THE REQUIREMENTS OF ASTM C171 UNTIL THEY ARE DELIVERED TO THE TESTING LAB OR TEST SPECIMENS ARE EXTRACTED. DO NOT IMMERSE THE TEST PANELS IN WATER. DO NOT FURTHER DISTURB THE TEST PANELS FOR THE FIRST 24 HOURS AFTER SHOOTING. PROVIDE AT LEAST THREE 3-INCH DIAMETER CORE SAMPLES CUT FROM EACH TEST PANEL WITH REINFORCEMENT FOR CORE GRADING. PROVIDE AT LEAST NINE 3-INCH DIAMETER CORE SAMPLES CUT FROM EACH UNREINFORCED PRODUCTION TEST PANEL FOR ABSORPTION AND COMPRESSIVE STRENGTH TESTING. THE CONTRACTOR HAS THE OPTION OF EXTRACTING TEST SPECIMENS FROM TEST PANELS IN THE FIELD OR TRANSPORTING THE TEST PANELS TO ANOTHER LOCATION FOR EXTRACTION. KEEP PANELS IN THEIR FORMS WHEN TRANSPORTED. DO NOT TAKE CORES FROM THE OUTER 6 INCHES OF TEST PANELS MEASURED IN FROM THE TOP OUTSIDE EDGES OF THE PANEL FORM. TRIM THE ENDS OF THE COMPRESSIVE STRENGTH CORES TO PROVIDE TEST CYLINDERS AT LEAST 3 INCHES LONG. DO NOT TRIM THE ENDS OF THE CORES TO BE TESTED FOR BOILED ABSORPTION.

IF THE CONTRACTOR CHOOSES TO TAKE CORES FROM THE WALL FACE IN LIEU OF MAKING PRODUCTION TEST PANELS, LOCATIONS WILL BE DESIGNATED BY ODOT. FILL THE CORE HOLES IN THE WALL BY DRY-PACKING WITH NON-SHRINK PATCHING MORTAR AFTER THE HOLES HAVE BEEN CLEANED AND DAMPENED. DO NOT FILL THE CORE HOLES WITH SHOTCRETE. CLEARLY MARK THE CORES AND CONTAINER TO IDENTIFY THE CORE LOCATIONS AND WHETHER THEY ARE FOR PRECONSTRUCTION OR PRODUCTION TESTING. IF FOR PRODUCTION TESTING, MARK THE SECTION OF THE WALL REPRESENTED BY THE CORES ON THE CORES AND CONTAINER. IMMEDIATELY WRAP CORES IN WET BURLAP OR MATERIAL MEETING THE REQUIREMENTS OF ASTM C171 AND SEAL IN A PLASTIC BAG. DELIVER CORES TO THE INDEPENDENT TESTING LAB WITHIN 48 HOURS OF SHOOTING THE PANELS.

COMPRESSIVE STRENGTH AND BOILED ABSORPTION TESTING ARE TO BE PERFORMED BY AN INDEPENDENT TESTING LAB. UPON DELIVERY TO THE INDEPENDENT TESTING LAB, SAMPLES SHOULD BE PLACED IN THE MOIST ROOM UNTIL THE TIME OF TEST. WHEN THE TEST LENGTH OF A CORE IS LESS THAN TWICE THE DIAMETER, THE CORRECTION FACTORS GIVEN IN AASHTO T24/ASTM C42 WILL BE APPLIED TO OBTAIN THE COMPRESSIVE STRENGTH OF INDIVIDUAL CORES. THREE CORES WILL BE TESTED AT 3 DAYS AND THREE CORES WILL BE TESTED AT 28 DAYS FOR COMPRESSIVE STRENGTH PER AASHTO T24/ASTM C42. THREE CORES WILL BE TESTED AT 7 DAYS FOR BOILED ABSORPTION PER ASTM C642.

RETAINING WALL, TEMPORARY SHOTCRETE FACING, AND WALL DRAINAGE (CONTINUED):

3. TEMPORARY SHOTCRETE FACING
- CLEAN THE FACE OF THE EXCAVATION AND OTHER SURFACES TO BE SHOTCRETED OF LOOSE MATERIALS, MUD, REBOUND, OVERSPRAY OR OTHER FOREIGN MATTER THAT COULD PREVENT OR REDUCE SHOTCRETE BOND. AVOID LOOSENING, CRACKING, OR SHATTERING THE GROUND DURING EXCAVATION AND CLEANING. REMOVE ANY SURFACE MATERIAL WHICH IS SO LOOSENED OR DAMAGED, TO A SUFFICIENT DEPTH TO PROVIDE A BASE THAT IS SUITABLE TO RECEIVE THE SHOTCRETE. DO NOT PLACE SHOTCRETE ON FROZEN SURFACES. REMOVE ANY SURFACE MATERIAL THAT LOOSENS AS THE SHOTCRETE IS APPLIED. PROTECT ADJACENT SURFACES FROM OVERSPRAY DURING SHOOTING.

ENSURE THAT THE THICKNESS OF THE SHOTCRETE SATISFIES THE MINIMUM REQUIREMENTS SHOWN ON SHEET [30/62] USING THICKNESS CONTROL DEVICES INSTALLED NORMAL TO THE SURFACE SUCH THAT THEY PROTRUDE THE REQUIRED SHOTCRETE THICKNESS OUTSIDE THE SURFACE AND MAINTAIN A PLANE SURFACE. REMOVE SHOOTING WIRES AFTER COMPLETION OF SHOTCRETING.

THE MINIMUM CONCRETE COVER TO ANY REINFORCING BARS FOR THE TEMPORARY SHOTCRETE FACING IS NOTED ON STRUCTURAL WALL DETAIL ON SHEET [30/62]. UNLESS OTHERWISE NOTED ON THE PLANS, MINIMUM SHOTCRETE COVER MEASURED FROM THE FACE OF SHOTCRETE TO THE FACE OF ANY REINFORCING BAR SHALL BE 2".

A CLEARLY DEFINED PATTERN OF CONTINUOUS HORIZONTAL OR VERTICAL RIDGES OR DEPRESSIONS AT THE REINFORCING ELEMENTS AFTER THEY ARE COVERED WITH SHOTCRETE WILL BE CONSIDERED AN INDICATION OF INSUFFICIENT REINFORCEMENT COVER OR POOR NOZZLE TECHNIQUES. IN THIS CASE, THE APPLICATION OF SHOTCRETE SHALL BE IMMEDIATELY SUSPENDED AND THE CONTRACTOR SHALL IMPLEMENT CORRECTIVE MEASURES BEFORE RESUMING THE SHOTCRETE OPERATIONS.

CONSTRUCTION TOLERANCES FOR THE TEMPORARY SHOTCRETE FACING ARE

- A. HORIZONTAL LOCATION OF WIRE MESH AND REBAR, FROM PLAN LOCATION: 0.4 INCH
- B. HEADED STUDS LOCATION ON BEARING PLATE, FROM PLAN LOCATION: 25 INCH
- C. SPACING BETWEEN REINFORCING BARS, FROM PLAN DIMENSION: 1 INCH
- D. REINFORCING LAP, FROM SPECIFIED DIMENSION: 1 INCH
- E. COMPLETED THICKNESS OF SHOTCRETE, FROM PLAN DIMENSION: 0.4 INCH

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GENERAL NOTES

SOIL NAIL WALL E1B

HAM-71-3.81

PID No. 77628

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GENERAL NOTES - SOIL NAIL WALLS (CONTINUED)

TYPICAL CONSTRUCTION SEQUENCE:

WALL E1B SHALL BE BUILT FROM THE TOP DOWN IN GENERAL ACCORDANCE WITH THE STAGED EXCAVATION LIFTS SHOWN ON THE TYPICAL SOIL NAIL WALL SECTION DETAIL ON SHEET [29/62] FOR PROPOSED TEST NAIL LOCATIONS.

THE FOLLOWING WALL CONSTRUCTION SEQUENCE FOR EACH EXCAVATION LIFT SHALL BE COMPLETE PRIOR TO INITIATING WORK ON THE NEXT EXCAVATION LIFT UNLESS OTHERWISE APPROVED BY THE GEOTECHNICAL ENGINEER OF RECORD:

INSTALL PRE-PRODUCTION VERIFICATION TEST NAILS FOR THE ANTICIPATED STRATUM. SEE SHEET [28/62] .

PERFORM SOIL NAIL PULLOUT VERIFICATION TESTS AFTER NAIL GROUT HAS ATTAINED THE SPECIFIED STRENGTH BELOW. PROCEED WITH CONSTRUCTION ONLY AFTER SUCCESSFUL TESTS COMPLETED.

EXCAVATE TO ROUGH GRADE OF THE EXCAVATION LIFT.

TRIM TO FINAL WALL FACE EXCAVATION LINE OR TO STABILIZING BERM (IF USED).

DRILL, INSTALL AND GROUT SOIL NAILS. TRIM STABILIZATION BERM (IF USED) TO FINAL WALL FACE EXCAVATION LINE.

INSTALL GEOCOMPOSITE DRAINAGE STRIP.

PLACE REINFORCING AND APPLY TEMPORARY FACING SHOTCRETE. ANCHOR PLATES SHALL BE SET AGAINST THE FACE OF THE SHOTCRETE WHILE IT IS STILL PLASTIC AND BEFORE ITS INITIAL SET. NUTS SHALL BE TIGHTENED AGAINST THE ANCHOR PLATES ONLY AFTER THE SHOTCRETE HAS CURED. NO EXCAVATION WHICH HAS AN EXPOSED WALL FACE SHALL BE LEFT UNSTABILIZED BY SHOTCRETE AT THE END OF THE WORK DAY.

PERFORM NAIL PULLOUT PROOF TESTS PER SPECIFICATIONS AFTER THE SHOTCRETE AND THR NAIL GROUT HAVE ATTAINED THEIR SPECIFIED STRENGTHS. FOR SHOTCRETE:
3 DAY COMPRESSIVE STRENGTH = 2,000 PSI
28 DAY COMPRESSIVE STRENGTH = 4,000 PSI.
FOR NAIL GROUT:
3 DAY COMPRESSIVE STRENGTH = 1,500 PSI
28 DAY COMPRESSIVE STRENGTH = 3,000 PSI

INSTALL PVC CONNECTOR PIPES DURING CONSTRUCTION OF THE FINAL SHOTCRETE LIFT TO PROVIDE DRAINAGE OF THE GEOCOMPOSITE DRAINAGE STRIPS INTO THE WALL TOE DRAIN AS SHOWN ON THE TYPICAL DETAILS ON SHEET [31/62].

INSTALL CIP PERMANENT WALL FACING AS SHOWN ON SHEETS [29/62] AND [30/62] .

IF NECESSARY, COMPACT BACKFILL WITHIN 3 FEET BEHIND THE UPPER CANTILEVER OF THE WALL FACING USING LIGHT MECHANICAL TAMPERS.

LOAD TESTING NOTES:

VERIFICATION LOAD TESTS AND PROOF LOAD TESTS OF THE SOIL NAILS WILL BE REQUIRED.

TESTING OF ANY NAIL SHALL NOT BE PERFORMED UNTIL THE NAIL GROUT SHOTCRETE, AS APPLICABLE, HAVE CURED FOR AT LEAST 72 HOURS AND HAVE ATTAINED AT LEAST THEIR SPECIFIED 3 DAY COMPRESSIVE STRENGTH.

SHOULD ANY TEST NAILS FAIL TO REACH ADEQUATE CAPACITY DURING TESTING, THE CONTRACTOR SHALL MODIFY THE CONSTRUCTION METHODS AND PROCEDURES, INSTALL ADDITIONAL NAILS, AND RETEST TO ENSURE REQUIRED CAPACITY IS ACHIEVED.

TESTING EQUIPMENT:

TESTING EQUIPMENT SHALL INCLUDE DIAL GAUGES, DIAL GAUGE SUPPORT, JACK AND PRESSURE GAUGE, ELECTRONIC LOAD CELL, AND A REACTION FRAME. THE LOAD CELL IS REQUIRED ONLY FOR THE CREEP TEST PORTION OF THE VERIFICATION TEST. SEE THE VERIFICATION TEST SOIL NAIL DETAIL ON SHEET[27/62].

DESIGN THE TESTING REACTION FRAME TO BE SUFFICIENTLY RIGID AND OF ADEQUATE DIMENSIONS SUCH THAT EXCESSIVE DEFORMATION OF THE TESTING EQUIPMENT DOES NOT OCCUR. IF THE REACTION FRAME WILL BEAR DIRECTLY ON THE SHOTCRETE FACING, DESIGN IT TO PREVENT CRACKING OF THE SHOTCRETE. INDEPENDENTLY SUPPORT AND CENTER THE JACK OVER THE NAIL BAR SO THAT THE BAR DOES NOT CARRY THE WEIGHT OF THE TESTING EQUIPMENT. ALIGN THE JACK, BEARING PLATES, AND STRESSING ANCHORAGE WITH THE BAR SUCH THAT UNLOADING AND REPOSITIONING OF THE EQUIPMENT WILL NOT BE REQUIRED DURING THE TEST.

APPLY AND MEASURE THE TEST LOAD WITH A HYDRAULIC JACK AND PRESSURE GAUGE. THE PRESSURE GAUGE SHALL BE GRADUATED IN 50 PSI INCREMENTS OR LESS. THE JACK AND PRESSURE GAUGE SHALL HAVE A PRESSURE RANGE NOT EXCEEDING TWICE THE ANTICIPATED MAXIMUM TEST PRESSURE. JACK RAM TRAVEL SHALL BE SUFFICIENT TO ALLOW THE TEST TO BE DONE WITHOUT RESETTING THE EQUIPMENT. MONITOR THE NAIL LOAD DURING VERIFICATION TESTS WITH BOTH THE PRESSURE GAUGE AND THE LOAD CELL. USE THE LOAD CELL TO MAINTAIN CONSTANT LOAD HOLD DURING THE CREEP TEST LOAD HOLD INCREMENT OF THE VERIFICATION TEST.

MEASURE THE NAIL HEAD MOVEMENT WITH A DIAL GAUGE CAPABLE OF MEASURING TO 0.001 INCH. THE DIAL GAUGE SHALL HAVE A TRAVEL SUFFICIENT TO ALLOW THE TEST TO BE DONE WITHOUT HAVING TO RESET THE GAUGE. VISUALLY ALIGN THE GAUGE TO BE PARALLEL WITH THE AXIS OF THE NAIL AND SUPPORT THE GAUGE INDEPENDENTLY FROM THE JACK, WALL OR REACTION FRAME. USE TWO DIAL GAUGES WHEN THE TEST SETUP REQUIRES REACTION AGAINST A SOIL CUT FACE.

VERIFICATION LOAD TESTING:

PRE-PRODUCTION VERIFICATION TESTING SHALL BE PERFORMED PRIOR TO INSTALLATION OF PRODUCTION NAILS TO VERIFY THE CONTRACTOR'S INSTALLATION METHODS AND THE NAIL PULLOUT RESISTANCE. A MINIMUM OF TWO VERIFICATION LOAD TESTS WILL BE REQUIRED. SUGGESTED LOCATIONS FOR THE TEST NAIL ARE SHOWN ON SHEET [28/62] . IF VARYING ROCK CONDITIONS ARE ENCOUNTERED, ODOT MAY REQUIRE UP TO TWO ADDITIONAL TEST NAILS.

THE VERIFICATION TEST NAILS ARE SACRIFICIAL NAILS AND SHALL NOT BE USED AS PRODUCTION NAILS.

THE TEST NAILS SHALL HAVE BOTH BONDED AND UNBONDED LENGTHS. SET BONDED LENGTH COMPLETELY INTO ONE SOIL OR ROCK UNIT FOR VERIFICATION TEST NAILS.

PRIOR TO TESTING, ONLY THE BONDED LENGTH OF THE TEST NAIL SHALL BE GROUTED. THE TEMPORARY UNBONDED LENGTH OF THE TEST NAIL SHALL BE AT LEAST 3 FEET. THE BONDED LENGTH OF THE TEST NAIL SHALL BE DETERMINED BASED ON THE PRODUCTION NAIL BAR GRADE AND SIZE SUCH THAT THE ALLOWABLE BAR STRUCTURAL LOAD IS NOT EXCEEDED DURING TESTING, BUT SHALL NOT BE LESS THAN 10 FEET. THE ALLOWABLE BAR STRUCTURAL LOAD DURING TESTING SHALL NOT BE GREATER THAN 90 PERCENT OF THE YIELD STRENGTH FOR GRADE 60 BARS.

THE VERIFICATION TEST BONDED LENGTH (LBV) SHALL NOT EXCEED THE TEST ALLOWABLE BAR STRUCTURAL LOAD DIVIDED BY 2 TIMES THE ALLOWABLE PULLOUT RESISTANCE VALUE. THE FOLLOWING EQUATION SHALL BE USED FOR DETERMINING THE VERIFICATION TEST NAIL MAXIMUM BONDED LENGTH TO BE USED TO AVOID STRUCTURALLY OVERSTRESSING THE VERIFICATION TEST NAIL BAR SIZE:

LBV = C X FY X AS / 2 QD , OR 10 FEET, WHICHEVER IS GREATER.
LBV = MAXIMUM VERIFICATION TEST NAIL BONDED LENGTH (FT)
C = 0.9 FOR GRADE 60 BARS
FY = BAR YIELD OR ULTIMATE STRESS (KSI)
QD = ALLOWABLE PULLOUT RESISTANCE (KIP/FT, KIPS PER LINEAL FOOT OF GROUTED NAIL LENGTH AS SPECIFIED ON SHEET [23/62])

THE DESIGN TEST LOAD (DTL) DURING VERIFICATION TESTING SHALL BE DETERMINED BY THE FOLLOWING EQUATION:
DTL = LBV X QD
LBV = AS-BUILT BONDED TEST LENGTH (FT)
MTL = 2.0 X DTL = MAXIMUM TEST LOAD (KIP)

VERIFICATION TEST NAILS SHALL BE INCREMENTALLY LOADED TO A MAXIMUM TEST LOAD OF 200 PERCENT OF THE DESIGN TEST LOAD (DTL) IN ACCORDANCE WITH THE FOLLOWING LOADING SCHEDULE. THE SOIL NAIL MOVEMENTS SHALL BE RECORDED AT EACH LOAD INCREMENT.

VERIFICATION LOAD TESTING (CONTINUED):

VERIFICATION TEST LOADING SCHEDULE

LOAD	HOLD TIME
AL (.05 DTL MAX)	1 MINUTE
0.25 DTL	10 MINUTES
0.50 DTL	10 MINUTES
0.75 DTL	10 MINUTES
1.00 DTL	10 MINUTES
1.25 DTL	10 MINUTES
1.5 DTL (CREEP TEST)	60 MINUTES
1.75 DTL	10 MINUTES
2.00 DTL (MAX TEST LOAD	10 MINUTES

THE ALIGNMENT LOAD (AL) SHOULD BE THE MINIMUM LOAD REQUIRED TO ALIGN THE TESTING APPARATUS AND SHOULD NOT EXCEED 5 PERCENT OF THE DESIGN TEST LOAD (DTL). DIAL GAUGES SHOULD BE SET TO "ZERO" AFTER THE ALIGNMENT LOAD HAS BEEN APPLIED.

EACH LOAD INCREMENT SHALL BE HELD FOR AT LEAST 10 MINUTES. THE VERIFICATION TEST NAIL SHALL BE MONITORED FOR CREEP AT THE 1.50 DTL LOAD INCREMENT. NAIL MOVEMENTS DURING THE CREEP PORTION OF THE TEST SHALL BE MEASURED AND RECORDED AT 1 MINUTE, 2, 3, 5, 6, 10, 20, 30, 50, AND 60 MINUTES. THE LOAD DURING THE CREEP TEST SHALL BE MAINTAINED WITHIN 2 PERCENT OF THE INTENDED LOAD BY USE OF THE LOAD CELL.

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GENERAL NOTES
SOIL NAIL WALL E1B

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DESIGNED	DRAWN	REVIEWED	DATE
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PROOF LOAD TESTING:

PROOF LOAD TESTING OF THE SOIL NAILS SHALL BE PERFORMED ON 5% OF THE PRODUCTION NAILS IN EACH ROW. THE PROOF TEST LOCATIONS SHALL BE UNIFORMLY DISTRIBUTED ALONG WITHIN THE LIMITS OF THE WALL SURFACE, WITH AT LEAST ONE TEST PER ROW.

PRODUCTION PROOF TEST NAILS SHALL HAVE BOTH BONDED AND TEMPORARY UNBONDED LENGTHS. PRIOR TO TESTING ONLY THE BONDED LENGTH OF THE TEST NAIL SHALL BE GROUTED. THE TEMPORARY UNBONDED LENGTH OF THE TEST NAIL SHALL BE AT LEAST 3 FEET. THE BONDED LENGTH OF THE TEST NAIL SHALL BE DETERMINED BASED ON THE PRODUCTION NAIL BAR GRADE AND SIZE SUCH THAT THE ALLOWABLE BAR STRUCTURAL LOAD IS NOT EXCEEDED DURING TESTING, BUT SHALL NOT BE LESS THAN 10 FEET. PRODUCTION PROOF TEST NAILS SHORTER THAN 12 FEET IN LENGTH MAY BE CONSTRUCTED WITH LESS THAN THE MINIMUM 10 FEET BOND LENGTH WITH THE UNBONDED LENGTH LIMITED TO 3 FEET. THE ALLOWABLE BAR STRUCTURAL LOAD DURING TESTING SHALL NOT BE GREATER THAN 90 PERCENT OF THE YIELD STRENGTH FOR GRADE 60 BARS.

THE PROOF TEST BONDED LENGTH (LBP) SHALL NOT EXCEED THE TEST ALLOWABLE BAR LOAD DIVIDED BY 1.5 TIMES THE ALLOWABLE PULLOUT RESISTANCE VALUE, OR ABOVE MINIMUM LENGTHS, WHICHEVER IS GREATER. THE FOLLOWING EQUATION SHALL BE USED FOR SIZING THE PROOF TEST NAIL BONDED LENGTH TO AVOID OVERSTRESSING THE PRODUCTION NAIL BAR SIZE:

$$LBP = C \times FY \times AS \div 1.5 \times QD, \text{ OR ABOVE MINIMUM LENGTHS, WHICHEVER IS GREATER.}$$

$$LBP = \text{MAXIMUM PROOF TEST NAIL BONDED LENGTH (FT)}$$

$$C = 0.9 \text{ FOR GRADE 60 BARS}$$

$$FY = \text{BAR YIELD OR ULTIMATE STRESS (KSI)}$$

$$AS = \text{BAR STEEL AREA (IN}^2\text{)}$$

$$1.5 = \text{PULLOUT RESISTANCE SAFETY FACTOR}$$

$$QD = \text{ALLOWABLE PULLOUT RESISTANCE (KIP/FT, KIPS PER LINEAL FOOT OF GROUTED NAIL LENGTH, AS SPECIFIED ON SHEET[23/62])}$$

THE DESIGN TEST LOAD (DTL) DURING PROOF TESTING SHALL BE DETERMINED BY THE FOLLOWING EQUATION:

$$DTL = LBP \times QD$$

$$LBP = \text{AS-BUILT BONDED TEST LENGTH (MFT)}$$

$$MTL = 1.5 \times DTL = \text{MAXIMUM TEST LOAD (KIP)}$$

PROOF TESTS SHALL BE PERFORMED BY INCREMENTALLY LOADING THE PROOF TEST NAIL TO A MAXIMUM TEST LOAD OF 150 PERCENT OF THE DESIGN TEST LOAD (DTL). THE NAIL MOVEMENT AT EACH LOAD SHALL BE MEASURED AND RECORDED BY THE ENGINEER IN THE SAME MANNER AS FOR VERIFICATION TESTS. THE TEST LOAD SHALL BE MONITORED BY A JACK PRESSURE GAUGE WITH A SENSITIVITY AND RANGE MEETING THE REQUIREMENTS OF PRESSURE GAUGES USED FOR VERIFICATION TEST NAILS. AT LOAD INCREMENTS OTHER THAN MAXIMUM TEST LOAD, THE LOAD SHALL BE HELD LONG ENOUGH TO OBTAIN A STABLE READING. INCREMENTAL LOADING FOR PROOF TESTS SHALL BE IN ACCORDANCE WITH THE FOLLOWING LOADING SCHEDULE. THE SOIL NAIL MOVEMENTS SHALL BE RECORDED AT EACH LOAD INCREMENT.

GENERAL NOTES - SOIL NAIL WALLS (CONTINUED)

PROOF TEST LOADING SCHEDULE

LOAD	HOLD TIME
AL (.05 DTL MAX)	UNTIL STABLE
0.25 DTL	UNTIL STABLE
0.50 DTL	UNTIL STABLE
0.75 DTL	UNTIL STABLE
1.00 DTL	UNTIL STABLE
1.25 DTL	UNTIL STABLE
1.5 DTL (MAX TEST LOAD)	SEE BELOW

THE ALIGNMENT LOAD (AL) SHOULD BE THE MINIMUM LOAD REQUIRED TO ALIGN THE TESTING APPARATUS AND SHOULD NOT EXCEED 5 PERCENT OF THE DESIGN TEST LOAD (DTL). DIAL GAUGES SHOULD BE SET TO "ZERO" AFTER THE ALIGNMENT LOAD HAS BEEN APPLIED.

ALL LOAD INCREMENTS SHALL BE MAINTAINED WITHIN 5 PERCENT OF THE INTENDED LOAD. DEPENDING ON PERFORMANCE, EITHER 10 MINUTE OR 60 MINUTE CREEP TESTS SHALL BE PERFORMED AT THE MAXIMUM TEST LOAD (1.50 DTL). THE CREEP PERIOD SHALL START AS SOON AS THE MAXIMUM TEST LOAD IS APPLIED AND THE NAIL MOVEMENT SHALL BE MEASURED AND RECORDED AT 1 MINUTES, 2, 3, 5, 6, AND 10 MINUTES. WHERE THE NAIL MOVEMENT BETWEEN 1 MINUTE AND 10 MINUTES EXCEEDS 1 MM, THE MAXIMUM TEST LOAD SHALL BE MAINTAINED AN ADDITIONAL 50 MINUTES AND MOVEMENTS SHALL BE RECORDED AT 20 MINUTES, 30, 50, AND 60 MINUTES.

TEST NAIL ACCEPTANCE CRITERIA

A TEST NAIL SHALL BE CONSIDERED ACCEPTABLE WHEN:

1. FOR VERIFICATION TESTS, A TOTAL CREEP MOVEMENT OF LESS THAN 0.08 INCH PER LOG CYCLE OF TIME BETWEEN THE 6 AND 60 MINUTE READINGS IS MEASURED DURING CREEP TESTING AND THE CREEP RATE IS LINEAR OR DECREASING THROUGHOUT THE CREEP TEST LOAD HOLD PERIOD.
2. FOR PROOF TESTS, A TOTAL CREEP MOVEMENT OF LESS THAN 0.04 INCH IS MEASURED BETWEEN THE 1 AND 10 MINUTE READINGS OR A TOTAL CREEP MOVEMENT OF LESS THAN 0.08 INCH IS MEASURED BETWEEN THE 6 AND 60 MINUTE READINGS AND THE CREEP RATE IS LINEAR OR DECREASING THROUGHOUT THE CREEP TEST LOAD HOLD PERIOD.
3. THE TOTAL MEASURED MOVEMENT AT THE MAXIMUM TEST LOAD EXCEEDS 80 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE TEST NAIL UNBONDED LENGTH.
4. A PULLOUT FAILURE DOES NOT OCCUR AT THE MAXIMUM TEST LOAD. PULLOUT FAILURE IS DEFINED AS THE LOAD AT WHICH ATTEMPTS TO FURTHER INCREASE THE TEST LOAD SIMPLY RESULT IN CONTINUED PULLOUT MOVEMENT OF THE TEST NAIL. THE PULLOUT FAILURE LOAD SHALL BE RECORDED AS PART OF THE TEST DATA.

SUCCESSFUL PROOF TESTED NAILS MEETING THE ABOVE TEST ACCEPTANCE CRITERIA MAY BE INCORPORATED AS PRODUCTION NAILS, PROVIDED THAT (1) THE UNBONDED LENGTH OF THE TEST NAIL DRILLHOLE HAS NOT COLLAPSED DURING TESTING, (2) THE MINIMUM REQUIRED DRILLHOLE DIAMETER HAS BEEN MAINTAINED, (3) THE SPECIFIED CORROSION PROTECTION IS PROVIDED, AND (4) THE TEST NAIL LENGTH IS EQUAL TO OR GREATER THAN THE SCHEDULED PRODUCTION NAIL LENGTH. TEST NAILS MEETING THESE REQUIREMENTS CAN BE COMPLETED BY SATISFACTORILY GROUTING UP THE UNBONDED TEST LENGTH. MAINTAINING THE TEMPORARY UNBONDED TEST LENGTH FOR SUBSEQUENT GROUTING IS THE CONTRACTOR'S RESPONSIBILITY. IF THE UNBONDED TEST LENGTH OF PRODUCTION PROOF TEST NAILS CANNOT BE SATISFACTORILY GROUTED SUBSEQUENT TO TESTING, THE PROOF TEST NAIL SHALL BECOME SACRIFICIAL AND SHALL BE REPLACED.

SOIL NAIL SCHEDULE

ROW	MINIMUM LENGTH (FT)	NAIL DECLINATION (DEGREES)	MINIMUM STEEL BAR SIZE	MINIMUM GROUT HOLE DIAMETER (IN)	NUMBER OF SOIL NAILS
1	19	15	#9	6	23
2	19	15	#9	6	23
3	19	15	#9	6	23
4	19	15	#9	6	23
5	19	15	#9	6	3

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GENERAL NOTES
SOIL NAIL WALL E1B

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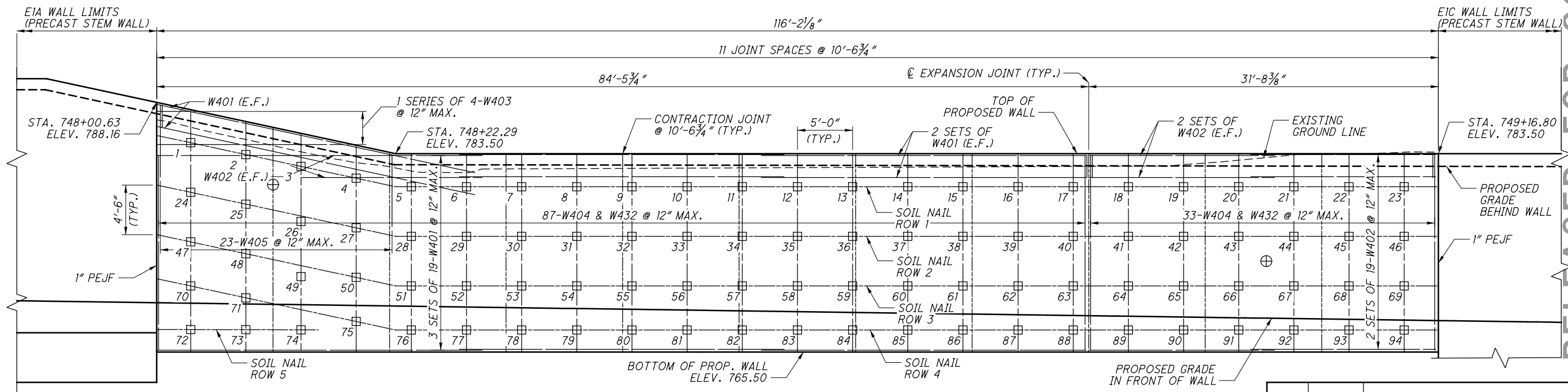
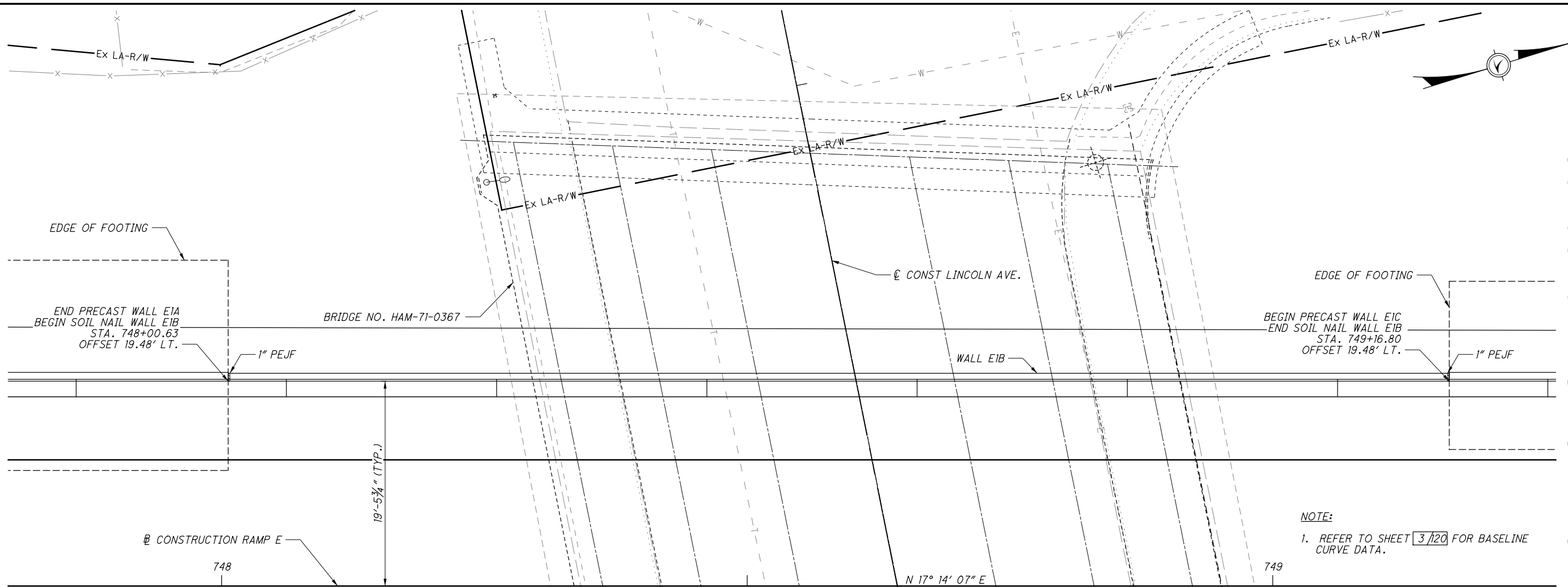
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EX. GROUND ELEV.
BEHIND WALL



⊕ SUGGESTED VERIFICATION
TEST NAIL LOCATION

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

PLAN AND ELEVATION

SOIL NAIL WALLS EIB

HAM-71-3.81

PID No. 77628

28/62

70
120

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DESIGNED
TCB

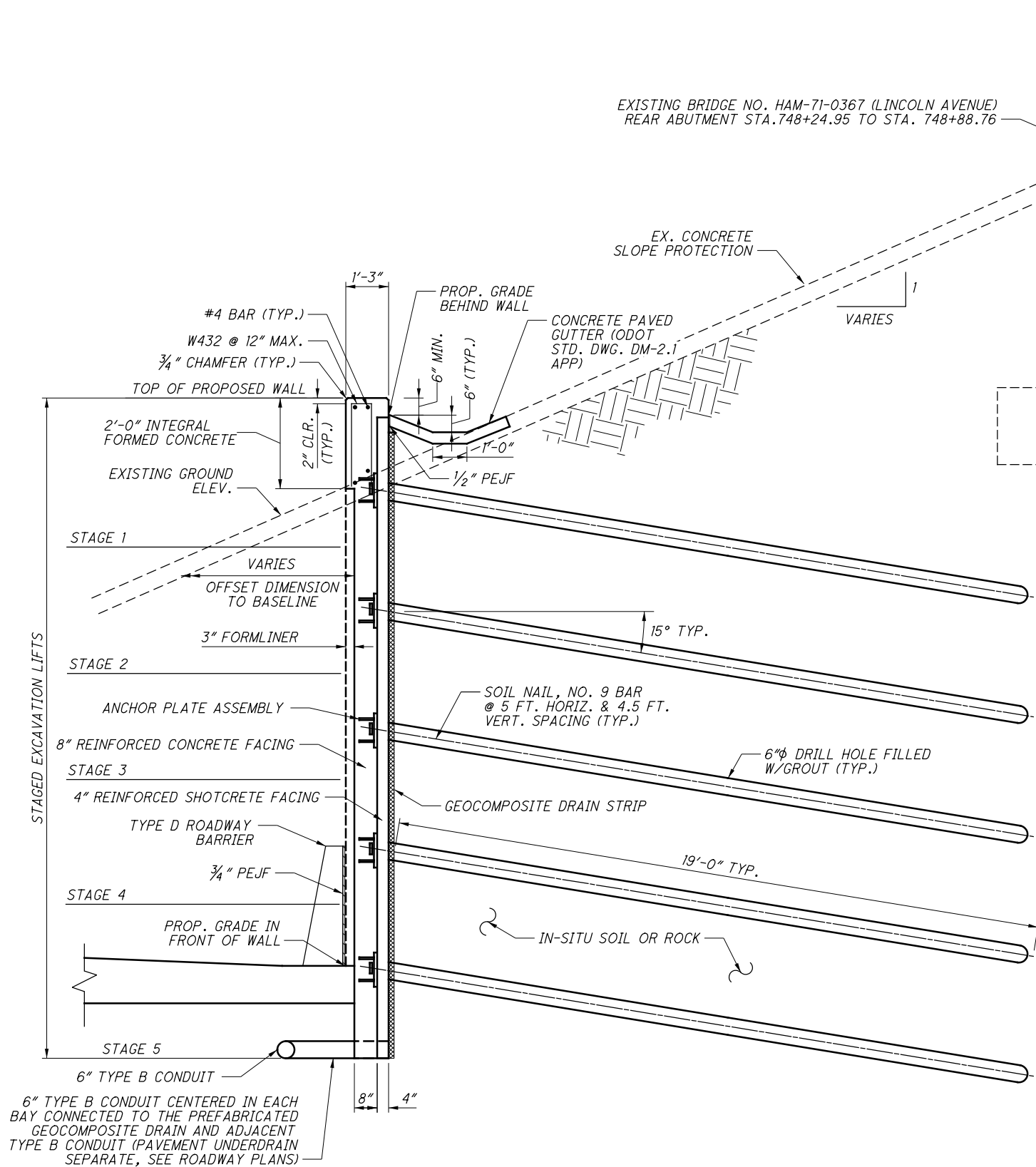
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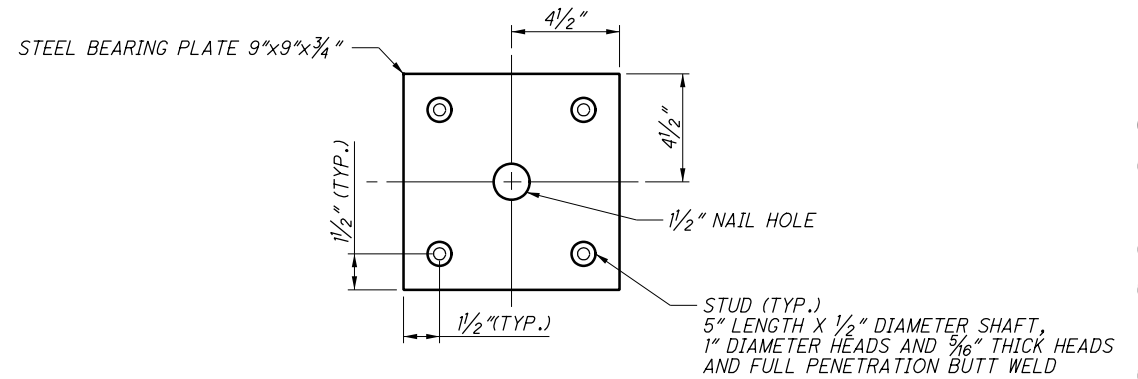
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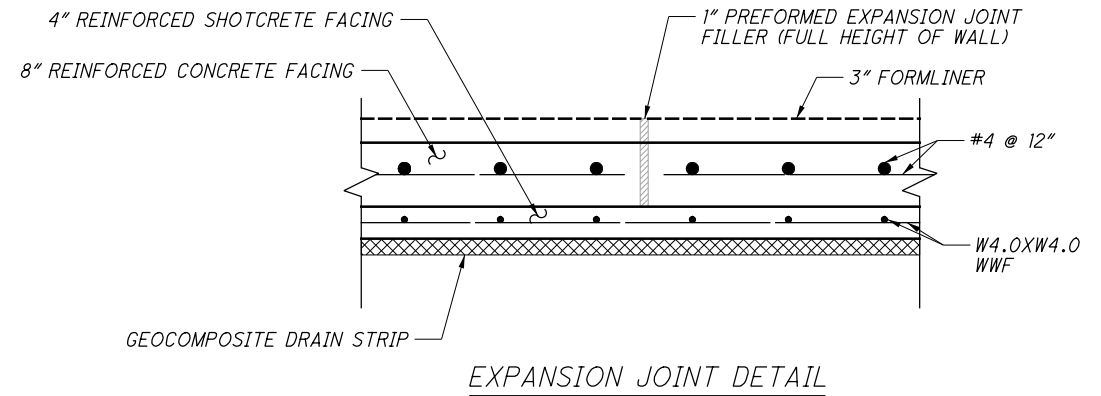
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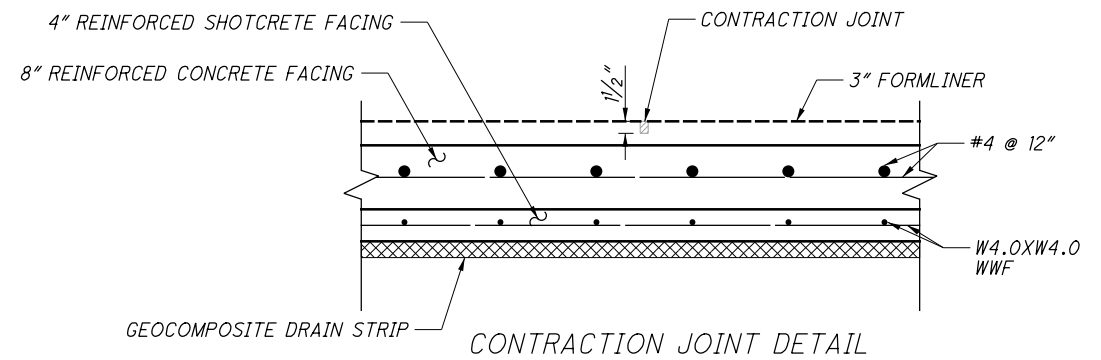
TYPICAL SOIL NAIL WALL SECTION



ANCHOR PLATE WITH STUD DETAIL



EXPANSION JOINT DETAIL



CONTRACTION JOINT DETAIL

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

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SOIL NAIL WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALL EIB)

HAM-71-3.81
PID No. 77628

29/62

71
120

DESIGN AGENCY
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9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

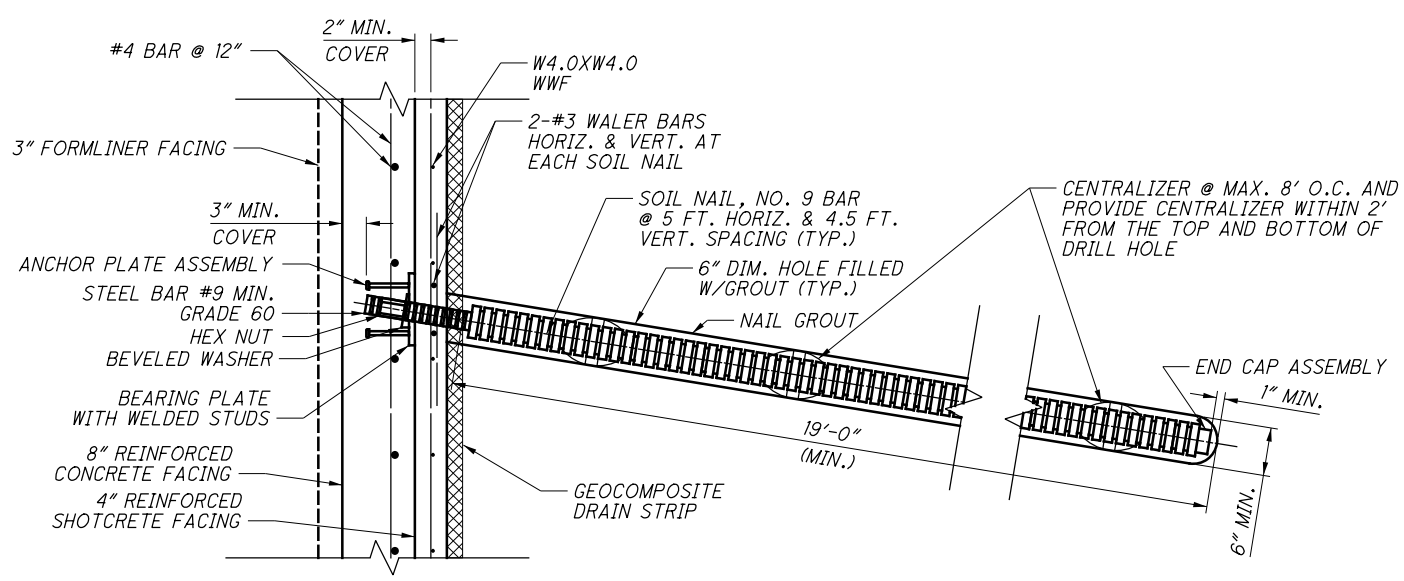
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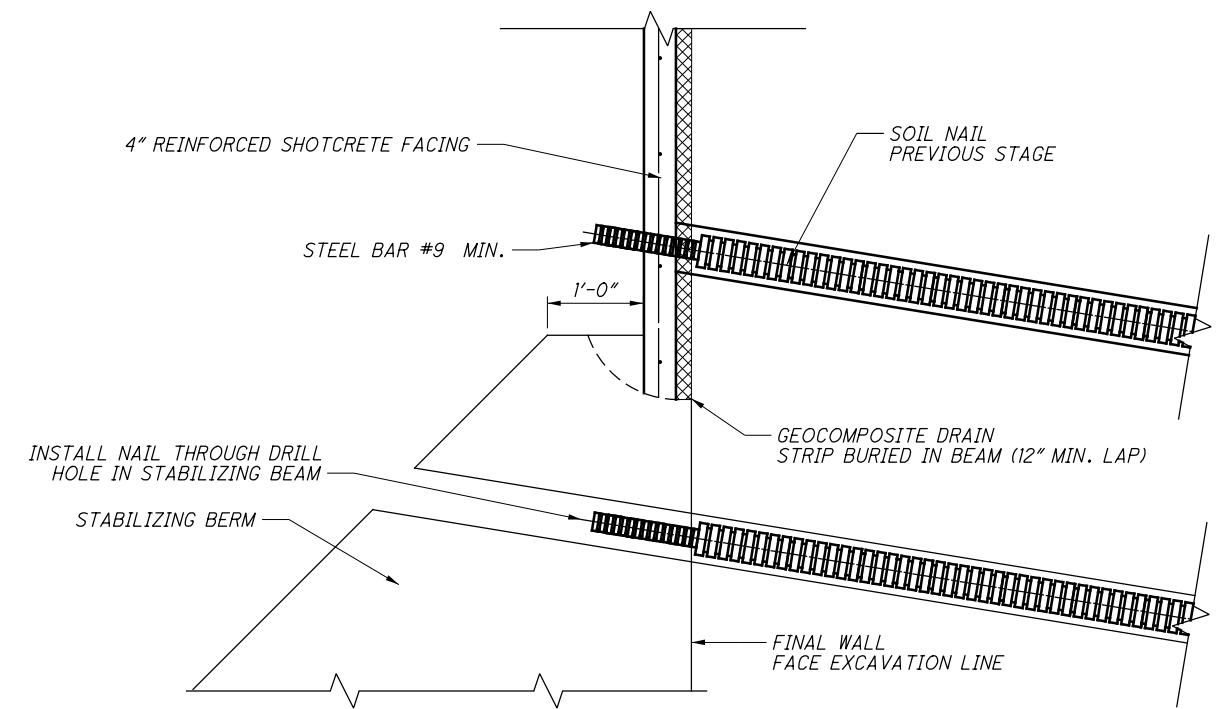
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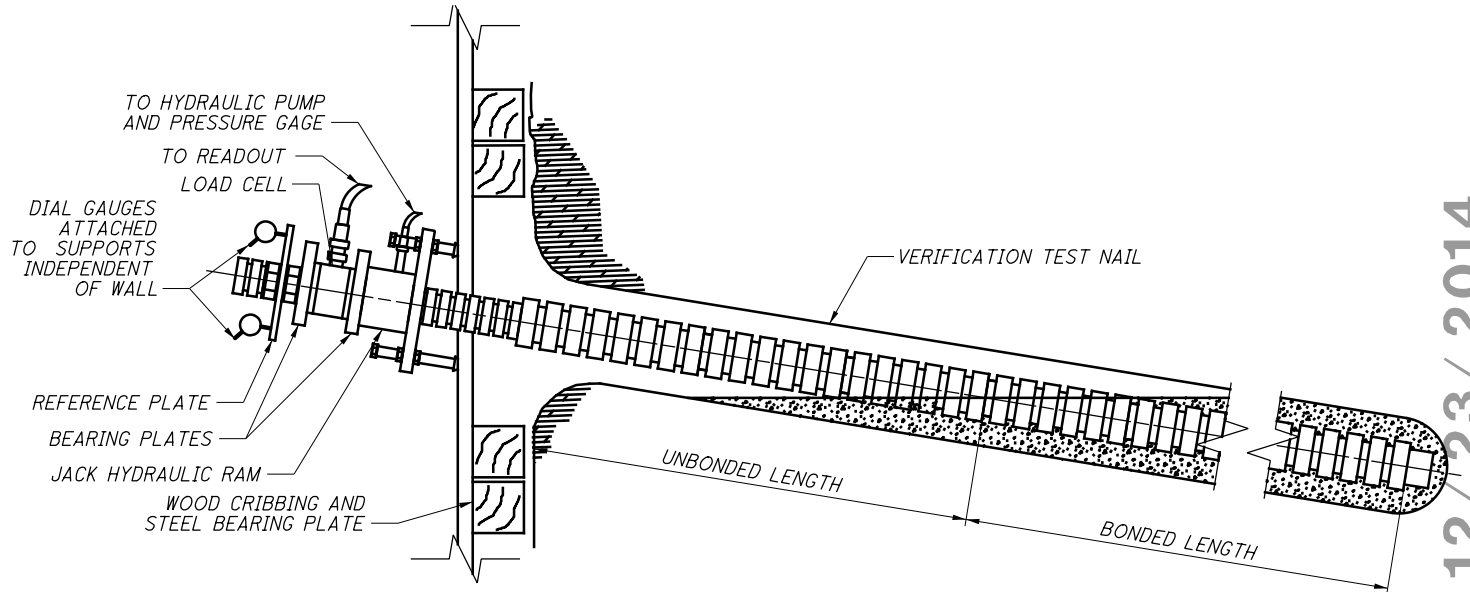
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STRUCTURAL WALL DETAIL
NOT TO SCALE

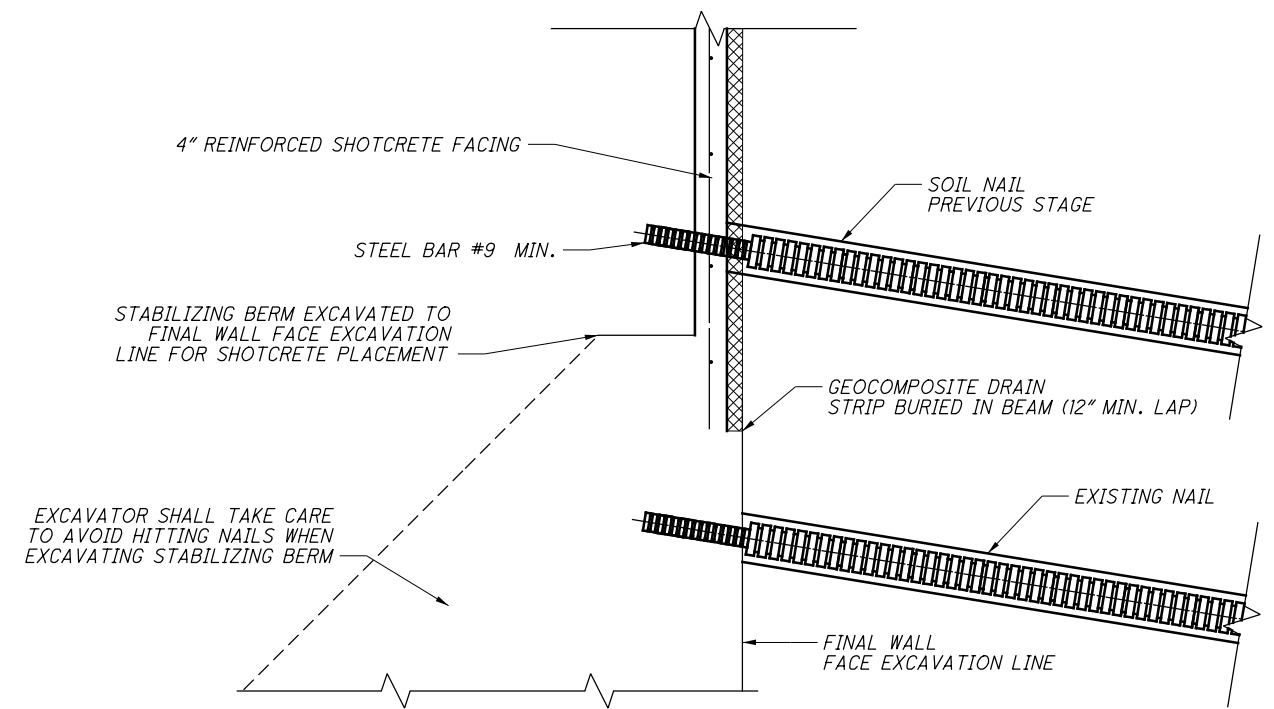


NAIL INSTALLATION THOUGH TEMPORARY STABILIZING BEAM (CONTRACTOR OPTION)
NOT TO SCALE



VERIFICATION TEST SOIL NAIL DETAIL
NOT TO SCALE

- NOTES:
1. BARE BARS MAY BE USED FOR SACRIFICIAL TEST NAILS.
 2. PROOF TEST DETAILS ARE THE SAME EXCEPT LOAD CELL IS NOT REQUIRED.
 3. GROUT UNBONDED LENGTH AFTER TEST IS COMPLETED.



EXCAVATION OF TEMPORARY STABILIZING BEAM FOR SHOTCRETE PLACEMENT (CONTRACTOR OPTION)
NOT TO SCALE

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1500

FOR

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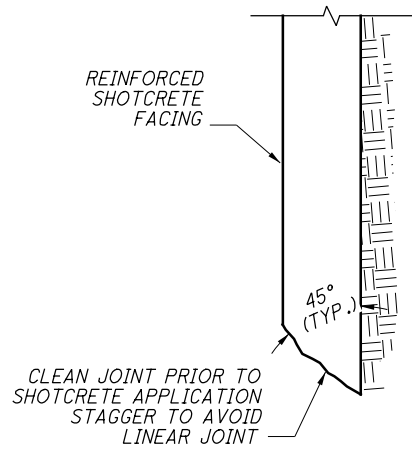
SOIL NAIL WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALL E1B)

HAM-71-3.81
PID No. 77628

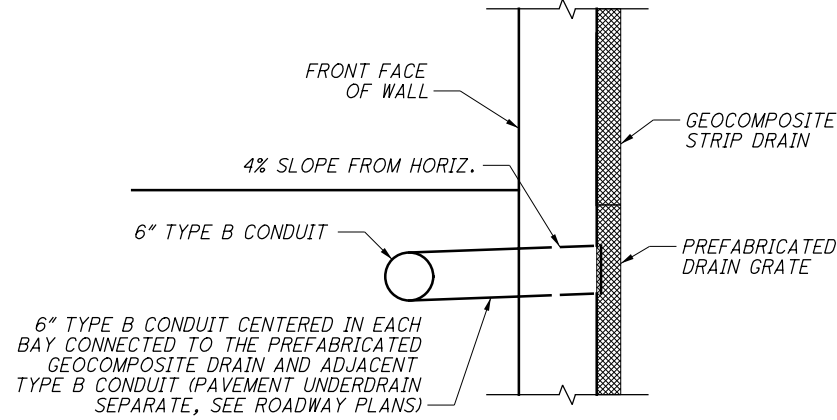
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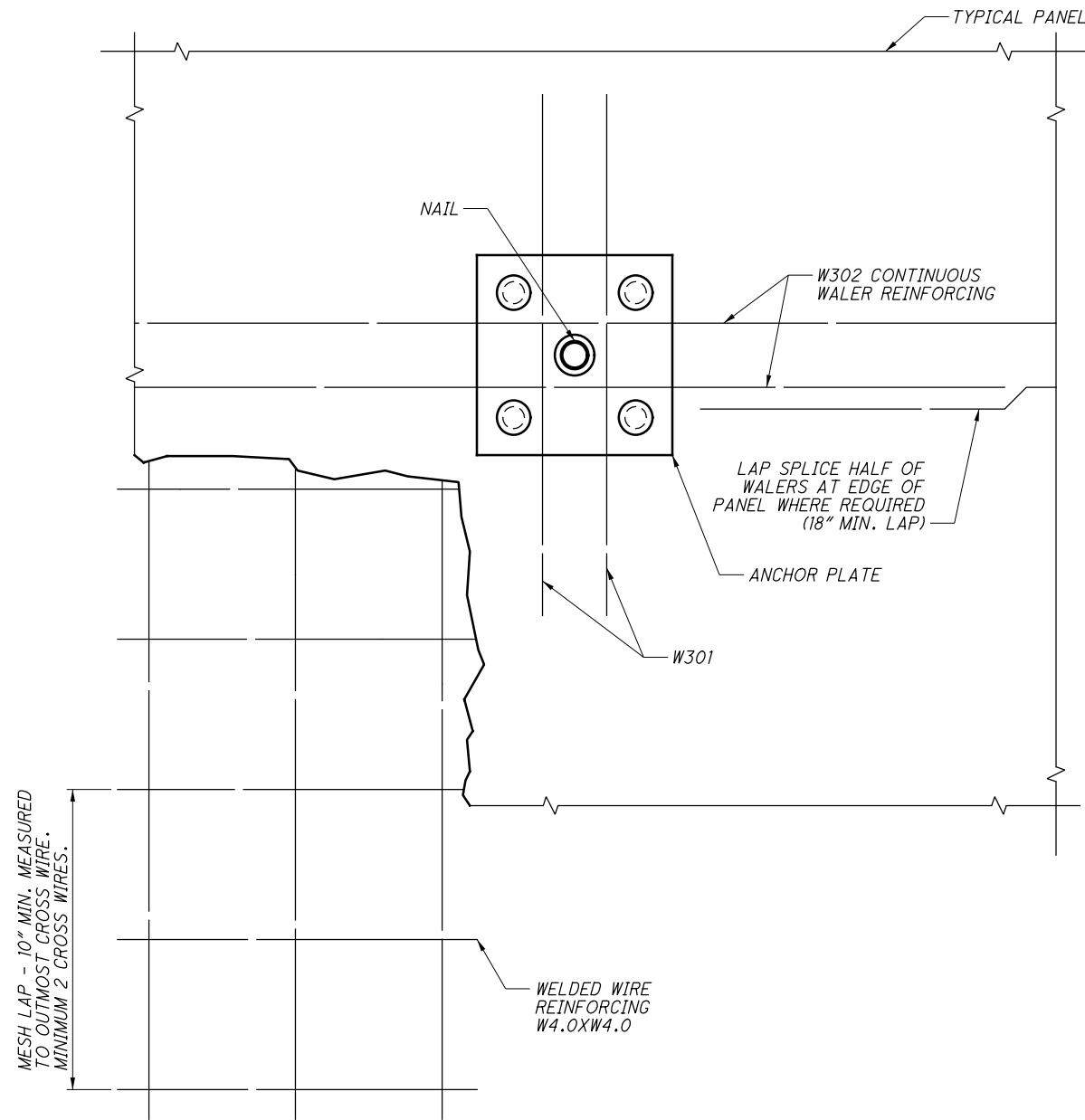
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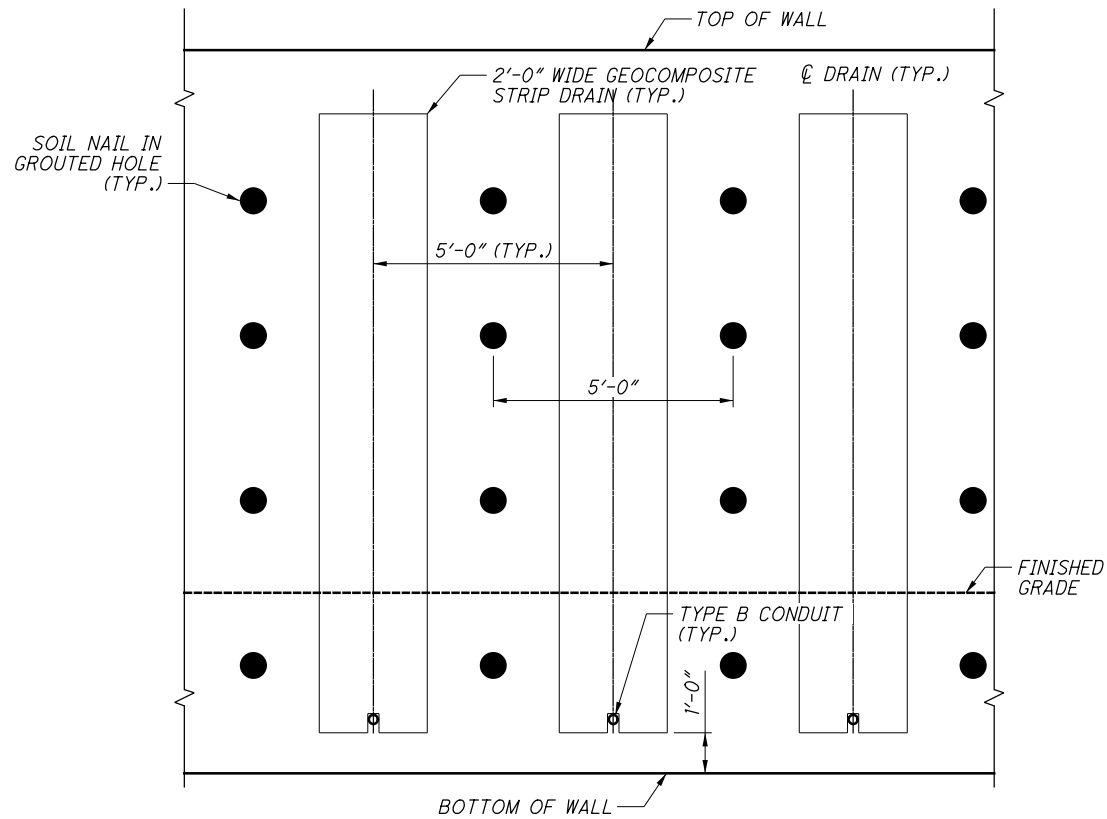
TYPICAL SHOTCRETE CONSTRUCTION JOINT



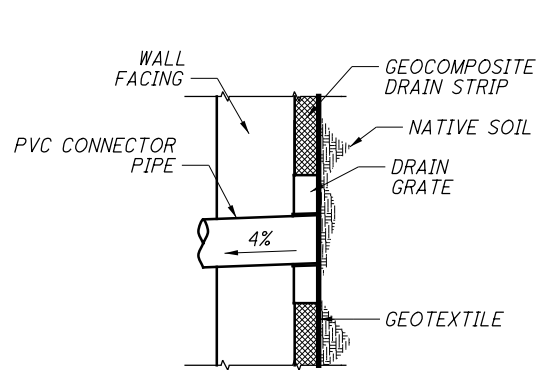
TYPICAL WALL TOE DRAIN
SPICES OF GEOCOMPOSITE DRAIN STRIPS SHALL
CONSIST OF A 1'-0" MIN. LAP OF UPPER GEOTEXTILE
FABRIC OVER THE LOWER FABRIC.



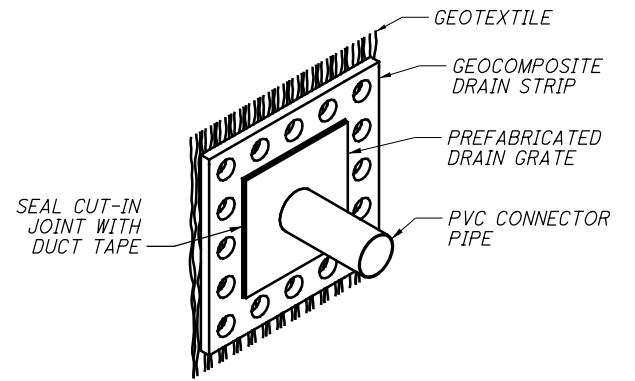
TYPICAL SHOTCRETE REINFORCING STEEL AT ANCHOR ASSEMBLY
NOT TO SCALE



DRAINAGE STRIP DETAIL
NOT TO SCALE



SECTION VIEW



ISOMETRIC VIEW

NOTES:

1. DRAIN GRATE INSTALLATION SHALL NOT DISRUPT GEOTEXTILE.
2. SHOTCRETE AND C.I.P. FACING NOT SHOWN FOR CLARITY.

DRAIN GRATE DETAILS
NOT TO SCALE

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

SOIL NAIL WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALL E1B)

HAM-71-3.81
PID No. 77628

31/62

73
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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE 10/23/14
REVIEWED CHN
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DESIGNED TCB
CHECKED DMV

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ITEM SPECIAL - WICK DRAIN

DESCRIPTION:
THE CONTRACTOR SHALL FURNISH ALL NECESSARY LABOR, EQUIPMENT, AND MATERIALS, AND PERFORM ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF WICK DRAINS IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS AND WITH THE REQUIREMENTS OF THESE SPECIFICATIONS. THE DRAINS SHALL BE SPACED AND ARRANGED AS SHOWN ON THE PLANS OR AS OTHERWISE DIRECTED BY THE DBT.

MATERIAL SPECIFICATION:
THE PREFABRICATED WICK DRAIN SHALL CONSIST OF A CONTINUOUS PLASTIC DRAINAGE CORE WRAPPED IN A NON-WOVEN GEOTEXTILE MATERIAL. THE PREFABRICATED DRAINS SHALL MEET THE MATERIAL SPECIFICATIONS IDENTIFIED HEREIN.

THE DRAINS SHALL BE FREE OF DEFECTS, RIPS, HOLES OR FLAWS.

EACH SEPARATE COMPONENT (GEOTEXTILE AND CORE) AND THE COMPOSITE WICK DRAIN SHALL HAVE A MINIMUM TENSILE STRENGTH WITHOUT DISTRESS OR SEPARATION OF 15 POUNDS PER INCH WIDTH BY CLAMPING OVER THE FULL WIDTH AND TESTING IN ACCORDANCE WITH ASTM D-4595 (I.E. 4-INCH GU AGE LENGTH TESTED IN A CONSTANT RATE OF EXTENSION TEST MACHINE AT 10 PERCENT STRAIN PER MINUTE).

MATERIAL SPECIFICATION:
THE COMPOSITE WICK DRAIN SHALL HAVE THE FOLLOWING FLOW CHARACTERISTICS. FLOW CAPACITY THROUGH THE CORE SHALL BE NOT LESS THAN 0.5 GALLONS PER MINUTE AS MEASURED UNDER A NORMAL STRESS OF 5000 PSF AFTER A PERIOD OF 24 HOURS USING A GRADIENT OF 1. THE PERMEABILITY OF THE GEOTEXTILE SHALL BE GREATER THAN 0.01 CENTIMETERS PER SECOND AS DETERMINED BY ASTM D-4491. THE GEOTEXTILE SHALL HAVE AN AOS OF NOT GREATER THAN 0.30 MILLIMETERS AND NOT LESS THAN 0.10 MILLIMETERS.

SOURCE APPROVAL
PRIOR TO DELIVERY OF THE WICK DRAIN PRODUCT, THE CONTRACTOR SHALL SUBMIT TO ODOT A COPY OF AN AFFIDAVIT SIGNED BY A LEGALLY AUTHORIZED OFFICIAL FROM THE COMPANY MANUFACTURING THE WICK DRAIN CORE AND THE GEOTEXTILE WRAP. THE AFFIDAVIT SHALL ATTEST THAT THE PRODUCTS MEET THE PHYSICAL AND MECHANICAL REQUIREMENTS STATED IN THE SPECIFICATION AND SHALL INCLUDE TEST RESULTS. A WICK DRAIN SAMPLE SHALL BE SUBMITTED FOR EVALUATION AT LEAST 15 WORKING DAYS PRIOR TO DELIVERY TO THE PROJECT. THIS SAMPLE SHALL BE AT LEAST 5 LINEAL FEET. APPROVAL OF THE WICK DRAIN BY ODOT WILL BE REQUIRED PRIOR TO SITE DELIVERY.

CONTROL TESTING:
SAMPLES OF THE WICK DRAIN WILL BE PERIODICALLY REVIEWED BY ODOT. ODOT RESERVES THE RIGHT TO COLLECT SAMPLES PERIODICALLY DURING CONSTRUCTION FOR CONFIRMATION TESTING.

SHIPMENT AND STORAGE:
DURING PERIODS OF SHIPMENT AND STORAGE, THE WICK DRAINS SHALL BE WRAPPED IN A HEAVY DUTY PROTECTIVE COATING. THE STORAGE AREA SHALL BE SUCH THAT THE DRAINS ARE PROTECTED FROM SUNLIGHT, MUD, DIRT, DUST, DEBRIS, AND DETRIMENTAL SUBSTANCES.

ITEM SPECIAL - WICK DRAIN (CONTINUED)

EQUIPMENT:
THE WICK DRAINS SHALL BE INSTALLED WITH EQUIPMENT WHICH WILL CAUSE A MINIMUM OF DISTURBANCE OF THE SUBSOIL DURING THE INSTALLATION. THE PREFABRICATED WICK DRAINS SHALL BE INSTALLED USING A MANDREL OR SLEEVE THAT WILL BE ADVANCED THROUGH APPROXIMATELY 24 INCHES OF GRANULAR MATERIAL COMPRISING THE DRAINAGE BLANKET AND INTO THE UNDERLYING SOILS TO THE REQUIRED DEPTH USING VIBRATORY, CONSTANT LOAD, OR CONSTANT RATE OF ADVANCEMENT METHODS. USE OF FALLING WEIGHT IMPACT HAMMERS OR JETTING SHALL NOT BE PERMITTED FOR INSTALLATION OF DRAINS. THE MANDREL SHALL PROTECT THE PREFABRICATED DRAIN MATERIAL FROM TEARS, CUTS, AND ABRASIONS DURING INSTALLATION AND SHALL BE WITHDRAWN AFTER THE INSTALLATION OF THE DRAIN. THE DRAIN SHALL BE PROVIDED WITH AN ANCHOR PLATE OR ROD AT THE BOTTOM TO ANCHOR THE BOTTOM OF THE DRAIN AT THE REQUIRED DEPTH AT THE TIME OF MANDREL REMOVAL. THE PROJECTED CROSS-SECTION AREA OF THE MANDREL AND ANCHOR COMBINATION SHALL NOT BE GREATER THAN THAT SUGGESTED BY THE MANUFACTURER.

THE CONTRACTOR SHALL EXAMINE THE SITE AND ALL GEOTECHNICAL INFORMATION TO DETERMINE THE EQUIPMENT REQUIRED FOR THE SUPPORT CONDITIONS ANTICIPATED. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SELECTION OF SUCH EQUIPMENT AND, IF REQUIRED, SHALL MODIFY SUCH EQUIPMENT OR PROVIDE CONSTRUCTION PLATFORMS SUCH THAT ADEQUATE SUPPORT IS ACHIEVED TO INSTALL THE WICK DRAINS IN ACCORDANCE WITH THIS SPECIFICATION.

AT LEAST 2 WEEKS PRIOR TO THE INSTALLATION OF THE WICK DRAINS, THE CONTRACTOR SHALL SUBMIT TO ODOT, FOR REVIEW , DETAILS OF THE SEQUENCE AND METHOD OF INSTALLATION. THE SUBMITTAL WILL, AT A MINIMUM, CONTAIN THE FOLLOWING INFORMATION:

- A. SIZE, TYPE, WEIGHT, MAXIMUM PUSHING FORCE, VIBRATORY HAMMER RATED ENERGY, AND CONFIGURATION OF THE INSTALLATION RIG
- B. DIMENSIONS AND LENGTH OF MANDREL
- C. DETAILS OF DRAIN ANCHORAGE
- D. DETAILED DESCRIPTION OF PROPOSED INSTALLATION PROCEDURES, INCLUDING METHODS OF INSTALLING WICK DRAINS THROUGH KNOWN OR ANTICIPATED HARD MATERIALS
- E. PROPOSED METHOD(S) FOR OVERCOMING OBSTRUCTIONS
- F. PROPOSED METHOD(S) FOR SPLICING DRAINS.

THIS REVIEW BY ODOT WILL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO INSTALL WICK DRAINS IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. IF, AT ANY TIME, ODOT CONSIDERS THE METHOD OF INSTALLATION INCAPABLE OF PRODUCING A SATISFACTORY DRAIN, THE CONTRACTOR SHALL ALTER HIS METHOD AND/OR EQUIPMENT AS NECESSARY TO COMPLY WITH THE PLANS AND SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS:
WICK DRAINS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THESE PLANS, UNLESS OTHERWISE DIRECTED BY DBT.

SEQUENCE:
WICK DRAINS SHOULD BE INSTALLED AFTER SITE GRADING TO THE BASE OF THE WALL AND AFTER INSTALLATION OF THE 24-INCH THICK DRAINAGE BLANKET, BUT PRIOR TO CONSTRUCTION OF WALL DIA AND PRIOR TO THE INSTALLATION OF SETTLEMENT PLATFORMS AT WALL DIA.

GENERAL NOTES - MSE WALLS

ITEM SPECIAL - WICK DRAIN (CONTINUED)

PRIOR TO INSTALLATION OF THE WICK DRAINS, THE CONTRACTOR SHALL STAKE OUT THE PROPOSED LOCATIONS OF THE DRAINS AND THEN TAKE ALL REASONABLE PRECAUTIONS TO PRESERVE THE STAKES. THE LOCATIONS OF THE STAKES SHALL NOT VARY BY MORE THAN 6 INCHES FROM THE LOCATIONS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL DEMONSTRATE THAT HIS EQUIPMENT, METHOD, AND MATERIALS PRODUCE A SATISFACTORY INSTALLATION IN ACCORDANCE WITH THIS SPECIFICATION. IF AT ANY TIME, ODOT CONSIDERS THAT THE METHOD OF INSTALLATION DOES NOT PRODUCE A SATISFACTORY WICK DRAIN, THE CONTRACTOR SHALL ALTER HIS METHOD AND/OR EQUIPMENT AS NECESSARY TO COMPLY WITH THESE SPECIFICATIONS.

THE WICK DRAINS SHALL BE INSTALLED THROUGH THE SOFT LACUSTRINE SOILS AND INTO THE HARD RESIDUAL SOILS OR WEATHERED BEDROCK. DRAINS THAT DEViate FROM THE PLAN LOCATION BY MORE THAN 6 INCHES, ARE DAMAGED, OR IMPROPERLY INSTALLED, SHALL BE REJECTED. REJECTED DRAINS ARE TO BE REMOVED OR ABANDONED IN-PLACE, AND REPLACEMENT DRAINS SHALL BE OFFSET APPROXIMATELY 18 INCHES FROM THE LOCATION OF THE REJECTED DRAIN.

THE DRAINS SHALL BE INSTALLED VERTICAL. THE CONTRACTOR SHALL PROVIDE ODOT WITH A SUITABLE MEANS OF VERIFYING THE PLUMBNESS OF THE MANDREL AND DETERMINING THE DEPTH OF THE DRAIN AT ANY TIME. THE EQUIPMENT SHALL BE CAREFULLY CHECKED FOR PLUMBNESS AND SHALL NOT DEVIATE MORE THAN 0.25 INCHES PER FOOT FROM VERTICAL.

SPLICES OR CONNECTIONS IN THE WICK DRAIN MATERIAL SHALL BE DONE SO AS TO ENSURE CONTINUITY OF THE WICK MATERIAL AND THE SPLICED WICKS SHALL CONFORM TO ALL OF THE MATERIAL SPECIFICATION REQUIREMENTS. THE PREFABRICATED WICK DRAIN SHALL BE CUT SUCH THAT AT LEAST A 12 INCH LENGTH PROTRUDES ABOVE THE WORKING SURFACE AT EACH PREFABRICATED WICK DRAIN LOCATION.

WHERE OBSTRUCTIONS ARE ENCOUNTERED WITHIN THE COMPRESSIBLE MATERIAL (KNOWN OR ANTICIPATED AREAS OF HARD MATERIALS ARE NOT CONSIDERED OBSTRUCTIONS), THE CONTRACTOR SHALL ABANDON THE HOLE, AND INSTALL A NEW DRAIN WITHIN 18 INCHES OF THE OBSTRUCTED DRAIN. A MAXIMUM OF 2 ATTEMPTS WILL BE MADE FOR EACH OBSTRUCTED DRAIN. IF THE DRAIN STILL CANNOT BE INSTALLED TO THE LEVEL OF THE HARD RESIDUAL SOILS OR WEATHERED BEDROCK, THE DRAIN LOCATION SHOULD BE ABANDONED AND THE INSTALLATION EQUIPMENT SHOULD BE MOVED TO THE NEXT DRAIN LOCATION.

IF MORE THAN 10 WICK DRAIN LOCATIONS IN THE SAME GENERAL AREA MUST BE ABANDONED WITHOUT REACHING THE HARD RESIDUAL, SOIL LAYER SPECIFIED, THE CONTRACTOR SHALL NOTIFY THE DBT. IN SUCH CASES, THE DBT MAY DIRECT THE CONTRACTOR TO INSTALL DRAINS TO A DIFFERENT TIP ELEVATION, OR MAY DIRECT THE CONTRACTOR TO USE DIFFERENT INSTALLATION METHODS, AS REQUIRED.

ITEM 204 - GRANULAR EMBANKMENT, AS PER PLAN

THE DRAINAGE BLANKET BENEATH THE MSE WALL SHALL BE A 2-FOOT MINIMUM THICK LAYER OF SAND FILL. THE MATERIAL SHALL BE SAND AS SPECIFIED IN 703.02A, FINE AGGREGATE. THE SAND SHALL BE PLACED IN ACCORDANCE WITH 204 EXCEPT THE COMPACTION REQUIREMENTS SHALL BE AS FOLLOWS. COMPACT THE INITIAL 12-INCHES TO 98% MAXIMUM DRY DENSITY. COMPACT THE FINAL 12-INCHES TO 100% MAXIMUM DRY DENSITY. WHERE WICK DRAINS ARE INSTALLED, PLACE AND COMPACT THE FINAL 6 INCHES OF SAND AFTER THE WICK DRAINS ARE IN PLACE.

SEQUENCE OF CONSTRUCTION

- 1. EXCAVATE TO THE ELEVATION OF THE BOTTOM OF DRAINAGE BLANKET, USING TEMPORARY SHORING AS NECESSARY.
- 2. PLACE DRAINAGE BLANKET.
- 3. INSTALL WICK DRAINS.
- 4. INSTALL MONITORING EQUIPMENT.
- 5. CONSTRUCT MSE RETAINING WALL.

WICK DRAIN SCHEDULE

LOCATION	FROM	TO	AREA S.F.	EST. BOTTOM TIP EL.
WALL DIA	553+63	554+14	1500	744
WALL DIA	554+14	554+64	1500	735
WALL DIA	554+64	555+00	1080	728
WALL DIA	555+00	555+35	1050	724.5
WALL DIA	555+35	555+70	1085	721
WALL DIA	555+70	556+10	1320	717
WALL DIA	556+10	556+20	340	716

ITEM 840 - MECHANICALLY STABILIZED EARTH WALL, AS PER PLAN

ADJUST LEVELING PAD ACCORDINGLY TO ACCOMODATE DRAINAGE STRUCTURES THAT ARE LOCATED DIRECTLY IN FRONT OF MSE WALL PANELS.

0	12/19/14	RFC SUBMITTAL BU 5
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A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
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GENERAL NOTES

MSE WALL DIA

HAM-71-3.81

PID No. 77628

32/62

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DESIGN AGENCY
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9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500



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ITEM 203 – ROADWAY MISC: STONE COLUMNS

ITEM 203 – ROADWAY MISC: STONE COLUMN EQUIPMENT MOBILIZATION

1.0 GENERAL

1.1 DESCRIPTION

THIS WORK INCLUDES FURNISHING THE MATERIAL FOR AND INSTALLATION OF 36 INCH DIAMETER STONE COLUMNS, IN LOCATIONS AS SHOWN IN THE CONTRACT DOCUMENTS.

THIS WORK SHALL BE ACCOMPLISHED BY A CONTRACTOR EXPERIENCED AND PROPERLY EQUIPPED IN THE INSTALLATION OF STONE COLUMNS.

1.2 PURPOSE

THE PURPOSE OF THE STONE COLUMNS ON THIS PROJECT IS TO INCREASE THE ALLOWABLE BEARING CAPACITY AND OTHER SOIL PARAMETERS OF THE EXISTING FOUNDATION SOILS BENEATH WALL E3A. THE CONTRACTOR SHOULD BECOME FAMILIAR WITH THE SUBSURFACE CONDITIONS ENCOUNTERED AT THE TEST BORING LOCATIONS IN THE VICINITY OF WALL E3A BEFORE DESIGNING THE STONE COLUMNS.THE CONTRACTOR SHOULD NOTE THAT SUBSURFACE CONDITIONS ENCOUNTERED IN THE TEST BORING ARE REPRESENTATIVE OF THE CONDITIONS ONLY AT THE LOCATIONS WHERE SUCH INFORMATION OBTAINED. THERE IS NO EXPRESSED OR IMPLIED AGREEMENT THAT UNIFORMITY OF MATERIAL EXISTS BETWEEN THE EXPLORED LOCATIONS.

THE STONE COLUMNS SHALL PRODUCE A FACTORED BEARING RESISTANCE FOR SUPPORT OF THE RETAINING WALL EQUAL TO OR EXCEEDING THE REQUIRED DESIGN SOIL BEARING PRESSURE SPECIFIED IN THE MSE WALL GENERAL NOTES. A FACTOR OF SAFETY OF 2.5 OR GREATER SHALL BE PROVIDED IN DETERMINING THE ALLOWABLE SOIL BEARING PRESSURE. REFER TO THE PERFORMANCE MONITORING SECTION IN THE NOTES FOR SETTLEMENT REQUIREMENTS OF WALLS CONSTRUCTED ON FOUNDATION IMPROVEMENTS. EACH INDIVIDUAL STONE COLUMN SHALL PENETRATE TO THE TOP OF THE WEATHERED BEDROCK.

1.3 SUBMITTALS

- 1.3.1 THE CONTRACTOR SHALL SUBMIT HARD COPIES OF THE FOLLOWING DOCUMENTS TO ODOT A MINIMUM OF 14 DAYS PRIOR TO ANY MOBILIZATION OF EQUIPMENT, THE ORDERING OF ANY MATERIALS, OR INSTALLATION OF THE STONE COLUMNS.
- A. CONSTRUCTION DRAWINGS SHOWING COLUMN LOCATIONS, DEPTHS, AND IDENTIFICATION NUMBERS. CONSTRUCTION DRAWINGS SHALL SHOW AND ADDRESS EXISTING UTILITY LOCATIONS. CONSTRUCTION DRAWINGS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF OHIO.
 - B. A DESCRIPTION OF THE EQUIPMENT AND CONSTRUCTION PROCEDURES TO BE USED, INCLUDING A PLAN TO DISPOSE OF ANY WATER OR SPOILS IF APPLICABLE.
 - C. A PROPOSED PLAN FOR QUALITY CONTROL THROUGHOUT THE INSTALLATION PROCEDURE. THIS PLAN SHALL ADDRESS ISSUES SUCH AS CONTROL AND MEASUREMENT OF COLUMN DIAMETER, LIFT THICKNESS, AND ANY OTHER PERTINENT INFORMATION.

- D. A PROPOSED VERIFICATION PROGRAM, INCLUDING PROPOSED INDEPENDENT TESTING AGENCY TO BE USED.
- E. THE SOURCE OF PROPOSED STONE COLUMN BACKFILL MATERIAL AND THE GRADATION AND BANDWIDTHS THE CONTRACTOR PROPOSES TO USE. UPON APPROVAL OF THE BACKFILL SOURCE AND GRADATION, THE CONTRACTOR SHALL MAINTAIN THIS GRADATION THROUGHOUT THE STONE COLUMN INSTALLATION.
- F. CALCULATIONS FOR ANTICIPATED SETTLEMENTS, BEARING RESISTANCE, AND OTHER CALCULATIONS RELATING TO PERFORMANCE OF THE STONE COLUMNS AND REQUIRED COMPOSITE SOIL PARAMETERS.

- 1.3.2 VERIFICATION PROGRAM
- A VERIFICATION PROGRAM DESIGNED, ACCOMPLISHED, AND REPORTED BY THE CONTRACTOR IS REQUIRED TO MEASURE THE QUALITY OF THE INSTALLED STONE COLUMNS. AS A MINIMUM, THE VERIFICATION PROGRAM SHALL INCLUDE THE FOLLOWING.
- A. PROPOSED MEANS AND METHODS FOR VERIFICATION THAT THE DESIGN AND PERFORMANCE CRITERIA AS STATED IN THIS NOTE AND THE FOUNDATION IMPROVEMENT DETAILS HAVE BEEN SATISFIED. THIS MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, MODULUS OR LOAD TESTS ON INDIVIDUAL ELEMENTS AND/OR GROUPS, SOIL BORINGS, AND OTHER METHODS AS REQUIRED BY THE STONE COLUMN DESIGNER.
 - B. QUALITY CONTROL PROGRAM TO VERIFY THAT THE STONE COLUMNS ARE INSTALLED IN ACCORDANCE WITH THE DESIGNER’S SPECIFICATIONS AND THE REQUIREMENTS AS OUTLINED IN THIS NOTE AND THE FOUNDATION IMPROVEMENT DETAILS. THE QUALITY CONTROL PROGRAM SHALL INCLUDE TESTING AND/OR OBSERVATIONS BY AN INDEPENDENT TESTING LABORATORY AS REQUIRED IN THE CONTRACT DOCUMENTS.

- 1.3.3 DAILY REPORTS
- DURING CONSTRUCTION, THE CONTRACTOR SHOULD SUBMIT 1 COPY OF DAILY PROGRESS REPORTS IN WRITING TO ODOT DETAILING THE FOLLOWING AT A MINIMUM:
- A. STONE COLUMN IDENTIFIED BY LOCATION NUMBER.
 - B. DATE CONSTRUCTED
 - C. ELEVATION OF TOP AND BOTTOM OF EACH STONE COLUMN
 - D. AVERAGE LIFT THICKNESS
 - E. ESTIMATE OF GROUND HEAVE OR SUBSIDENCE
 - F. VIBRATOR POWER CONSUMPTION DURING PENETRATION AND COMPACTION OF EACH INCREMENT OF STONE COLUMN CONSTRUCTED
 - G. JETTING PRESSURE (AIR OR WATER)
 - H. DESCRIPTION OF SOIL AND GROUNDWATER CONDITIONS
 - I. DETAILS OF OBSTRUCTIONS, DELAYS, AND ANY UNUSUAL GROUND CONDITIONS
 - J. QUANTITY OF AGGREGATE PLACED IN EACH STONE COLUMN
 - K. AMOUNT OF WATER USED PER COLUMN (IF APPLICABLE).
 - L. RESULTS OF QUALITY CONTROL TESTING.

GENERAL NOTES – MSE WALLS (CONTINUED)

1.3.4 FINAL REPORT

UPON COMPLETION OF THE STONE COLUMNS AT WALL E3A, THE CONTRACTOR SHOULD SUBMIT A REPORT TO ODOT DETAILING THE PERFORMANCE OF THE SITE DURING TREATMENT, AND THAT THE SITE MEETS THE CRITERIA ESTABLISHED FOR THE SITE AND PROJECT.

1.4 PRE-CONSTRUCTION CONFERENCE

PRE-CONSTRUCTION CONFERENCE SHALL BE HELD AT LEAST FIVE WORKING DAYS PRIOR TO THE CONTRACTOR BEGINNING ANY STONE COLUMN INSTALLATION WORK AT THE SITE TO DISCUSS CONSTRUCTION PROCEDURES, PERSONNEL, QUALITY CONTROL, AND EQUIPMENT TO BE USED. THOSE ATTENDING SHALL INCLUDE THE SUPERINTENDENT,ON-SITE SUPERVISORS, INDEPENDENT TESTING AGENCY REPRESENTATIVE, AND ALL FOREMEN IN CHARGE OF STONE COLUMN INSTALLATION OPERATIONS, AS WELL AS ODOT AND THEIR, KEY INSPECTION PERSONNEL.

IF THE CONTRACTOR’S KEY PERSONNEL CHANGE OR IF THE CONTRACTOR PROPOSES A SIGNIFICANT REVISION OF THE INSTALLATION PLAN, AN ADDITIONAL CONFERENCE SHALL BE HELD BEFORE ANY ADDITIONAL WORK IS PERFORMED.

1.5 BASIS OF ACCEPTANCE

BASIS OF ACCEPTANCE FOR THE STONE COLUMNS WILL INCLUDE VISUAL INSPECTION BY ODOT AND MEETING THE TOLERANCES IN SECTION 3.2 SEE SHEET 34/62.

2.0 MATERIALS

STONE COLUMN BACKFILL MATERIAL SHALL BE FURNISHED BY THE CONTRACTOR. AGGREGATE USED FOR THE CONSTRUCTION OF STONE COLUMNS SHALL BE RELATIVELY CLEAN CRUSHED CARBONATE STONE OR CLEAN CRUSHED GRAVEL, MEETING THE REQUIREMENTS OF CMS SECTION 703.02B FOR ABRASION LOSS, FREEZE-THAW DURABILITY, AND DELETERIOUS MATERIAL CONTENT.

AGGREGATE FOR STONE COLUMNS SHALL BE HARD, ANGULAR TO SUBANGULAR DURABLE ROCK FRAGMENTS WITH THE MAJORITY OF PARTICLES IN THE RANGE OF ⅙ INCH TO 1½ INCHES IN ACCORDANCE WITH ASTM C33 SIZE 57.

3.0 CONSTRUCTION REQUIREMENTS

3.1 PROCEDURES

THE ACTUAL CONSTRUCTION PROCEDURES SHOULD BE DETERMINED BY THE CONTRACTOR ACCORDING TO THE PROVISIONS OF THIS NOTE. THE FOLLOWING ARE MINIMUM REQUIREMENTS AND SHOULD BE REFERENCED BY THE CONTRACTOR WHEN PREPARING SUBMITTALS.

AFTER WALL EXCAVATION, THE SITE SHALL BE GRADED AS NEEDED FOR PROPER INSTALLATION OF THE STONE COLUMNS. SEE RETAINING WALL PLANS FOR DETAILS.

3.1.1 STONE COLUMNS

INSTALL THE STONE COLUMNS WITH A DOWN-HOLE VIBRATOR CAPABLE OF DENSIFYING THE AGGREGATE BY FORCING IT RADIALY INTO THE SURROUNDING SOIL. THE VIBRATOR SHALL BE OF SUFFICIENT SIZE AND CAPACITY APPROPRIATE TO CONSTRUCTING STONE COLUMNS TO THE CONTRACTOR’S DESIGN PLAN DIAMETERS AND LENGTHS.

3.1.1.1 THE PROBE AND FOLLOWER TUBES SHALL BE OF SUFFICIENT LENGTH TO REACH THE ELEVATIONS SHOWN ON THE CONTRACTOR’S DESIGN PLANS AND SHOP DRAWINGS. THE PROBE, USED IN CONJUNCTION WITH THE AVAILABLE PRESSURE TIP JET, SHALL BE CAPABLE OF PENETRATING TO THE TOP OF THE WEATHERED BEDROCK. PRE-BORING OF SLIT LENSES, LAYERS, OR STRATA, IF ENCOUNTERED IS PERMITTED.

3.1.1.2 THE PROBE AND FOLLOWER TUBES SHALL HAVE VISIBLE MARKINGS AT REGULAR INCREMENTS TO ENABLE MEASUREMENT OF PENETRATION AND RE-PENETRATION DEPTHS.

3.1.1.3 PROVIDE METHODS FOR SUPPLYING TO THE TIP OF THE PROBE A SUFFICIENT QUANTITY OF AIR OR WATER TO WIDEN THE PROBE HOLE TO ALLOW ADEQUATE SPACE FOR STONE BACKFILL PLACEMENT AROUND THE PROBE. MAINTAIN THE FLOW OF AIR OR WATER FROM THE BOTTOM JET AT ALL TIMES DURING BACKFILLING TO PREVENT CAVING OR COLLAPSE OF THE HOLE AND TO FORM A CLEAN STONE COLUMN.

3.1.1.4 THE PROBE SHALL PENETRATE TO THE MINIMUM DEPTHS REQUIRED IN THE PLANS.

3.1.1.5 LIFT THICKNESS SHALL NOT EXCEED 4 FEET. AFTER PENETRATION TO THE TREATMENT DEPTH, SLOWLY RETRIEVE THE VIBRATOR IN 1 TO 1-1/2 FOOT INCREMENTS TO ALLOW BACKFILL PLACEMENT.

3.1.1.6 COMPACT THE BACKFILL IN EACH LIFT BY RE-PENETRATING IT AT LEAST TWICE WITH THE HORIZONTALLY VIBRATING PROBE SO AS TO DENSIFY AND FORCE THE STONE RADIALY INTO THE SURROUNDING SOIL. RE-PENETRATE THE STONE IN EACH INCREMENT A SUFFICIENT NUMBER OF TIMES TO DEVELOP AN AMMETER READING ON THE MOTOR SIGNIFICANTLY HIGHER THAN THE FREESTANDING (UNLOADED) AMPERE DRAW ON THE MOTOR.

3.1.1.7 STONE COLUMNS SHALL BE INSTALLED SO THAT EACH COMPLETED COLUMN IS CONTINUOUS THROUGHOUT ITS LENGTH.

3.1.1.8 SHOULD ANY OBSTRUCTIONS BE ENCOUNTERED DURING INSTALLATION THAT CANNOT BE PENETRATED WITH REASONABLE EFFORT, THE CONTRACTOR SHALL REMOVE SUCH OBSTRUCTION OR THE ELEMENT SHALL BE RELOCATED. IF THE OBSTRUCTION IS DEEP, THE ELEMENTS SHALL BE CONSTRUCTED FOLLOWING THE SPECIFIED PROCEDURES FROM THE OBSTRUCTION TO THE SURFACE. OBSTRUCTIONS INCLUDE BUT ARE NOT LIMITED TO BOULDERS, TIMBERS, CONCRETE AND UTILITY LINES WHICH PREVENT PLACING THE ELEMENTS TO THE REQUIRED DEPTH, OR CAUSE THE ELEMENT TO DRIFT FROM THE REQUIRED LOCATION.

3.1.1.9 ANY GROUND HEAVE THAT IS OBSERVED SHALL BE REWORKED AND COMPACTED BY THE CONTRACTOR PRIOR TO RETAINING WALL FOUNDATION CONSTRUCTION.

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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-964-1500

DATE
10/23/14

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GENERAL NOTES
MSE WALL E3A

HAM-71-3.81
PID No. 77628

33/62

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GENERAL NOTES - MSE WALLS (CONTINUED)

ITEM 203 - ROADWAY MISC: STONE COLUMNS (CONTINUED)

3.2 TOLERANCES

3.2.1 HORIZONTAL CONTROL: THE CENTER OF THE COMPLETED COLUMN SHALL BE WITHIN 8 INCHES OF THE PLAN LOCATION.

3.2.2 VERTICAL CONTROL: THE COMPLETED COLUMN SHALL NOT DEVIATE FROM VERTICAL BY MORE THAN 2 INCHES IN 10 FEET.

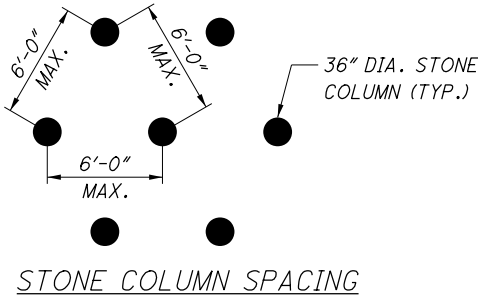
3.2.3 DIAMETER: THE COMPLETED PIER OR COLUMN DIAMETER SHALL NOT BE LESS THAN THE PLAN DIAMETER.

IF ANY COLUMN DOES NOT MEET PLAN REQUIREMENTS, AN ADDITIONAL COLUMN MAY BE REQUIRED BY THE ENGINEER TO BE INSTALLED AT THE CONTRACTOR'S EXPENSE.

3.2.4 FINISH SUBGRADE TO WITHIN 3 INCHES OF THE PROPOSED ELEVATION.

STONE COLUMN INFORMATION TABLE					
WALL NO.	WALL STA. RANGE		MIN. TIP EL.		STONE COLUMN SPACING FT.
	BEGIN STA.	END STA.	BEGIN EL.	END EL.	
E3A	757+12	759+00	746	VARIES	6

* - STONE COLUMNS SHALL EXTEND TO THE TOP OF WEATHERED BEDROCK (ANTICIPATED TO EXTEND TO ELEVATIONS RANGING FROM 737.0 TO 739.5 FEET).



PROPRIETARY RETAINING WALLS DATA:

DESIGN THE INTERNAL STABILITY OF A MECHANICALLY STABILIZED EARTH (MSE) WALL IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 840. THE FACTORED BEARING RESISTANCE AT THE BASE OF THE REINFORCED SOIL MASS IS SHOWN ON SHEET 35/62.

ITEM 840 - CONCRETE COPING:

PROVIDE EPOXY COATED REINFORCING AND CLASS QC CONCRETE AS SHOWN IN THE PLANS. CONCRETE AND REINFORCING STEEL IN THE COPING, ADDITIONAL CONCRETE AND REINFORCING STEEL AT ROADWAY FEATURES, PEJF BETWEEN COPING AND BARRIER, AND EXPANSION AND CONTRACTION JOINTS SHALL BE INCLUDED IN THE QUANTITY FOR THIS ITEM.

ITEM 840 - DRAINAGE PIPE:

PROVIDE A MINIMUM SLOPE OF 1.00% ON ALL MSE WALL DRAINS UNLESS NOTED OTHERWISE.

LOCATE THE PIPE AS CLOSE AS POSSIBLE TO THE TOP OF THE LEVELING PAD. IT MAY BE LOCATED ABOVE THE BOTTOM ROW OF REINFORCING STRAPS, HOWEVER, AT NO TIME SHALL THE PIPE BE LOCATED WITHIN 1 FOOT OF THE PROPOSED GROUND LINE.

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STONE COLUMN NOTES
MSE WALLS E3A

HAM-71-3.81
PID No. 77628

34/62

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ITEM SPECIAL - SETTLEMENT PLATFORM

SETTLEMENT PLATFORMS SHALL BE PLACED AT THE BOTTOM OF THE MSE WALL AT THE LOCATIONS INDICATED BELOW, UNLESS OTHERWISE DIRECTED BY DBT.

CONTRACTOR HAS THE OPTION OF USING EITHER STEEL OR PLYWOOD PLATFORM BASE.

CONTRACTOR SHALL FURNISH MATERIALS AND LABOR TO EXTEND PIPE THROUGH ENTIRE FILL.

SETTLEMENT PLATFORMS SHALL BE ANCHORED BY STAKES DRIVEN AT EACH CORNER TO PREVENT OVERTURNING.

SPECIFICATIONS:

DESCRIPTION:
THIS ITEM CONSISTS OF FURNISHING, CONSTRUCTING, AND MAINTAINING SETTLEMENT PLATFORMS AND OBTAINING SETTLEMENT READINGS AS REQUIRED BY THE PLANS OR AS DIRECTED BY THE DBT. AT THE OPTION AND EXPENSE OF THE CONTRACTOR, ADDITIONAL SETTLEMENT PLATFORMS MAY BE INSTALLED AT ADDITIONAL LOCATIONS.

SETTLEMENT READINGS SHALL BE TAKEN WEEKLY DURING CONSTRUCTION AND DURING ANY SPECIFIED WAITING PERIOD. THE READINGS SHALL BE PLOTTED UTILIZING THE SETTLEMENT PLATFORM READINGS EXCEL SPREADSHEET AS DEVELOPED BY ODOT'S OFFICE OF GEOTECHNICAL ENGINEERING. A COPY OF EACH CUMULATIVE PLOT SHALL BE SENT TO ODOT, AFTER EACH SETTLEMENT READING IS RECORDED.

VIBRATING WIRE SETTLEMENT MONITORING PLATFORMS MAY BE CONSIDERED IN LIEU OF THE CONVENTIONAL SETTLEMENT PLATFORMS. THE CONTRACTOR SHOULD PROVIDE DETAILS OF THE PROPOSED VIBRATING WIRE SETTLEMENT PLATFORMS AS WELL AS DESIGN DRAWINGS OF THE PROPOSED PLATFORM AND CABLING LAYOUT TO ODOT AT LEAST 14 DAYS PRIOR TO CONSTRUCTION.

THE DESIGN DRAWINGS SHOULD ILLUSTRATE THE PROPOSED SETTLEMENT VIBRATING WIRE SETTLEMENT PLATFORM LOCATIONS WITH ALL EXISTING AND PROPOSED SITE FEATURES TO VERIFY THE PROPOSED CABLING WILL NOT CONFLICT WITH EXISTING FACILITIES, PROPOSED FACILITIES OR UTILITIES.

THE CONTRACTOR SHALL IDENTIFY, SET AND MAINTAIN AN APPROPRIATE NUMBER OF FIXED BENCHMARKS, REFERENCE POINTS, ETC. TO FACILITATE THE SURVEYING OF THE SETTLEMENT PLATFORMS.

MATERIALS:
SOUND LUMBER SUCH AS 3/4" EXTERIOR GRADE PLYWOOD SHALL BE USED FOR THE BASE. THE PIPE SHALL BE 2-1/2" STANDARD BLACK PIPE WITH THREADED FITTINGS AS SHOWN ON THE PLANS. A STEEL PLATE 3'-0"x 3'-0"x 1/8" MAY BE SUBSTITUTED, FOR THE LUMBER TO CONSTRUCT THE PLATFORMS, AT THE CONTRACTORS OPTION.

CONSTRUCTION METHODS: THE PLATFORM SHALL CONFORM TO THE DETAILS SHOWN ON THE PLANS. IF EXISTING PAVEMENT IS ENCOUNTERED AT THE SPECIFIED LOCATIONS, THE PAVEMENT (INCLUDING ANY BASE MATERIAL) SHALL BE REMOVED AND THE SETTLEMENT PLATFORM SHALL BE SET ON THE EXPOSED SUBGRADE. THE PLATFORM SHALL BE SET ON A LEVEL SURFACE. THE PIPE SHALL BE FIRMLY SECURED TO THE PLATFORM AND SHALL BE MAINTAINED IN A PLUMB POSITION DURING CONSTRUCTION OF THE MSE WALL. THE PIPE SHALL BE MARKED AT INTERVALS TO FACILITATE MEASUREMENT OF THE DEPTH OF FILL.

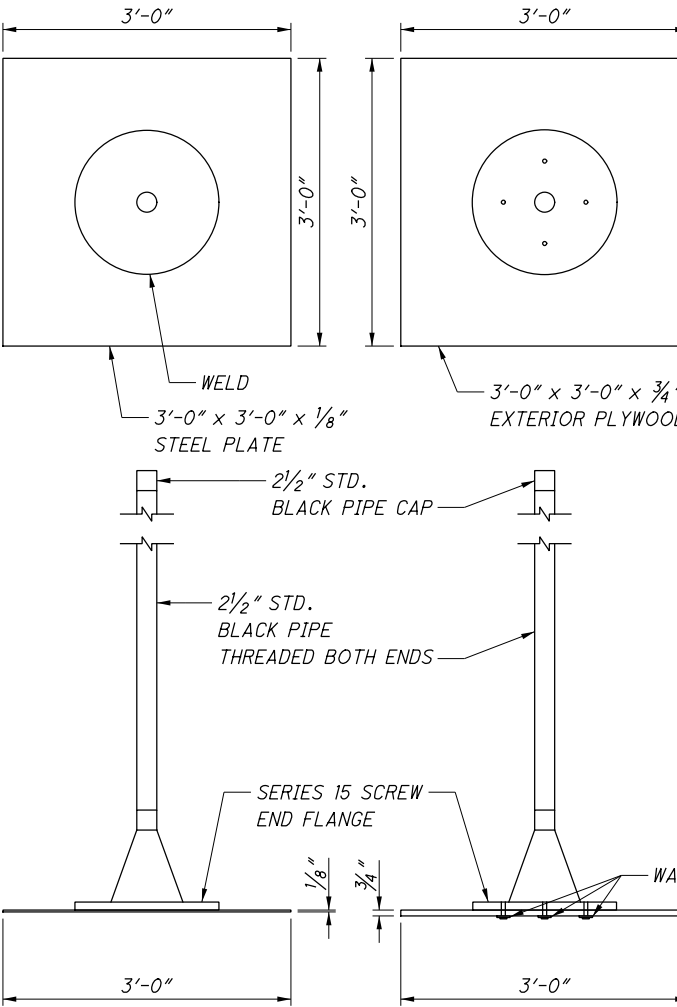
GENERAL NOTES - MSE WALLS (CONTINUED)

ITEM SPECIAL - SETTLEMENT PLATFORM (CONTINUED)

THE CONTRACTOR SHALL PROTECT SETTLEMENT PLATFORMS FROM CONSTRUCTION TRAFFIC/ACTIVITIES USING APPROPRIATE METHODS SUCH AS BARRICADES, CONES, GUARD-STAKES WITH HIGH VISIBILITY RIBBON, ETC. THE CONTRACTOR SHALL STOP WORK IN ANY LOCATION WHERE THE SETTLEMENT PLATFORM HAS BEEN DISTURBED OR DAMAGED. PLATFORMS OR PIPES DAMAGED OR DISPLACED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR PROPER CONDITION.

PRIOR TO PAVING: THE TOP OF THE SETTLEMENT PLATFORM PIPE SHALL BE CUT OFF TWO FEET BELOW THE FINISHED SURFACE OF THE SUBGRADE OR FINISHED GROUND SURFACE. WHICHEVER IS APPLICABLE.

SETTLEMENT PLATE DESIGNATION	ALIGNMENT	STATION	OFFSET
P1	RAMP D	554+00	10' RT
P2	RAMP D	555+00	7' RT
P3	RAMP D	556+00	15' RT
P4	RAMP C	656+97	10' RT
P5	RAMP C	658+00	18' RT



ITEM SPECIAL - SETTLEMENT PLATFORM (CONTINUED)

WAITING PERIOD:
BOTH MSE WALL C2A AND DIA SHALL BE CONSTRUCTED IN TWO STAGES. THE WAITING PERIOD SHALL NOT BE CONSIDERED TO BEGIN UNTIL ALL PROPOSED WICK DRAINS AND DRAINAGE LAYER/FEATURES HAVE BEEN INSTALLED AND ALL FILL ASSOCIATED WITH THE STAGE 1 WALL HEIGHT HAS BEEN PLACED. AT ANY LOCATION ON THE PROJECT THE LOADING FILL SHALL CONSIST OF THE PROPOSED MSE WALL CONSTRUCTED TO THE ENTIRE PROPOSED LATERAL EXTENTS AND TO THE MAXIMUM ALLOWABLE STAGE 1 WALL HEIGHTS TABULATED BELOW.

STAGE 1 ALLOWBALE LIMITS ⁽¹⁾			
WALL	REQUIRED CONSOLIDATION (MINIMUM)	WALL HEIGHT FT. ⁽²⁾	ESTIMATED WAITING PERIOD (DAYS)
C2A	33% (0.6")	22	35
DIA	84% (3")	17	60

- NOTES:
- 1.) REQUIREMENTS THAT MUST BE ACHIEVED PRIOR TO CONSTRUCTION OF THE REMAINING WALL HEIGHTS.
 - 2.) INCLUDES WALL EMBANKMENT.

THE WAITING PERIOD WILL CONTINUE AT THE SOLE DISCRETION OF THE GEOTECHNICAL ENGINEER OF RECORD UNTIL THE ESTIMATED TOTAL SETTLEMENT IS REACHED OR THE RATE OF SETTLEMENT HAS SLOWED TO A RATE CONSIDERED ACCEPTABLE TO THE GEOTECHNICAL ENGINEER OF RECORD. WALL CONSTRUCTION AND/OR PLACEMENT OF EMBANKMENT FILL ABOVE THE ALLOWABLE STAGE 1 HEIGHTS CANNOT OCCUR DURING THE WAITING PERIOD. IF THE SETTLEMENT DATA COLLECTED FROM THE PROJECT INSTRUMENTATION SHOWS TOTAL SETTLEMENT OR THE TIME RATE OF SETTLEMENT TO BE WITHIN LIMITS CONSIDERED ACCEPTABLE TO THE GEOTECHNICAL ENGINEER OF RECORD AT A TIME LESS THAN THAT TABULATED, OR CONVERSELY SHOWS SETTLEMENT CONTINUING AT AN UNACCEPTABLE RATE AT THE END OF THE ESTIMATED WAITING PERIOD, THE WAITING PERIOD WILL BE ADJUSTED ACCORDINGLY AT THE DISCRETION OF THE GEOTECHNICAL ENGINEER OF RECORD.

MINIMUM SOIL REINFORCEMENT LENGTHS:

PROVIDE MINIMUM 8 FOOT SOIL REINFORCEMENT LENGTHS ACCORDING TO SUPPLEMENTAL SPECIFICATION 840.04 EXCEPT AS FOLLOWS:

MINIMUM SOIL REINFORCEMENT LENGTHS				
MSE WALL LETTER	WALL LIMITS		MIN. STRAP LENGTH	MIN. STRAP LENGTH
	FROM STA.	TO STA.		
C1A	656+85	658+00	0.7 x H	VARIES FROM 10'-8" TO 14'-6"
C2A	656+79	662+45	1.4 x H	VARIES FROM 8'-0" TO 35'-10"
D1A	551+65	553+50	0.7 x H	VARIES FROM 8'-0" TO 9'-6"
D1A	553+50	556+10	N/A*	VARIES FROM 29'-1" TO 33'-1"
E3A	757+13	759+00	1.1 x H	VARIES FROM 8'-2" TO 23'-9"
E3A	759+00	769+90	0.8 x H	VARIES FROM 8'-0" TO 21'-8"

H = THE WALL HEIGHT AS DEFINED ACCORDING TO SUPPLEMENTAL SPECIFICATION 840.04.
* - BACK-TO-BACK WALL WITH REINFORCEMENT EXTENDING FROM WEST WALL FACE TO EAST WALL FACE.

MSE WALL DESIGN CRITERIA:

THE FACTORED BEARING RESISTANCE FOR EACH MSE WALL IS LISTED IN THE TABLE BELOW:

FACTORED BEARING RESISTANCE (PSF)				
MSE WALL LETTER	WALL LIMITS		BEFORE GROUND IMPROVEMENT	AFTER GROUND IMPROVEMENT
	FROM	TO		
C1A	656+85	658+00	6650	N/A
C2A	656+79	662+45	4250	5670
D1A	551+65	553+50	13300	N/A
D1A	553+50	556+10	3340	5850
E3A	757+13	759+00	3670	7900
E3A	759+00	769+90	26700	N/A

THE FOUNDATION SOIL SHALL BE EVALUATED BY THE GEOTECHNICAL ENGINEER OF RECORD DURING CONSTRUCTION TO DETERMINE SUITABILITY FOR SUPPORT OF THE APPLIED BEARING STRESSES.

ITEM 840 AESTHETIC SURFACE TREATMENT:

THE ITEM OF WORK SHALL CONSIST OF PROVIDING AESTHETIC TREATMENTS TO THE CONCRETE SURFACES OF MSE WALLS AS SHOWN IN THE PLANS.

FOR ADDITIONAL INFORMATION SEE NOTE ON SHEET 2/62.

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GENERAL NOTES

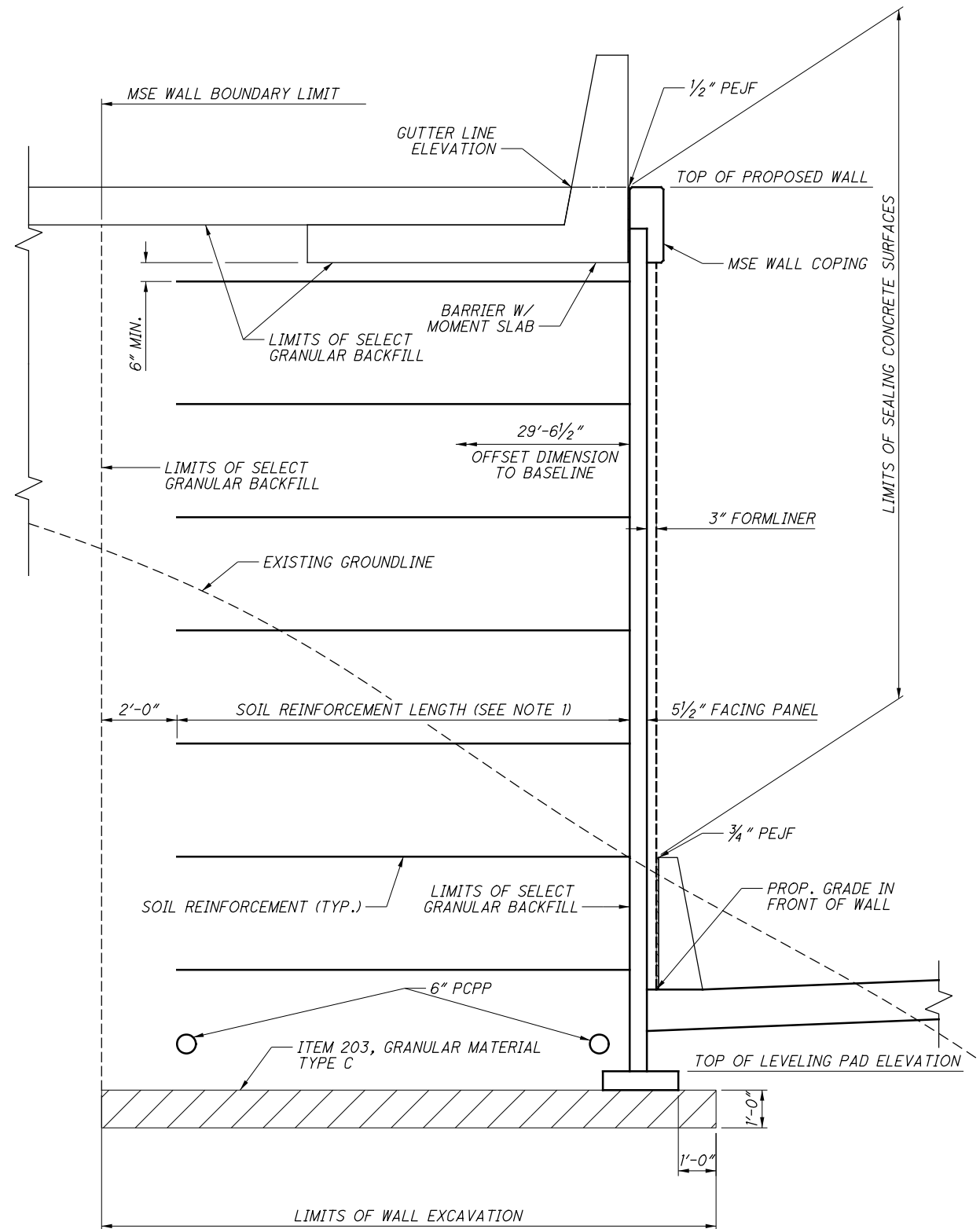
MSE WALLS C2A AND D1A

HAM-71-3.81

PID No. 77628

35/62

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MSE WALL SECTION (C2A)
(STA. 658+00 TO STA. 662+45)

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MSE WALL DETAILS
WALL SECTION C2A

HAM-71-3.81
PID No. 77628

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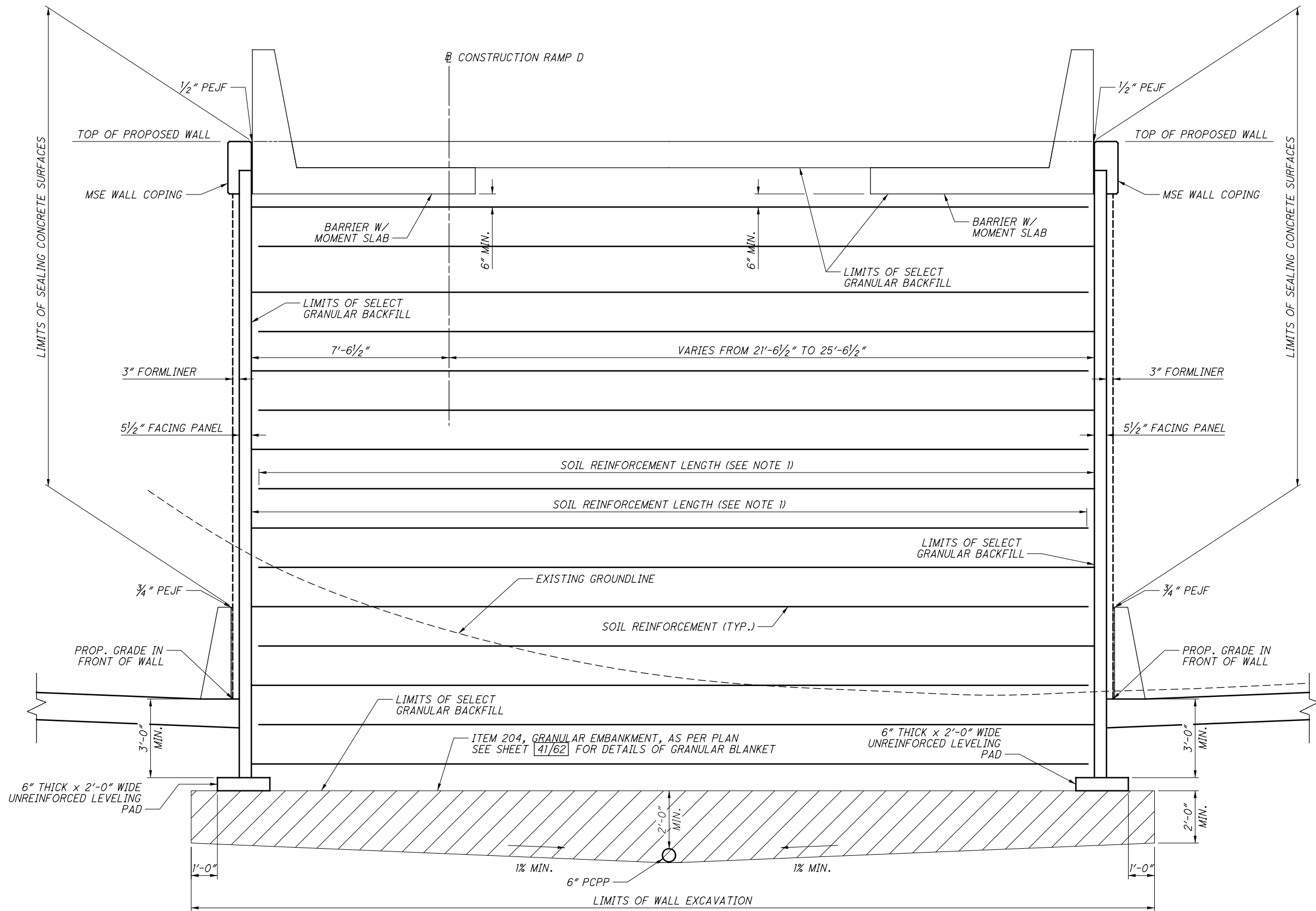
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MSE WALL SECTION (D1A)
(STA. 553+50 TO STA. 556+10)

NOTES:

- SOIL REINFORCEMENT VARIES FROM 29'-1" TO 33'-1".
- WICK DRAINS NOT SHOWN FOR CLARITY. FOR ADDITIONAL INFORMATION, SEE SHEET 41/62.
- FOR MSE WALL COPING REINFORCING SEE DETAIL ON SHEET 41/62.

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MSE WALL DETAILS
WALL SECTION D1A

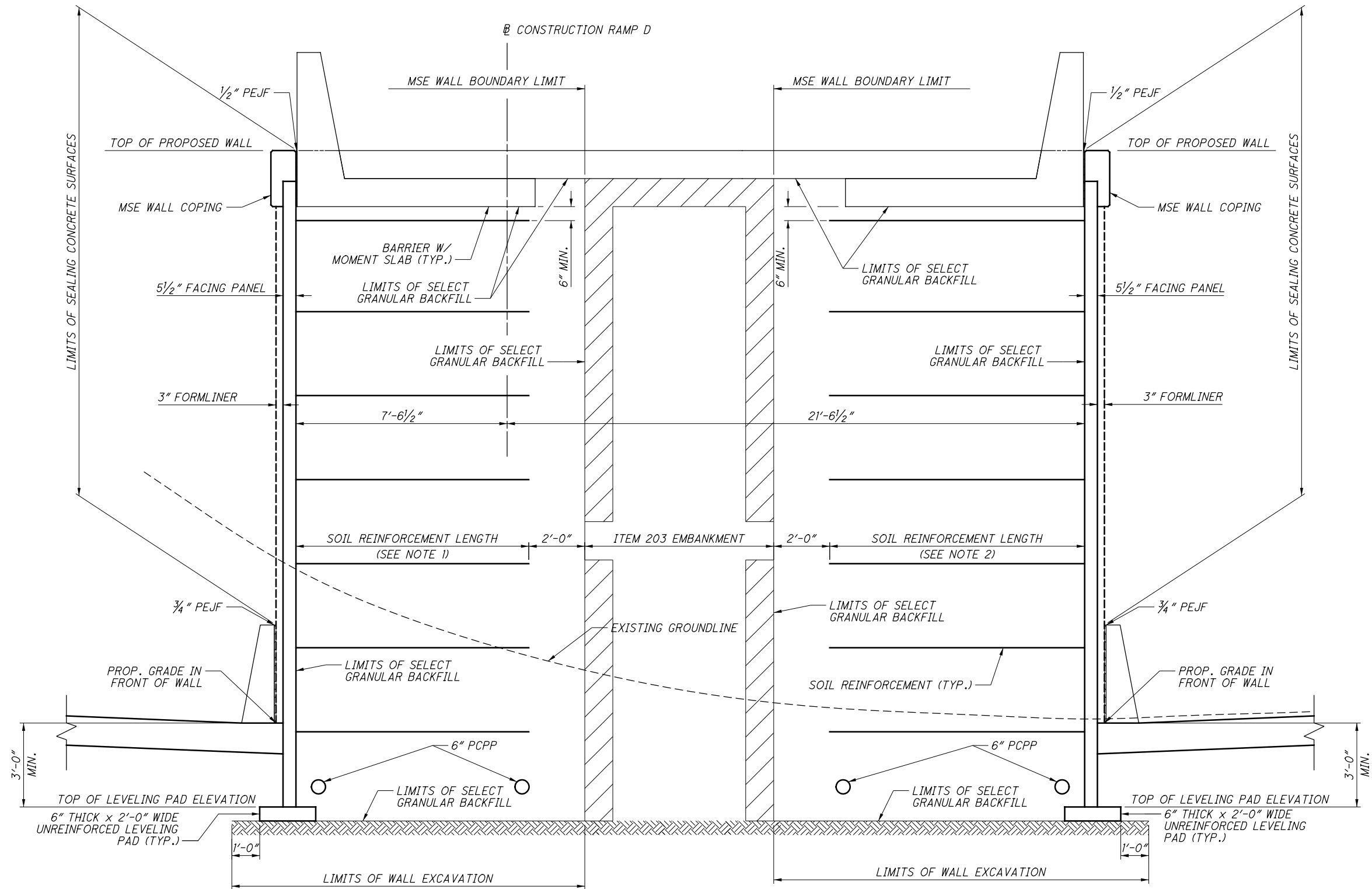
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MSE WALL SECTION (D1A)
(STA. 551+65 TO STA. 553+50)

NOTES:

1. SOIL REINFORCEMENT VARIES FROM 8'-0" TO 8'-8".
2. SOIL REINFORCEMENT VARIES FROM 8'-0" TO 9'-6".
3. SS 840 FOUNDATION PREPARATION IS NOT SHOWN DUE TO THE ANTICIPATED PRESENCE OF BEDROCK AT THE BOTTOM OF THE WALL. FOUNDATION PREPARATION WILL BE NECESSARY IF ROCK IS NOT ENCOUNTERED AT THE DESIGN MSE WALL BEARING LEVEL.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
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PID No. 77628

38/62

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MSE WALL DETAILS
WALL SECTION DIA

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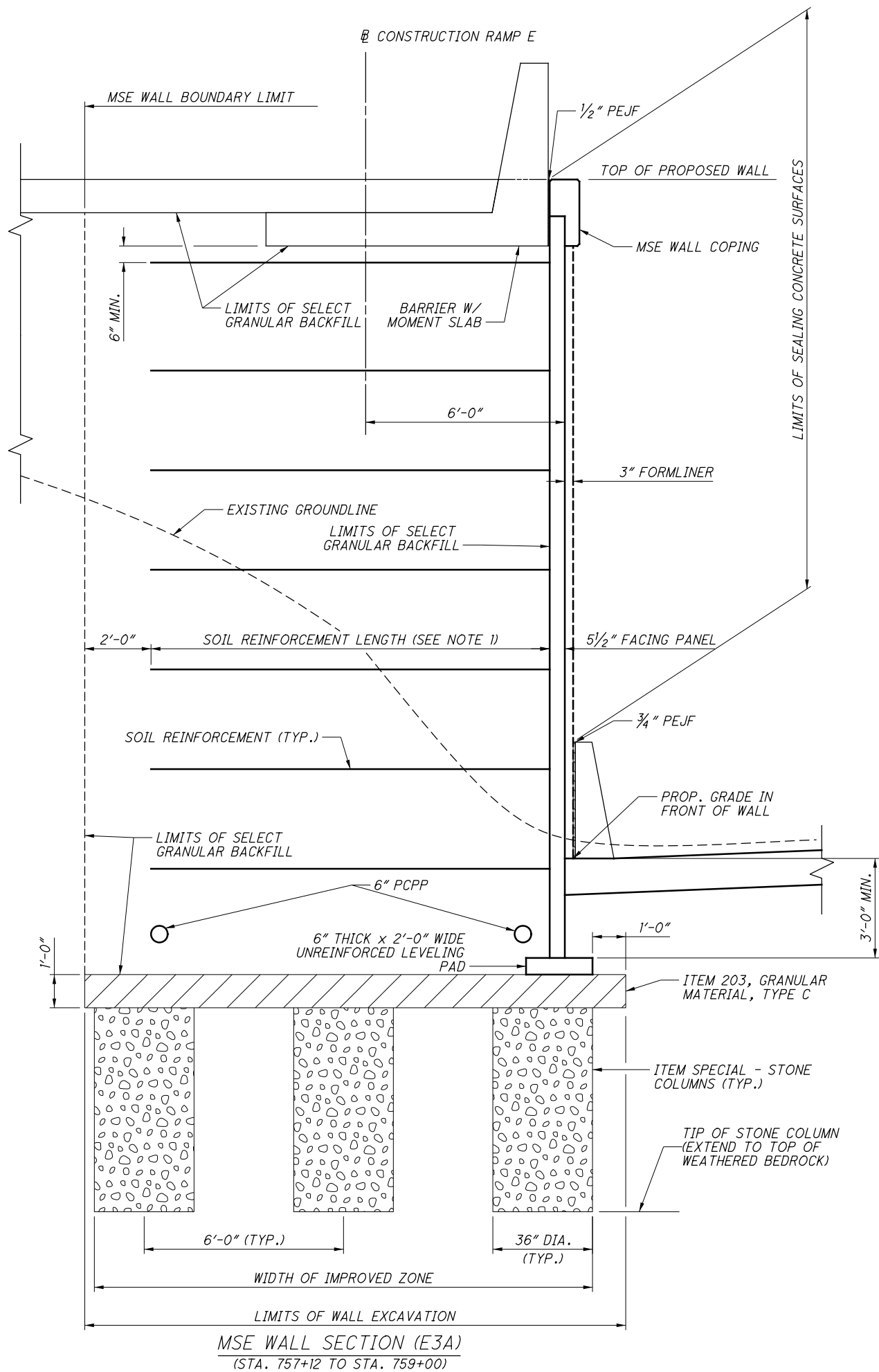
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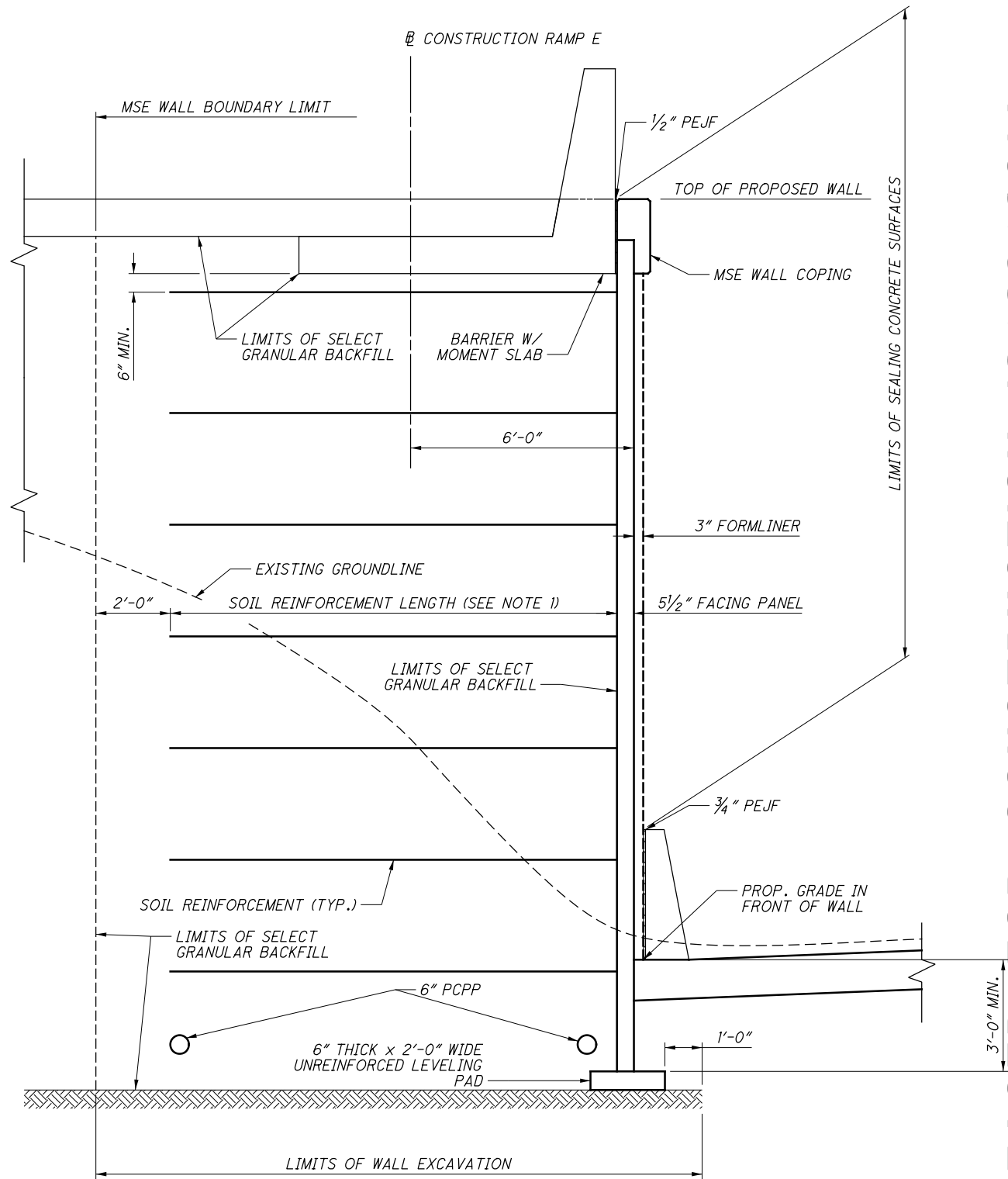


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MSE WALL SECTION (E3A)
(STA. 757+12 TO STA. 759+00)



MSE WALL SECTION (E3A)
(STA. 759+00 TO STA. 769+00)

NOTES:

1. SOIL REINFORCEMENT VARIES FROM 8'-0" TO 23'-9".

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PID No. 77628

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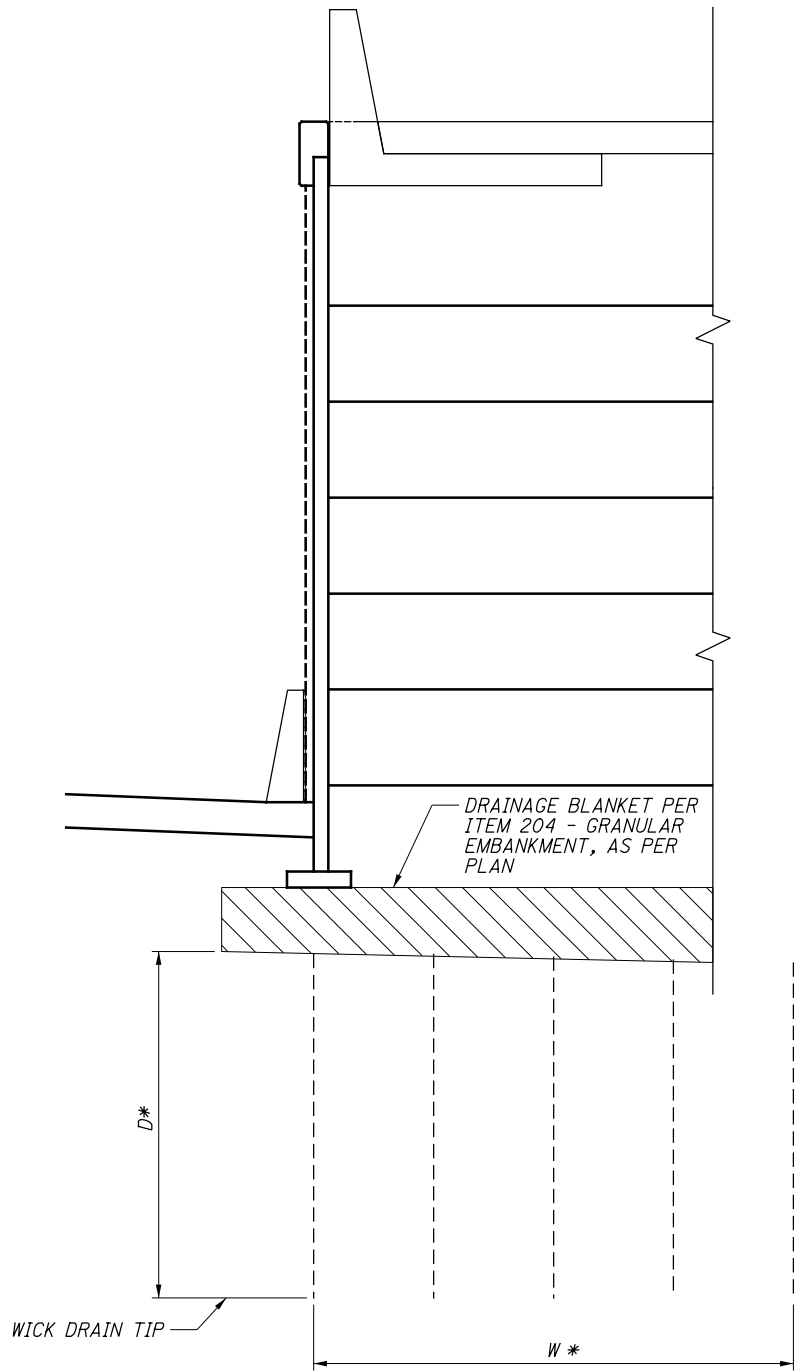
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MSE WALL DETAILS
WALL SECTIONS E3A

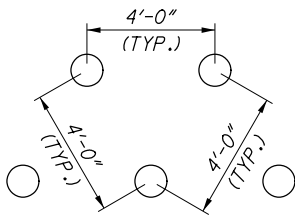
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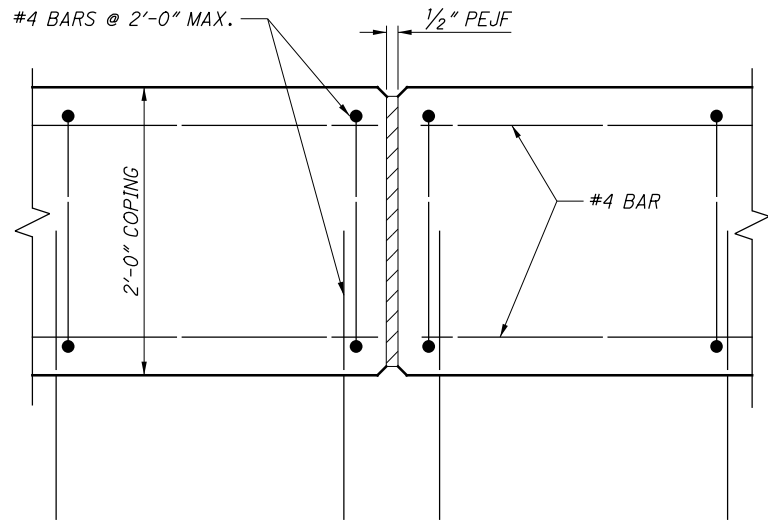
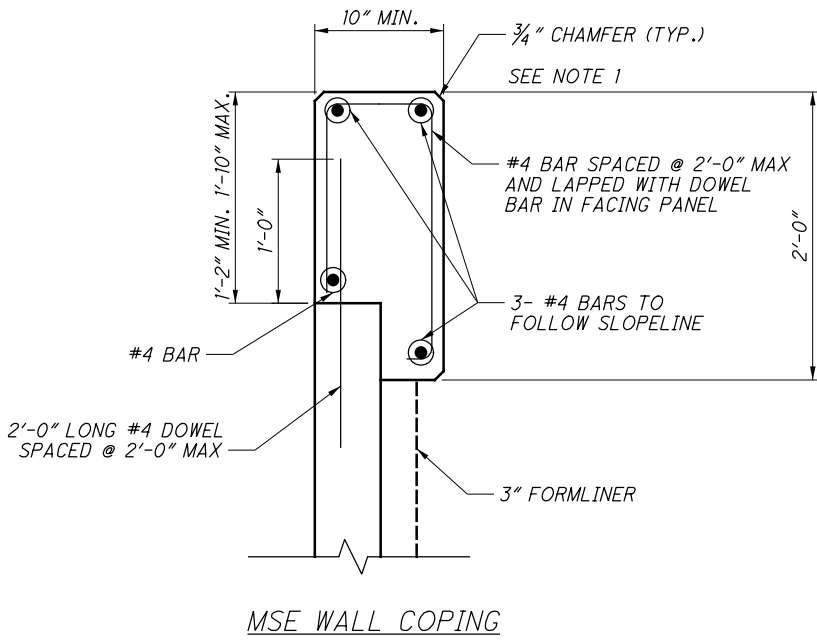


WICK DRAIN SECTION
(MSE WALL DIA, STA. 553+63 TO STA. 556+20)

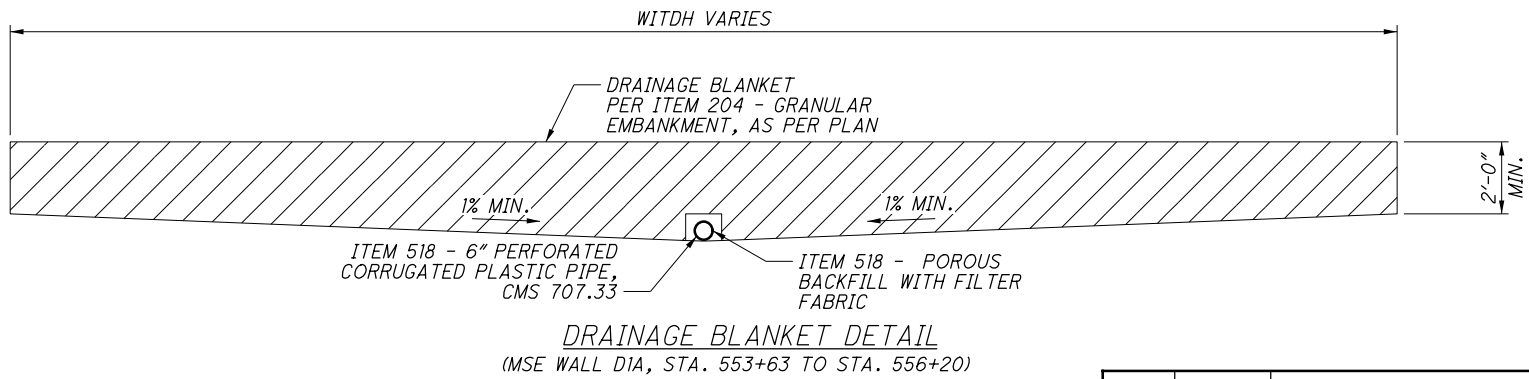


WICK DRAIN SPACING
(MSE WALL DIA, STA. 553+63 TO STA. 556+20)

D* = DEPTH OF WICK DRAINS
(VARIES, SEE TABLE ON WICK DRAIN NOTES)
W* = WIDTH OF WICK DRAINS
(WEST WALL FACE TO 5 FEET EAST OF EAST WALL FACE)



COPING EXPANSION JOINT AT WALL PANEL JOINT



NOTE:
1. TOP OF COPING ELEVATION SHOULD BE WITHIN 3" OF GUTTER LINE.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
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SRD

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CHN

DATE
10/23/14

MISCELLANEOUS SECTIONS AND DETAILS (WALLS C1A, C2A, D1A AND E3A)

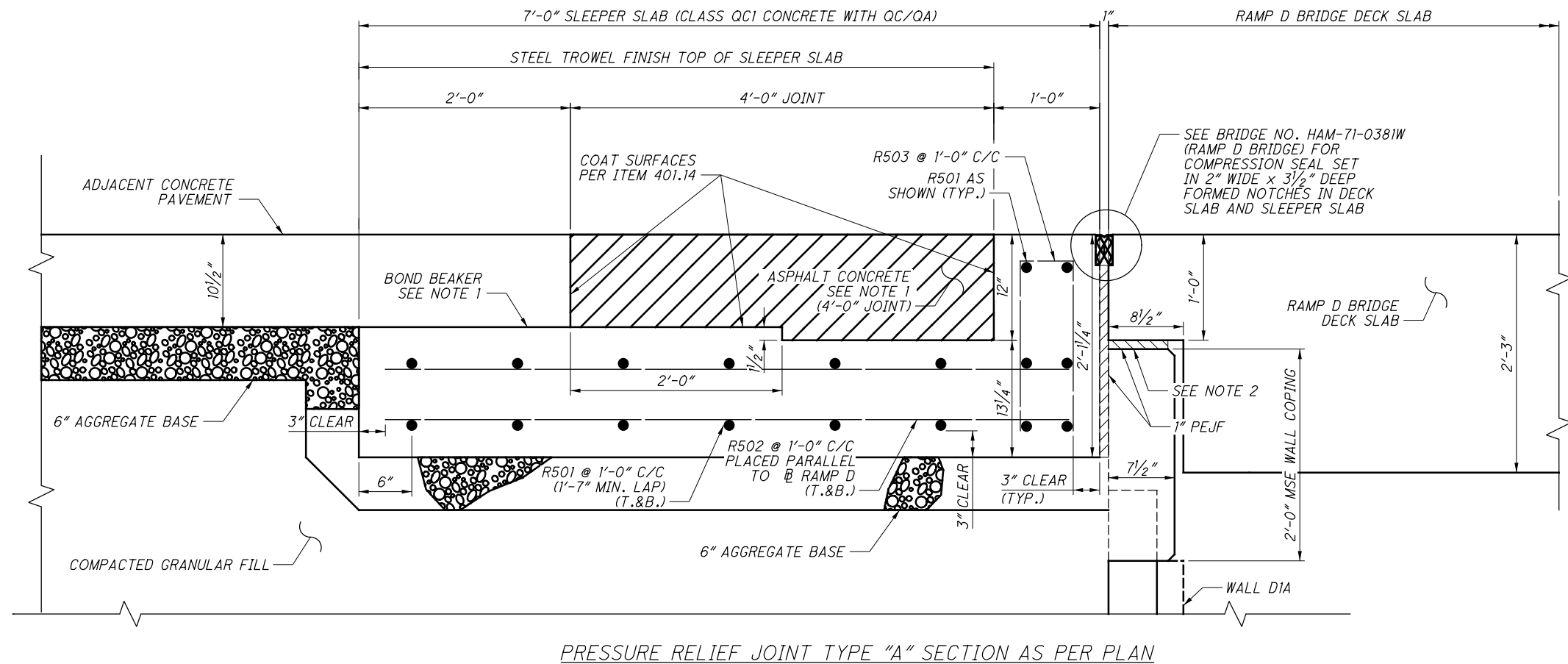
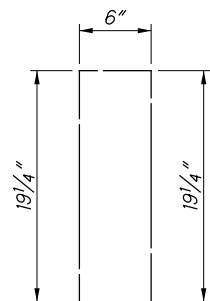
MSE WALL DETAILS

HAM-71-3.81

PID No. 77628

41 / 62

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120



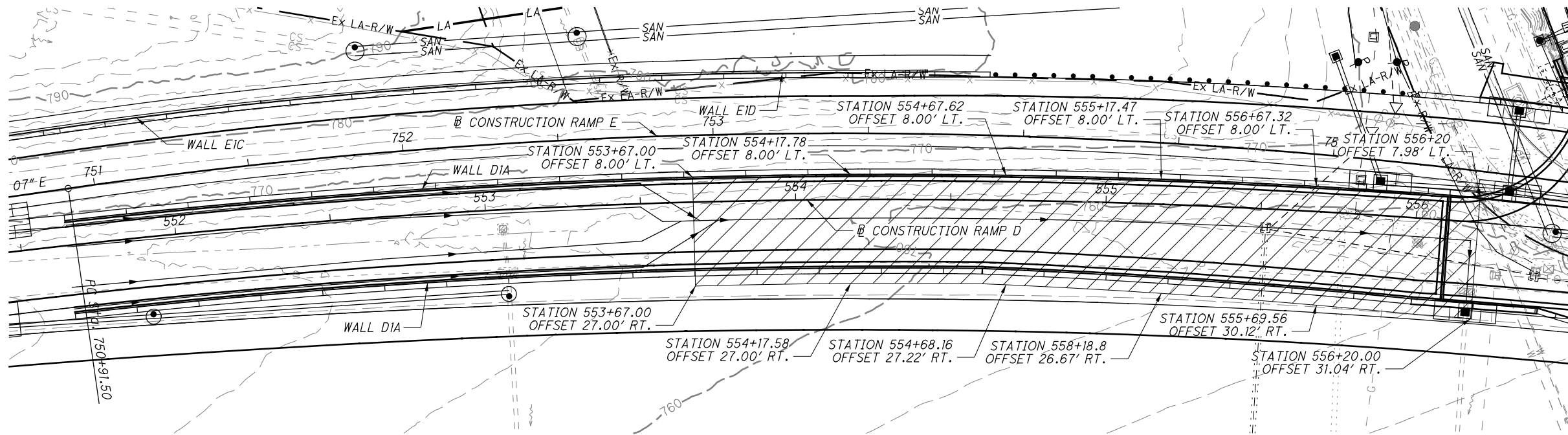
- NOTES:
1. FOR ADDITIONAL INFORMATION, SEE ODOT STD. DWG. BP-2.3.
 2. SLOPE TOP OF MSE WALL COPING THAT IS LOCATED ADJACENT TO RAMP D BRIDGE, 2% TOWARDS THE RAMP D BRIDGE.

0	12/19/14	RFC SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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LEGEND:

 = LIMITS OF WICK DRAINS (RAMP D STA. 553+63 TO RAMP D STA. 556+20 BETWEEN THE WEST WALL FACE AND 5'-0" RIGHT OF THE EAST WALL FACE.)



WICK DRAIN PLAN

NOTE:

1. SEE SHEETS 32/62 & 41/62 FOR ADDITIONAL DETAILS.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

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HAM-71-3.81
PID No. 77628

WICK DRAIN PLAN
WALL DIA (MSE WALL)

DESIGNED	DRAWN	REVIEWED	DATE
SPR	SRD	CHN	10/23/14
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CINCINNATI, OHIO 45242
513-984-1500

44/62

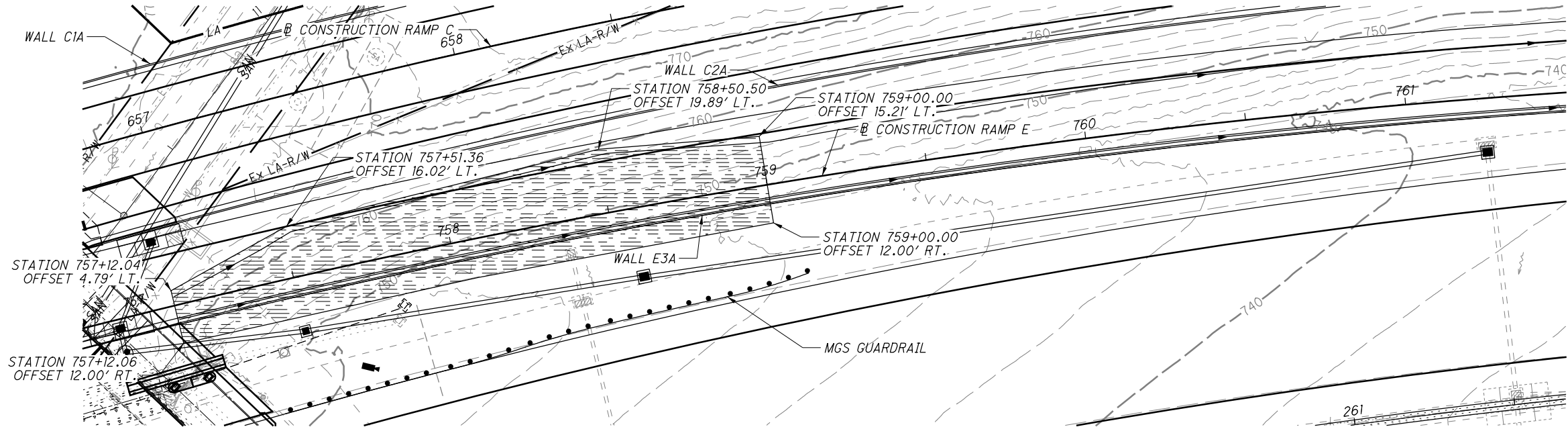
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LEGEND:



= LIMITS OF STONE COLUMNS (RAMP E STA. 757+12 TO RAMP E STA. 759+00
FROM 6'-0" EAST OF WALL E3A TO BACK EDGE OF SELECT GRANULAR BACKFILL).



STONE COLUMN PLAN

NOTE:

1. SEE SHEETS 33/62, 34/62 & 40/62 FOR ADDITIONAL DETAILS.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

STONE COLUMN PLAN
WALL E3A (MSE WALL)

HAM-71-3.81
PID No. 77628

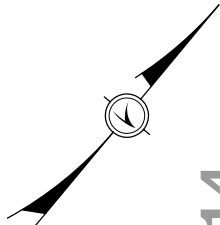
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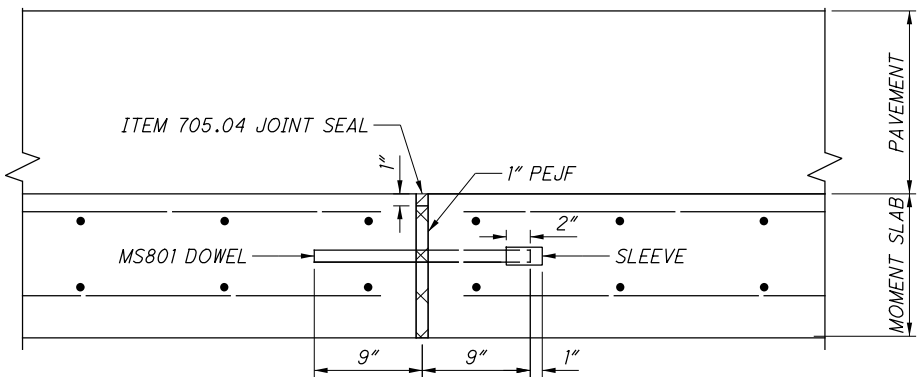
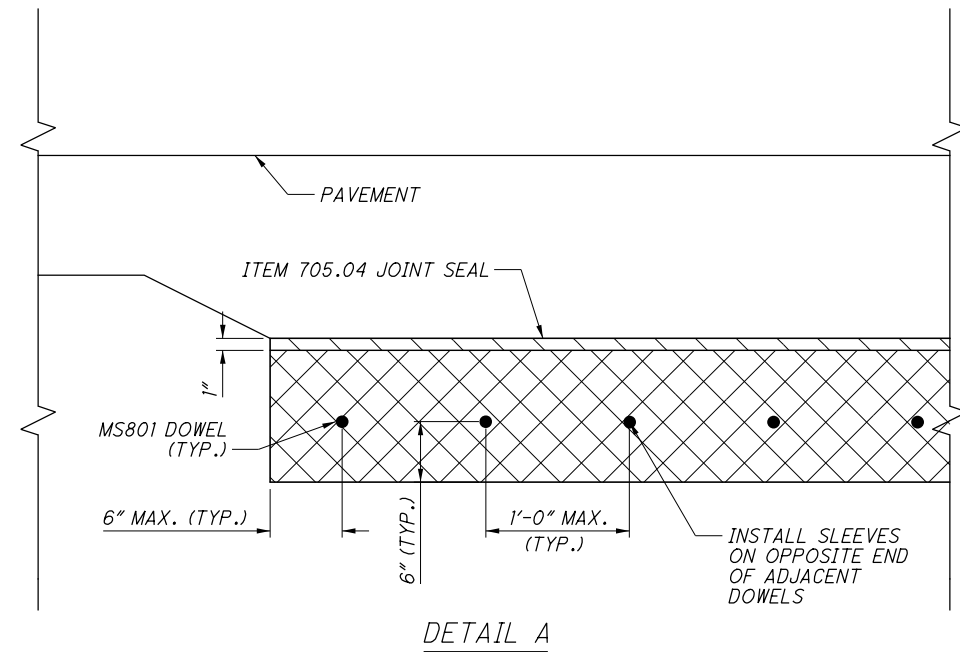
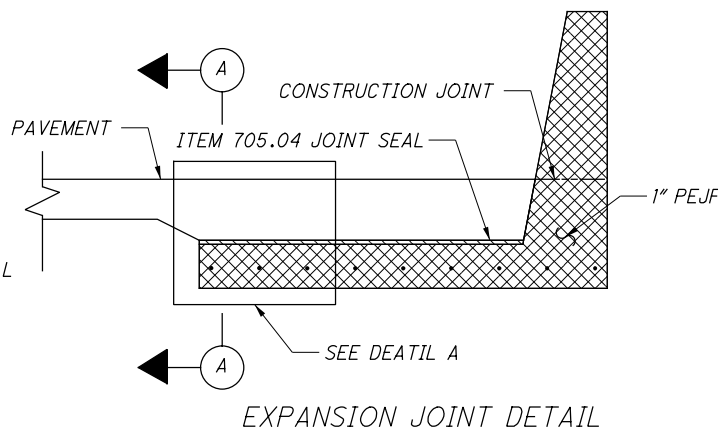
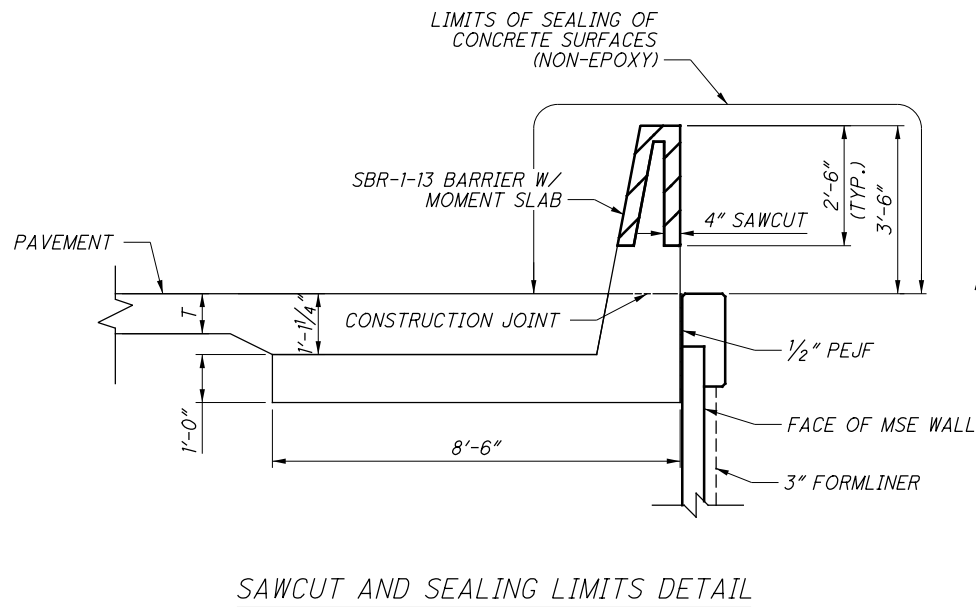
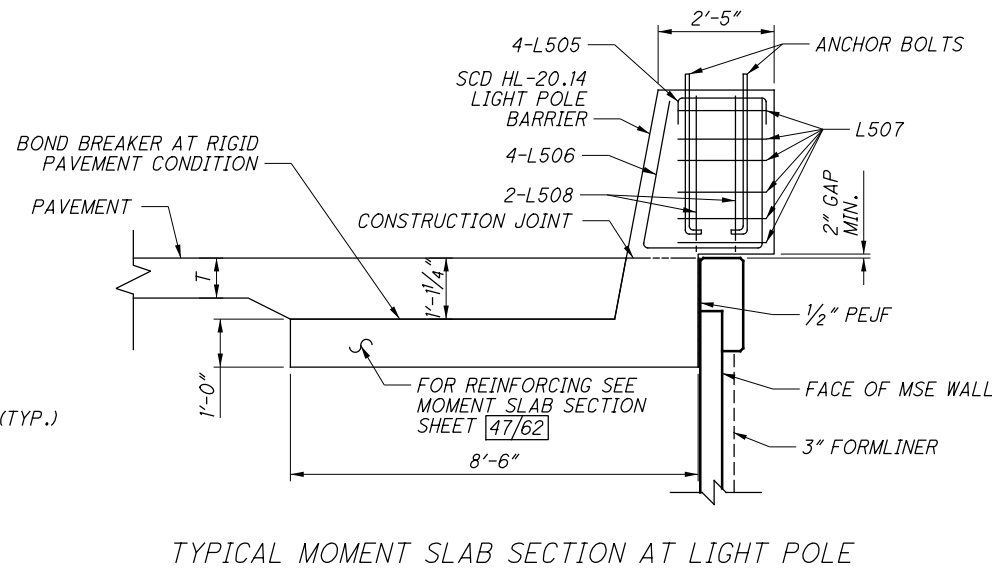
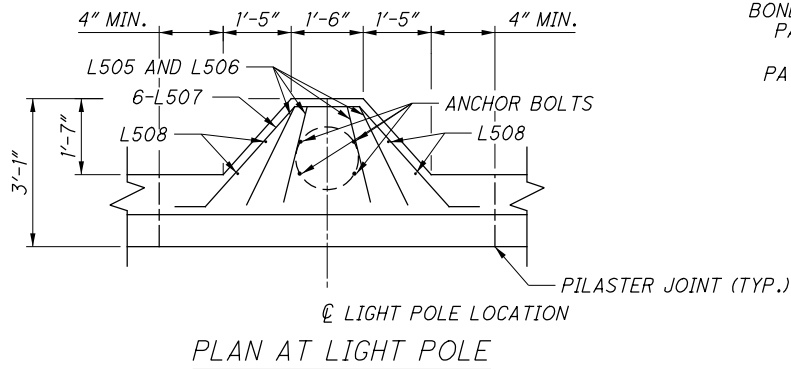
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	REVISED
	DRAWN



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PROPOSED ϕ LIGHT POLE LOCATION
RAMP D, STA. 552+84 LT.
RAMP D, STA. 555+38 LT.
RAMP C, STA. 659+23 RT.
RAMP C, STA. 661+06 RT.



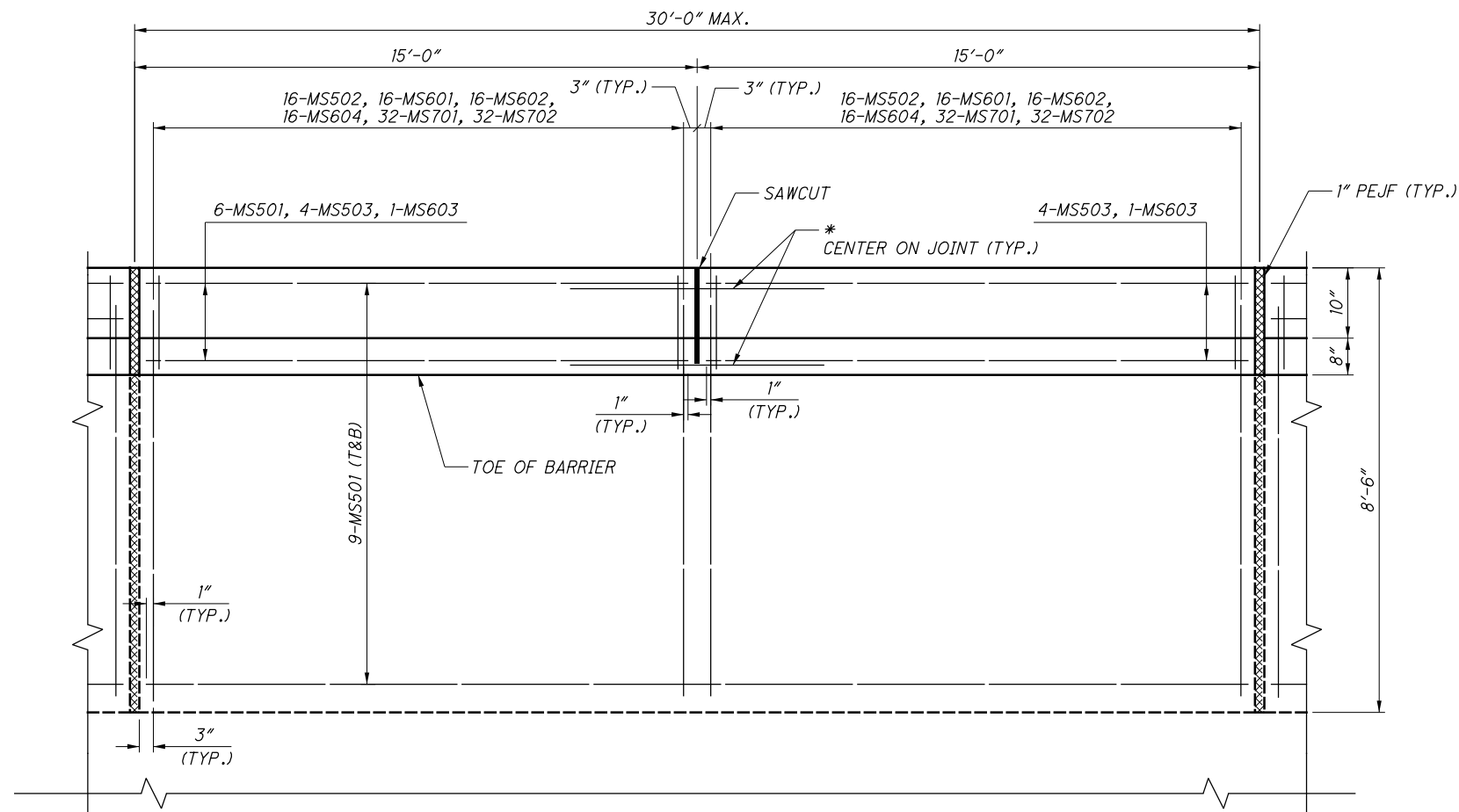
NOTES:

1. FOR PAVEMENT THICKNESS "T" DIMENSIONS REFER TO SHEET 47/62.
2. FOR ANCHOR BOLT DETAILS REFER TO SCD HL-10.13.

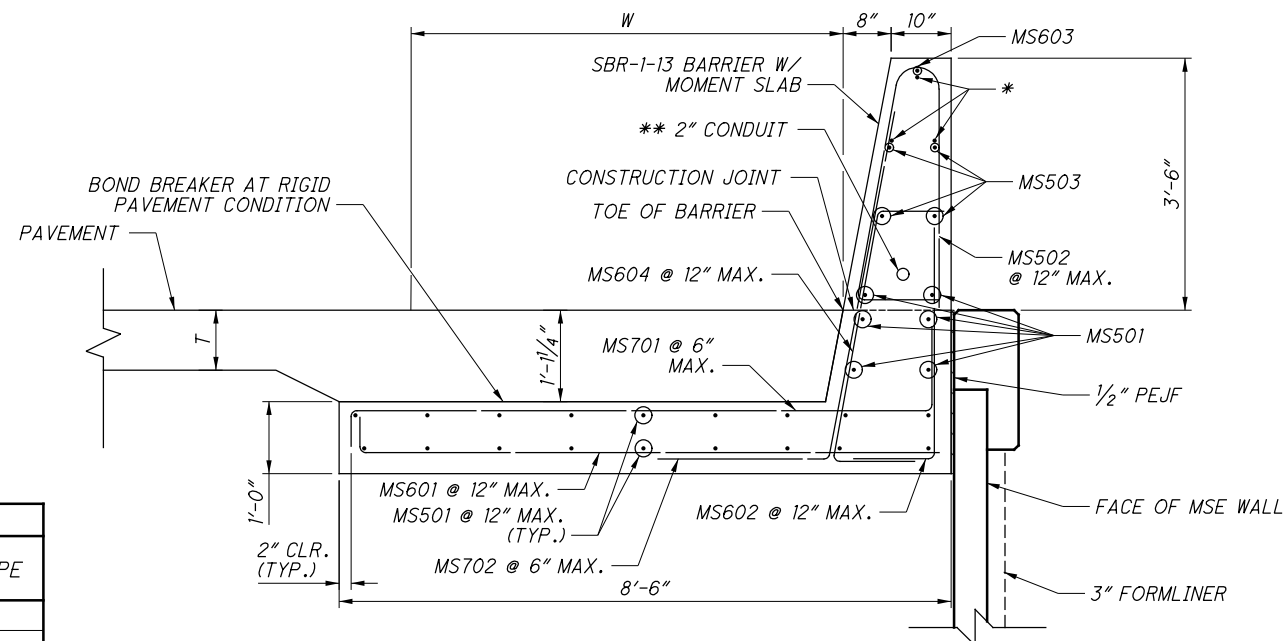
NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

DESIGN AGENCY HDR ENGINEERING, INC. 9987 CARVER ROAD, SUITE 200 CINCINNATI, OHIO 45242 513-984-1500	DATE 10/23/14	REVIEWED CHN	DRAWN SRD	DESIGNED RBK	CHECKED JPC	MOMENT SLAB DETAILS MISCELLANEOUS SECTIONS AND DETAILS	HAM-71-3.81 PID No. 77628	46/62	88 120



TYPICAL PANEL PLAN



TYPICAL MOMENT SLAB SECTION

* = 1/2" ϕ GLASS FIBER REINFORCED POLYMER (GFRP) STIFFENING REINFORCEMENT
** = 2" CONDUIT IN BARRIER FOR WALLS C1A, D1A (LEFT/WEST SIDE) AND C2A.

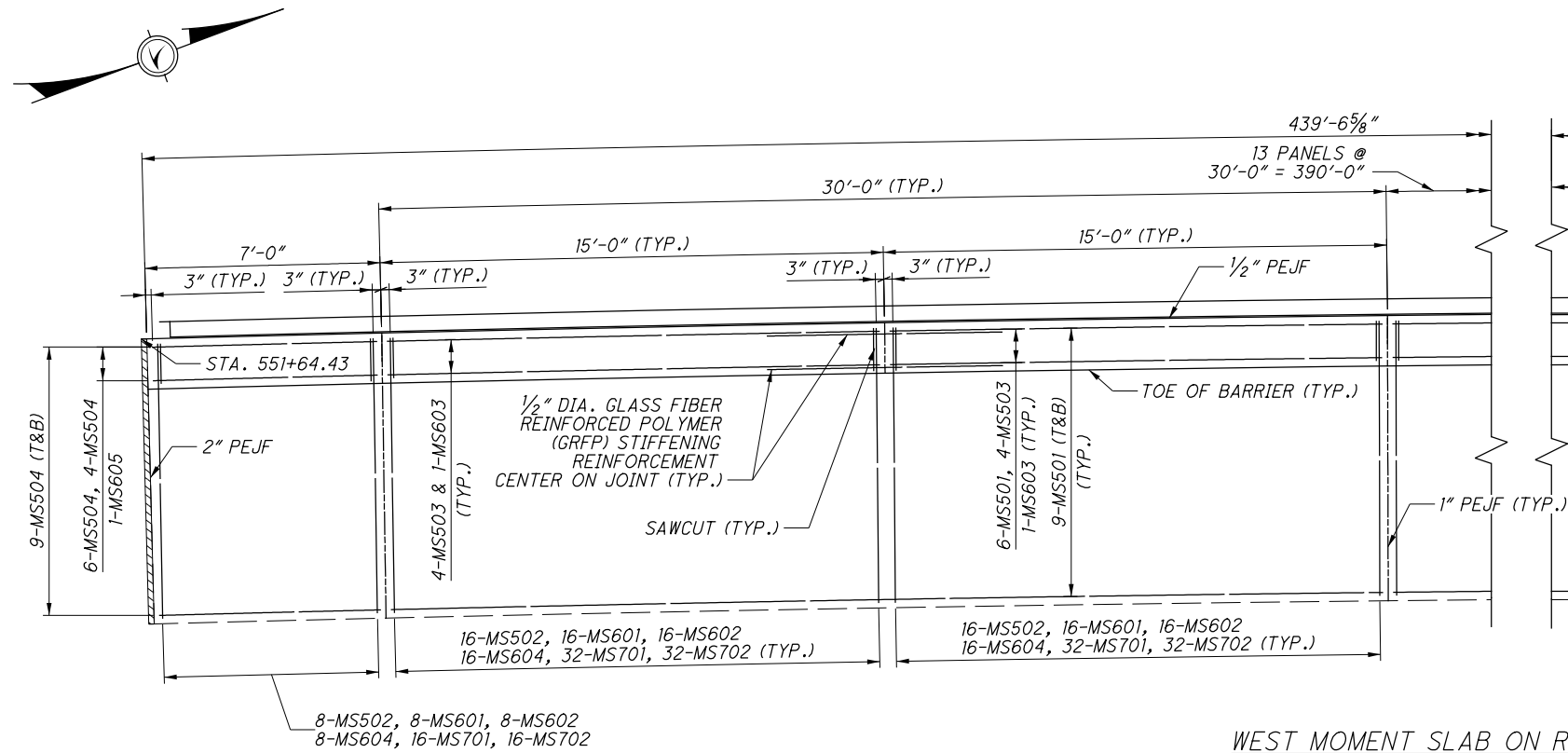
NOTES:

1. FOR SAWCUT AND SEALING OF CONCRETE LIMITS REFER TO SHEET 46/62.
2. FOR 1" EXPANSION JOINT DETAILS REFER TO SHEET 46/62.

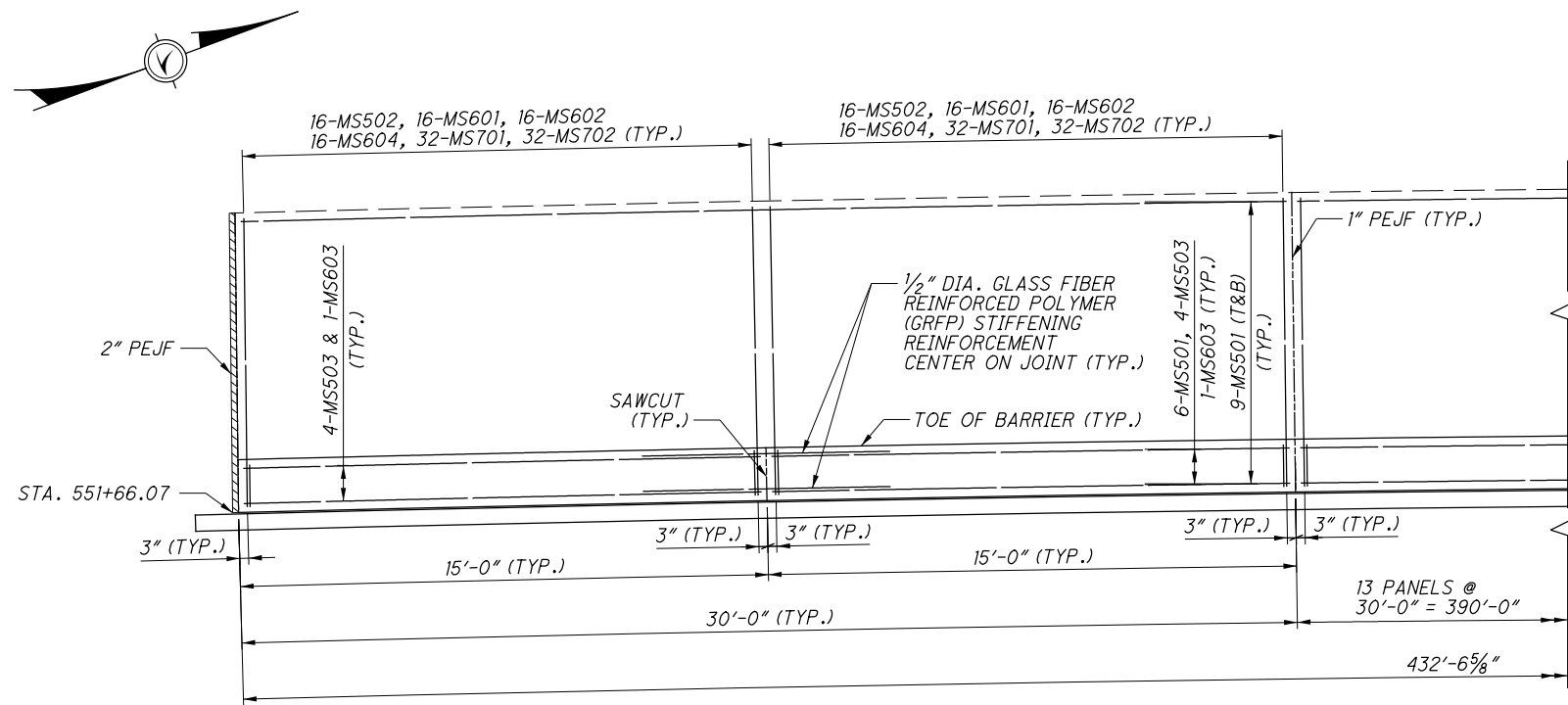
MOMENT SLAB DIMENSIONS			
WALL DESIGNATION	SHOULDER WIDTH (W)	PAVEMENT THICKNESS (T)	PAVEMENT TYPE
C1A	6'-0"	10"	RIGID
C2A	4'-0"	10"	RIGID
D1A (EAST)	4'-0"	10½"	RIGID
D1A (WEST)	6'-0"	10½"	RIGID
E3A	4'-0"	1'-1¼"	FLEXIBLE

O	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

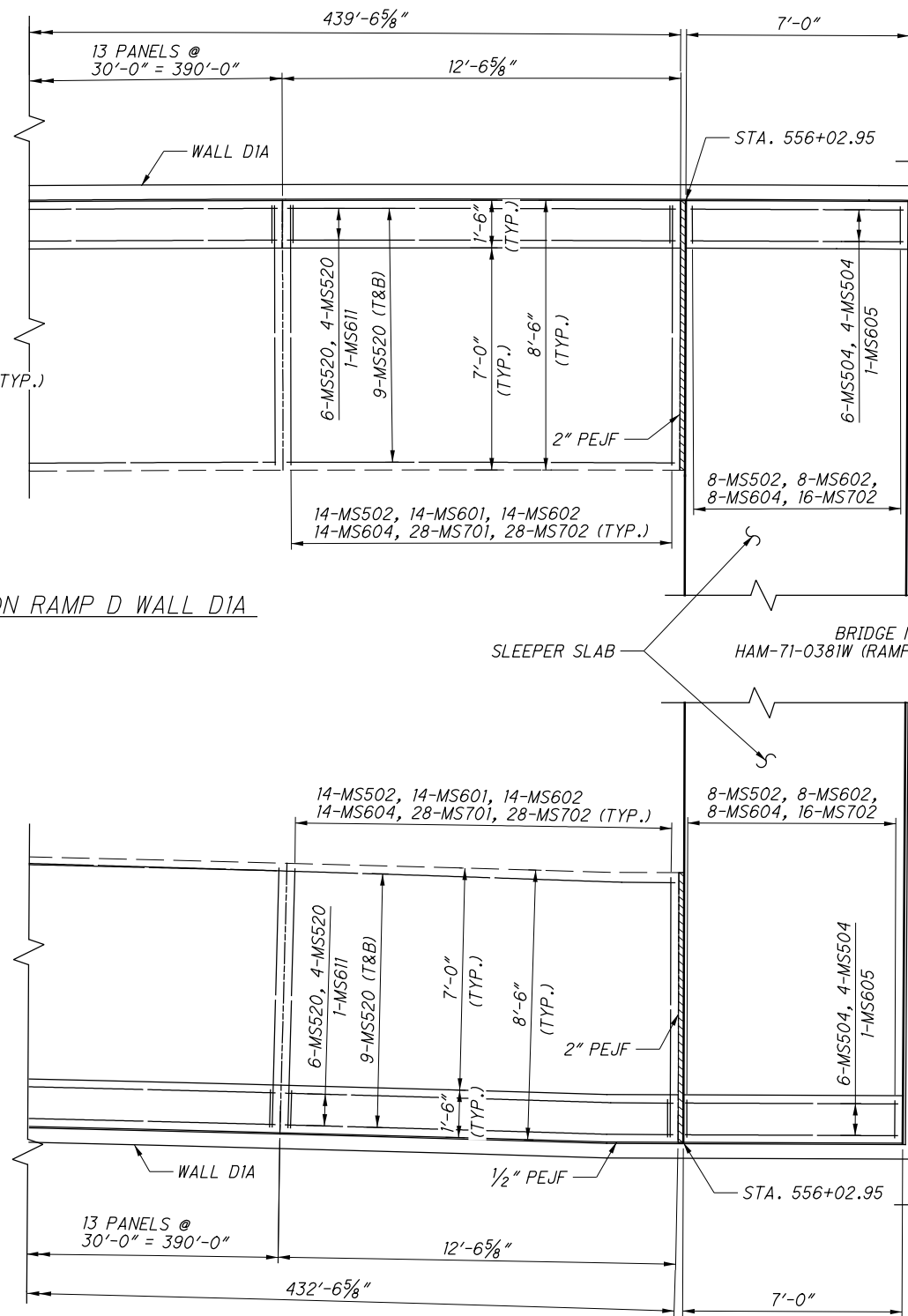
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WEST MOMENT SLAB ON RAMP D WALL DIA



EAST MOMENT SLAB ON RAMP D WALL DIA



SLEEPER SLAB
BRIDGE NO. HAM-71-0381W (RAMP D)

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
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HAM-71-3.81
PID No. 77628

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MOMENT SLAB DETAILS
(WALL DIA)

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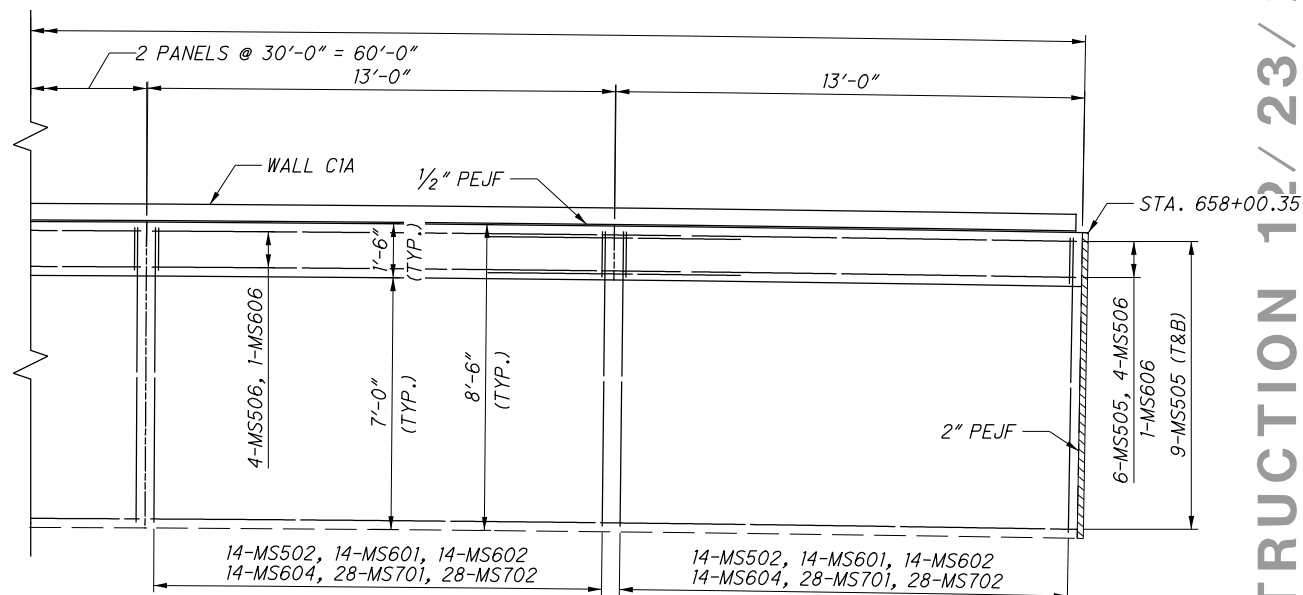
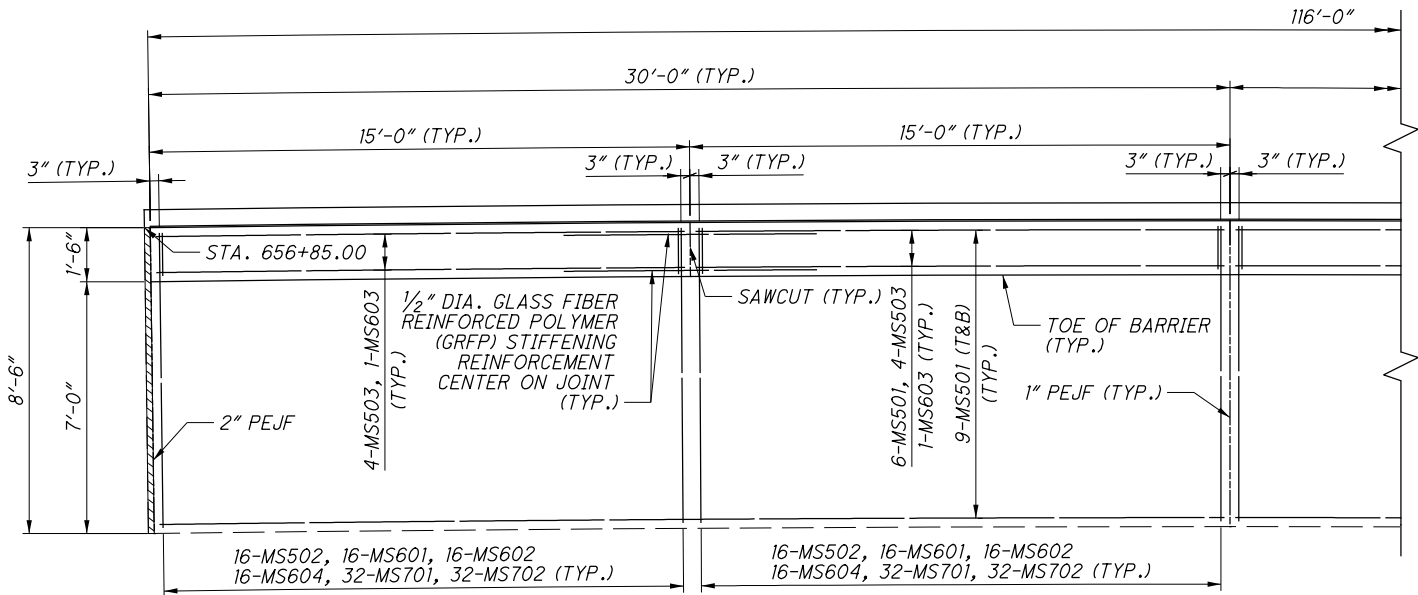
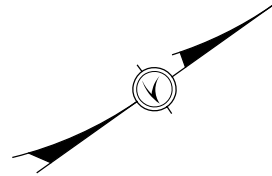
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DATE
10/23/14

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MOMENT SLAB ON RAMP C WALL CIA

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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PID No. 77628

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MSE WALL DETAILS
(WALL CIA)

DESIGNED
RBK

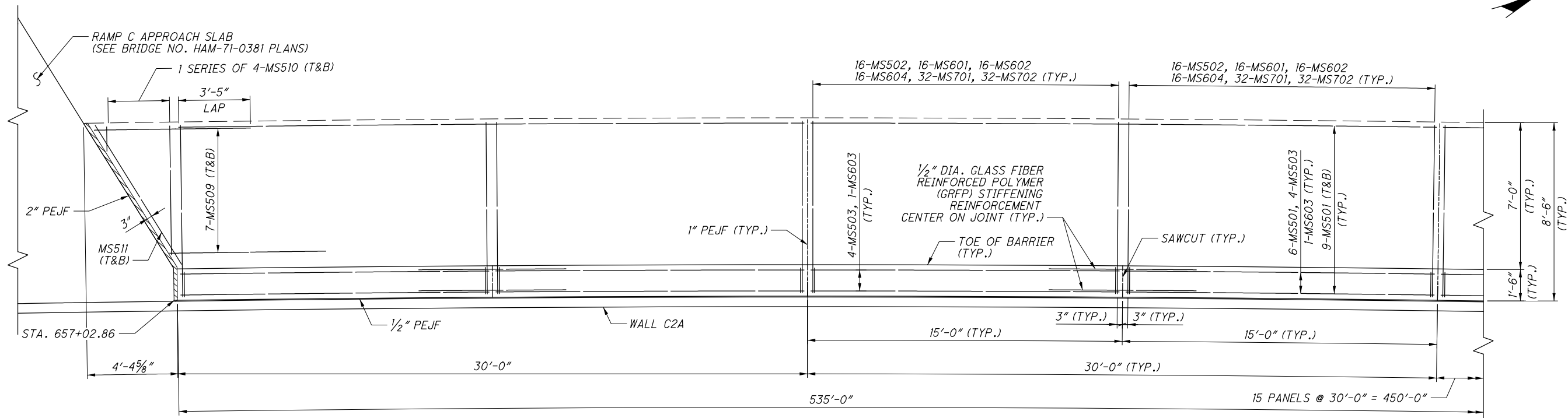
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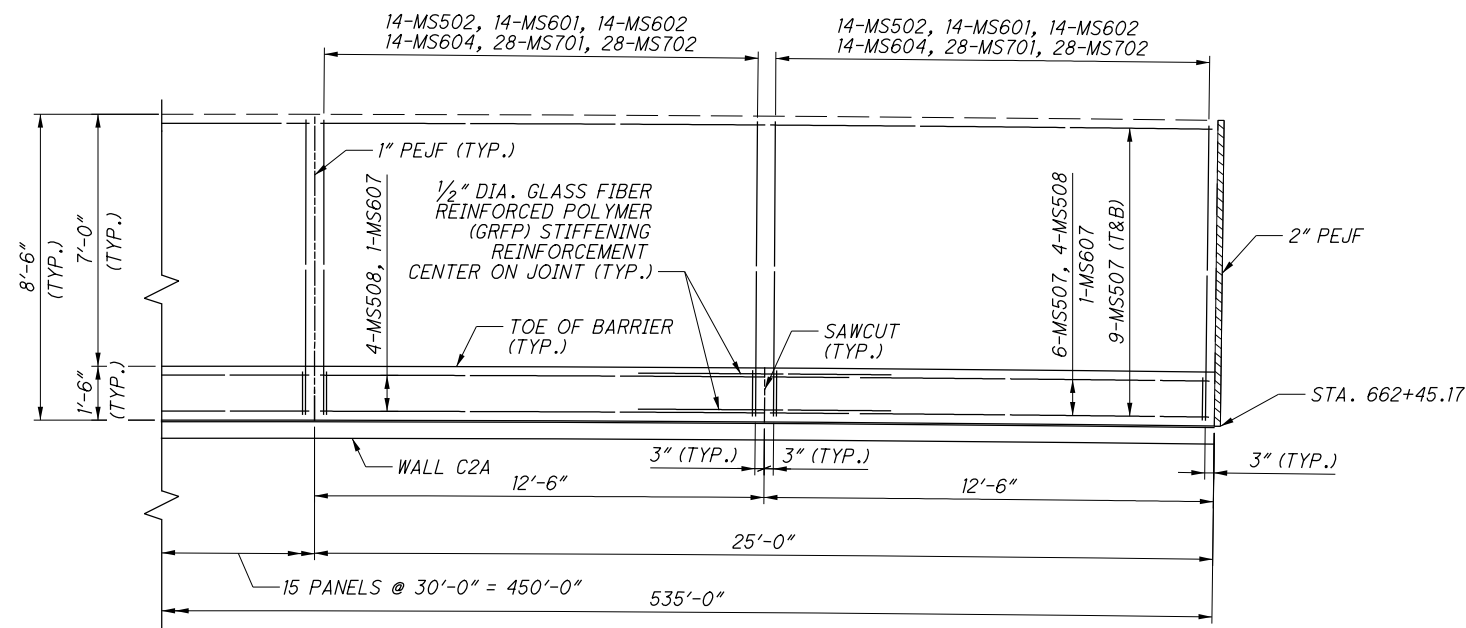
DATE
10/23/14

DESIGN AGENCY
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MOMENT SLAB ON RAMP C WALL C2A



MOMENT SLAB ON RAMP C WALL C2A

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

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PID No. 77628

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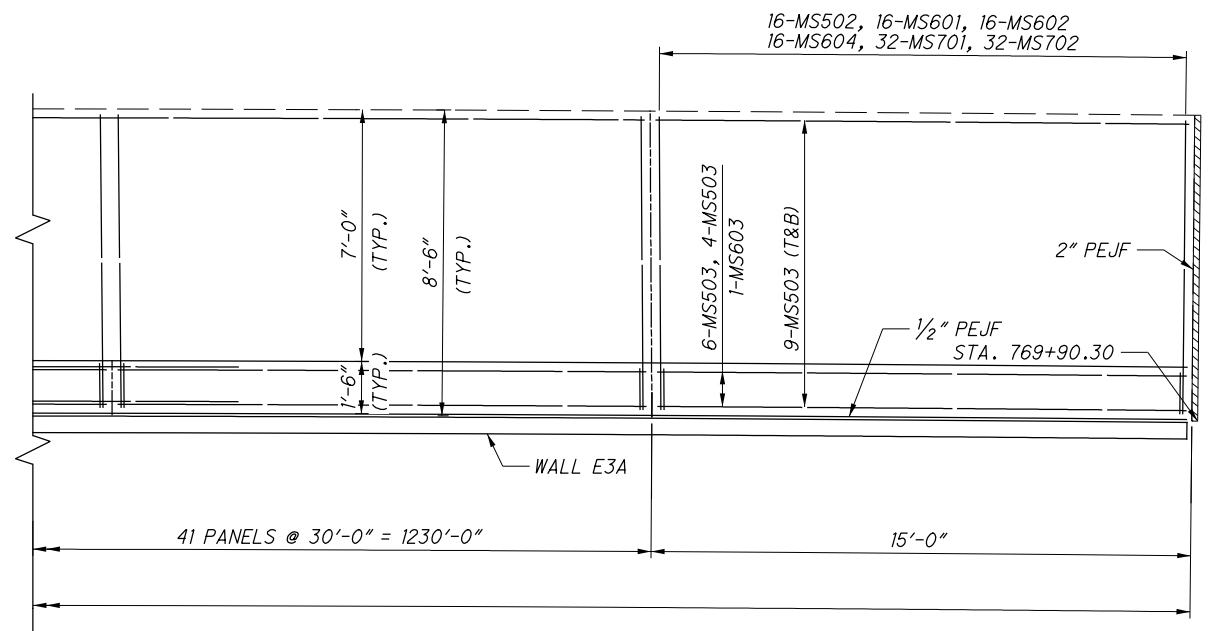
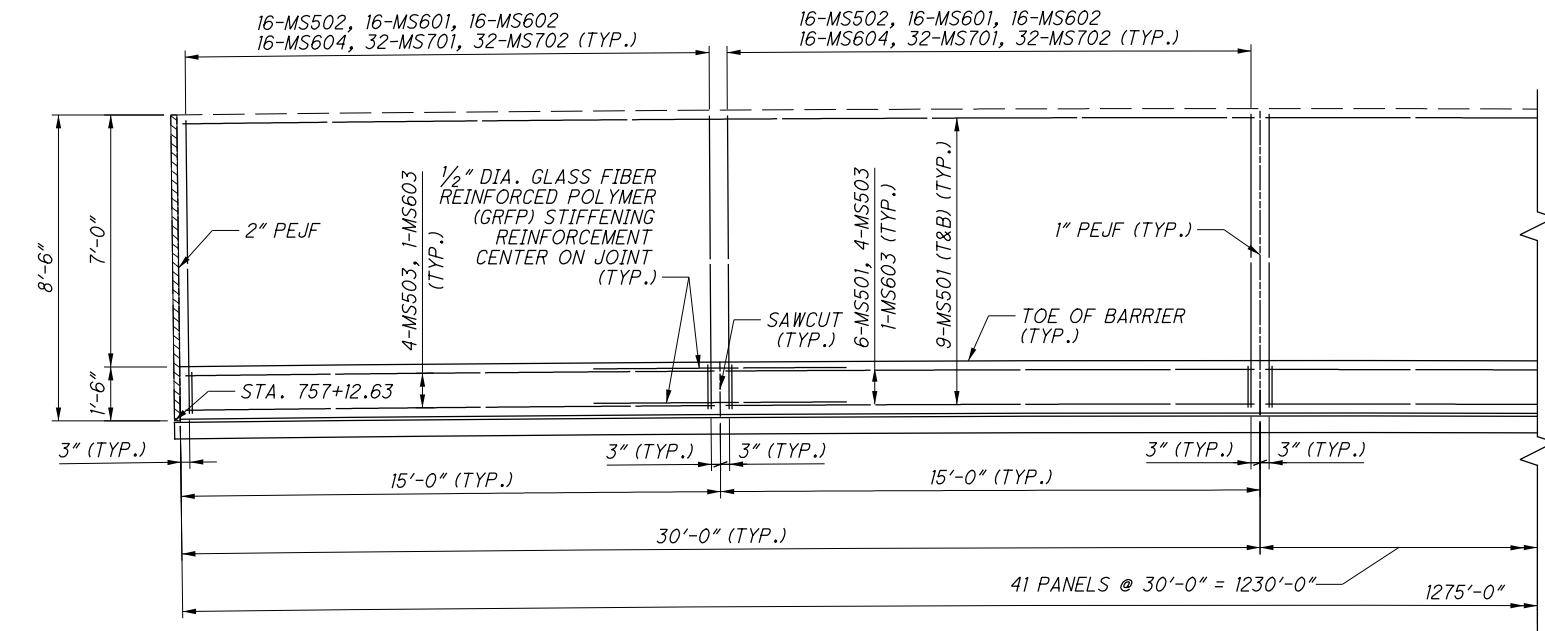
MOMENT SLAB DETAILS
(WALL C2A)

DESIGNED	DRAWN	REVIEWED	DATE
RBK	SRD	CHN	10/23/14
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MOMENT SLAB ON RAMP E WALL E3A

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0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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PID No. 77628

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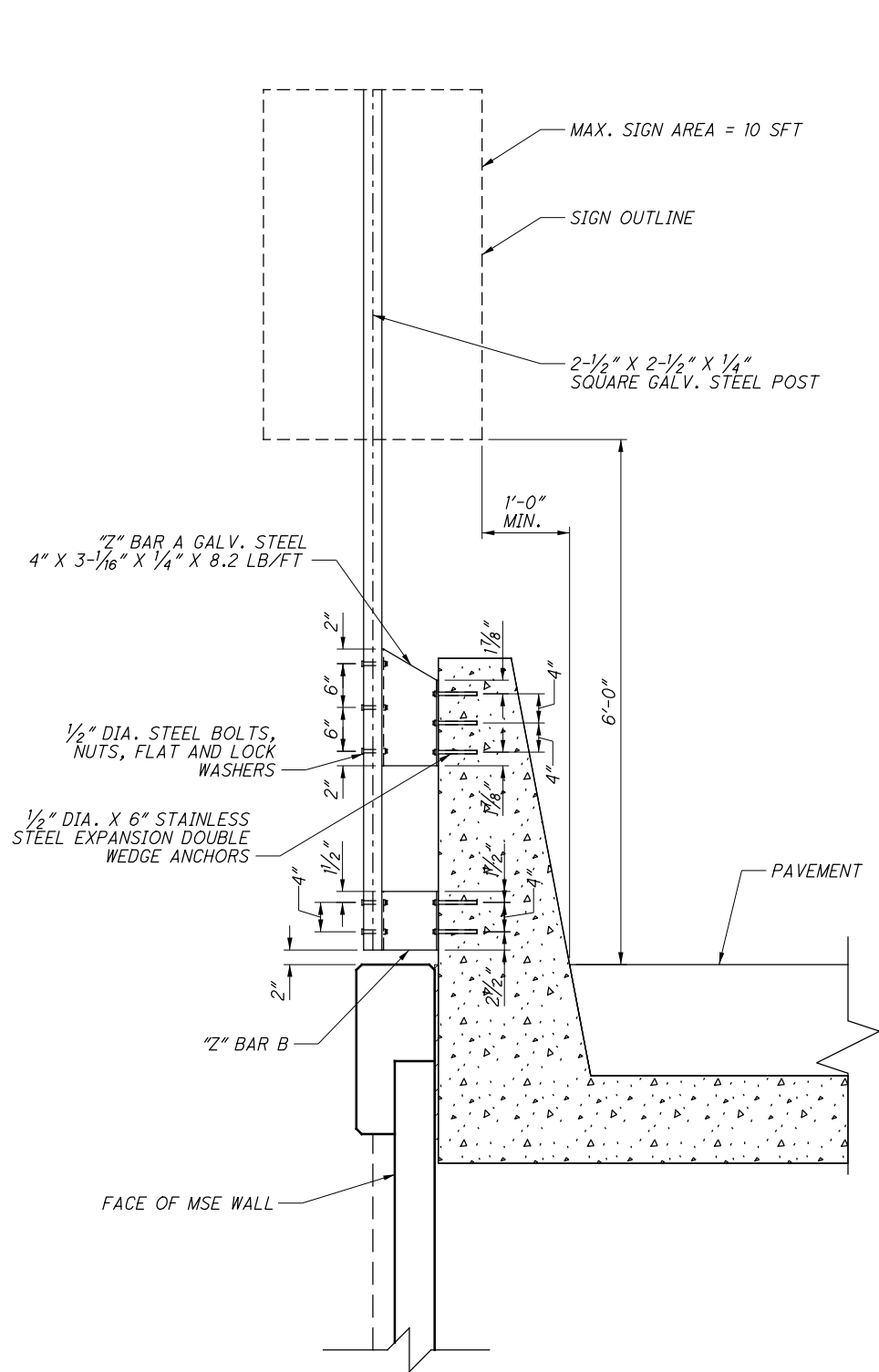
MOMENT SLAB DETAILS
(WALL E3A)

DESIGNED	RBK	CHECKED	JPC
DRAWN	SRD	REVIEWED	CHN
DATE	10/23/14		

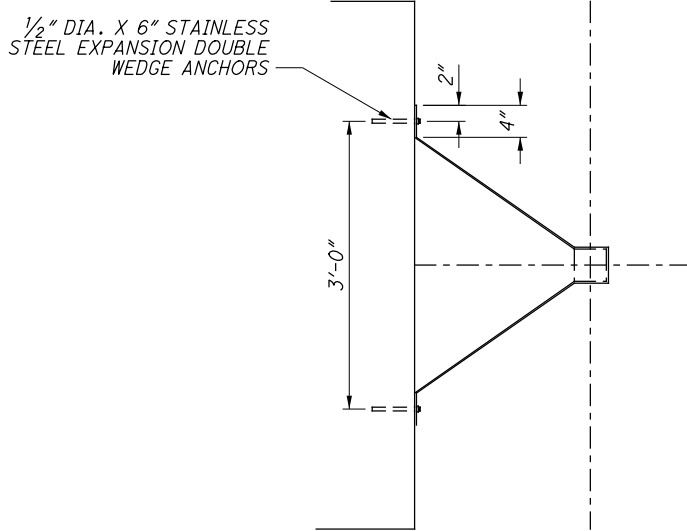
DESIGN AGENCY
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9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

HDR

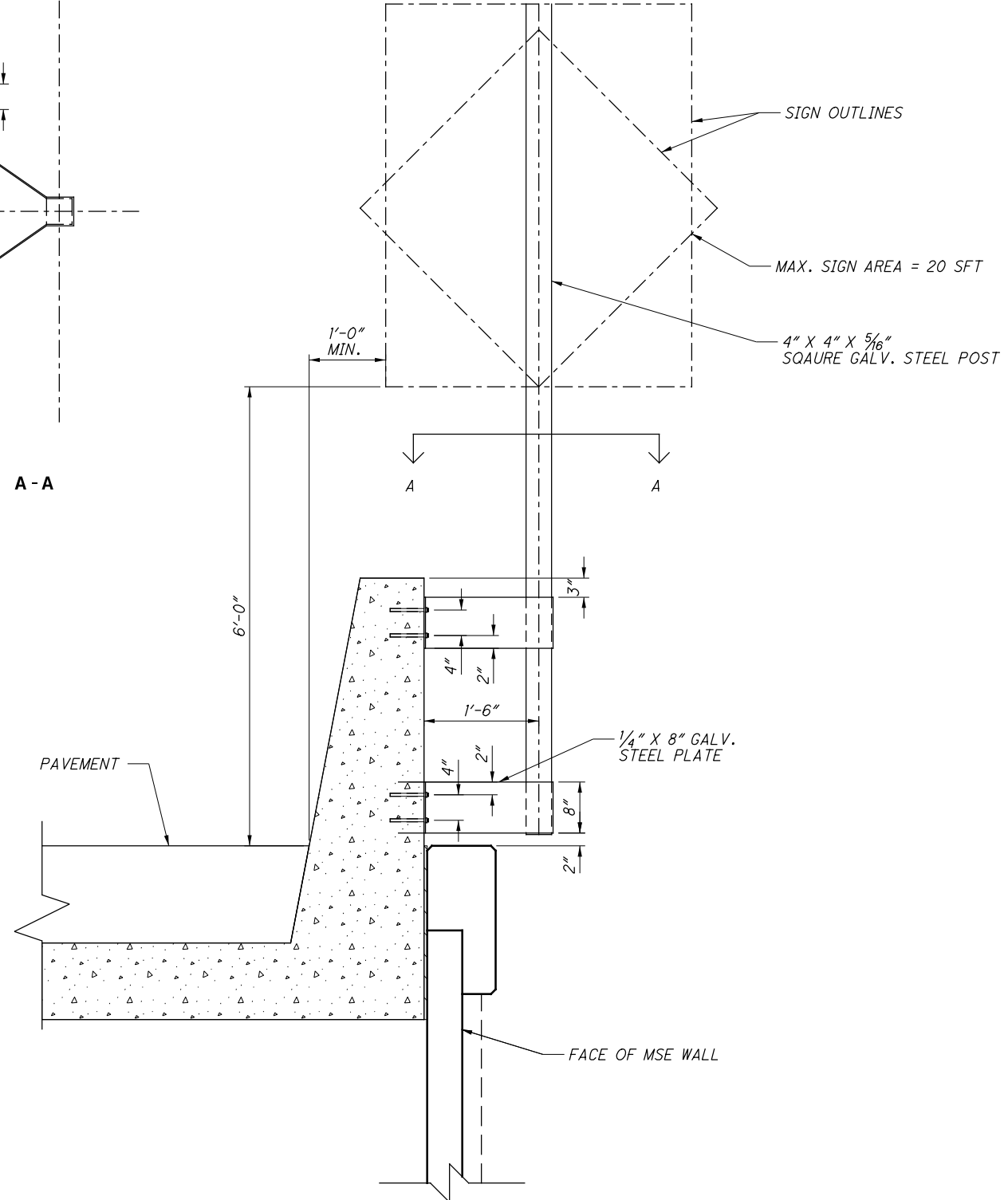
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SIGN SUPPORT ASSEMBLY, WALL MOUNTED, TYPE 1



SECTION A-A



SIGN SUPPORT ASSEMBLY, WALL MOUNTED, TYPE 2

NOTE:

1. FOR SIGN SUPPORT LOCATIONS SEE BU3 PLAN SET.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
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HAM-71-3.81

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SPECIAL SIGN DETAIL
ATTACHMENTS AND SUPPORTS ON MOMENT SLABS

CALCULATED	NDE
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ITEM 524, DRILLED SHAFTS, 30" DIAMETER, AS PER PLAN:
ITEM 524, DRILLED SHAFTS, 36" DIAMETER, AS PER PLAN:

THIS WORK CONSISTS OF FURNISHING AND INSTALLING DRILLED SHAFTS FOR SOLDIER PILE AND LAGGING RETAINING WALL STRUCTURES. THE DRILLED SHAFTS ARE REINFORCED WITH STEEL PILES INSTEAD OF REINFORCING STEEL CAGES. THE SOLDIER PILES EXTEND ABOVE THE TOP OF THE DRILLED SHAFTS. FURNISH AND INSTALL THE DRILLED SHAFTS IN ACCORDANCE WITH CMS 524 EXCEPT AS MODIFIED AND SUPPLEMENTED BELOW.

EXCAVATE THE HOLE FOR THE DRILLED SHAFT WITHIN 3 INCHES OF THE PLAN LOCATION. NO SHAFT EXCAVATION SHALL BE MADE WITHIN THREE DIAMETERS OF AN UNCASED SHAFT FILLED WITH CONCRETE THAT IS LESS THAN 48 HOURS OLD.

THE DESIGN IS BASED ON MINIMUM BEDROCK EMBEDMENT DEPTH OF 14.0 FEET FOR W24X192 STEEL PILE, 11.0 FEET FOR THE W18X143 STEEL PILE AND 10.0 FEET FOR THE HP14X73 STEEL PILE. IF FIELD CONDITIONS INDICATE GREATER DEPTHS ARE NECESSARY, NOTIFY THE DBT FOR FURTHER EVALUATION.

PLACE THE PILE VERTICALLY WITHIN THE HOLE. SIT THE PILE DIRECTLY ON THE BOTTOM OF THE HOLE. DO NOT ALLOW THE VERTICAL ALIGNMENT OF THE PILE TO VARY BY MORE THAN 1/4 INCH PER FOOT OF DEPTH. PLACE THE PILE SO THAT THE FLANGES ARE PARALLEL TO THE CENTERLINE OF THE ROW OF DRILLED SHAFTS. CENTER THE STEEL PILE WITHIN THE HOLE. SUPPORT THE SOLDIER PILE SO THAT IT DOES NOT MOVE DURING CONCRETE PLACEMENT. DO NOT ALLOW THE ORIENTATION OF THE FLANGES TO VARY BY MORE THAN 10 DEGREES.

USE CLASS QC2 CONCRETE WITH QC/QA ACCORDING TO CMS 511. THE CONTRACTOR MAY PLACE CONCRETE USING THE FREE FALL METHOD PROVIDED THE DEPTH OF WATER IS LESS THAN 6 INCHES AND THE CONCRETE FALLS WITHOUT STRIKING THE SIDES OF THE HOLE. POURING CONCRETE ALONG THE WEB OF THE PILE IS ACCEPTABLE.

USE LOW STRENGTH MORTAR (LSM) BACKFILL, ACCORDING TO CMS 613, ABOVE THE TOP OF DRILLED SHAFTS. REMOVE LSM BACKFILL DURING EXCAVATION TO INSTALL LAGGING.

CHECK THE POSITION, THE VERTICAL ALIGNMENT AND ORIENTATION OF THE PILE IMMEDIATELY AFTER CONCRETE PLACEMENT. MAKE CORRECTIONS AS NECESSARY TO MEET THE ABOVE TOLERANCES. PLACE TEMPORARY LAGGING SO THAT THE SOLDIER PILE FLANGE OVERLAPS THE END OF THE LAGGING BY AT LEAST 3 INCHES AT BOTH ENDS OF THE LAGGING.

CARE SHALL BE EXERCISED AS TO COVER UNATTENDED OPEN SHAFTS. TEMPORARY COVERS SHALL BE OF ADEQUATE STRENGTH TO PREVENT A PERSON FROM FALLING IN. NO DRILLED SHAFT EXCAVATION MAY BE LEFT OVERNIGHT WITHOUT CONCRETE PLACED.

SEQUENCE OF CONSTRUCTION:

THE INSTALLATION SEQUENCE SHALL BE SUCH THAT NO DRILLED SHAFT IS INSTALLED ADJACENT TO EITHER AN OPEN DRILLED SHAFT EXCAVATION OR A DRILLED SHAFT IN WHICH THE CONCRETE HAS LESS THAN A 48 HOUR CURE. INSTALLING THE SHAFTS IN AN ALTERNATE SEQUENCE OR ANY OTHER SEQUENCE THAT MEETS THIS CRITERIA IS ACCEPTABLE.

WORK PERFORMED IS TO BE IN A TOP DOWN MANNER. SOLDIER PILES ARE TO BE INSTALLED FROM THE EXISTING GRADE.

EXISTING CONDITION:

THE EXISTING CONDITIONS AS SHOWN ON THESE PLANS ARE BELIEVED TO BE ESSENTIALLY CORRECT, BUT THE DBT DOES NOT GUARANTEE THEIR ACCURACY OR COMPLETENESS. FINAL TOP OF ROCK ELEVATION WILL BE DETERMINED DURING DRILLING OF THE PREBORED HOLES. ANY CHANGES IN LOCATIONS, TYPE, LENGTH OF PILING, SIZE OF PREBORED HOLES, DEPTH OF ROCK, NECESSITATED BY A DEVIATION OF EXISTING CONDITIONS FROM THOSE SHOWN ON THESE PLANS, SHALL BE DETERMINED BY THE DESIGN BUILD TEAM DURING CONSTRUCTION.

ITEM 507 - STEEL PILES W24X192, FURNISHED, AS PER PLAN:
ITEM 507 - STEEL PILES W18X143, FURNISHED, AS PER PLAN:
ITEM 507 - STEEL PILES HP14X73, FURNISHED, AS PER PLAN:

THIS WORK CONSISTS OF FURNISHING AND PLACING STEEL PILES INTO DRILLED 30-INCH OR 36-INCH DIAMETER BORE HOLES. FURNISH PILES CONSISTING OF STRUCTURAL STEEL MEMBERS THAT MEET THE PLAN REQUIREMENTS AND CONFORM TO ASTM A572, GRADE 50 AND CMS 711.01. DO NOT FIELD WELD OR SPLICE STEEL PILES.

ITEM SPECIAL - RETAINING WALL, MISC.: TEMPORARY HARDWOOD LAGGING

THIS ITEM CONSISTS OF FURNISHING AND INSTALLING UNTREATED HARDWOOD LAGGING TO SERVE AS TEMPORARY LAGGING FOR THE SOLDIER PILE WALL. THE LAGGING SHALL CONSIST OF HARDWOOD TIMBER WITH NOMINAL 3" X 8" DIMENSIONS. LAGGING SHOULD BE PLACED IN A TOP DOWN MANNER AS EXCAVATION PROCEEDS DOWNWARD. AT NO TIME SHOULD MORE THAN 5 FEET OF UNSUPPORTED EXCAVATION BE PERMITTED. REDUCE THE UNSUPPORTED HEIGHT AS NECESSARY TO PREVENT CAVING AND SLOUGHING OF THE SOILS BETWEEN THE SOLDIER PILES. PROVIDE 1/4" TO 3/8" HORIZONTAL JOINT SPACING BETWEEN THE LAGGING BOARDS TO PERMIT DRAINAGE.

ITEM SPECIAL - RETAINING WALL, MISC.: PREFABRICATED GEOCOMPOSITE DRAIN

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREFABRICATED GEOCOMPOSITE DRAIN (PGD) VERTICALLY AND CENTERED IN EACH SOLDIER PILE BAY. THE PGD SHALL BE A MINIMUM OF 4 FEET WIDE IN EACH SOLDIER PILE BAY. THE DBT SHALL USE ONE OF THE FOLLOWING OR AN EQUAL PGD APPROVED BY THE DBT.

AMERIDRAIN 200
AMERICAN WICK DRAIN CORPORATION, INC.
1209 AIRPORT ROAD
MONROE, NC 28110-7389
PHONE: 1-800-242-9425 OR 704-238-9200

TENCATE G100N
TENCATE GEOSYNTHETICS NORTH AMERICA
365 SOUTH HOLLAND DRIVE
PENDERGRASS, GA 30567
PHONE: 1-800-685-9900 OR 706-693-2226

J-DRAIN 200
JDR ENTERPRISES, INC.
292 SOUTH MAIN STREET, SUITE 200
ALPHARETTA, GA 30009
PHONE: 1-800-843-7569 OR 770-442-1461

INSTALL THE PGD PER THE MANUFACTURER'S RECOMMENDATIONS. PLACE THE GEOTEXTILE SIDE OF THE PGD AGAINST THE RETAINED SLOPE FACE. EXTEND THE PGD TO THE FULL HEIGHT OF THE WALL AS SHOWN IN THE PLANS. CARRY THE PGD TO THE BOTTOM OF THE WALL AND OUTLET TO THE UNDERDRAIN.

ITEM 513, WELDED STUD SHEAR CONNECTORS:

3/8" X 6" STEEL STUDS SHALL BE WELDED TO THE FLANGES OF THE PILES FOR CONNECTION OF THE REINFORCED CONCRETE FACING. STUDS SHALL BE SPACED AS SHOWN IN THE PLANS STARTING 6" BELOW THE TOP OF PILE.

PROTECTION OF ALL WELDED AND ACCEPTED STEEL STUDS AGAINST DAMAGE SHALL BE MAINTAINED UNTIL PERMANENT CAST-IN-PLACE REINFORCED CONCRETE FACING IS CAST TO EMBED THESE STUDS. ALL DAMAGAED STUDS SHALL BE REPLACED.

ITEM 511, CLASS QC1 CONCRETE WITH QC/QA, MISC.: CIP WALL FACING:

THIS ITEM OF WORK SHALL CONSIST OF CONSTRUCTING THE PERMANENT WALL FACING AND PROVIDING AESTHETIC TREATMENTS TO THE CONCRETE SURFACES OF SOLDIER PILE WALL AS SHOWN IN THE PLANS.

FOR ADDITIONAL INFORMATION, SEE NOTE ON SHEET 2/62.

0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
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DESIGN AGENCY
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GENERAL NOTES

SOLDIER PILE WALLS C3A AND E1D

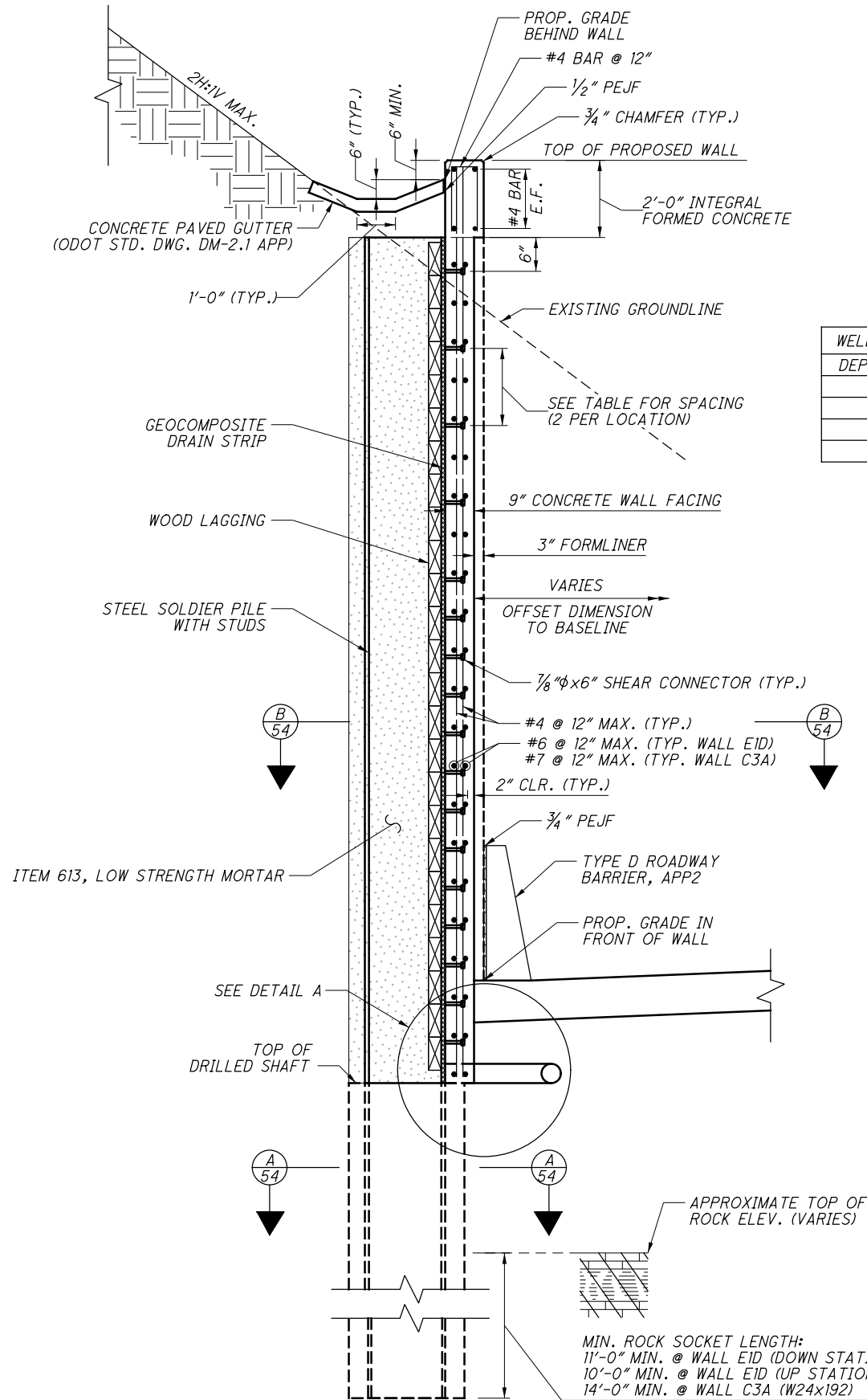
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PID No. 77628

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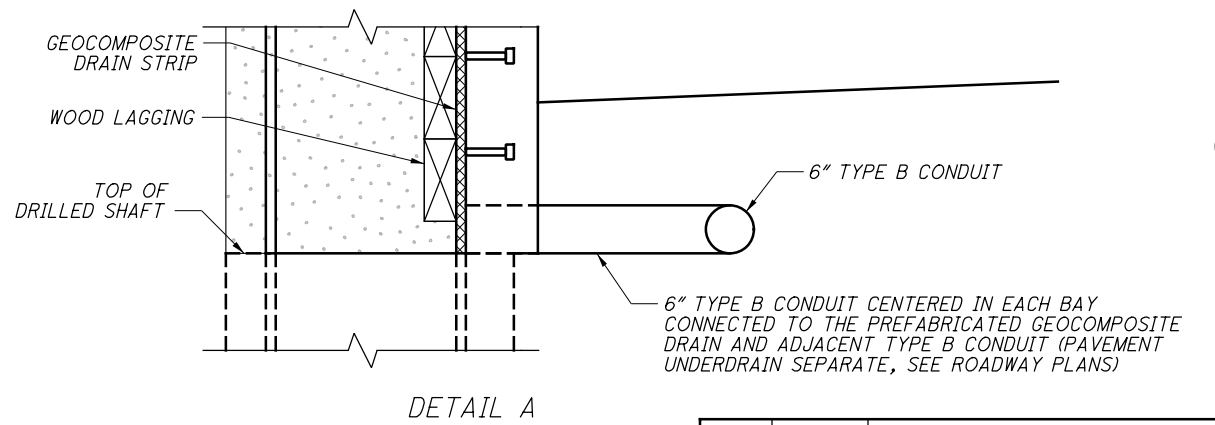
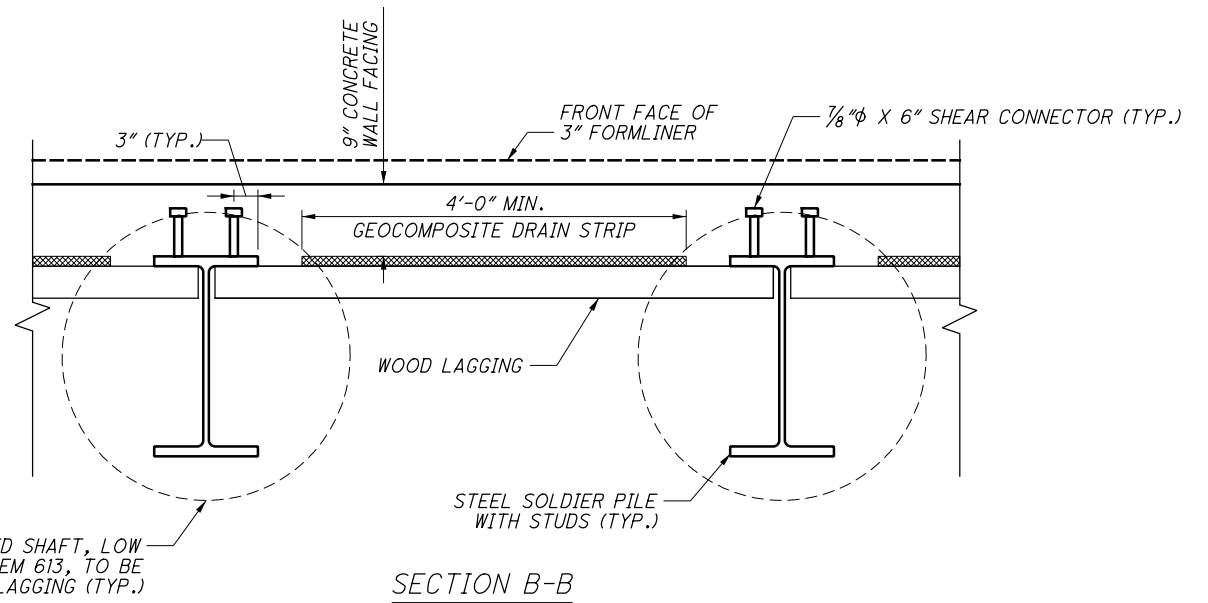
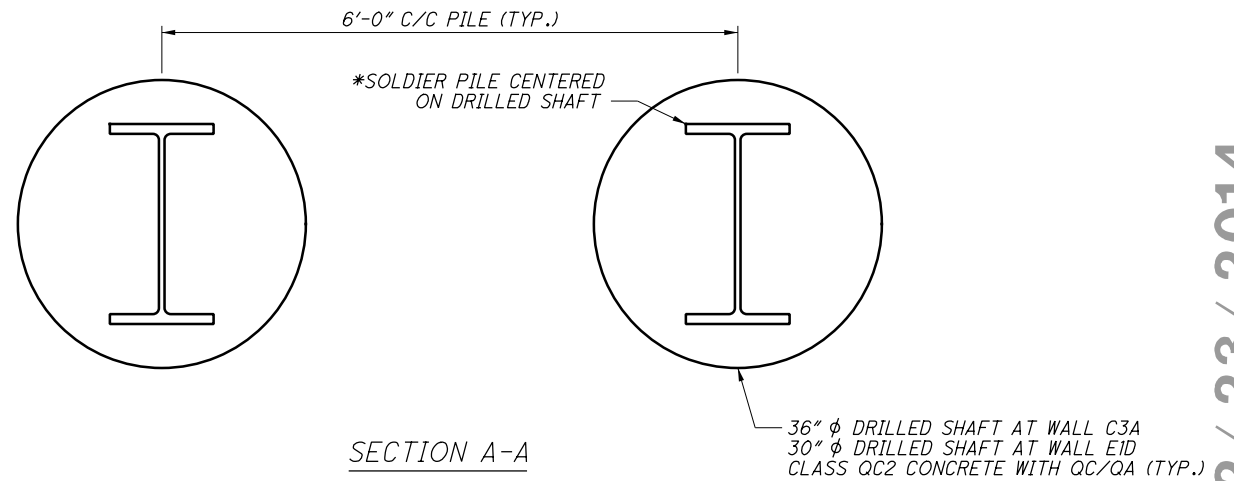
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SOLDIER PILE AND LAGGING SECTION

WELDED STUD SHEAR CONNECTOR SPACINGS	
DEPTH FROM TOP OF PILE	C/C SPACING
0'-10'	24"
10'-20'	15"
20'-25'	12"
25'+	10"



NOTES:

- PLACE CRUSHED GRANULAR MATERIAL IN ANY VOIDS BETWEEN WOOD LAGGING AND RETAINED SOIL.
- FOR CONCRETE WALL FACING REINFORCING DETAILS SEE SHEET 58/62 FOR WALL EID AND 62/62 FOR C3A.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

SOLDIER PILE WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALLS EID AND C3A)

HAM-71-3.81
PID No. 77628

54/62

96
120

DESIGN AGENCY
HOR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

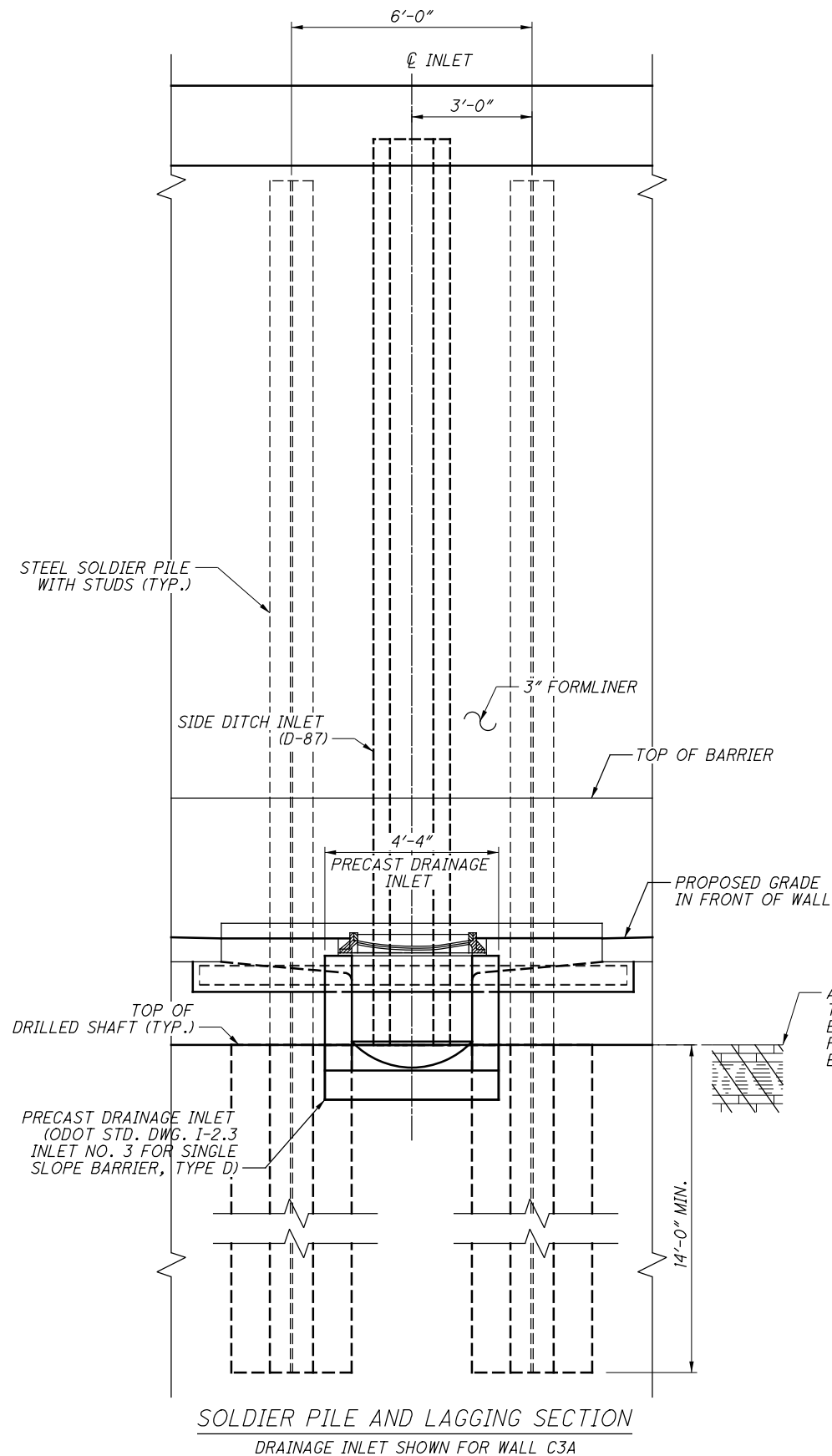
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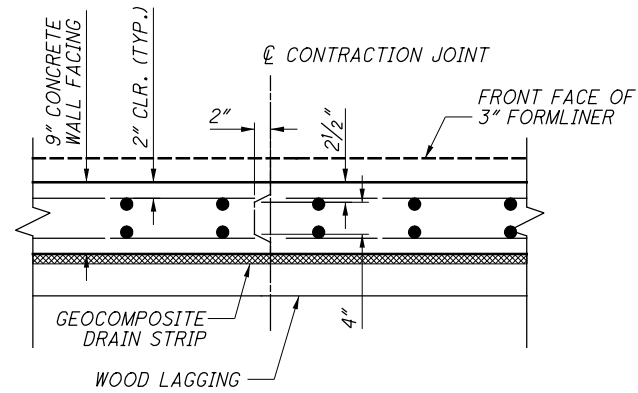
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RBK

CHECKED
JPC

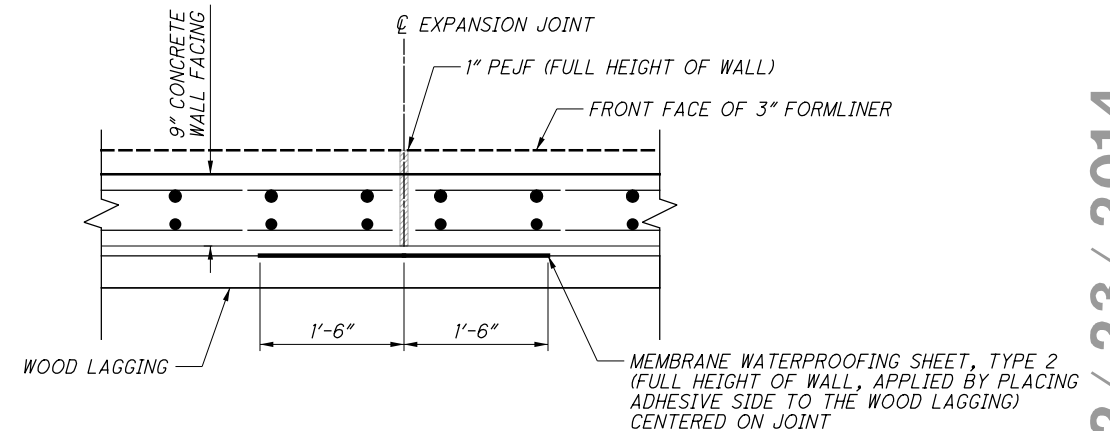
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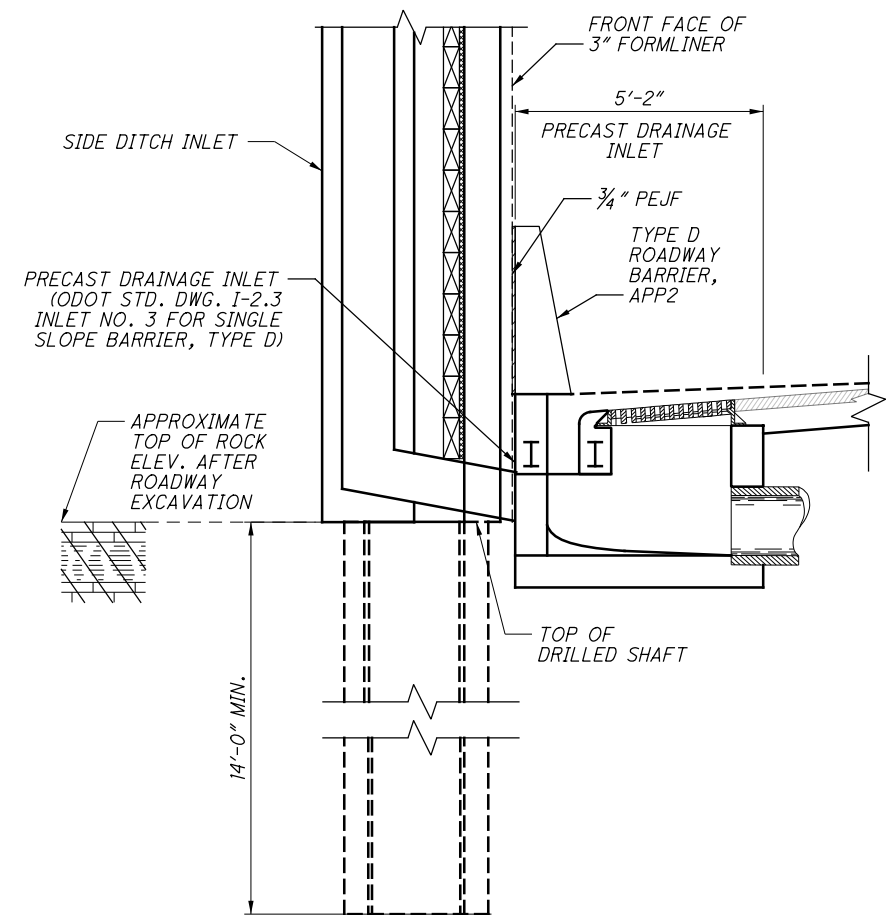
SOLDIER PILE AND LAGGING SECTION
DRAINAGE INLET SHOWN FOR WALL C3A



CONTRACTION JOINT DETAIL
WALLS E1D AND C3A



EXPANSION JOINT DETAIL
WALLS E1D AND C3A



SOLDIER PILE AND LAGGING SECTION
DRAINAGE INLET SHOWN WALL C3A

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

55/62

97
120

SOLDIER PILE WALL DETAILS
MISCELLANEOUS SECTIONS AND DETAILS (WALLS E1D AND C3A)

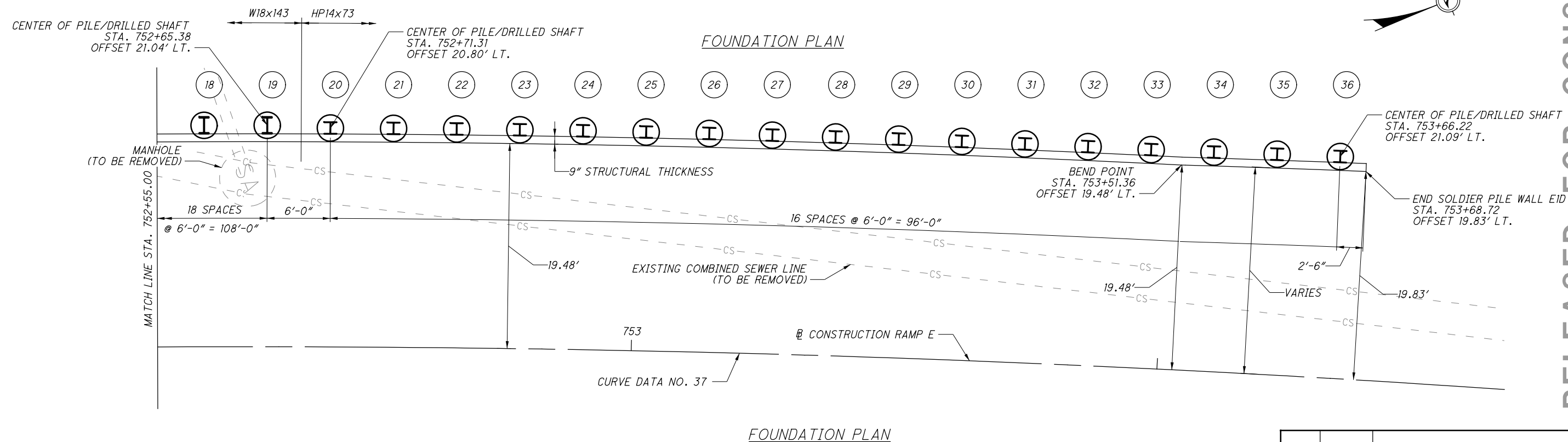
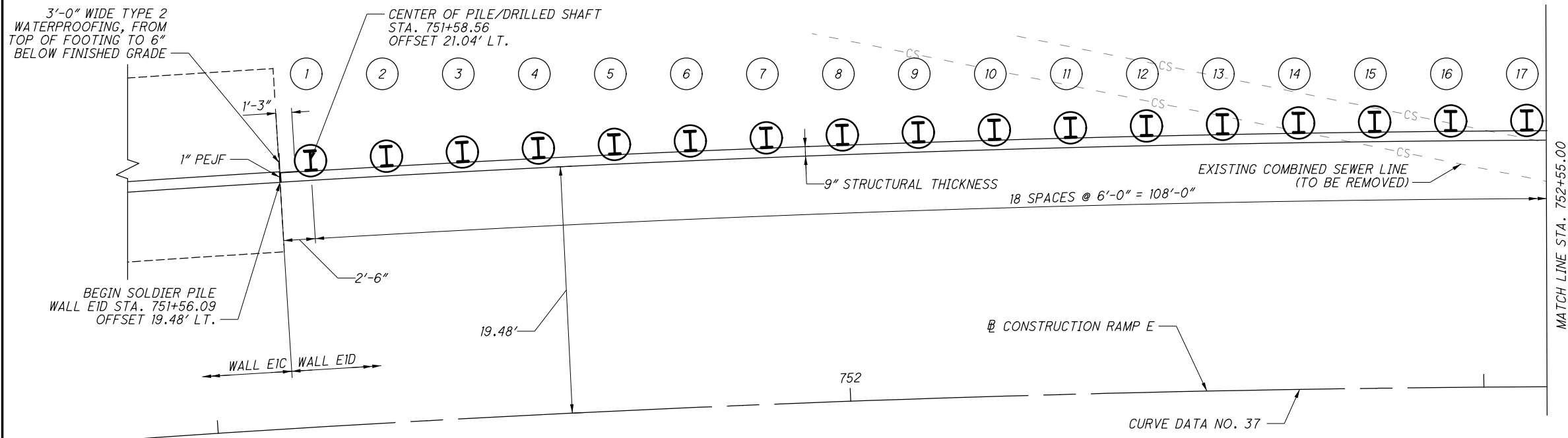
DESIGNED
RBK
CHECKED
JPC

DRAWN
JML
REVISED

REVIEWED
CHN
DATE
10/23/14

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1500

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LEGEND

- ① - PROPOSED W18x143 PILE, 30" ϕ DRILLED SHAFT DOWN STATION OF STA. 752+70.00
PROPOSED HP14x73 PILE, 30" ϕ DRILLED SHAFT UP STATION OF STA. 752+70.00

NOTE:

1. REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

56/62

98
120

FOUNDATION PLAN
WALL EID (SOLDIER PILE WALL)

DESIGNED	JML	CHECKED	JPC
DRAWN	JML	REVIEWED	CHN
DATE	10/23/14	REVIEWED	CHN

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

HDR

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WALL	PILE NO.	PILE SIZE	APPROXIMATE BOTTOM OF PILE ELEV.	BOTTOM OF CIP WALL ELEV.	TOP OF PILE ELEV.	TOP OF WALL ELEV.	ESTIMATED LENGTH OF PILE (FEET)
E1D	1	W18x143	748.00	761.00	778.21	780.21	31
E1D	2	W18x143	748.00	761.00	778.18	780.18	31
E1D	3	W18x143	748.00	761.00	777.83	779.83	30
E1D	4	W18x143	748.00	761.00	777.48	779.48	30
E1D	5	W18x143	748.00	761.00	777.13	779.13	30
E1D	6	W18x143	748.00	761.00	776.77	778.77	29
E1D	7	W18x143	748.00	761.00	776.42	778.42	29
E1D	8	W18x143	748.00	761.00	776.07	778.07	29
E1D	9	W18x143	748.00	761.00	775.72	777.72	28
E1D	10	W18x143	748.00	761.00	775.37	777.37	28
E1D	11	W18x143	748.00	761.00	775.02	777.02	28
E1D	12	W18x143	748.00	761.00	774.67	776.67	27
E1D	13	W18x143	748.00	761.00	774.31	776.31	27
E1D	14	W18x143	748.00	761.00	773.96	775.96	26
E1D	15	W18x143	748.00	761.00	773.61	775.61	26
E1D	16	W18x143	748.00	761.00	773.26	775.26	26
E1D	17	W18x143	748.00	761.00	772.91	774.91	25
E1D	18	W18x143	748.00	761.00	772.56	774.56	25
E1D	19	W18x143	748.00	761.00	772.21	774.21	25
E1D	20	HP14x73	749.00	761.00	771.85	773.85	23
E1D	21	HP14x73	749.00	761.00	771.50	773.50	23
E1D	22	HP14x73	749.00	761.00	771.15	773.15	23
E1D	23	HP14x73	749.00	761.00	770.80	772.80	22
E1D	24	HP14x73	749.00	761.00	770.45	772.45	22
E1D	25	HP14x73	749.00	761.00	770.10	772.10	22
E1D	26	HP14x73	749.00	761.00	769.74	771.74	21
E1D	27	HP14x73	749.00	761.00	769.39	771.39	21
E1D	28	HP14x73	749.00	761.00	769.04	771.04	21
E1D	29	HP14x73	749.00	761.00	768.69	770.69	20
E1D	30	HP14x73	749.00	761.00	768.34	770.34	20
E1D	31	HP14x73	749.00	761.00	767.99	769.99	19
E1D	32	HP14x73	749.00	761.00	767.64	769.64	19
E1D	33	HP14x73	749.00	761.00	767.28	769.28	19
E1D	34	HP14x73	749.00	761.00	766.93	768.93	18
E1D	35	HP14x73	749.00	761.00	766.58	768.58	18
E1D	36	HP14x73	749.00	761.00	766.23	768.23	18

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

57/62

99
120

SOLDIER PILE WALL DETAILS
WALL EID ELEVATIONS

DESIGNED
JML

CHECKED
JPC

DRAWN
JML

REVISED

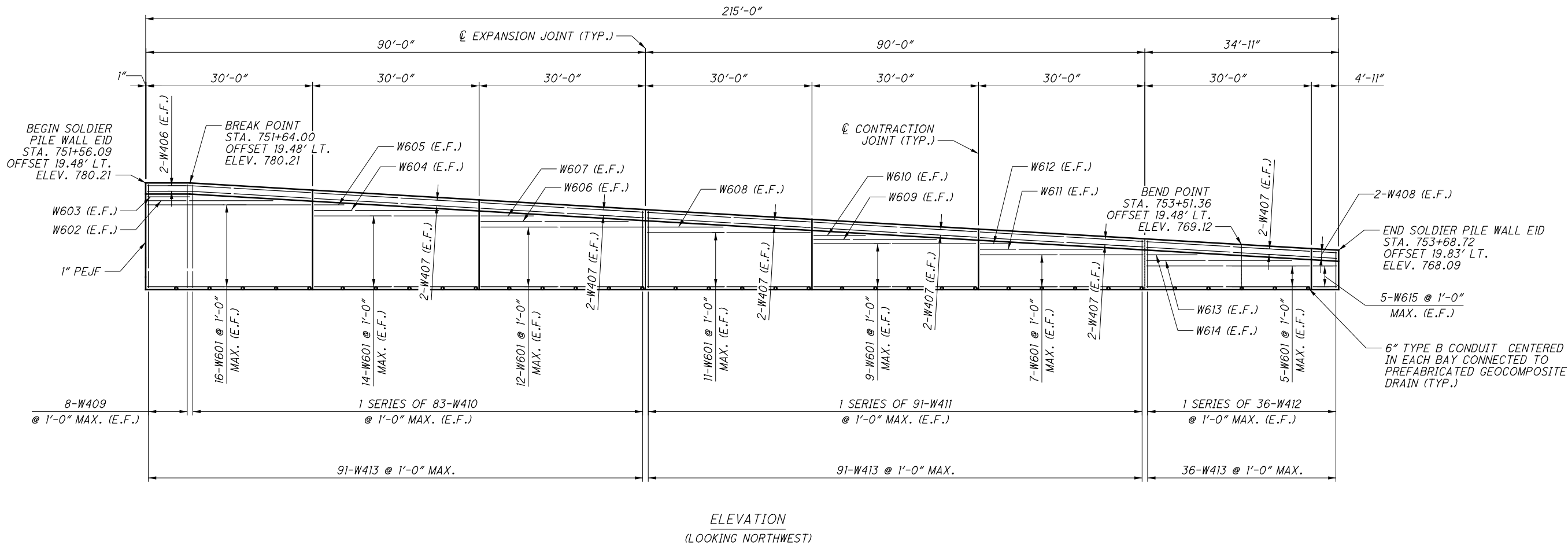
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DATE
10/23/14

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

HDR

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NOTES:

- DIMENSIONS ARE MEASURED ALONG FRONT FACE OF WALL.
- PROVIDE RELIEF JOINTS AT 10'-0" O.C. TO MATCH AESTHETICS OF ADJACENT PRECAST WALL ETC.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

SOLDIER PILE WALL DETAILS
WALL EID DETAILS

HAM-71-3.81
PID No. 77628

58/62

100
120

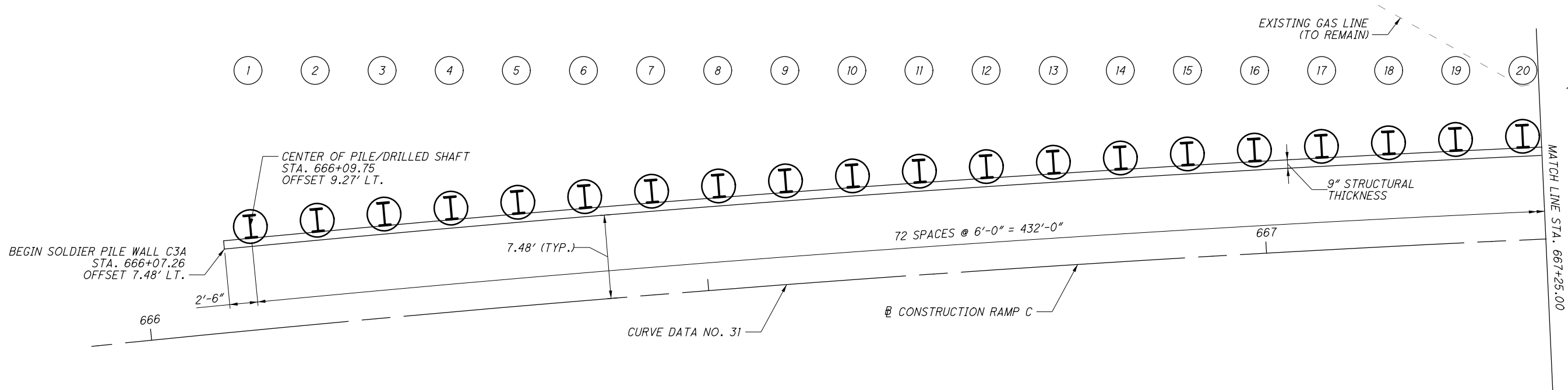
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HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/23/14

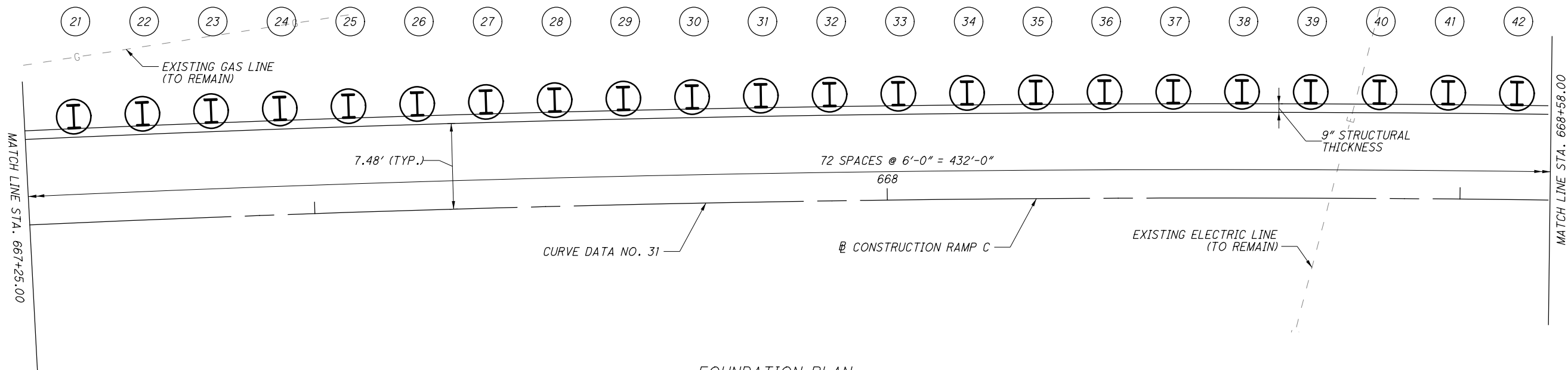
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CHECKED
JPC

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FOUNDATION PLAN



FOUNDATION PLAN

LEGEND

① - PROPOSED W24x192 PILE, 36" ϕ DRILLED SHAFT

NOTE:

1. REFER TO SHEET 3/120 FOR BASELINE CURVE DATA.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

FOUNDATION PLAN (SHEET 1 OF 2)
WALL C3A (SOLDIER PILE WALL)

HAM-71-3.81
PID No. 77628

59/62

101
120

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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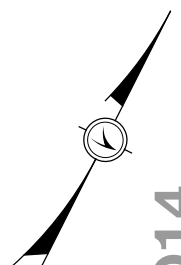
DATE
10/23/14

DRAWN
JML

CHECKED
JPC

DESIGNED
JML

REVISOR
JPC



MATCH LINE STA. 669+78.00

EXISTING COMBINED SEWER LINE (TO BE REMOVED)

SA

**CENTER OF PILE/DRILLED SHAFT
STA. 670+40.80
OFFSET 9.27' LT.**

11 1/2" MIN.

3'-0" WIDE TYPE 2 WATERPROOFING, FROM TOP OF FOOTING TO 6" BELOW FINISHED GRADE

2" PEJF

**END SOLDIER PILE WALL C3A
STA. 670+43.35
OFFSET 7.48' LT.**

9" STRUCTURAL THICKNESS

72 SPACES @ 6'-0" = 432'-0"

N 64° 21' 57" E

670

7.48' (TYP.)

2'-6"

@ CONSTRUCTION RAMP C

BRIDGE NO. HAM-71-0396 FORWARD ABUTMENT

WALL C3A

EXISTING CONDUIT LINE

EXISTING WATER LINE

EXISTING BRIDGE NO. HAM-71-0403 (TO BE REMOVED)

1. REFER TO SHEET **3/120** FOR BASELINE CURVE DATA.

102
120

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WALL	PILE NO.	PILE SIZE	APPROXIMATE BOTTOM OF PILE ELEV.	BOTTOM OF CIP WALL ELEV.	TOP OF PILE ELEV.	TOP OF WALL ELEV.	ESTIMATED LENGTH OF PILE (FEET)
C3A	1	W24x192	722.75	736.75	743.17	745.17	21
C3A	2	W24x192	722.75	736.75	744.37	746.37	22
C3A	3	W24x192	722.75	736.75	745.57	747.57	23
C3A	4	W24x192	722.75	736.75	746.77	748.77	25
C3A	5	W24x192	720.25	734.25	747.97	749.97	28
C3A	6	W24x192	720.25	734.25	749.17	751.17	29
C3A	7	W24x192	720.25	734.25	750.37	752.37	31
C3A	8	W24x192	720.25	734.25	751.57	753.57	32
C3A	9	W24x192	720.25	734.25	752.77	754.77	33
C3A	10	W24x192	720.25	734.25	753.97	755.97	34
C3A	11	W24x192	720.25	734.25	755.17	757.17	35
C3A	12	W24x192	720.25	734.25	756.37	758.37	37
C3A	13	W24x192	717.50	731.50	757.57	759.57	41
C3A	14	W24x192	717.50	731.50	757.94	759.94	41
C3A	15	W24x192	717.50	731.50	757.94	759.94	41
C3A	16	W24x192	717.50	731.50	757.94	759.94	41
C3A	17	W24x192	717.50	731.50	757.94	759.94	41
C3A	18	W24x192	717.50	731.50	757.94	759.94	41
C3A	19	W24x192	717.50	731.50	757.94	759.94	41
C3A	20	W24x192	717.50	731.50	757.93	759.93	41
C3A	21	W24x192	715.00	729.00	757.41	759.41	43
C3A	22	W24x192	715.00	729.00	756.90	758.90	42
C3A	23	W24x192	715.00	729.00	756.37	758.37	42
C3A	24	W24x192	715.00	729.00	755.86	757.86	41
C3A	25	W24x192	715.00	729.00	755.34	757.34	41
C3A	26	W24x192	715.00	729.00	754.82	756.82	40
C3A	27	W24x192	715.00	729.00	754.30	756.30	40
C3A	28	W24x192	715.00	729.00	753.78	755.78	39
C3A	29	W24x192	712.50	726.50	753.26	755.26	41
C3A	30	W24x192	712.50	726.50	752.75	754.75	41
C3A	31	W24x192	712.50	726.50	752.23	754.23	40
C3A	32	W24x192	712.50	726.50	751.71	753.71	40
C3A	33	W24x192	712.50	726.50	751.19	753.19	39
C3A	34	W24x192	712.50	726.50	750.67	752.67	39
C3A	35	W24x192	712.50	726.50	750.15	752.15	38
C3A	36	W24x192	712.50	726.50	749.63	751.63	38
C3A	37	W24x192	710.25	724.25	749.11	751.11	39
C3A	38	W24x192	710.25	724.25	748.59	750.59	39
C3A	39	W24x192	710.25	724.25	748.08	750.08	38
C3A	40	W24x192	710.25	724.25	747.56	749.56	38

WALL	PILE NO.	PILE SIZE	APPROXIMATE BOTTOM OF PILE ELEV.	BOTTOM OF CIP WALL ELEV.	TOP OF PILE ELEV.	TOP OF WALL ELEV.	ESTIMATED LENGTH OF PILE (FEET)
C3A	41	W24x192	710.25	724.25	747.04	749.04	37
C3A	42	W24x192	710.25	724.25	746.52	748.52	37
C3A	43	W24x192	710.25	724.25	746.00	748.00	36
C3A	44	W24x192	710.25	724.25	745.48	747.48	36
C3A	45	W24x192	708.00	722.00	744.96	746.96	37
C3A	46	W24x192	708.00	722.00	744.44	746.44	37
C3A	47	W24x192	708.00	722.00	743.92	745.92	36
C3A	48	W24x192	708.00	722.00	743.41	745.41	36
C3A	49	W24x192	708.00	722.00	742.88	744.88	35
C3A	50	W24x192	708.00	722.00	742.37	744.37	35
C3A	51	W24x192	708.00	722.00	741.85	743.85	34
C3A	52	W24x192	708.00	722.00	741.33	743.33	34
C3A	53	W24x192	706.00	720.00	740.81	742.81	35
C3A	54	W24x192	706.00	720.00	740.29	742.29	35
C3A	55	W24x192	706.00	720.00	740.08	742.08	35
C3A	56	W24x192	706.00	720.00	740.08	742.08	35
C3A	57	W24x192	706.00	720.00	740.08	742.08	35
C3A	58	W24x192	706.00	720.00	740.08	742.08	35
C3A	59	W24x192	706.00	720.00	740.08	742.08	35
C3A	60	W24x192	706.00	720.00	740.08	742.08	35
C3A	61	W24x192	704.25	718.25	740.08	742.08	36
C3A	62	W24x192	704.25	718.25	740.08	742.08	36
C3A	63	W24x192	704.25	718.25	740.08	742.08	36
C3A	64	W24x192	704.25	718.25	740.08	742.08	36
C3A	65	W24x192	704.25	718.25	740.08	742.08	36
C3A	66	W24x192	704.25	718.25	740.08	742.08	36
C3A	67	W24x192	704.25	718.25	740.08	742.08	36
C3A	68	W24x192	704.25	718.25	740.08	742.08	36
C3A	69	W24x192	703.25	717.25	744.26	742.08	42
C3A	70	W24x192	703.25	717.25	740.08	742.08	37
C3A	71	W24x192	703.25	717.25	740.08	742.08	37
C3A	72	W24x192	703.25	717.25	740.08	742.08	37
C3A	73	W24x192	703.25	717.25	740.08	742.08	37

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

SOLDIER PILE WALL DETAILS
WALL C3A ELEVATIONS

HAM-71-3.81
PID No. 77628

61/62

103
120

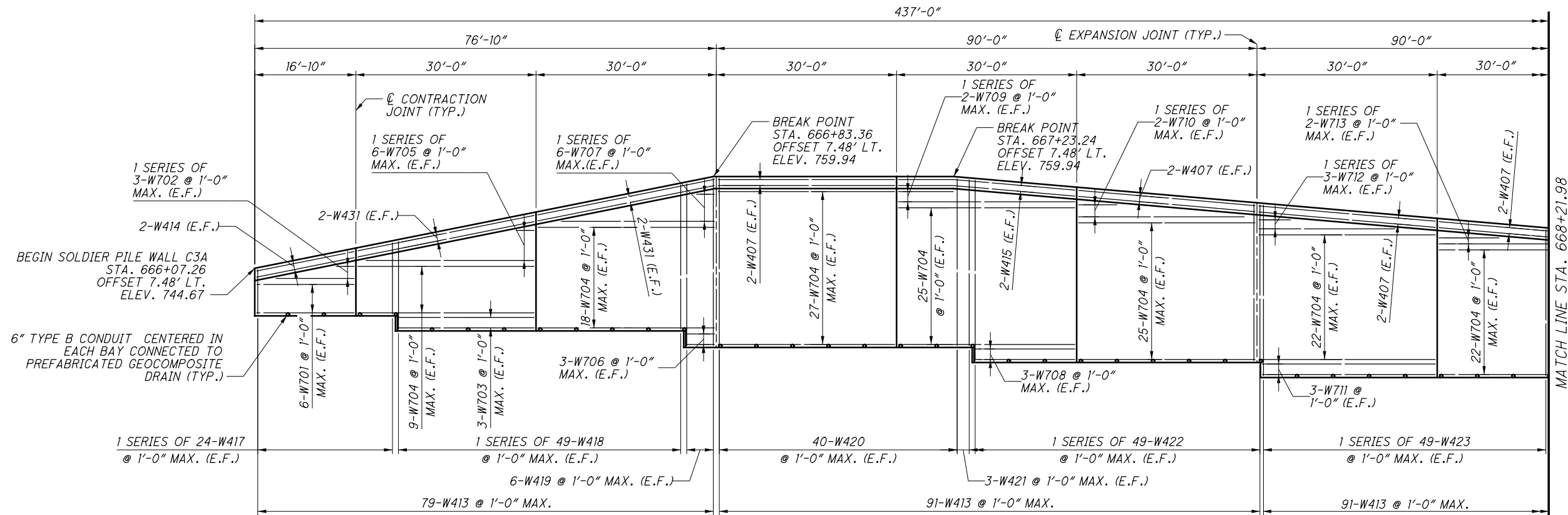
DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1500



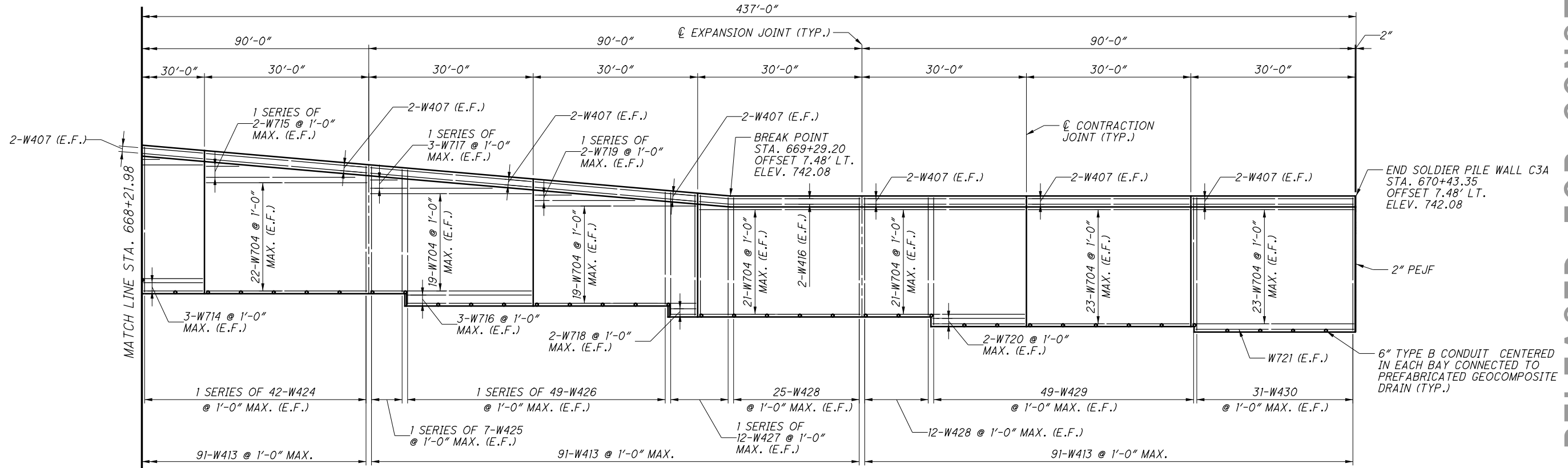
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ELEVATION



ELEVATION

NOTES:

- DIMENSIONS ARE MEASURED ALONG FRONT FACE OF WALL.
- PROVIDE RELIEF JOINTS AT 10'-0" O.C. TO MATCH AESTHETICS OF ADJACENT PRECAST WALL C3B.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

HAM-71-3.81
PID No. 77628

62/62

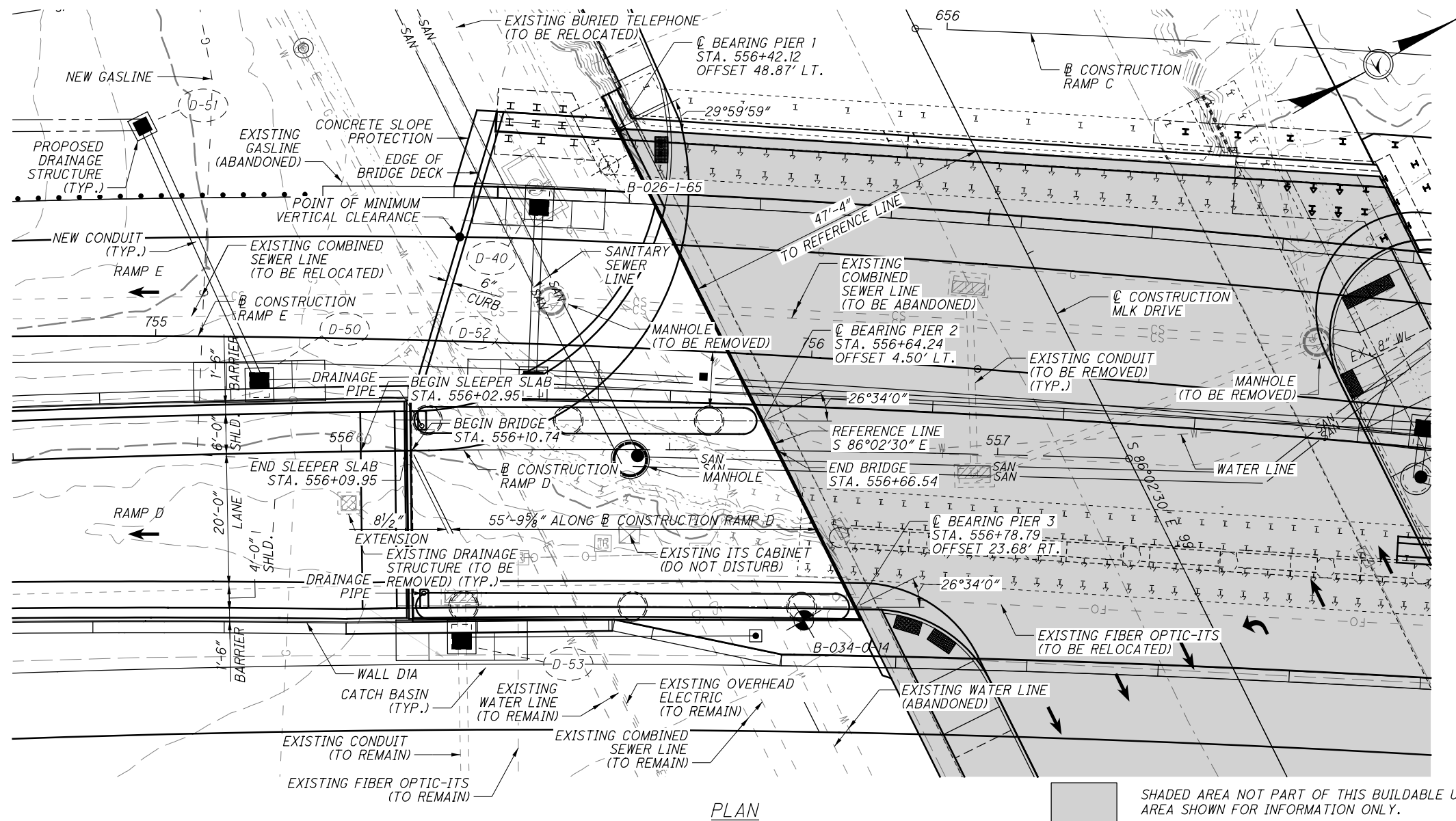
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SOLDIER PILE WALL DETAILS
WALL C3A DETAILS

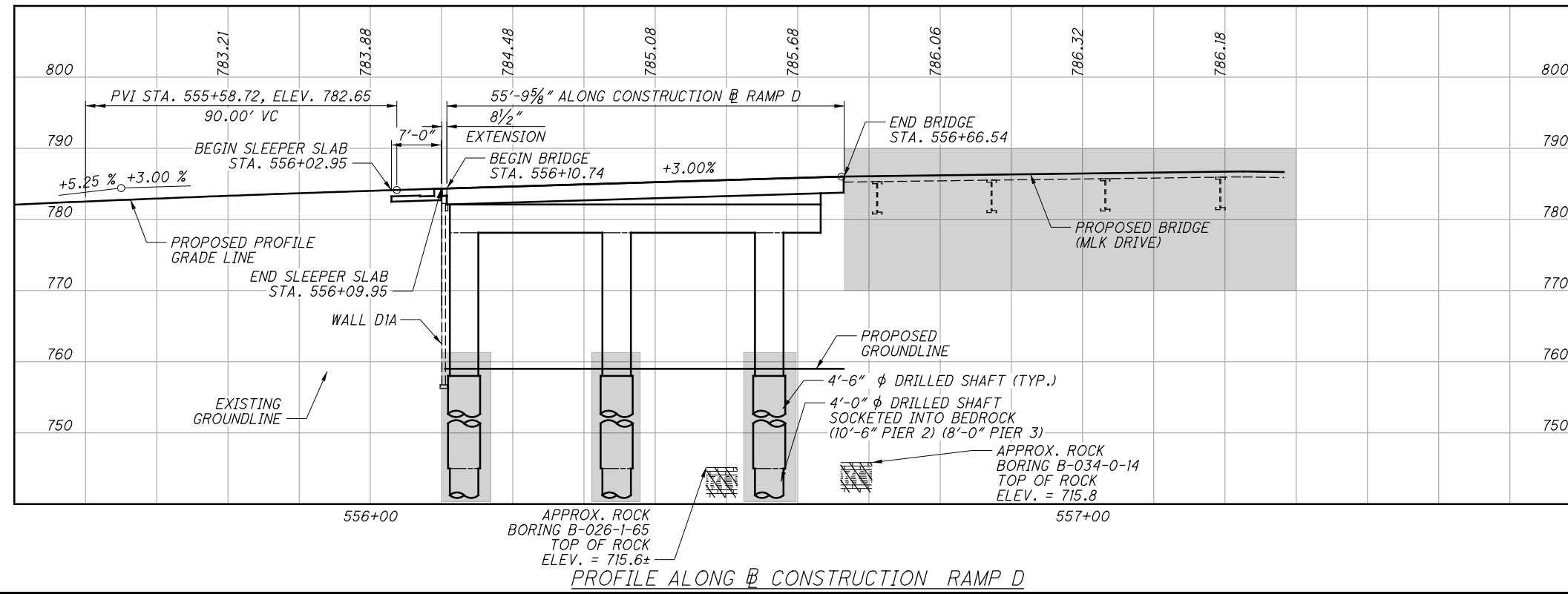
DESIGN AGENCY
HDR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DESIGNED	JML	CHECKED	JPC
DRAWN	JML	REVISED	
REVIEWED	CHN	DATE	10/23/14

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PLAN



PROFILE ALONG B CONSTRUCTION RAMP D

BENCHMARK DATA

BM #1 STA. 255+77.52 ELEV. 767.86, OFFSET 165.15' LT.

SEE ROADWAY PLANS FOR ADDITIONAL BENCHMARK INFORMATION.

RAMP D CURVE DATA NO. 34

P.I. Sta. 554+12.73
 $\Delta = 14^\circ 48' 58''$ (RT)
 $D_c = 2^\circ 23' 50''$
 $R = 2,390.00'$
 $T = 310.75'$
 $L = 618.03'$
 $E = 20.12'$

NOTES

- EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
- FOR LIMITS OF PROPOSED CONCRETE SLOPE PROTECTION SEE PLAN SET BU 3.

DESIGN TRAFFIC (RAMP D):

2019 ADT = 11550 2019 ADTT = 578
2039 ADT = 12620 2039 ADTT = 631
DIRECTIONAL DISTRIBUTION = 1.00

LEGEND

- BORING LOCATION
- HISTORICAL BORING LOCATION
- 16'-6" REQUIRED MINIMUM VERTICAL CLEARANCE
- 21'-2" ACTUAL MINIMUM VERTICAL CLEARANCE
- 5'-8" REQUIRED MINIMUM HORIZONTAL CLEARANCE
- 8'-2" ACTUAL MINIMUM HORIZONTAL CLEARANCE

PROPOSED STRUCTURE

TYPE: CONTINUOUS REINFORCED CONCRETE SLAB BRIDGE ON WALL AND CAP AND COLUMN REINFORCED CONCRETE PIERS ON PILE AND SHAFT FOUNDATIONS.

SPANS: 49'-8 1/4", 31'-8 1/4" C/C BEARINGS ALONG REFERENCE LINE

ROADWAY: VARIES

LOADING: HL-93, 60 PSF (FWS)

SKREW: VARIES

WEARING SURFACE: 1" MONOLITHIC CONCRETE

APPROACH SLABS: 30'-0" LONG, REAR

ALIGNMENT: TANGENT TO REFERENCE LINE

CROWN: 0.0255 FT/FT ALONG B CONSTRUCTION RAMP D

COORDINATES: LATITUDE N39°08'05"
LONGITUDE N84°29'38"

BORING	STATION	OFFSET
B-034-0-14	556+70.82	25.81' RT.
B-026-I-65	556+40.72	43.29' LT

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

DESIGN AGENCY
HBR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1700

DATE
10/24/14

REVIEWED
CHN

DRAWN
MJS

DESIGNED
KRJ

HAMILTON COUNTY
STA. 556+10.74
STA. 556+66.54

BU 5 SITE PLAN
BRIDGE NO. HAM-71-038IW
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

1 / 16

105
120

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STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWINGS:

EXJ-4-87 DATED (REVISED) 07-19-02
SBR-1-13 DATED 07-19-13

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

SS800 DATED 01-17-14

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 6TH EDITION, INCLUDING THE 2013 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL, 2007.

SPECIAL DESIGN SPECIFICATIONS

THIS BRIDGE REQUIRED THE USE OF A THREE DIMENSIONAL MODEL USING THE FINITE ELEMENT DESIGN METHOD TO ANALYZE THE STRUCTURE. THE COMPUTER PROGRAM USED FOR STRUCTURAL ANALYSIS WAS LARSA 4D. THE BRIDGE COMPONENTS DESIGNED BY THIS METHOD WERE THE CONTINUOUS FLAT SLAB AND FIXED INTERIOR PIER 2.

LRFD LOAD MODIFIERS

REDUNDANCY: THE DRILLED SHAFTS SUPPORTING PIERS 2 AND 3 WERE CONSIDERED NON-REDUNDANT FOR DESIGN AND INCLUDE A MODIFIED RESISTANCE FACTORE EQUAL TO 0.80 IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, ARTICLE 10.5.5.2-4.

OPERATIONAL IMPORTANCE: A LOAD MODIFIER OF 1.00 HAS BEEN ASSUMED FOR THE DESIGN OF THIS STRUCTURE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, ARTICLE 1.3.5 AND THE ODOT BRIDGE DESIGN MANUAL, 2007.

SEISMIC DESIGN

SEISMIC DESIGN PERFORMED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE SPECIFCATIONS AND THE ODOT BRIDGE DESIGN MANUAL, 2007, SECTION 1000.

DESIGN LOADING

DESIGN LOADING: HL-93

FUTURE WEARING SURFACE (FWS) OF 60 LBS/FT².

DESIGN DATA

CONCRETE QC2 WITH QC/QA - COMPRESSIVE STRENGTH 4.5 KSI (SUPERSTRUCTURE)

CONCRETE QC1 WITH QC/QA - COMPRESSIVE STRENGTH 4.0 KSI (SUBSTRUCTURE)

CONCRETE QC2 WITH QC/QA - COMPRESSIVE STRENGTH 4.5 KSI (DRILLED SHAFT)

REINFORCING STEEL - ASTM A615 OR A996, GRADE 60, MINIMUM YIELD STRENGTH 60 KSI

STEEL H-PILES - ASTM A572 - YIELD STRENGTH 50 KSI

DECK PROTECTION METHOD

EPOXY COATED REINFORCING STEEL

2½" CONCRETE COVER

MONOLITHIC WEARING SURFACE

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 1 INCH THICK.

EXISTING STRUCTURE VERIFICATION (HAM-71-0381)

DETAILS AND DIMENSIONS SHOWN ON THESE PLANS PERTAINING TO THE EXISTING STRUCTURE HAVE BEEN OBTAINED FROM PLANS OF THE EXISTING STRUCTURE OR FROM FIELD OBSERVATIONS AND MEASUREMENTS. CONSEQUENTLY, THEY ARE INDICATIVE OF THE EXISTING STRUCTURE AND THE PROPOSED WORK BUT THEY SHALL BE CONSIDERED TENTATIVE AND APPROXIMATE. THE DBT IS REFERRED TO CMS SECTIONS 102.05, 105.02 AND 513.04.

ITEM 511, CLASS QC2 CONCRETE, SUPERSTRUCTURE, AS PER PLAN

WATER/CEMENT RATIO = 0.40 MAXIMUM; MICRO-SILICA ADMIXTURE (7% BY WEIGHT OF CEMENT); 2 LBS/CU YD POLYPROPYLENE FIBERS (3/4" MIN.) SHALL BE ADDED TO THE MIX.

MIX SHALL INCLUDE A MIGRATING CORROSION INHIBITOR AS MANUFACTURED BY AN APPROVED SUPPLIER LISTED ON ODOT'S QUALIFIED APPROVED SUPPLIERS, ITEM 515.15.

THE FIBERS SHALL BE INCORPORATED INTO THE MIX IN SUCH A WAY THAT NO 'BALLING' OCCURS. UPON INSPECTION OF THE MIX AT THE TIME OF PLACEMENT, IF 'BALLING' OCCURS DURING ANY TIME OF THE POUR, THE REMAINDER OF THE LOAD SHALL BE REJECTED.

THE BATCH WEIGHTS SHALL BE CORRECTED TO COMPENSATE FOR THE MOISTURE CONTAINED IN THE AGGREGATE AT THE TIME OF USE. A CHEMICAL ADMIXTURE (705.12, TYPE A OR D) SHALL BE USED. THE TRANSIT MIXER CHARGE SHALL BE LIMITED TO ¾ OF ITS RATED CAPACITY OR 6 CUBIC YARDS, WHICHEVER IS SMALLER, UNLESS A LARGER SIZE IS APPROVED BY THE ENGINEER.

ITEM 512, SEALING OF CONCRETE SURFACES, AS PER PLAN, (PERMANENT GRAFFITI PROTECTION)

APPLY A PERMANENT GRAFFITI COATING QUALIFIED ACCORDING TO SUPPLEMENT 1083 THAT IS COMPATIBLE WITH THE CONCRETE SEALER OVER WHICH IT IS APPLIED. APPLY THE GRAFFITI COATING IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS. THIS SHALL BE APPLIED TO PIER 1, FROM THE GROUND SURFACE TO THE FULL HEIGHT ABOVE THE GROUND SURFACE. THE COST OF ALL WORK ASSOCIATED SHALL BE INCLUDED IN THE LUMP SUM PRICE PAY ITEM FOR BRIDGE NO. HAM-71-0381W.

ITEM 516, STRUCTURAL EXPANSION JOINTS INCLUDING ELASTOMERIC STRIP SEAL, AS PER PLAN

INSTALL NEOPRENE TROUGH UNDER EXPANSION JOINT AT INTERFACE WITH MLK BRIDGE AS SHOWN IN THE PLANS. SECURE NEOPRENE SHEETING TO THE CONCRETE WITH 1¼"X #10 GAGE (LENGTH X SHANK DIAMETER) GALVANIZED BUTTON HEAD SPIKES THROUGH A 1" DIAMETER, #10 GAGE GALVANIZED WASHER. MAXIMUM FASTENER SPACING IS 6 INCHES.

THE NEOPRENE SHEETING SHALL BE 3/32" MIN. THICKNESS GENERAL PURPOSE, HEAVY DUTY NEOPRENE WITH NYLON REINFORCEMENT. THE NEOPRENE SHEETING SHALL CONFORM TO THE FOLLOWING:

THICKNESS, INCHES: 0.094 MIN. (ASTM D751)

BREAKING STRENGTH: 700 LBS. X 700 LBS. EACH WAY

(ASTM D751) ADHSESIVE STRIP: 9 LBS. MIN., 1"X 2" STRIP

(ASTM D751) BURST STRENGTH: 1400 PSI MIN. (ASTM D751)

HEAT AGING: NO CRACKING OF COATING AT 70 HR, 212F DEG. WITH 180 DEG. BEND (ASTM D2136)

LOW TEMPERATURE BRITTLINESS: NO CRACKING OF COATING AT 1 HR, -40F DEG. BEND AROUND ¼" MANDREL (ASTM D2136)

DBT TO PROVIDE DETAILED SHOP DRAWINGS FOR CONNECTION OF NEOPRENE TROUGH TO STEEL DOWNSPOUT. CONNECTION SHALL INCLUDE A COMPLETE SEAL AT THE DOWNSPOUT TROUGH CONNECTION. VULCANIZATION IS REQUIRED, AS OPPOSED TO ADHESIVE SEALING. PROPRIETARY DRAINAGE TROUGH SYSTEMS MAY BE SUBSTITUTED AS APPROVED BY ODOT ENGINEER.

COSTS FOR FURNISHING AND INSTALLING THE NEOPRENE TROUGH SHALL BE INLCUED IN THE LUMP SUM PRICE PAY ITEM FOR BRIDGE NO. HAM-71-0381W.

STANDARD ABBREVIATIONS:

BRG. - BEARING
C/C - CENTER TO CENTER
C.J. - CONSTRUCTION JOINT
CPP - CORRUGATED PLASTIC PIPE
CLR. - CLEAR
DIA. - DIAMETER
E.F. - EACH FACE
ELEV. - ELEVATION
EQ. - EQUAL
EXIST. - EXISTING
EXP. - EXPANSION
F.A. - FORWARD ABUTMENT

F.F. - FRONT FACE
FIN. - FINISHED
MIN. - MINIMUM
OPT. - OPTIONAL
O/O - OUT TO OUT
PEJF - PREFORMED EXPANSION JOINT FILLER
R.A. - REAR ABUTMENT
R.F. - REAR FACE
SHLD. - SHOULDER
SPA. - SPACING/SPACES
T&B - TOP AND BOTTOM
TYP. - TYPICAL

0	12/19/14	RFC SUBMITTAL BU 5
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NO.	DATE	DESCRIPTION
ISSUE RECORD		

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BU 5 GENERAL NOTES
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

2 / 16

106
120

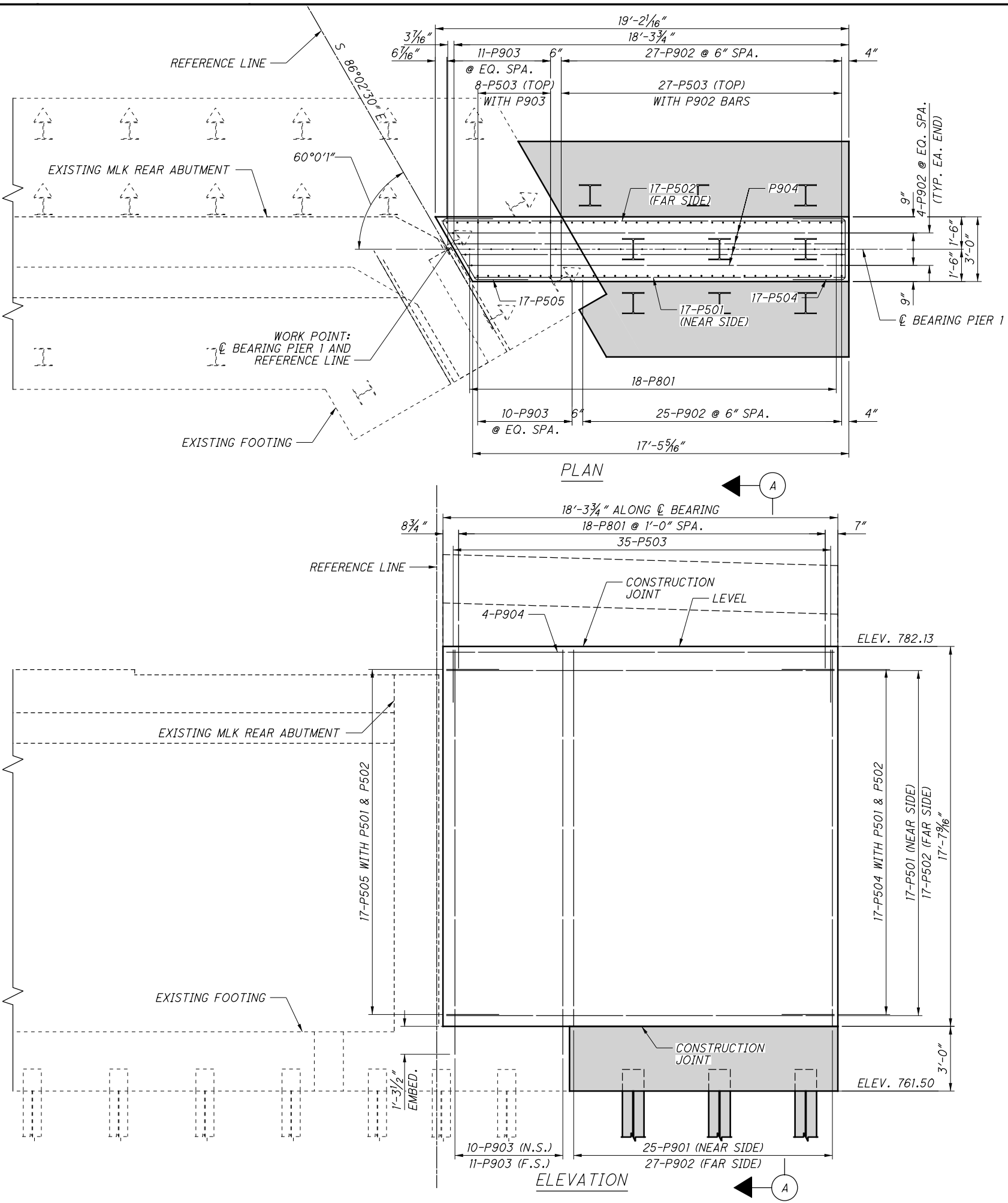
DESIGN AGENCY
HBR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-1500

HBR

DATE
10/24/14
REVIEWED
CHN
STRUCTURE FILE NUMBER
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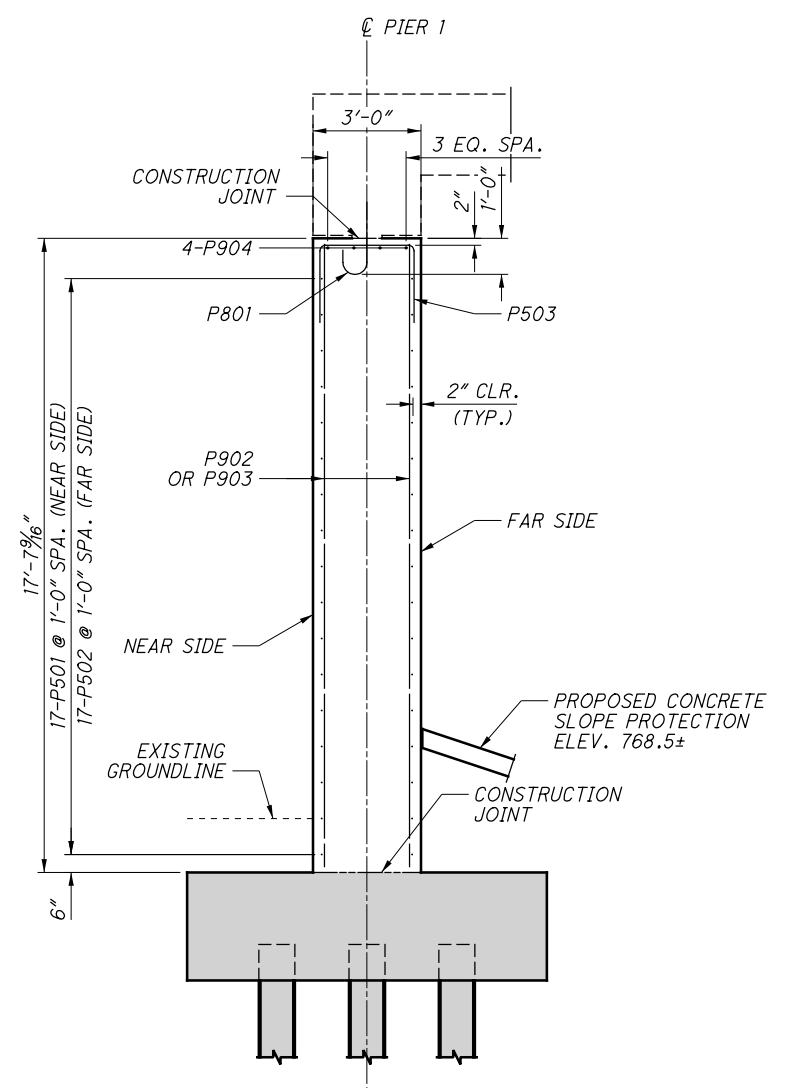


LEGEND

- = EXISTING 10BP42 PILE
- = EXISTING 10BP42 PILE BATTERED (1 HORIZ. :3 VERTICAL EXISTING ABUTMENT)

NOTES:

- ALL NEW EXPOSED CONCRETE SURFACES ABOVE GROUND, EXCEPT FOR THE TOP OF THE PIER CAP, SHALL BE SEALED WITH A CLEAR NON-EPOXY SEALER. ALSO, ITEM 512 SEALING OF CONCRETE SURFACES, AS PER PLAN, (PERMANENT GRAFFITI PROTECTION) SHALL BE APPLIED. SEE [2/16].
 - P903 BARS SHALL BE DRILLED AND GROUTED TO A DEPTH OF 1'-3 1/2" OR PER THE MANUFACTURER'S INSTRUCTIONS. FURNISH NONSHRINK, NONMETALLIC GROUT, 705.20.
 - FOR DECK DETAILS AND REINFORCING SEE [8/16], [10/16], [11/16] AND [13/16].
- SHADED AREA NOT PART OF THIS BUILDABLE UNIT. AREA SHOWN FOR INFORMATION ONLY.



SECTION A-A

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

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DESIGN AGENCY
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9987 CARVER ROAD, SUITE 200
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513-984-1500

PIER 1 DETAILS
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

3 / 16

107
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DESIGNED
KRJ

CHECKED
CAA

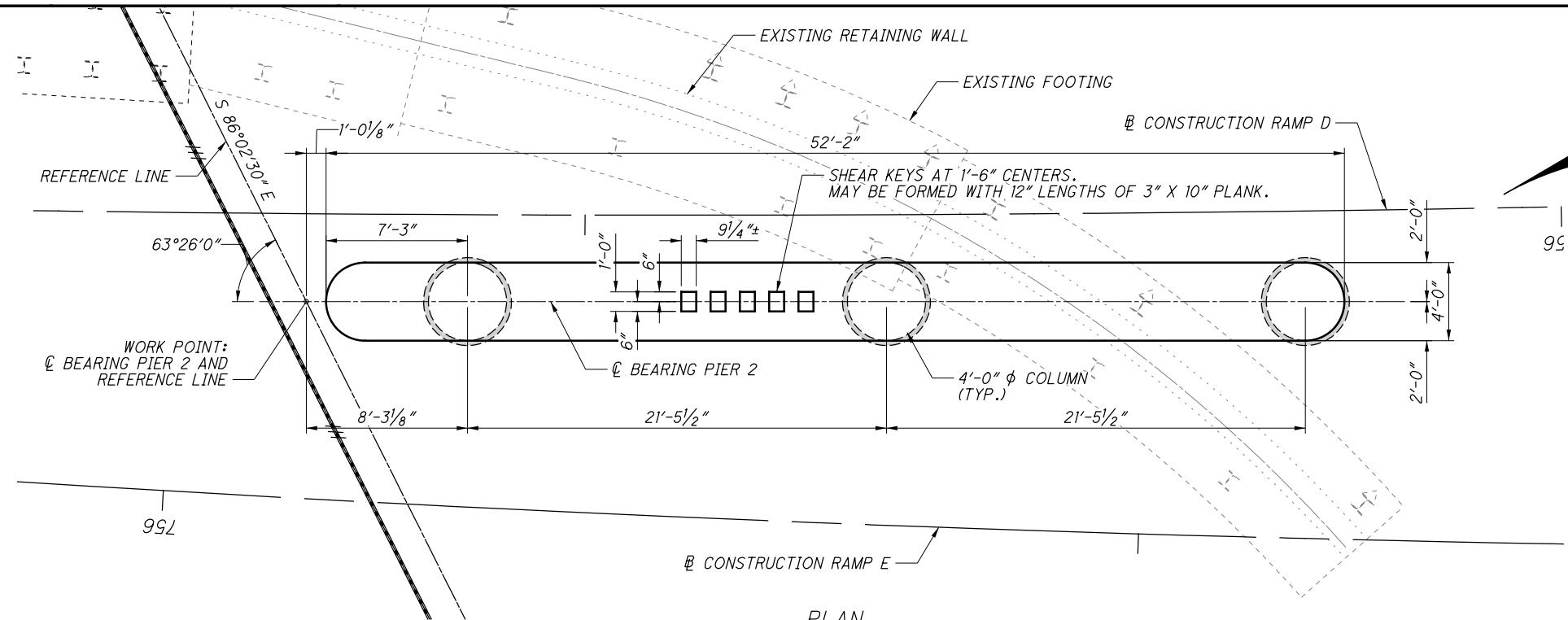
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DATE
10/24/14

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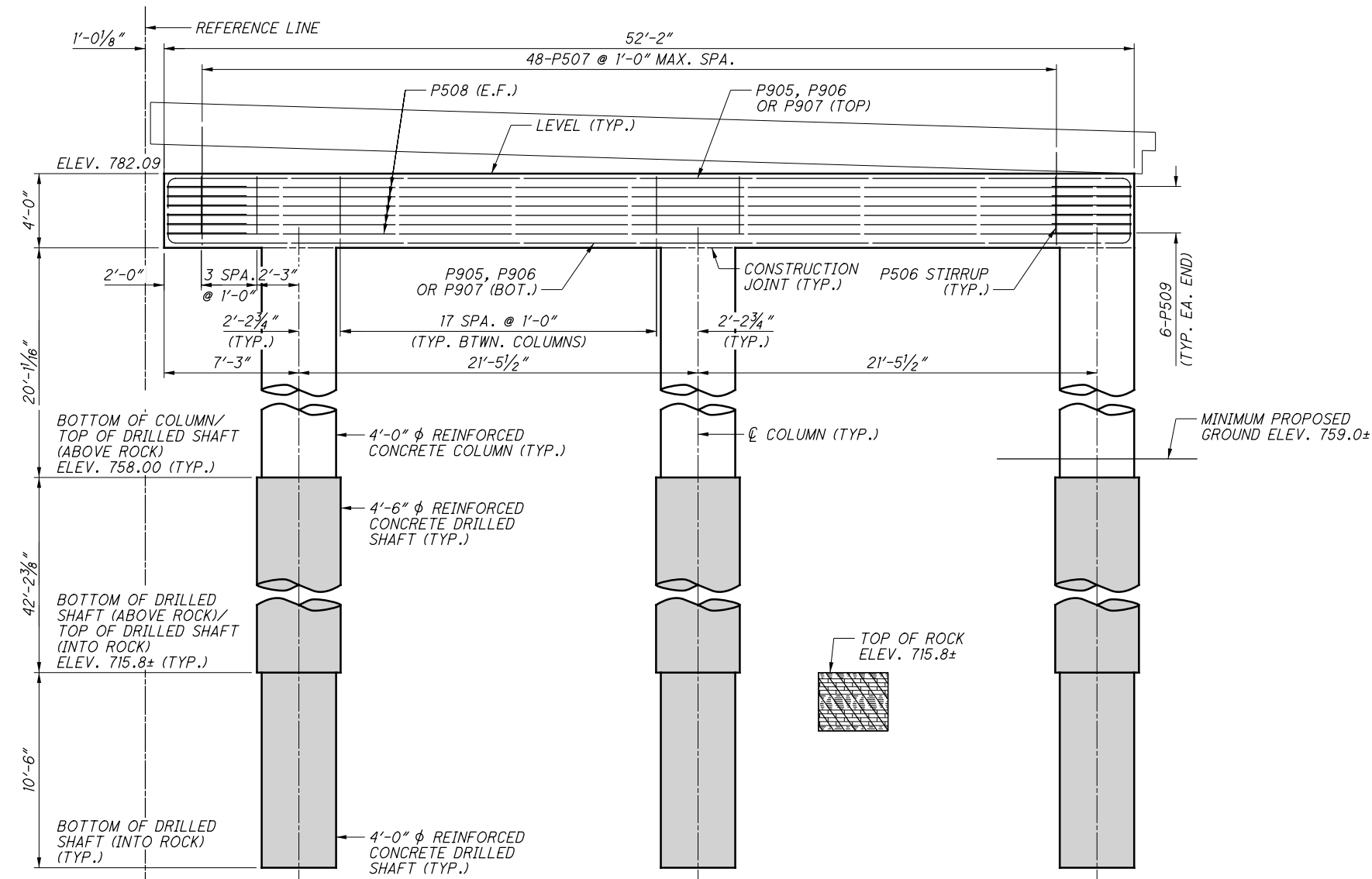
LEGEND

- = EXISTING 10BP42 PILE
- = EXISTING 10BP42 PILE BATTERED
(1 HORIZ. : 3 VERTICAL EXISTING ABUTMENT)

NOTES:

- ALL NEW EXPOSED CONCRETE SURFACES ABOVE GROUND, EXCEPT FOR THE TOP OF THE PIER CAP, SHALL BE SEALED WITH A CLEAR NON-EPOXY SEALER.
- FOR DECK DETAILS AND REINFORCING SEE 8/16, 10/16, 11/16 AND 13/16.

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PIER 2 DETAILS - 1
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

4 / 16

108
120

NO.	DATE	DESCRIPTION
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A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-964-7500

DATE
10/24/14

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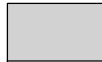
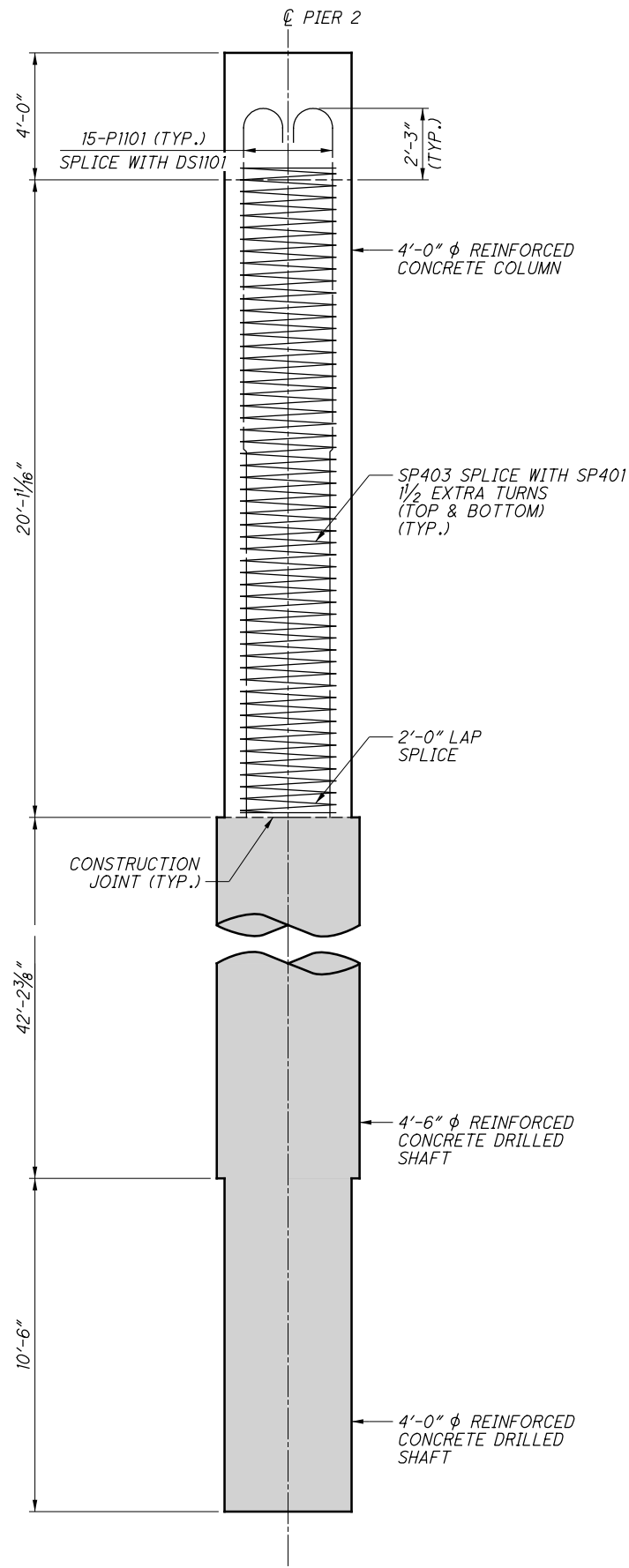
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DESIGNED
KRJ

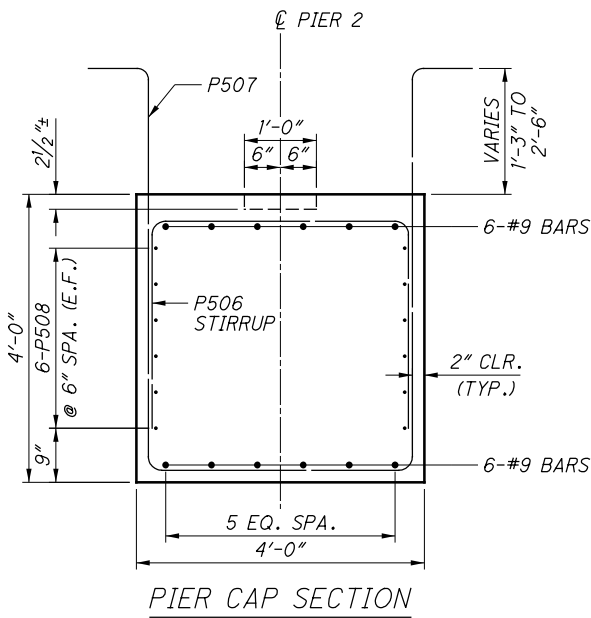
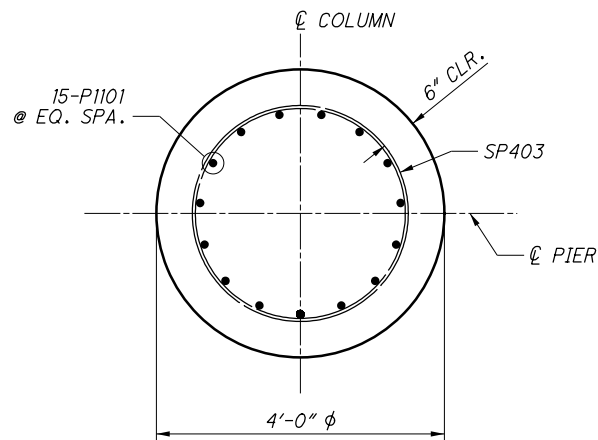
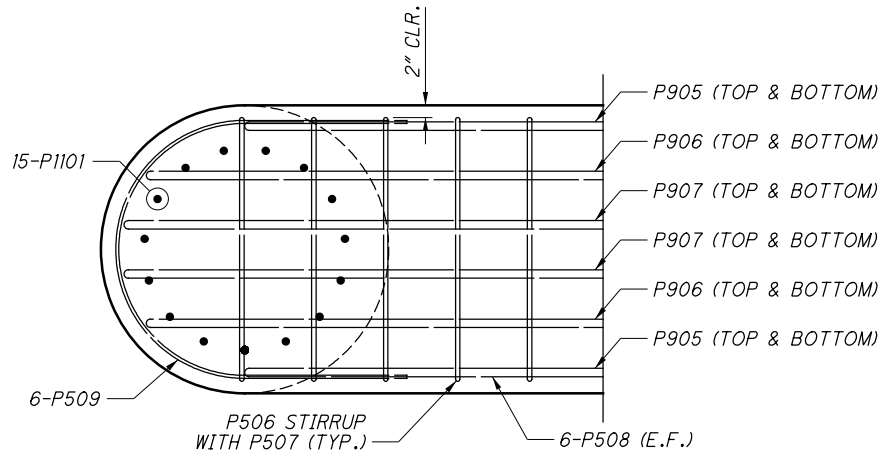
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SHADED AREA NOT PART OF THIS BUILDABLE UNIT.
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NOTE:
1. FOR DECK/PIER INTERFACE DETAILS SEE 13/16.

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

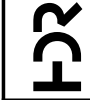
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BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

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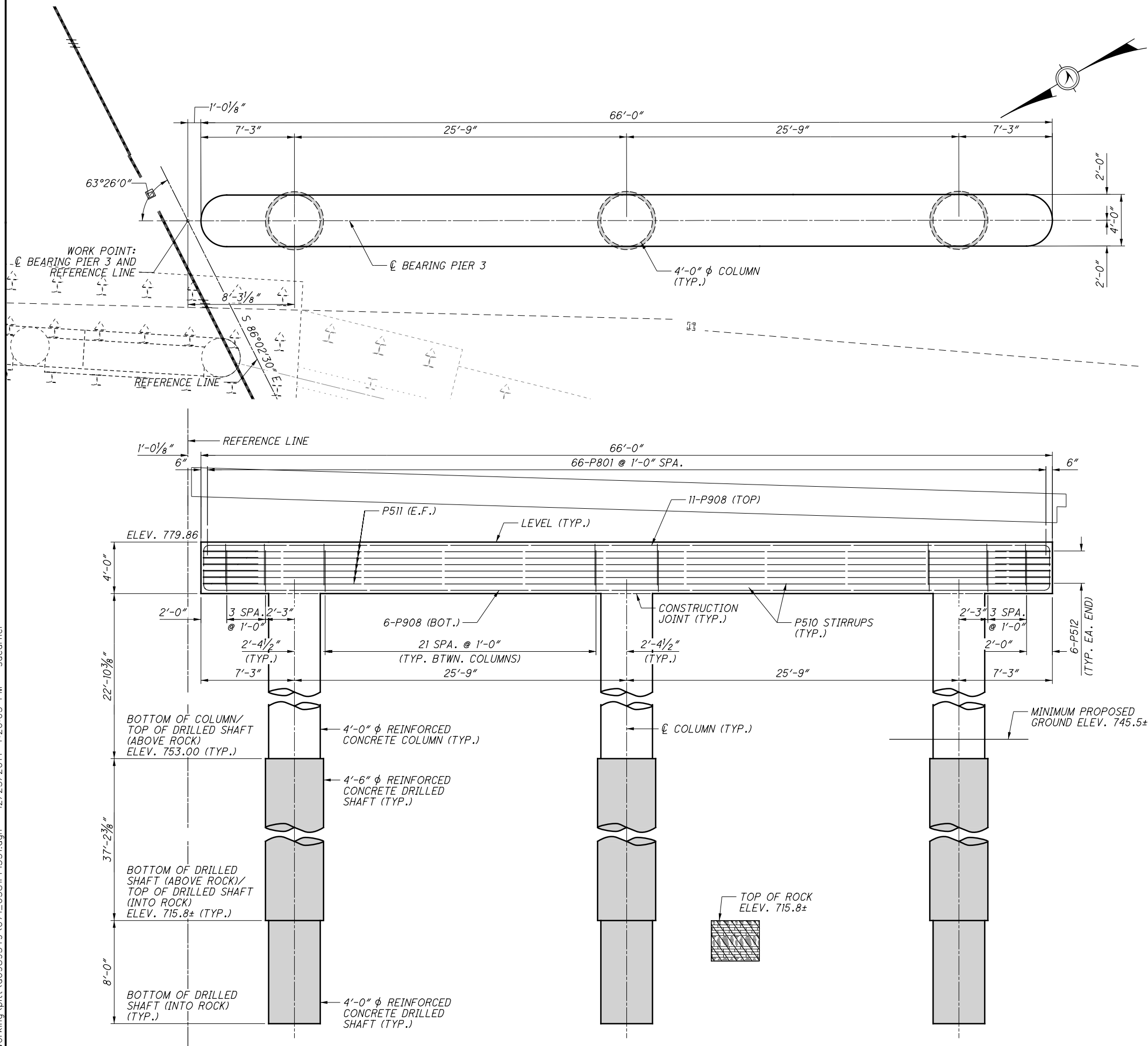
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10/24/14
STRUCTURE FILE NUMBER
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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500





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LEGEND

-  = EXISTING 10BP42 PILE
-  = EXISTING 10BP42 PILE BATTERED
(1 HORIZ. : 3 VERTICAL EXISTING ABUTMENT)

NOTES:

- ALL NEW EXPOSED CONCRETE SURFACES ABOVE GROUND, EXCEPT FOR THE TOP OF THE PIER CAP, SHALL BE SEALED WITH A CLEAR NON-EPOXY SEALER.
- FOR DECK DETAILS AND REINFORCING SEE 8/16, 10/16, 11/16 AND 13/16.

SHADED AREA NOT PART OF THIS BUILDABLE UNIT.
AREA SHOWN FOR INFORMATION ONLY.

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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

HR

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PIER 3 DETAILS - 1
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

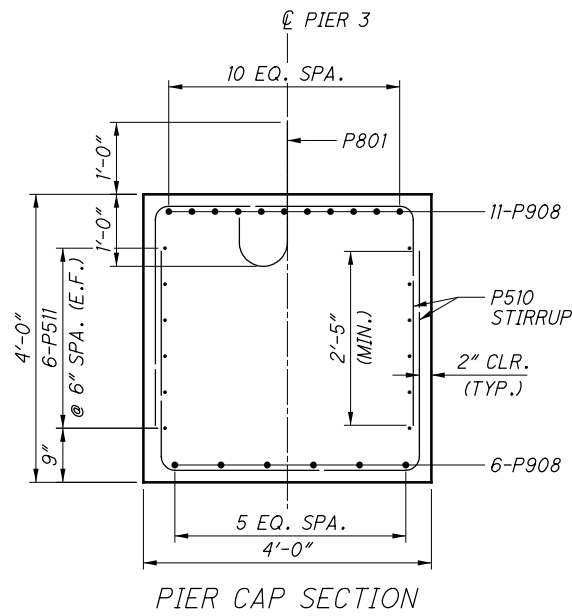
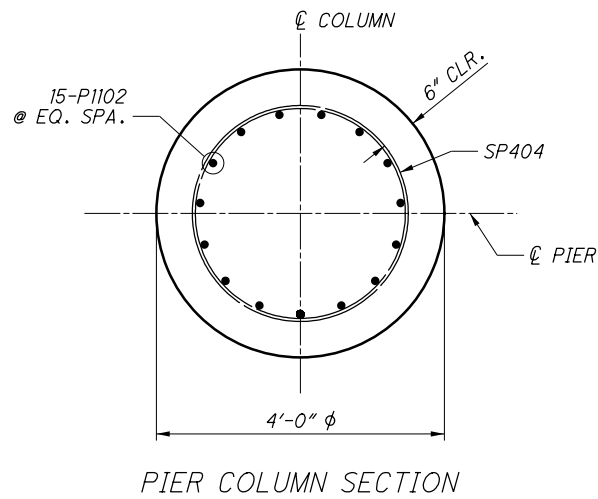
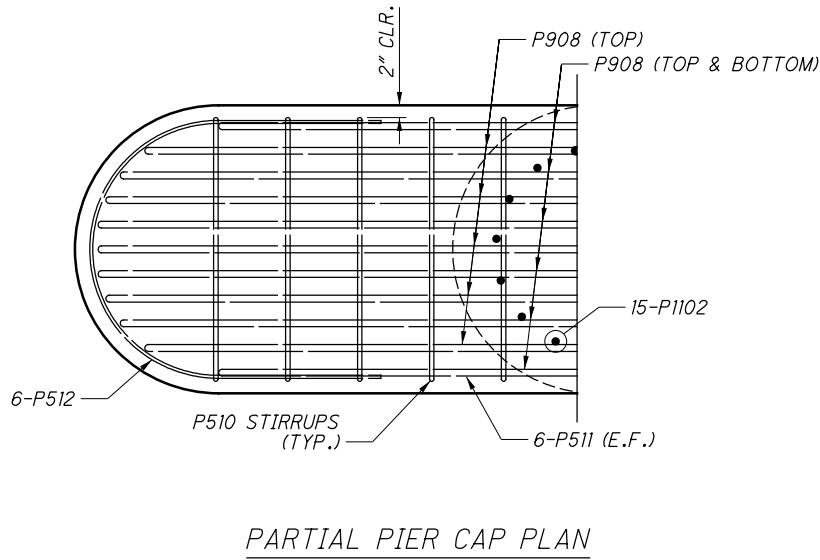
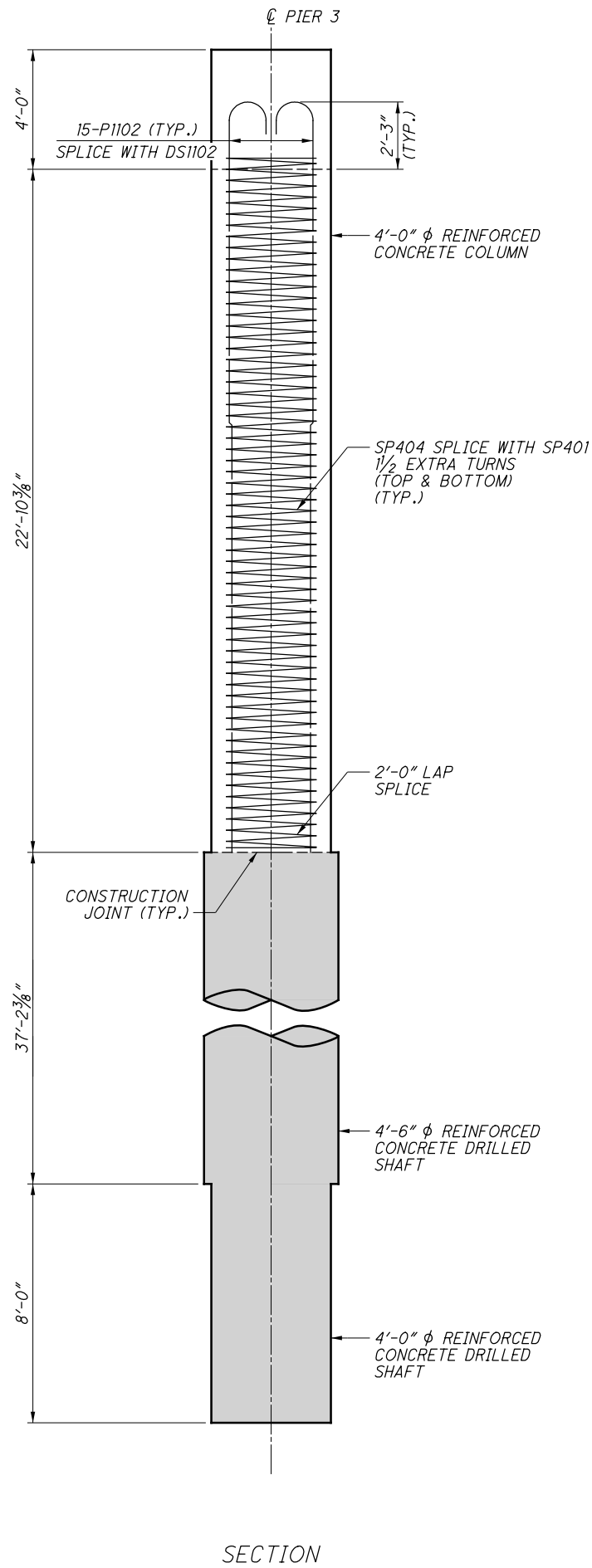
HAM-71-3.81
PID No. 77628

6 / 16

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NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

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NOTES:
1. FOR DECK/PIER INTERFACE DETAILS SEE 13/16.

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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HAM-71-3.81
PID No. 77628

PIER 3 DETAILS - 2
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

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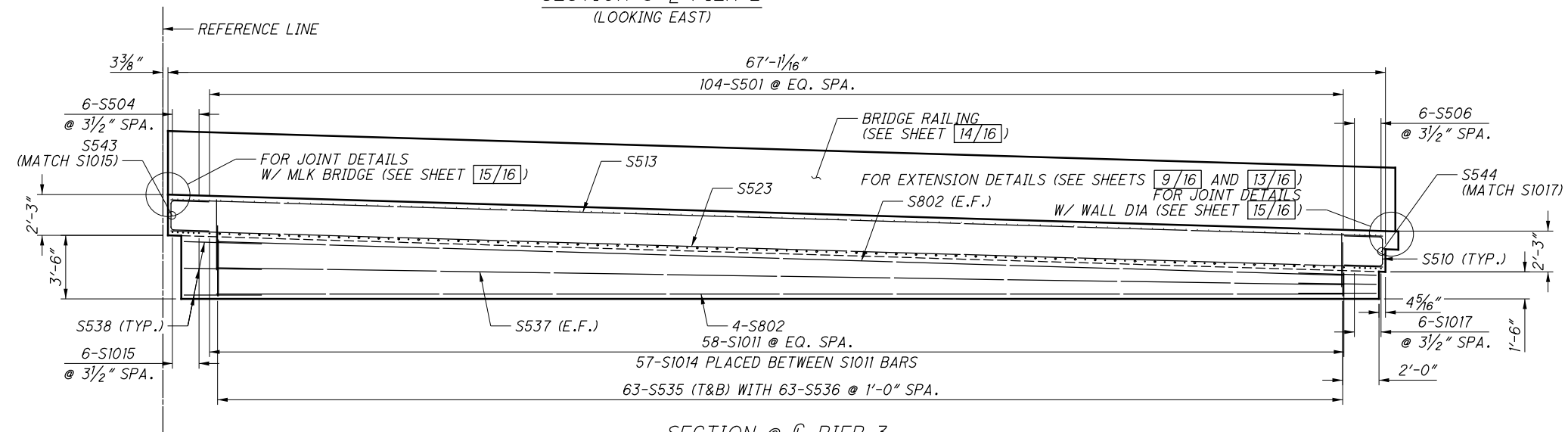
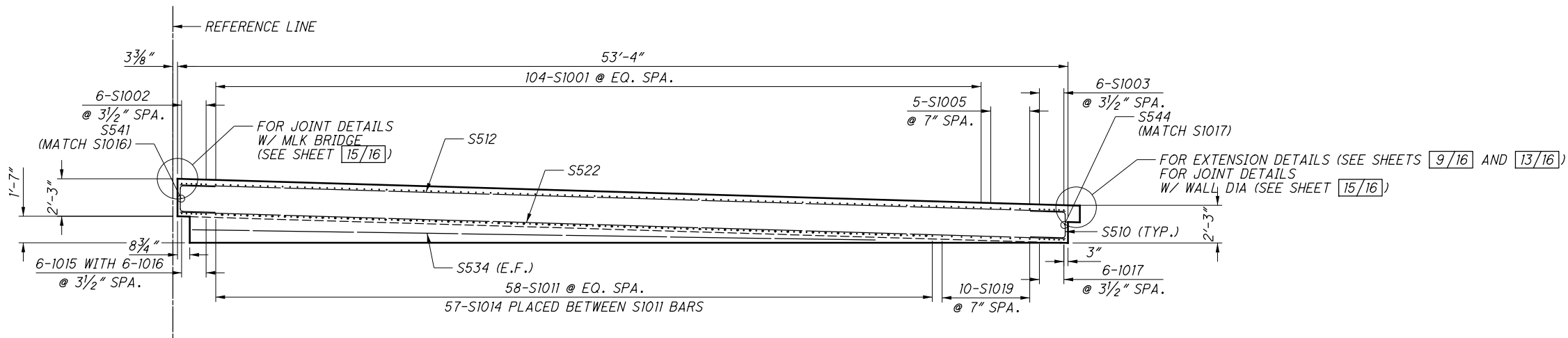
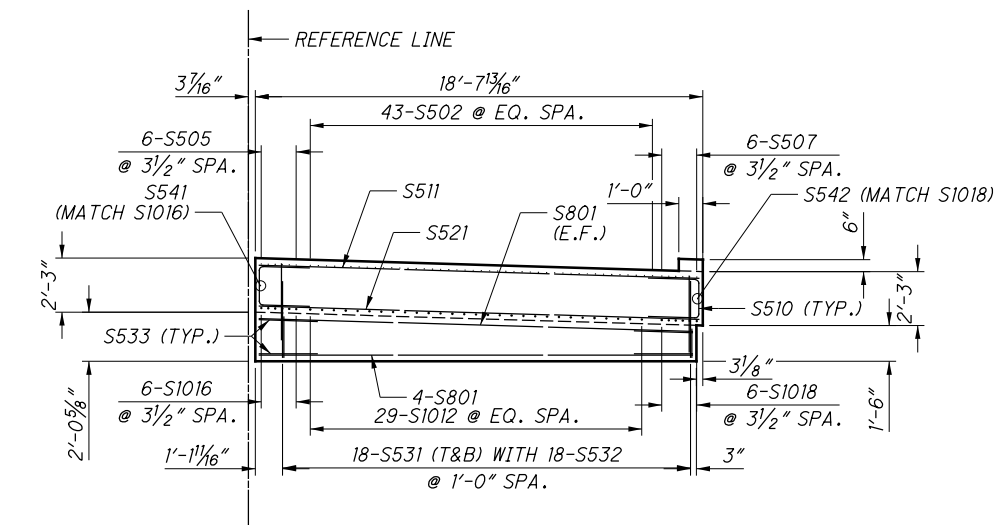
DESIGN AGENCY
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9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
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DATE
10/24/14

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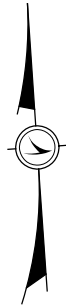
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NO.	DATE	DESCRIPTION
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B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
ISSUE RECORD		

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DESIGN AGENCY HDR ENGINEERING, INC. 9987 CARVER ROAD, SUITE 200 CINCINNATI, OHIO 45242 513-984-7500	
DESIGNED KRJ	REVIEWED CHN
DRAWN MJS	DATE 10/24/14
CHECKED CAA	STRUCTURE FILE NUMBER 3110000
TRANSVERSE SECTION BRIDGE NO. HAM-71-0381W RAMP D OVER RAMP E	
HAM-71-3.81 PID No. 77628	
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DECK PLAN

BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

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DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

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CHN	10/24/14

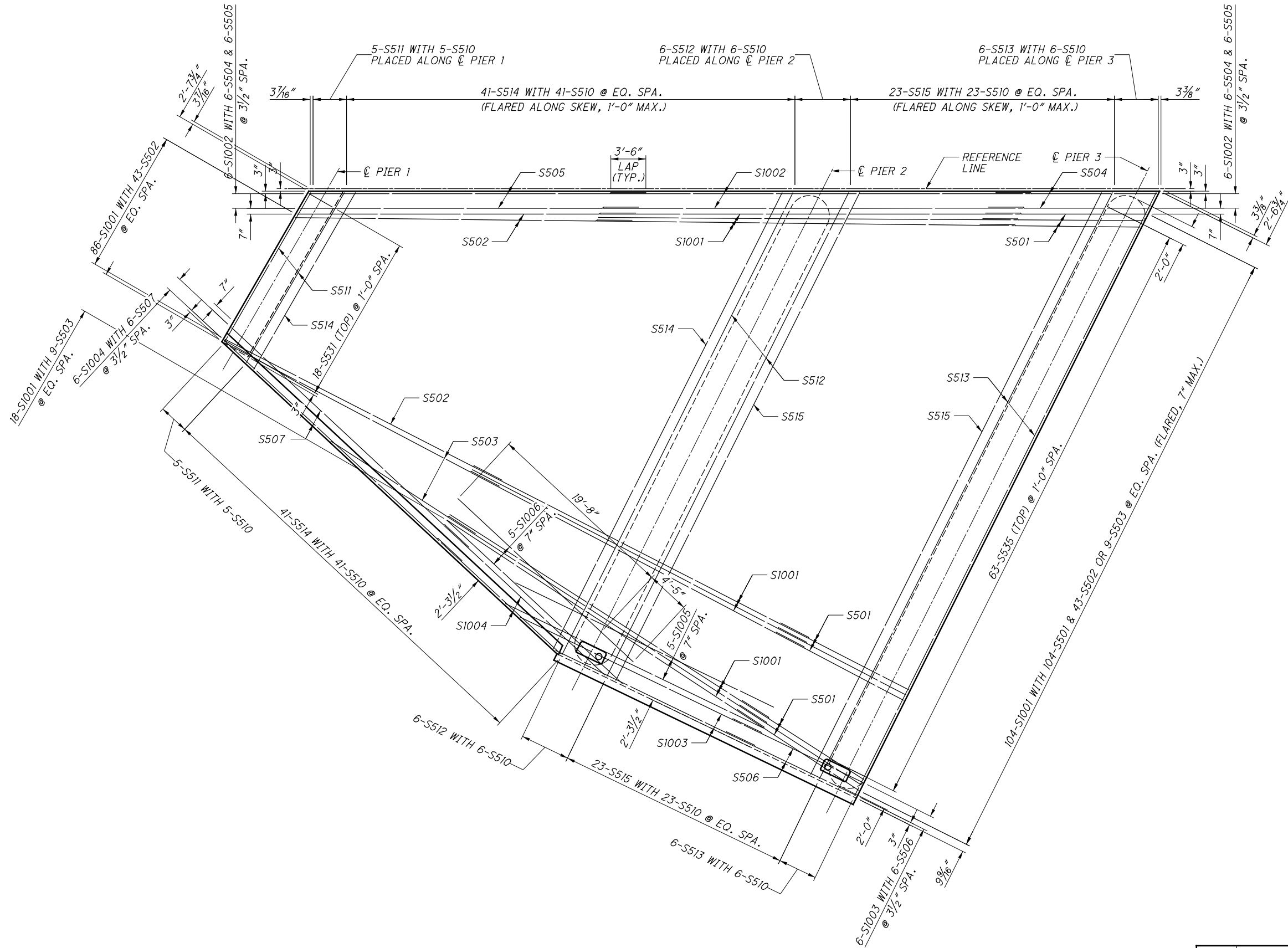
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3110000

DESIGNED KRJ	DRAWN MJS
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2. FOR DRAINAGE DETAILS AND SECTIONS SEE SHEET 16/16.

O	12/19/14	RFC SUBMITTAL BU 5
B	10/28/14	FINAL SUBMITTAL BU 5
A	9/15/14	INTERIM SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

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TOP OF DECK PLAN

NOTES:

1. FOR DECK DIMENSIONS SEE 9/16.
2. BRIDGE RAILING NOT SHOWN FOR CLARITY. FOR BRIDGE RAILING REINFORCING LAYOUT SEE 14/16.
3. FOR BOTTOM OF DECK REINFORCING LAYOUT SEE 11/16.
4. CUT BARS AS NECESSARY TO AVOID CONFLICT WITH DECK DRAINAGE. FOR DECK DRAINAGE DETAILS AND REINFORCING SEE 16/16.

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

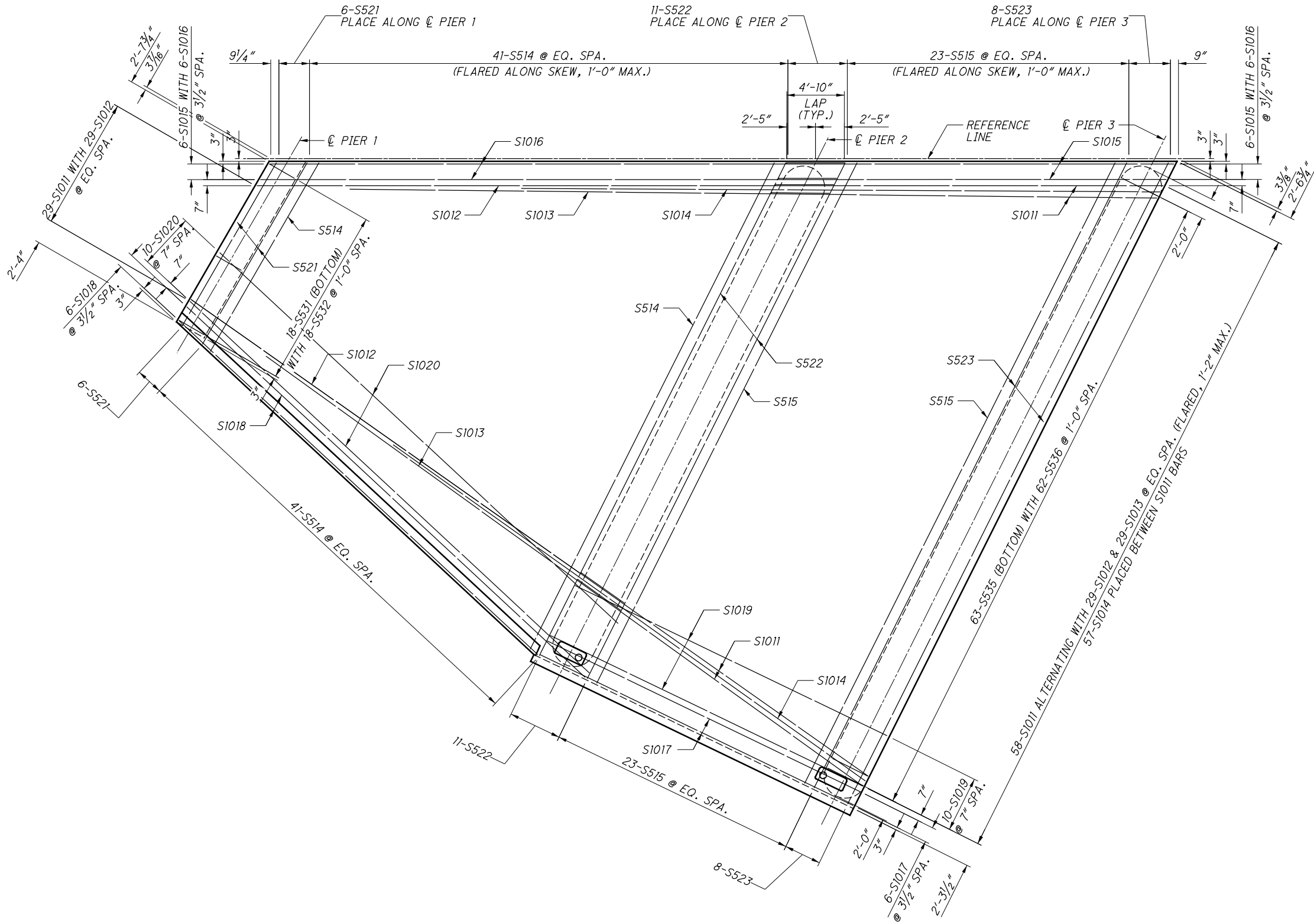
DECK PLAN - 2
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

DESIGNED	DRAWN	REVIEWED	DATE
KRJ	MJS	CHN	10/24/14
CHECKED	REVISED	STRUCTURE FILE NUMBER	
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DESIGN AGENCY
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CINCINNATI, OHIO 45242
513-984-7500



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NOTES:

1. FOR DECK DIMENSIONS SEE [9/16].
2. BRIDGE RAILING NOT SHOWN FOR CLARITY. FOR BRIDGE RAILING REINFORCING LAYOUT SEE [14/16].
3. FOR TOP OF DECK REINFORCING LAYOUT SEE [10/16].
4. CUT BARS AS NECESSARY TO AVOID CONFLICT WITH DECK DRAINAGE. FOR DECK DRAINAGE DETAILS AND REINFORCING SEE [16/16].

BOTTOM OF DECK PLAN

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

HAM-71-3.81
PID No. 77628

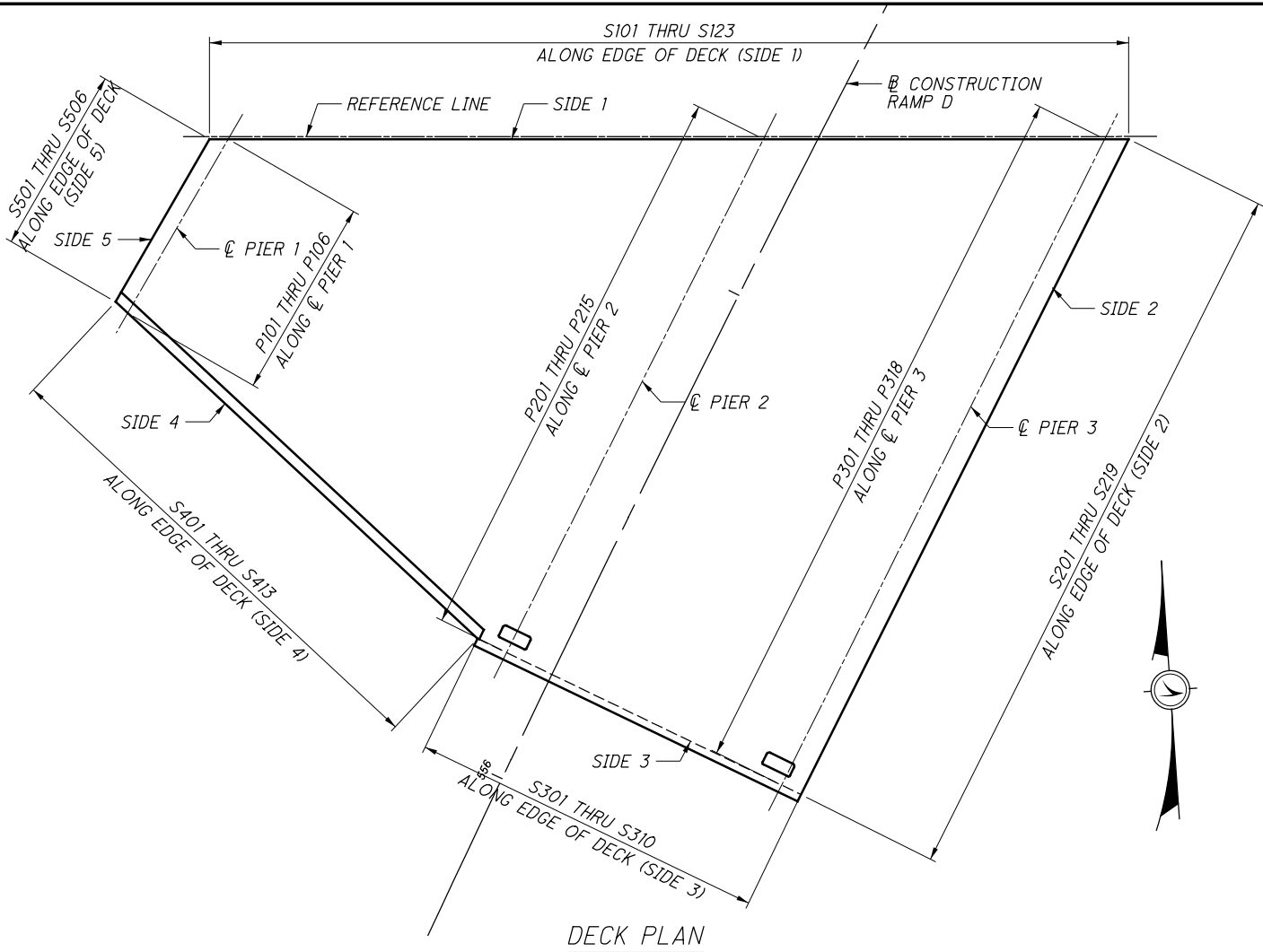
DECK PLAN - 3
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

DESIGNED	DRAWN	REVIEWED	DATE
KRJ	MJS	CHN	10/24/14
CHECKED	REVISED	STRUCTURE FILE NUMBER	
CAA		310000	

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500



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SIDE 1			
POINT	STATION	OFFSET	ELEVATION
S101	556+41.08	-50.44	786.44
S102	556+42.25	-48.04	786.42
S103	556+44.00	-44.46	786.38
S104	556+45.76	-40.88	786.34
S105	556+47.52	-37.30	786.30
S106	556+49.29	-33.73	786.26
S107	556+51.06	-30.16	786.22
S108	556+52.84	-26.58	786.18
S109	556+54.63	-23.01	786.14
S110	556+56.41	-19.44	786.10
S111	556+58.21	-15.87	786.06
S112	556+60.01	-12.31	786.02
S113	556+61.81	-8.74	785.98
S114	556+63.62	-5.18	785.94
S115	556+65.44	-1.61	785.90
S116	556+67.26	1.95	785.86
S117	556+69.08	5.51	785.82
S118	556+70.92	9.07	785.78
S119	556+72.75	12.63	785.74
S120	556+74.60	16.18	785.70
S121	556+76.44	19.74	785.66
S122	556+78.30	23.29	785.62
S123	556+79.54	25.67	785.59

SIDE 2			
POINT	STATION	OFFSET	ELEVATION
S201	556+10.74	25.67	783.55
S202	556+12.79	25.70	783.61
S203	556+16.84	25.75	783.73
S204	556+20.88	25.79	783.85
S205	556+24.92	25.83	783.97
S206	556+28.97	25.86	784.09
S207	556+33.01	25.88	784.21
S208	556+37.05	25.90	784.33
S209	556+41.10	25.91	784.45
S210	556+45.14	25.91	784.57
S211	556+49.18	25.91	784.69
S212	556+53.23	25.90	784.81
S213	556+57.27	25.88	784.93
S214	556+61.32	25.86	785.05
S215	556+65.36	25.83	785.17
S216	556+69.40	25.79	785.29
S217	556+73.45	25.75	785.41
S218	556+77.49	25.70	785.53
S219	556+79.54	25.67	785.59

SIDE 3			
POINT	STATION	OFFSET	ELEVATION
S301	556+10.74	-7.67	784.40
S302	556+10.74	-5.00	784.33
S303	556+10.74	-1.00	784.23
S304	556+10.74	3.00	784.13
S305	556+10.74	7.00	784.03
S306	556+10.74	11.00	783.93
S307	556+10.74	15.00	783.82
S308	556+10.74	19.00	783.72
S309	556+10.74	23.00	783.62
S310	556+10.74	25.67	783.55

SIDE 4			
POINT	STATION	OFFSET	ELEVATION
S401	556+24.04	-51.57	785.92
S402	556+23.20	-48.74	785.82
S403	556+22.05	-44.91	785.69
S404	556+20.91	-41.09	785.56
S405	556+19.76	-37.26	785.43
S406	556+18.61	-33.44	785.29
S407	556+17.45	-29.61	785.16
S408	556+16.29	-25.79	785.03
S409	556+15.12	-21.96	784.90
S410	556+13.96	-18.14	784.77
S411	556+12.78	-14.32	784.63
S412	556+11.61	-10.50	784.50
S413	556+10.74	-7.67	784.40

SIDE 5			
POINT	STATION	OFFSET	ELEVATION
S501	556+24.04	-51.57	785.92
S502	556+26.70	-51.39	786.00
S503	556+30.60	-51.12	786.12
S504	556+34.51	-50.86	786.24
S505	556+38.42	-50.61	786.36
S506	556+41.08	-50.44	786.44

PIER 1			
POINT	STATION	OFFSET	ELEVATION
P101	556+23.60	-50.10	785.87
P102	556+26.58	-49.87	785.97
P103	556+30.76	-49.61	786.09
P104	556+34.67	-49.35	786.21
P105	556+38.58	-49.09	786.33
P106	556+41.84	-48.89	786.43

PIER 2			
POINT	STATION	OFFSET	ELEVATION
P201	556+10.74	4.67	784.33
P202	556+13.40	4.64	784.41
P203	556+17.39	4.59	784.53
P204	556+21.38	4.54	784.65
P205	556+25.37	4.51	784.77
P206	556+29.37	4.48	784.89
P207	556+33.36	4.45	785.01
P208	556+37.35	4.44	785.13
P209	556+41.34	4.43	785.25
P210	556+45.34	4.43	785.37
P211	556+49.33	4.43	785.49
P212	556+53.32	4.44	785.61
P213	556+57.31	4.46	785.73
P214	556+61.31	4.48	785.85
P215	556+63.97	4.50	785.93

PIER 3			
POINT	STATION	OFFSET	ELEVATION
P301	556+10.74	23.67	783.60
P302	556+14.32	23.72	783.71
P303	556+18.36	23.77	783.83
P304	556+22.40	23.81	783.95
P305	556+26.44	23.84	784.07
P306	556+30.48	23.87	784.19
P307	556+34.52	23.89	784.31
P308	556+38.56	23.91	784.43
P309	556+42.60	23.91	784.55
P310	556+46.64	23.91	784.67
P311	556+50.68	23.91	784.79
P312	556+54.72	23.90	784.91
P313	556+58.76	23.88	785.03
P314	556+62.80	23.85	785.15
P315	556+66.84	23.82	785.27
P316	556+70.88	23.78	785.39
P317	556+74.92	23.73	785.51
P318	556+78.50	23.68	785.61

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/ 23/ 2014

FINAL TOP OF DECK ELEVATIONS
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

12 / 16

116
120

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/24/14

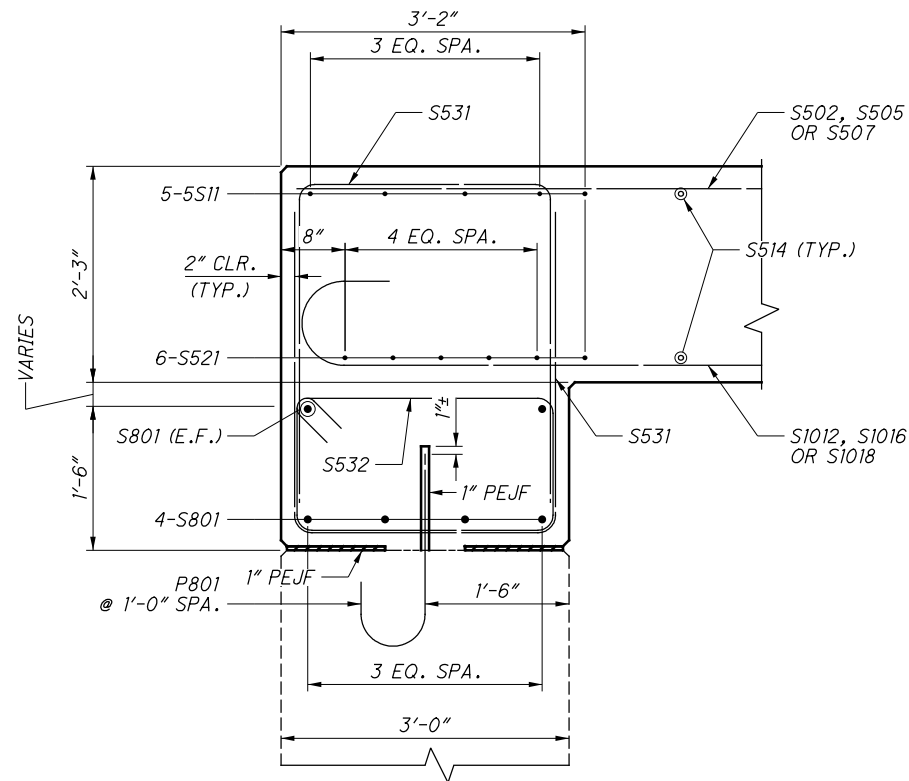
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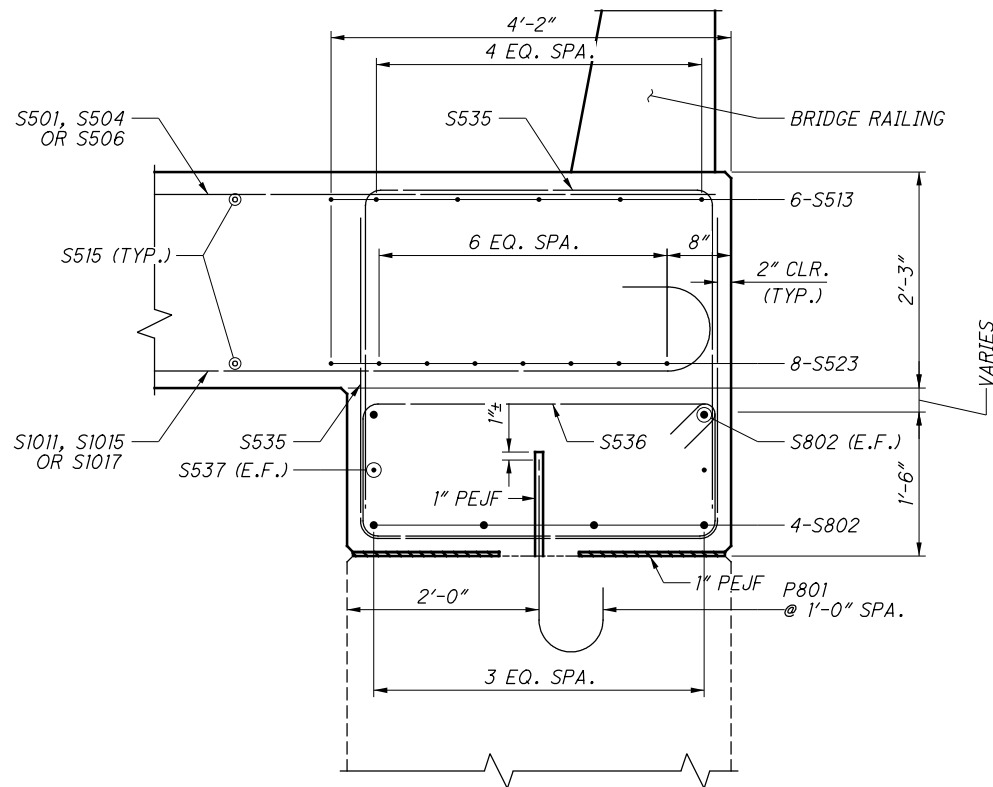
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STRUCTURE FILE NUMBER
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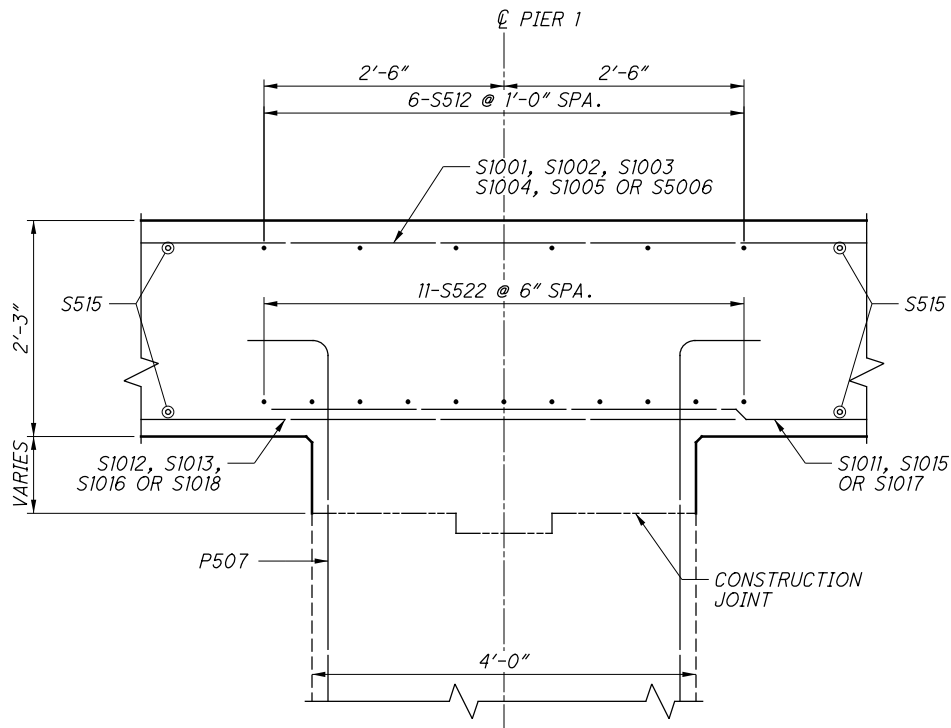
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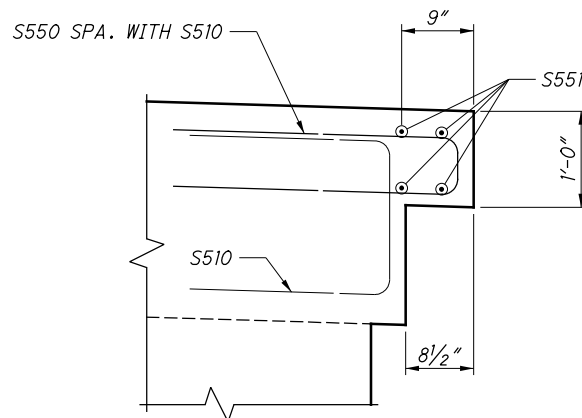
SECTION THRU CAP @ PIER 1



SECTION THRU CAP @ PIER 3



SECTION THRU CAP @ PIER 2



SECTION X-X
S510 BARS SHOWN, ADDITIONAL DECK REINFORCING NOT SHOWN FOR CLARITY.

RELEASED FOR CONSTRUCTION 12/23/2014

0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
NO.	DATE	DESCRIPTION
ISSUE RECORD		

HAM-71-3.81
PID No. 77628

DECK DETAILS
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

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REVIEWED
CHN
DATE
10/24/14

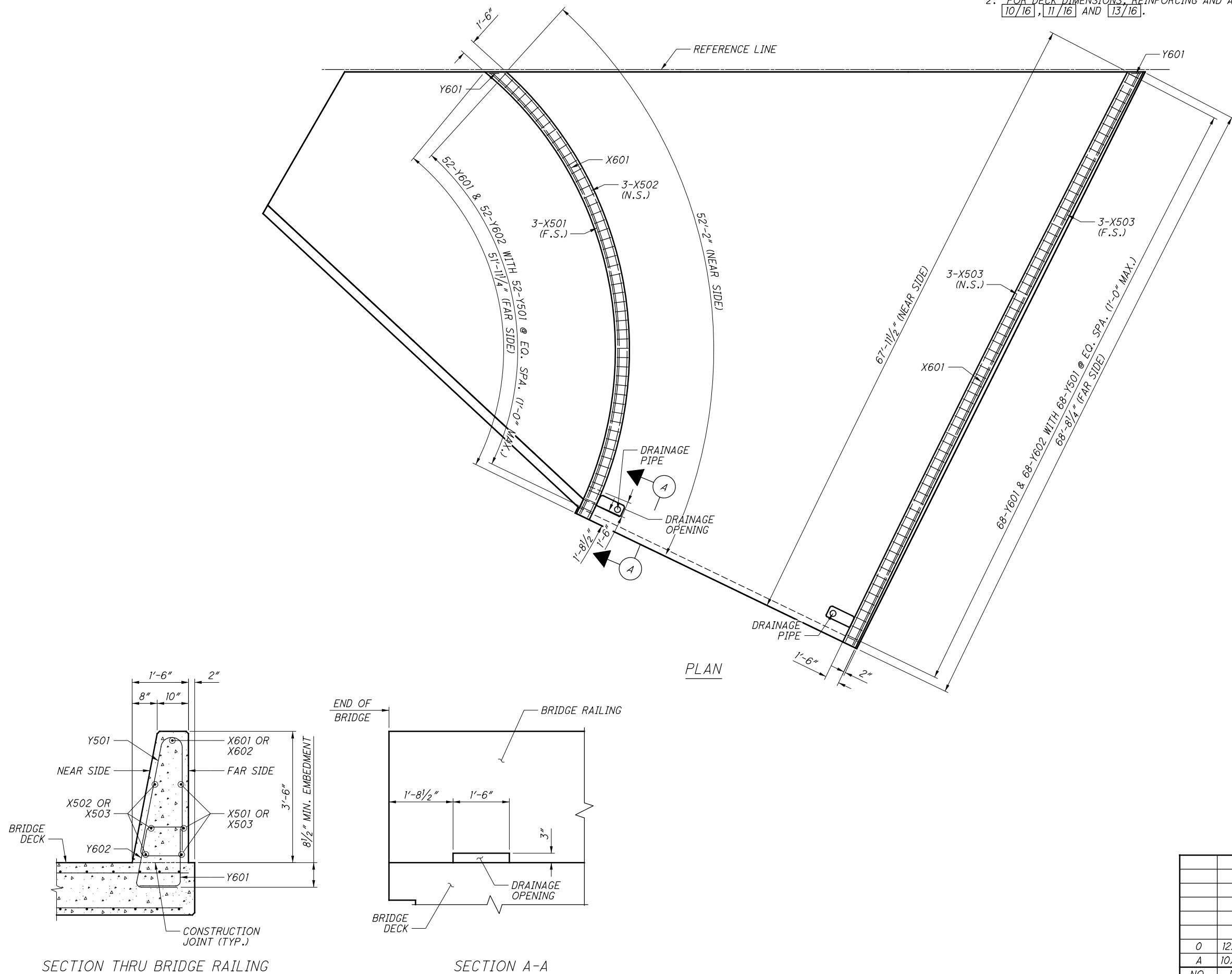
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DESIGN AGENCY
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CINCINNATI, OHIO 45242
513-984-7500

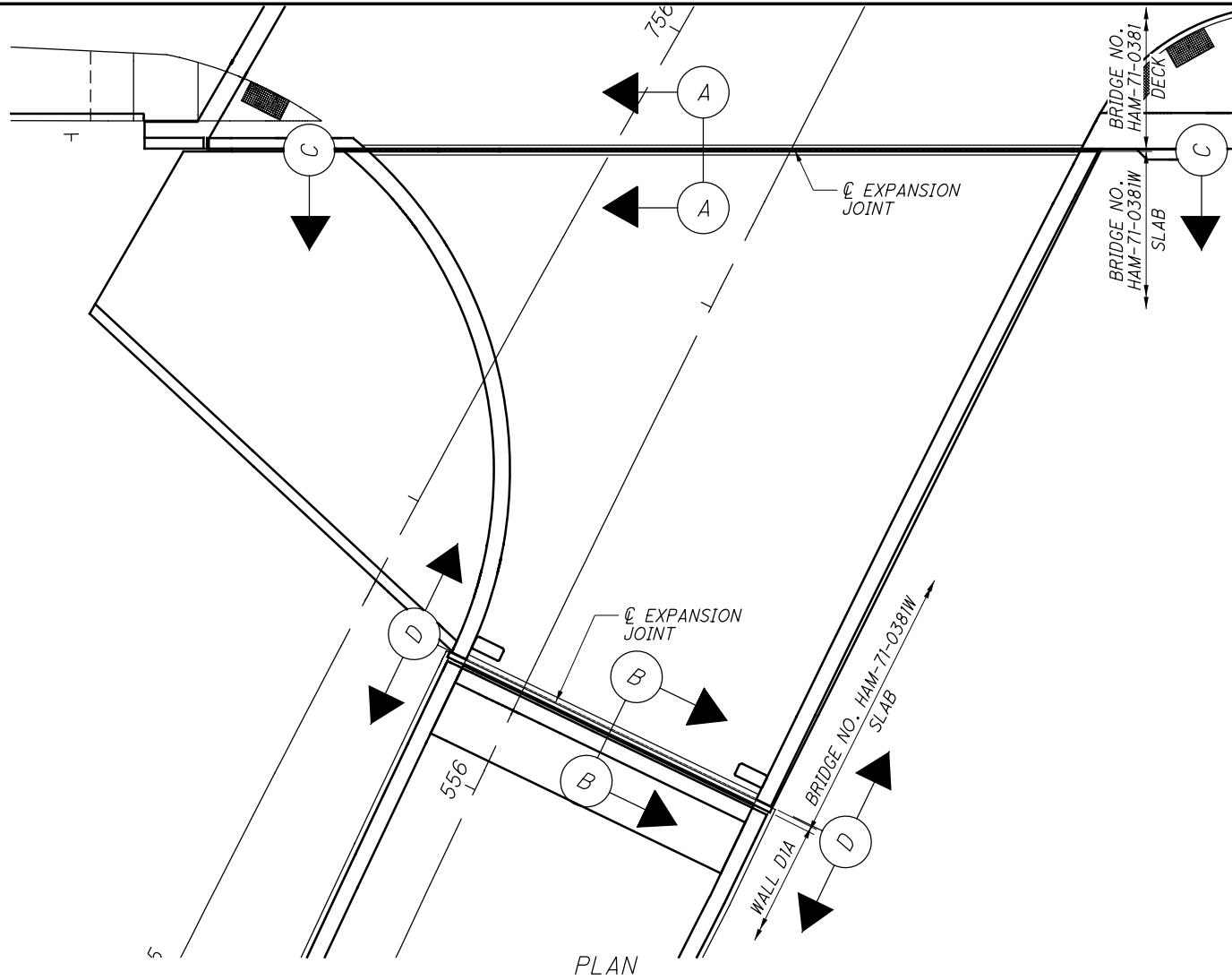
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13/16

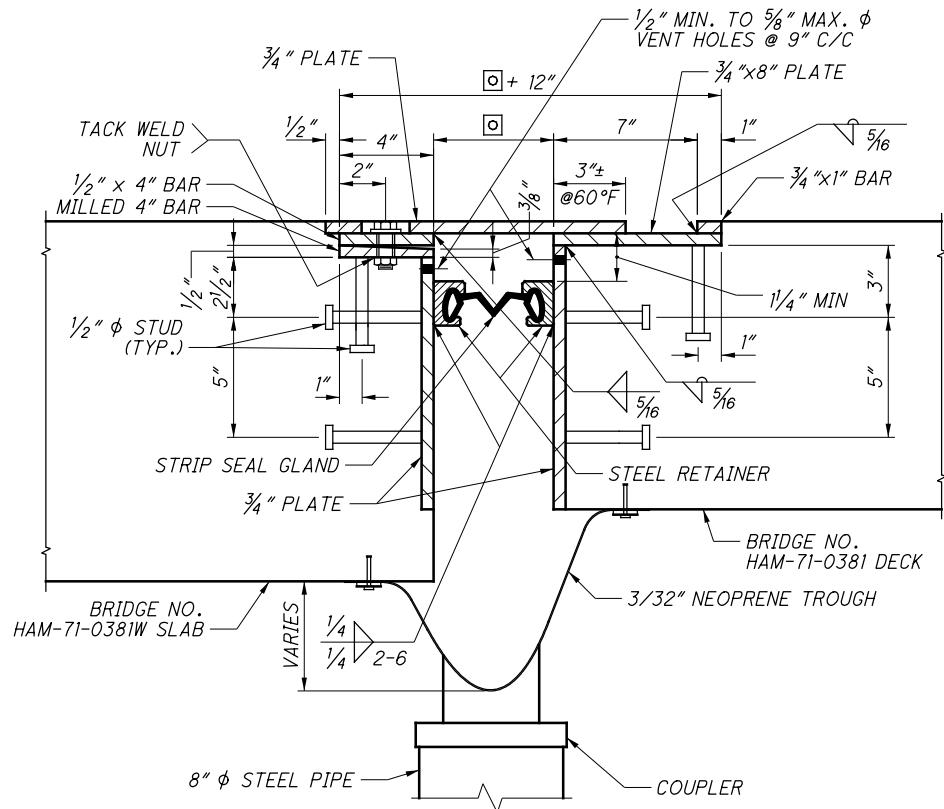
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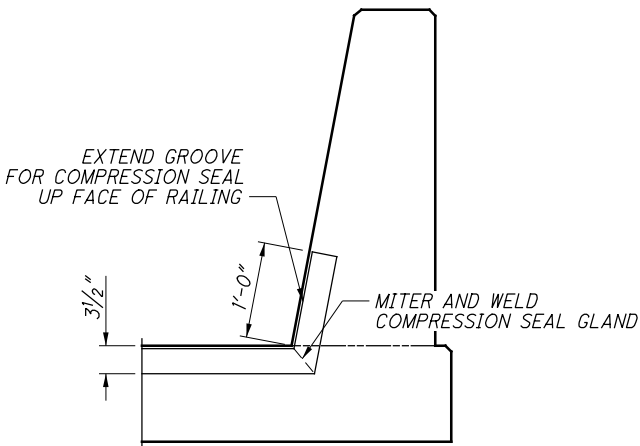
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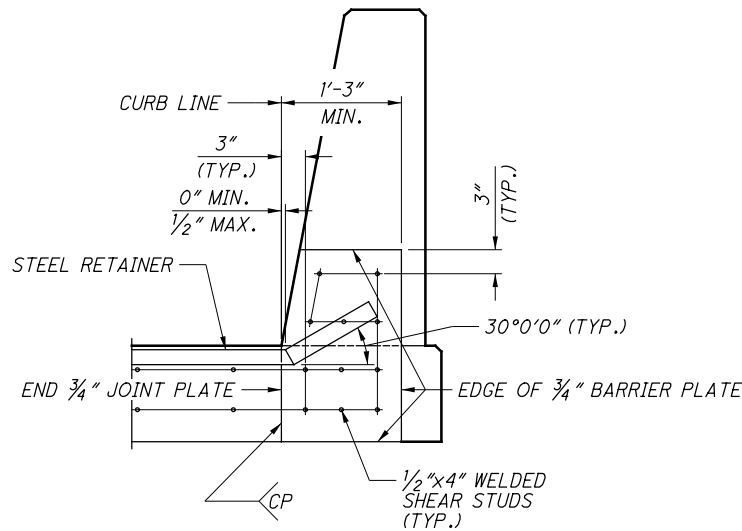
SECTION A-A
(NOT TO SCALE)

NOTES:

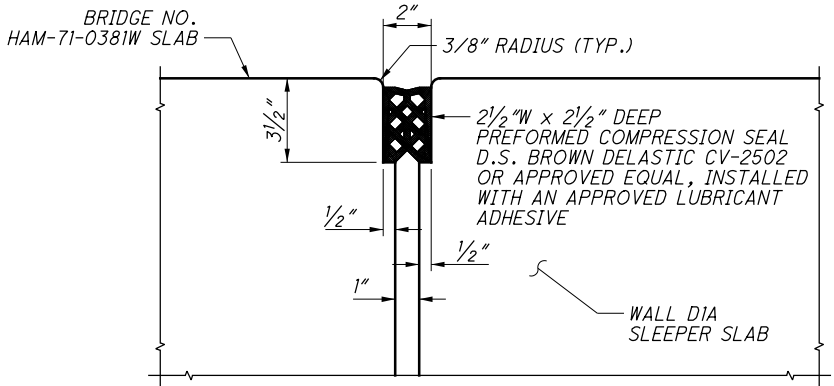
1. FOR ADDITIONAL DETAILS AND NOTES INCLUDING TURN-UP DETAIL AT BARRIER AND SIDEWALKS, REFER TO ODOT STANDARD DRAWING EXJ-4-87 SHEETS 1 THROUGH 5.
2. MINIMUM JOINT OPENING, DIMENSION "A", AT THE TIME OF SEAL GLAND INSTALLATION SHALL NOT BE LESS THAN 1 1/2". IF THE JOINT OPENING IS LESS, INSTALLATION SHALL BE POSTPONED UNTIL THE TEMPERATURE DROPS A SUFFICIENT AMOUNT TO ALLOW THE MINIMUM 1 1/2" OPENING.
3. EXPANSION DEVICE REQUIRES COMPLETE PENETRATION WELDED BUTT JOINTS. BUTT WELDS IN CONTACT WITH THE SEALING GLAND SHALL BE GROUND FLUSH AT THE CONTACT AREA. THE CONSTRUCTION JOINT FOR THE MC12X45 SHALL NOT BE LOCATED WITHIN THE LIMITS OF THE END CROSSFRAME GUSSET PLATE. RELOCATE THE MC12X45 CONSTRUCTION JOINT AS NEEDED TO CLEAR THE GUSSET PLATE.
4. STRIP SEAL AND COMPRESSION SEAL GLANDS SHALL BE INSTALLED IN ONE CONTINUOUS PIECE.
5. INSTALLATION OF SEAL: DURING INSTALLATION OF THE SUPPORT/ARMOR FOR THE SUPERSTRUCTURE SIDE OF THE EXPANSION JOINT SEAL, OBSERVE THE SEATING OF THE BEAMS ON BEARINGS TO ASSURE THAT POSITIVE BEARING IS MAINTAINED.
6. [Symbol] - DIMENSION IS THE SUM OF 2 x STEEL RETAINER WIDTH + DIMENSION "A" (SEE TABLE).
7. NEOPRENE TROUGH SHALL SLOPE DOWN A MIN. OF 4% FROM MIDPOINT TOWARDS DOWNSPOUT FROM BOTH DIRECTIONS.
8. SEE GENERAL NOTES SHEET [2/16] FOR ADDITIONAL REQUIREMENTS.



SECTION D-D
(NOT TO SCALE)



SECTION C-C
(NOT TO SCALE)



SECTION B-B
(NOT TO SCALE)

SETTING
STRIP SEAL JOINT WIDTHS

AMBIENT TEMPERATURE	DIMENSION "A"
	BRIDGE NO. HAM-71-0381W 3" SEAL
90°F	1.51"
80°F	1.56"
70°F	1.62"
60°F	1.67"
50°F	1.72"
40°F	1.78"
30°F	1.83"

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
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ISSUE RECORD		

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EXPANSION JOINT DETAILS

BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

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120

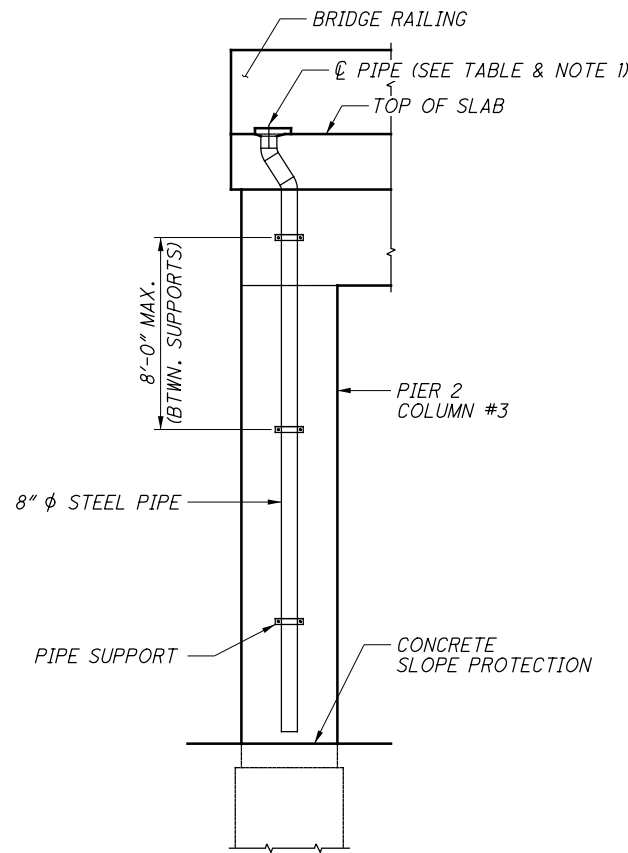
DESIGN AGENCY
HBR ENGINEERING, INC.
9887 CARVER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/24/14

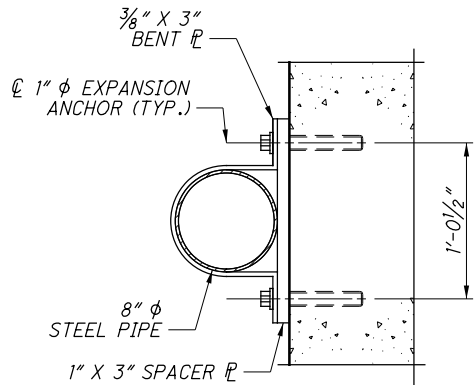
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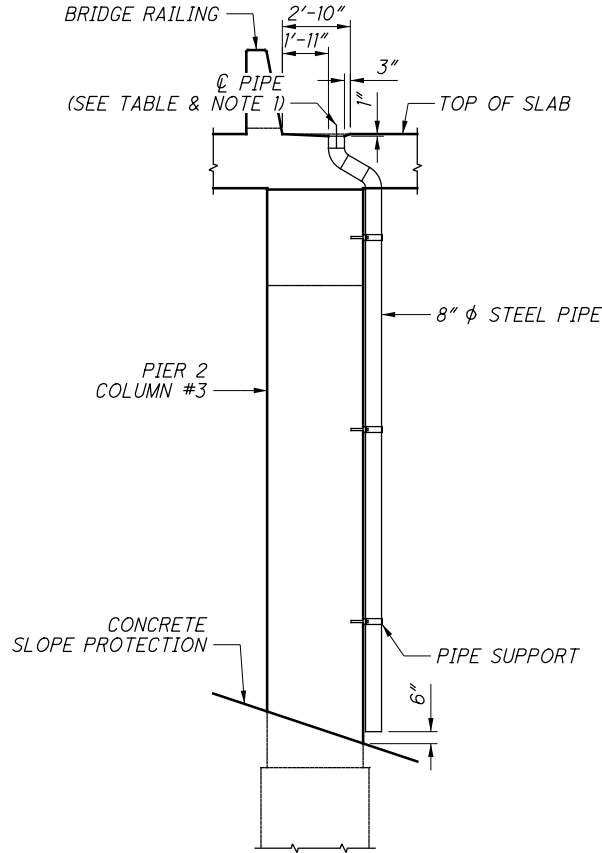
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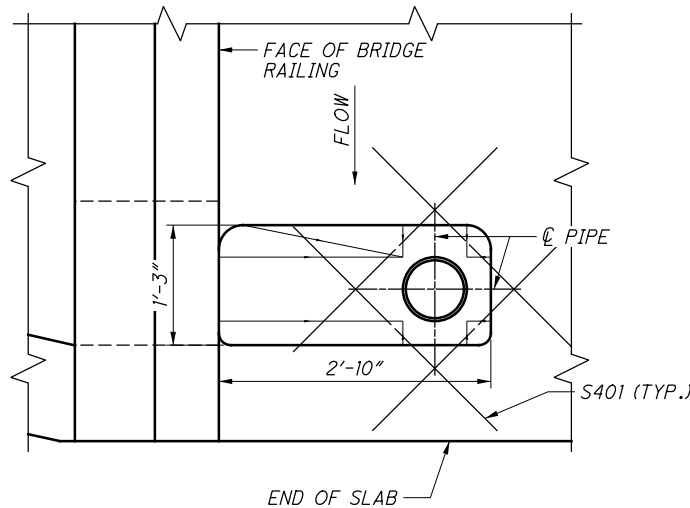
SECTION A-A



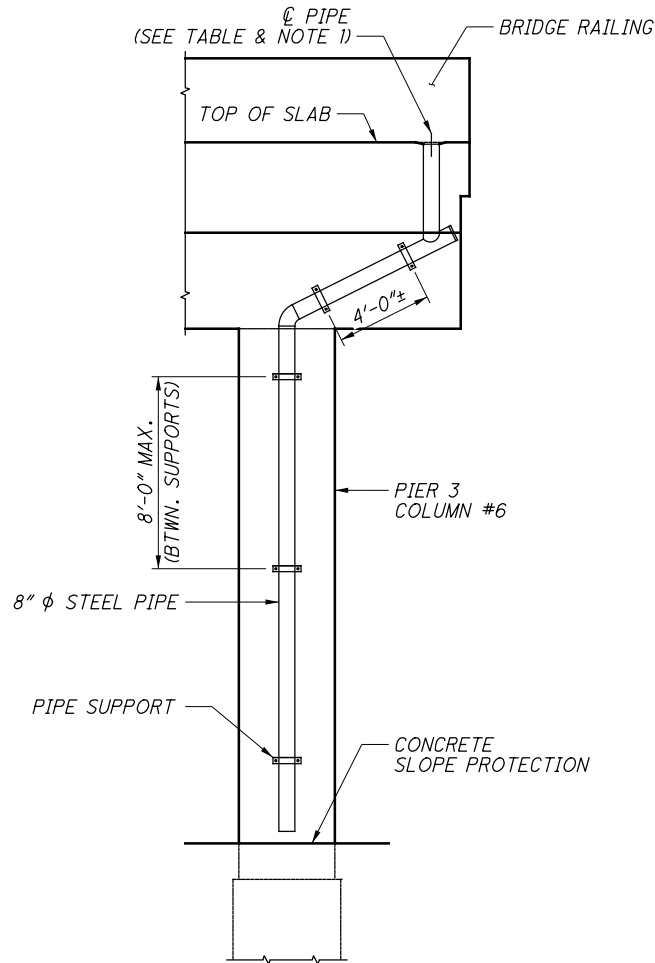
PIPE SUPPORT



SECTION B-B

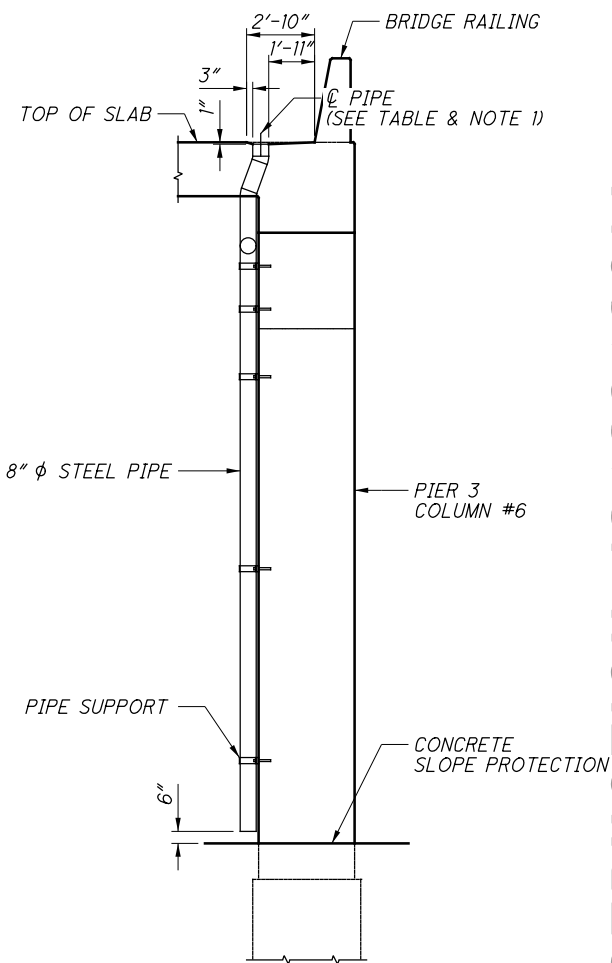


REINFORCING LAYOUT
(PIPE NO. 1 SHOWN, PIPE NO. 2 SIMILAR)



SECTION C-C

PIPE LOCATIONS & DEPTH		
PIPE NO.	STATION	OFFSET
1	556+12.32	3.76' LT.
2	556+12.33	21.75' RT.



SECTION D-D

- NOTES:
- FOR ADDITIONAL SCUPPER LOCATION DETAILS, SEE SHEET [9/16].
 - ADJUST THE TOP OF SCUPPER INLET TO MATCH THE CROSS SLOPE OF THE SLAB.
 - ALL MATERIALS FOR THE SUPPORT HANGERS, PIPE AND SCUPPERS SHALL BE PER CMS ITEM 518 AND GALVANIZED PER CMS 711.02. PAINT DRAINAGE PIPES TO MATCH THE COLOR OF THE FASCIA GIRDER PER ITEM 514. INSTALL AND CONNECT PIPE PER CMS 518.
 - CONTRACTOR TO DETERMINE PIPE LAYOUT NEEDED TO CONNECT DRAINAGE SYSTEM. SLOPE PIPES AS STEEPLY AS PRACTICAL WHILE STILL MAINTAINING THE MINIMUM SLOPE OF 15 DEGREES. WITH APPROVAL FROM ODOT'S RESIDENT FIELD ENGINEER THE CONTRACTOR MAY DEViate FROM THE MINIMUM SLOPE AS NECESSARY TO ENSURE THAT HORIZONTAL PIPE RUNS CONNECTING SCUPPERS TOGETHER ARE ABOVE THE BOTTOM FLANGE OF THE GIRDER AND THAT HORIZONTAL PIPE RUNS ALONG THE PIER CAP ARE WITHIN THE LIMITS OF THE PIER CAP.
 - REINFORCE THE CONCRETE DECK AROUND THE PIPE WITH FOUR #4 BAR, 3'-0" LONG ORIENTED AT 45° TO THE AXIS OF THE PIPE AND LOCATED JUST BELOW THE TRANSVERSE BARS IN THE TOP MAT OF STEEL.

NO.	DATE	DESCRIPTION
0	12/19/14	RFC SUBMITTAL BU 5
A	10/28/14	FINAL SUBMITTAL BU 5
ISSUE RECORD		

RELEASED FOR CONSTRUCTION 12/23/2014

DRAINAGE DETAILS
BRIDGE NO. HAM-71-0381W
RAMP D OVER RAMP E

HAM-71-3.81
PID No. 77628

16 / 16

120
120

DESIGN AGENCY
HDR ENGINEERING, INC.
9987 CARRER ROAD, SUITE 200
CINCINNATI, OHIO 45242
513-984-7500

DATE
10/24/14

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