

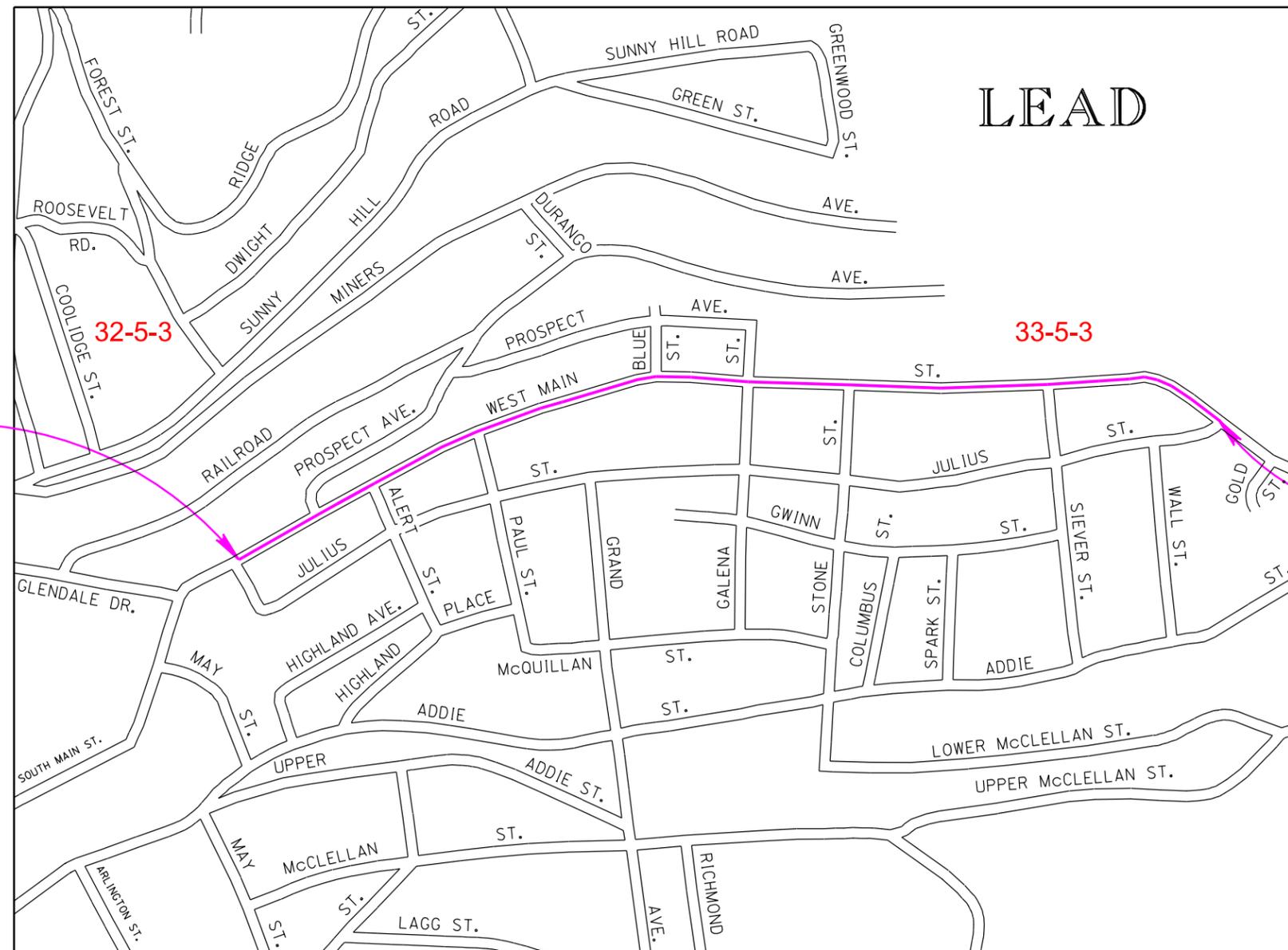
FOR BIDDING PURPOSES ONLY

# SECTION E: RETAINING WALL AND VAULT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E1	E36
FILE: E - Title.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	

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- E2 to E5 General Notes and Tables
- E6 Wall Layout Plan
- E7 to E15 Retaining Wall Plan and Profile
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**BEGIN GRADING**  
 US 85/West Main Street  
 Station 12+26.68

**END GRADING**  
 US 85/West Main Street  
 Station 38+01.70

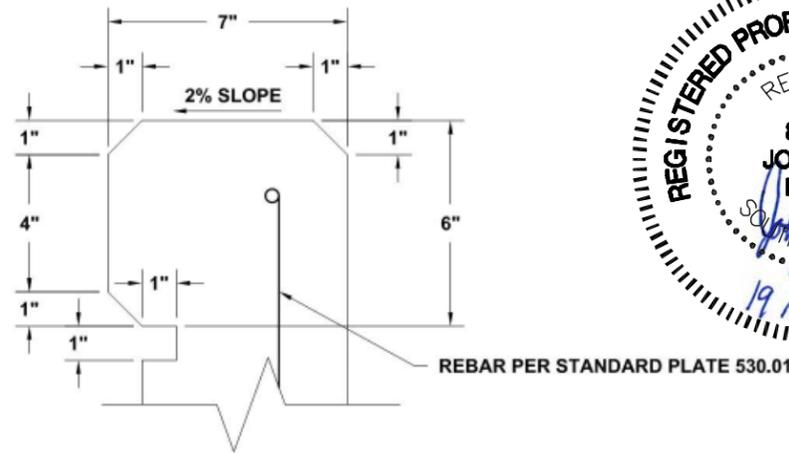


PLANS BY: **HDR**  
 RAPID CITY, SD

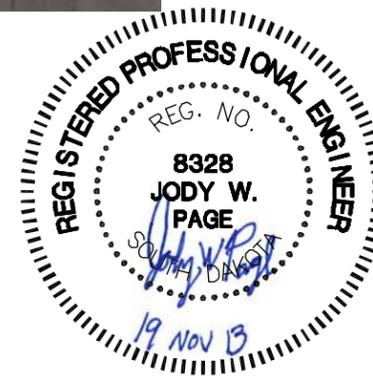
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
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**SECTION E ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1300	Remove Concrete Retaining Wall	780	Ft
260E6010	Granular Material	74.1	Ton
420E0300	Structure Excavation, Retaining Wall	1549	CuYd
420E0400	Structure Excavation, Miscellaneous	82.7	CuYd
421E1000	Footing Undercut	157.8	CuYd
460E0100	Class A45 Concrete, Miscellaneous	332.6	CuYd
460E0205	Architectural Surface Finish	464	SqFt
460E0206	Architectural Surface Finish Test Panel	2	Each
462E0100	Class M6 Concrete	35.5	CuYd
462E0200	Controlled Density Fill	187.2	CuYd
470E0020	Pipe Handrail	319	Ft
480E0100	Reinforcing Steel	24419	Lb
480E0200	Epoxy Coated Reinforcing Steel	18419	Lb
530E0300	Type C Concrete Retaining Wall	798	SqFt
530E0470	Gravity Large Concrete Block Wall	1429	SqFt
530E0810	Repair Retaining Wall	95	SqFt
530E0820	Reconstruct Stone and Masonry Retaining Wall	92	SqFt
680E0240	4" Corrugated Polyethylene Drainage Tubing	283	Ft



**TYPE C RETAINING WALL  
CAP DETAIL**



**RESTORATION OF EXISTING SURFACING**

Any landscaping or surfacing disturbed on temporary or permanent easements that is not called out for replacement elsewhere in the plans shall be replaced in kind by the Contractor. All costs for restoration of these items to their existing conditions shall be incidental to the respective retaining wall bid items.

Any retaining walls that are designated to remain in service that are damaged by construction shall be replaced in kind by the Contractor at no additional cost to the State.

**TYPE C RETAINING WALLS**

Type C Retaining walls shall be constructed per the standard details with the addition of a cast in place cap installed similar to the cap shown in the following photos and detail below. The rebar installation for the Type C wall shall extend into the retaining wall cap. All costs associated with forming, placing rebar, pouring, and finishing the cap shall be incidental to the unit price per square foot for "Type C Concrete Retaining Wall".



**ARCHITECTURAL SURFACE FINISH AND ARCHITECTURAL SURFACE FINISH TEST PANEL**

This work consists of construction of textured and colored formed concrete surfaces using simulated stone masonry molds and a color stain system designed to closely duplicate the appearance of natural stone on all retaining walls listed in the table of retaining walls to receive architectural finish.

**REQUIREMENTS**

- A. Form Liners:** The concrete surface shall be formed using a form lining system made of high strength urethane elastomer or flexible foam materials capable of withstanding anticipated concrete pour pressures without leakage or causing concrete surface damage. Form liners shall attach easily to forms and be removable without causing concrete surface damage. The liners shall be designed to form surfaces conforming to the design intent including shape, lines, and dimensions shown in the plans and to avoid visible pattern repeats. The liner shall be from the list below and match the type selected in the table of retaining walls. Match pattern features at form liner joints to minimize visible pattern repeats and make the formed concrete surface appear uniform and continuous without visible seams and form marks. When joints are unavoidable, make joints along main features of the pattern.

Form liners shall produce a textured effect of a highly realistic, stone masonry surface having random stones with rough, natural finish and hand tooled mortar joints. Surfaces having a smooth, slick or shiny surface will be rejected. The Type C walls to receive formliners shall be constructed per Standard Plate 530.01 with an additional 2" of thickness provided for the formliner making the total thickness of the wall 8". If a texture relief greater than 2 inches is used, the wall thickness shall be adjusted accordingly. No payment will be made for additional concrete required.

Form liner manufacturer must have five years minimum experience making liners used to create formed concrete surfaces matching natural stone shapes and textures.

Form liner materials shall be one of the following:

1. #1548-Chester Dry Stack SpecFormliners, Inc.  
www.specformliners.com  
Phone: (888) 429-9550
2. Other manufacturers approved by the Engineer.

Clean and repair form liner surfaces prior to re-use. Split, frayed, delaminated or otherwise damaged form liners shall not be used. Do not use "patched" form liners for exposed concrete surfaces, except as authorized by the Engineer.

Metal form ties which result in a portion of the tie permanently embedded in the concrete shall be designed to separate at least one inch back from the finished surface, leaving only a neat hole that can be plugged with an approved patching material. Finish tie holes and any defects with an approved patching material to blend with the balance of the stone pattern surface.

Strip form work in accordance with the form liner manufacturer's recommendations after concrete has sufficient strength to avoid surface damage. Release agent (if used) shall be verified to be compatible with form liner and color stain system to be applied to textured architectural concrete surfaces. It shall be non-staining and exhibit no adverse effects to the concrete surface. Release agent shall be applied in accordance with approved form liner manufacturer's direction.

The completed surface shall be free of blemishes, discolorations, surface voids, visible vertical or horizontal seams and conspicuous form marks. All surface defects shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

All concrete shall be cured according to 460.3.N except curing compound shall not be used on areas to receive the architectural surface finish.

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**ARCHITECTURAL SURFACE FINISH AND ARCHITECTURAL SURFACE FINISH TEST PANEL (Continued)**

**B. Architectural Surface Finish:** The surfaces to receive architectural surface finish shall be prepared by water blasting or other means as per the manufacturer's recommendations to break the surface film and to remove all laitance detrimental to the color staining system performance. The surface preparation shall not expose the coarse aggregate. The concrete to receive the architectural surface finish shall be allowed to cure for a minimum of 28 days, or as per the manufacturer's recommendations, whichever is more stringent, prior to application of the surface coloring.

The surface coloring shall be performed using approved stains applied in a manner to provide an aesthetically pleasing surface. Rock formed concrete surfaces shall be stained with the stains listed in the table of Retaining Walls.

Stain shall be designed for concrete and masonry surfaces. Acceptable products shall allow moisture and vapor transmission, be formulated for exterior application with resistance to freeze/thaw, moisture, alkali, acid, mildew, mold, fungus, discoloration, degradation, and shall meet weathering requirements of 1000 hours when subjected to the accelerated weathering test ASTM G155.

Subject to compliance with requirements stated above, provide colored concrete finishing products from one of the following manufacturers:

1. Kemiko Stone Tone Concrete Stain.  
www.kemiko.com
2. Other manufacturers approved by the Engineer.

All concrete finishing products shall be obtained from a single source. All materials shall be stored, prepared, applied, and cured according to product manufacturer directions, with special attention given to recommended temperature range.

The architectural surface finish shall be completed by or under the direct supervision of the manufacturer or the manufacturer's authorized representative. The installer shall be trained in the manufacturer's special techniques in order to achieve realistic surfaces.

Concrete finisher must have five years experience finishing simulated stone masonry textured concrete.

Coordination and sequencing shall be done so other project operations do not interfere with the application and cure of the architectural surface finish or damage the finished product. Where color finishing operations are adjacent to exposed soil, pavement, sidewalks, etc., the Contractor shall provide temporary covering protection from overspray and splatter.

**C. Test Panel:** The architectural surface finisher shall demonstrate their workmanship by completely finishing an architectural surface finish test panel using approved concrete stain products, materials, methods and workmanship including, but not limited to, concrete mix, forming system, form release agents, joint sealing, vibrating and form stripping practices. The test panel shall be unreinforced, vertically cast and of concrete construction to determine the surface texture resulting from the use of form liner products. The minimum size of concrete test panel shall be 8 inch thick, 6 foot wide and 6 foot high. The test panel shall include one form liner joint to verify that joints will not be visible after casting.

The finished effect shall closely duplicate the appearance of natural stone indigenous to the project area. An unsatisfactory test panel shall be replaced or may be blasted to completely remove the finish coating and refinished to produce a satisfactory panel. Final color selections will be based upon completion of the test panel.

**D. Submittals:** The Contractor shall submit the following to the Engineer for approval a minimum of 30 calendar days prior to pouring the test panel.

1. Product data including manufacturer's technical information, label analysis, and application instructions for each material proposed for use.
2. Laboratory test reports showing that materials meet physical or performance property requirements proposed for use.
3. Shop drawings indicating form liner layout and termination details. Indicate backup, rustication, reveal, and chamfer strip locations. Include jointing, form tie location, pattern placement, pattern match details, and end, edge and other special conditions. Indicate tolerances and procedure of installation and separation.
4. Qualifications of the architectural surface finisher including a list of completed projects with project name and location and architect/engineer/owner of record, including phone number.

**METHOD OF MEASUREMENT**

- A. Architectural Surface Finish:** Architectural surface finish will be measured to the nearest square foot.
- B. Architectural Surface Finish Test Panel:** Measurement of the test panel will be per each.

**BASIS OF PAYMENT**

- A. Architectural Surface Finish:** Architectural surface finish will be paid for at the contract unit price per square foot. Payment will be full compensation for furnishing and placing form liners, labor, equipment, materials, and all incidentals necessary to finish the concrete surface including surface preparation, grouting, and the color coating application procedure.

**B. Architectural Surface Finish Test Panel:** Payment for the Test Panel will be made for each panel furnished and installed. Payment will be full compensation for furnishing and placing forms and form liners, concrete, labor, equipment, materials, and all incidentals to color the concrete surface including surface preparation, grouting, and the multiple color coating application procedure. Payment will also include removal and disposal of the test panel after project completion.

**STONE AND MASONRY RETAINING WALLS**

Walls N14 and N15 on Parcel A6 shall be replaced with Type C retaining walls set back 2' behind the existing walls. The existing masonry and stone walls shall be reconstructed in front of the Type C wall on top of the sidewalk slab. The Contractor can either salvage the existing rock and reinstall or submit a new rock sample to the Engineer for approval. The existing cap stone shall be salvaged and reset. The contractor shall submit their plan for reconstructing these walls to the Engineer for approval prior to removing the existing walls. All items necessary to install the masonry and stone wall shall be incidental to the unit price per square foot for "Reconstruct Stone and Masonry Retaining Wall".

**GRAVITY LARGE CONCRETE BLOCK RETAINING WALLS**

Walls N8, N9, and S1003 shall be installed per the details shown on the plan sheets and shall be stained with the color listed in the Table of Retaining Walls. All costs associated with the staining of these walls shall be incidental to the unit price per square foot for "Gravity Large Concrete Block Wall".

**SLIP RESISTANT COATING FOR CONCRETE STAIRWAY**

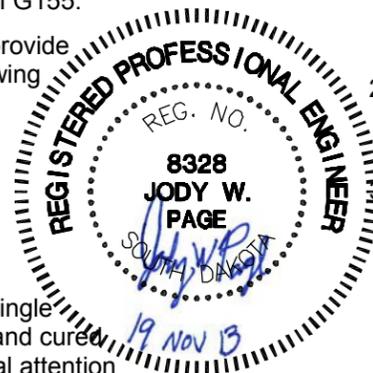
**Curing compounds shall not be utilized on concrete stairway treads during the concrete curing process.** Curing shall be accomplished with a double layer of burlap mats and polyethylene sheeting.

The Contractor shall apply a 2" wide slip resistant coating at the front of each stairway tread for the full width of the tread.

The slip resistant coating shall be a brick red color. The coating shall be a single component epoxy and have a minimum coefficient of friction value of 0.9 for dry and 0.9 for wet as determined by ASTM F 609.

The slip resistant coating shall be applied in accordance with the manufacturer's recommendations.

All cost for furnishing and applying the slip resistant epoxy coating including equipment, labor, and materials shall be incidental to various contract items.



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**TABLE OF CONCRETE STAIRWAYS IN GRAVITY LARGE CONCRETE BLOCK AND CIP CONCRETE CANTILEVER RETAINING WALLS**

Station	L/R	Top Landing Elev.	Bottom Landing Elev.	No. of Steps (w)	Class M6 Concrete (CuYd)	Epoxy Coated Reinf. Steel (Lb)	Structure Excavation, Miscellaneous (CuYd)	Pipe Handrail (Ft)
17+06.51	R	5285.12	5276.19	18	3.8	259.9	6.6	46.5
17+55.01	R	5283.03	5276.86	13	2.9	203.0	5.1	35.3
19+34.01	L	5282.01	5271.45	22	4.5	305.5	7.8	55.5
Totals:					11.1	768.3	19.5	137.4

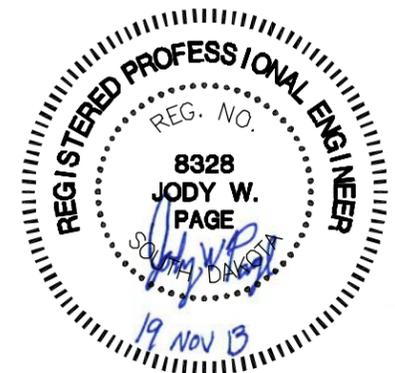
**TABLE OF CONCRETE STAIRWAYS IN TYPE C RETAINING WALLS**

Station	L/R	Top Landing Elev.	Bottom Landing Elev.	No. of Steps(w)	Class M6 Concrete (CuYd)	Epoxy Coated Reinf. Steel (Lb)	Structure Excavation, Miscellaneous (CuYd)	Pipe Handrail (Ft)
13+36.13	L	5305.87	5303.58	5	2.2	192.5	5.5	17.4
13+66.36	L	5305.28	5301.41	8	3.3	277.0	8.8	24.1
17+79.41	L	5281.98	5276.86	11	4.4	369.8	12.2	30.9
18+10.51	R	5280.62	5278.96	4	1.9	158.6	4.6	15.2
18+29.96	R	5279.62	5278.43	3	1.6	135.3	3.8	12.9
21+24.40	L	5269.09	5265.47	8	3.2	270.2	8.5	24.1
21+65.47	L	5265.66	5263.76	4	1.9	163.2	4.7	15.2
22+21.05	L	5263.39	5260.98	5	2.3	195.2	5.6	17.4
29+95.25	L	5240.05	5235.60	8	3.5	304.7	9.6	24.1
Totals:					24.4	2066.4	63.2	181.4

**TABLE OF VAULTS**

Vault No.	Station to	Station	Parcels Affected	Do not disturb/ Fill	Controlled Density Fill (CuYd)	Reinforcing Steel (Lb)	Class A45 Concrete, Miscellaneous (CuYd)
109	14+29.68-28.56'R	14+71.20-27.60'R	2	Fill*			
101	14+74.97-27.56'R	15+27.78-27.12'R	A9	Do not disturb			
100	15+30.41-28.95'R	15+97.09-28.84'R	A9, A10	Do not disturb			
108	16+73.70-23.23'R	16+77.08-24.88'R	3	Fill**	-	57	2.4
106	26+93.44-19.59'R	27+04.89-19.40'R	A17	Fill*			
107	27+52.20-20.58'R	27+64.25-20.14'R	A17	Fill*			
102	30+27.94-22.14'R	30+42.63-25.01'R	A22	Fill	25.5	468	3.9
103	30+65.61-19.84'R	31+06.49-20.19'R	A22	Fill	85.6	1051	8.3
105	31+37.13-19.30'R	31+67.42-22.90'R	A23	Do not disturb			
104	31+72.53-20.85'R	32+09.81-20.78'R	A23	Fill	76.1	1127	9.7
Total:					187.2	2703	24.3

\*Vault shall be filled with backfill from new retaining wall construction  
 \*\* Vault shall be filled with Class A45 Concrete



PLANS BY: **HDR**  
 RAPID CITY, SD

**TABLE OF RETAINING WALLS**

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Wall	STA. FROM	STA. TO	Parcels Affected	Do not disturb/Repair/Replace	Type of Wall Replacement	Area of Wall Replacement (SqFt)	Form or Stain Type
N1	12+66.39-21.12'L	12+76.73-21.31'L		Do not disturb			
N2	12+78.66-21.17'L	12+94.09-21.69'L		Do not disturb			
N3	13+00.81-21.54'L	13+27.96-21.16'L		Do not disturb			
N4	13+29.67-20.91'L	13+33.83-20.43'L	A1	Replace	Type C	7.46	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N4	13+38.42-20.27'L	13+64.12-19.92'L	A1, A2	Replace	Type C	71.96	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N5	13+68.60-20.34'L	13+78.65-20.35'L	A2	Replace all but eastern transverse leg	Type C	34.17	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N6	14+34.05-20.84'L	14+35.36-21.09'L		Do not disturb			
N7	14+84.31-23.68'L	18+00.98-25.55'L		Do not disturb			
N7	18+00.98-25.55'L	18+78.23-26.22'L	A3	Repair			
N8	19+09.83-25.13'L	19+31.06-33.81'L	A4	Replace	Gravity Large Conc. Block	206.00	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N9	19+35.57-33.80'L	19+47.23-25.84'L	A4	Replace	Gravity Large Conc. Block	112.00	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N10	19+49.79-26.67'L	19+84.35-28.45'L	A5	Do not disturb			
N11	19+92.33-28.71'L	20+57.02-25.92'L	A5	Do not disturb			
N12	20+61.68-25.94'L	20+75.49-25.67'L		Do not disturb			
N13	20+75.49-25.67'L	20+80.21-25.43'L		Do not disturb			
N13	20+93.94-25.74'L	20+97.73-25.76'L		Do not disturb			
N14	21+02.92-25.93'L	21+09.29-25.91'L		Do not disturb			
N14	21+11.27-27.90'L	21+21.78-27.78'L	A6	Replace	Type C & Reconstruct Stone and Masonry Wall	35.42	
N15	21+27.02-27.67'L	21+43.63-28.01'L	A6	Replace all but eastern transverse leg	Type C & Reconstruct Stone and Masonry Wall	56.31	
N16	21+44.75-25.55'L	21+63.19-28.41'L	A7 & A7A	Replace	Type C	37.86	No. 1548-Chester Dry Stack, Malay Tan Stain.
N17	21+68.05-28.97'L	21+96.71-26.19'L	A7 & A7A	Replace	Type C	57.16	No. 1548-Chester Dry Stack, Malay Tan Stain.
N18	21+96.71-26.19'L	22+18.39-27.99'L	A7	Replace	Type C	46.07	No. 1548-Chester Dry Stack, Malay Tan Stain.
N19	22+23.70-27.57'L	22+44.30-24.86'L	A7, A8	Replace	Type C	45.11	No. 1548-Chester Dry Stack, Malay Tan Stain.
N20	22+98.93-25.16'L	23+15.20-25.32'L		Do not disturb			
N21	25+39.65-28.43'L	25+92.76-23.90'L		Do not disturb			
N22	29+45.79-23.71'L	29+75.18-22.96'L	A19, A20	Do not disturb			
N22	29+75.25-29.71'L	29+95.25-29.71'L	A19, A20	Replace only portion around stairwell	Type C	120.30	No. 1548-Chester Dry Stack, Golden Wheat Stain.
N22	29+94.19-23.05'L	30+12.14-23.47'L	A19, A20	Do not disturb			
N23	34+78.16-23.63'L	35+01.64-23.63'L		Do not disturb			
N24	35+30.95-23.91'L	35+74.98-28.13'L		Do not disturb			
S1	13+25.66-28.40'R	13+42.87-28.45'R	1	Replace	CIP Conc. Cantilever		
S2	13+42.87-28.45'R	13+94.84-29.01'R	1	Replace	CIP Conc. Cantilever		
S3	16+94.74-24.95'R	17+03.99-25.64'R	3	Replace	CIP Conc. Cantilever		
S4	17+09.02-25.77'R	17+52.02-25.61'R	4	Replace	CIP Conc. Cantilever		
S5	17+57.99-26.31'R	17+77.24-26.81'R	4	Replace	CIP Conc. Cantilever		
S6	17+81.57-26.55'R	18+06.76-26.75'R	4	Replace	Type C	41.44	
S7	18+14.25-25.78'R	18+28.18-25.77'R	A11	Replace longitudinal portion	Type C	17.27	No. 1548-Chester Dry Stack, Golden Wheat Stain.
S8	18+31.74-25.59'R	18+51.92-25.63'R	A11	Replace	Type C	15.54	No. 1548-Chester Dry Stack, Golden Wheat Stain.
S9	18+49.91-25.72'R	18+72.69-25.53'R		Do not disturb			
S10	18+75.82-25.44'R	18+89.95-25.69'R		Do not disturb			
S11	19+43.73-26.50'R	19+70.65-26.12'R	A12	Do not disturb			
S12	23+40.11-25.10'R	23+44.16-24.77'R		Do not disturb			
S13	29+60.16-26.27'R	29+80.06-26.29'R		Do not disturb			
S14	33+55.82-26.95'R	33+84.34-26.67'R	A25	Do not disturb			
S15	35+74.17-28.21'R	37+03.04-27.62'R	A28	Do not disturb			
S16	37+40.04-28.16'R	37+59.83-32.37'R	A28	Do not disturb			
S1001	14+25.17-27.73'R	14+76.00-27.04'R	2	Replace	CIP Conc. Cantilever		
S1002	20+20.22-24.34'R	21+07.18-24.87'R	5	Replace	CIP Conc. Cantilever		
S1003	26+78.94-26.68'R	27+72.28-26.70'R	A16, A17	Replace	Gravity Large Conc. Block	1111.00	
S1004	21+07.72-24.87'R	21+44.21-25.00'R	5	Replace	Type C	99.90	
S1004	21+57.74-24.90'R	22+13.51-25.88'R	5	Replace	Type C	111.74	
<b>Total Replacement Area For Type C Retaining Walls:</b>						798	
<b>Total Replacement Area For Gravity Large Conc. Block Walls:</b>						1429	
<b>Total Replacement Area For Reconstruct Stone And Masonry Wall</b>						92	

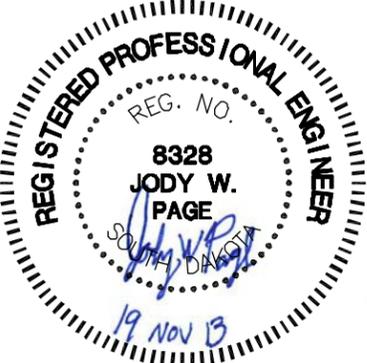
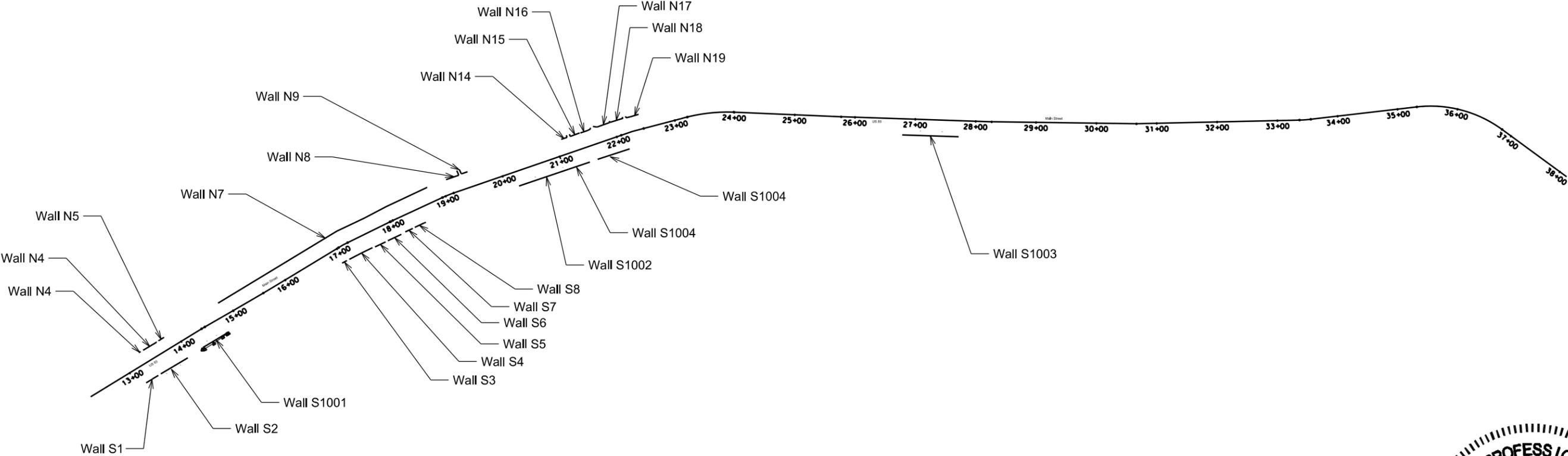


PLANS BY: **HDR**  
RAPID CITY, SD

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# WALL LAYOUT PLAN

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E6	E36
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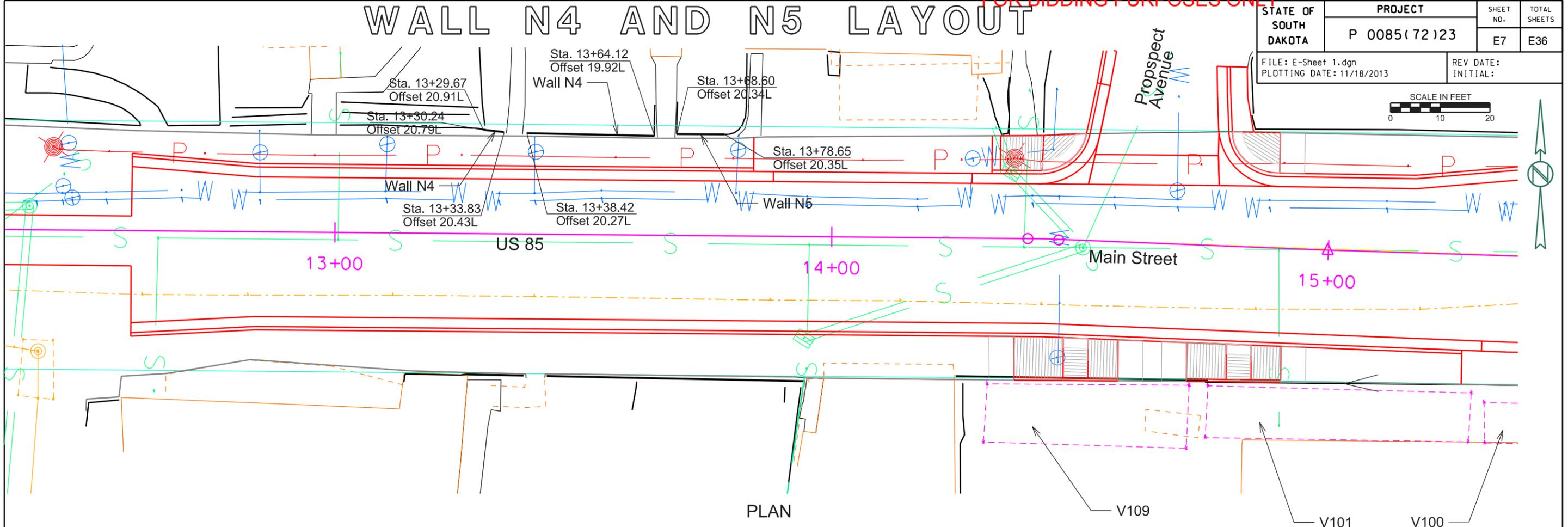


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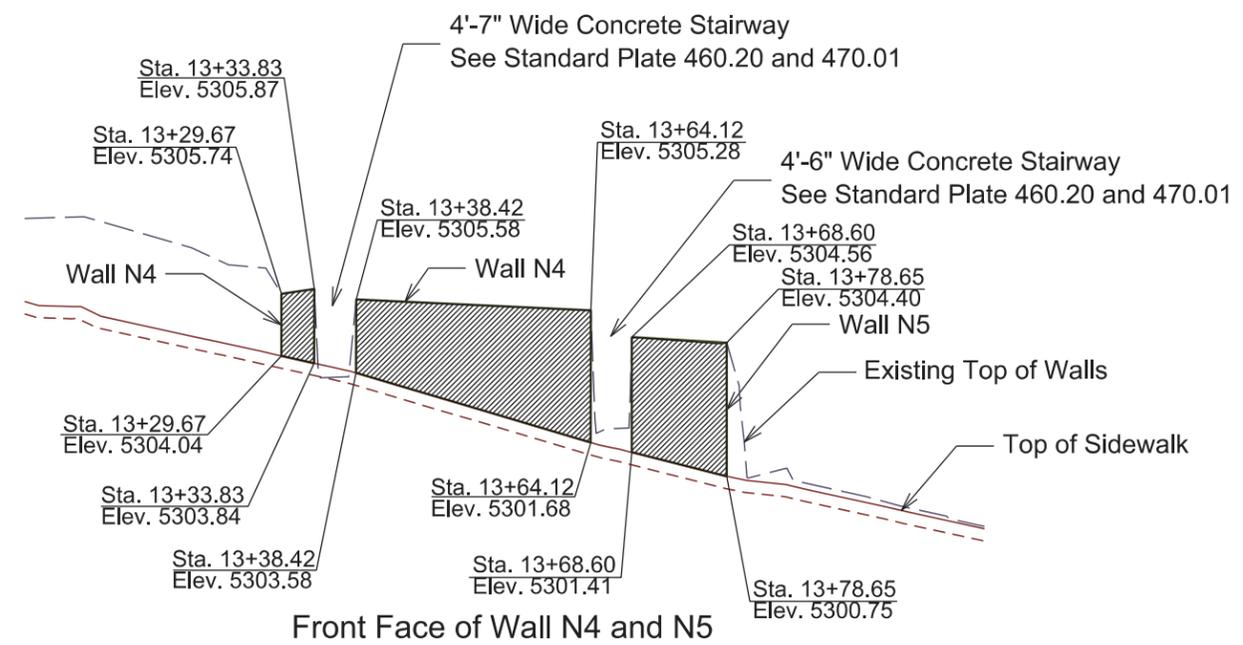
# WALL N4 AND N5 LAYOUT

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STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
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PLAN



ELEVATION

See Standard Plate 530.01 for Wall N4 and Wall N5

- LEGEND
- - - EXISTING GROUND
  - - - EXISTING TOP OF WALL
  - - - TOP OF SIDEWALK
  - ▨ WALL FACE

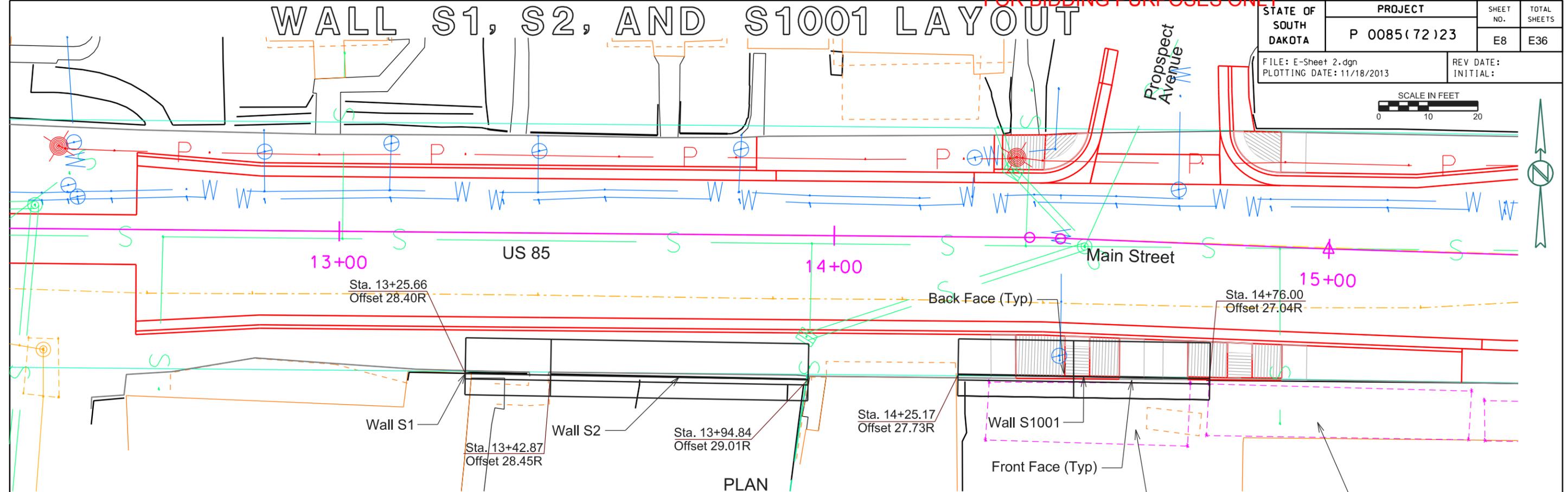


PLANS BY: **HR**  
RAPID CITY, SD

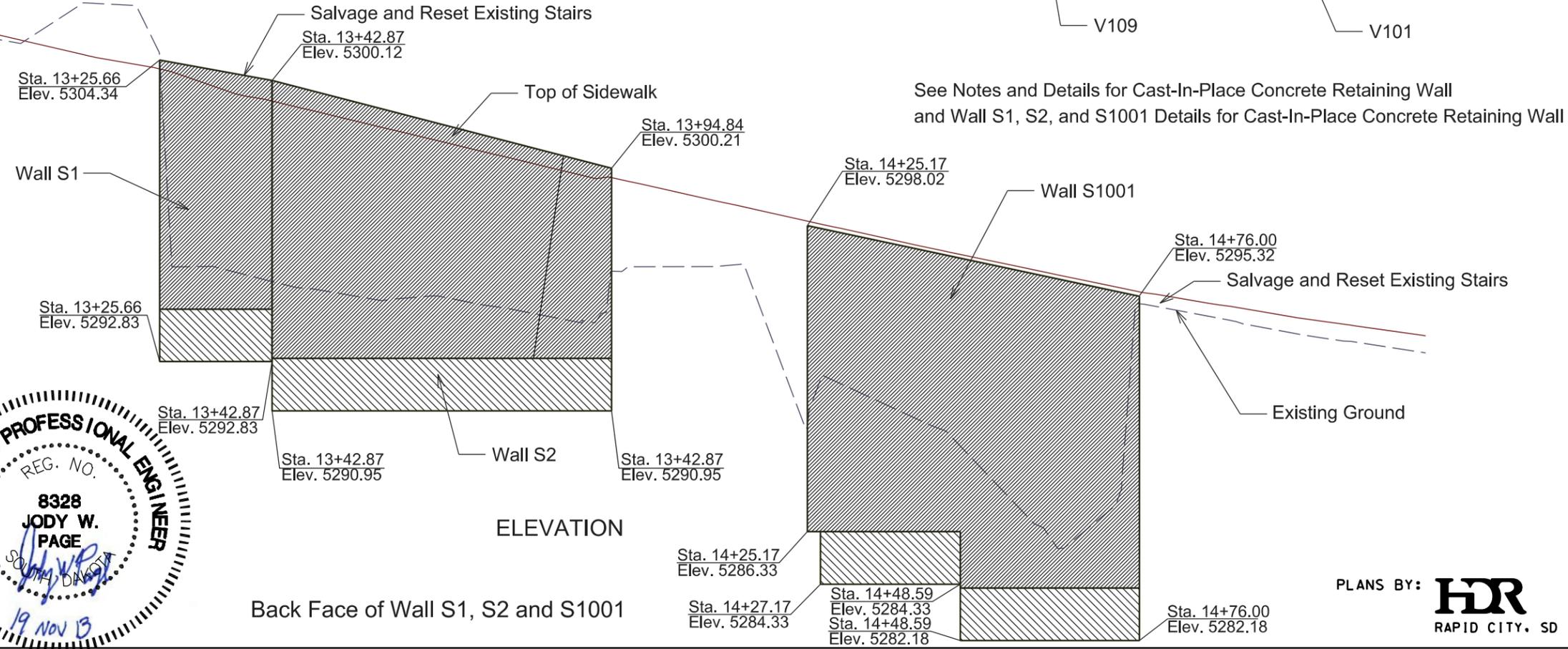
# WALL S1, S2, AND S1001 LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E8	E36
FILE: E-Sheet 2.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



PLAN

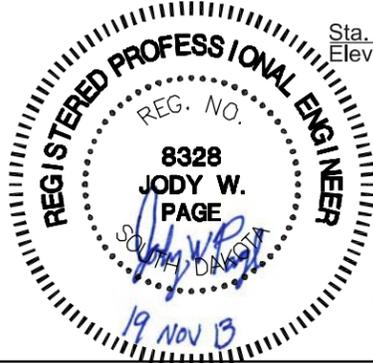


ELEVATION

Back Face of Wall S1, S2 and S1001

See Notes and Details for Cast-In-Place Concrete Retaining Wall and Wall S1, S2, and S1001 Details for Cast-In-Place Concrete Retaining Wall

- LEGEND
- EXISTING GROUND
  - - - EXISTING TOP OF WALL
  - TOP OF SIDEWALK
  - ▨ WALL FACE
  - ▩ WALL FOOTING

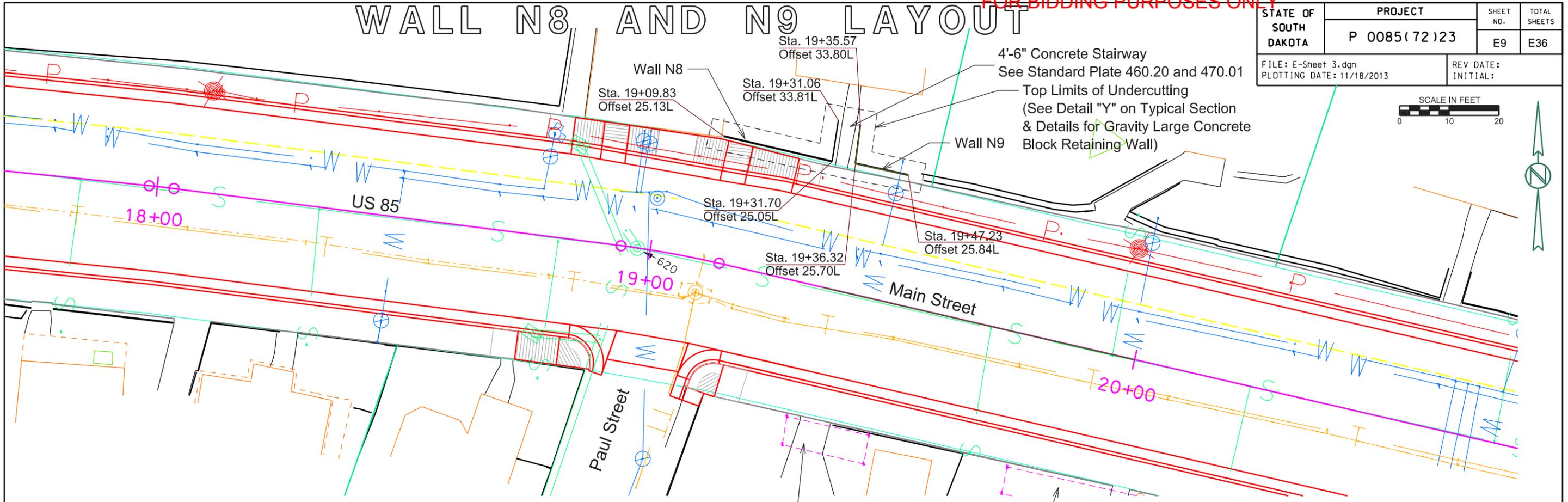


PLANS BY: **HR**  
RAPID CITY, SD

# WALL N8 AND N9 LAYOUT

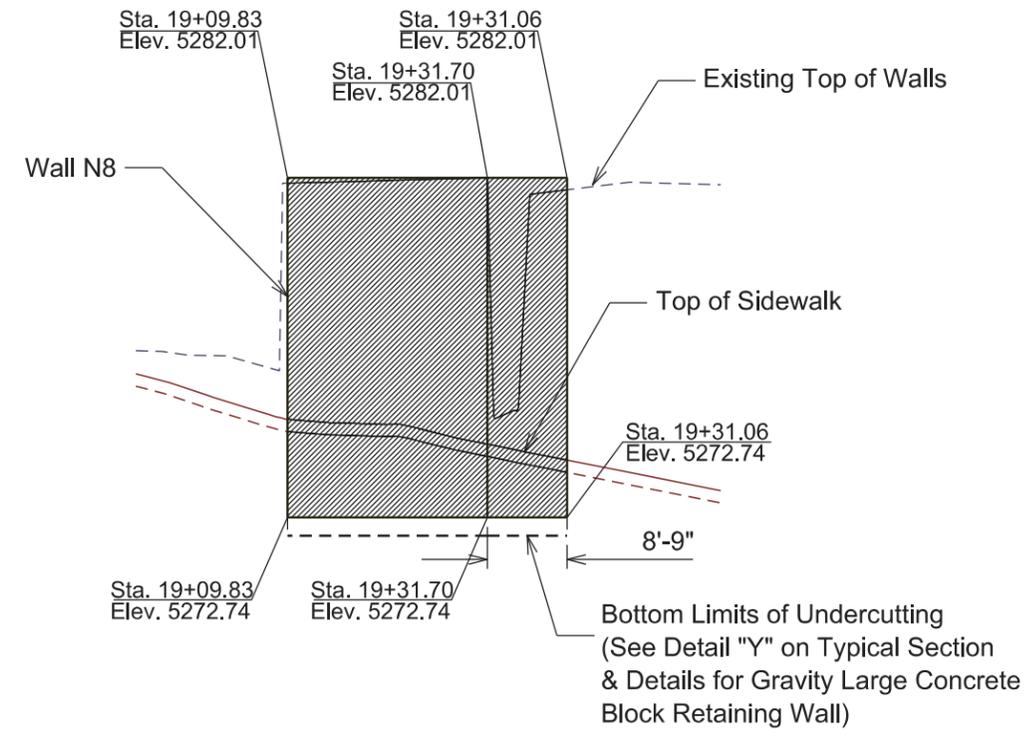
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
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FILE: E-Sheet 3.dgn PLOTTING DATE: 11/18/2013		REV. DATE: INITIAL:	

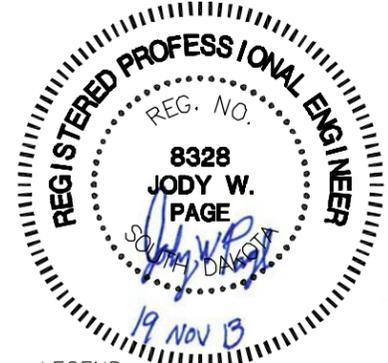
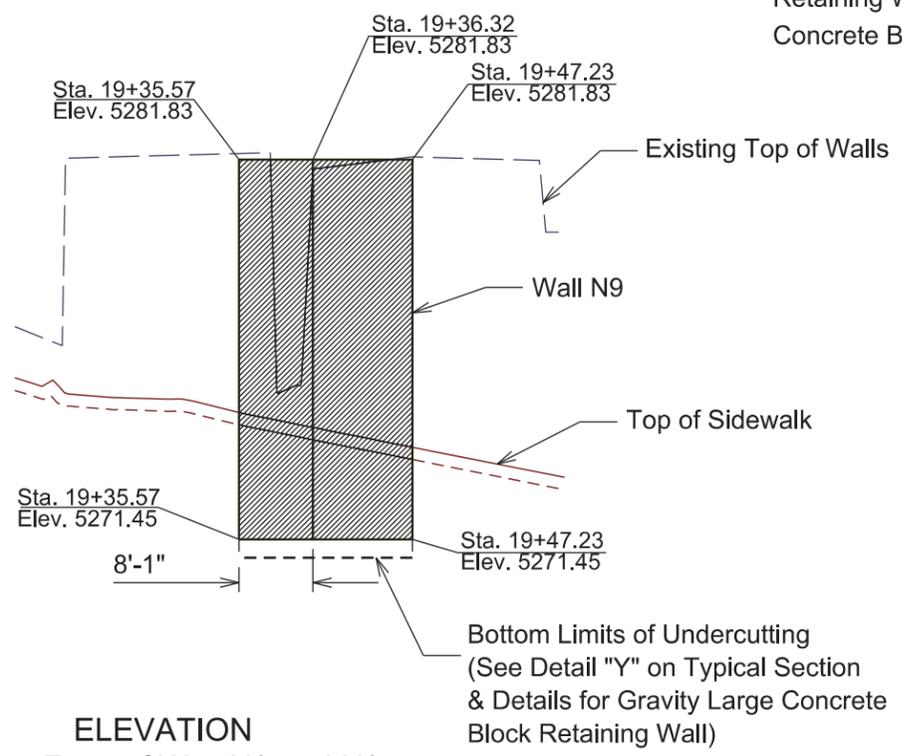


PLAN  
V111  
V112

See Notes & Quantities for Gravity Large Concrete Block Retaining Wall and Typical Section & Details for Gravity Large Concrete Block Retaining Wall for Walls N8 and N9



ELEVATION  
Front Face of Wall N8 and N9



LEGEND

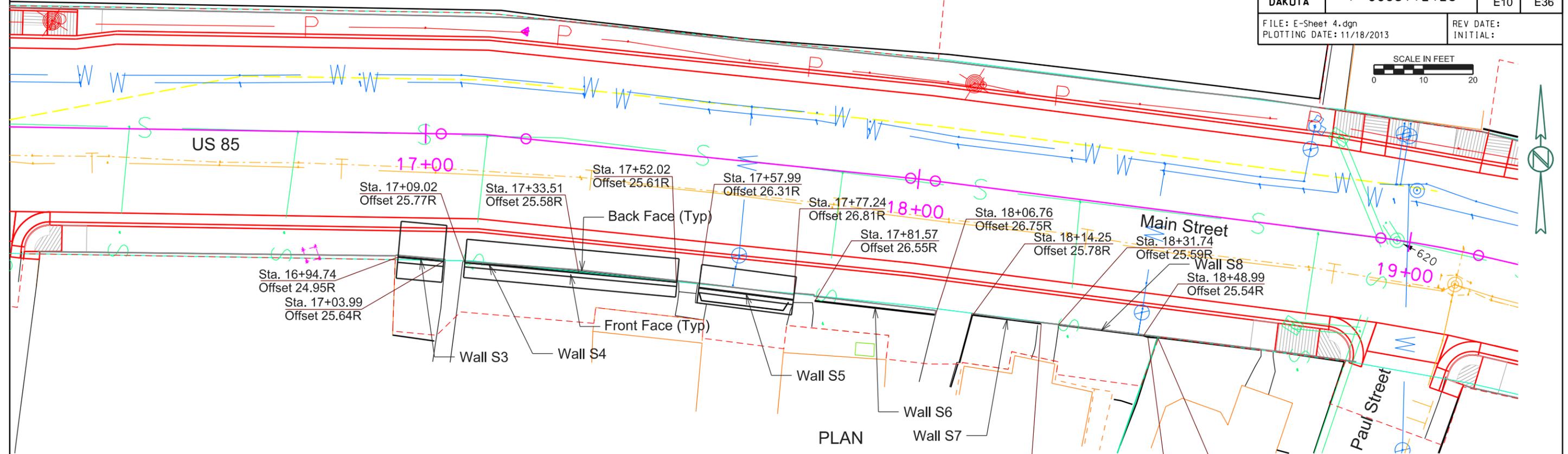
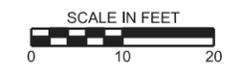
- EXISTING GROUND
- EXISTING TOP OF WALL
- TOP OF SIDEWALK
- WALL FACE

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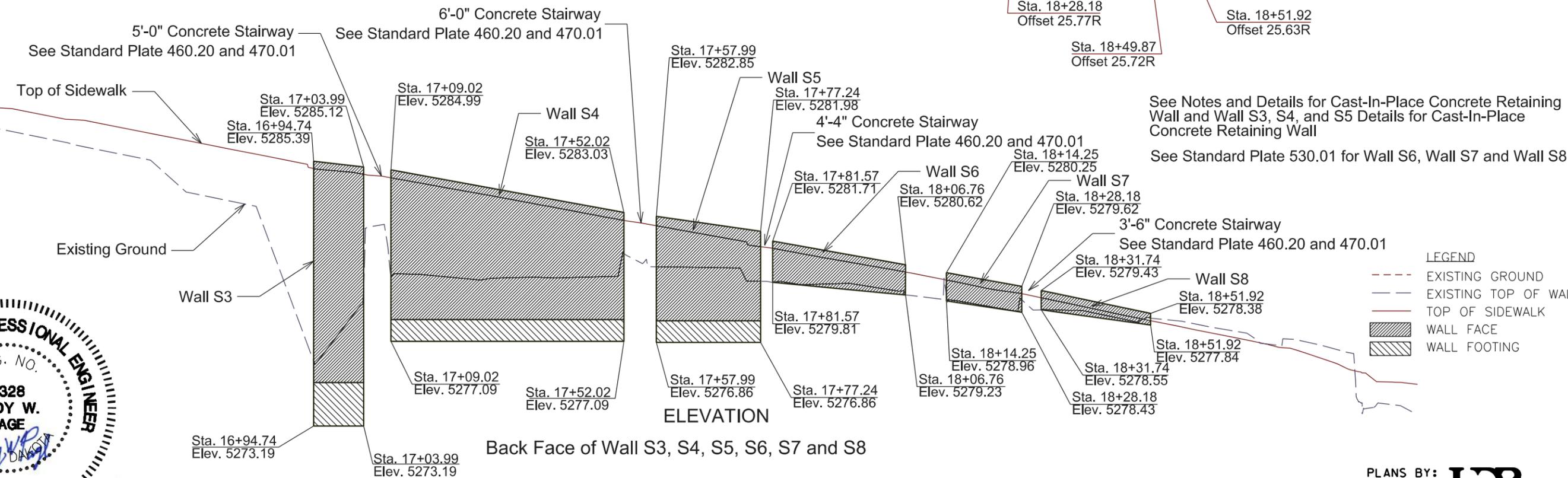
# WALL S3, S4, S5, S6, S7, AND S8 LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E10	E36
FILE: E-Sheet 4.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



PLAN



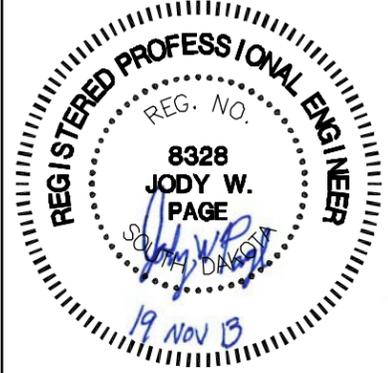
ELEVATION

Back Face of Wall S3, S4, S5, S6, S7 and S8

See Notes and Details for Cast-In-Place Concrete Retaining Wall and Wall S3, S4, and S5 Details for Cast-In-Place Concrete Retaining Wall  
See Standard Plate 530.01 for Wall S6, Wall S7 and Wall S8

LEGEND

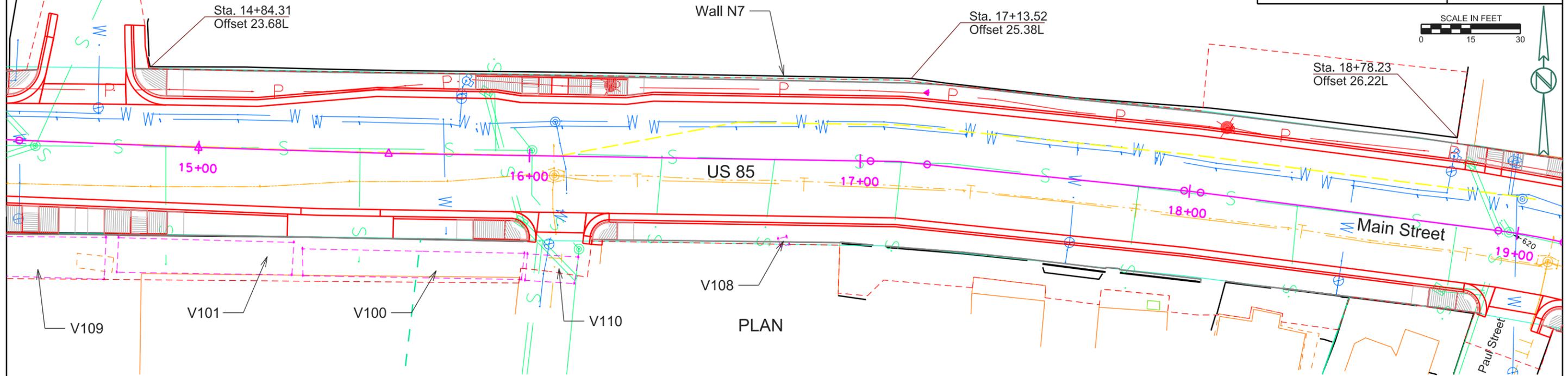
- - - - - EXISTING GROUND
- - - - - EXISTING TOP OF WALL
- - - - - TOP OF SIDEWALK
- ▨ WALL FACE
- ▩ WALL FOOTING



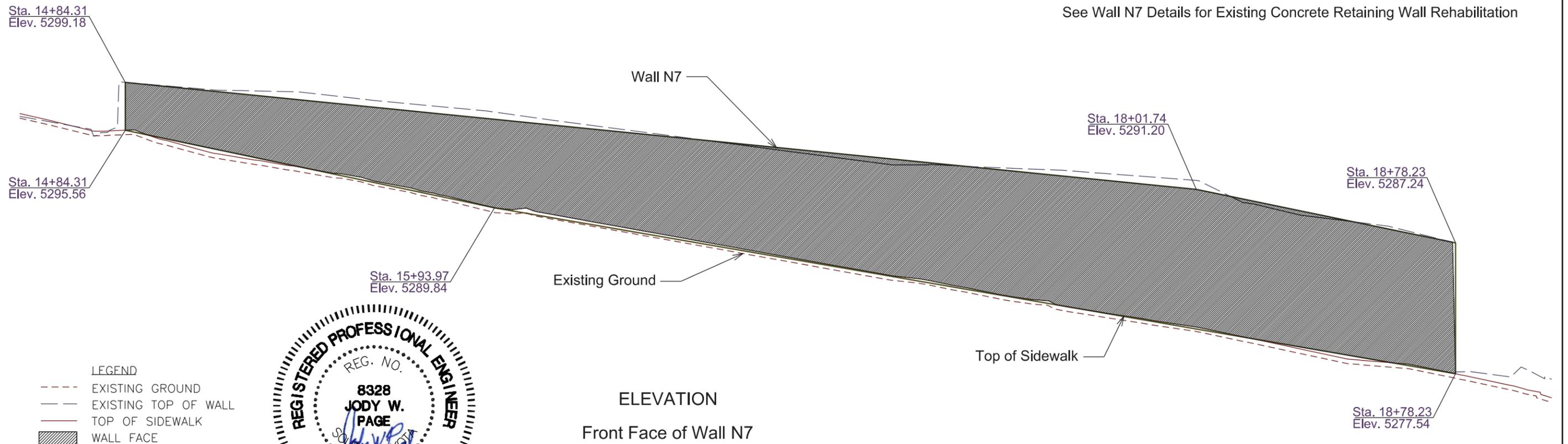
FOR BIDDING PURPOSES ONLY

# WALL N7 LAYOUT

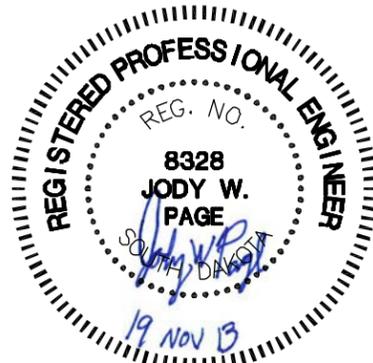
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	P 0085(72)23	E11	E36
FILE: E-Sheet 5.dgn PLOTTING DATE: 11/18/2013		REV. DATE: INITIAL:	



See Wall N7 Details for Existing Concrete Retaining Wall Rehabilitation



- LEGEND
- EXISTING GROUND
  - - - EXISTING TOP OF WALL
  - TOP OF SIDEWALK
  - ▨ WALL FACE



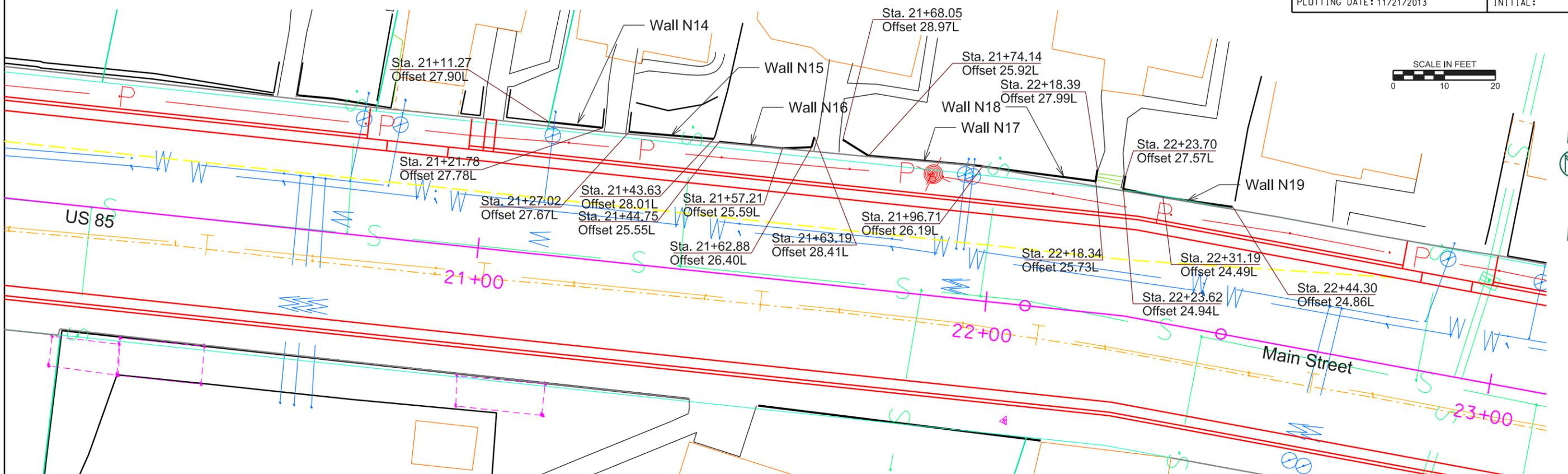
ELEVATION  
Front Face of Wall N7

PLANS BY: **HR**  
RAPID CITY, SD

# WALL N14, N15, N16, N17, N18, AND N19 LAYOUT

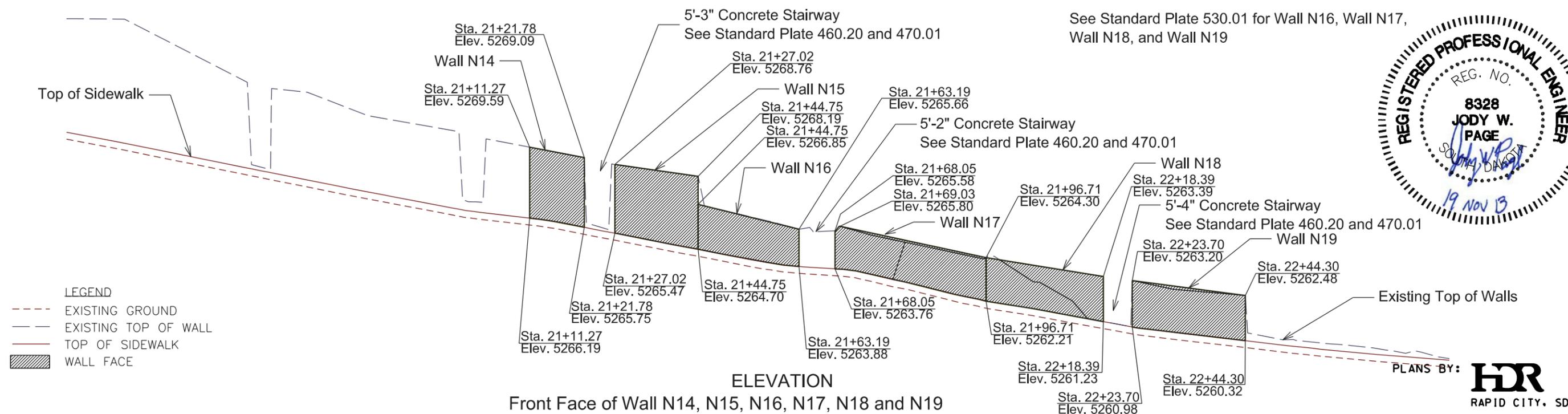
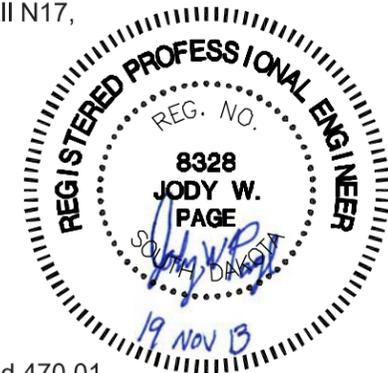
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E12	E36
FILE: E-Sheet 6.dgn PLOTTING DATE: 11/21/2013		REV DATE: INITIAL:	



PLAN

See notes and details for Wall N14 and Wall N15.  
See Standard Plate 530.01 for Wall N16, Wall N17, Wall N18, and Wall N19



ELEVATION

Front Face of Wall N14, N15, N16, N17, N18 and N19

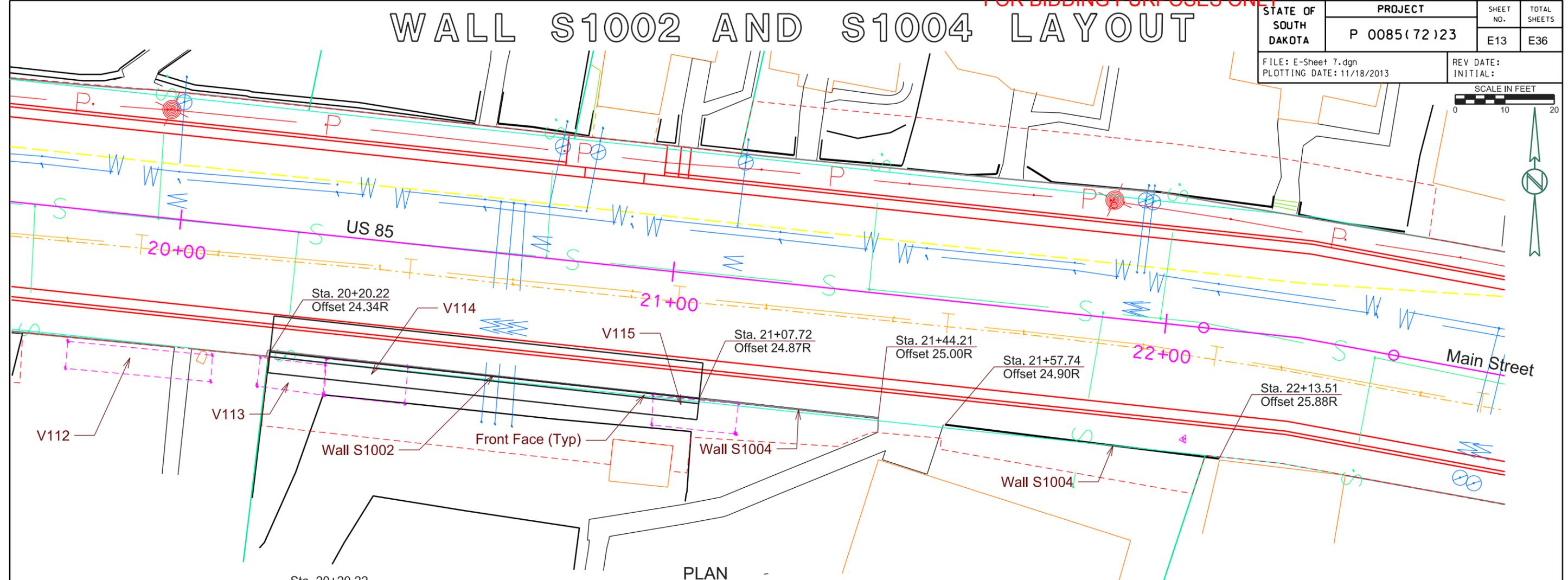
PLANS BY: **HR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

# WALL S1002 AND S1004 LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E13	E36
FILE: E-Sheet 7.dgn PLOTTING DATE: 11/18/2013		REV. DATE: INITIAL:	

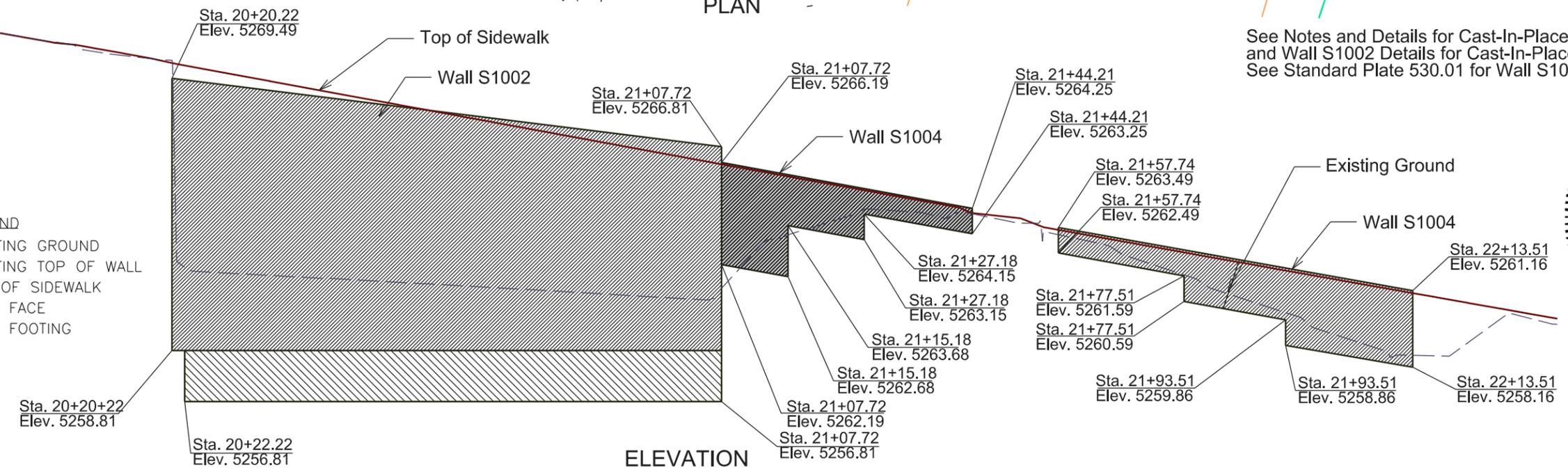
SCALE IN FEET  
0 10 20



PLAN

See Notes and Details for Cast-In-Place Concrete Retaining Wall and Wall S1002 Details for Cast-In-Place Concrete Retaining Wall See Standard Plate 530.01 for Wall S1004

- LEGEND
- - - EXISTING GROUND
  - - - EXISTING TOP OF WALL
  - - - TOP OF SIDEWALK
  - ▨ WALL FACE
  - ▨ WALL FOOTING



ELEVATION  
Back Face of Wall S1002 and S1004

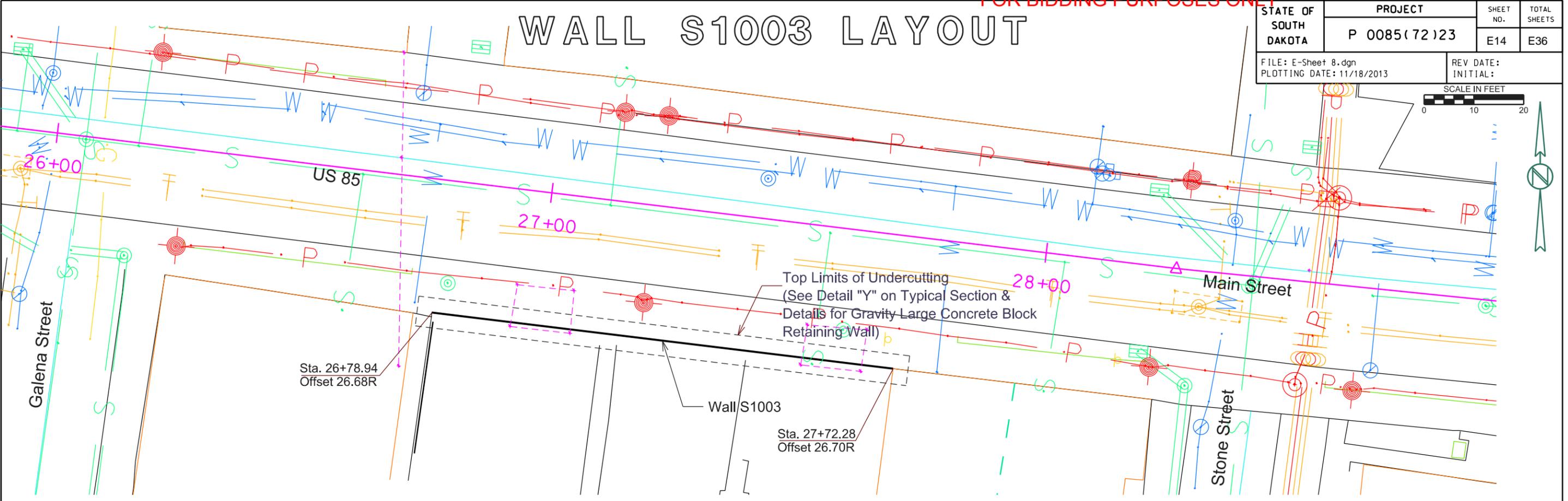
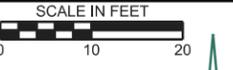


PLANS BY: **HR**  
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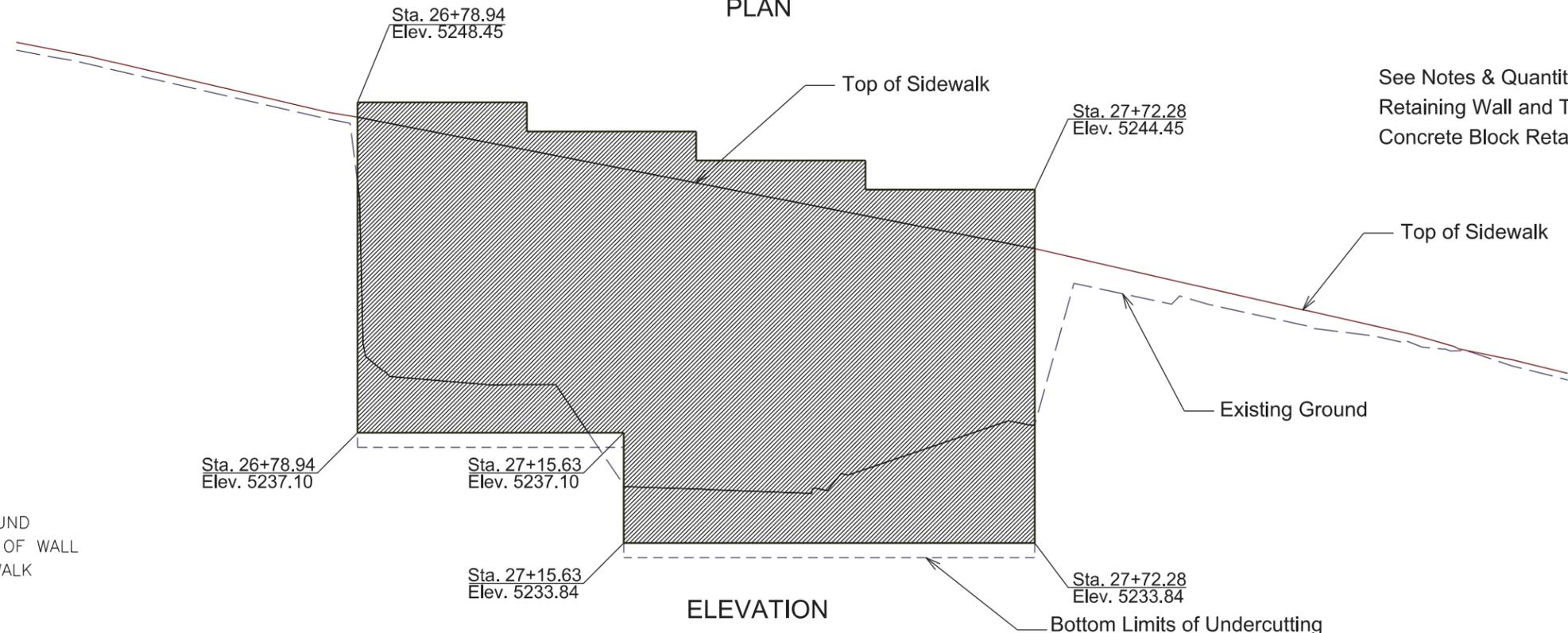
FOR BIDDING PURPOSES ONLY

# WALL S1003 LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E14	E36
FILE: E-Sheet 8.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



PLAN



ELEVATION

Back Face of Wall S1003

See Notes & Quantities for Gravity Large Concrete Block Retaining Wall and Typical Section & Details for Gravity Large Concrete Block Retaining Wall for Wall S1003

- LEGEND
- EXISTING GROUND
  - EXISTING TOP OF WALL
  - TOP OF SIDEWALK
  - █ WALL FACE

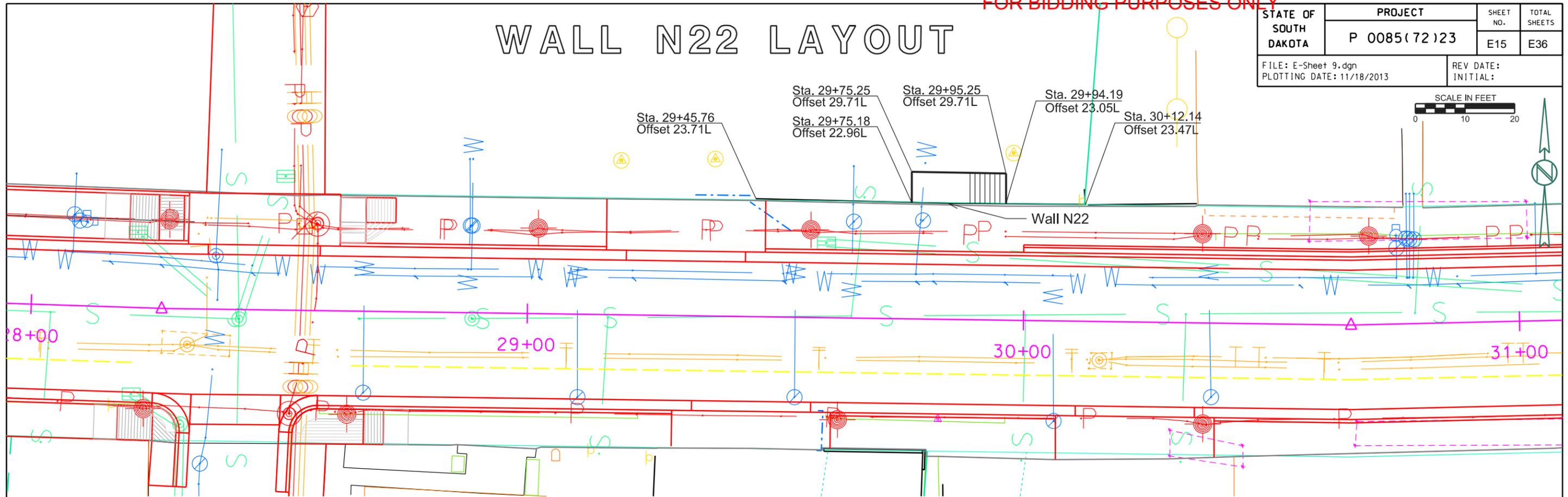


PLANS BY: **HR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

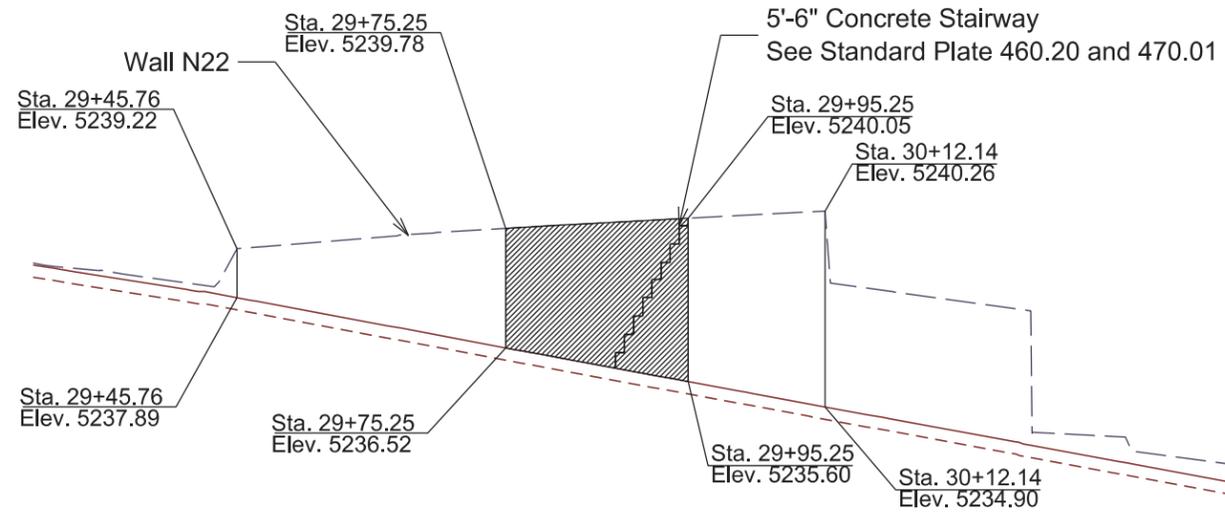
# WALL N22 LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E15	E36
FILE: E-Sheet 9.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



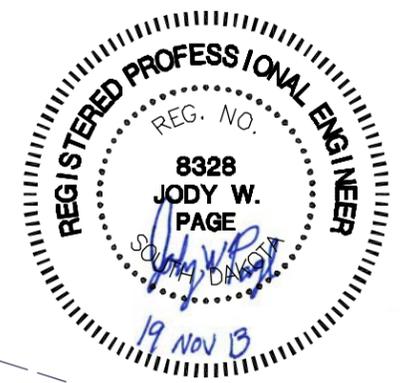
PLAN

See Standard Plate 530.01 for Wall N22



ELEVATION  
Front Face of Wall N22

- LEGEND
- EXISTING GROUND
  - - - EXISTING TOP OF WALL
  - TOP OF SIDEWALK
  - ▨ WALL FACE

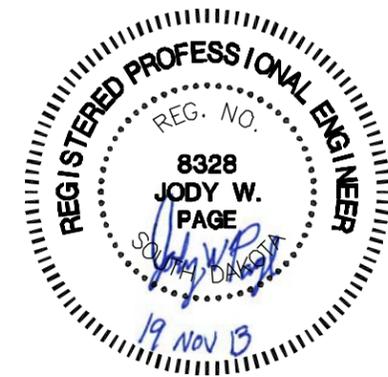
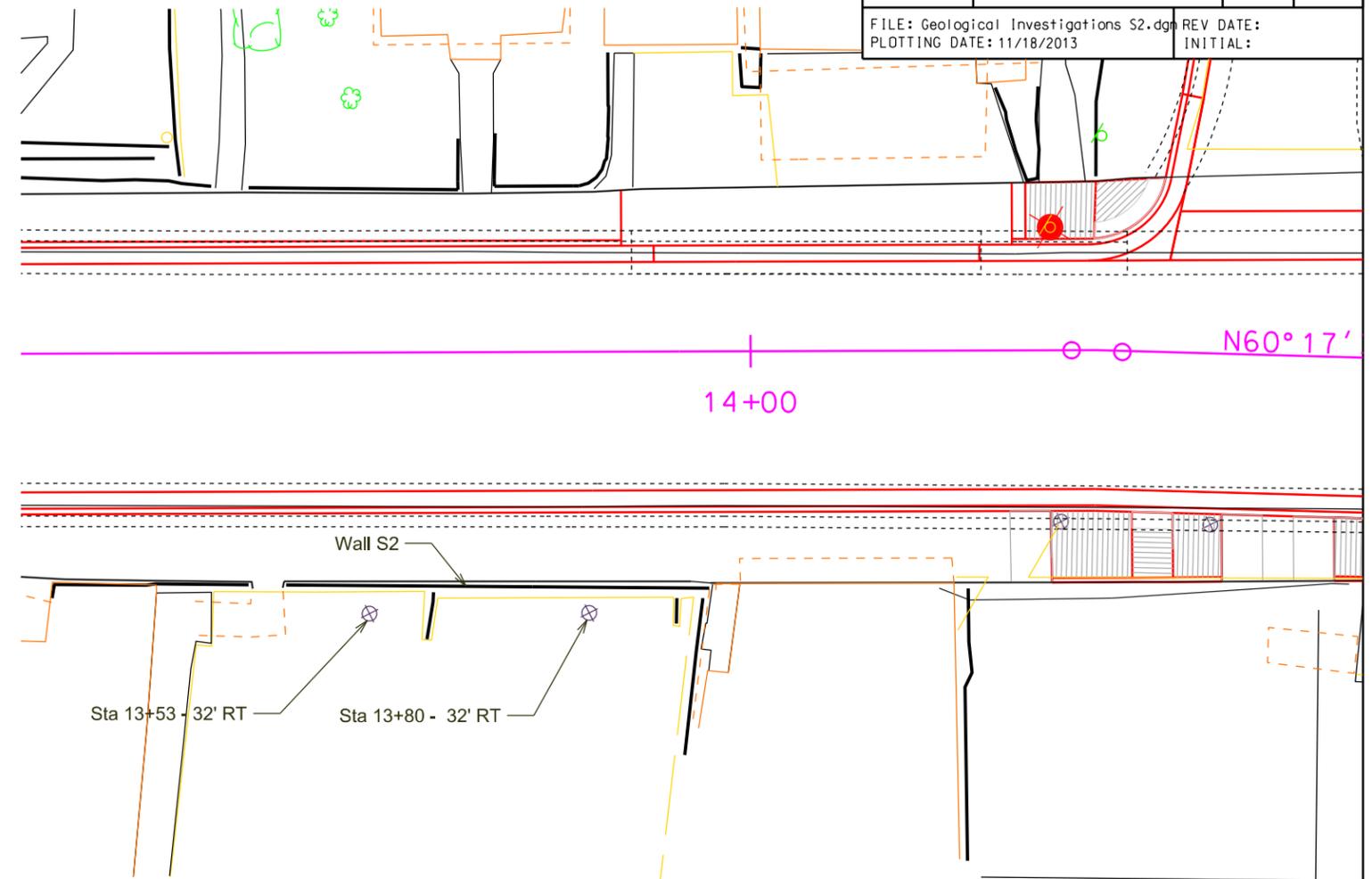
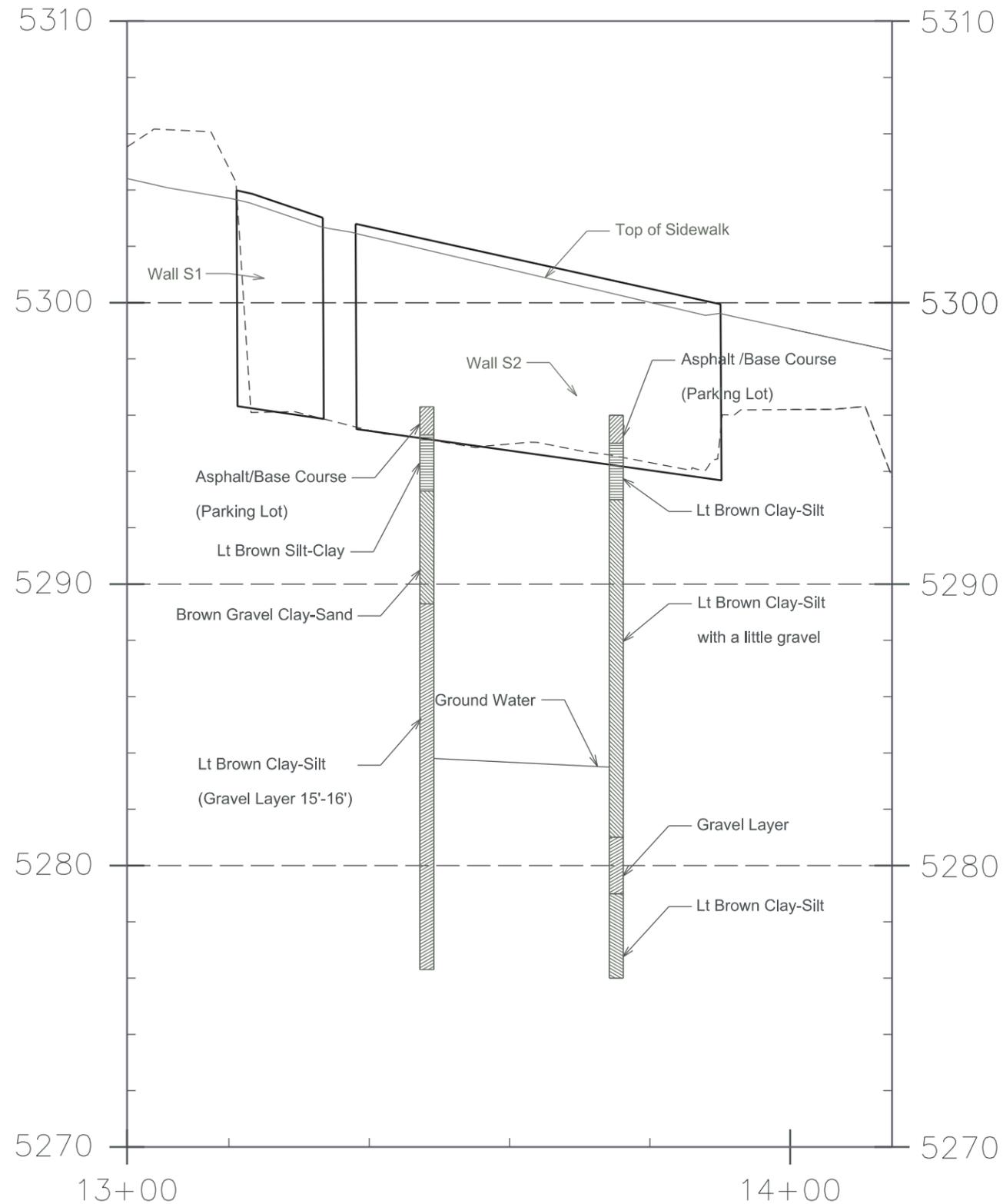


PLANS BY: **HR**  
RAPID CITY, SD

# GEOTECHNICAL INVESTIGATION WALL S2

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E16	E36
FILE: Geological Investigations S2.dgn		REV DATE:	
PLOTTING DATE: 11/18/2013		INITIAL:	

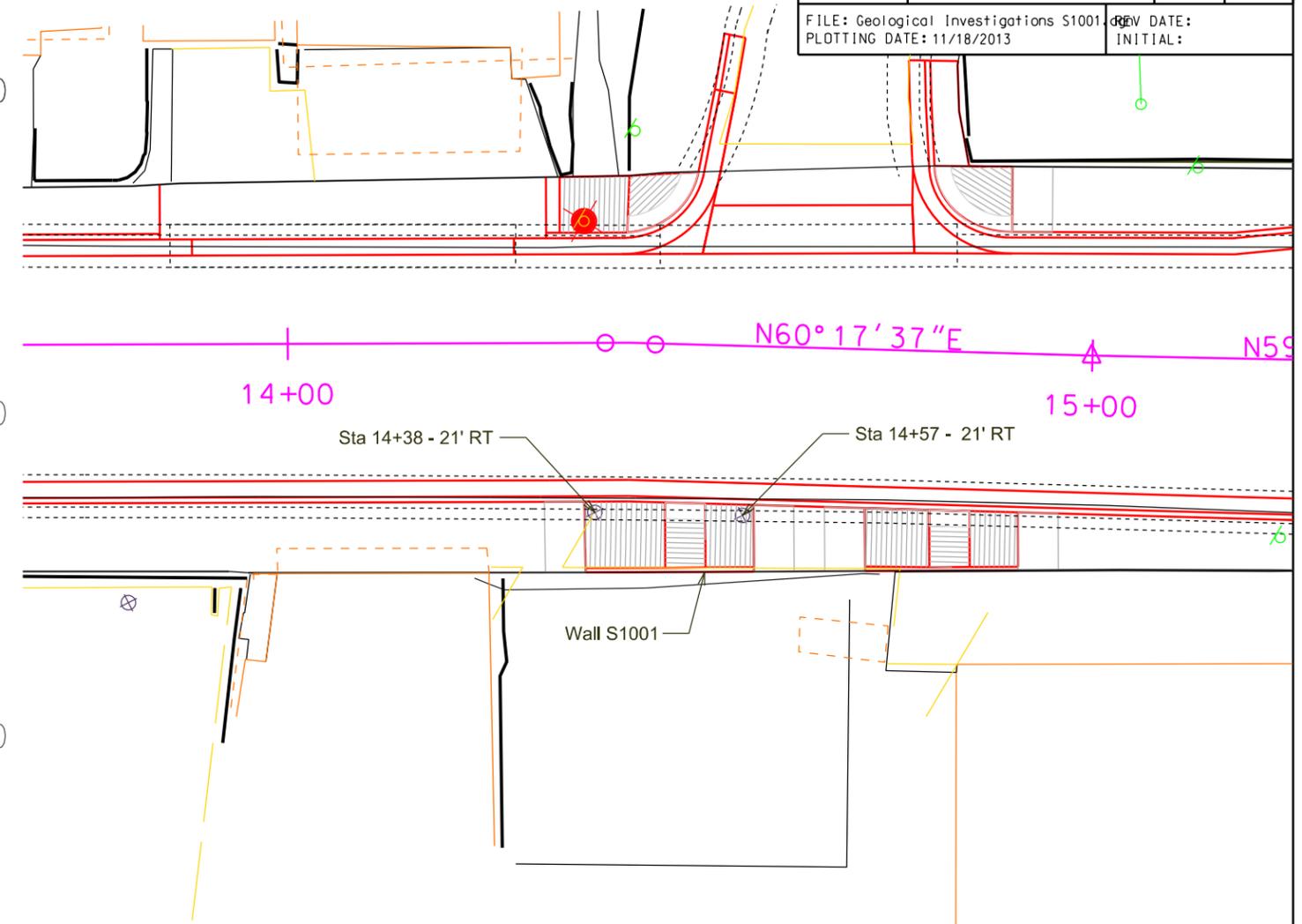
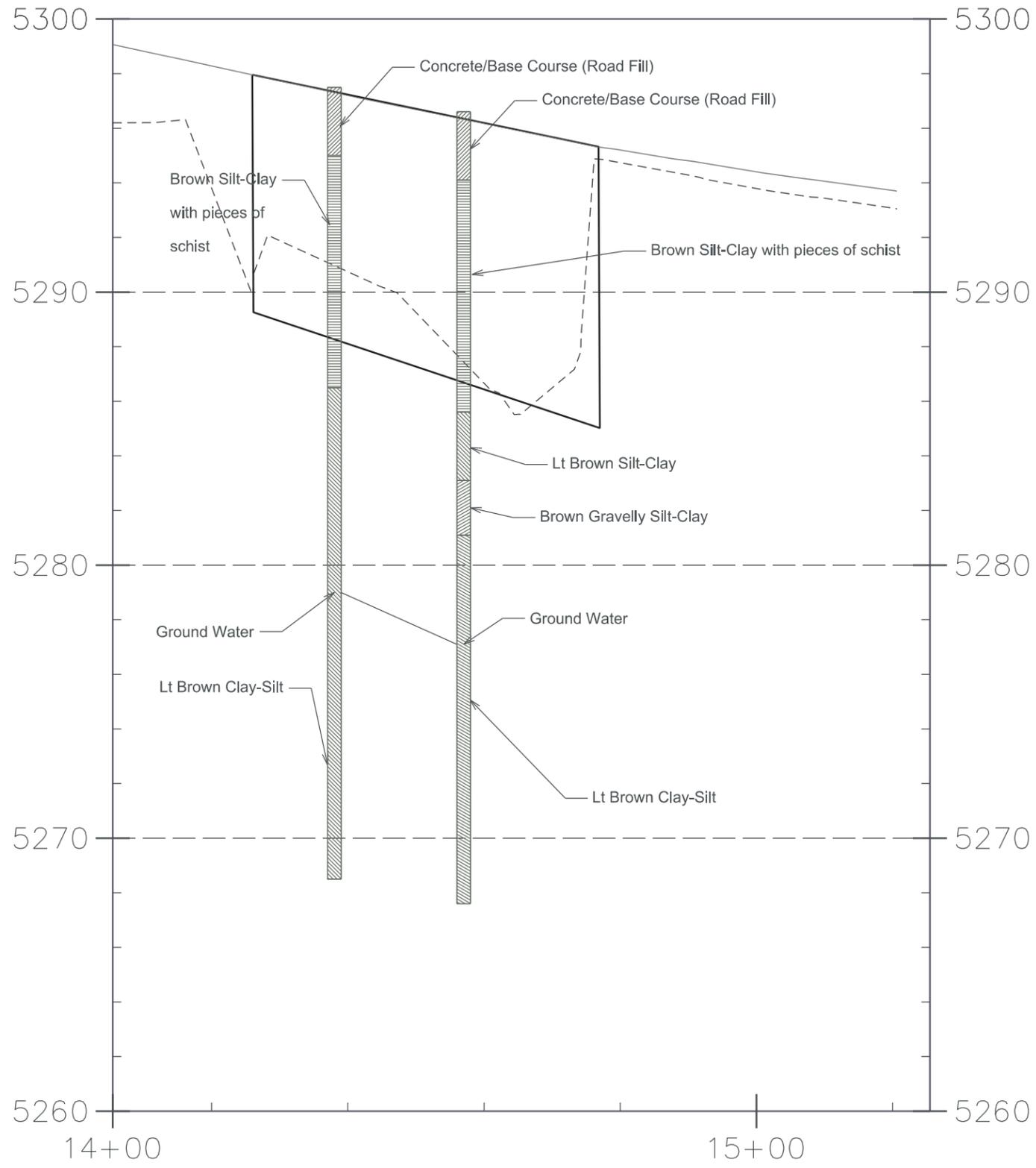


PLANS BY: **HDR**  
RAPID CITY, SD

# GEOTECHNICAL INVESTIGATION WALL S1001

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E17	E36
FILE: Geological Investigations S1001		REV DATE:	INITIAL:
PLOTTING DATE: 11/18/2013			

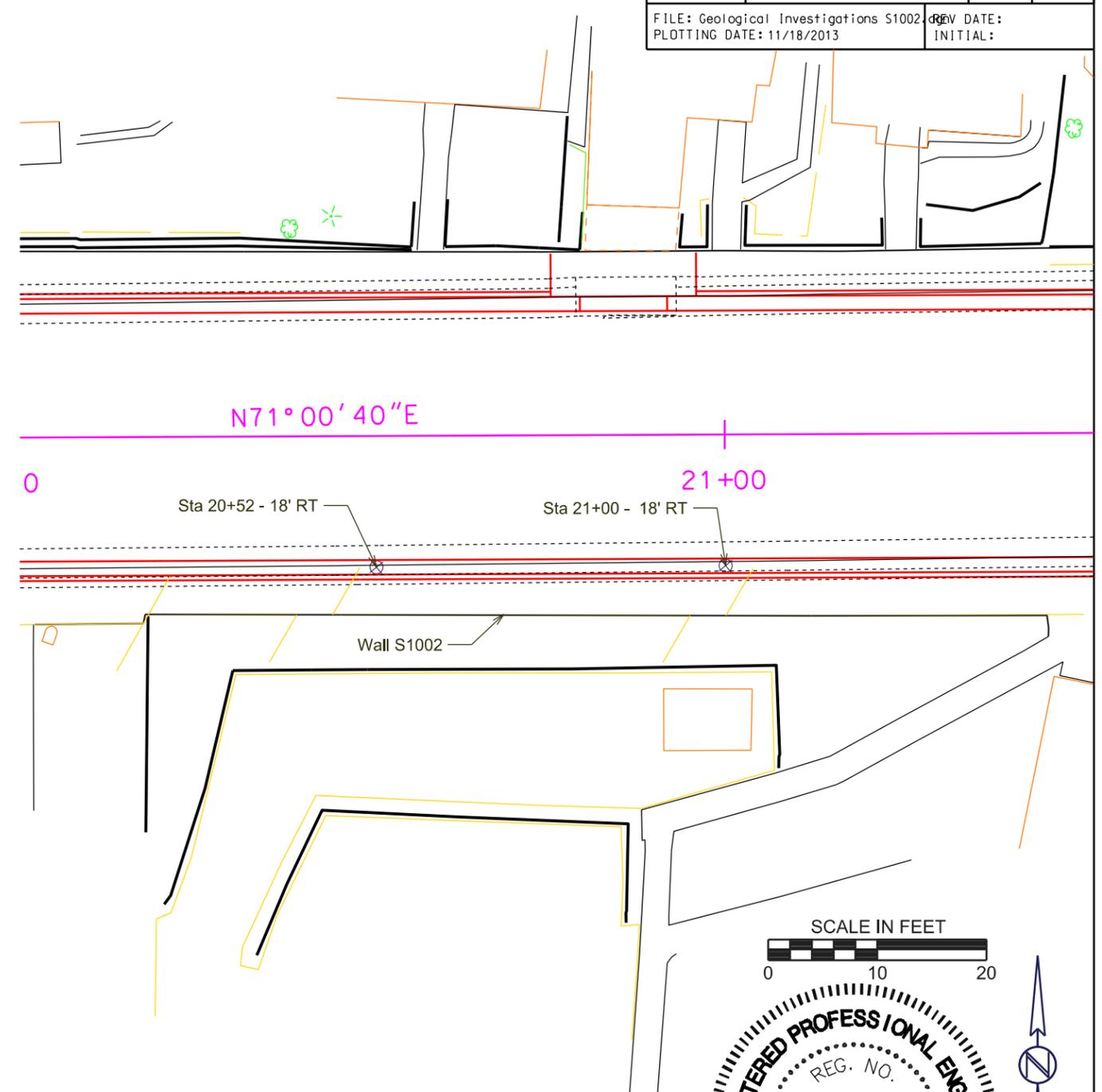
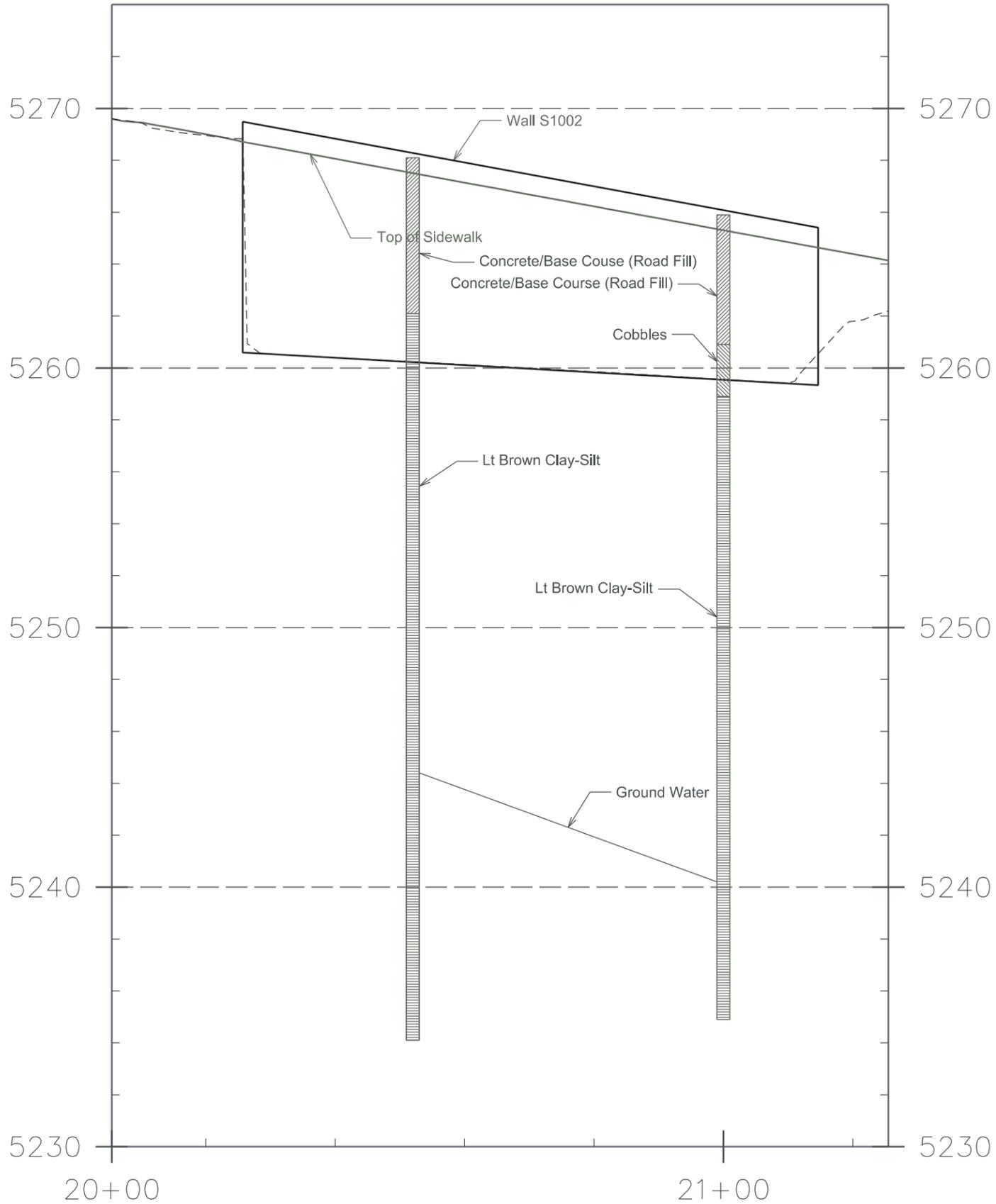


PLANS BY: **HDR**  
RAPID CITY, SD

# GEOTECHNICAL INVESTIGATION WALL S1002

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E18	E36
FILE: Geological Investigations S1002		REV DATE:	
PLOTTING DATE: 11/18/2013		INITIAL:	



SCALE IN FEET  
0 10 20

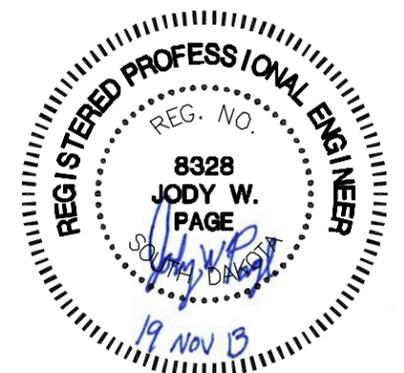
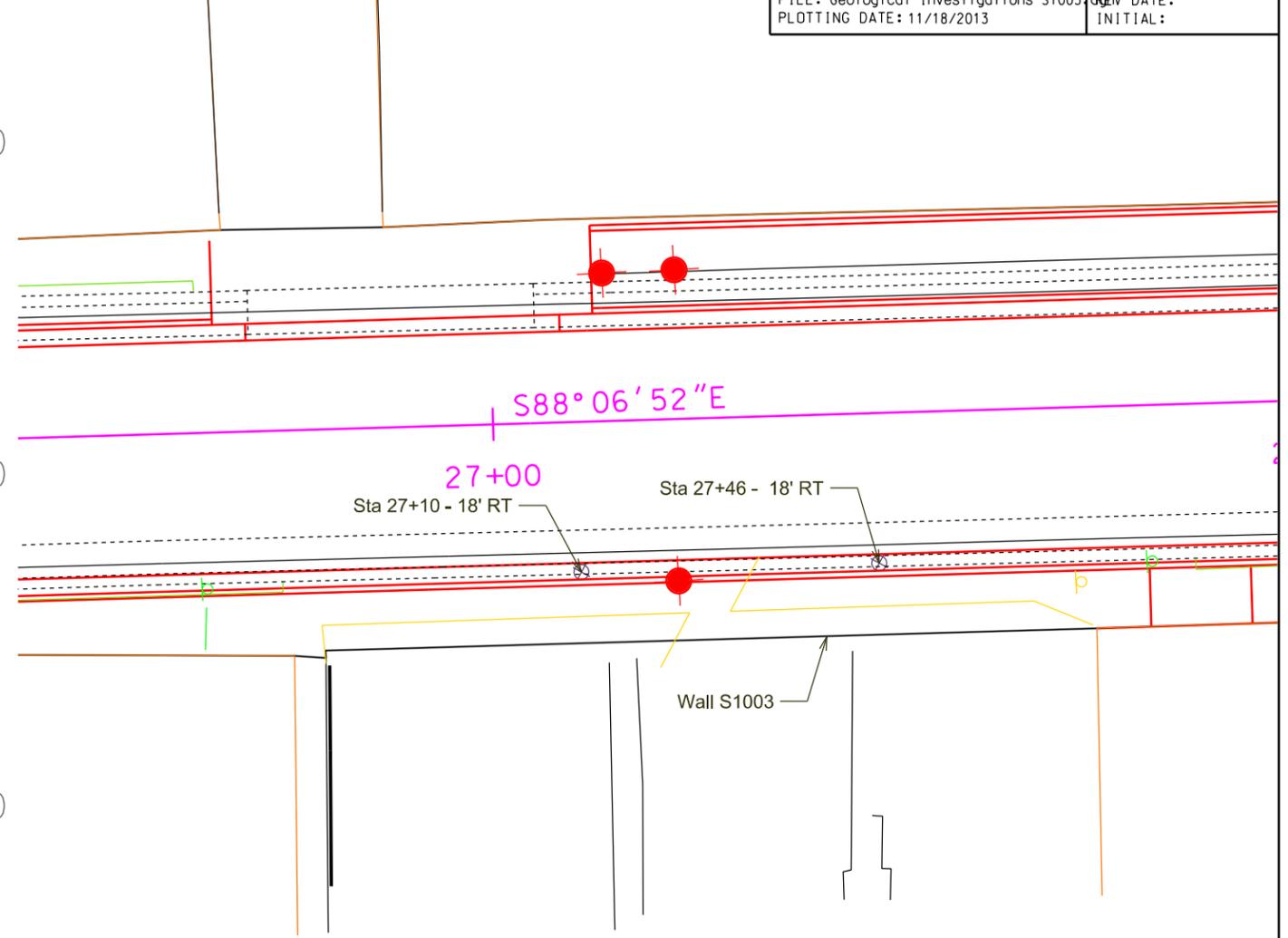
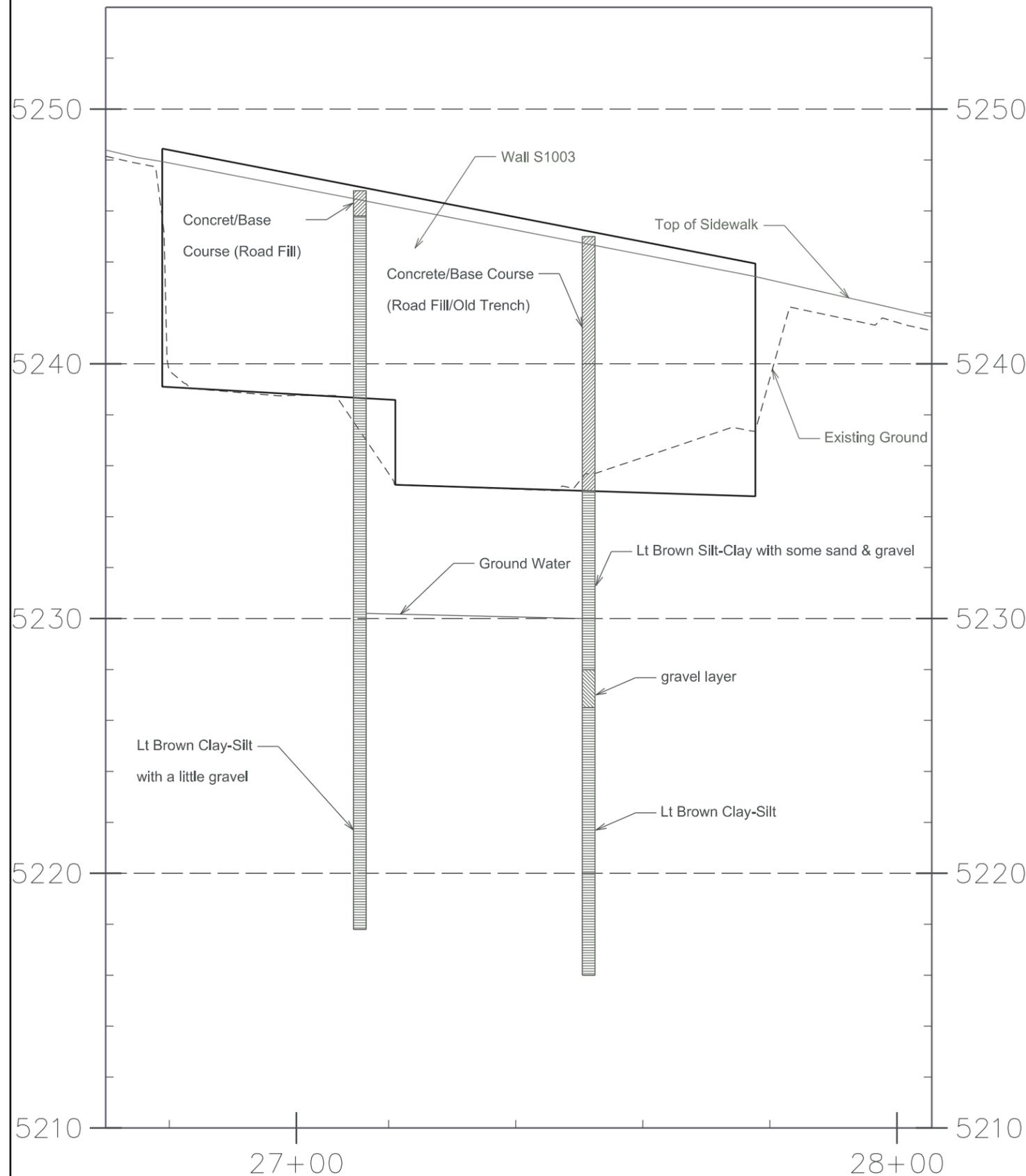
REGISTERED PROFESSIONAL ENGINEER  
REG. NO.  
8328  
JODY W. PAGE  
SOUTH DAKOTA  
19 NOV 13

PLANS BY: **HDR**  
RAPID CITY, SD

# GEOTECHNICAL INVESTIGATION WALL S1003

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E19	E36
FILE: Geotechnical Investigations S1003		REV DATE:	
PLOTTING DATE: 11/18/2013		INITIAL:	



PLANS BY: **HDR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E20	E36
FILE: Wall_CIP_Details_Notes.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	

**SPECIFICATIONS**

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

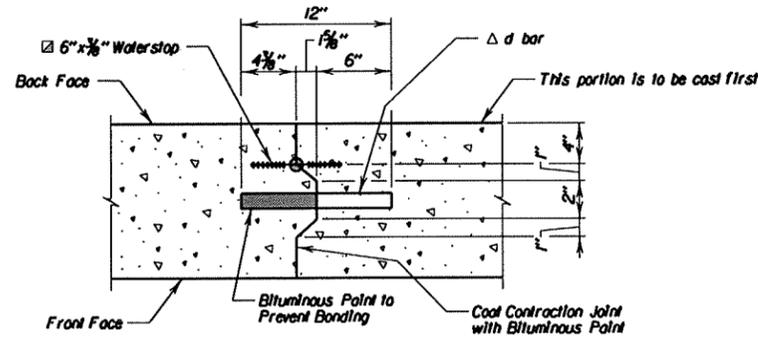
**GENERAL NOTES FOR CAST-IN-PLACE CONCRETE RETAINING WALL**

- All exposed edges shall be chamfered  $\frac{3}{8}$ ".
- Design Material Strengths:  
Concrete f'c = 4500 psi  
Reinforcing Steel (ASTM A615 Gr. 60) fy = 60000 psi
- All reinforcing steel except the d bars, shall be deformed bars.
- Use 2 Inch clear cover on all reinforcing steel EXCEPT as shown.
- All costs involved in furnishing and installing the preformed expansion joint filler material shall be incidental to the contract unit price for Class A45 Concrete, Miscellaneous.
- All costs involved in furnishing and installing waterstops shall be incidental to the contract unit prices per cubic yard Class A45 Concrete, Miscellaneous.
- All costs involved in furnishing and installing the drainage fabric, crushed gravel and 2" Dia. PVC pipe shall be incidental to the contract unit prices for 4" Dia. Corrugated Perforated Polyethylene Drainage Tubing.
- Backfill wall with local material. Use 1'-0" crushed gravel adjacent to the back face of the wall.
- Foundation preparation shall consist of placing the cast-in-place concrete retaining wall on a granular leveling pad. Prior to placement of the granular leveling pad, all spoil or loose material shall be removed and the area wetted then proof rolled to ensure adequate density. The leveling pad shall be constructed using granular material conforming to the specifications for aggregate base course in Section 882 of the Standard Specifications for Roads and Bridges, 2004. Compaction of the material shall be governed by the Specified Density Method. All costs for equipment, labor, tools, and incidentals required for the undercutting and use or disposal of the excavated material and for furnishing, placing, watering, and compacting the granular material used in the foundation preparation shall be paid for at the contract unit price per cubic yard for Footing Undercut.
- The Contractor shall be responsible for all shoring, temporary support and/or other protective measures that may be required during removal of the existing walls and construction of the proposed walls. Extreme caution should be used to prevent undermining of the adjacent building foundations and retaining walls.
- All damage that occurs to the existing buildings, foundations, stairways, walls that remain in place or other structures as a result of removal or construction activity shall be the responsibility of the Contractor.

**DESIGN MIX OF CONCRETE**

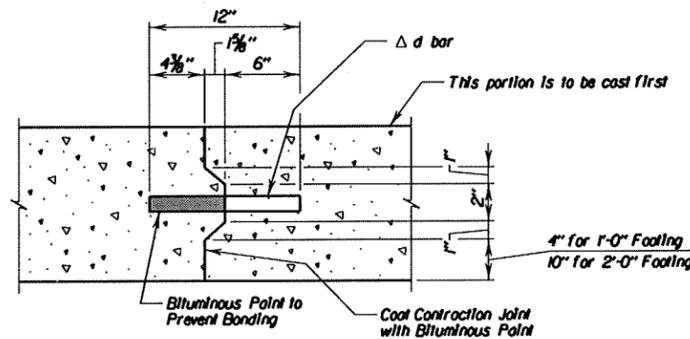
- Concrete mix shall produce a concrete having a minimum compressive strength of 4500 psi at 28 days.
- Type II cement is required.

LEGEND FOR PLACING RE-STEEL	
B.F.W.	Back Face of Wall
F.F.W.	Front Face of Wall
E.F.	Each Face

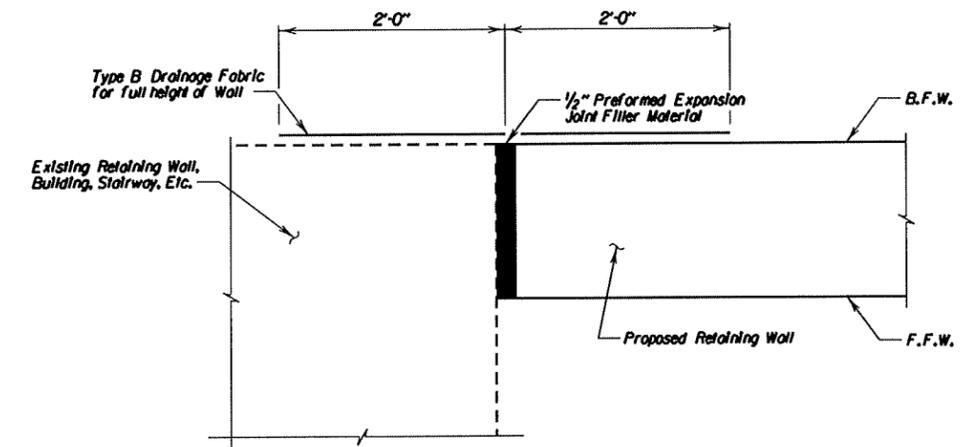


**CONTRACTION JOINT (Wall)**  
(Joint may be reversed at the option of the Contractor)

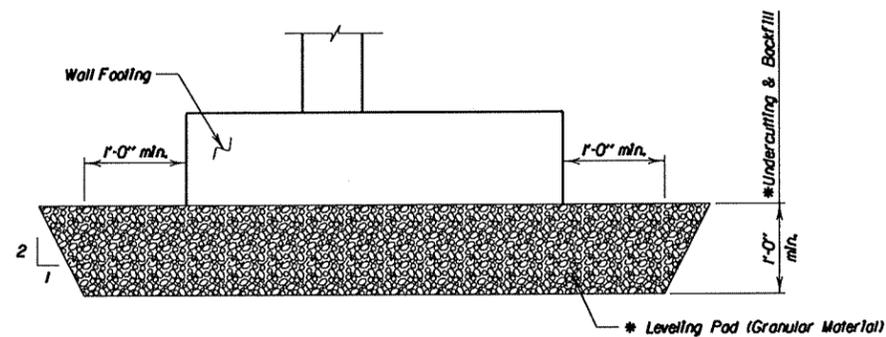
Waterstop is to be placed in one continuous strip to within one inch of the top.



**CONTRACTION JOINT (Footing)**  
(Joint may be reversed at the option of the Contractor)



DETAIL "A"

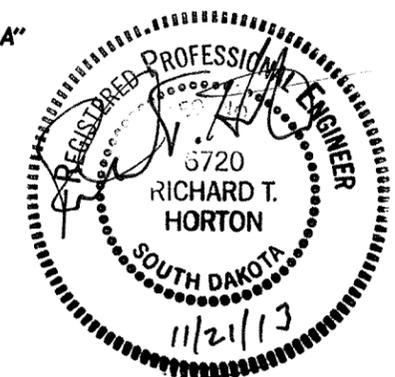


TYPICAL FOUNDATION PREPARATION

\* Granular Material shall meet the requirements of aggregate base course in Section 882 of the Standard Specifications for Roads and Bridges, 2004 Edition. Prior to placing any aggregate base course material, all spoil or loose material shall be removed and the area wetted then proof rolled to ensure adequate density.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	304.9
Reinforcing Steel	Lb.	21716
Epoxy Coated Reinforcing Steel	Lb.	15261
Structure Excavation, Retaining Wall	Cu. Yd.	1188
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Ft.	283
Remove Concrete Retaining Wall	Ft.	283
Footing Undercut	Cu. Yd.	144.3

Total for all Cast-in-Place Concrete Retaining Walls.



NOTES & DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

PLANS BY: HDR  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E21	E36
FILE: Wall_Details_S1.dgn		REV DATE: INITIAL:	
PLOTTING DATE: 11/18/2013			

WALL THICKNESS	
WALL	THICKNESS AT TOP (Inches)
S1	12 <sup>3</sup> / <sub>16</sub> " to 12 <sup>9</sup> / <sub>16</sub> "
S2	12 <sup>7</sup> / <sub>16</sub> " to 13 <sup>1</sup> / <sub>16</sub> "
S3	12 <sup>7</sup> / <sub>16</sub> " to 12 <sup>1</sup> / <sub>2</sub> "
S1001	12 <sup>7</sup> / <sub>16</sub> " to 12 <sup>3</sup> / <sub>16</sub> "
S1002	12 <sup>3</sup> / <sub>16</sub> " to 13"

TABLE A

REINFORCING SCHEDULE - WALL S1

Mk.	No.	Size	Length	Type	Bending Details
d	21	5	1'-0"	Str.	
f1	48	7	11'-2"	Str.	
N	18	4	10'-6"	17A	
k1	35	6	10'-10"	17A	
k3	18	4	6'-6"	17	
p1	24	5	16'-11"	Str.	
p2	20	4	16'-11"	Str.	

NOTE --  
 All dimensions are out to out of bars.  
 Δ d bars shall be smooth bars.  
 ▢ Bars to be epoxy coated.

ESTIMATED QUANTITIES - WALL S1

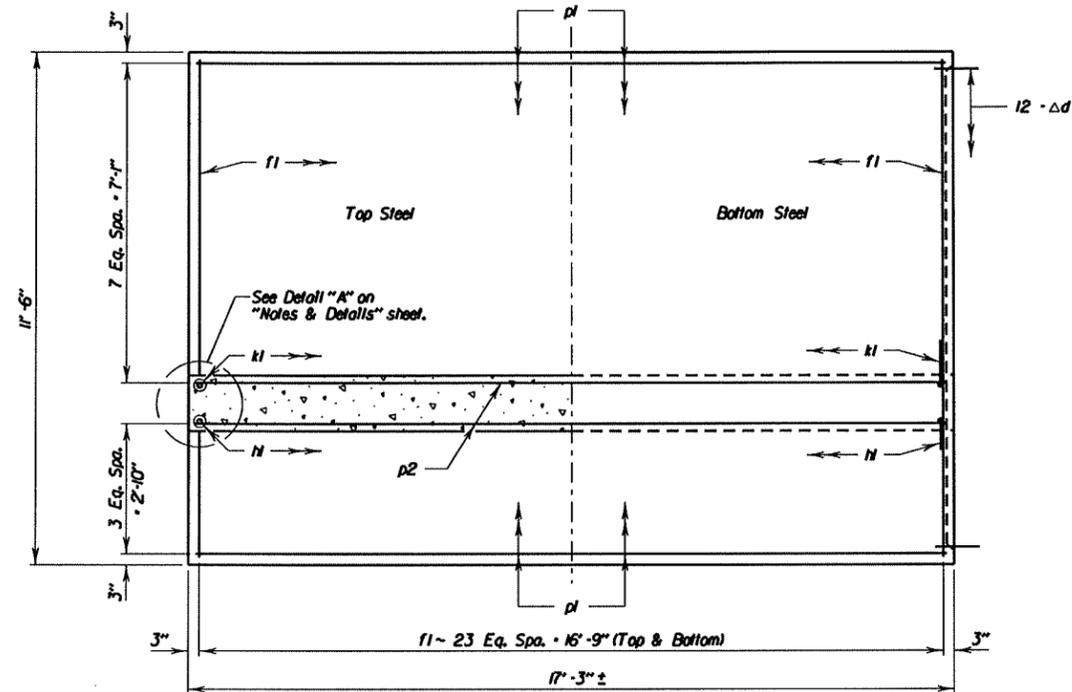
ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	21.3
Reinforcing Steel	Lb.	1519
Epoxy Coated Reinforcing Steel	Lb.	1022
Structure Excavation, Retaining Wall	Cu. Yd.	78
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	18
Remove Concrete Retaining Wall	Fl.	18
Footing Undercut	Cu. Yd.	8.9



WALL S1 DETAILS FOR  
 CAST-IN-PLACE CONCRETE  
 RETAINING WALL  
 LAWRENCE COUNTY

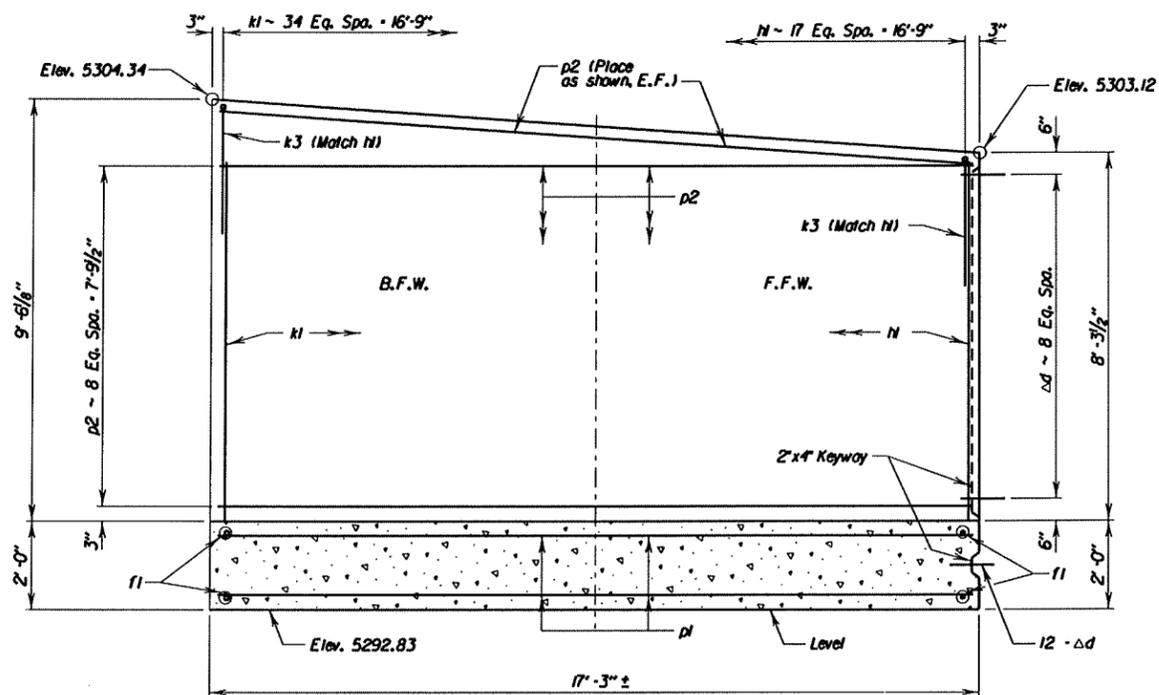
PLANS BY: **HDR**  
 RAPID CITY, SD

See Section B for Details.

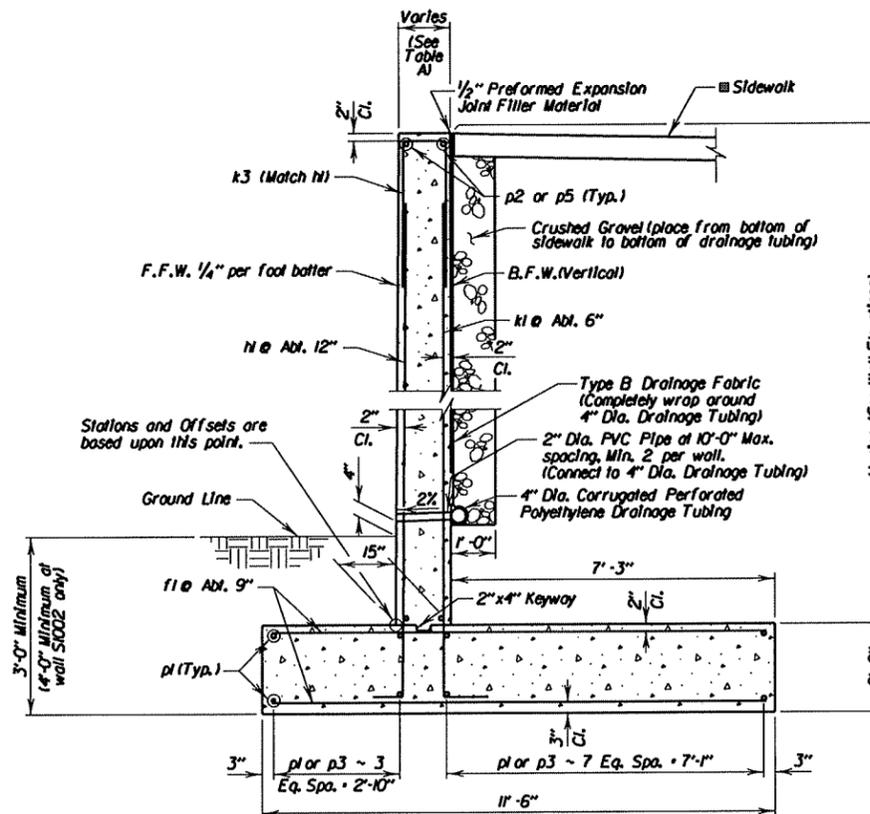


WALL S1 PLAN

NOTE:  
 "d" bars and keyway shall be placed with Wall S1 as shown if constructed before Wall S2. Alternatively, place "d" bars and keyway with Wall S2 if it is constructed prior to Wall S1.



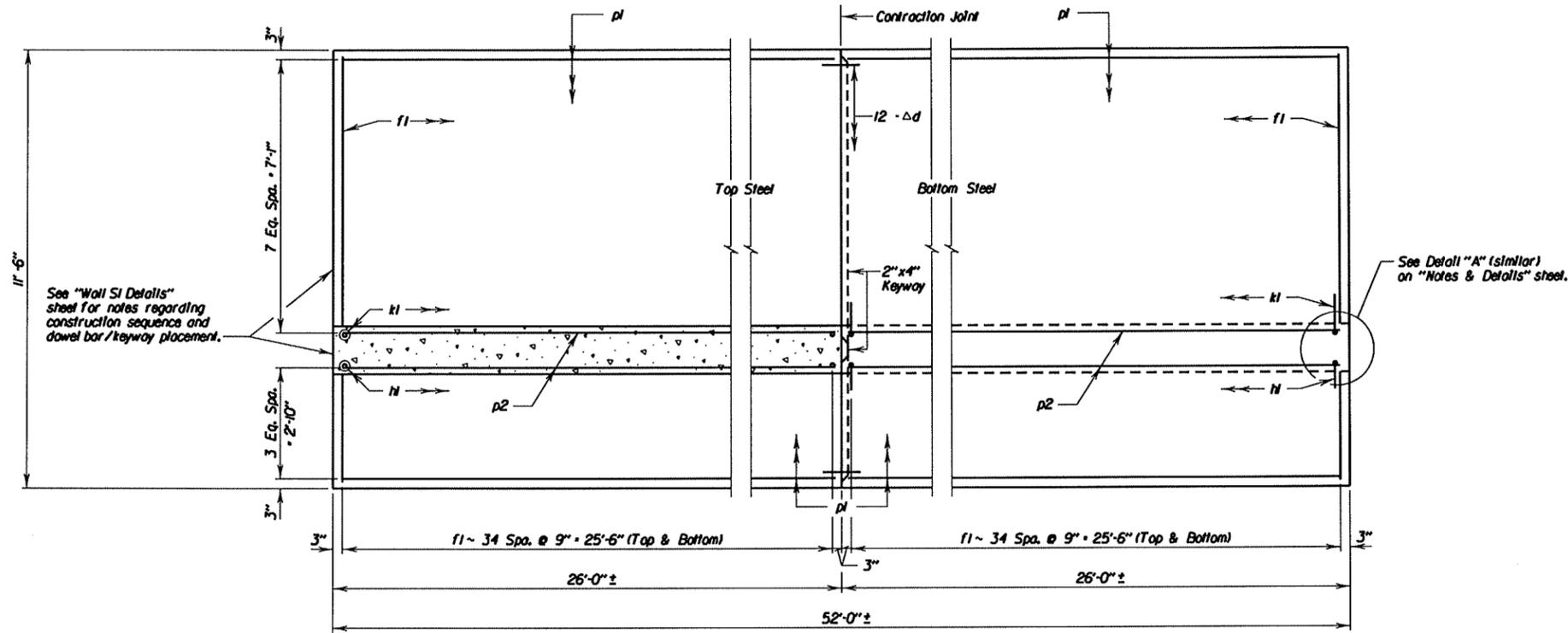
WALL S1 ELEVATION



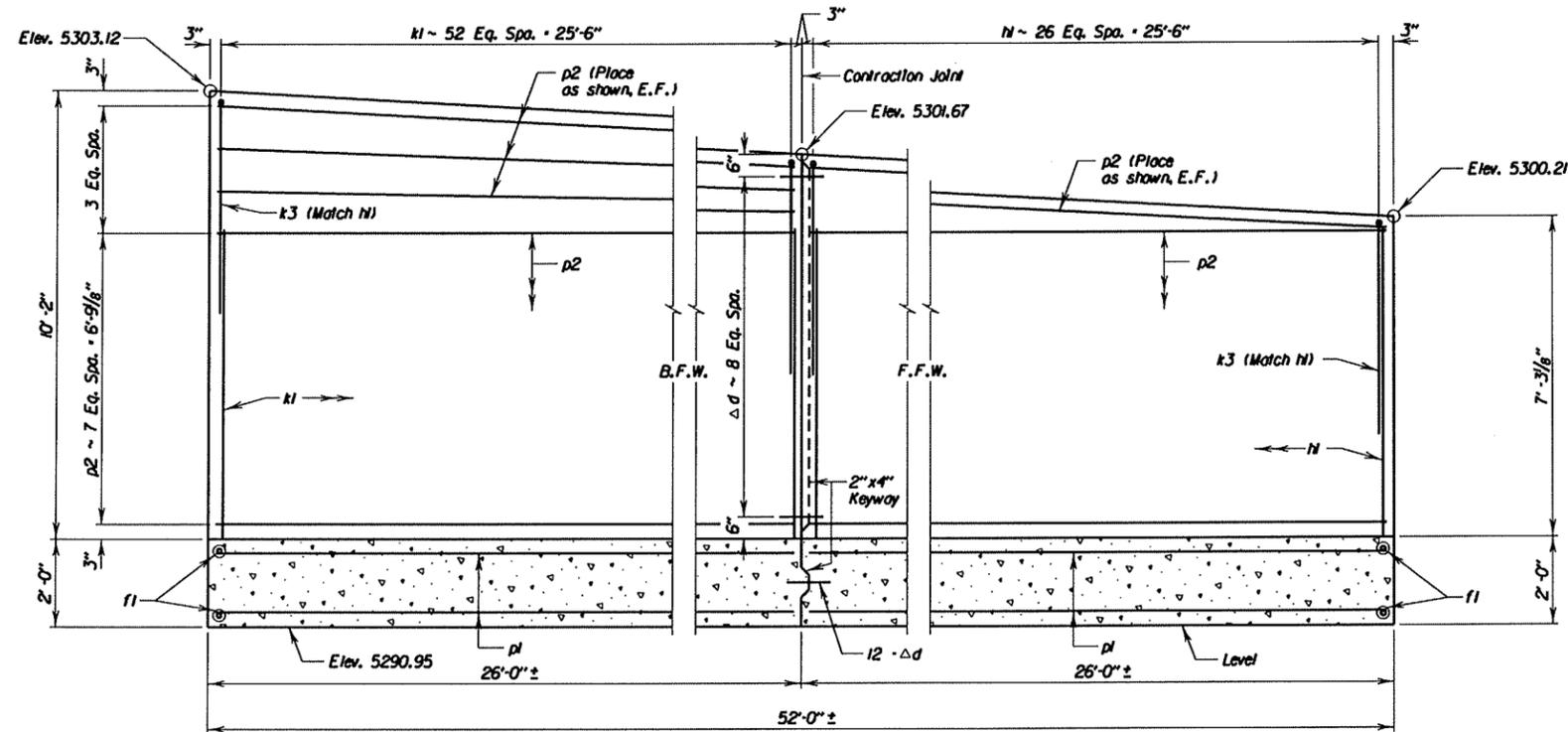
TYPICAL SECTION  
 (Walls S1 thru S3, S1001 & S1002)

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E22	E36
FILE: Wall_Details_S2.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



WALL S2 PLAN

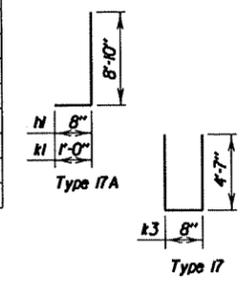


WALL S2 ELEVATION

REINFORCING SCHEDULE - WALL S2

Mk.	No.	Size	Length	Type
d	21	5	1'-0"	Str.
f1	140	7	11'-2"	Str.
N	54	4	9'-6"	17A
k1	106	6	9'-10"	17A
k3	54	4	9'-10"	17
p1	48	5	25'-8"	Str.
p2	40	4	25'-8"	Str.

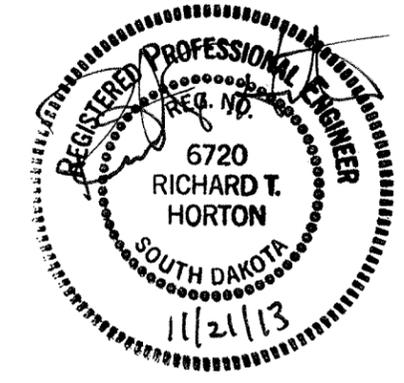
NOTE --  
All dimensions are out to out of bars.  
Δ d bars shall be smooth bars.  
⊕ Bars to be epoxy coated.



ESTIMATED QUANTITIES - WALL S2

ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	63.7
Reinforcing Steel	Lb.	4480
Epoxy Coated Reinforcing Steel	Lb.	2972
Structure Excavation, Retaining Wall	Cu. Yd.	235
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	53
Remove Concrete Retaining Wall	Fl.	53
Footing Undercut	Cu. Yd.	27.0

NOTE:  
See "Wall S1 Details" sheet for Typical Section.

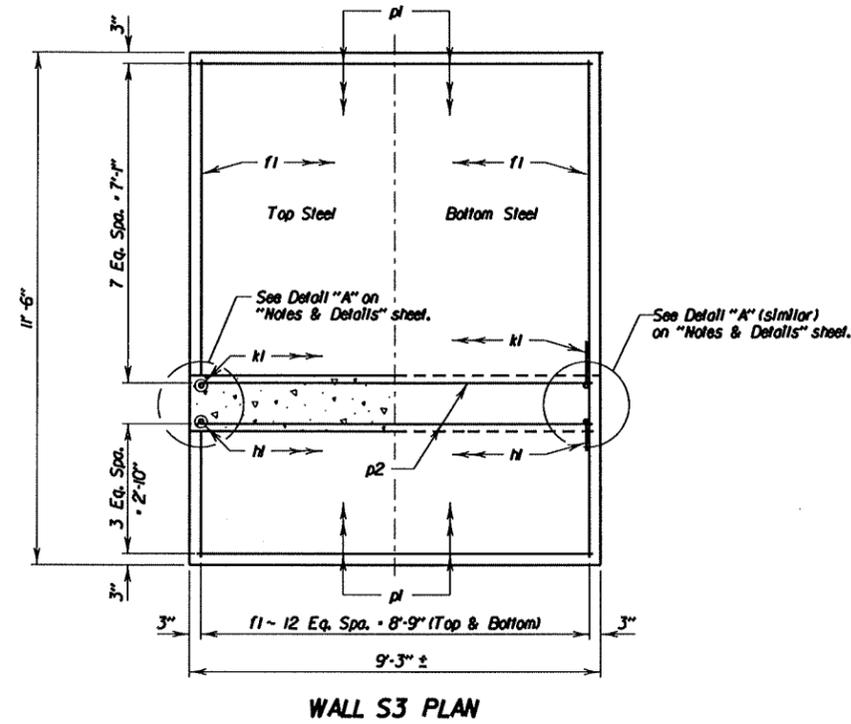


WALL S2 DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E23	E36
FILE: Wall_Details_S3.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	

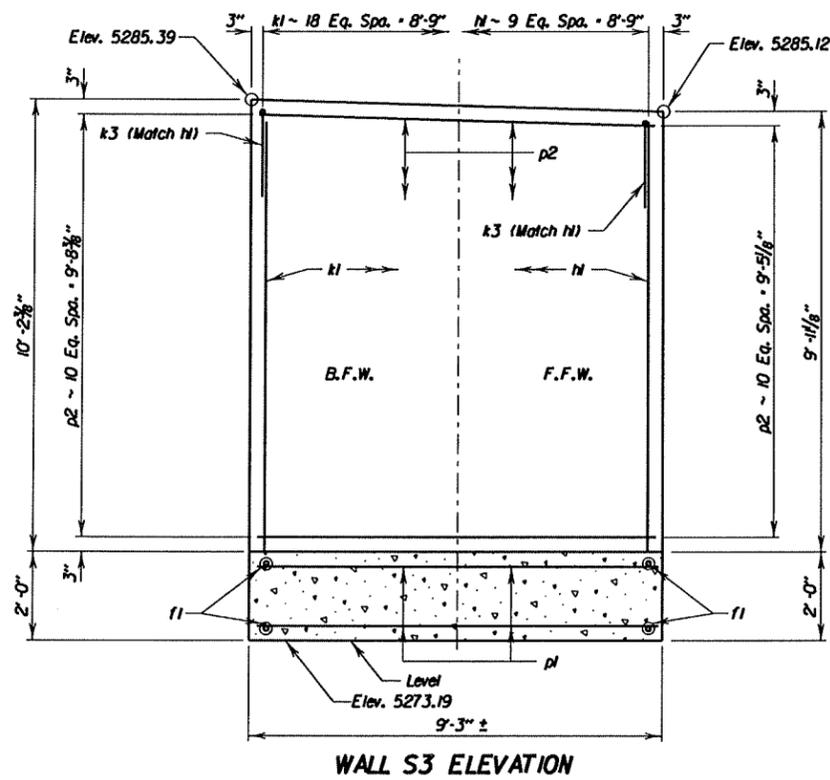


REINFORCING SCHEDULE - WALL S3				
Mk.	No.	Size	Length	Type
f1	26	7	11'-2"	Sir.
N	10	4	12'-2"	17A
k1	19	6	12'-6"	17A
k3	10	4	4'-6"	17
p1	24	5	8'-11"	Sir.
p2	22	4	8'-11"	Sir.

NOTE --  
All dimensions are out to out of bars.  
φ Bars to be epoxy coated.

ESTIMATED QUANTITIES - WALL S3		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	11.8
Reinforcing Steel	Lb.	816
Epoxy Coated Reinforcing Steel	Lb.	599
Structure Excavation, Retaining Wall	Cu. Yd.	47
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	10
Remove Concrete Retaining Wall	Fl.	10
Footing Undercut	Cu. Yd.	4.8

NOTE:  
See "Wall S1 Details" sheet for Typical Section.



WALL S3 DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL
	P 0085(72)23	NO.	SHEETS
FILE: Wall_Details_S4.dgn		REV DATE:	
PLOTTING DATE: 11/18/2013		INITIAL:	

WALL THICKNESS	
WALL	THICKNESS AT TOP (Inches)
S4	10 1/4" to 10 3/4"
S5	10 3/4" to 11"

TABLE B

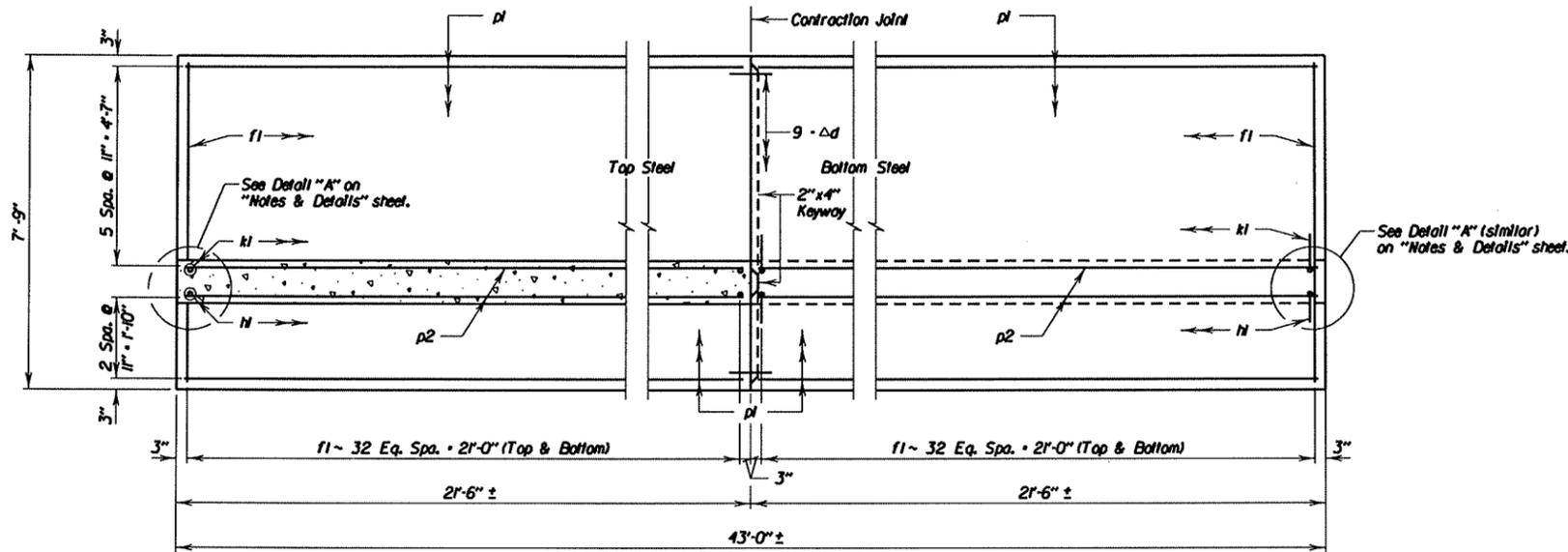
REINFORCING SCHEDULE - WALL S4

Mk.	No.	Size	Length	Type
d	15	5	1'-0"	Str.
f1	132	5	7'-5"	Str.
h1	44	4	6'-2"	17A
k1	44	5	6'-4"	17A
k3	44	4	7'-10"	17
p1	36	5	2'-2"	Str.
p2	30	4	2'-2"	Str.

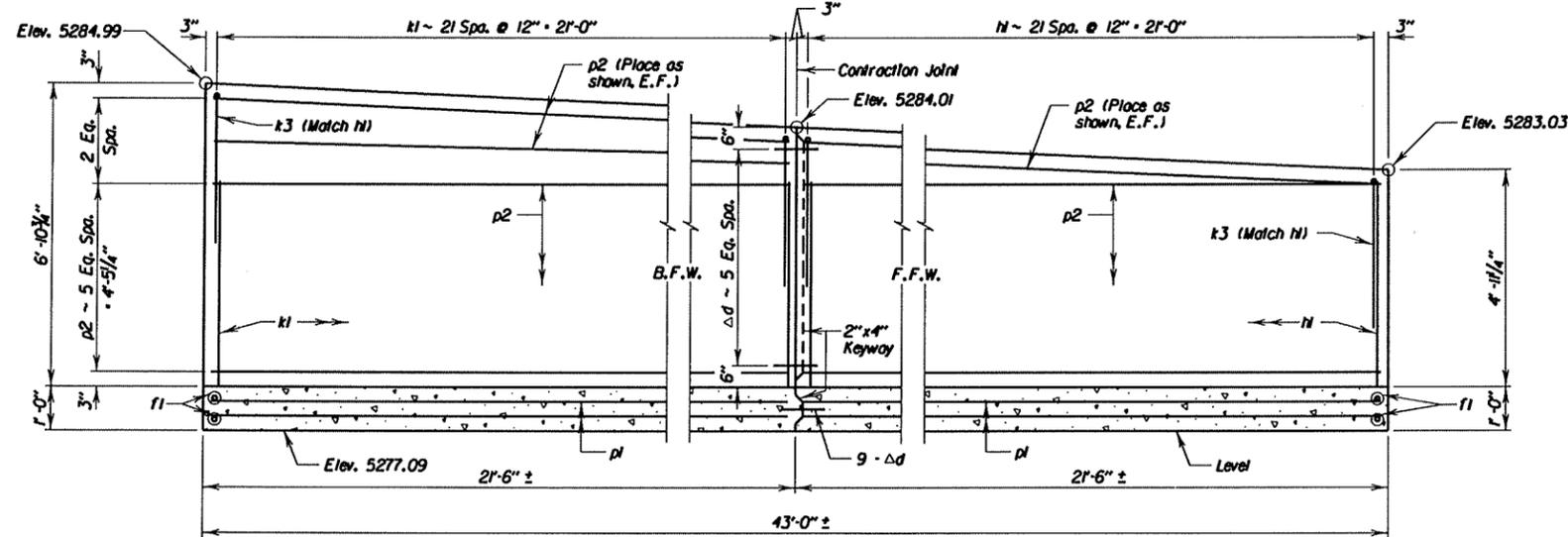
NOTE --  
All dimensions are out to out of bars.  
Δ d bars shall be smooth bars.  
ϕ Bars to be epoxy coated.

ESTIMATED QUANTITIES - WALL S4

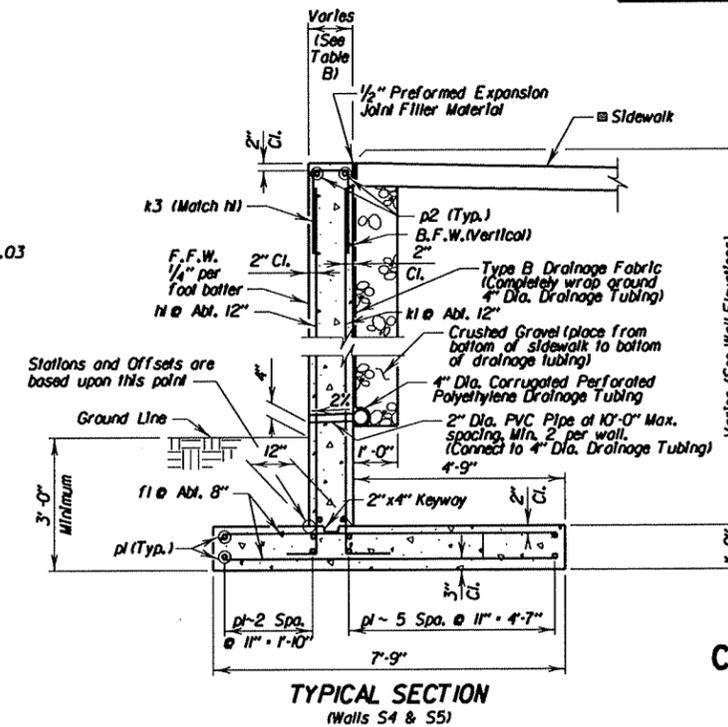
ITEM	UNIT	QUANTITY
Class M45 Concrete, Miscellaneous	Cu. Yd.	21.2
Reinforcing Steel	Lb.	186
Epoxy Coated Reinforcing Steel	Lb.	1142
Structure Excavation, Retaining Wall	Cu. Yd.	93
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	44
Remove Concrete Retaining Wall	Fl.	44
Footing Undercut	Cu. Yd.	22.3



WALL S4 PLAN



WALL S4 ELEVATION



TYPICAL SECTION  
(Walls S4 & S5)



WALL S4 DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

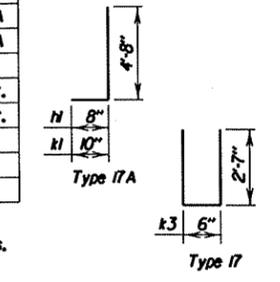
PLANS BY: **HDR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E25	E36
FILE: Wall_Details_S5.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	

**REINFORCING SCHEDULE - WALL S5**

Mk.	No.	Size	Length	Type
f1	60	5	7'-5"	Sir.
n	20	4	5'-4"	17A
k1	20	5	5'-6"	17A
k3	20	4	5'-8"	17
p1	18	5	18'-11"	Sir.
p2	12	4	18'-11"	Sir.

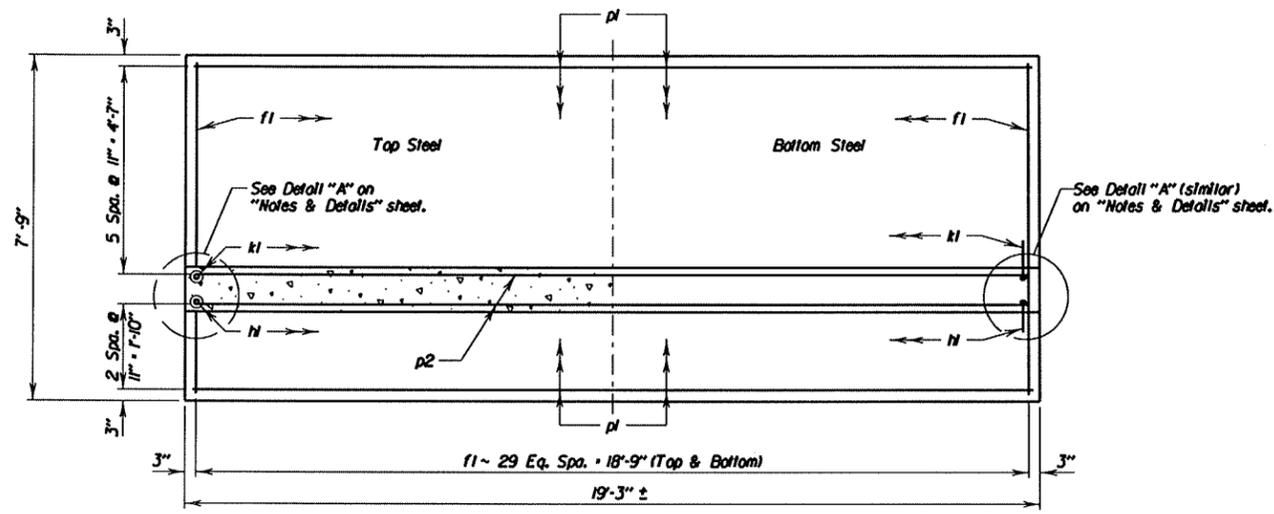


NOTE --  
All dimensions are out to out of bars.  
φ Bars to be epoxy coated.

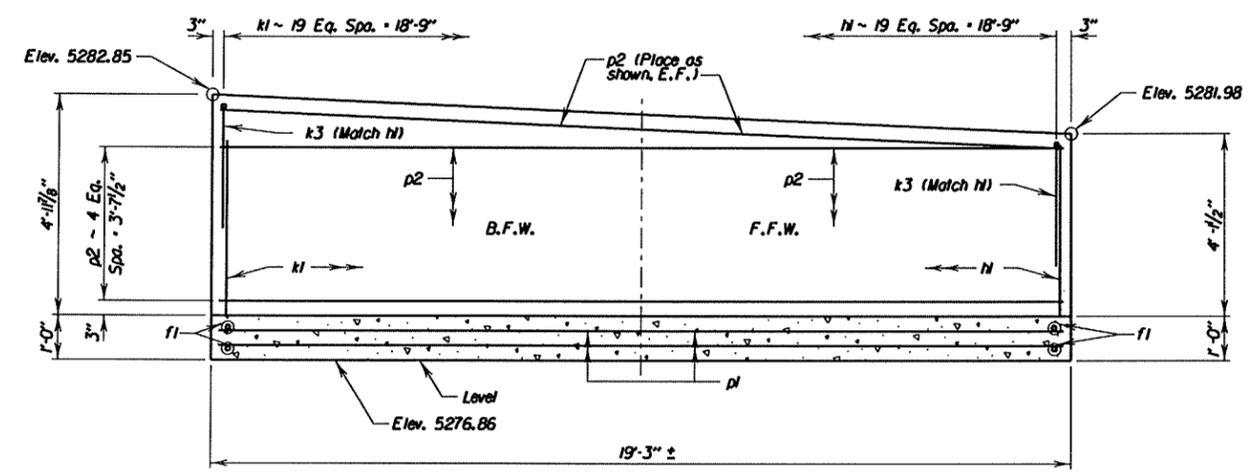
**ESTIMATED QUANTITIES - WALL S5**

ITEM	UNIT	QUANTITY
Class M45 Concrete, Miscellaneous	Cu. Yd.	8.6
Reinforcing Steel	Lb.	819
Epoxy Coated Reinforcing Steel	Lb.	414
Structure Excavation, Retaining Wall	Cu. Yd.	36
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	20
Remove Concrete Retaining Wall	Fl.	20
Footing Undercut	Cu. Yd.	10.0

NOTE:  
See "Wall S4 Details" sheet for Typical Section.



WALL S5 PLAN



WALL S5 ELEVATION



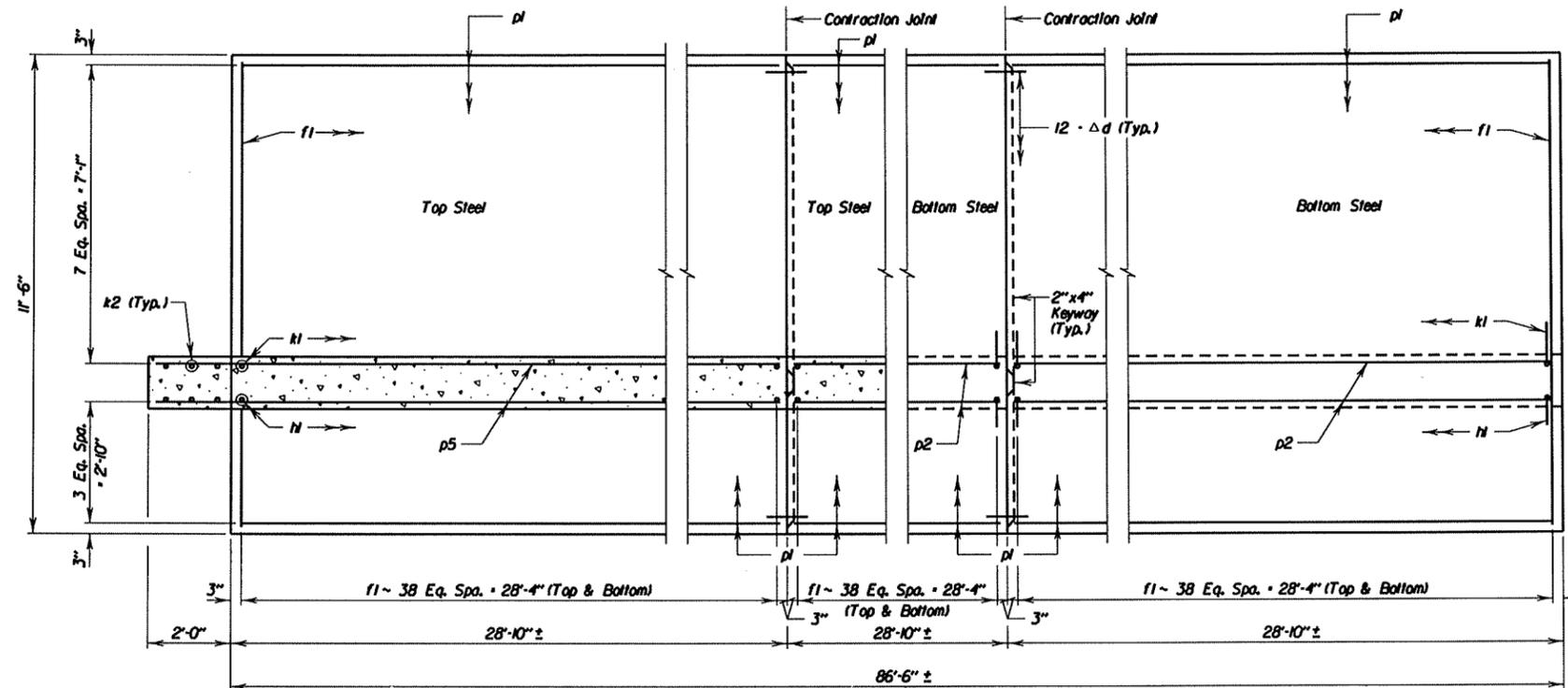
WALL S5 DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

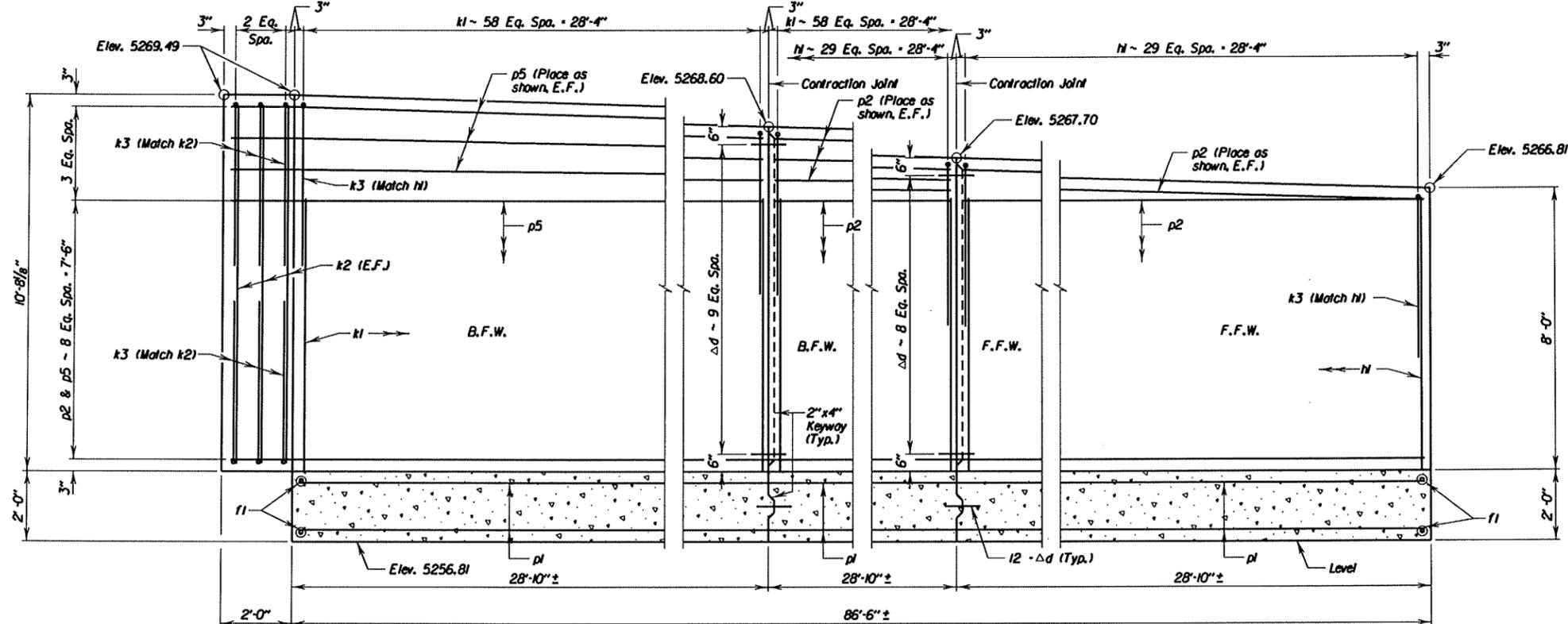


FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E27	E36
FILE: Wall_Details_S1002.dgn PLOTTING DATE: 11/18/2013		REV DATE: INITIAL:	



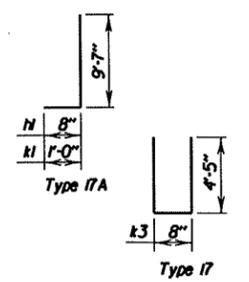
WALL S1002 PLAN



WALL S1002 ELEVATION

REINFORCING SCHEDULE - WALL S1002

Mk.	No.	Size	Length	Type
d	43	5	1'-0"	Str.
f1	234	7	11'-2"	Str.
h1	90	4	10'-3"	17A
k1	177	6	10'-7"	17A
k2	6	5	10'-4"	Str.
k3	96	4	9'-6"	17
p1	72	5	28'-6"	Str.
p2	44	4	28'-6"	Str.
p5	24	4	30'-6"	Str.

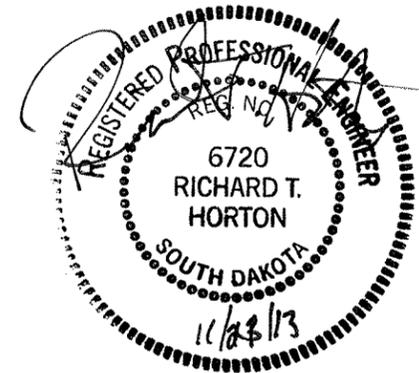


NOTE --  
All dimensions are out to out of bars.  
Δ d bars shall be smooth bars.  
Φ Bars to be epoxy coated.

ESTIMATED QUANTITIES - WALL S1002

ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	109.1
Reinforcing Steel	Lb.	7481
Epoxy Coated Reinforcing Steel	Lb.	5476
Structure Excavation, Retaining Wall	Cu. Yd.	399
4" Dia. Corrugated Perforated Polyethylene Drainage Tubing	Fl.	87
Remove Concrete Retaining Wall	Fl.	87
Footling Undercut	Cu. Yd.	44.9

NOTE:  
See "Wall S1 Details" sheet for Typical Section.



WALL S1002 DETAILS FOR  
CAST-IN-PLACE CONCRETE  
RETAINING WALL  
LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085 (72) 23	E28	E36
FILE: Wall_Block_Details_Notes.dgn PLOT DATE: 11/18/2013		REV DATE: INITIAL:	

**SPECIFICATIONS**

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

The soil parameters listed below shall be used in the design of the retaining walls.

FOUNDATION SOIL PARAMETERS	
Allowable Loading Pressure	$Q_a = 2,000$ psf
Friction Angle	$\phi = 26^\circ$
Cohesion	$c = 50$ psf
Wet Unit Weight	$\gamma_w = 110$ pcf

**GENERAL NOTES FOR GRAVITY LARGE CONCRETE BLOCK RETAINING WALL**

- All costs involved in furnishing and installing the preformed expansion joint filler material shall be incidental to the contract unit price for Gravity Large Concrete Block Wall.
- The Contractor shall be responsible for all shoring, temporary support and/or other protective measures that may be required during removal of the existing walls and construction of the proposed walls. Extreme caution should be used to prevent undermining of the adjacent building foundations and retaining walls.
- All damage that occurs to the existing buildings, foundations, stairways, walls that remain in place or other structures as a result of removal or construction activity shall be the responsibility of the Contractor.

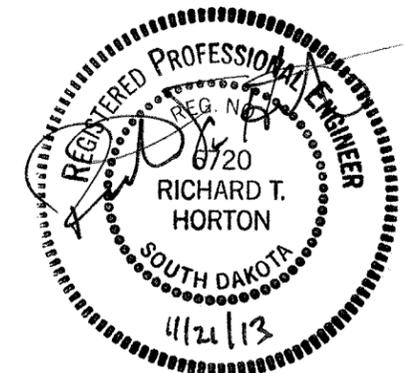
**ESTIMATED QUANTITIES**

ITEM	UNIT	WALL			TOTAL
		NB	N9	S1003	
Gravity Large Concrete Block Wall	Sq. Ft.	206	112	111	1429
Structure Excavation, Retaining Wall	Cu. Yd.	54	29	278	361
Remove Concrete Retaining Wall	Ft.	23	11	94	128
Footing Undercut	Cu. Yd.	2.4	1.2	9.9	13.5

A 6" thick leveling pad and 3'-6" wide concrete block were assumed for undercutting.

**RETAINING WALL**

- The Gravity Large Concrete Block Retaining Wall shall be on the current approved products list located at the following web address: <http://apps.sd.gov/applications/HCE0ApprovedProducts/main.aspx>
- The Contractor shall consult with an approved wall company and obtain design calculations and construction plans done by a South Dakota Registered Professional Engineer. Two copies of this data shall be forwarded to the Office of Bridge Design a minimum of 2 weeks in advance of construction for approval. Construction plans shall include plan view, elevation view (to include elevations), typical cross sections, foundation and drainage details, material and construction specifications, and a detailed listing of all quantities required for wall construction including concrete retaining wall blocks, excavation and foundation preparation.
- Foundation preparation shall consist of placing the gravity large concrete block retaining wall system on a granular leveling pad. Prior to placement of the granular leveling pad all spoil or loose material shall be removed and the area wetted then proof rolled to ensure adequate density. The leveling pad shall be constructed using granular material conforming to the specifications for aggregate base course in Section 882 of the Standard Specifications for Roads and Bridges, 2004. Compaction of the material shall be governed by the Specified Density Method. All costs for equipment, labor, tools, and incidentals required for the undercutting and use or disposal of the excavated material and for furnishing, placing, watering, and compacting the granular material used in the foundation preparation shall be paid for at the contract unit price per cubic yard for Footing Undercut.
- The minimum embedment depth to the bottom of the gravity large concrete block retaining wall shall be 2.0 ft for Wall S1003 and a minimum of 1.0 ft for Wall NB and Wall N9.
- Drainage fill material for the gravity large concrete block retaining wall system shall be granular material meeting the criteria as set by the wall block manufacturer and shall be incidental to the bid item "Gravity Large Concrete Block Retaining Wall".
- The retaining wall shall be installed in strict adherence to the selected wall companies' instructions, specifications and approved shop drawings.
- Quantities for Footing Undercut, Gravity Large Concrete Block Wall, and Structure Excavation, Retaining Wall are for bidding purposes only. Actual quantities for the above listed items must be determined from design calculations as incorporated in the shop drawings supplied by the wall designer and will be adjusted accordingly for pay purposes. The various bid items will be full compensation for the construction of the gravity large concrete block wall.



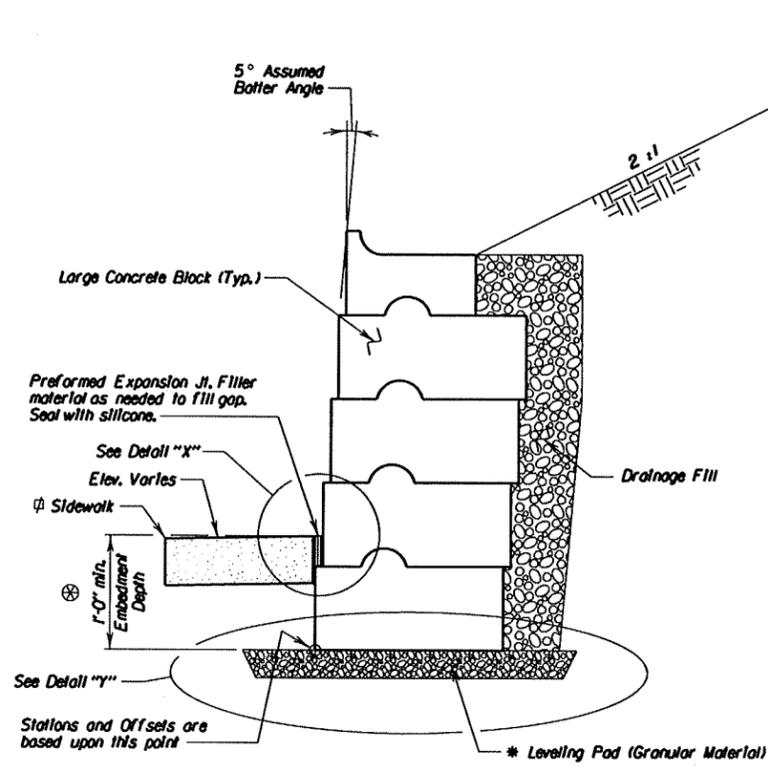
NOTES & QUANTITIES  
FOR  
**GRAVITY LARGE CONCRETE  
BLOCK RETAINING WALL**

LAWRENCE COUNTY

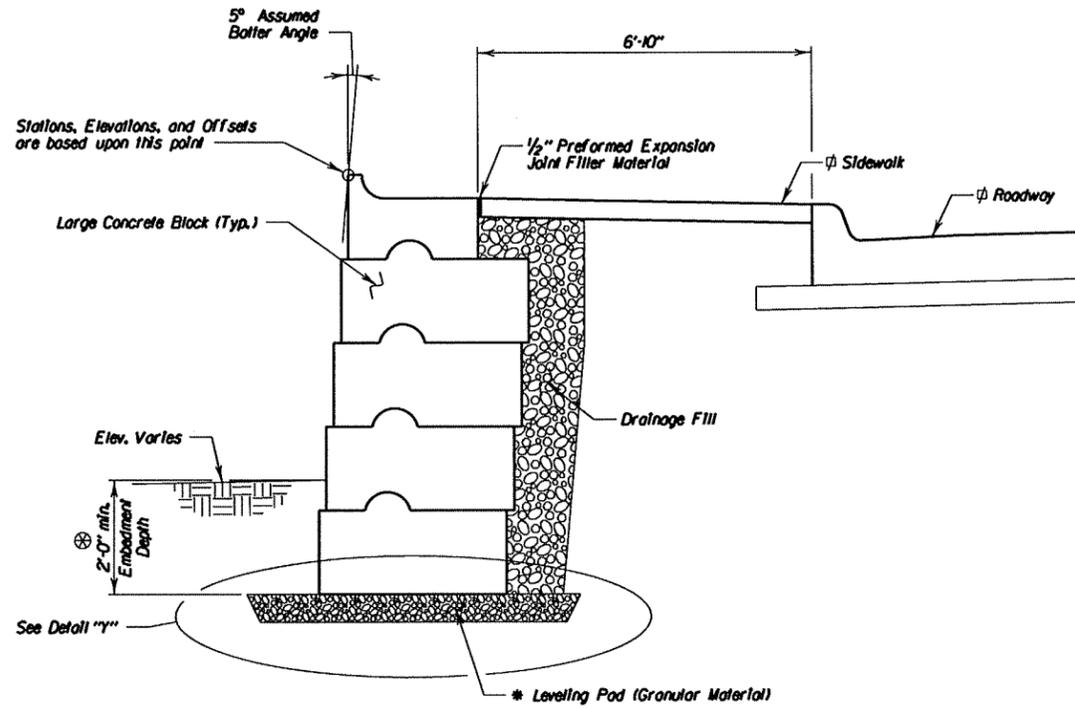
PLANS BY: **HR**  
RAPID CITY, SD

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E29	E36
FILE: Wall_Details_Typical_Section&Details.dwg		DATE:	
PLOTTING DATE: 11/18/2013		INITIAL:	



WALLS N8 & N9

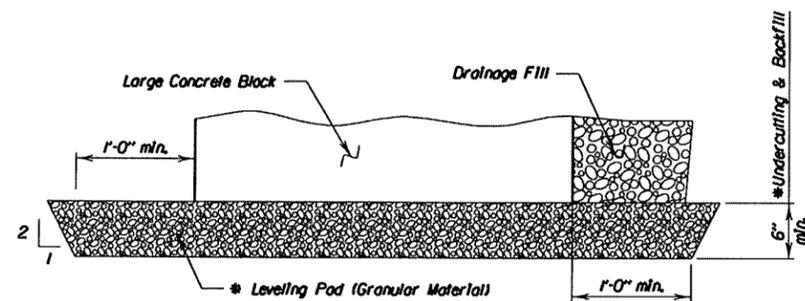


WALL S1003

⊕ 2'-0" min. for Wall S1003. Embedment depth for Walls N8 and N9 shall match existing adjacent wall embedment

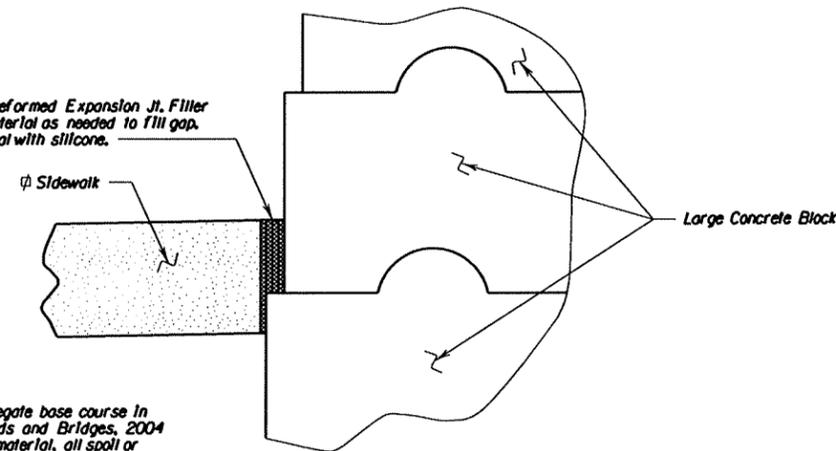
TYPICAL SECTIONS

⊕ See Section B for Details.



DETAIL "Y"  
(Foundation Preparation)

\* Granular Material shall meet the requirements of aggregate base course in Section 882 of the Standard Specifications for Roads and Bridges, 2004 Edition. Prior to placing any aggregate base course material, all spoil or loose material shall be removed and the area wetted then proof rolled to ensure adequate density.



DETAIL "X"



TYPICAL SECTION & DETAILS  
FOR  
GRAVITY LARGE CONCRETE  
BLOCK RETAINING WALL

LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E30	E36
FILE: Wall_Details_N7.dgn PLOT DATE: 11/18/2013		REV DATE: INITIAL:	

**SPECIFICATIONS**

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

**GENERAL NOTES FOR EXISTING CONCRETE RETAINING WALL REHABILITATION**

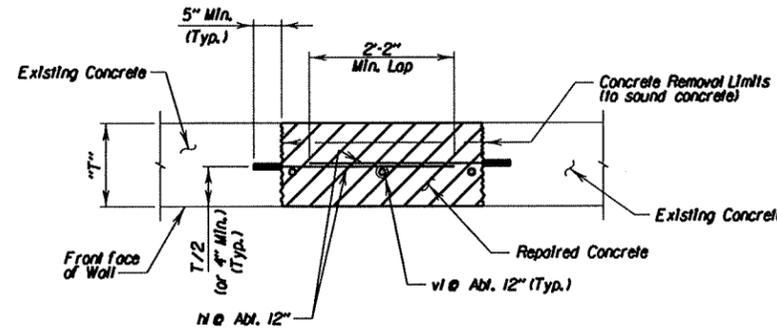
- All exposed edges shall be chamfered 1/4".
- Design Material Strengths:  
Concrete f'c = 4500 p.s.i.  
Reinforcing Steel (ASTM A615 Gr. 60) fy = 60000 p.s.i.
- These contract documents have been prepared based on field inspection and other information available at the time. Actual field conditions may require modifications to construction details and work quantities. The Contractor shall perform the work in accordance with field conditions, and as directed by the Engineer.
- Before ordering any materials, the Contractor shall make a detailed field inspection of the existing structure verifying all pertinent dimensions and elevations, and report to the Engineer any discrepancies between field measurements and those shown on the plans.
- The Contractor shall be responsible for maintaining the stability of the retaining wall during construction. The cost of any temporary bracing or shoring required as a result of the construction method shall not be paid for directly, but shall be included with the items for which direct payment is made.
- The general locations of spalled areas noted for repair are shown in these plans. The limits of spalled areas shall be outlined and identified by the Engineer by means of sounding the concrete. Removal of spalled areas marked for removal by the Engineer shall be initiated by a saw cut. The wall thickness is unknown. Concrete removal in the spalled areas shall include removal of the entire thickness of the wall, or as directed by the Engineer, but in no case shall the thickness removed be less than 6", so as to facilitate placement of reinforcing dowels. Concrete removal shall leave boundaries which will allow complete filling with plastic concrete. The Contractor shall be paid for the actual amount of repairs made on a square foot basis based on the price bid per square foot.
- The Contractor shall sandblast and clean all prepared concrete surfaces not more than 24 hours before the concrete is placed. Concrete surfaces shall be thoroughly dampened with clean water immediately prior to concrete placement.
- The cost of all preparatory work required, including field verification of all pertinent dimensions, as well as concrete removal including saw cutting, cleaning of concrete surfaces and disposal of material, as well as all labor, tools, equipment and material, shall be included in the unit price bid for WALL REPAIR.

**DESIGN MIX OF CONCRETE**

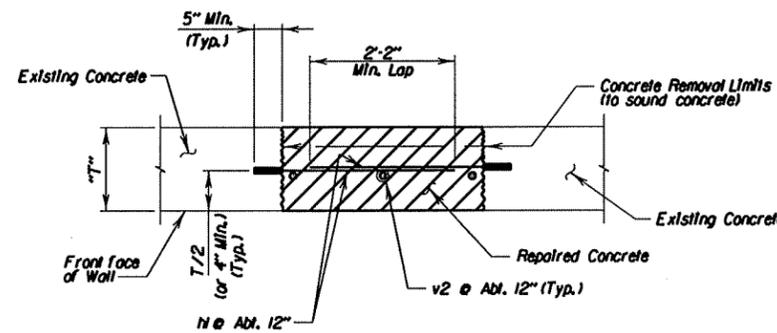
- Concrete mix shall produce a concrete having a minimum compressive strength of 4500 psi at 28 days.
- Type II cement is required.

**REINFORCING DOWELS IN CONCRETE**

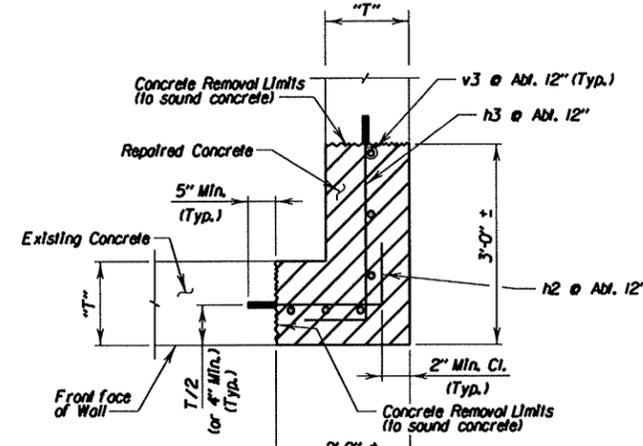
- Holes drilled in the existing concrete shall be true and normal or as shown on the plans.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (equivalent to ASTM C881, Type IV, Grade 3).
- The diameter of the drilled holes shall not be less than 1/8" inch greater, nor more than 3/8" inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/2 to 3/4 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the dowel bar. Care shall be taken to prevent epoxy from running out of horizontal holes prior to dowel bar insertion. Rotate the dowel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Include the cost of the dowel bars, drilling holes, epoxy adhesive, approval testing, installation and other incidental items in the price bid for WALL REPAIR.



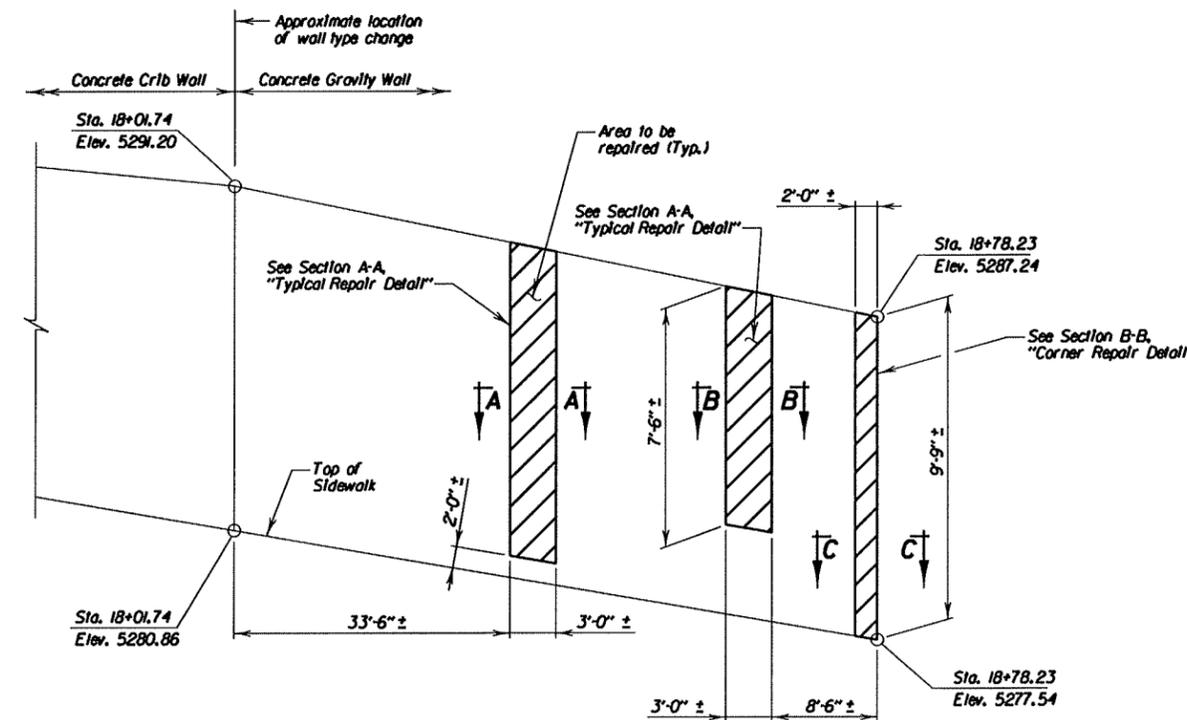
**SECTION A-A**  
(Typical Repair Detail)



**SECTION B-B**  
(Typical Repair Detail)



**SECTION C-C**  
(Corner Repair Detail)



**WALL N7 ELEVATION**  
(Front Face)

**REINFORCING SCHEDULE**

Mk.	No.	Size	Length	Type	Bending Details
∅	n1	3/8	5	3'-0"	Str.
∅	n2	11	5	3'-1"	17A
∅	n3	11	5	4'-1"	17A
∅	v1	3	5	8'-0"	Str.
∅	v2	3	5	7'-2"	Str.
∅	v3	6	5	9'-5"	Str.

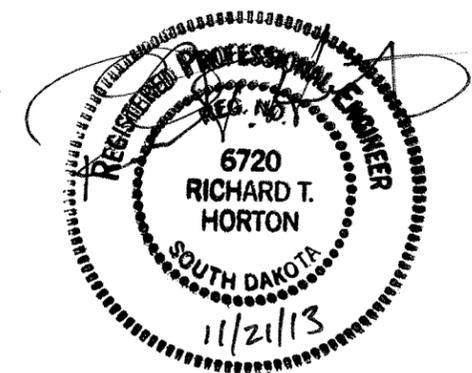
NOTE --  
All dimensions are out to out of bars.  
∅ Bars to be epoxy coated.

**ESTIMATED QUANTITIES**

ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	3.2
Epoxy Coated Reinforcing Steel	Lb.	307
Wall Repair	Sq. Ft.	95

**NOTES:**

- Wall thickness is unknown. Concrete quantity is calculated assuming 12" wall thickness.
- As described in the General Notes, the actual areas identified for repair are determined in the field by the Engineer. Reinforcing steel shall be ordered after field verifying these areas.



**WALL N7 DETAILS FOR EXISTING CONCRETE RETAINING WALL REHABILITATION**

LAWRENCE COUNTY

PLANS BY: **HDR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E31	E36
FILE: Vault_Details_102.dgn PLOT DATE: 11/18/2013		REV DATE: INITIAL:	

**SPECIFICATIONS**

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

**GENERAL NOTES FOR UNDERGROUND VAULT REHABILITATION**

- Design Material Strengths:  
Concrete f'c = 4500 p.s.i.  
Reinforcing Steel (ASTM A615 Gr. 60) fy = 60000 p.s.i.
- These contract documents have been prepared based on field inspection and other information available at the time. Actual field conditions may require modifications to construction details and work quantities. The Contractor shall perform the work in accordance with field conditions, and as directed by the Engineer.
- Before ordering any materials, the Contractor shall make a detailed field inspection of the existing structures verifying all pertinent dimensions and elevations, and report to the Engineer any discrepancies between field measurements and those shown on the plans.
- The Contractor shall support the vault walls prior to removing the sidewalk slab as required to provide stability. The cost of any temporary bracing or shoring required as a result of the construction method shall not be paid for directly, but shall be included with the items for which direct payment is made.
- The cost of all preparatory work required, including field verification of all pertinent dimensions, as well as all labor, tools, equipment and material, including concrete and reinforcing steel, granular material, polyurethane waterproofing, preformed joint filler with sealant and any required formwork, shall be included in the unit price bid for CONTROLLED DENSITY FILL.

**DESIGN MIX OF CONCRETE**

- Concrete mix shall produce a concrete having a minimum compressive strength of 4500 psi at 28 days.
- Type II cement is required.

**REINFORCING DOWELS IN CONCRETE**

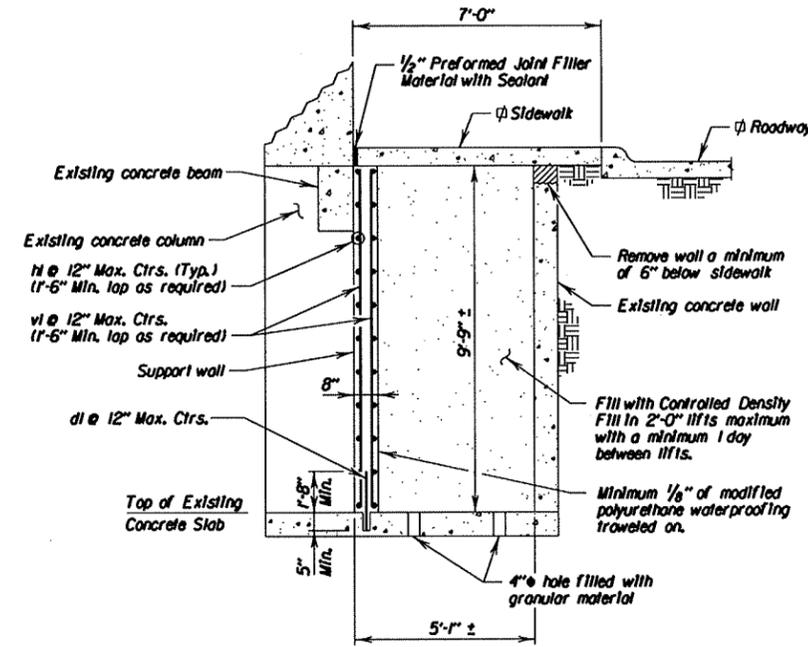
- Holes drilled in the existing concrete shall be true and normal or as shown on the plans.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (equivalent to ASTM C881, Type IV, Grade 3).
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the dowel bar. Rotate the dowel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Include the cost of the dowel bars, drilling holes, epoxy adhesive, approval testing, installation and other incidental items in the price bid for CONTROLLED DENSITY FILL.

**CONTROLLED DENSITY FILL**

- Controlled density fill shall be placed within the existing vaults, as shown on the plans. The fill shall be placed to the bottom of subgrade elevation of the proposed sidewalk and/or roadway. Controlled density fill shall be a flowable mortar material. Material and mixing shall be in accordance with Section 462 of the SD Standard Specifications, except as modified below. The mix shall be as follows:

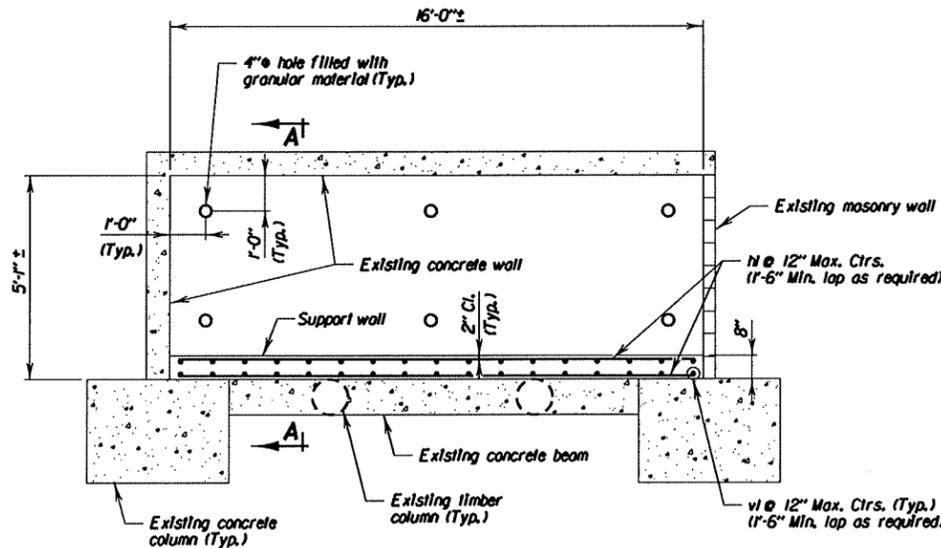
MATERIAL	RATE PER CUBIC YARD
Portland Cement Type I, II, III, or V	100 Lbs.
Fine Aggregate	2600 Lbs.
Water	60 Gal.
Fly Ash, Type C	300 Lbs.

- The fine aggregate shall be natural sand consisting of mineral aggregate particles conforming to the following gradation requirements:  
Percent Passing #4 sieve: 100  
Percent Passing No. 200 sieve: 0 - 10
- The mix shown above is designed to produce a minimum compressive strength of 100 psi. The Engineer may adjust the proportion of water at the site to provide the necessary mix consistency.
- No backfill material shall be placed sooner than 4 hours after placement of the controlled density fill.
- All costs for furnishing and installing the controlled density fill, including formwork, labor, materials, equipment and incidentals necessary to complete the work shall be included in the contract unit price per cubic yard for CONTROLLED DENSITY FILL. Payment will be for plans quantity regardless of the quantity actually placed.



SECTION A-A

See Section B for Details



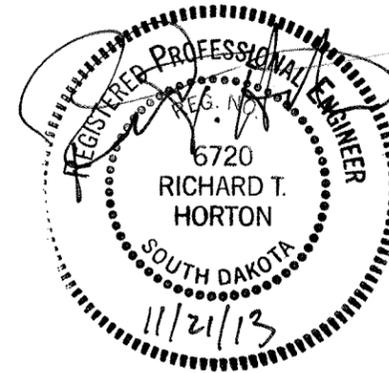
VAULT 102 - PLAN

**REINFORCING SCHEDULE**

VAULT	Mk.	No.	Size	Length	Type
102	dl	17	4	2'-1"	Str.
	N	22	4	15'-8"	Str.
	V	34	4	9'-5"	Str.
103	dl	47	4	2'-1"	Str.
	N	16	4	45'-3"	Str.
	V	94	4	8'-0"	Str.
104	dl	39	4	2'-1"	Str.
	N	22	4	38'-2"	Str.
	V	78	4	9'-10"	Str.
108	N	18	4	3'-0"	Str.
	V	4	4	7'-11"	Str.

NOTES:

- All dimensions are out to out of bars.
- Reinforcing steel shall not be ordered until the Contractor has completed the field inspection and verification of dimensions as described in the General Notes.



NOTES & VAULT 102 DETAILS FOR UNDERGROUND VAULT REHABILITATION

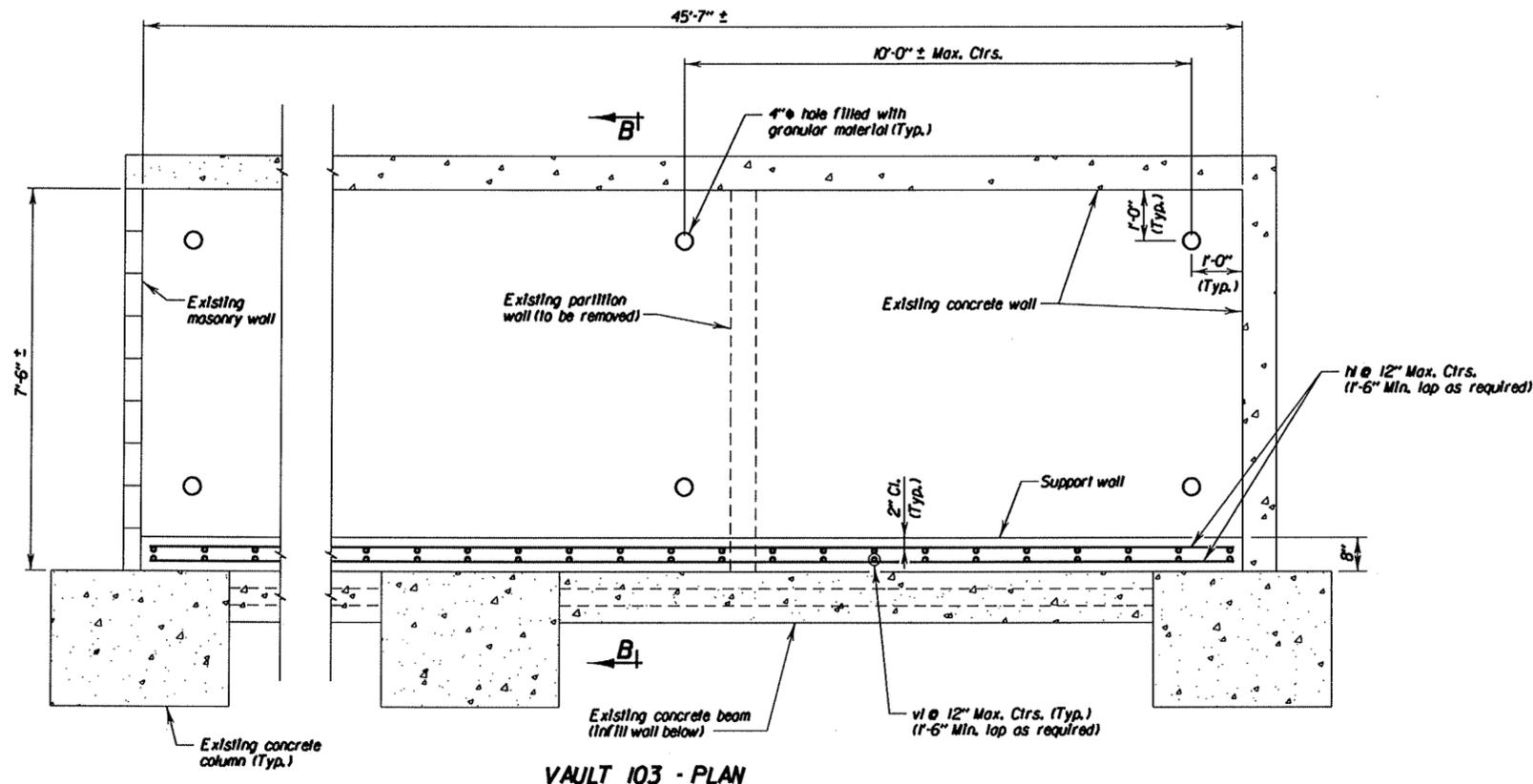
LAWRENCE COUNTY

PLANS BY: HDR  
RAPID CITY, SD

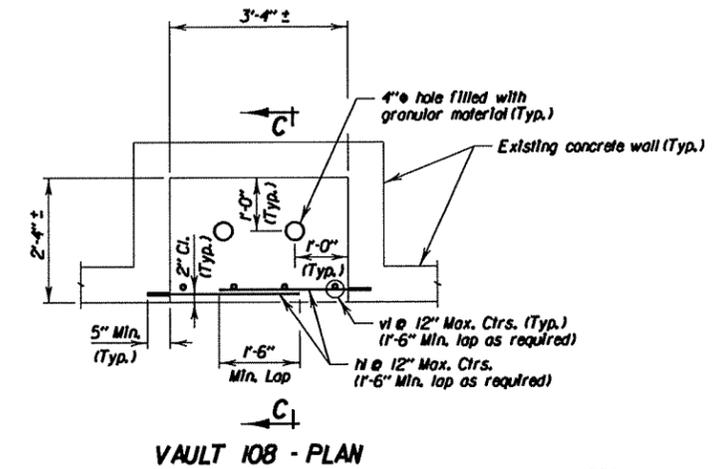
**ESTIMATED QUANTITIES**

ITEM	UNIT	VAULT				TOTAL
		102	103	104	108	
Class A45 Concrete, Miscellaneous	Cu. Yd.	3.9	8.3	9.7	2.4	24.3
Reinforcing Steel	Lb.	468	1051	1127	57	2703
Controlled Density Fill	Cu. Yd.	25.5	85.6	76.1	-	187.2

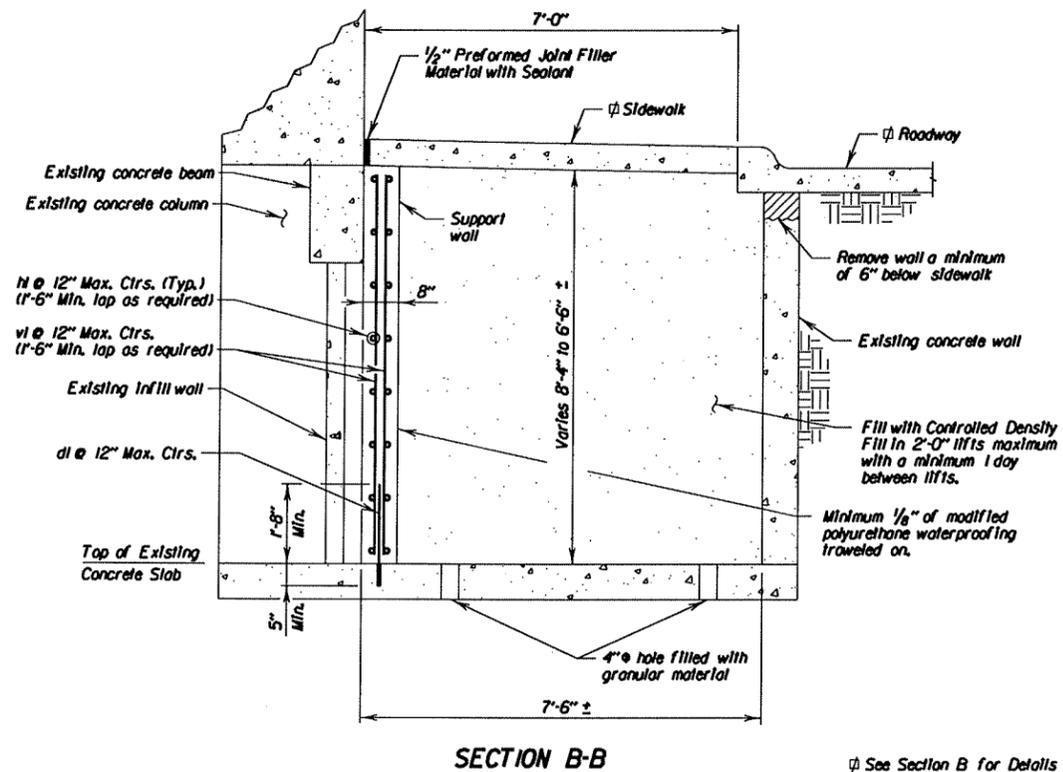
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E32	E36
FILE: Vault_Details_103_108.dgn PLOT DATE: 11/18/2013		REV DATE: INITIAL:	



VAULT 103 - PLAN

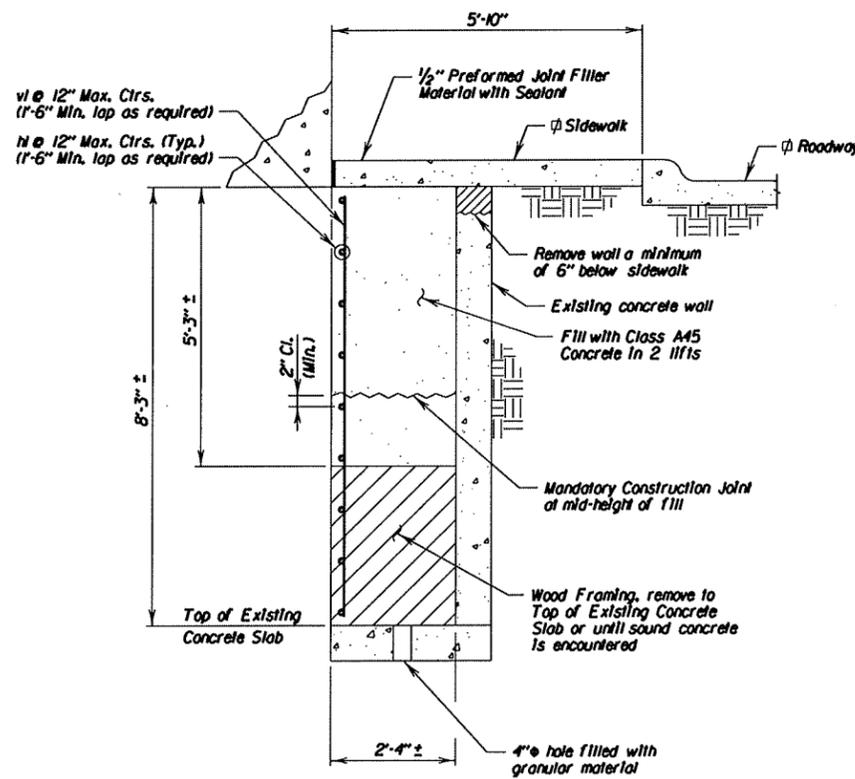


VAULT 108 - PLAN



SECTION B-B

See Section B for Details



SECTION C-C

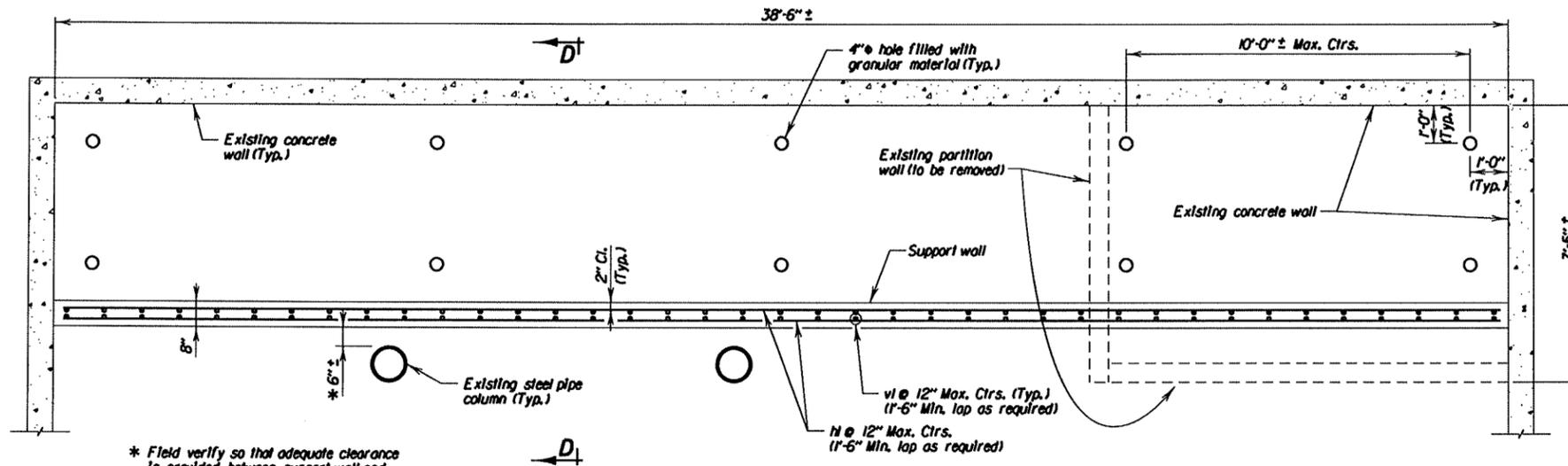


NOTE:  
See "Notes & Vault 102 Details" for  
Estimated Quantities and Reinforcing Schedule.

VAULT 103 & VAULT 108 DETAILS FOR  
UNDERGROUND VAULT  
REHABILITATION  
LAWRENCE COUNTY

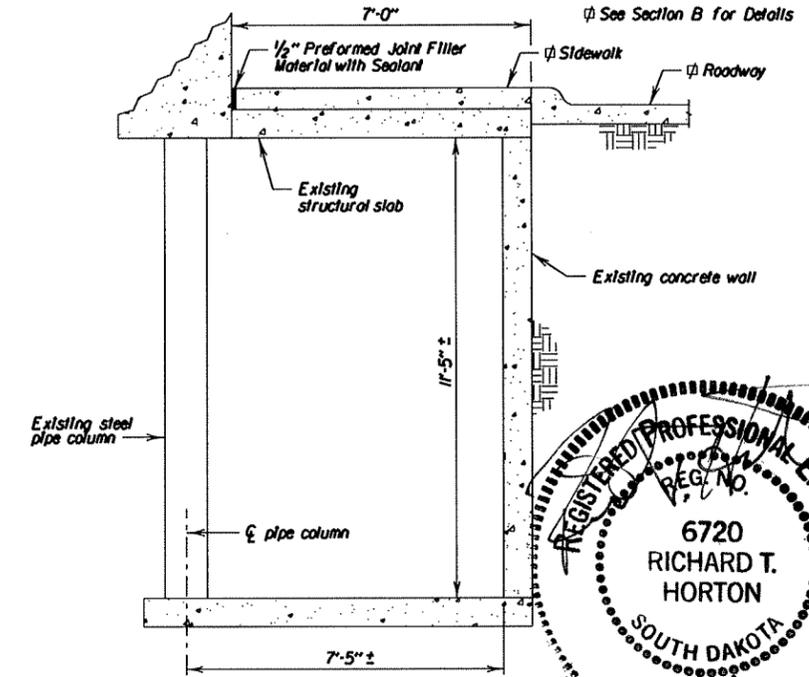
PLANS BY: **HDR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085 ( 72 ) 23	E33	E36
FILE: Vault_Details_104_105.dgn PLOT DATE: 11/18/2013		REV DATE: INITIAL:	

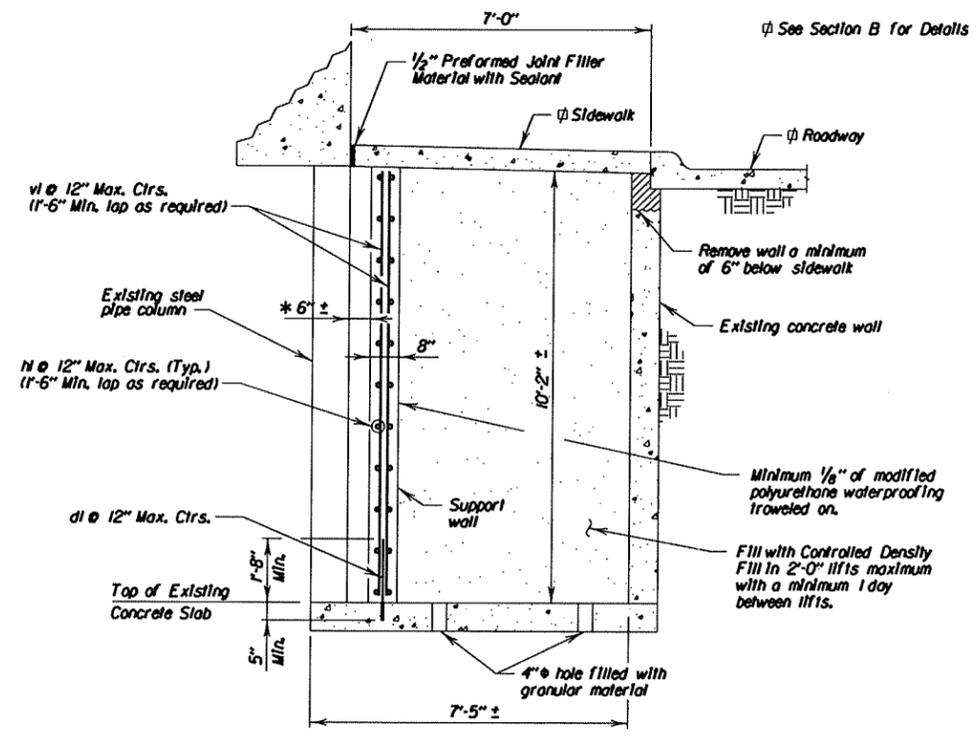
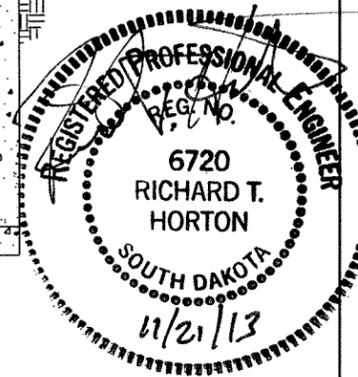


VAULT 104 - PLAN

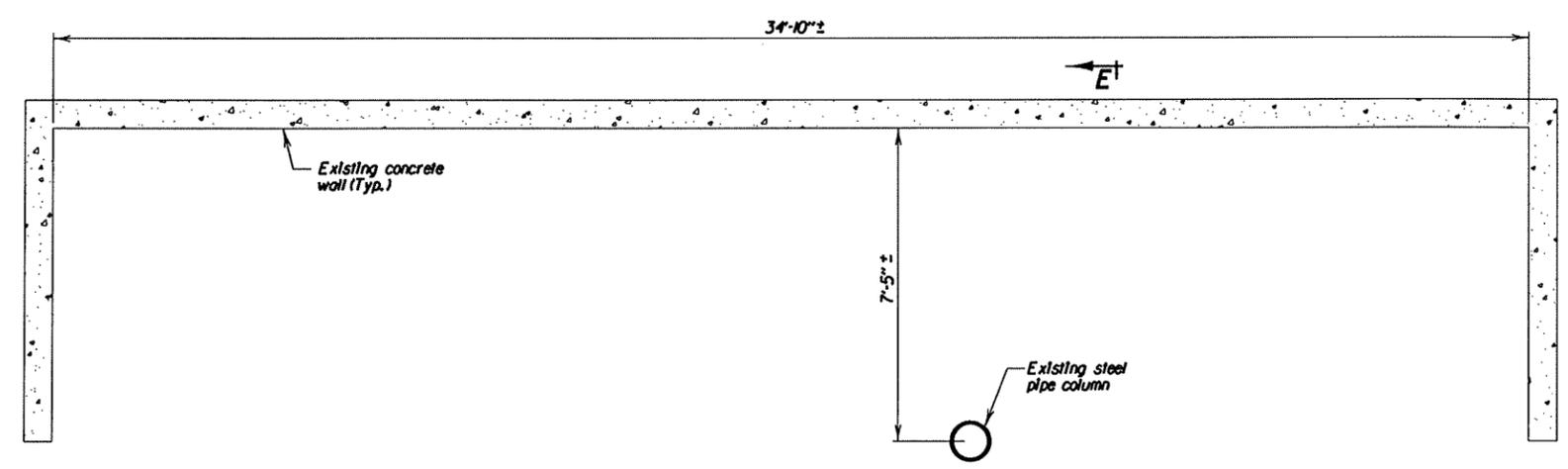
NOTE:  
See "Notes & Vault 102 Details" for  
Estimated Quantities and Reinforcing Schedule.



SECTION E-E



SECTION D-D



VAULT 105 - PLAN

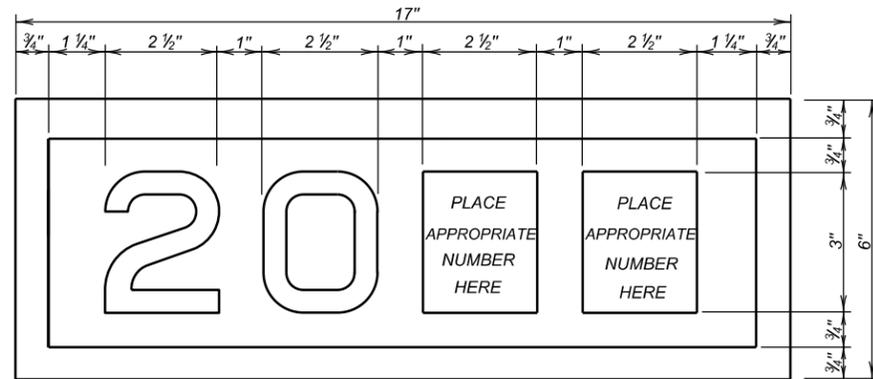
VAULT 105 NOTES

1. Vault 105 is to remain in service after completion of the project. Controlled density fill will not be used at this location.
2. The existing sidewalk is to be removed and replaced as detailed in Section B. The Contractor shall exercise extreme care in removal of the sidewalk. The removal shall be performed using light hand tools. Heavy construction equipment is not permitted on the sidewalk.
3. The Contractor shall verify the presence of both a sidewalk and an independent structural slab supporting the sidewalk. If there is no independent structural slab, and the sidewalk acts as the structural roof slab of the vault, the Contractor shall stop work and notify the Engineer immediately.
4. With the existing sidewalk fully removed, the proposed sidewalk shall be constructed. The Contractor is responsible for any required shoring or temporary works that may be required to keep the vault in service. All costs associated with these tasks shall be included in the price bid for CONTROLLED DENSITY FILL.

VAULT 104 & VAULT 105 DETAILS FOR  
UNDERGROUND VAULT  
REHABILITATION  
LAWRENCE COUNTY

PLANS BY: **HR**  
RAPID CITY, SD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E34	E36
FILE: Standard Plates.dgn PLOTTING DATE: 10/23/2013		REV DATE: INITIAL:	

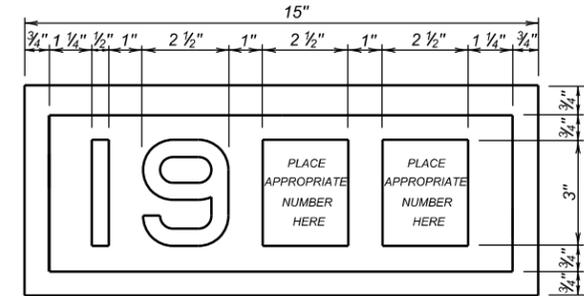


YEAR PLATE DETAILS

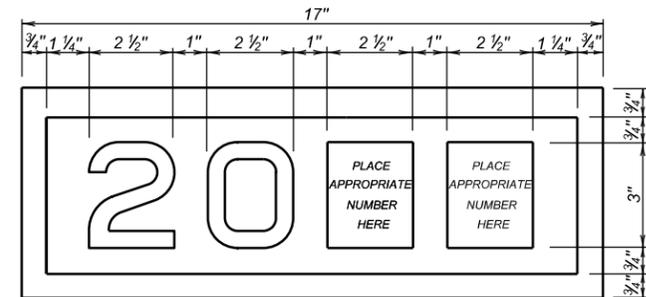
**GENERAL NOTES:**

- Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates shall be located on structure (s) as follows:
  - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
  - On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
  - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.

**YEAR PLATE DETAILS FOR ORIGINAL CONSTRUCTION**

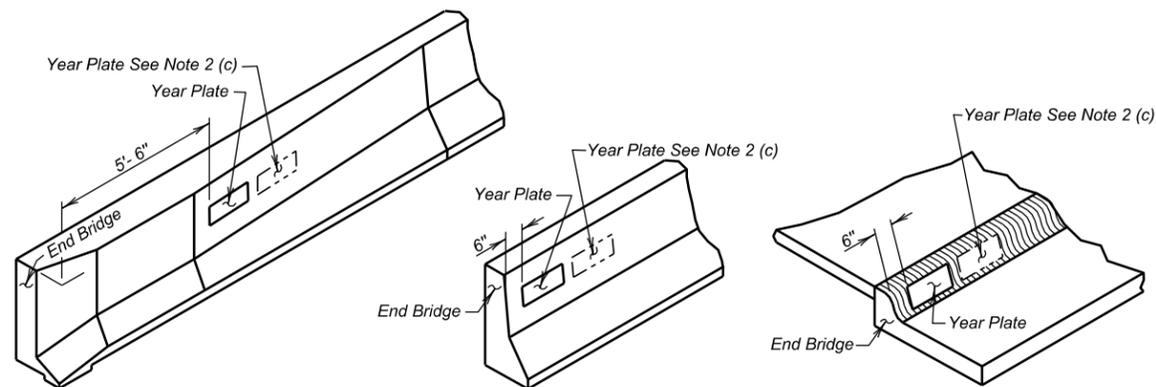


**YEAR PLATE DETAILS FOR NEW CONSTRUCTION**



**GENERAL NOTES:**

- Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates shall be located on structure(s) as follows:
  - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
  - On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
  - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.

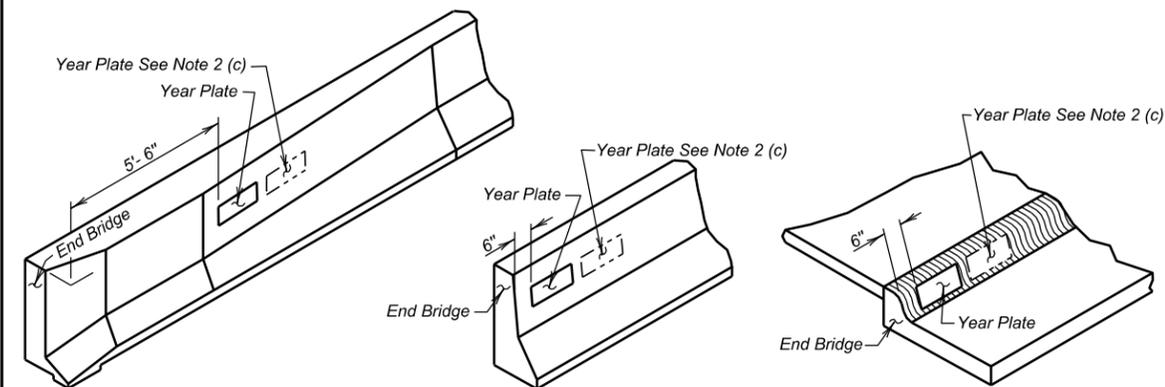


JERSEY BARRIER  
(With Endblock)

JERSEY BARRIER

TYPE B CURB

June 26, 2012



JERSEY BARRIER  
(With Endblock)

JERSEY BARRIER

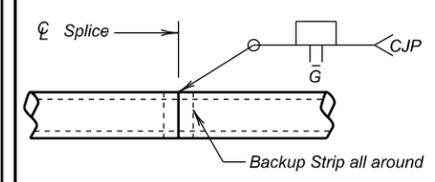
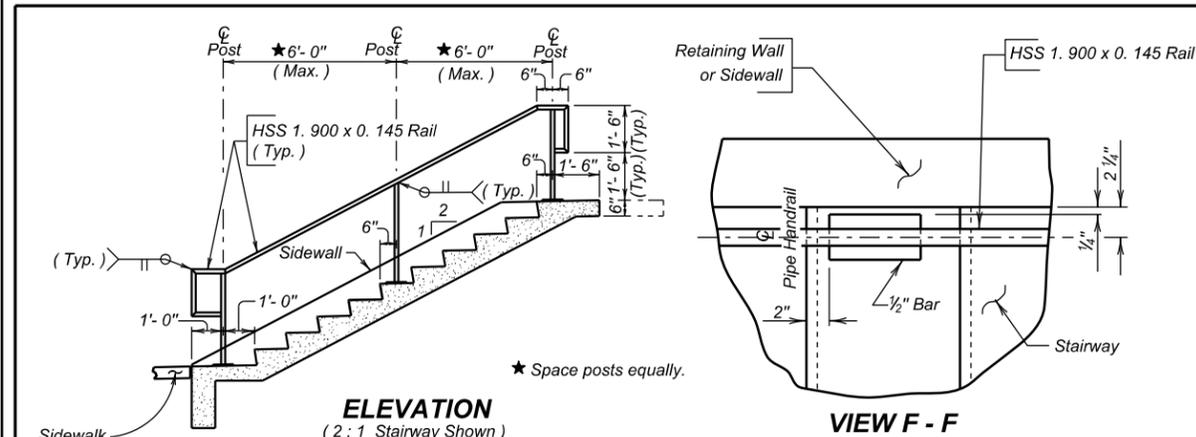
TYPE B CURB

June 26, 2012

Published Date: 4th Qtr. 2013	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 of 1

Published Date: 4th Qtr. 2013	S D D O T	DUAL DATE YEAR PLATE DETAILS	PLATE NUMBER 460.03
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E35	E36
FILE: Standard Plates.dgn PLOTTING DATE: 10/23/2013		REV DATE: INITIAL:	



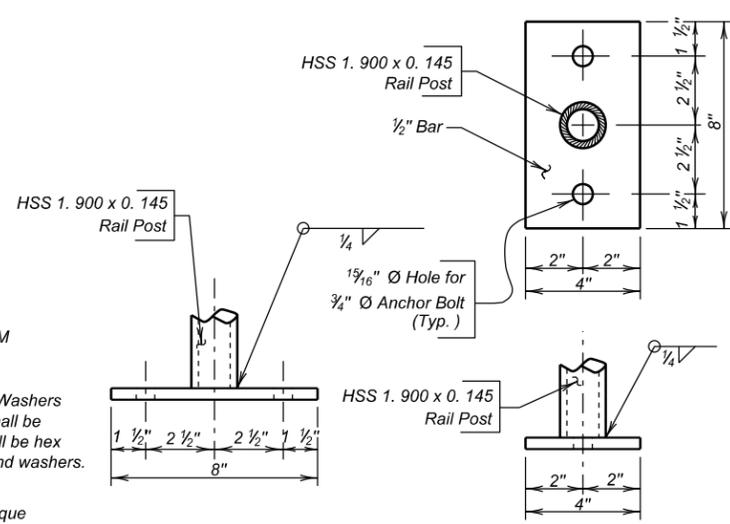
**RAIL SPLICE DETAILS**

**GENERAL NOTES:**

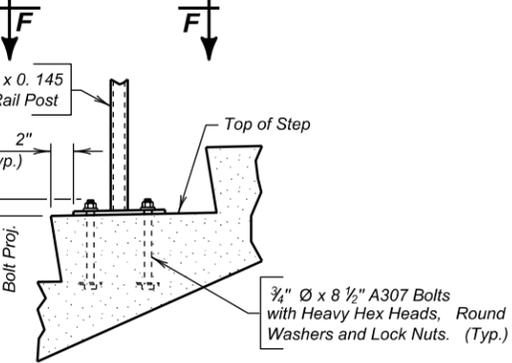
- All rail posts shall be built vertical.
- Steel pipe for railing and posts shall conform to ASTM A500, Grade B. Railpost base plates shall conform to ASTM A709, Grade 36.
- Anchor Bolts and nuts shall conform to ASTM A307. Washers shall be in accordance with ASTM F436. Hardware shall be galvanized in accordance with ASTM A153. Bolts shall be hex head Structural type with heavy hex lock nuts and round washers.
- All anchor bolts shall be tightened to a Torque of 120 ft-lbs (approximated without the use of a calibrated torque wrench).
- Painting of steel railing shall be done in accordance with Section 411 of the Standard Specifications. The finish color shall be Federal Standard 595B, color 27038 (semi-gloss black) unless stated otherwise in the plans.
- Welding and weld inspection shall be done in accordance with AWS D1. 1-(Current Year) Structural Welding Code - Steel.
- The cost of structural steel, anchor bolts, painting, galvanizing, fabrication and installation of the Pipe Handrail shall be incidental to welding, weld inspection and that which is incidental to the contract unit price per foot for "Pipe Handrail".
- Alternate rail designs, including aluminum rail, may be submitted through proper channels to the Office of Bridge Design for approval.

**SHOP PLANS**

The fabricator shall initially submit 2 copies of the shop plans to the Office of Bridge Design for review. One reviewed copy will be sent back to the fabricator who will then make changes, if any, and then send the Office of Bridge Design 7 final approved copies for distribution. Include design and check design, if applicable, with initial submittal.



**BASE PLATE DETAILS**

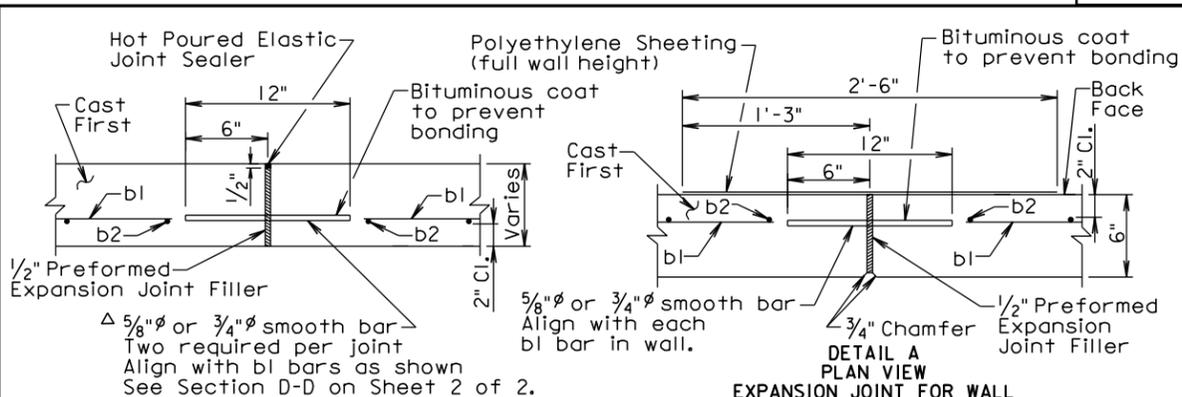


**ANCHOR BOLT DETAIL**

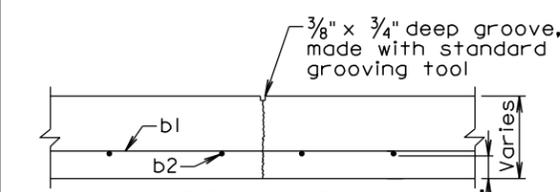
December 23, 2012

S D D O T	STAIRWAY HANDRAIL	PLATE NUMBER 470.01
		Sheet 1 of 1

Published Date: 4th Qtr. 2013



**ELEVATION VIEW EXPANSION JOINT FOR FOOTING**

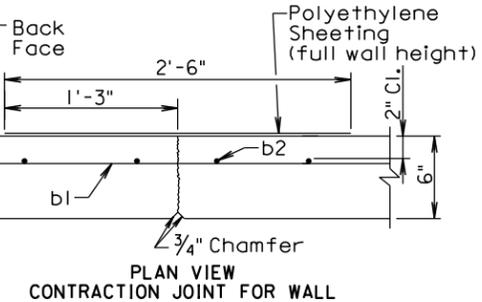


**ELEVATION VIEW CONTRACTION JOINT FOR FOOTING**

**GENERAL NOTES:**

- The Type C Concrete Retaining Wall shall be placed adjacent to pavement or curb and gutter as shown in Section D-D on sheet 2 of 2.
- \*The sidewalk width of the Type C Concrete Retaining Wall shall not be wider than 8 feet or narrower than 5 feet. See plans for specified width.
- In the areas where the retaining wall footing is to be placed, a 2 inch thickness of cushion material shall be placed and compacted. The cushion material shall conform to Section 651.2 C. of the Standard Specifications.
- All concrete shall be Class M6 and conform to Section 462 of the Standard Specifications.
- All reinforcing steel shall be epoxy coated and shall conform to ASTM A615, Grade 60. The epoxy coating shall conform to AASHTO M284.
- For variable height walls, the top b1 bar shall be placed parallel to the top of the wall. The b1 bars shall be lapped a minimum of 12 inches.
- A 3/4 inch chamfer shall be provided on all exposed retaining wall edges.
- Use Detail B on sheet 2 of 2 for constructing corners in the retaining wall.
- The maximum expansion joint spacing shall be 90 feet and the maximum contraction joint spacing shall be 30 feet. The contraction and expansion joints shall be placed to match pavement or curb joints where possible.
- The exposed retaining wall surfaces shall receive a finish in accordance with 460.3 M. of the Standard Specifications. The exposed surface of the retaining wall footing, when used as a sidewalk, shall receive a broom finish.
- The Type C Concrete Retaining Wall shall be measured to the nearest square foot of front face area.
- All costs for excavation, furnishing and placing backfill and cushion material, labor, equipment, preformed expansion joint filler, all reinforcing steel including the smooth bars, and all concrete except in the areas of PCC driveway and approach pavement, shall be incidental to the contract unit price per square foot for "Type C Concrete Retaining Wall".
- The concrete used for the retaining wall footing that extends into the approach and/or driveway pavement shall be paid for at the contract unit price per square yard for the corresponding "PCC Approach Pavement" and/or "PCC Driveway Pavement" bid items.

**EXPANSION JOINT FOR WALL**



**PLAN VIEW CONTRACTION JOINT FOR WALL**

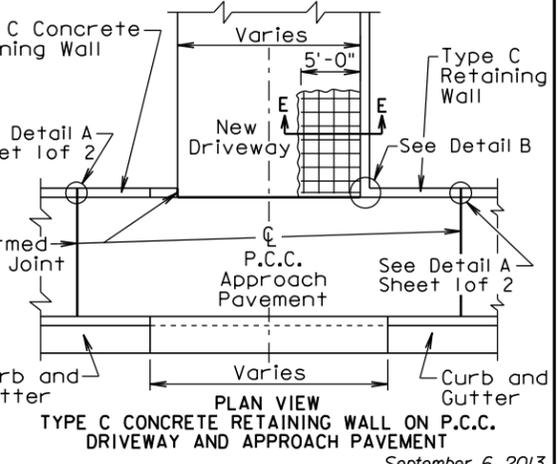
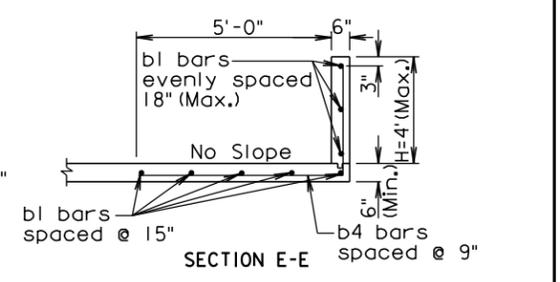
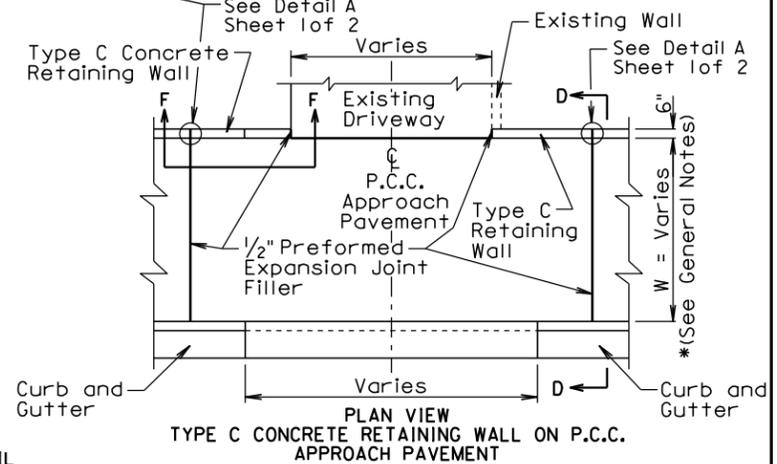
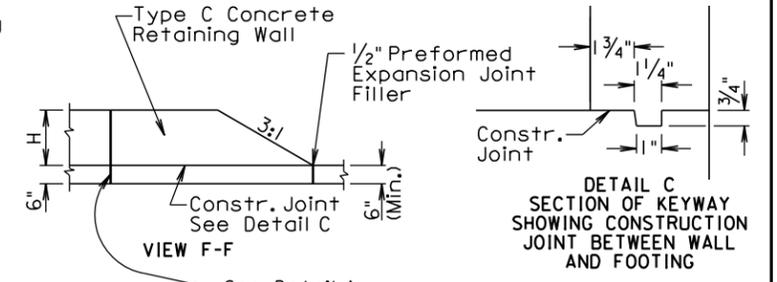
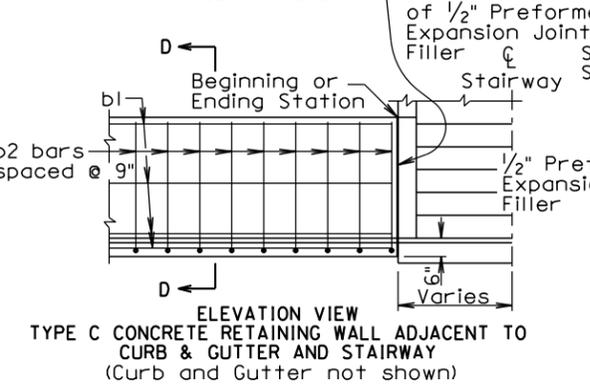
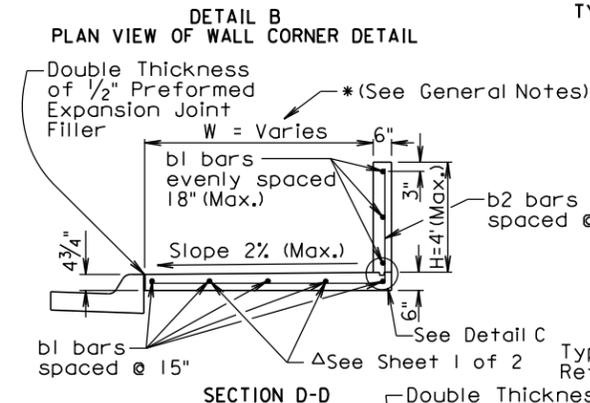
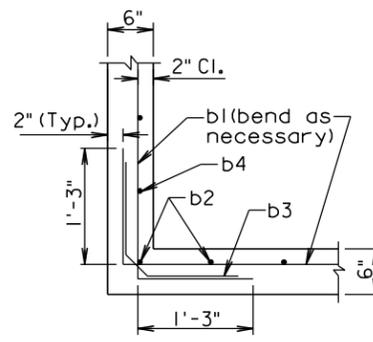
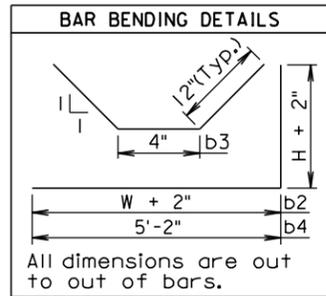
September 6, 2013

S D D O T	TYPE C CONCRETE RETAINING WALL	PLATE NUMBER 530.01
		Sheet 1 of 2

Published Date: 4th Qtr. 2013

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0085(72)23	E36	E36
FILE: Standard Plates.dgn PLOTTING DATE: 10/23/2013		REV DATE: INITIAL:	

Use No. 4 bars for all reinforcing steel unless specified otherwise.



September 6, 2013

Published Date: 4th Qtr. 2013

SD DOT

**TYPE C CONCRETE RETAINING WALL**

PLATE NUMBER  
530.01  
Sheet 2 of 2

PLANS BY: **HR**  
RAPID CITY, SD