Section B: Grading Plans

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0292(96)073 IM 2292(90)0	B1	B128

Plotting Date: 8/31/2015

INDEX OF SHEETS

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B2-B12	Estimate with General Notes and Tables
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B15-B16	Borrow Pit Information Layout
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B26-B76	Grading Plan & Profile Sheets
B77-B93	Guardrail Layouts
B94-B99	Ramp Gore Layouts
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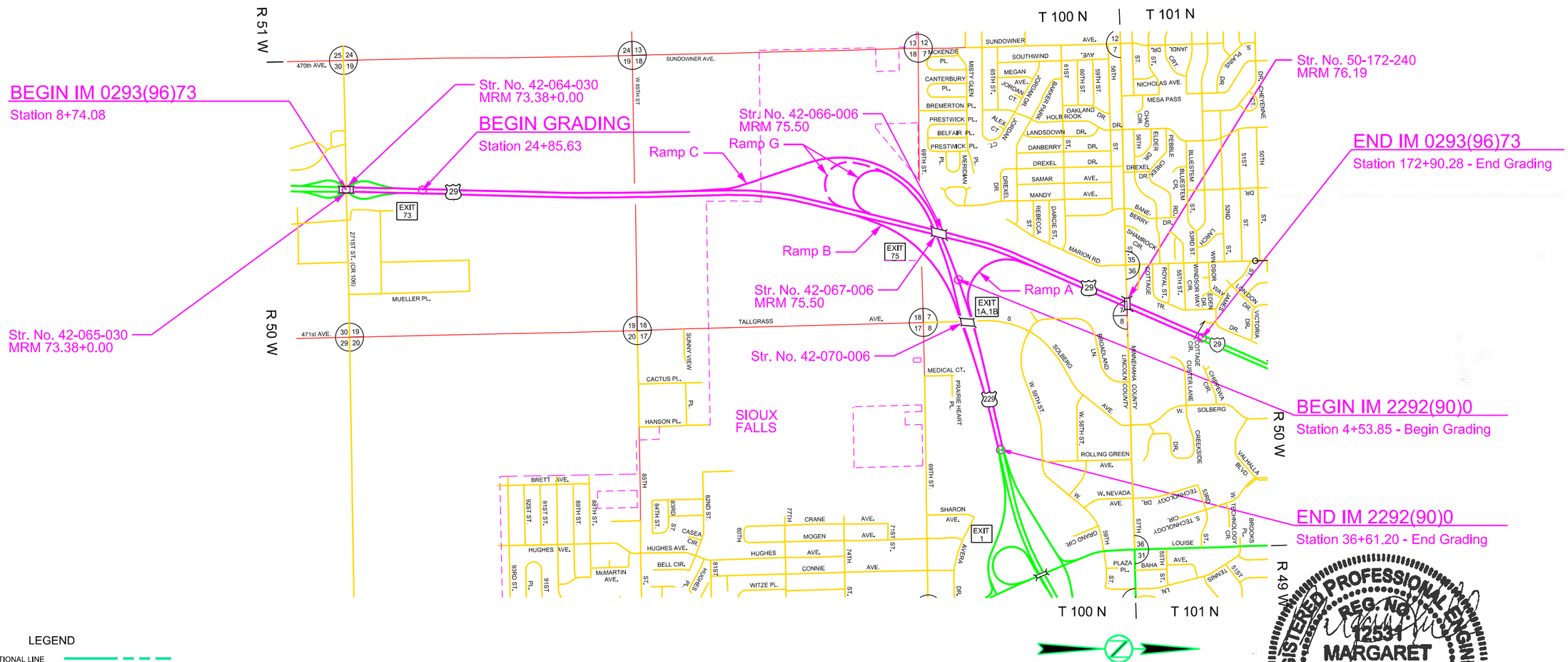

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Plot Scale - 1:200
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Plot Name - 2
File - ...\rd\prj\LINC01QSitlleB.dgn

SECTION B ESTIMATE OF QUANTITIES

01QS

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
004E0050	Remove Traffic Diversion(s)	Lump Sum	LS
009E0010	Mobilization	Lump Sum	LS
009E3230	Grade Staking	16.679	Mile
009E3240	Graded Centerline Staking	7.136	Mile
009E3245	Final Cross Section Survey	7.508	Mile
009E3250	Miscellaneous Staking	7.508	Mile
009E3280	Slope Staking	7.508	Mile
009E3290	Structure Staking	2	Each
009E3300	Three Man Survey Crew	160	Hour
100E0100	Clearing	Lump Sum	LS
110E0400	Remove Drop Inlet	9	Each
110E0500	Remove Pipe Culvert	300	Ft
110E0600	Remove Fence	24,697	Ft
110E0650	Remove Crossover Closure	371	Ft
110E0655	Remove Interim Crossover Closure	448	Ft
110E0700	Remove 3 Cable Guardrail	3,893	Ft
110E0730	Remove Beam Guardrail	785	Ft
110E0740	Remove 3 Cable Guardrail Anchor Assembly	21	Each
110E0770	Remove W Beam Guardrail Breakaway Cable Terminal	3	Each
110E1100	Remove Concrete Pavement	107,960	SqYd
110E6010	Remove 3 Cable Guardrail Anchor Assembly for Reset	4	Each
110E7510	Remove Pipe End Section for Reset	3	Each
120E0010	Unclassified Excavation	395,804	CuYd
120E0400	Select Subgrade Topping	167,077	CuYd
120E0500	Option Borrow Excavation	52,741	CuYd
120E1000	Muck Excavation	27,170	CuYd
120E6100	Water for Embankment	2,553.1	MGal
240E0010	Obliterate Old Road	20	Sta
250E0020	Incidental Work, Grading	Lump Sum	LS
270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	99,894.5	Ton
* 270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	69,676.2	Ton
270E0110	Salvage and Stockpile Granular Material	3,305.7	Ton
421E0100	Pipe Culvert Undercut	108	CuYd
450E0102	12" RCP Class 2, Furnish	176	Ft
450E0110	12" RCP, Install	176	Ft
450E0142	24" RCP Class 2, Furnish	362	Ft
450E0150	24" RCP, Install	362	Ft
450E0162	30" RCP Class 2, Furnish	528	Ft
450E0170	30" RCP, Install	528	Ft
450E0182	36" RCP Class 2, Furnish	8	Ft
450E0190	36" RCP, Install	8	Ft
450E0242	72" RCP Class 2, Furnish	16	Ft
450E0250	72" RCP, Install	16	Ft
450E2016	24" RCP Flared End, Furnish	4	Each
450E2017	24" RCP Flared End, Install	4	Each
450E2024	30" RCP Flared End, Furnish	8	Each
450E2025	30" RCP Flared End, Install	8	Each
450E2200	24" RCP Sloped End, Furnish	3	Each
450E2201	24" RCP Sloped End, Install	3	Each
450E2304	18" RCP Safety End, Furnish	1	Each
450E2307	18" RCP Safety End, Install	1	Each
450E3012	24" RCP Arch Class 2, Furnish	106	Ft
450E3020	24" RCP Arch, Install	106	Ft
450E3072	60" RCP Arch Class 2, Furnish	200	Ft
450E3080	60" RCP Arch, Install	200	Ft
450E4528	60" RCP Arch Flared End, Furnish	4	Each
450E4529	60" RCP Arch Flared End, Install	4	Each
450E4600	24" RCP Arch Sloped End, Furnish	1	Each
450E4601	24" RCP Arch Sloped End, Install	1	Each
450E4739	12" CMP 16 Gauge, Furnish	434	Ft
450E4740	12" CMP, Install	434	Ft
450E4758	18" CMP 14 Gauge, Furnish	48	Ft
450E4760	18" CMP, Install	48	Ft
450E5203	12" CMP Flared End, Furnish	4	Each
450E5204	12" CMP Flared End, Install	4	Each
450E5211	18" CMP Flared End, Furnish	2	Each
450E5212	18" CMP Flared End, Install	2	Each
450E9001	Reset Pipe End Section	3	Each
462E0100	Class M6 Concrete	16.1	CuYd
464E0100	Controlled Density Fill	4.5	CuYd
480E0100	Reinforcing Steel	1,496	Lb
600E0300	Type III Field Laboratory	1	Each
620E0030	Type 3 Right-of-Way Fence	9,176	Ft
620E1020	2 Post Panel	14	Each
620E1030	3 Post Panel	6	Each
621E0160	6' Chain Link Fence with Tension Wired Top	15,521	Ft
629E0100	3 Cable Guardrail	2,395	Ft
629E0110	NCHRP 350 Test Level 3 High Tension Cable Guardrail	6,200	Ft
629E0290	NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly	30	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly	8	Each
629E0400	3 Cable Guardrail Anchor Assembly	4	Each
629E0410	Reset 3 Cable Guardrail Anchor Assembly	4	Each
* 629E1107	Furnish High Tension Cable Guardrail Post	50	Each
* 629E1109	Furnish High Tension Cable Guardrail Post and Sleeve	50	Each
* 629E8010	Cable Tension Indicator	1	Each
629E9000	Crossover Closure	608	Ft
630E0110	Straight Double Class A Thrie Beam Guardrail with Wood Posts	75	Ft
630E1010	Straight Class A W Beam Guardrail with Wood Posts	225	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	6	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal	6	Each
650E4380	Type D48 Concrete Curb and Gutter	106	Ft
670E2200	Type C Frame and Grate	1	Each
670E3200	Type D Frame and Grate	8	Each
670E4205	Type M Frame and Grate Assembly	2	Each
670E5400	Precast Drop Inlet Collar	8	Each
671E7010	Adjust Manhole	1	Each
720E1015	Bank and Channel Protection Gabion	18.0	CuYd

020Q

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3230	Grade Staking	2.745	Mile
009E3240	Graded Centerline Staking	1.141	Mile
009E3245	Final Cross Section Survey	1.141	Mile
009E3250	Miscellaneous Staking	1.141	Mile
009E3280	Slope Staking	1.141	Mile
009E3300	Three Man Survey Crew	40	Hour
100E0100	Clearing	Lump Sum	LS
110E0400	Remove Drop Inlet	1	Each
110E0600	Remove Fence	5,025	Ft
110E0700	Remove 3 Cable Guardrail	330	Ft
110E0730	Remove Beam Guardrail	180	Ft
110E0740	Remove 3 Cable Guardrail Anchor Assembly	2	Each
110E1100	Remove Concrete Pavement	16,923	SqYd
120E0010	Unclassified Excavation	90,257	CuYd
120E0400	Select Subgrade Topping	30,335	CuYd
120E1000	Muck Excavation	3,230	CuYd
120E6100	Water for Embankment	581.1	MGal
270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	6,813.1	Ton
* 270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	4,752.1	Ton
450E0122	18" RCP Class 2, Furnish	16	Ft
450E0129	18" RCP, Install	16	Ft
450E2304	18" RCP Safety End, Furnish	1	Each
450E2307	18" RCP Safety End, Install	1	Each
462E0100	Class M6 Concrete	0.8	CuYd
480E0100	Reinforcing Steel	108	Lb
621E0160	6' Chain Link Fence with Tension Wired Top	5,025	Ft
629E0110	NCHRP 350 Test Level 3 High Tension Cable Guardrail	2,212	Ft
629E0290	NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly	10	Ft
670E2200	Type C Frame and Grate	1	Each

* Denotes Non- Participating

GRADING OPERATIONS

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste.

The estimated cubic yards of excavation and/or embankment required to construct outlet ditches, ditch blocks, and approaches are included in the earthwork balance notes on the profile sheets.

Special ditch grades and other sections of the roadway different than the typical sections shall be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer shall contact the Designer for the proposed change.

Generally, all shallow inlet and outlet ditches as noted on the plan sheets shall be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

Temporary fence and/or permanent fence shall be placed ahead of the grading operation unless otherwise directed by the Engineer.

On superelevated curves the grade referred to on the profile is the centerline grade elevation prior to calculating superelevation.

A copy of the soils profile is available for review at the Mitchell Region and Sioux Falls Area offices.

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TYPE III FIELD LABORATORY

The lab shall be equipped with an internet connection such as DSL, cable modem, or other approved service. The internet connection shall be provided with a multi-port wireless router. The internet connection shall be a minimum speed of 512 Kb unless limited by job location and approved by the DOT. Prior to installing the wireless router the Contractor shall submit the wireless router's technical data to the Area Office to check for compatibility with the state's computer equipment. The internet connection is intended for state personnel usage only. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer.

The Contractor shall submit a copy of each monthly bill for calls charged to this phone at the end of each month. The Project Engineer will then audit the bills to ensure all calls are legitimate and then initiate a Construction Change Order (CCO) to reimburse the Contractor for the actual phone calls made, including local and long distance calls. Reimbursement will not be made for fees associated with the purchase, installation, disconnection, monthly line charges, and incidentals involved in the installation, maintenance, and disconnection of the phone (including attachments). These items shall be incidental to the contract unit price per each for "Type III Field Laboratory".

UTILITIES

The Contractor shall be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor shall contact each utility owner and confirm the status of all existing and new utility facilities. The utility contact information is provided elsewhere in the plans or bidding documents.

CONDUIT INSTALLATION

Each end of each conduit shall be marked with a ½-inch dia. x 12-inch long reinforcing bar driven flush with the finished grade, except when the conduit end terminates inside a junction box. The ends of each conduit run shall be capped to prevent water and soil from entering. This work shall be done by the Lighting Contractor and shall not be disturbed by the Grading Contractor.

CLEARING

Before clearing activities begin, the Contractor shall contact the Engineer to determine the limits of clearing for the project. If the trees or shrubs that are supposed to remain within the limits of work are damaged or destroyed by the Contractor, the Contractor shall replace them with the same size and type at the Contractor's expense.

TRAFFIC DIVERSION

The traffic diversion constructed in a previous project shall be removed during the course of this project as described in Section C, Sequence of Operations. Quantities for the removal of the diversion are included in the items Unclassified Excavation (Section B), Salvage and Stockpile Asphalt Mix and Granular Base Material (Section B), and Removal of Structures (Section E).

RAMP DETOURS

Ramp detours shall be constructed according to the layout provided in these plans at the following locations:

Exit 75: I29 SB On Ramp from I229 SB (Ramp C)
Exit 75: I29 NB Off Ramp to I229 NB (Ramp B)
Exit 75: I29 SB Off Ramp to I229 NB (Ramp G)
Exit 75: I29 NB On Ramp from I229 SB (Ramp A)
Exit 75: Ramp G to Ramp C

The maximum horizontal degree of curve shall be 6º45' and the vertical alignment shall be constructed to provide adequate stopping sight distance. The Engineer shall have final approval of the horizontal and vertical alignment of the ramp detours.

Existing drainage impacted by the ramp detours shall be addressed. The Contractor shall be responsible for sizing the pipes if pipes are necessary to drain water under the ramp detours. The Contractor shall provide sloped end sections for all 30-inch and smaller diameter pipe used in ramp detours. If the Contractor provides 36-inch or larger diameter pipe in the ramp detours, then the Contractor shall either provide sloped end sections or shall extend the pipe to a minimum of 30 feet from the nearest edge of traveled lane or farther if required by higher fill sections. All costs for pipe, pipe end sections, and other costs associated with the temporary modification of existing drainage shall be incidental to the various contract items needed to construct the ramp detours.

Material quantities necessary for constructing the ramp detours are as specified in Section F - Surfacing Plans.

Prior to completion of this project the Contractor shall remove the ramp detours and dispose of material at a site approved by the Engineer. The modification of any existing drainages shall be restored. All costs for removing the ramp detours and restoring the drainages shall be incidental to the contract lump sum price for "Remove Traffic Diversion(s)".

OBLITERATING OLD ROAD

The Contractor shall obliterate the existing roadway at the locations listed in the Table of Obliterating Old Road.

The surfacing material of the existing roadway shall be salvaged. Refer to the Salvage and Stockpile Asphalt Mix and Granular Base Material note for quantities and payment information.

The Contractor shall obliterate the existing roadway in accordance with Section 240 of the Specifications when the existing roadway is not being removed in accordance with the template section.

The earthwork necessary for obliterating the existing road shall be accomplished to such an extent that placing topsoil and seeding can be done in a satisfactory manner. Quantities of topsoil, fertilizing, mulching, and seeding for the obliterated sections of the old road are included in the Section D - Erosion and Sediment Control Plans Estimate of Quantities.

TABLE OF OBLITERATING OLD ROAD

Station	to	Station	L/R	Length (Sta)
101+25 (I29)		22+13 (I229 Ramp G)	L	19.47
			Total:	19.47

MAINTENANCE CROSSOVERS (01QS)

Maintenance crossovers shall be constructed as shown in the plans. The maintenance crossovers noted with "Retain" are maintenance crossovers at the same location and approximately the same elevation as the existing crossovers; therefore small quantities of excavation or embankment are required at these locations. The maintenance crossover subgrade shall be constructed to conform to the details on Standard Plate 120.04.

Excavation quantities for the maintenance crossovers are included in the earthwork balance notes on the profile sheets.

TABLE OF MAINTENANCE CROSSOVERS (01QS)

Station	Type
59+28	Remove
111+66	Construct
128+30	Retain
151+57	Retain

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PUBLIC ACCESS MEDIAN CROSSOVERS

Public access median crossovers shall be constructed at the locations listed in the Table of Public Access Median Crossovers. The median crossovers noted with "Retain" are median crossovers at the same location and approximately the same elevation as the existing crossovers; therefore small quantities of excavation or embankment are required at these locations. The median crossover subgrade shall be constructed to conform to the details on Standard Plate 120.03.

Excavation quantities for the public access median crossovers are included in the earthwork balance notes on the profile sheets.

TABLE OF PUBLIC ACCESS MEDIAN CROSSOVERS

Station	01QS	020Q	Width (Ft)
43+50	Retain		184
77+69	Remove		173
103+28	Remove		155
172+90	Retain		255
41+55 (Ramp C)	Remove		214
63+80 (Ramp C)	Remove		117
27+62 (I229)		Retain	164

CROSSOVER CLOSURES

The crossover closures (estimated at 371') for the median crossovers at Sta. 43+50 and Sta. 172+90 and the interm crossover closures (estimated at 448') for the ramp crossovers at Sta. 77+96 and Sta. 103+28 shall be removed prior to traffic being carried on the crossover in accordance with Section C – Traffic Control. New crossover closures (estimated at 608') shall be installed for the median crossovers at Sta. 43+50 and Sta. 172+90 when traffic is no longer being carried on the crossover. The crossover closure shall be constructed according to the standard plate.

RAMP ACCELERATION LANES

Ramp acceleration lanes shall be constructed according to the layout provided in these plans at the following locations:

Exit 75: Southbound Lane On Ramp (I229 Ramp C)
Exit 75: Northbound Lane On Ramp (I229 Ramp A)

The total amount of embankment needed to construct all ramp acceleration lanes has been included in the quantity for Option Borrow Excavation. The quantities for surfacing are as specified in Section F - Surfacing Plans.

SHRINKAGE FACTOR

Name of Road	Station to	Station	% Shrink Embankment	% Shrink Undercut
I29	24+52	47+00	+40%	+40%
I29	47+00	78+00	+25%	+25%
I29	78+00	110+00	+40%	+25%
I29	110+00	137+00	+30%	+30%
I29	137+00	164+00	+40%	+25%

Name of Road	Station to	Station	% Shrink Embankment	% Shrink Undercut
I229	4+54	39+38	+40%	+25%
Ramp A	13+02	26+83	+40%	+40%
Ramp B	21+62	41+72	+30%	+30%
Ramp C	12+65	74+00	+25%	+25%
Ramp G	11+05	49+00	+35%	+35%

TABLE OF EXCAVATION QUANTITIES BY BALANCES

Name of Road	Station to	Station	Construction Phase	Excavation (CuYd)	* Muck Exc. (CuYd)	* Option Borrow Exc. (CuYd)	*** Undercut for Select Topping (CuYd)	Total Excavation (CuYd)	Out-of-Balance Exc. (CuYd)	** Waste (CuYd)	** Dead Haul (CuYdSta)	** Option Borrow Haul (CuYdSta)	** Haul (CuYdSta)	** Out-of-Balance Exc. Haul (CuYdSta)	* Select Subgrade Topping (CuYd)
I29 SB	24+86	117+69	Phase 1	6,146	9,659	13,997	28,384	58,186	5,110		984,479	101,632	81,792	103,733	40,898
I29 SB	121+34	172+90	Phase 1	9,576	5,285	8,361	20,007	43,229	15,355		583,556	36,438		333,664	27,364
I29 NB	43+50	118+30	Phase 3	17,604			32,332	49,936		21,133			424,724		32,495
I29 NB	121+99	172+90	Phase 3	19,018			20,314	39,332		21,529					20,804
I229 Ramp C	12+95	38+50	Phase 1	2,877			8,933	11,810		5,110					8,933
I229 Ramp C	38+50	42+00	Phase 2	252			1,323	1,575		582					1,323
I229 Ramp C	64+00	73+03	Phase 2/3	1,181			3,284	4,465		1,786					3,571
I229 Ramp G	10+00	38+00	Phase 1	24,442			8,268	32,710		15,355			14,448		11,635
I229 Ramp G	38+00	39+60	Phase 2	23,307			1,240	24,547		23,541					1,240
I229 Ramp G	39+60	49+00	Phase 1	11,756	5,009	25,483	1,191	43,439			1,389,970	59,725			3,630
I229 Ramp A	11+63	28+54	Phase 3	14,169	6,458		643	21,270	6,891					86,482	4,799
I229 Ramp B	16+66	46+55	Phase 1/3	5,298	759		7,790	13,847	4,583				15,245	237,628	10,385
			01QS Subtotals:	135,626	27,170	47,841	133,709	344,346	31,939	89,036	2,958,005	197,795	536,209	761,507	167,077
I229 SB	73+03	101+23	Phase 1/3	10,467	1,302		14,526	24,993		12,320			124,196	0	12,737
I229 NB	149+00	181+05	Phase 1/3	34,123	1,928		17,598	53,649		8,213			35,434	0	17,598
			020Q Subtotals:	44,590	3,230	0	32,124	78,642	0	20,533	0	0	159,630	0	30,335
			Project Totals:	180,216	30,400	47,841	165,833	422,988	31,939	109,569	2,958,005	197,795	695,839	761,507	197,412

* The quantities for these items are in the Estimate of Quantities under their respective bid items.
** The quantities for these items are for information only.
*** Undercutting for Select Topping shall be mixed with salvaged surfacing material and used as "Select Subgrade Topping" material. Undercutting for Select Topping shall be paid for once under "Unclassified Excavation".

TABLE OF UNCLASSIFIED EXCAVATION

	01QS	020Q	Project Total
Excavation	135,626	44,590	180,216
Undercutting for Select Topping	133,709	32,124	165,833
Topsoil *	29,638	6,528	36,166
Salvaged Asphalt Mix and Granular Base Material (quantity from Section F)	52,854	3,605	59,994
Salvaged Asphalt Mix and Granular Base Material (Nonparticipating) (quantity from Section F)	36,866	2,514	39,455
Salvaged Granular Material quantity from Section F)	1,749		1,749
Waste Material (as directed by the Engineer, quantity from Section F)	5,362	896	6,265
Totals:	395,804	90,257	486,061

* Quantity does not include 2,900 cubic yards of topsoil located in the DOT Maintenance Yard that shall be used at no additional cost to the project as described in the following notes.

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PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY

When plan quantities are used for payment, the Unclassified Excavation quantity shall be used for final payment.

The following paragraphs are general earthwork information and information in regards to computing the Unclassified Excavation quantity when final cross sections are taken in the field:

The Unstable Material Excavation quantity is included in the Excavation quantity listed in the Table of Unclassified Excavation. When finaling a project, the Unstable Material Excavation quantity shall be added to the Excavation quantity to compute the Unclassified Excavation quantity.

Out-of-Balance Excavation is material obtained from waste generated from excavation from other balances. The quantity of Out-of-Balance Excavation is included in the Excavation quantity in the balance where it is excavated and is paid for once as Unclassified Excavation.

The Topsoil quantity in the Table of Unclassified Excavation is an estimate. When finaling the project, the total quantity of field measured Topsoil shall be used in place of the estimated Topsoil quantity. The quantity of Topsoil from the cuts will be paid for twice as Unclassified Excavation, as it will be in both the Excavation and Topsoil quantities. This will be full compensation for Excavation, which includes necessary undercutting to provide space for placement of topsoil. The estimated quantity of 2,900 cubic yards of topsoil located in the DOT Maintenance Yard in the northwest quadrant of Tallgrass Avenue and 69th Street shall be used for this project (01QS) at no additional cost to the project.

The Excavation quantities from individual balances and the Table of Unclassified Excavation have been reduced by the volume of in place surfacing that will be removed and/or salvaged.

As shown in the Table of Unclassified Excavation (above and in Section F), the estimated quantity of 104,491 cubic yards of Salvaged Asphalt Mix and Granular Base Material from fill sections shall be added to the Excavation quantity to determine the Unclassified Excavation quantity. When finaling a project, the quantities of Salvaged Asphalt Mix and Granular Base Material from fill sections and off-alignment roadways or obliterated old roads will not be adjusted according to field measurements. The quantity of Salvaged Asphalt Mix and Granular Base Material from cut sections will not be added to the Excavation quantity as it is already in the cuts on the final cross sections.

The volume of in place Concrete Surfacing removed will NOT be paid for as Unclassified Excavation.

The Excavation quantities from individual balances and the table above have been reduced by the volume of in place concrete pavement that will be removed.

When finaling the project, the estimated quantity of 30,911 cubic yards of Concrete Pavement removed from the cut sections shall be subtracted from the Unclassified Excavation quantity for final payment. The quantity of Concrete Pavement from cut sections subtracted from the Unclassified Excavation quantity shall be plans quantity and will not be adjusted according to field measurements.

TABLE OF OPTION BORROW EXCAVATION

	(CuYd)
Option Borrow Excavation	47,841
Topsoil in Option Borrow Pits	4,900
Total:	52,741

HAUL

Included in the Table of Excavation Quantities by Balances are Dead Haul, Option Borrow Haul, Out-of-Balance Haul, and Haul. They are not pay items and are for informational purposes only.

Dead Haul: Estimated quantity (CuYdSta) for moving option borrow excavation material from the option borrow site to the centerline mainline station listed in the Table of Borrow Locations in Earthwork Balance.

Option Borrow Haul: Estimated quantity (CuYdSta) for moving option borrow excavation material from the centerline mainline station listed in the Table of Borrow Locations in Earthwork Balance to the locations where it is needed throughout the earthwork balance.

Out-of-Balance Haul: Estimated quantity (CuYdSta) for moving material from an earthwork balance to another earthwork balance.

Haul: Estimated quantity (CuYdSta) for moving unclassified excavation material to the locations where it is needed throughout the earthwork balance.

For Purpose of Extra Haul Computations:

Average Haul = (Haul + Out-of-Balance Haul)/Unclassified Excavation
= (695,839 + 761,507)/180,216 = 8.0 Sta.

Average Option Borrow Haul = (Option Borrow Haul + Dead Haul)/Total Option Borrow Excavation = (197,795+2,958,005)/47,841 = 66.0 Sta.

UNDERCUTTING FOR SELECT SUBGRADE TOPPING

After the existing PCCP and asphalt is removed, the existing gravel cushion/ base course shall be removed and stockpiled. The removed PCCP will be crushed to a minus 2.5 inch size.

In all cut sections, the subgrade will be undercut to a depth of 1.5 feet. The undercut area will be scarified to a depth of 6 inches and re-compacted by the Specified Density Method. The crushed PCCP and the salvaged gravel cushion/ base course will be blended with the soil taken from the undercut and used as Select Subgrade Topping to backfill the undercut. The blended backfill material will consist of a mix of approximately 60% undercut soil and 40% salvaged surfacing and gravel cushion/ base course.

In fill sections, the top 1.5 feet of subgrade will be constructed with the Select Subgrade Topping. To obtain the Select Subgrade Topping, the salvaged PCCP and granular material will be mixed with new embankment material at the same 60/40 rate as the undercut backfill. Shallow embankment sections, i.e. fills less than 1.5 feet in height measure at the finished subgrade shoulder, will be undercut to ensure the upper 1.5 of subgrade is constructed with Select Subgrade Topping.

Payment to remove the undercut shall be paid for once as Unclassified Excavation.

All cost associated with the crushing, mixing and placement of the Select Subgrade Topping material shall be included in the contract unit price per cubic yard for Select Subgrade Topping.

Select Subgrade Topping shall be compacted with sheepsfoot or other approved rollers. Compaction shall be as per 260.3.D. Additional test strips will be made as required by changes in soil types. Moisture requirements will be determined in accordance with SD 104, except the optimum and field moisture will be determined using material passing a ¾ inch sieve. Density testing will be performed a minimum of 1 per half mile per lift. Moisture testing will be performed a minimum of 1 per day.

UNSTABLE MATERIAL EXCAVATION

The areas of unstable material excavation are drawn on the cross sections with a normal depth of 2 feet. The estimated quantity of 4,637 cubic yards of unstable material excavation shall be paid for at the contract unit price per cubic yard for “Unclassified Excavation”.

All areas designated as Unstable shall be excavated. The unstable material excavated on this project shall be placed outside the subgrade shoulder in fill sections or stockpiled and used as topsoil.

Field measurement of unstable material excavation shall not be made. However, if there are additional areas of unstable material excavation other than what is shown in the plans, the Engineer shall direct removal of these areas and the additional areas will be measured according to the Engineer.

TABLE OF UNSTABLE MATERIAL EXCAVATION

Station to	Station	L/R	Depth (Ft)	Quantity (CuYd)
122+00	125+00	L	2	558
21+34	26+00 (Ramp B)	R	2	494
27+00	35+00 (Ramp G)	R	2	206
39+50	43+00 (Ramp G)	R	2	3,004
		01QS Subtotal:		4,262
16+00	19+00	L	2	375
		020Q Subtotal:		375
		Project Total:		4,637

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MUCK EXCAVATION

The areas of muck excavation are drawn on the cross sections with a normal depth of 3 feet. The estimated quantity of 30,400 cubic yards of muck excavation shall be paid for at the contract unit price per cubic yard for "Muck Excavation".

Muck excavation consists of the removal of highly organic and/or highly saturated material from the designated areas shown on the cross sections. Highly organic muck material shall not be used in the embankment but may be used as topsoil. Non-organic muck material may be used as embankment outside of the fill subgrade shoulder if it is properly handled and dried prior to placement in the embankment.

Field measurement of muck excavation will not be made unless the Engineer orders additional excavation, or when the Engineer determines, in accordance with Section 120.3 A.1. of the Specifications, that the classification of excavation be changed.

If the areas designated as muck excavation can be removed with similar equipment and procedures as used for unclassified excavation, the material shall be measured and paid for as "Unclassified Excavation".

TABLE OF MUCK EXCAVATION

Station to	Station	L/R	Depth (Ft)	Quantity (CuYd)
44+00	62+00	L	3	5,624
70+00	72+00	L	3	374
106+00	117+00	L	3	3,661
125+00	138+00	L	3	5,285
15+00	25+50 (Ramp A)	R	3	6,458
36+00	40+00 (Ramp B)	L	3	759
43+00	49+00 (Ramp G)	R	3	5,009
		01QS Subtotal:		27,170
19+00	31+00	R	3	1,928
23+00	31+00	L	3	1,302
		020Q Subtotal:		3,230
		Project Total:		30,400

SALVAGE AND STOCKPILE GRANULAR MATERIAL

The granular material being removed is Pit Run. The granular material will be reused as Pit Run for the construction of ramp detours. Refer to Section F typical sections for location of material. This quantity is based on a unit weight of 1.89 tons per cubic yard for the reclaimed granular aggregate.

The quantity of salvaged granular material may vary from the plans. Plans quantity will be the basis of measurement and payment for this work.

No adjustment in the contract unit price per ton for salvaged material will be made because of a variation in salvaged material quantities.

TABLE OF SALVAGE AND STOCKPILE GRANULAR MATERIAL

Location of Removal	Salvaged Granular Material (Tons)
Ramp C to I29 NB Detour, Sta. 75+00 (I29) *	1,795.3
Ramp G to I29 NB Detour, Sta. 105+00 (I29) *	1,510.4
01QS Total:	3,305.7

* The sequence of construction will allow the salvaged material from these two detours to be reused as Pit Run in detours constructed later in this project.

All cost to salvage, haul, and stockpile the granular material shall be incidental to the contract unit price per ton for Salvage and Stockpile Granular Material.

SALVAGE AND STOCKPILE ASPHALT MIX AND GRANULAR BASE MATERIAL

An estimated 181,135.9 tons (95,839.3 Cubic Yards) of asphalt mix and granular base material shall be salvaged from the entire length of the existing highway (including ramps) and stockpiled at a site satisfactory to the Engineer, see Section F typical sections. The salvaged material will be used as Gravel Cushion, Salvaged or Base Course, Salvaged.

Salvaged material shall be processed to provide material meeting the following gradation:

Sieve Size	% Passing
2 inch (50.0 mm)	100
1 inch (25.0 mm)	70-100

The quantity of salvage asphalt mix and granular base material may vary from the plans. No adjustment will be made to the contract unit price for variations of the quantity of "Salvage and Stockpile Asphalt Mix and Granular Base Material."

A table of estimated salvageable material quantities is located in Section F – Surfacing. These quantities were used to compute the unclassified excavation quantities.

The excess material (estimated at 74,428.3 tons) shall be hauled and stockpiled at Lot H-2 South of I-229 in SE 1/3 Section 7 T100N R50W of 5th PM as directed by the Engineer. All cost to salvage, haul, and stockpile the granular material shall be incidental to the contract unit price per ton for Salvage and Stockpile Asphalt Mix and Granular Base Material.

TABLE OF BORROW LOCATIONS IN EARTHWORK BALANCE

Site	Station	L/R	Dead Haul Distance (Sta)	Option Borrow Exc. (CuYd)	Dead Haul (CuYdSta)
1	114+00	L	70	13,997	984,479
2	125+00	L	70	8,361	583,556
3	45+00 RampG	R	54	25,483	1,389,970
			Totals:	47,841	2,958,005

Stations in the above table are not pit locations, but stations where the borrow is interjected into the earthwork balance for haul calculations.

The quantities listed in the above table for Dead Haul are for information only. The Dead Haul quantities are also included in the Table of Excavation Quantities by Balances.

The quantities listed in the above table for Option Borrow Excavation is also included in the Table of Excavation Quantities by Balances.

TABLE OF PIPE CULVERT UNDERCUT

The Table of Pipe Culvert Undercut is intended to be used to establish an estimated quantity of Pipe Culvert Undercut for bidding purposes only. The table includes undercut for 36 inch and larger pipe culverts. The depth of undercut is an estimate and the actual depth necessary shall be determined during construction. Pipes shown may or may not require undercutting and pipes not shown may require undercutting. The Engineer will determine which pipe shall be undercut in accordance with Section 424 of the Specifications.

Station	Undercut Depth (Ft)	Quantity (CuYd)
30+00	1	2
130+43	1	10
17+23 (Ramp A)	1	48
17+45 (Ramp A)	1	48
01QS Total:		108

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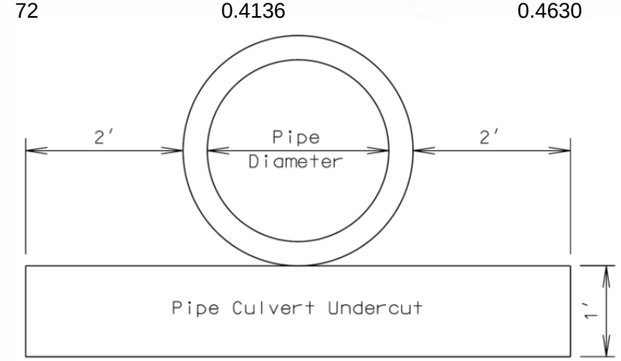
The table below contains the rate of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
36	0.2840	0.3110
60	0.3704	0.4105
72	0.4136	0.4630



INCIDENTAL WORK, GRADING

Station (01QS)	L/R	Remarks
58+99 to 59+54	M	Take out 18"-55' CMP & 2 End Sections
76+19 to 79+19	M	Take out 24"-300' RCP & 2 End Sections
102+00 to 105+00	M	Take out 24" – 300' Arch RCP & 2 End Sections
108+45	L	Take out 24" – 68' RCP & 2 End Sections
111+42 to 111+89	M	Take out 18"-47' CMP & 2 End Sections
113+17	R	Grade temporary work platform at TL5
117+57	L	Take out 12" – 112' CMP & 1 End Section
118+17	R	Take out 12" – 60' RCP & 1 End Section
121+19	L	Grade temporary work platform at TL9
121+52	L	Take out 12" – 112' CMP & 1 End Section
122+11	R	Take out 12" – 52' RCP & 1 End Section
17+23 (Ramp A)	L	Take out 60" – 68' Arch RCP & 2 End Sections
17+45 (Ramp A)	L	Take out 60" – 68' Arch RCP & 2 End Sections
38+20 (Ramp B)	L/R	Take out 24"-164' Twin RCP & 4 End Sections
59+53 to 61+81 (Ramp C)	L	Take out 36" – 228' Arch RCP & 2 End Sections, Restore Ditch
62+55 to 65+05 (Ramp C)	R	Take out 24"-250' RCP & 2 End Sections
15+08 (Ramp G)	L	Take out 12" – 88' RCP & 2 End Sections
46+45 (Ramp G)	R	Take out 30" – 227' RCP & 1 Inlet & 2 End Sections
46+62 (Ramp G)	R	Take out 30" – 227' RCP & 2 End Sections

Station (020Q)	L/R	Remarks
82+96 (I229 SB)	L	Take Out 1 Inlet & 1 End Section

REMOVAL OF EXISTING CONCRETE PAVEMENT STA. 43+50.00 to STA. 172+90.28

Existing asphalt concrete and/or existing asphalt concrete patch work that was placed above the existing concrete pavement is included in the quantity for "Remove Concrete Pavement". The Contractor shall incorporate the removed concrete pavement into the subgrade as indicated in the Undercutting for Select Subgrade Topping notes.

The existing 9 inch dowel jointed P.C.C. Pavement is typically 24 feet wide. The welded wire fabric weighs not less than 61 pounds per 100 square feet. The longitudinal wires are No. 1 gauge and are spaced 6 inches center to center and the transverse wires are No. 4 gauge and are spaced 12 inches center to center.

The existing contraction joints are spaced at approximately 46.5 feet.

The aggregate in the existing P.C.C. pavement is quartzite.

HIGH MAST TOWER LIGHT FOOTINGS

The Contractor shall grade a flat work platform for the equipment necessary to construct the hight mast light tower footings for TL5 and TL9. After the high mast light towers are installed, the contractor shall be responsible for removing the work platform and constructing the final grading. All costs involved in grading and removing the tower footing work platforms shall be incidental to the contract lump sum price for "Incidental Work, Grading".

TABLE OF CONCRETE PAVEMENT REMOVAL

Station	to	Station	Description	Quantity (SqYd)
47+84		48+74	I29 SB Tea Interchange	320
51+26		52+16	I29 SB Tea Interchange	300
47+84		48+74	I29 NB Tea Interchange	320
51+26		52+16	I29 NB Tea Interchange	300
43+50		117+51	I29 SB	21,240
121+57		173+90	I29 SB	15,432
43+50		118+12	I29 NB	19,897
122+19		172+90	I29 NB	14,142
12+40		25+30	I229 Ramp A	3,052
22+69		45+55	I229 Ramp B	6,207
10+00		73+03	I229 Ramp C	16,139
10+00		49+00	I229 Ramp G	10,611
			01QS Subtotal:	107,960
154+00		176+22	I229 NB	8,075
73+03		101+23	I229 SB	8,848
			020Q Subtotal:	16,923
			Project Total:	124,883

TABLE OF DROP INLET REMOVAL

All costs for removal of the frame and grate assembly shall be incidental to the contract unit price per each for "Remove Drop Inlet".

Station	L/R	Quantity (Each)
117+57	L	2
118+17	R	2
121+52	L	2
122+11	R	2
46+45 (Ramp G)	L	1
01QS Subtotal:		9
82+96 (I229 SB)	L	1
020Q Subtotal:		1
Project Total:		10

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UNDERDRAIN

Two underdrains exist within the project limits from Station 147+00± to Station 154+00± and from Station 158+50 to Station 169+50±. Underdrain installation and associated Muck Excavation was completed with construction of the outside southbound lanes during a previous project. Each underdrain was installed near the toe of the new inslope approximately 100 feet left of centerline. The Southern underdrain daylights at a concrete headwall at approximately Station 154+00±, 100 Lt. The other underdrain tees into a drop inlet located in the west ditch bottom at Station 169+50±. The Contractor shall take precautions to avoid damaging the underdrains during construction. Damaged underdrain tubing and headwalls shall be repaired as directed by the Engineer.

CORRUGATED METAL PIPE

Corrugated metal pipes shall have 2 ⅔-inch X ½-inch corrugations for 42-inch and smaller round pipe unless otherwise stated in the plans.

The soils within the project area are highly corrosive to steel. Corrugated metal pipe in these areas are specified in the Table of Pipe Quantities and the pipe shall be 14 gauge steel. Corrugated metal pipe in these areas including the connection bands shall be polymer coated and shall be in conformance with AASHTO M245 and AASHTO M36. The connection bands shall be 24 inches wide.

All damage to the polymer coating shall be repaired in accordance with the manufacturer's recommendations prior to installation of the pipe.

All costs associated with the polymer coating including repair of polymer coating shall be incidental to the corresponding CMP bid items.

Metal pipe end sections connected to polymer coated CMP shall be aluminum-coated (Type 2) in accordance with AASHTO M36 as specified in the Table of Pipe Quantities. All costs associated for gauge, coating, and connections shall be incidental to the corresponding CMP End Section bid items.

CONTROLLED DENSITY FILL FOR PIPE

Controlled density fill shall be in conformance with Section 464 of the Specifications.

The controlled density fill shall be placed between the pipes from the base of pipe elevation to the haunch of the pipes.

TABLE OF CONTROLLED DENSITY FILL FOR PIPE

Station	Quantity (CuYd)
91+46 to 92+05	4.5
01QS Total:	4.5

CONCRETE PIPE CONNECTIONS

Pipe connections to existing pipes, manholes, junction boxes, and drop inlets shall be done by breaking a hole into the existing structure and inserting the pipe. A concrete collar shall then be poured around the pipe in the area of the connection.

When it is not possible to use a normal pipe joint (male-female ends), connections to existing pipe shall be made by placing a 2' wide by 6" thick M6 concrete collar around the outside of the connection. The concrete collar shall be reinforced with 6x6 W2.9 x W2.9 wire mesh.

All costs for constructing the concrete collars including materials and labor shall be incidental to the contract unit price per foot for the corresponding pipe bid item.

DROP INLETS

The plan shown quantities of the drop inlet components such as Class M6 Concrete, Reinforcing Steel, Type C Frame and Grate, Type D Frame and Grate, and Precast Drop Inlet Collar will be the basis of payment for these items.

If additions or reductions to the number of drop inlets are ordered by the Engineer, payment for the components required to construct the drop inlets will be made at the contract unit prices for the components of the drop inlets.

TABLE OF DROP INLETS AND QUANTITIES

Station	L / R	Drop Inlet Size	Drop Inlet Type	Class M6 Concrete (CuYd)	Reinf. Steel (Lb)	Precast Drop Inlet Collar (Each)	Frame and Grate/Lid Type
117+57	L	1.5'x3'	D	2.22	134	1	D
117+57	L	1.5'x3'	D	2.10	144	1	D
118+17	R	1.5'x3'	D	1.19	132	1	D
118+17	R	1.5'x3'	D	1.26	144	1	D
121+52	L	1.5'x3'	D	1.17	134	1	D
121+52	L	1.5'x3'	D	1.26	144	1	D
122+11	R	1.5'x3'	D	1.19	124	1	D
122+11	R	1.5'x3'	D	1.16	134	1	D
RampG 44+00	L	3'x4'	C	2.02	230	0	C
		01QS Subtotals:		13.57	1,320	8	
I229 17+76	L	3'x4'	C	0.84	108	1	C
		020Q Subtotals:		.84	108	1	
		Project Totals:		0.00	0	0	
Total Type C Frame and Grate						2	
Total Type D Frame and Grate						8	

ADJUSTMENT OF MANHOLES

The Contractor shall adjust manholes to the extent necessary on this project. Adjusting the manholes may consist of removing the upper course of brick or removing the concrete walls, replacing the removed materials with brick or Class M6 concrete, placing adjusting rings if necessary, and resetting the manhole frame and lid. The elevation of the lid shall be set at the same elevation of the adjacent new pavement or surrounding ground. All manhole frames, lids, and rings that are cracked or broken due to carelessness of the Contractor shall be replaced with new manhole frames, lids, and rings that conform with the Specifications at the Contractor's expense. Manholes shall be adjusted to the satisfaction of the Engineer. All costs involved in adjusting the manholes shall be incidental to the contract unit price per each for "Adjust Manhole".

The Engineer may direct adjustment of manholes that were not included in these plans. Payment for adjusting manholes that were not included in the plans will be at the contract unit price per each for "Adjust Manhole".

TABLE OF ADJUST MANHOLES

Station	L/R	Type of Adjustment
130+60	L	Adjust to finished grade

TABLE OF TYPE M MEDIAN DRAINS

Station	L/R	Class M6 Concrete (CuYd)	Reinforcing Steel (Lb)	Type M Frame and Grate Assembly (Each)
91+50	R	1.46	94	1
106+84	R	1.07	82	1
	Totals:	2.53	176	2

TABLE OF BANK AND CHANNEL PROTECTION GABIONS

Station	L/R	Quantity (CuYd)
117+57	171' L	4.5
118+17	194' R	4.5
121+52	171' L	4.5
122+11	171' R	4.5
	Total:	18.

TABLE OF TYPE D48 CONCRETE CURB AND GUTTER

Station	to	Station	L/R	Quantity (Ft)
117+55		117+70	78' L	15
117+55		117+70	22' L	15
118+15		118+24	22' R	9
118+15		118+24	66' R	9
121+35		121+54	78' L	19
121+35		121+54	22' L	19
122+03		122+13	22' R	10
122+03		122+13	66' R	10
			Total:	106.

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TABLE OF GUARDRAIL

FOR BIDDING PURPOSES ONLY

Revised: 9/22/2015 (MRK)

Location	Remove 3 Cable Guardrail (Ft)	Remove 3 Cable Guardrail Anchor Assembly (Each)	Remove Beam Guardrail (Ft)	Remove W Beam Guardrail Breakaway Cable Terminal (Each)	Remove 3 Cable Guardrail Anchor Assembly for Reset (Each)	3 Cable Guardrail (Ft)	Reset 3 Cable Guardrail Anchor Assembly (Each)	NCHRP 350 Test Level 3 High Tension Cable Guardrail (Ft)	NCHRP 350 TL 3 High Tension Cable Guardrail Anchor Assembly (Each)	3 Cable Guardrail Anchor Assembly (Each)	3 Cable Guardrail Slip Base Anchor Assembly (Each)	Straight Double Class A Thrie Beam Guardrail with Wood Posts (Ft)	Straight Class A W Beam Guardrail with Wood Posts (Ft)	W Beam to Thrie Beam Guardrail Transition (Each)	W Beam Guardrail Breakaway Cable Terminal (Each)
Existing Str. 42-065-030 I29 NB Bridge															
5+23 L to 8+84 L	203	1	81	1	1	343	1				1	12.5	62.5	1	1
Existing Str. 42-064-030 I29 SB Bridge															
11+16 R to 14+77 R	203	1	81	1	1	343	1				1	12.5	62.5	1	1
I29 SB Cantilever Sign															
21+69 L to 25+91 L								422	2						
I29 NB Sign Bridge															
49+95 to 53+37-20' R								342	2						
49+95 to 53+37-76' R								342	2						
61+55-66' L to 64+49-68' L	294	2													
I29 SB Sign Bridge															
68+63 to 71+89-20' L								326	2						
68+63 to 71+89-76' L								326	2						
I29 Interim Crossover Closure															
76+42 to 78+95	253	2													
I29 NB Sign Bridge															
76+61 to 79+87-20' R								326	2						
I29 Interim Crossover Closure															
102+10 to 104+45	195	2													
I29 NB Sign Bridge															
103+01 to 106+27-20' R								326	2						
103+01-85' R to 106+27-89' R								326	2						
New Str. 42-066-006 I29 SB Bridge & Sign Bridge															
114+33-80' L to 117+72-78' L						339									
114+37-21' L to 118+08-22' L	174	1				371									
120+97-78' L to 123+47-87' L	283	1	74			220				1	1	12.5	25	1	1
121+34-22' L to 124+53-8' L			246	1		290				1	1	12.5	25	1	1
New Str. 42-067-006 I29 NB Bridge															
115+17-9' R to 118+30-22' R			251			283				1	1	12.5	25	1	1
116+24-75' R to 118+59-66' R	289	2	52			206				1	1	12.5	25	1	1
122+04-22' R to 123+99-18' R	195	1													
I29 SB Cantilever Sign															
140+68 to 143+94-76' L								326	2						
Existing Str. 50-172-240 57th St Bridge & I29 SB Sign Bridge															
154+22 to 158+28-20' R	308	1						406	2						
158+01 to 159+77-20' R *	176	1			1		1	176							
154+63 to 159+47-76' R								484	2						
154+49 to 156+89-20' L *	240	1			1		1	240							
156+89 to 160+63-20' L	308	1						374	2						
157+67 to 162+21-76' L	284	2						454	2						
Sheet Subtotals:	3,405	19	785	3	4	2,395	4	5,196	26	4	8	75	225	6	6

* Locations are temporary extensions of existing High Tension Cable Guardrail for phasing traffic configurations (see Section C – Traffic Control). Existing guardrail, guardrail extensions, and end anchor assemblies shall be removed before the permanent High Tension Cable Guardrail is installed.

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TABLE OF GUARDRAIL (Continued)

Location	Remove 3 Cable Guardrail (Ft)	Remove 3 Cable Guardrail Anchor Assembly (Each)	Remove Beam Guardrail (Ft)	Remove W Beam Guardrail Breakaway Cable Terminal (Each)	Remove 3 Cable Guardrail Anchor Assembly for Reset (Each)	3 Cable Guardrail (Ft)	Reset 3 Cable Guardrail Anchor Assembly (Each)	NCHRP 350 Test Level 3 High Tension Cable Guardrail (Ft)	NCHRP 350 TL 3 High Tension Cable Guardrail Anchor Assembly (Each)	3 Cable Guardrail Anchor Assembly (Each)	3 Cable Guardrail Slip Base Anchor Assembly (Each)	Straight Double Class A Thrie Beam Guardrail with Wood Posts (Ft)	Straight Class A W Beam Guardrail with Wood Posts (Ft)	W Beam to Thrie Beam Guardrail Transition (Each)	W Beam Guardrail Breakaway Cable Terminal (Each)
New Str. 42-066-006 I29 SB Bridge & Str. 42-067-006 I29 NB Bridge															
57+38 to 62+40-22' R (Ramp C)								502	2						
34+67 to 39+67-10' L (Ramp G)	214	2						502	2						
35+57-27' R to 38+34-15' R (Ramp G)	274														
Sheet Subtotals:	488	2						1,004	4						
01QS Subtotals:	3,893	21	785	3	4	2,395	4	6,200	30	4	8	75	225	6	6
Existing Str. No. 42-070-006 Solberg Ave Bridge and I229 NB Sign Bridge															
150+98 to 156+32-22' L (I229 NB)								534	2						
Existing I229 SB Sign Bridge															
73+72 to 74+62-16' R (I229 SB)			90												
73+72 to 74+62-31' L (I229 SB)			90												
I229 SB Sign Bridge (Sta. 13+00)															
77+69 to 80+79-22' R I229 SB								310	2						
77+69 to 80+47-36' L I229 SB								278	2						
I229 SB Sign Bridge (Sta. 31+65)															
96+37 to 99+47-22' R (I229 SB)								310	2						
96+37 to 99+15-36' L (I229 SB)								278	2						
I229 SB Sign Bridge (Sta. 61+50)															
124+18 to 129+20-22' R (I229 SB)	330	2						502	2						
020Q Subtotals:	330	2	180					2,212	10						
Project Totals:	4,223	23	965	3	4	2,395	4	8,412	40	4	8	75	225	6	6

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SOUTH DAKOTA

HIGH TENSION CABLE GUARDRAIL

The Contractor shall furnish and install a 3 or 4 cable high tension guardrail system that meets the Test Level 3 crash testing requirements of National Cooperative Highway Research Program (NCHRP) 350 or current Manual for Assessing Safety Hardware (MASH). The maximum dynamic deflection of the system shall be less than 8 feet and the maximum post spacing shall be 16 feet unless specified otherwise in the plans.

The high tension cable guardrail system shall be in compliance with Specifications Section 6.9 Buy America.

The Contractor shall install the system according to the manufacturer's installation recommendations except where stated otherwise in the plans. A copy of the detail drawings and installation instructions for the high tension cable guardrail and anchor assemblies shall be given to the Engineer a minimum of 4 weeks prior to installation of the high tension cable guardrail system.
All posts shall be galvanized and inserted into driven galvanized steel sleeves with soil plates.

Reflective sheeting shall be placed on the face of every other post cap or cable spacer and on the cable release post. The sheeting shall be in conformance with Section 982.2 K.2. of the Specifications. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The cables provided shall be pre-stretched in the factory.

The Contractor shall check and adjust the tension of the cables a minimum of 3 weeks after installation and not longer than 6 weeks after installation. Cost for this work shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

The lengths of high tension cable guardrail stated in the plans were based on a non-effective length of 26' at each end of the "run" of guardrail. The length and location of the high tension cable guardrail at each site will need to be adjusted during construction as necessary if a system with a different non-effective length is used and it shall be approved by the Engineer before installation.

The Contractor shall provide a signed letter of compliance to the Engineer upon completion of the high tension cable guardrail installation(s) stating that the high tension cable barrier system has been installed in conformance to the installation instructions, specifications, and at a minimum meets the TL-3 crash test requirements of NCHRP 350 or MASH 2009.

The high tension cable guardrail shall be measured along the centerline of the cable guardrail from center of anchor assembly to center of anchor assembly to the nearest foot. Example: If the system utilizes 4 anchor footings in the anchor assembly, then the center of the anchor assembly would be centered between the 2nd and 3rd footing.

All costs for furnishing and installing the 3 or 4 cable high tension guardrail system including all labor, materials, and equipment shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

HIGH TENSION CABLE GUARDRAIL ANCHOR ASSEMBLY

The beginning and end of each “run” of high tension cable guardrail shall terminate with an anchor assembly that meets the Test Level 3 crash testing requirements of NCHRP 350 or MASH 2009.

The footing for the anchor assembly shall be designed to allow for 1 inch maximum of lateral deflection. The allowable design soil pressure shall be 1000 psf. The top 2 feet of soil pressure shall be neglected in the design of the footing. The footing shall be a minimum of 5’ deep. The footing design shall be submitted through proper channels to the Office of Bridge Design for approval a minimum of 4 weeks prior to construction of the anchor footings.

All costs for furnishing and installing the High Tension Cable Guardrail Anchor Assembly including all labor, equipment, and materials which include the anchor footing, hardware, and all attachments to the anchor footing, shall be incidental to the contract unit price per each for “NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly”.

HIGH TENSION CABLE GUARDRAIL POST

The Contractor shall furnish an additional 50 galvanized posts and 50 caps or cable spacers with white reflective sheeting and shall deliver and stockpile the materials at the DOT Lennox Maintenance Shop located just NW of Exit 62. The posts shall be the same type of posts provided in the installation of the high tension cable guardrail on the project.

All costs for furnishing the posts and caps and delivering them to the Lennox Maintenance Shop shall be incidental to the contract unit price per each for "Furnish High Tension Cable Guardrail Post".

HIGH TENSION CABLE GUARDRAIL POST AND SLEEVE

The Contractor shall furnish an additional 50 galvanized posts, 50 sleeves with soil plates, and 50 caps or cable spacers with white reflective sheeting and shall deliver and stockpile the materials at the DOT Lennox Maintenance Shop located just NW of Exit 62. The posts and sleeves shall be the same type of posts and sleeves provided in the installation of the high tension cable guardrail on the project.

All costs for furnishing the posts, sleeves with soil plates, caps, and delivering them to DOT Lennox Maintenance Shop shall be incidental to the contract unit price per each for "Furnish High Tension Cable Guardrail Post and Sleeve".

CABLE TENSION INDICATOR

The Contractor shall furnish a cable tension indicator that is compatible with the 3 or 4 cable high tension guardrail system installed on this project.

The cable tension indicator shall become the property of the State. The Contractor shall deliver the cable tension indicator to the Engineer after the Contractor has retensioned the cables after the 3 week original installation date. The cost for furnishing and delivering the cable tension indicator to the Engineer shall be incidental to the contract unit price per each for "Cable Tension Indicator".

TABLE OF SUPERELEVATION

Station	to	Station	
I29 Northbound			
43+50.00	78+01.06	-	Normal Crown Section
78+01.06	80+65.06	-	Superelevation Transition
80+65.06	94+80.79	-	5729’ Radius Curve Right 0.034’/’ Superelevation Rate Point of Rotation 12’ Right of NB Centerline
94+80.79	97+44.79	-	Superelevation Transition
97+44.79	123+21.73	-	Normal Crown Section
123+21.73	125+85.73	-	Superelevation Transition
125+85.73	135+00.47	-	5760’ Radius Curve Right 0.034’/’ Superelevation Rate Point of Rotation 12’ Right of NB Centerline
135+00.47	137+64.47	-	Superelevation Transition
137+64.47	172+90.28	-	Normal Crown Section
I29 Southbound			
43+50.00	78+77.86	-	Normal Crown Section
78+77.86	80+60.86	-	Superelevation Transition
80+60.86	94+84.99	-	5729’ Radius Curve Right 0.034’/’ Superelevation Rate Point of Rotation 12’ Left of SB Centerline
94+84.99	96+67.99	-	Superelevation Transition
96+67.99	122+43.73	-	Normal Crown Section
122+43.73	125+97.73	-	Superelevation Transition
125+97.73	134+88.47	-	5760’ Radius Curve Right 0.034’/’ Superelevation Rate Point of Rotation 12’ Left of SB Centerline
134+88.47	138+42.47	-	Superelevation Transition
138+42.47	172+90.28	-	Normal Crown Section
I229 Northbound			
149+00.00	152+80.00	-	Reverse Crown Section (1-lane)
152+80.00	154+00.00	-	Superelevation Transition
154+00.00	181+05.17	-	Normal Crown Section

Station	to	Station	
I229 SB / Ramp A			
10+20.06	11+09.06	-	Superelevation Transition
11+09.06	27+54.94	-	768’ Radius Curve Right 0.060’/’ Superelevation Rate Point of Rotation at Centerline
27+53.94	28+43.94	-	Superelevation Transition
Ramp B			
17+99.19	18+94.19	-	Superelevation Transition
18+94.19	44+12.35	-	2500’ Radius Curve Right 0.058’/’ Superelevation Rate Point of Rotation at Centerline
44+12.35	45+83.35	-	Superelevation Transition
Ramp C / I229 SB			
9+28.82	10+28.82	-	Superelevation Transition
10+28.82	16+22.83	-	2075’ Radius Curve Left 0.058’/’ Superelevation Rate Point of Rotation at Centerline
16+22.83	17+28.83	-	Superelevation Transition
17+28.83	26+32.62	-	Normal Crown Section
26+32.62	28+56.62	-	Superelevation Transition
28+56.62	56+51.78	-	1898’ Radius Curve Right 0.060’/’ Superelevation Rate Point of Rotation at Centerline
56+51.78	58+75.78	-	Superelevation Transition
58+75.78	101+23.82	-	Normal Crown Section
Ramp G			
9+38.18	10+15.46	-	Superelevation Transition
10+15.46	37+37.19	-	400’-1836’ Radius Compound Curve Right 0.060’/’ Superelevation Rate Point of Rotation at Centerline
37+37.19	39+61.19	-	Superelevation Transition
39+61.19	49+00.00	-	Normal Crown Section

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM0293(96)73/IM2292(90)0	B12	B128

FOR BIDDING PURPOSES ONLY

TABLE OF CONSTRUCTION STAKING
(See Special Provision for Contractor Staking)

Roadway and Description	Begin Station	End Station	Number of Lanes	Length (Ft)	Grade Staking: Length (Mile)	Grade Staking: Lane Factor	Grade Staking: *Sets of Stakes	Grade Staking: **Grade Staking Quantity (Mile)	Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)	Final Cross Section Survey Quantity (Mile)	Graded Centerline Staking Quantity (Mile)	Structure Staking Quantity (Each)
I29 SB (1 Shoulder PCCP)	23+85 L	43+50 L	1	1,965	0.372	0.5	2	0.372	0.372	0.372	0.372		
I29 SB (3 Lanes PCCP)	43+50 L	75+65 L	3	3,215	0.609	1.5	2	1.827	0.609	0.609	0.609	0.609	
I29 SB (2 Lanes PCCP)	75+65 L	107+13 L	2	3,148	0.596	1	2	1.192	0.596	0.596	0.596	0.596	
I29 SB (4 Lanes PCCP)	107+13 L	112+53 L	4	540	0.102	2	2	0.408	0.102	0.102	0.102	0.102	
I29 SB (Transition from 4 Lanes to 3 Lanes PCCP)	112+53 L	114+93 L	4	240	0.045	2	2	0.182	0.045	0.045	0.045	0.045	
I29 SB (3 Lanes PCCP)	114+93 L	118+05 L	3	132	0.059	1.5	2	0.177	0.059	0.059	0.059	0.059	
I29 SB (Bridge over I229 Ramps C & G)	118+05 L	121+09 L	3										1
I29 SB (3 Lanes PCCP)	121+09 L	172+90 L	3	5,181	0.981	1.5	2	2.943	0.981	0.981	0.981	0.981	
I29 NB (3 Lanes PCCP)	43+50 R	105+47 R	3	6,197	1.174	1.5	2	3.521	1.174	1.174	1.174	1.174	
I29 NB (2 Lanes PCCP)	105+47 R	118+56 R	2	1,309	0.248	1	2	0.496	0.248	0.248	0.248	0.248	
I29 NB (Bridge over I229 Ramps C & G)	118+56 R	121+72 R	2										1
I29 NB (2 Lanes PCCP)	121+72 R	137+45 R	2	1,573	0.298	1	2	0.596	0.298	0.298	0.298	0.298	
I29 NB (3 Lanes PCCP)	137+45 R	172+90 R	3	3,545	0.671	1.5	2	2.013	0.671	0.671	0.671	0.671	
I229 Ramp A (I229 SB to I29 NB) (1 Lane PCCP)	10+00	28+54	1	1,854	0.351	0.5	2	0.351	0.351	0.351	0.351	0.351	
I229 Ramp B (I29 NB to I229 NB) (1 Lane PCCP)	18+75	44+46	1	2,571	0.487	0.5	2	0.487	0.487	0.487	0.487	0.487	
I229 Ramp C (I229 SB to I29 SB) (1 Lane PCCP)	10+07	19+40	1	933	0.177	0.5	2	0.177	0.177	0.177	0.177	0.177	
I229 Ramp C (Transition from 1 Lane to 2 Lanes PCCP)	19+40	25+22	2	582	0.110	1	2	0.220	0.110	0.110	0.110	0.110	
I229 Ramp C (I229 SB to I29 SB) (2 Lanes PCCP)	25+22	42+00	2	1,678	0.318	1	2	0.636	0.318	0.318	0.318	0.318	
I229 Ramp C (I229 SB to I29 SB) (2 Lanes PCCP)	64+00	73+03	2	903	0.171	1	2	0.342	0.171	0.171	0.171	0.171	
I229 Ramp G (I29 SB to I229 NB) (1 Lane PCCP)	10+00	49+00	1	3,900	0.739	0.5	2	0.739	0.739	0.739	0.739	0.739	
						01QS Subtotals:		16.679	7.508	7.508	7.508	7.136	2
I229 SB (3 Lanes PCCP)	73+03	101+23	3	2,820	0.534	1.5	2	1.602	0.534	0.534	0.534	0.534	
I229 NB (1 Lane PCCP)	149+00	152+77	1	377	0.071	0.5	2	0.071	0.071	0.071	0.071	0.071	
I229 NB (2 Lanes PCCP)	152+77	181+05	2	2,828	0.536	1	2	1.072	0.536	0.536	0.536	0.536	
						020Q Subtotals:		2.745	1.141	1.141	1.141	1.141	0
						Project Totals:		19.424	8.649	8.649	8.649	8.277	2

* 1 = Blue Top Stakes Only (Asphalt Concrete Pavement)
2 = Blue Top and Paving Hub Stakes (PCC Pavement)

** Grade Staking Quantity = (Length) x (Lane Factor) x (Sets of Stakes)

REGISTERED PROFESSIONAL ENGINEER
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9/3/15
SOUTH DAKOTA

PIPE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B13	B128

	RCP														CMP						
	Circular						Arch		Flared End			Sloped End		Safety End	Circular		Flared End		Remove Pipe Culvert	Remove Pipe End Section for Reset	Reset Pipe End Section
	12" Cl 2	18" Cl 2	24" Cl 2	30" Cl 2	36" Cl 2	72" Cl 2	24" Cl 2	60" Cl 2	24"	30"	60" Arch	24"	24" Arch	18"	12"	18" 14-Gauge	12"	18"			
Station-Offset (L/R)	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Each	Each	Each	Each		Each	Ft	Ft	Each	Each	Ft	Each	Each
30+00-116' L to 124' L					8															1	1
91+50-1' L to 116' R			110									1									
91+69-123' R to 92+05-149' R				48						4											
106+84-0' R to 112' R							106						1								
111+42 to 111+89																48		2			
117+57-22' L to 171' L	50														94		1				
118+17-22' R to 194' R	38														134		1				
121+52-22' L to 171' L	50														94		1				
122+11-22' R to 171' R	38														112		1				
130+43-124' L to 144' L						16														1	1
17+23-57' L to 57' R (Ramp A)								100			2										
17+45-57' L to 57' R (Ramp A)								100			2										
35+85 (Ramp B)			180						4												
59+40-27' R to 60+16-20' R (Ramp C)																			80		
60-71-26'L to 61+48-33' L (Ramp C)																			80		
15+00-32' L to 48' R (Ramp G)			72									2									
25+86-46' R (Ramp G)														1					10		
38+69-49' R to 40+09-39' R (Ramp G)																			140	1	1
44+00-66' R to -190' L (Ramp G)				236						2											
44+23-63' R to -189' L (Ramp G)				244						2											
01QS Subtotals:	176		362	528	8	16	106	200	4	8	4	3	1	1	434	48	4	2	310	3	3
82+96 L (I-229 SB)		6												1							
82+96 R (I-229 SB)		10																			
020Q Subtotals:		16												1							
Project Totals:	176	16	362	528	8	16	106	200	4	8	4	3	1	2	434	48	4	2	310	3	3

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FENCE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B14	B128

Station to Station			Right-of-Way Fence Type 3 (Ft)	Post Panels 2 Post (Each)	Post Panels 3 Post (Each)	Chain Link Fence 6' with Tension Wired Top (Ft)	Fence Remove (Ft)
43+50	77+65	L	3,415	2	2		3,415
10+07 (Ramp C)	48+25 (Ramp C)	L	3,818	11	2		3,818
48+25 (Ramp C)	57+73 (Ramp C)	L				948	948
120+20	156+44	L				3,624	3,624
43+50	62+93	R	1,943	1	2		1,943
62+93	105+47	R				4,254	4,254
18+75 (Ramp B)	45+57 (Ramp B)	R				2,682	2,682
10+00 (Ramp A)	28+26 (Ramp A)	R				1,826	1,826
135+68	157+55	R				2,187	2,187
	01QS Subtotals:		9,176	14	6	15,521	24,697
152+77 (I229 NB)	153+40 (I229 NB)	R				63	63
156+26 (I229 NB)	183+47 (I229 NB)	R				2,721	2,721
78+03 (I229 SB)	100+44 (I229 SB)	L				2,241	2,241
	020Q Subtotals:		0	0	0	5,025	5,025
	TOTALS:		9,176	14	6	20,546	29,722

Post Type and Sequence:
Right-of-way fence shall be constructed using alternate wood and steel posts.

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SOUTH DAKOTA

BORROW PIT INFORMATION LAYOUT
Sheet 1 OF 2

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B15	B128

Plotting Date: 01/22/2015

PIT NO. 1 & 2 OPTION BORROW

PROJECT NO. IM 0293(96)73 & IM 2292(90)0 COUNTY Lincoln & Minnehaha

LOCATION ____ SEC. 8 TOWNSHIP 100N RANGE 50W

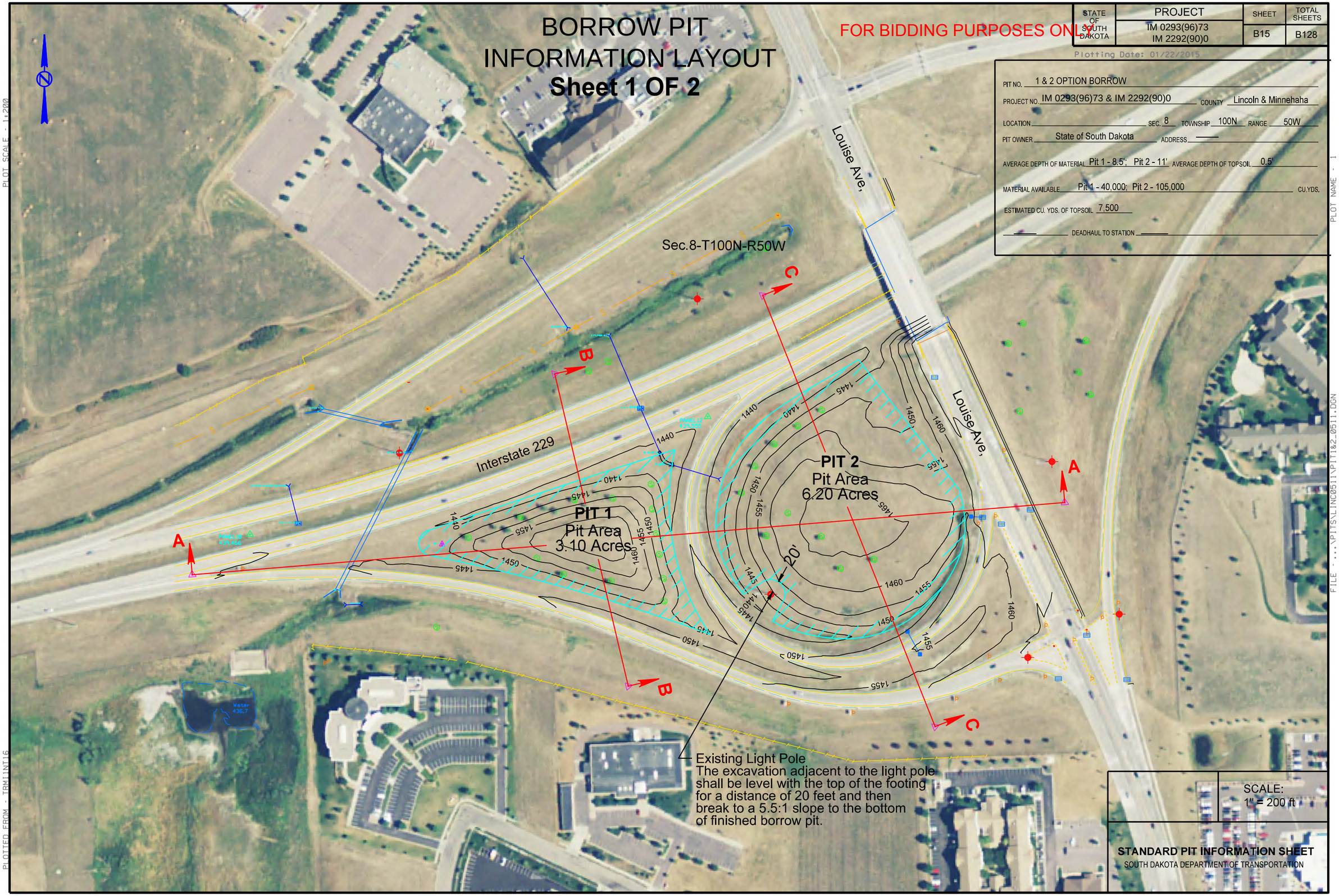
PIT OWNER State of South Dakota ADDRESS ____

AVERAGE DEPTH OF MATERIAL Pit 1 - 8.5'; Pit 2 - 11' AVERAGE DEPTH OF TOPSOIL 0.5'

MATERIAL AVAILABLE Pit 1 - 40,000; Pit 2 - 105,000 CU.YDS.

ESTIMATED CU. YDS. OF TOPSOIL 7,500

____ DEADHAUL TO STATION ____



PLOT SCALE - 1:200

PLOTTED FROM - TRMIINT16

PLOT NAME - 1

FILE - ...\PITS\LINC0511\PIT1&2_0511.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B16	B128

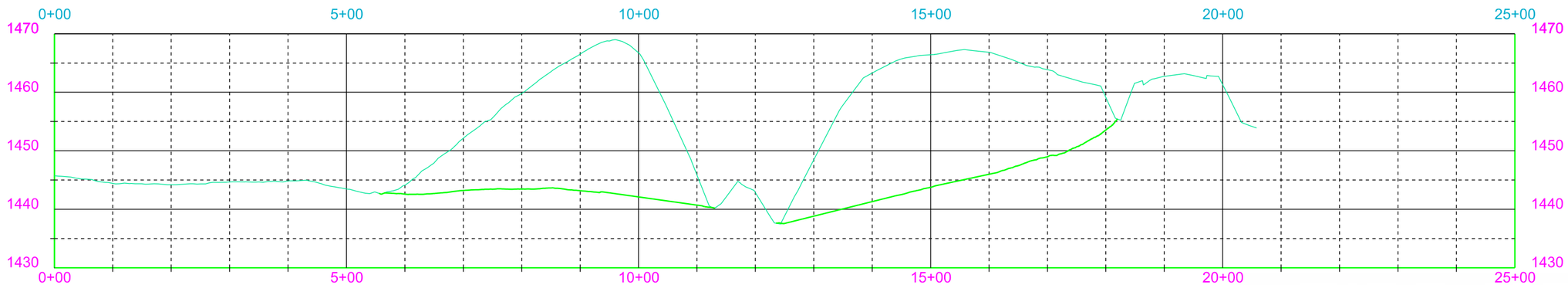
Plotting Date: 01/22/2015

BORROW PIT INFORMATION LAYOUT

Sheet 2 OF 2

FOR BIDDING PURPOSES ONLY

SECTION A-A



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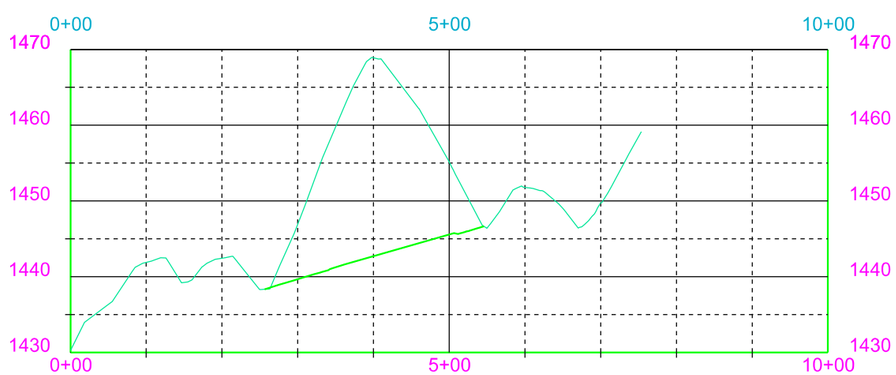
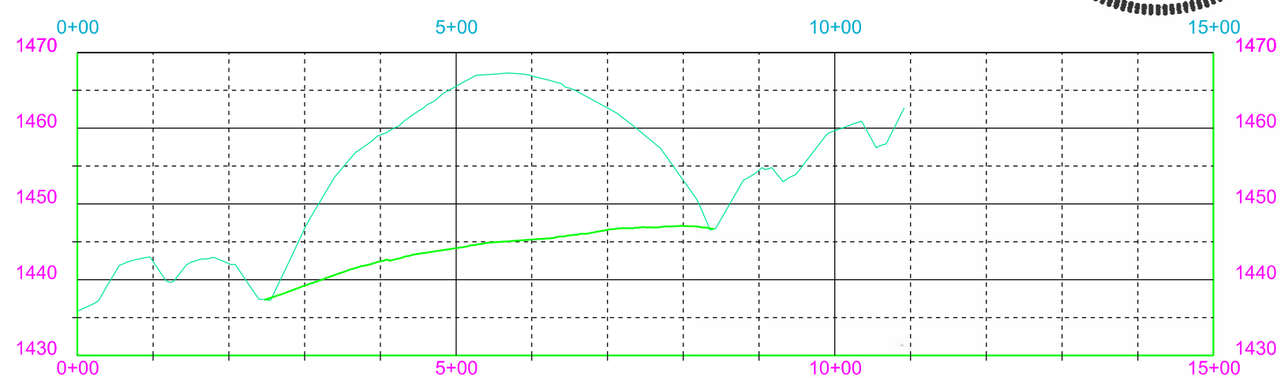
9/3/15
SOUTH DAKOTA

SECTION B-B



SECTION C-C



PLOT SCALE - 1:200

PLOTTED FROM - TRMIINT16

PLOT NAME - 2

FILE - ...\PITS\LINC0511\PITI&2_0511.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B17	B128

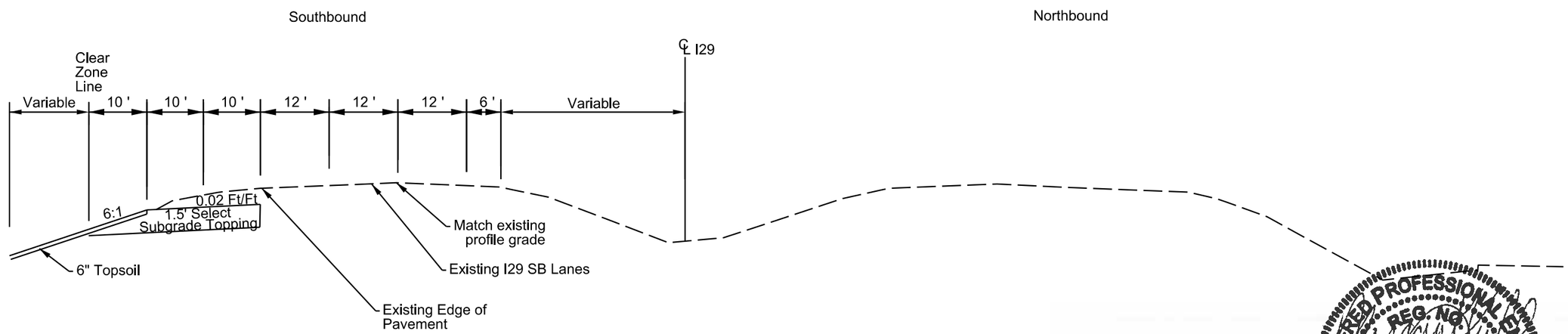
Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

TYPICAL GRADING SECTIONS

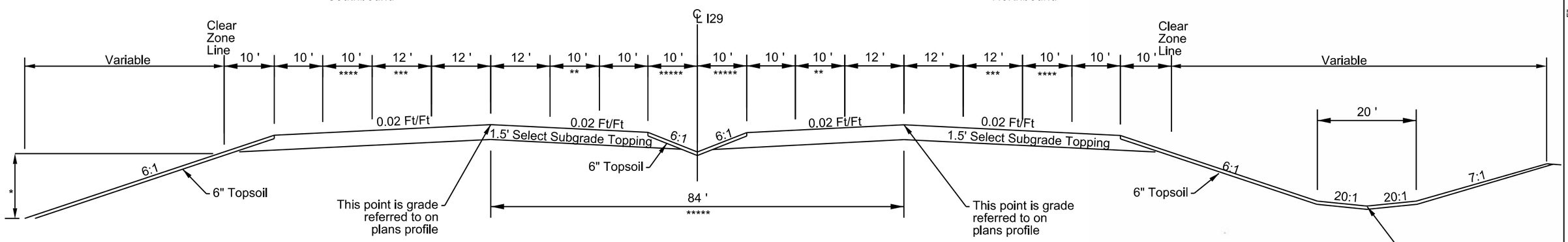
I29

Sta. 24+85.63 to Sta. 43+50.00



I29

Sta. 43+50.00 to Sta. 77+65.25 SB
Sta. 43+50.00 to Sta. 105+47.03 NB
Sta. 107+13.58 to Sta. 125+00.00 SB
Sta. 131+00.00 to Sta. 172+90.28 SB
Sta. 137+44.99 to Sta. 172+90.28 NB



*If vertical distance is more than 3.83' and the slope catch point extends outside the R.O.W., then use 3:1 as foreslope for ditch.

No new ditch is required if new foreslope ties to existing foreslope prior to existing ditch bottom.

** Taper inside shoulders from 6' at 43+50 to 10' at 45+45

*** I29 NB auxiliary lane: Taper from 12' at 95+21.59 to 15' at 105+54.27 and from 15' at 136+50.40 to 12' at 138+00.40.
I29 SB auxiliary lane: Taper from 12' at 75+15.25 to 15' at 75+65.25, from 31' at 107+13.58 to 24' at 108+53.58, and from 24' at 112+53.58 to 12' at 114+93.58.

**** I29 NB outside shoulder: Taper from 10' at 95+21.59 to 19' at 105+75.61 and from 8' at 136+50.40 to 10' at 138+00.40.
SB outside shoulder: Taper from 4' at 107+33.58 to 10' at 108+53.58.

***** I29 NB&SB median: Taper from 10' at 109+00 to 12' at 117+00 and from 12' at 125+45 to 10' at 135+41.
NB&SB profile grade point: Taper from 84' at 109+00 to 88' at 117+00 and from 88' at 125+45 to 84' at 135+41.

REGISTERED PROFESSIONAL ENGINEER
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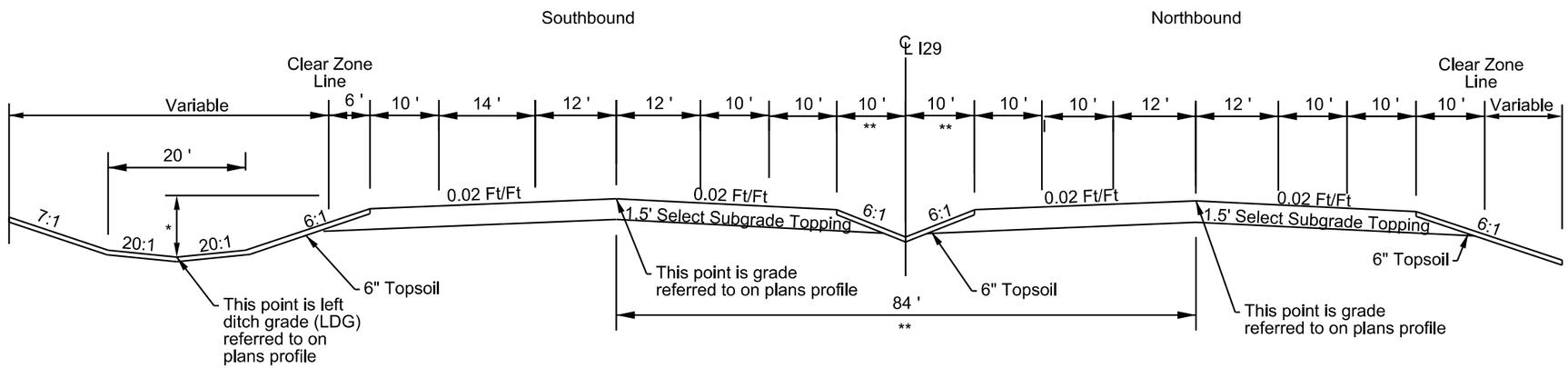
9/3/15
SOUTH DAKOTA

Plot Scale - 1:20
Plot Name - 3
File - ...\rd\prj\LINC01QS\typ_01.dgn
Plotted From - geoff_babovec

TYPICAL GRADING SECTIONS

I29

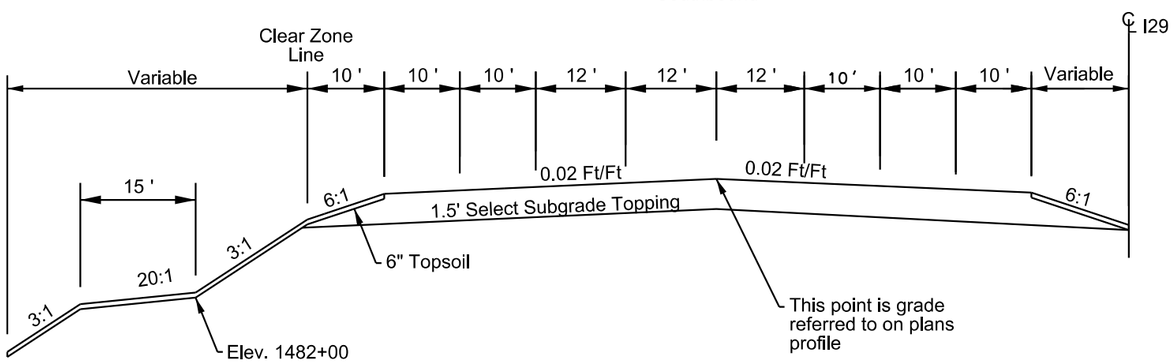
Sta. 77+65.25 to Sta. 107+13.58 SB
Sta 105+47.03 to Sta. 137+44.99 NB



I29

Sta. 125+00.00 to Sta. 131+00.00

Southbound



*If vertical distance is more than 3.83' and the slope catch point extends outside the R.O.W., then use 3:1 as foreslope for ditch.

No new ditch is required if new foreslope ties to existing foreslope prior to existing ditch bottom.

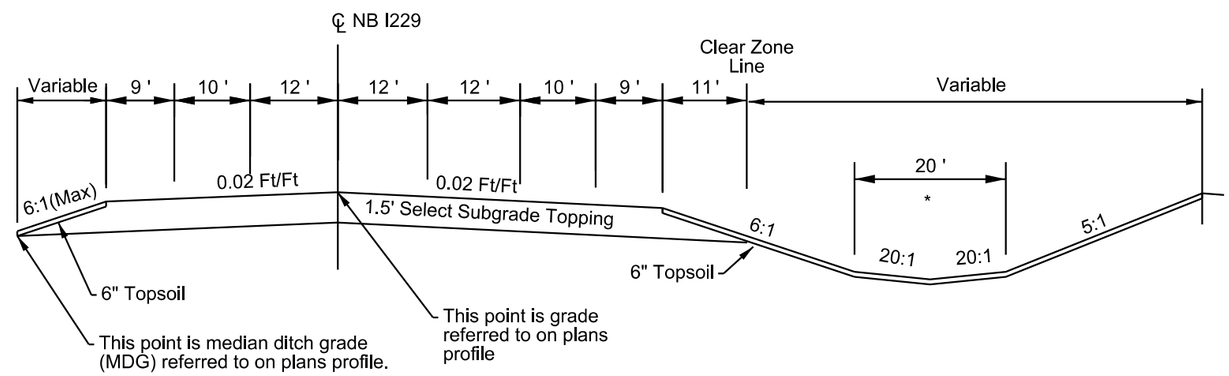
** I29 NB&SB median: Taper from 10' at 109+00 to 12' at 117+00 and from 12' at 125+45 to 10' at 135+41.
NB&SB profile grade point: Taper from 84' at 109+00 to 88' at 117+00 and from 88' at 125+45 to 84' at 135+41.

Plotted From - geoff_babovec
Plot Scale - 1:20
Plot Name - 4
File - ...\rd\prj\LINC01QS\typ_02.dgn

TYPICAL GRADING SECTIONS

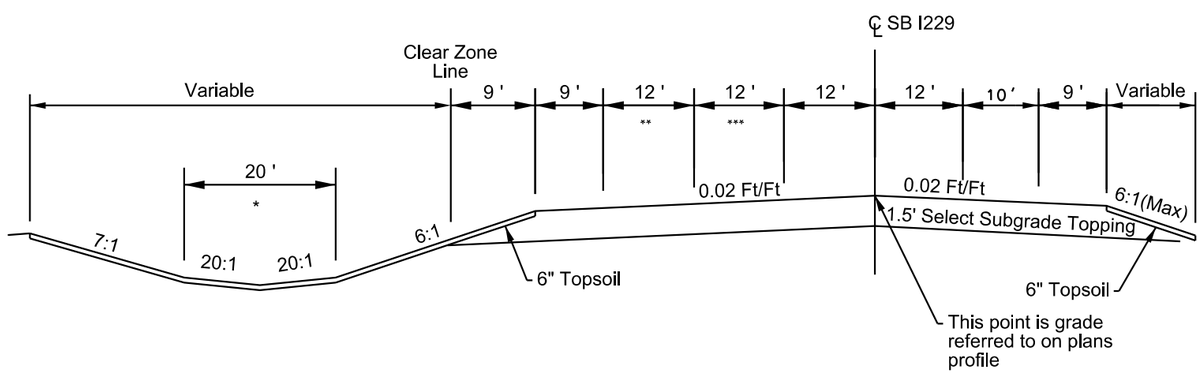
I229 NB

Sta. 152+77.28 to Sta. 181+05.17



I229 SB

Sta. 73+03.60 to Sta. 101+23.82



* No new ditch is required if new foreslope ties to existing foreslope prior to existing ditch bottom.

** Taper SB outside shoulder from 8' at 74+89.34 to 12' at 76+76.85. Taper SB auxiliary lane from 16' at 75+26.85 to 12' at 76+76.85.

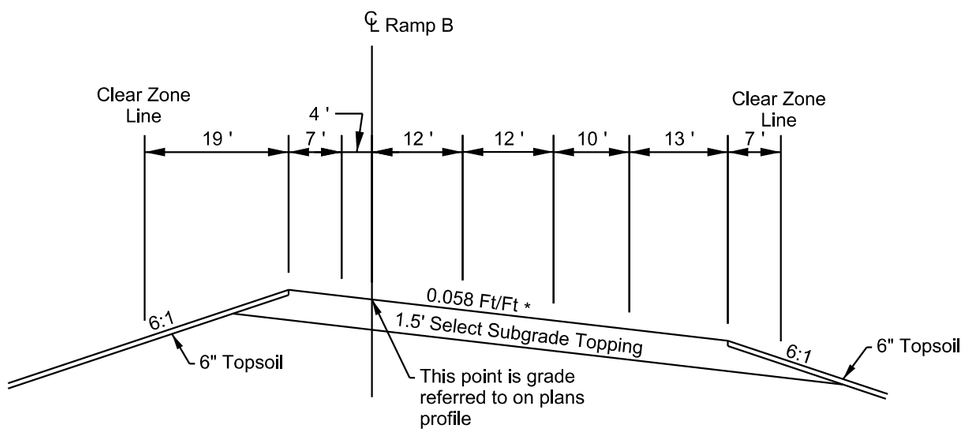
*** Taper SB auxiliary lane from 16' at 75+26.85 to 12' at 76+76.85.

FOR BIDDING PURPOSES ONLY

TYPICAL GRADING SECTIONS

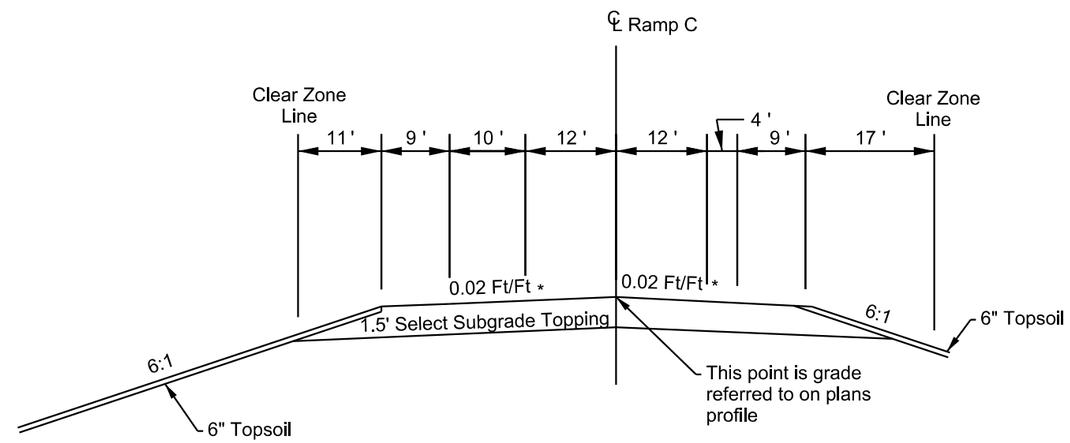
I229 Ramp B

Sta. 18+75.19 to Sta. 44+46.55



I229 Ramp C

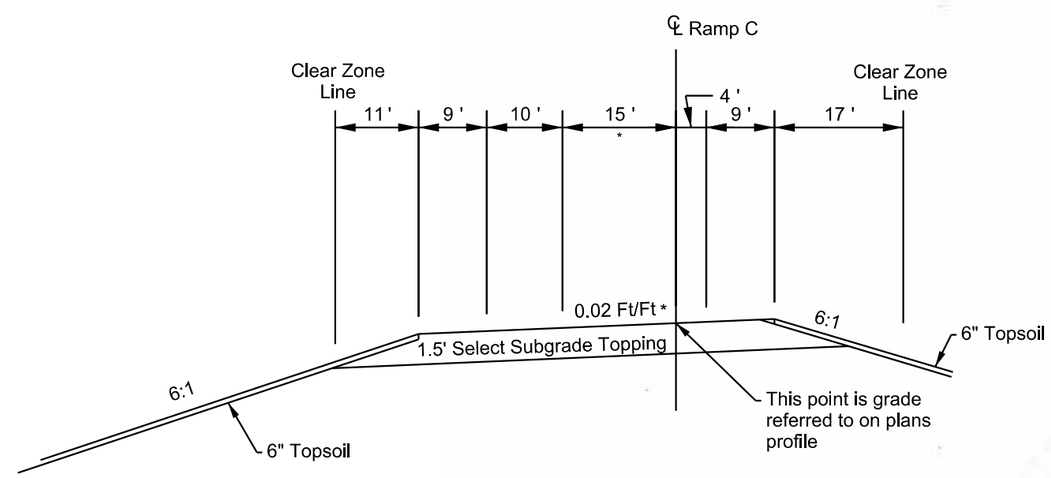
Sta. 26+00.00 to Sta. 42+00.00
Sta. 64+00.00 to Sta. 73+03.60



* Taper lane from 15' at 19+40.00 to 24' at 25+22.00

I229 Ramp C

Sta. 10+07.62 to Sta. 26+00.00



REGISTERED PROFESSIONAL ENGINEER
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MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

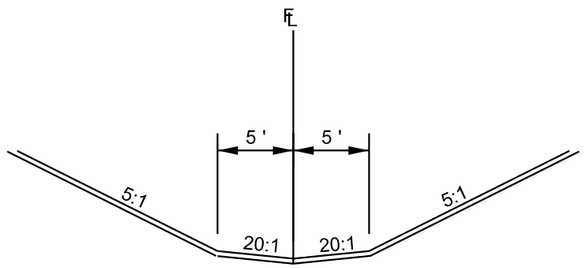
* See Table of Superelevation in Section B Notes for superelevation rates & transition stations.

Plotted From - geoff_babovec
Plot Scale - 1:20
Plot Name - 6
File - ...\rd\prj\LINC01QS\typ_04.dgn

TYPICAL GRADING SECTIONS

Ramp G Infield Ditch
Sta. 15+00 to Sta. 35+00

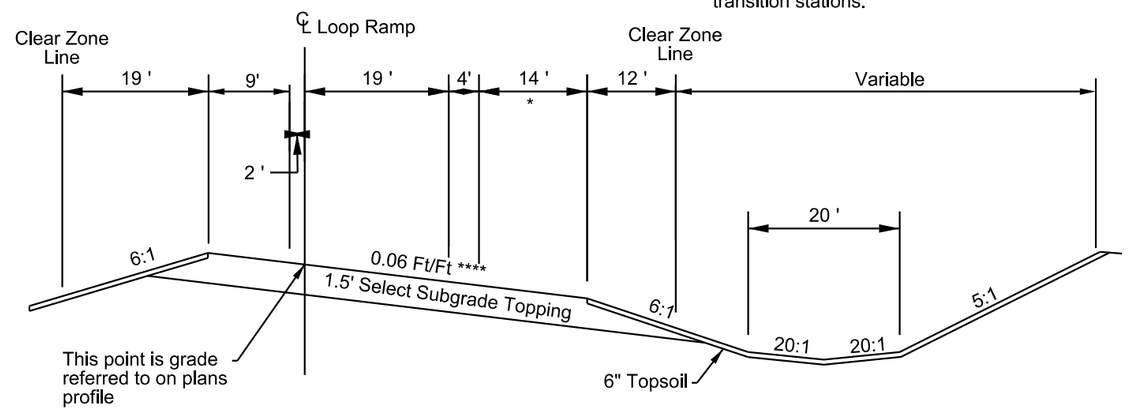
Ramp G Outlet Ditch
Sta. 44+10 to Sta. 45+60



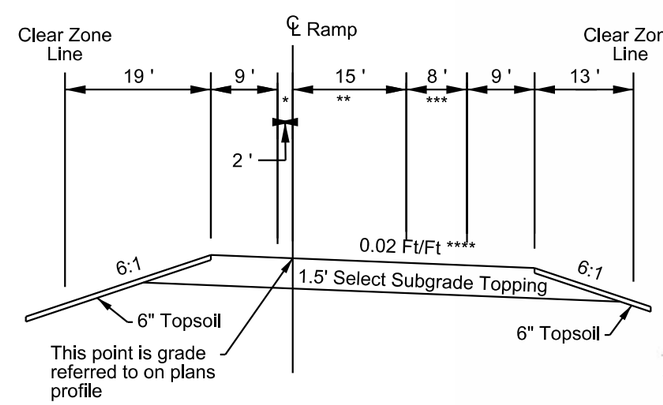
I229 Ramp G (Loop Ramp)
Sta. 10+00.00 to Sta. 39+00.00

* Taper right sluff from 14' at 37+37 to 9' at 39+61

**** See Table of Superelevation in Section B Notes for superelevation rates and transition stations.



1-Lane Ramp
Sta. 39+00.00 to Sta. 49+00.00 I229 Ramp G
Sta. 149+00.00 to Sta. 152+77.28 I229 NB
Sta. 10+20.06 to Sta. 28+54.38 I229 Ramp A



* I229 NB
Taper shoulder from 2' at 149+00.00 to 10' at 152+08.40

** Ramp G
Taper lane from 19' at 39+00.00 to 15' at 40+20.00 and from 15' at 46+90.00 to 12' at 49+00.00

*** Ramp G
Taper shoulder from 4' at 39+00.00 to 8' at 40+20.00 and from 8' at 46+90.00 to 11' at 49+00.00

**** See Table of Superelevation in Section B Notes for superelevation rates and transition stations.

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9/3/15
SOUTH DAKOTA

Plot Scale - 1:20
Plotted From - geoff_babovec
Plot Name - 7
File - ...\rd\prj\LINC01QS\typ_05.dgn

FOR BIDDING PURPOSES ONLY

HORIZONTAL ALIGNMENT DATA

I29 MAINLINE

Type	Station			Northing	Easting
POB	24+86.00			432448.183	290958.440
		TL= 1742.74	N 0°25'27" E		
PI	42+28.74			434191.247	2906971.342
		TL= 686.68	N 0°32'12" E		
PC	49+15.42			434877.894	2906977.774
PI	55+11.09	R = 25000.00	Delta = 2°43'47" L	435473.542	2906983.354
PT	61+06.54			436068.779	2906960.558
		TL= 1917.72	N 2°11'35" W		
PC	80+24.26			437985.097	2906887.168
PI	87+77.22	R = 5729.00	Delta = 14°58'29" R	438737.500	2906858.354
PT	95+21.59			439471.796	2907024.934
		TL= 3023.35	N 12°46'54" E		
PC	125+44.93			442420.224	2907693.804
PI	130+44.35	R = 5760.00	Delta = 9°54'39" R	442907.261	2907804.291
PT	135+41.27			443368.014	2907996.956
		TL= 3748.73	N 22°41'32" E		
POE	172+90.00			446826.816	2909443.257

I229 Southbound

Type	Station			Northing	Easting
POB	73+03.60			442426.402	2908864.074
PI	79+29.34	R = 14200.00	Delta = 5°02'47" R	442629.763	2909455.851
PT	85+54.27			442780.282	2910063.221
		TL= 1908.24	N 76°04'53" E		
PI	104+62.52			443239.299	2911915.433
PC	109+35.39			443353.047	2912374.425
PI	117+37.57	R = 5658.00	Delta = 16°08'20" L	443546.006	2913153.045
PT	125+29.12			443947.790	2913847.344
		TL= 1768.15	N 59°56'33" E		
POE	142+97.26			444833.400	2915377.715

I229 Northbound

Type	Station			Northing	Easting
POB	149+00.00			442162.143	2908599.829
		TL = 1389.68	N 71°42'46" E		
PC	162+89.68			442598.199	2909919.325
PI	170+52.78	R = 20000.00	Delta = 4°22'12" R	442837.644	2910643.880
PT	178+15.13			443021.183	2911384.574
		TL = 531.80	N 76°04'58" E		
POE	183+46.94			443149.092	2911900.766

I229 Baseline (for Cross Sections)

Type	Station			Northing	Easting
POB	4+00.00			442234.528	2908521.401
PI	22+99.66			442789.693	2910338.132
		TL= 1899.66	N 73°00'28" E		
PI	34+24.49			443074.793	2911426.224
		TL= 1124.82	N 75°19'03" E		
PI	39+38.90			443198.533	2911925.536
		TL= 472.88	N 76°04'53" E		
PC	44+11.78			443312.280	2912384.528
PI	52+19.91	R = 5700.00	Delta = 16°08'20" L	443506.671	2913168.928
PT	60+17.33			443911.438	2913868.381
		TL= 1768.15	N 76°04'53" E		
POE	77+85.48			444797.048	2915398.751

Ramp A (I229 SB to I29 NB)

Type	Station			Northing	Easting
POB	10+20.06			442508.706	2909072.060
PI	26+95.84	R = 768.00	Delta = 130°45'23" R	441989.077	2907478.882
PT	27+72.74			443535.132	2908125.367
		TL =81.64	N 22°41'32" E		
POE	28+54.38			443610.450	2908156.861

Ramp B (I29 NB to I229 NB)

Type	Station			Northing	Easting
POB	16+66.39			440256.250	2907304.458
		TL = 208.80	N 12°46'54" E		
PC	18+75.19			440459.876	2907304.458
PI	32+87.64	R = 2500.00	Delta = 58°55'52" R	441837.326	2907616.942
PT	44+46.55			442280.526	2908958.055
		TL = 208.80	N 71°42'46" E		
POE	46+55.35			442346.044	2909156.310

REGISTERED PROFESSIONAL ENGINEER
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9/3/15
SOUTH DAKOTA

The coordinates shown on this sheet are based on a Modified South Dakota State Plane Coordinate System. South Zone (NAD 83) SF = 0.99984263

HORIZONTAL ALIGNMENT DATA

FOR BIDDING PURPOSES ONLY

Ramp C (I229 SB to I29 SB)

Type	Station			Northing	Easting
POB	9+00.00			437616.665	2906847.239
		TL= 107.62	N 2°11'35" W		
PC	10+07.62			437724.205	2906843.120
PI	13+28.34	R = 2075.00	Delta = 17°34'22" L	438044.695	2906830.846
PT	16+44.03			438346.522	2906722.384
		TL= 955.97	N 19°45'58" W		
POE	26+00.00			439246.164	2906399.095
POB	26+00.00			439242.105	2906387.802
		TL=211.82	N 19°45'58" W		
PC	28+11.82			439441.444	2906316.169
PI	46+15.58	R = 1898.00	Delta = 87°05'00" R	441138.932	2905706.171
PT	56+96.58			441834.510	2907370.423
		TL= 685.68	N 67°19'03" E		
PC	63+82.25			442095.925	2908003.064
PI	68+43.09	R = 14200.00	Delta = 3°43'03" R	442276.634	2908428.256
POE	73+03.60			442426.402	2908864.074

Ramp G (I29 SB to I229 NB)

Type	Station			Northing	Easting
POB	9+95.00			440653.724	2907225.385
		TL = 5.00	S 12°46'54" W		
PC	10+00.00			440648.847	2907224.278
PI	14+54.05			440206.046	2907123.826
CC		R = 400.00	Delta = 97°14'34" R	440737.342	2906834.190
PCC	16+78.88			440920.598	2906478.638
PI	21+32.94			440516.999	2906270.619
CC		R = 400.00	Delta = 97°14'34" R	440737.342	2906834.190
PT	23+57.77			440920.598	2906478.638
		TL = 50.00	N 27°16'02" E		
PI	31+07.87	R = 1836.00	Delta = 44°26'44" R	441587.355	2906822.294
PT	37+81.99			441822.725	2907534.519
		TL = 1118.01	N 71°42'46" E		
POE	49+00.00			442173.536	2908596.064

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9/3/15
SOUTH DAKOTA

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CONTROL DATA

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B24	B128

HORIZONTAL AND VERTICAL CONTROL POINTS

POINT	STATION	OFFSET	DESCRIPTION	NORTHING	EASTING	ELEVATION
CP10	171+07	12' R	REBAR & CAP STAMPED "SDDOT SURVEY POINT" - 11'+/- EAST OF CENTER OF MEDIAN MRM 76.19+0.259	446653.540	2909383.806	1449.72
CP11	149+85	11' R	MRM 76.03 - REBAR & CAP STAMPED "SDDOT SURVEY POINT" - 10'+/- EAST OF CENTER OF MEDIAN	444695.587	2908563.907	1476.90
CP12	138+30	147' R	MRM 75.81 - NGS POINT OQ0986 - ALONG EAST ROW FENCE - 10'+/- SOUTH OF BEGINNING OF CHAIN LINK FENCE	443578.103	2908243.741	1477.49
CP13	121+96	24' R	MRM 75.50 - 2" DURANAIL & WASHER STAMPED "SDDOT CONTROL PT" DRILLED INTO TOP OF NW WINGWALL OF NB I29 NOTES BRIDGE OVER 229	442074.523	2907640.387	1511.28
CP14	117+31	20' R	MRM 75.41 - REBAR & CAP STAMPED "SDDOT SURVEY POINT" - 3' BEHIND GUARDRAIL (MEDIAN SIDE) FOR NB 1-29 BRIDGE OVER 229	441621.950	2907533.161	1508.62
CP15	105+79	11' R	MRM 75.20 - NGS POINT OQ0985 - I29-075.5 - 5' NORTH OF WEST SIGN BRIDGE FOOTING (IN MEDIAN)	440500.323	2907269.897	1489.27
CP16	94+14	229' L	MRM 74.95 - 5/8" x 5' REBAR & CAP STAMPED "SDDOT CONTROL POINT" - IN GORE AREA - 230'+/- WEST OF I29 CENTERLINE	439413.577	2906777.791	1499.98
CP17	85+41	1' L	MRM 74.79 - REBAR & CAP "SDDOT SURVEY POINT" - CENTER OF MEDIAN	438501.653	2906889.210	1507.38
CP18	73+62	148' R	MRM 74.57 - 5/8" x 5' REBAR & CAP STAMPED "SDDOT CONTROL POINT" - 1' WEST OF NORTH POST OF 2 POST PANEL ALONG EAST ROW OF I-29	437329.330	2907059.987	1519.59
CP19	65+72	1' R	MRM 74.40 - REBAR AND CAP STAMPED "SDDOT SURVEY POINT" - CENTER OF MEDIAN	436534.251	2906943.610	1519.03
CP20	52+35	147' L	MRM 74.13 - 5/8" x 5' REBAR & CAP STAMPED "SDDOT CONTROL POINT" - 1' EAST OF WEST ROW FENCE - MIDDLE OF 2 POST PANEL	435197.040	2906831.246	1525.61
CP21	43+55	148' L	MRM 73.96 - 5/8" x 5' REBAR & CAP STAMPED "SDDOT CONTROL POINT" - 1' EAST OF WEST ROW FENCE IN MIDDLE OF NORTH 2 POST PANEL	434318.531	2906824.455	1522.42
CP22	35+14	13' L	MRM 73.80 - 5/8" x 5' REBAR & CAP STAMPED "SDDOT CONTROL POINT" - 14'+/- WEST OF CENTER OF MEDIAN	433476.366	2906953.541	1519.58

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9/3/15
SOUTH DAKOTA

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South Zone (NAD 83) SF = 0.99984263
The elevations shown on this sheet are based on NAVD/88.

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0292(96)073 IM 2292(90)0	B25	B128

Plotting Date: 8/31/2015

EXISTING TOPOGRAPHY SYMBOLOGY AND LEGEND

Anchor
Antenna
Approach
Assumed Corner
Azimuth Marker
BBQ Grill/ Fireplace
Bearing Tree
Bench Mark
Box Culvert
Bridge
Brush
Buildings
Bulk Tank
Cattle Guard
Cemetery
Centerline
Cistern
Clothes Line
Commercial Sign Double Face
Commercial Sign One Post
Commercial Sign Overhead
Commercial Sign Two Post
Concrete Symbol
Creek Edge
Curb/Gutter
Curb
Dam Grade/Dike/Levee
Deck Edge
Ditch Block
Doorway Threshold
Drainage Profile
Drop Inlet
Edge Of Asphalt
Edge Of Concrete
Edge Of Gravel
Edge Of Other
Edge Of Shoulder
Elec. Trans./Power Jct. Box
Fence Barbwire
Fence Chainlink
Fence Electric
Fence Misc.
Fence Rock
Fence Snow
Fence Wood
Fence Woven
Fire Hydrant
Flag Pole
Flower Bed
Gas Valve Or Meter
Gas Pump Island
Grain Bin
Guardrail
Guide Sign One Post
Guide Sign Two Post
Gutter
Guy Pole
Haystack

Hedge
Highway R.O.W. Marker
Interstate Close Gate
Iron Pin
Irrigation Ditch
Lake Edge
Lawn Sprinkler
Mailbox
Manhole Electric
Manhole Gas
Manhole Misc
Manhole Sanitary Sewer
Manhole Storm Sewer
Manhole Telephone
Manhole Water
Merry-Go-Round
Microwave Radio Tower
Misc. Line
Misc. Property Corner
Misc. Post
Overhang Or Encroachment
Overhead Utility Line — OH —
Parking Meter
Pipe With End Section
Pipe With Headwall
Pipe Without End Section
Playground Slide
Playground Swing
Power And Light Pole
Power And Telephone Pole
Power Meter
Power Pole
Power Pole And Transformer
Power Tower Structure
Propane Tank
Property Pipe
Property Pipe With Cap
Property Stone
Public Telephone
Railroad Crossing Signal
Railroad Milepost Marker
Railroad Profile
Railroad R.O.W. Marker
Railroad Signs
Railroad Switch
Railroad Track
Railroad Trestle
Rebar
Rebar With Cap
Reference Mark
Regulatory Sign One Post
Regulatory Sign Two Post
Retaining Wall
Riprap
River Edge
Rock And Wire Baskets
Rockpiles
Satellite Dish
Septic Tank

Shrub Tree
Sidewalk
Sign Face
Sign Post
Slough Or Marsh
Spring
Stream Gauge
Street Marker
Subsurface Utility Exploration Test Hole
Telephone Fiber Optics — T/F —
Telephone Junction Box
Telephone Pole
Television Cable Jct Box
Television Tower
Test Wells/Bore Holes
Traffic Signal
Trash Barrel
Tree Belt
Tree Coniferous
Tree Deciduous
Tree Stumps
Triangulation Station
Underground Electric Line — P —
Underground Gas Line — G —
Underground High Pressure Gas Line — HG —
Underground Sanitary Sewer — S —
Underground Storm Sewer — S —
Underground Tank
Underground Telephone Line — T —
Underground Television Cable — TV —
Underground Water Line — W —
Warning Sign One Post
Warning Sign Two Post
Water Fountain
Water Hydrant
Water Meter
Water Tower
Water Valve
Water Well
Weir Rock
Windmill
Wingwall
Witness Corner

State and National Line
County Line
Section Line
Quarter Line
Sixteenth Line
Property Line
Construction Line
R. O. W. Line
New R. O. W. Line
Cut and Fill Limits
Control of Access
New Control of Access
Proposed ROW
(After Property Disposal)

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9/3/15
SOUTH DAKOTA

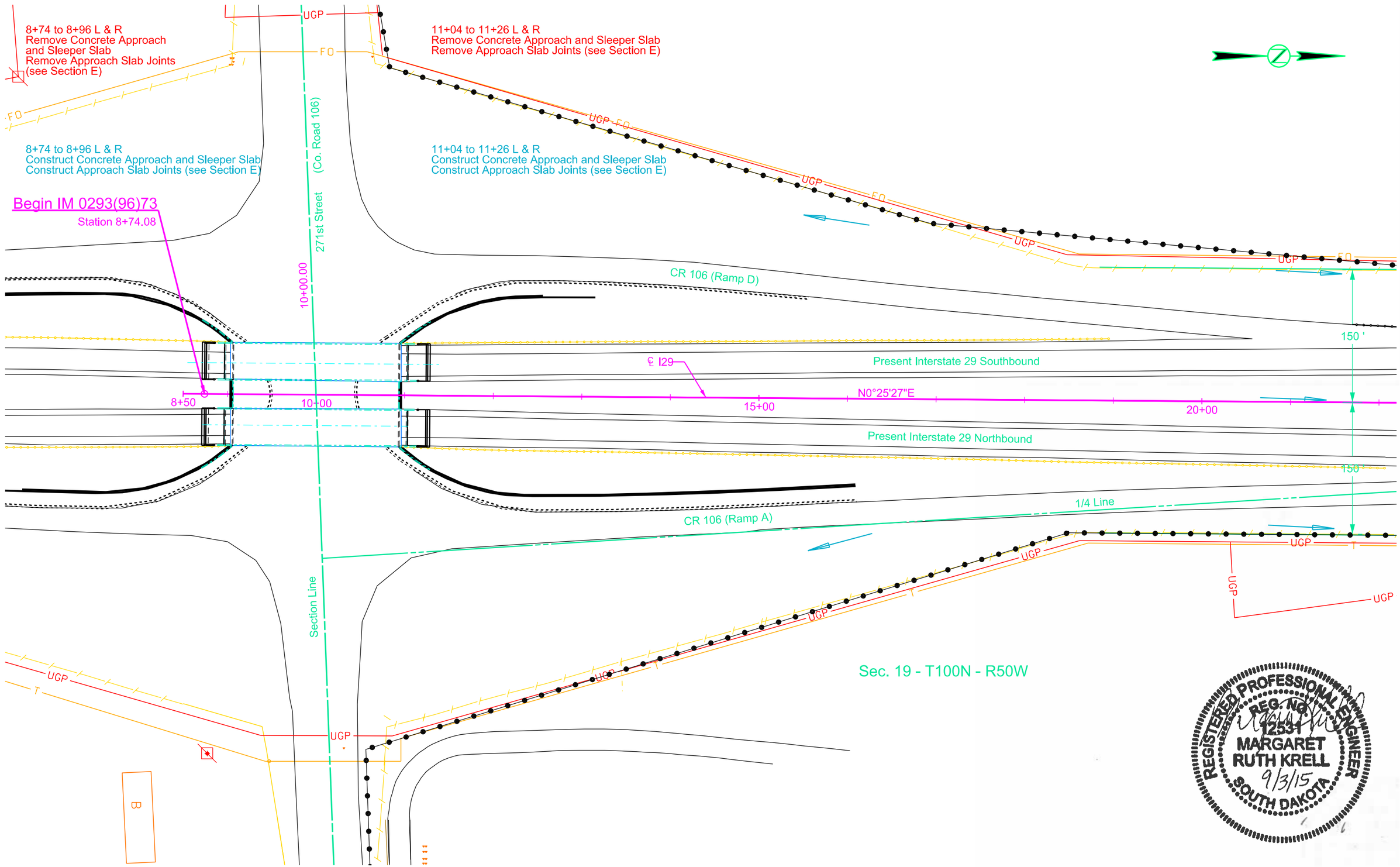
Plot Scale - 1:200
Plotted From - geoff_babovec
Plot Name - 8
File - ...\rd\prj\LINC01GS\toposymb.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B26	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

I29 NB/SB



Plot Scale - 1:100

Plotted From - geoff.babovec

Plot Name - 9

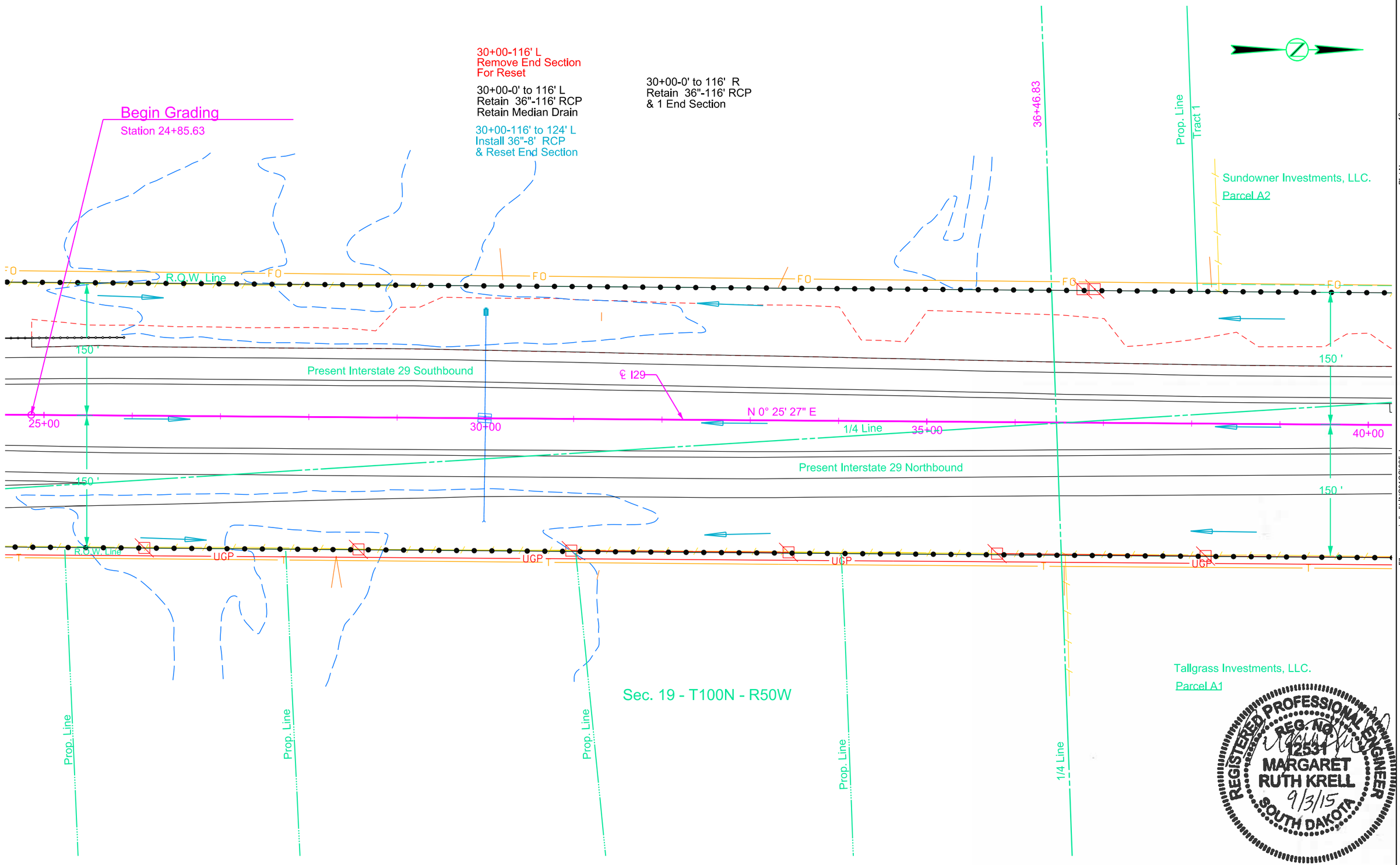
File - ...\rd\prj\LINC01QS\010.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B27	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I29 NB/SB



Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 10
File - ...\rd\prj\LINC01QS\025.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B28	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

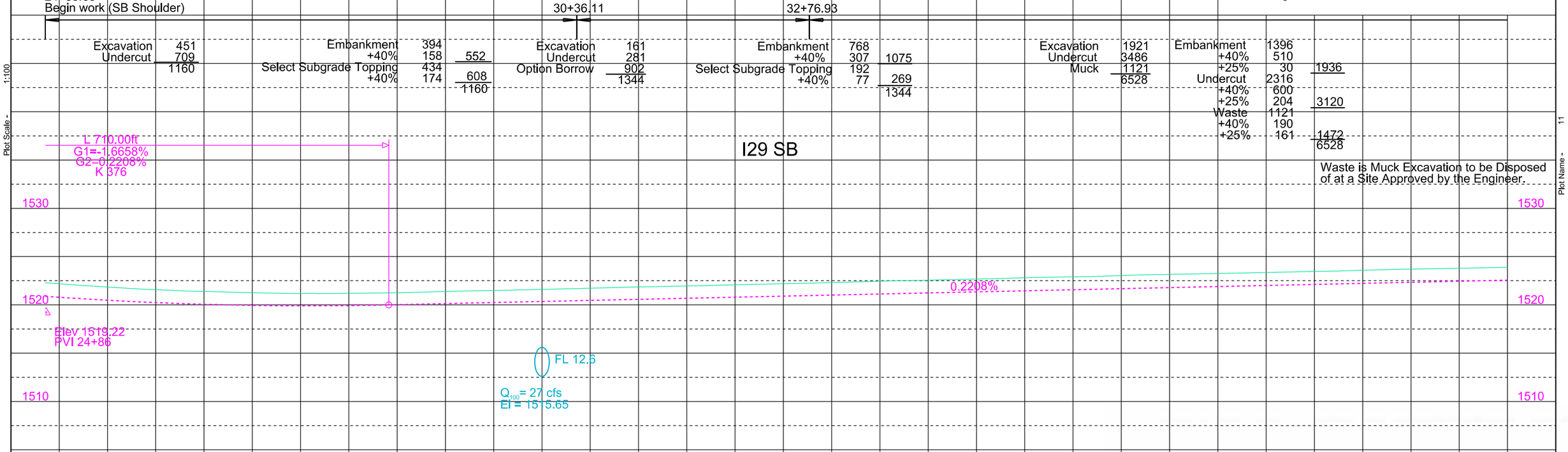
24+85.63
Begin work (SB Shoulder)

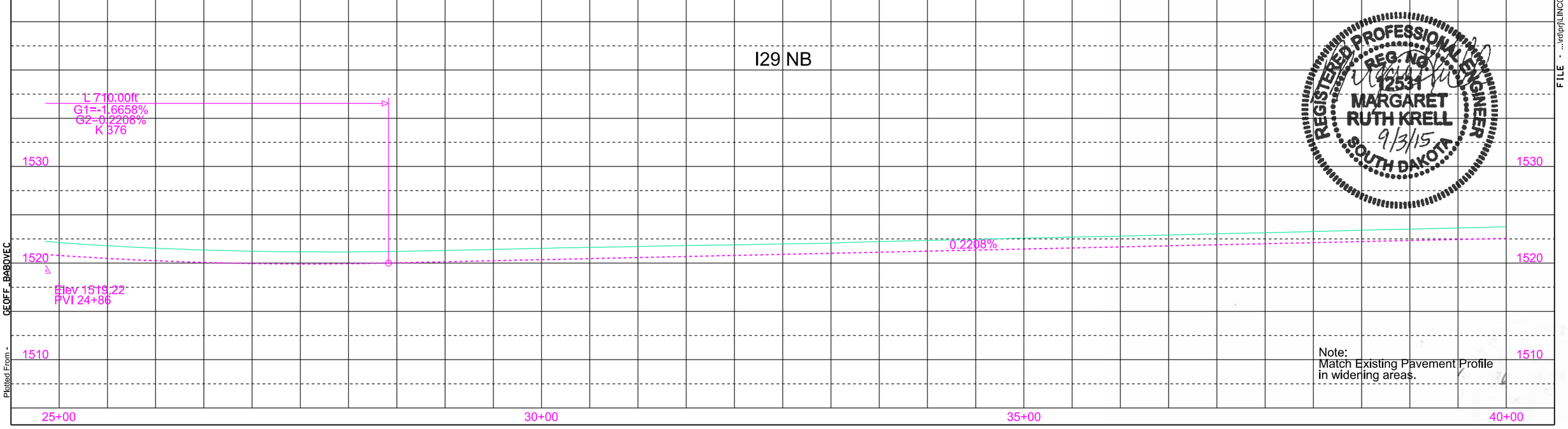
30+36.11

32+76.93

Excavation	451	Embankment	394		Excavation	161	Embankment	768		Excavation	1921	Embankment	1396										
Undercut	709	+40%	158	552	Undercut	281	+40%	307	1075	Undercut	3486	+40%	510										
	1160	Select Subgrade Topping	434		Option Borrow	902	Select Subgrade Topping	192		Muck	1121	+25%	30	1936									
		+40%	174	608		1344	+40%	77	269		6528	Undercut	2316										
				1160					1344			+40%	600										
												+25%	204	3120									
												Waste	1121										
												+40%	190										
												+25%	161	1472									
														6528									

Waste is Muck Excavation to be Disposed of at a Site Approved by the Engineer.





REGISTERED PROFESSIONAL ENGINEER
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MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Note:
Match Existing Pavement Profile in widening areas.

Plot Scale - 1:100
Plot Name - 11
FILE - ...\rdlprj\LINC01QS\025v.dgn
Plotted From - GEOFF_BABOVEC

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B29	B128

Plotting Date: 10/8/2015 Revised: 10/07/2015 (MRK)

FOR BIDDING PURPOSES ONLY

I29 NB/SB

43+50
Retain Median Crossover

41+32 to 45+61
Retain 24"-429' CMP
& 2 End Sections

42+41 to 43+47
Remove 106' Crossover Closure

42+14 to 44+86
Install 272' Crossover Closure

43+92 to 44+65
Remove 73' Crossover Closure

49+74-149' R
Retain Billboard Sign

55+96-153' L
Retain Billboard Sign

54+10-157' R
Retain Billboard Sign

Sundowner Investments, LLC
Parcel A2

Sundowner Investments
Addition

43+50-149'L
Begin Type 3 Fence

Type 3 Fence

3 PP

54+73
150'

54+92
176'

R.O.W. Line

150 '

1/4 Line

Present Interstate 29 Southbound

℄ I29

N0°25'27"E

N0°32'12"E

40+00

45+00

50+00

55+00

Present Interstate 29 Northbound

UGP

47+53
150'

49+74
175'

43+50-149'R
Begin Type 3 Fence

Tallgrass Investments, LLC
Parcel 01

Sec. 19 - T100N - R50W

I29
PI 42+28.74
N 434191.247
E 2906971.342
Del 0°06'45" Right

Parcel A1

47+53 to 62+40 R
Temporary Easement containing
0.7 ac, more or less
(32,298 sq ft)

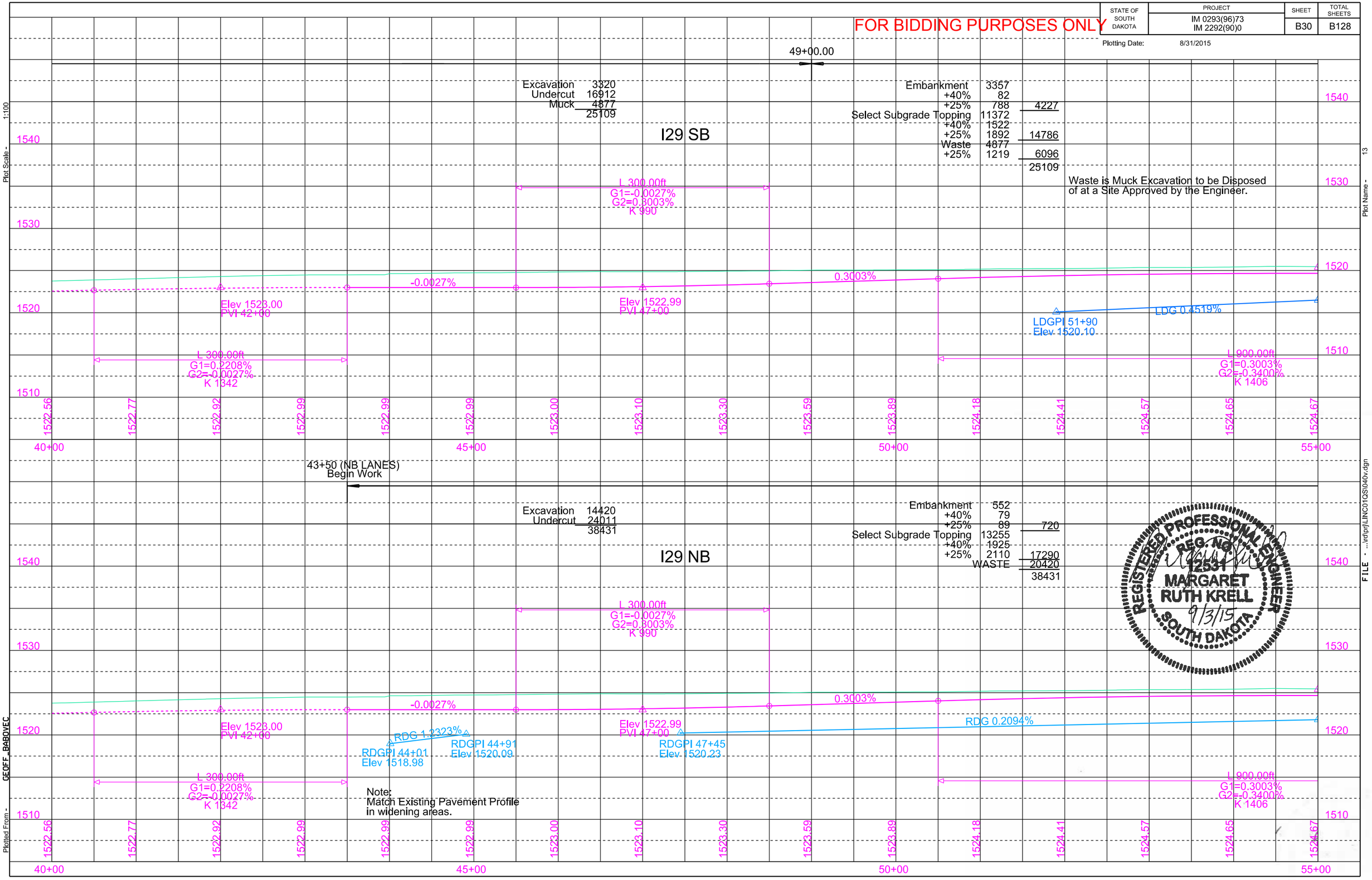
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
10/7/15
SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - margie_krell
Plot Name - 12
File - ...\rdlprj\LINC01OS\040.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B30	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plot Name - 13

FILE - ...\rdprj\LINC01QSt040v.dgn

Plotted From - GEOFF_BABOVEC

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B31	B128

Plotting Date: 8/31/2015

I29 NB/SB

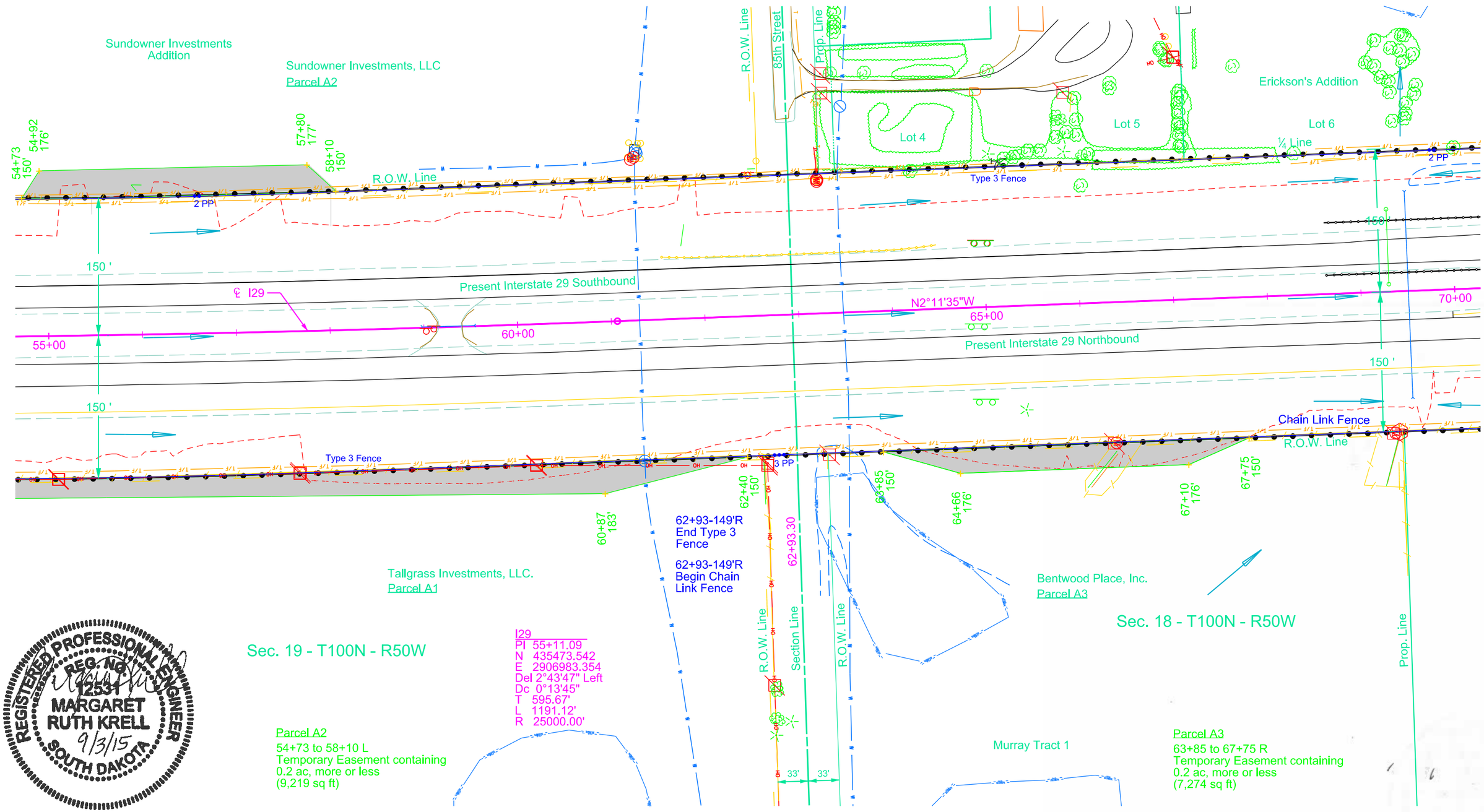
FOR BIDDING PURPOSES ONLY

59+28-0'R
Remove Crossover

58+99 to 59+54
Take Out 18"-55' CMP & 2 End Sections
(Incidental Work, Grading)

66+10-178' R
Retain Billboard Sign

69+51-105' L & R
Retain 30"-220' RCP
& 2 End Sections



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 14
File - ...\rd\prj\LINC01QS\055.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B32	B128

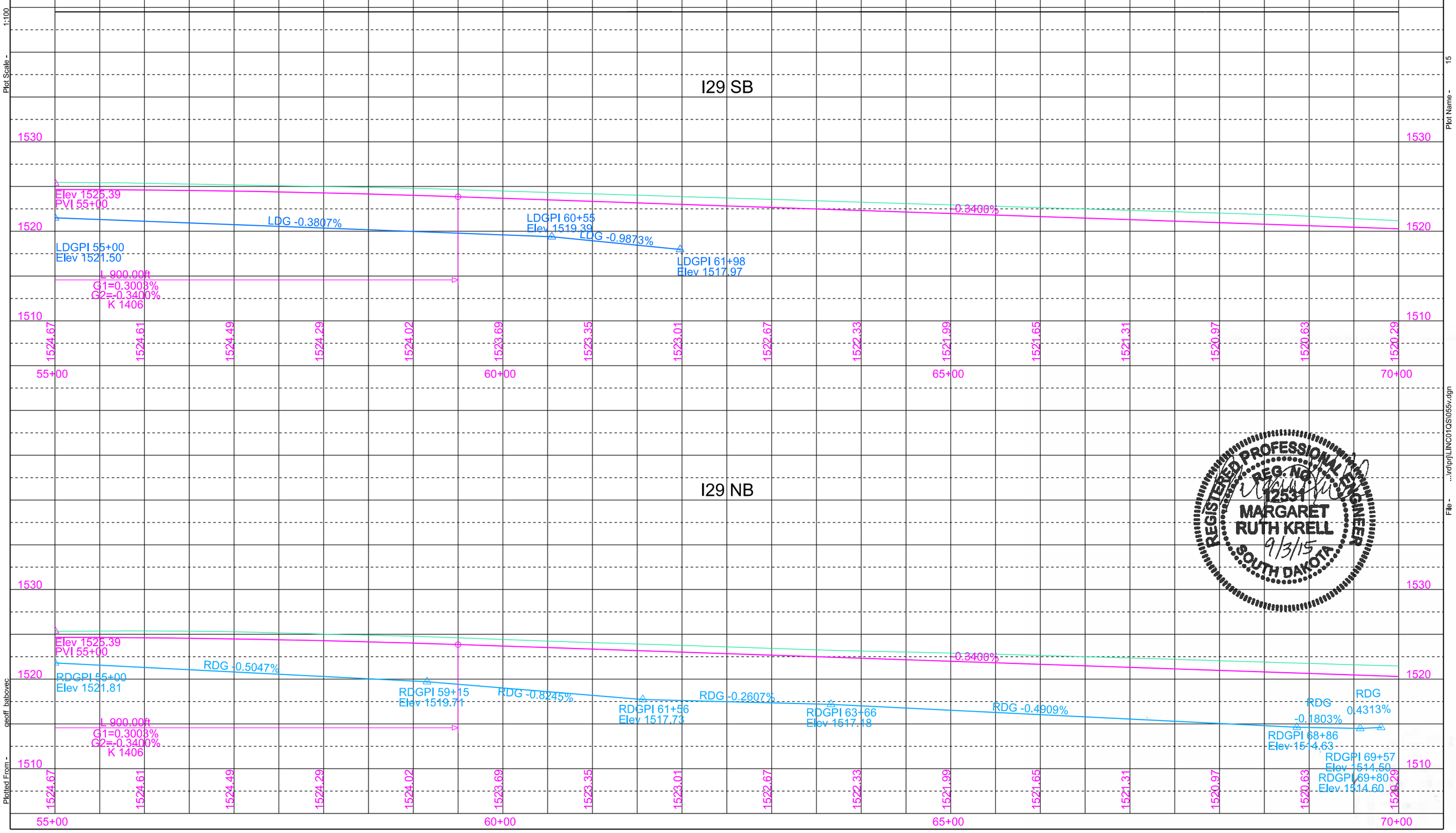
FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

Plot Scale - 1:100

Plot Name - 15

File - ...\rdlprj\LINC01QS\055v.dgn



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plotted From - geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B33	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 10/13/2015 Revised: 10/07/2015 (MRK)

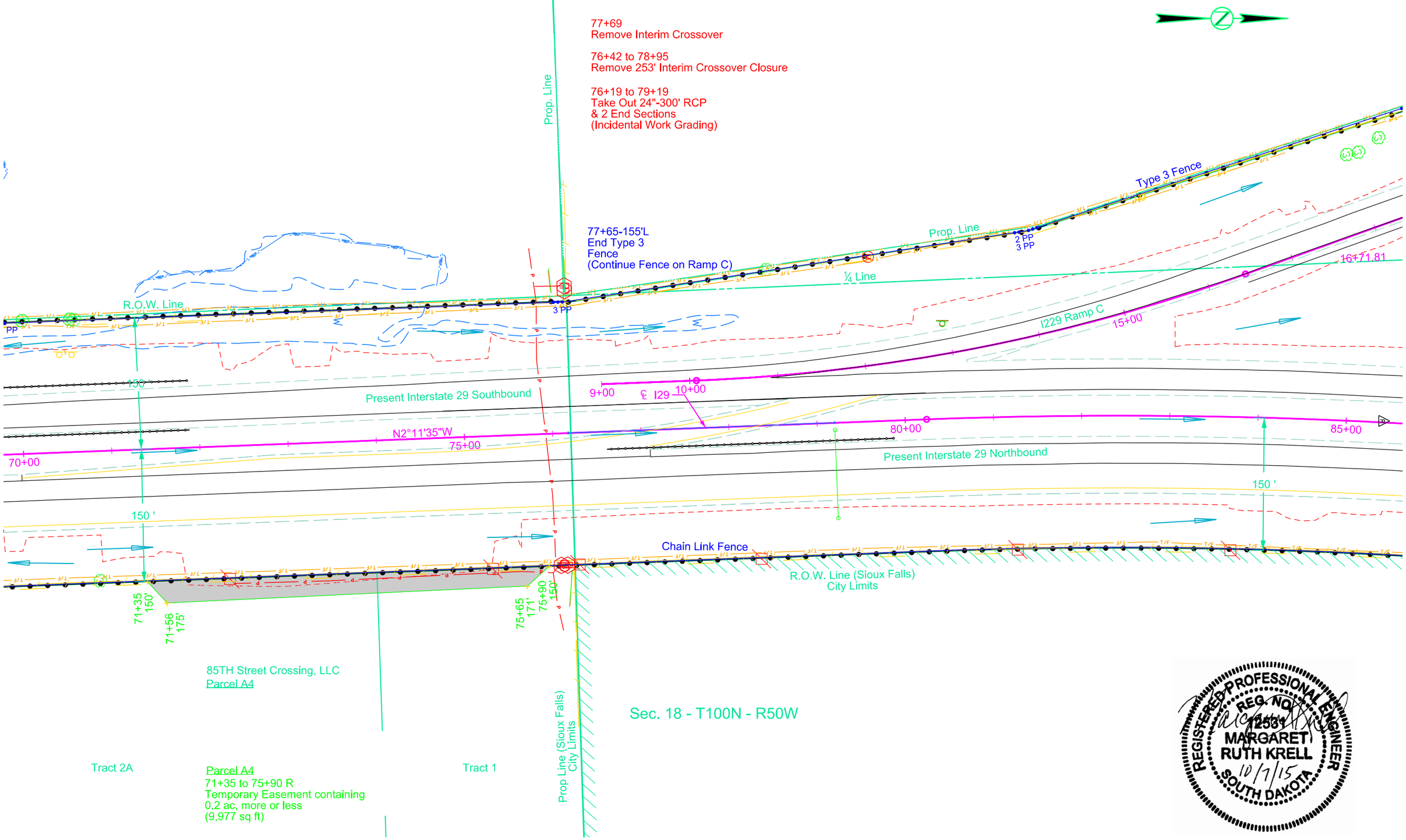
I29 NB/SB

77+69
Remove Interim Crossover

76+42 to 78+95
Remove 253' Interim Crossover Closure

76+19 to 79+19
Take Out 24"-300' RCP
& 2 End Sections
(Incidental Work Grading)

77+65-155'L
End Type 3
Fence
(Continue Fence on Ramp C)



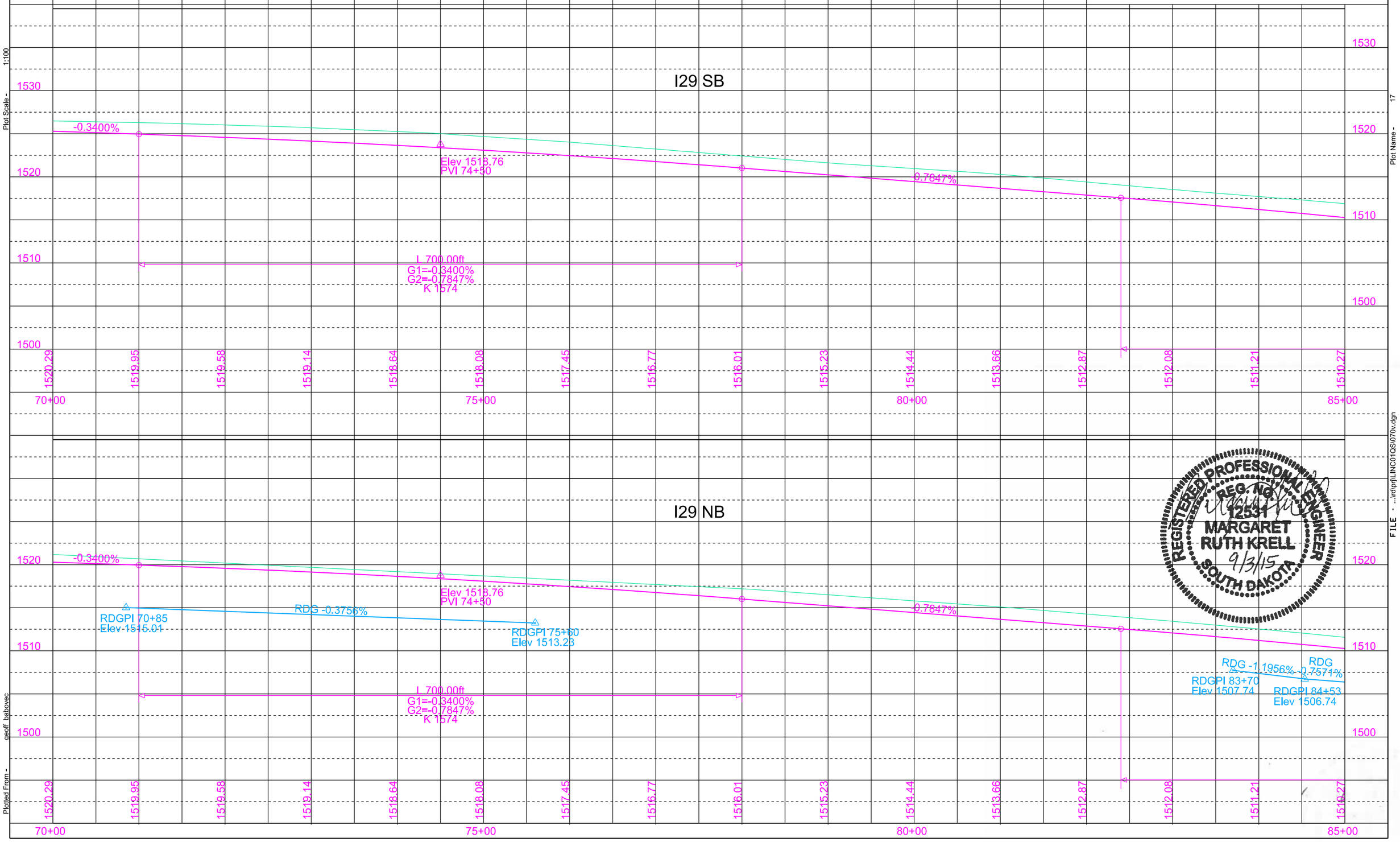
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
10/7/15
SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - Margie Krell
Plot Name - 16
File - ...\rd\prj\LINC01QS\070.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B34	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100
Plot Name - 17
FILE - ...\rdlprj\LINC01QS\070v.dgn
Plotted From - geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B35	B128

FOR BIDDING PURPOSES ONLY

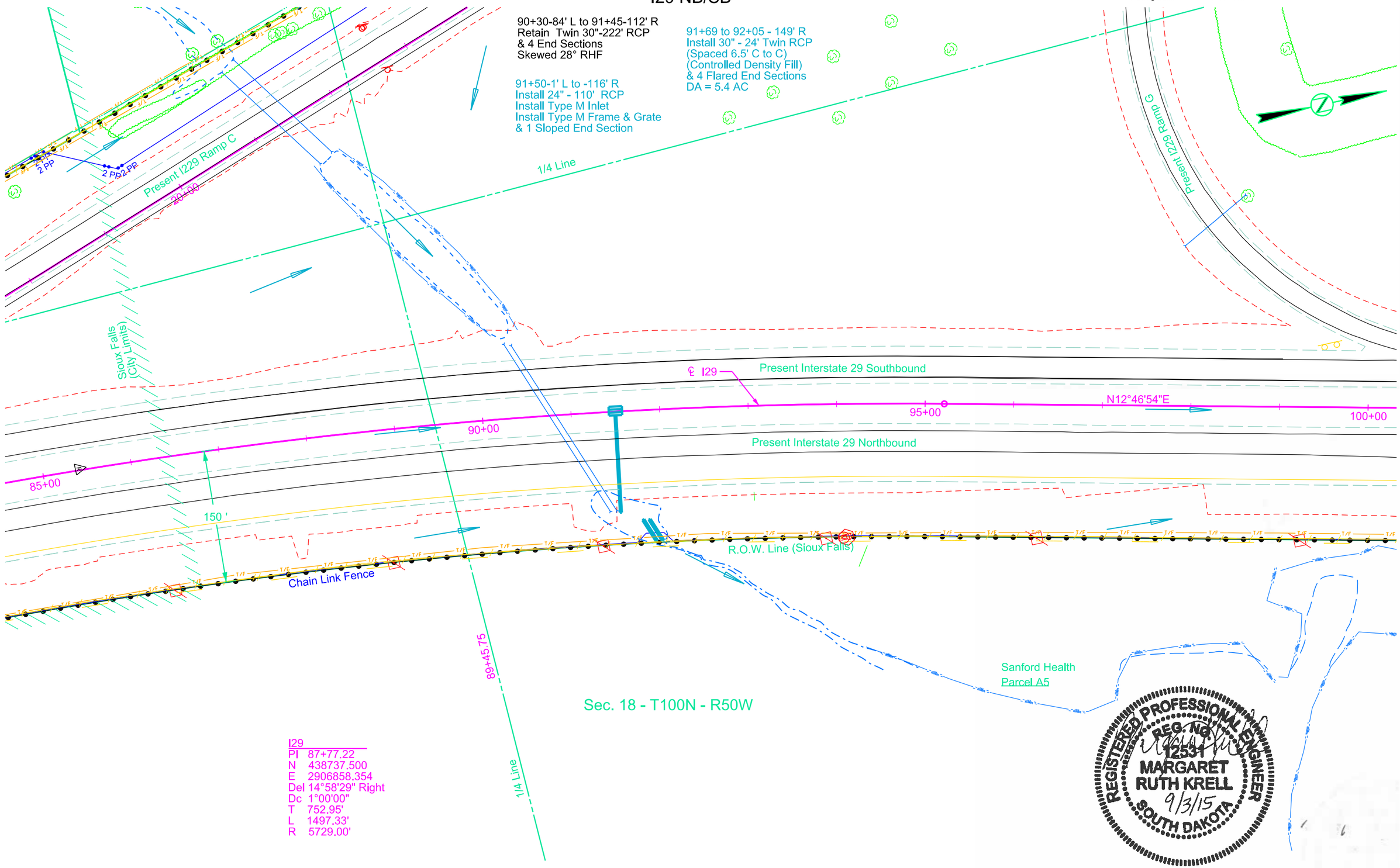
Plotting Date: 8/31/2015

I29 NB/SB

90+30-84' L to 91+45-112' R
Retain Twin 30"-222' RCP
& 4 End Sections
Skewed 28° RHF

91+50-1' L to -116' R
Install 24" - 110' RCP
Install Type M Inlet
Install Type M Frame & Grate
& 1 Sloped End Section

91+69 to 92+05 - 149' R
Install 30" - 24' Twin RCP
(Spaced 6.5' C to C)
(Controlled Density Fill)
& 4 Flared End Sections
DA = 5.4 AC



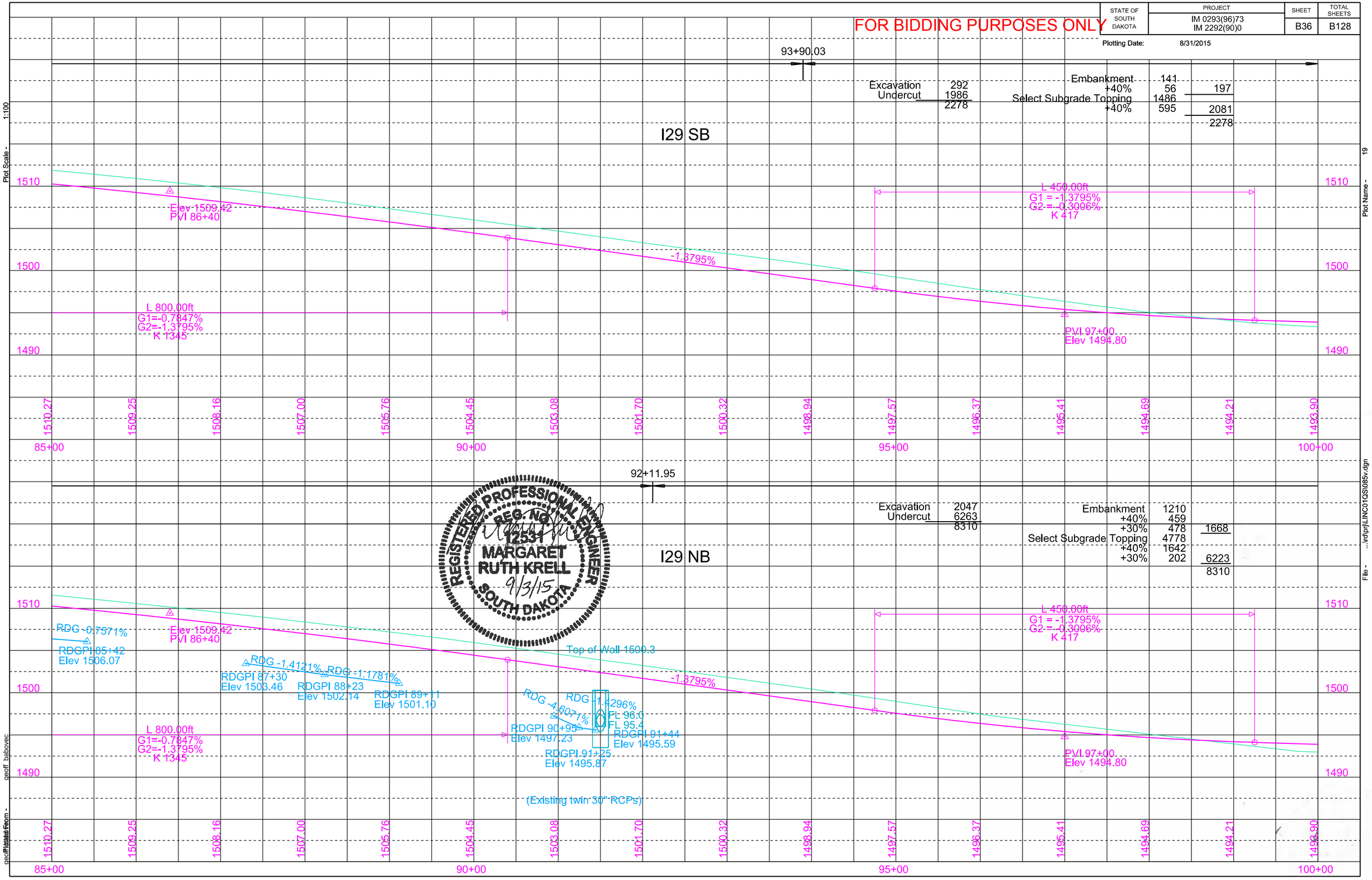
I29
PI 87+77.22
N 438737.500
E 2906858.354
Del 14°58'29" Right
Dc 1°00'00"
T 752.95'
L 1497.33'
R 5729.00'

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 18
File - ...\rdprj\LINC01QS\085.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B36	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plot Name - 19

File - ...\rdprj\LINC01QS\085v.dgn

geoff_babovec

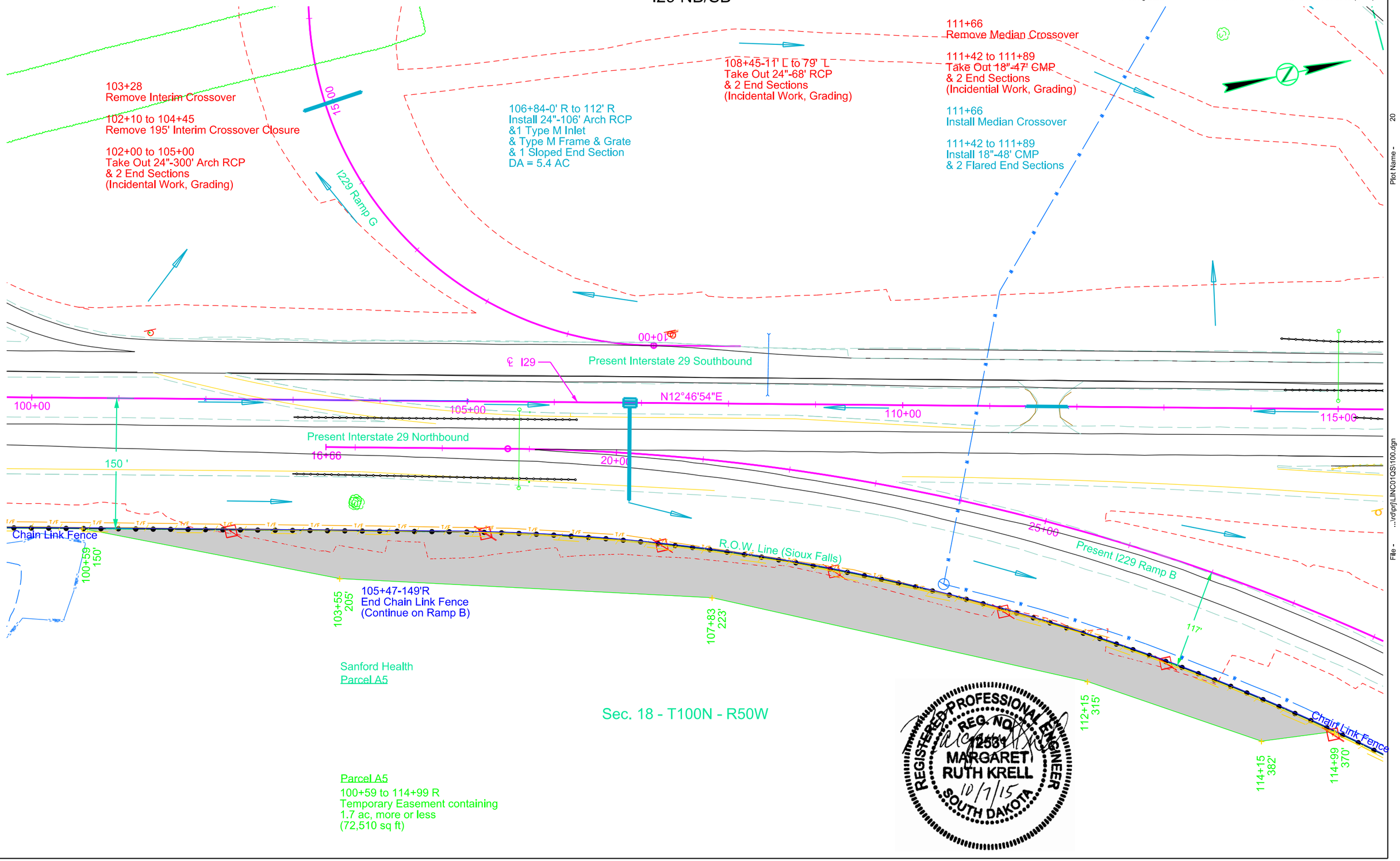
geoff Plotted From -

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B37	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 10/13/2015 Revised: 10/07/2015 (MRK)

I29 NB/SB



Plot Scale - 1:100

Plotted From - Margie Krell

Plot Name - 20

File - ...\rdprj\LINC01QS\100.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B38	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12534
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

99+98.90

Excavation	0			
Undercut	5011			
Muck	3661			
Option Borrow	18204			
	26876			

Embankment	11938		
+40%	470		
+30%	3229	15637	
Select Subgrade Topping	4721		
+40%	866		
+30%	766	6353	
Waste	3661		
+40%	505		
+30%	720	4886	
		26876	

Waste is Muck Excavation to be Disposed of at a Site Approved by the Engineer.

I29 SB

L 600.00ft
G1 = -0.3006%
G2 = 2.9335%
K 186

-0.3006%

2.9335%

PVI 109+75
Elev 1490.97

1510 1500 1490

1493.90 1493.60 1493.30 1493.00 1492.70 1492.39 1492.09 1491.81 1491.91 1492.56 1493.74 1495.46 1497.72 1500.49 1503.13 1505.38

100+00 105+00 110+00 115+00

112+00

Excavation	1136			
Undercut	2058			
	3194			

Embankment	445		
+30%	134	579	
Select Subgrade Topping	1463		
+30%	439	1902	
WASTE		713	
		3194	

I29 NB

L 600.00ft
G1 = -0.3006%
G2 = 2.9335%
K 186

111+66
20' Median
Crossover

2.9335%

Top of Wall 89.2

-0.3006%

RDG -1.9715%

RDG -0.2481%

RDGPI 101+5
Elev 1488.34

RDGPI 101+80
Elev 1487.76

RDGPI 106+42
Elev 1486.62

FL 86.2
FL 85.7

PVI 109+75
Elev 1490.97

1510 1500 1490

1493.90 1493.60 1493.30 1493.00 1492.70 1492.39 1492.09 1491.81 1491.91 1492.56 1493.74 1495.46 1497.72 1500.49 1503.13 1505.38

100+00 105+00 110+00 115+00

Plot Scale - 1:100

Plot Name - 21

FILE - ...\rdprj\LINC01QS\100v.dgn

Plotted From - geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B39	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

I29 NB/SB

117+57-26' L to 72' L
Take Out 12"-112' CMP
& 1 End Section
(Incidental Work, Grading)

117+57-26' L to 56' L
Remove 2 Inlets

117+57-22' L to 171' L
Install 12"-50' RCP
Install 12"-94" CMP
Install 2 Type D Drop Inlets
Install 2 Type D Frame & Grates
& 1 Flared End
Install Bank and Channel
Protection Gabions (4.5 CuYd)

118+17-26' R to 132' R
Take Out 12"-60' RCP
& 1 End Section
(Incidental Work, Grading)

118+17-26' R to 56' R
Remove 2 Inlets

118+17-22' R to 194' R
Install 12"-38' RCP
12"-134' CMP
Install 2 Type D Drop Inlets
Install 2 Type D Frame & Grates
& 1 Flared End
Install Bank and Channel
Protection Gabions (4.5 CuYd)

117+73 to 121+36 L
& 118+33 to 121+96 R
Remove Structures
(See Section E)

118+05 to 121+09 L
Install Cont. Comp. Girder Bridge
(See Section E)

118+56 to 121+72 R
Install Cont. Comp. Girder Bridge
(See Section E)

120+35 to 121+78 R
Remove Temporary
Structure (See Section E)

121+52-26' L to 70' L
Take Out 12"-112' CMP
& 1 End Section
(Incidental Work, Grading)

121+52-26' L to 56' L
Remove 2 Inlets

121+52-22' L to 171' L
Install 12"-50' RCP
Install 12"-94" CMP
Install 2 Type D Drop Inlets
Install 2 Type D Frame & Grates
& 1 Flared End
Install Bank and Channel
Protection Gabions (4.5 CuYd)

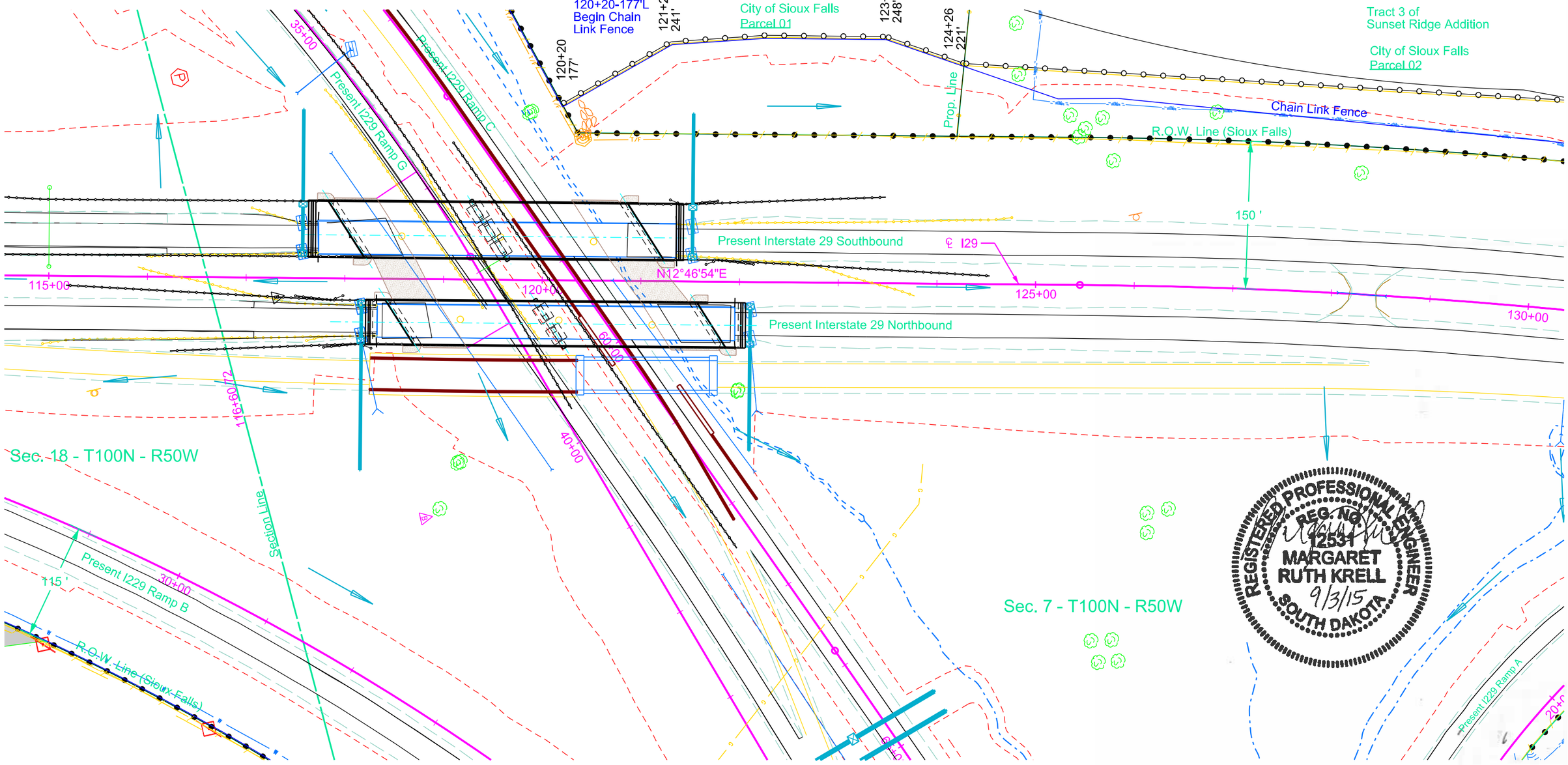
122+11-26' R to 130' R
Take Out 12"-52' RCP
& 1 End Section
(Incidental Work, Grading)

122+11-26' R to 56' R
Remove 2 Inlets

122+11-22' R to 171' R
Install 12"-38' RCP
Install 12"-112' CMP
Install 2 Type D Drop Inlets
Install 2 Type D Frame & Grates
& 1 Flared End
Install Bank and Channel
Protection Gabions (4.5 CuYd)

128+10 to 128+50
Retain 18"-40' CMP
& 2 End Sections

128+30
Retain Median Crossover



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

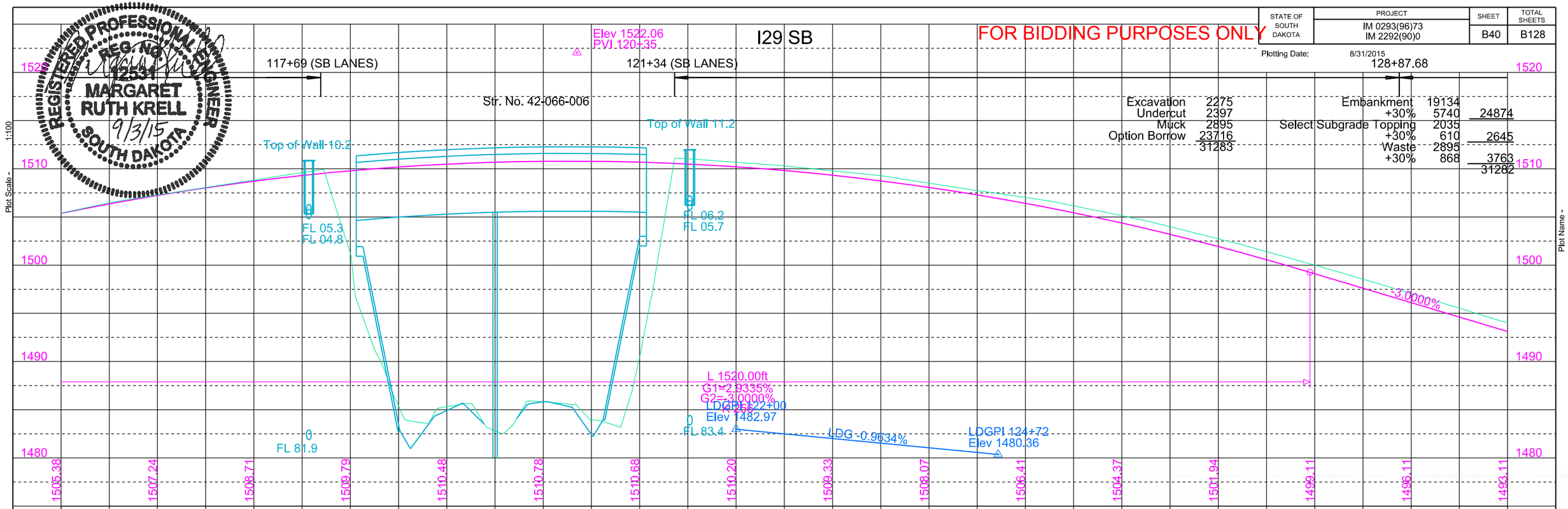
Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 22
File - ...\rdprj\LINC01QS\115.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B40	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
SOUTH DAKOTA
9/3/15



Plot Scale - 1:100

Plot Name - ...\rdlprj\LINC01QS\115v.dgn

File -

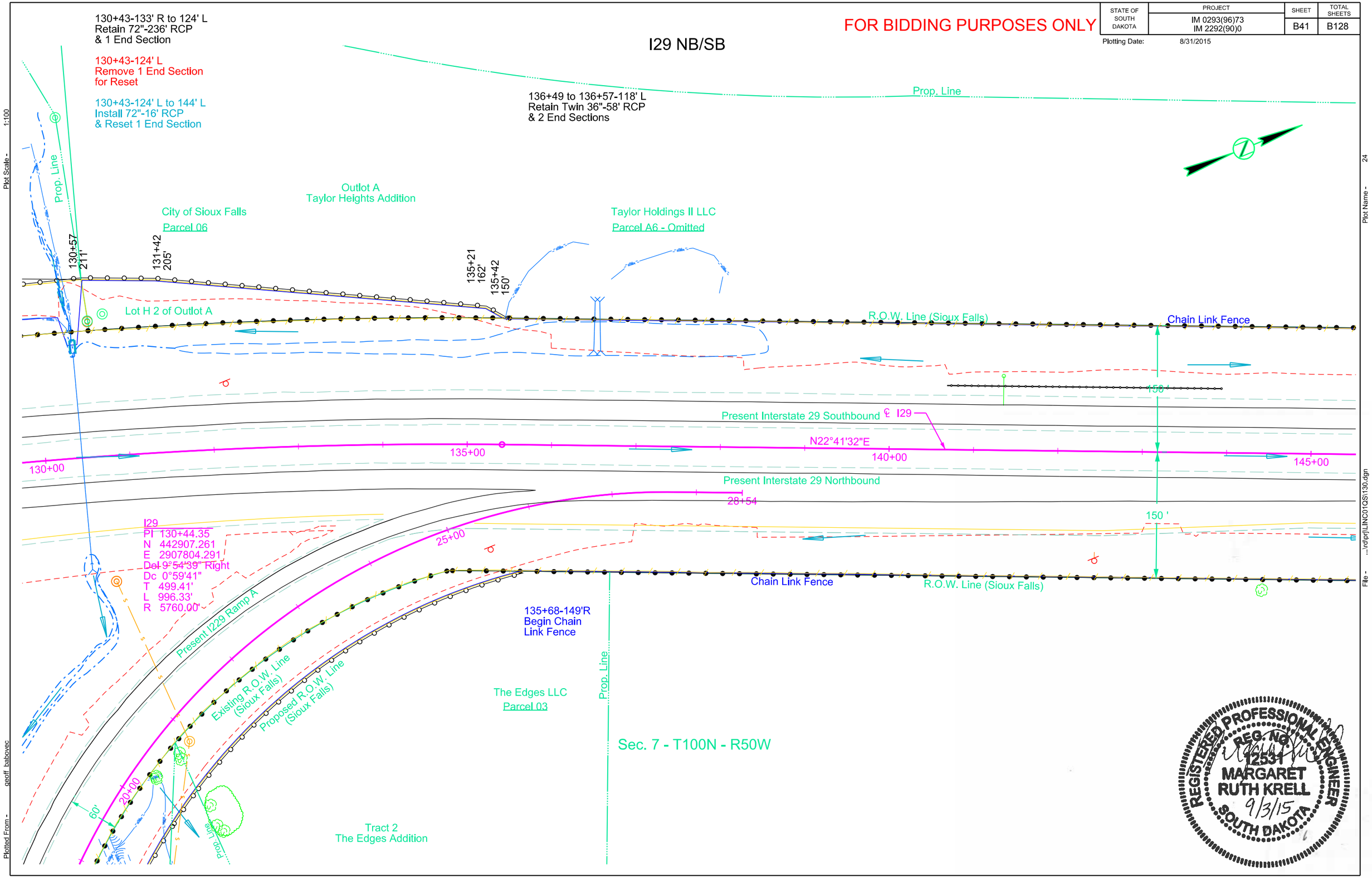
Plotted From - ceoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B41	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

I29 NB/SB



Plot Scale - 1:100

Plotted From - geoff_babovec

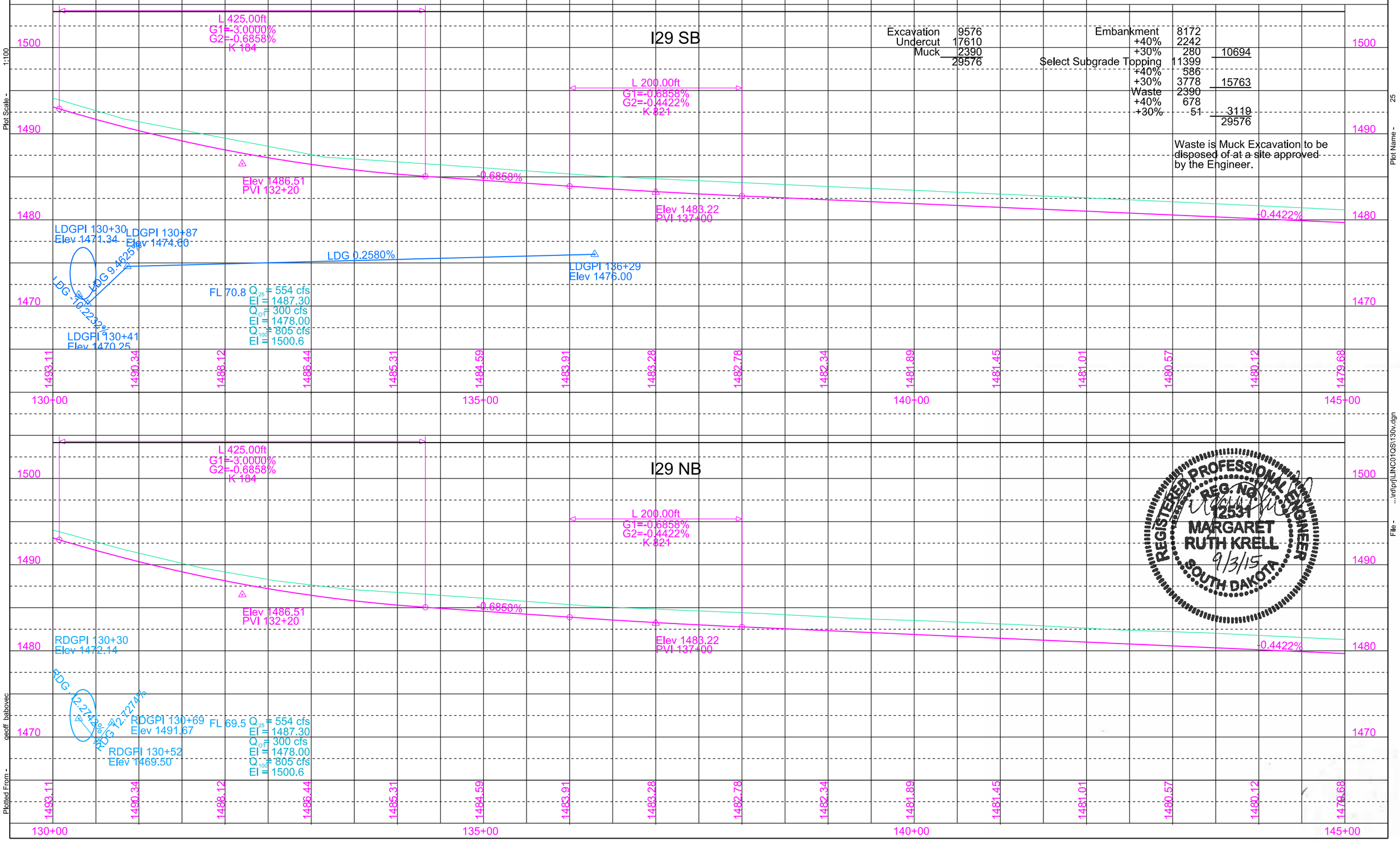
Plot Name - 24

File - ...\rd\prj\LINC01QS\130.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B42	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



Excavation	9576
Undercut	17610
Muck	2390
	29576

Embankment	8172	
+40%	2242	
+30%	280	10694
Select Subgrade Topping	11399	
+40%	586	
+30%	3778	15763
Waste	2390	
+40%	678	
+30%	51	3119
		29576

Waste is Muck Excavation to be disposed of at a site approved by the Engineer.

Plot Scale - 1:100

Plot Name - 25

File - ...\rdlprj\LINC01QS\130v.dgn

Plotted From - ceoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B43	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

I29 NB/SB

147+00 to 154+00-100' L
Do Not Disturb Existing Underdrain

151+37 to 151+77
Retain 18"-40' CMP
& 2 End Sections

151+57
Retain Median Crossover

155+85-93' L to 157+85-93' L
Retain Twin 30"-254' Arch RCP
& 4 Sloped Ends

157+00-93' R to 159+00-93' R
Retain 18"-246' Arch RCP
& 2 Safety Ends

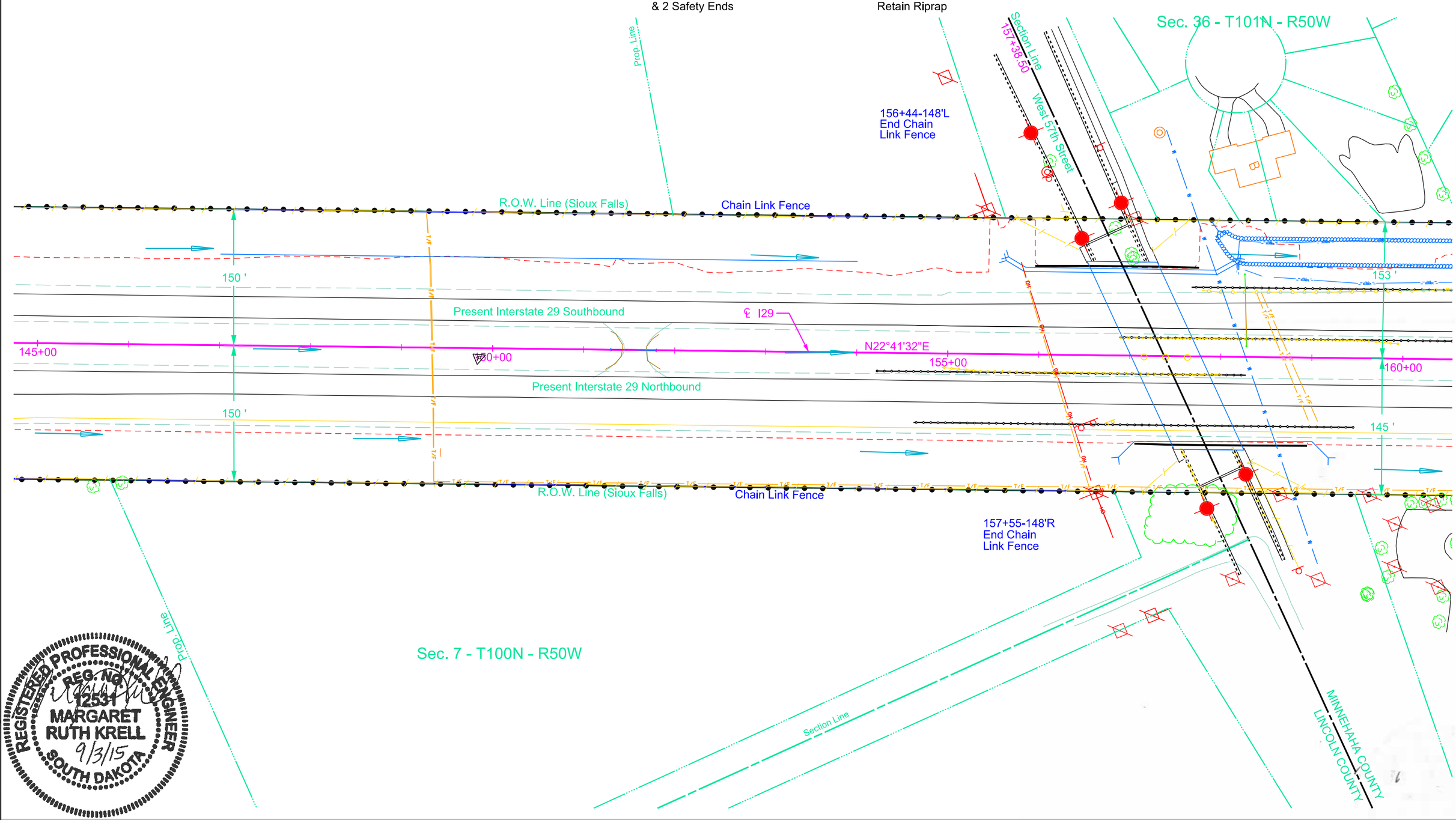
157+50 to 172+90-150' L
Do Not Disturb Existing Sound Barrier Wall

157+96-130' L
Retain 66" End Section

157+96 to 162+80 L
Retain Riprap

158+28 L
Retain Sign Bridge

158+50 to 169+50-100' L
Do Not Disturb Existing Underdrain



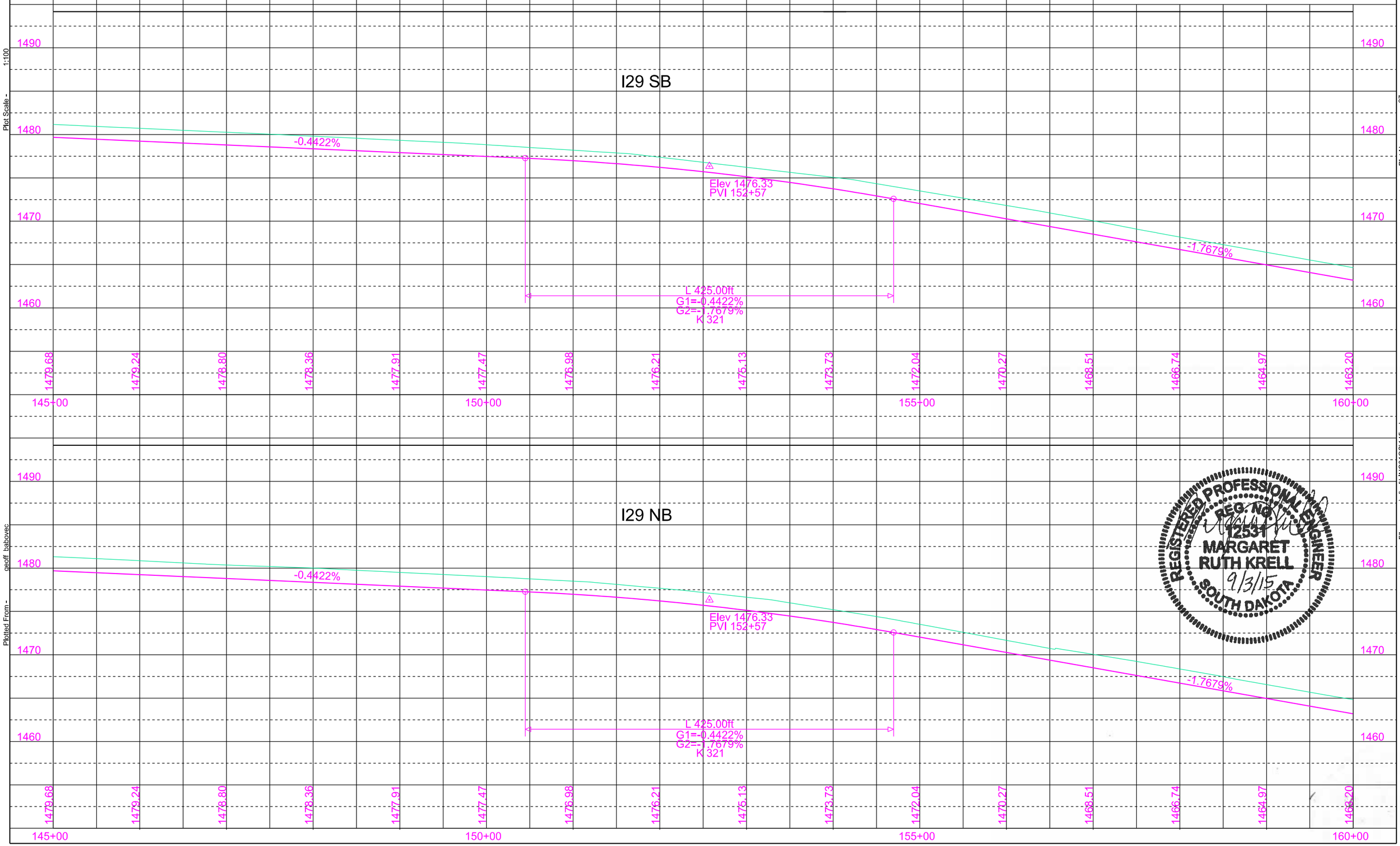
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 26
File - ...\rdprj\LINC01QS\145.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B44	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plotted From - geoff_babovec

Plot Name - 27

File - ...\rdlprj\LINC01QS\145v.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B45	B128

Plotting Date: 10/8/2015 Revised: 10/07/2015 (MRK)

FOR BIDDING PURPOSES ONLY

I29 NB/SB

169+50-100' L
Do Not Disturb Existing Drop Inlet

168+20 to 175+51-0' R
Retain Median Crossover

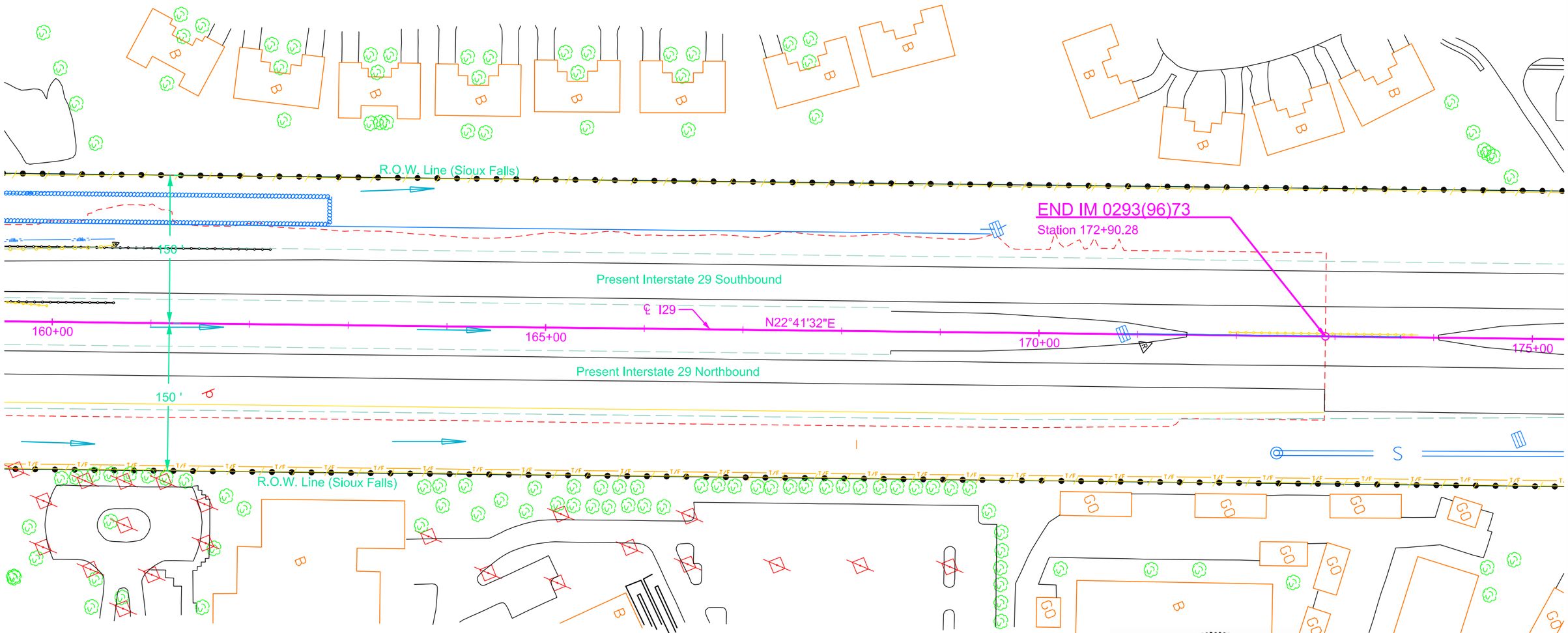
170+88 to 173+66-0' R
Retain 12"-278' CMP
& 2 End Sections

171+94 to 173+86
Remove 192' Crossover Closure

171+22 to 174+58
Install 336' Crossover Closure

172+42-110' R
Do Not Disturb Existing Manhole

172+42 to 172+90-110' R
Do Not Disturb Existing Pipe



Sec. 36 - T101N - R50W

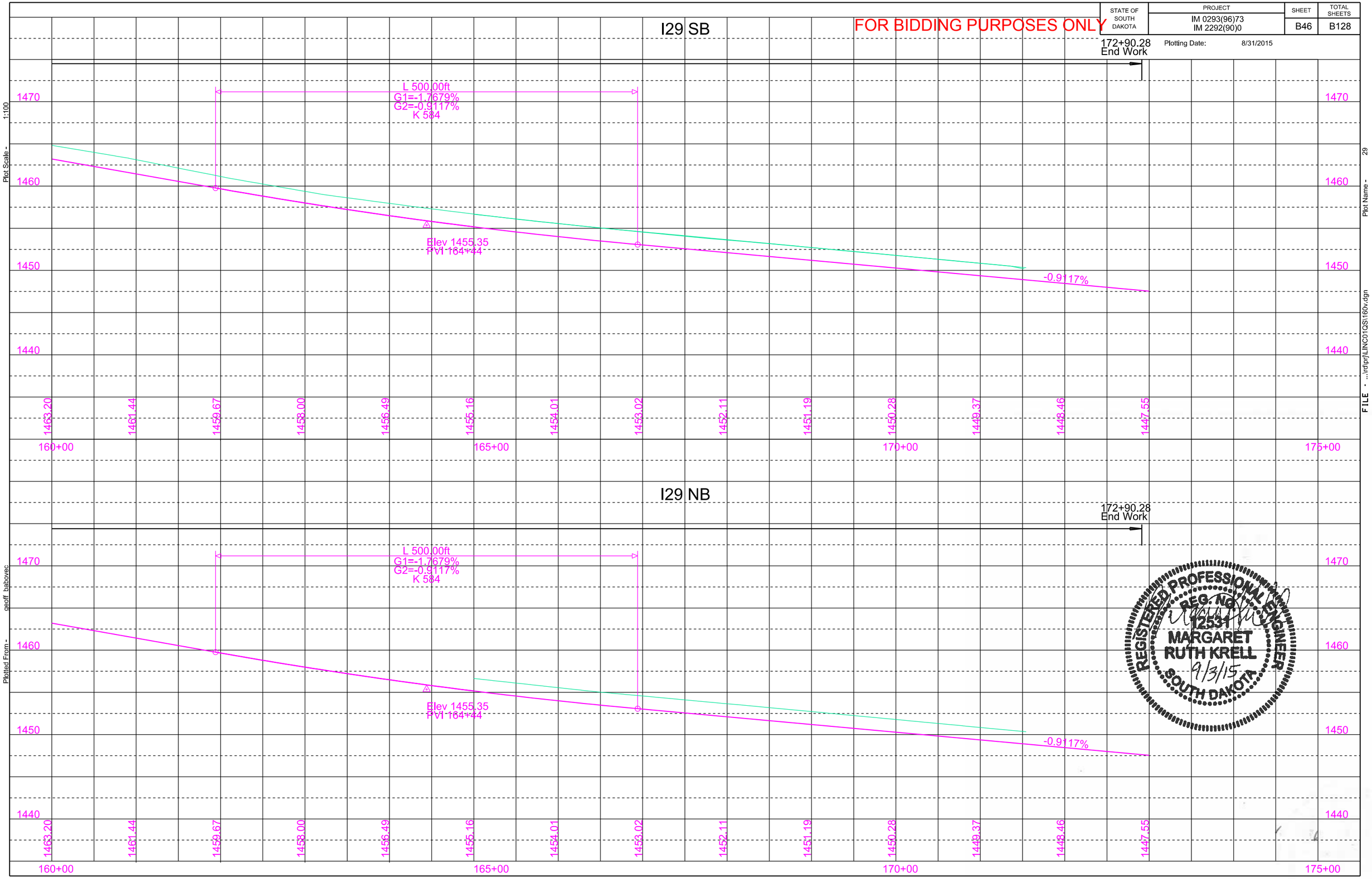
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12581
MARGARET RUTH KRELL
SOUTH DAKOTA
10/7/15

Plot Scale - 1:100
Plotted From - margie_krell
Plot Name - 28
File - ...\rd\prj\LINC01QS\160.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B46	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100

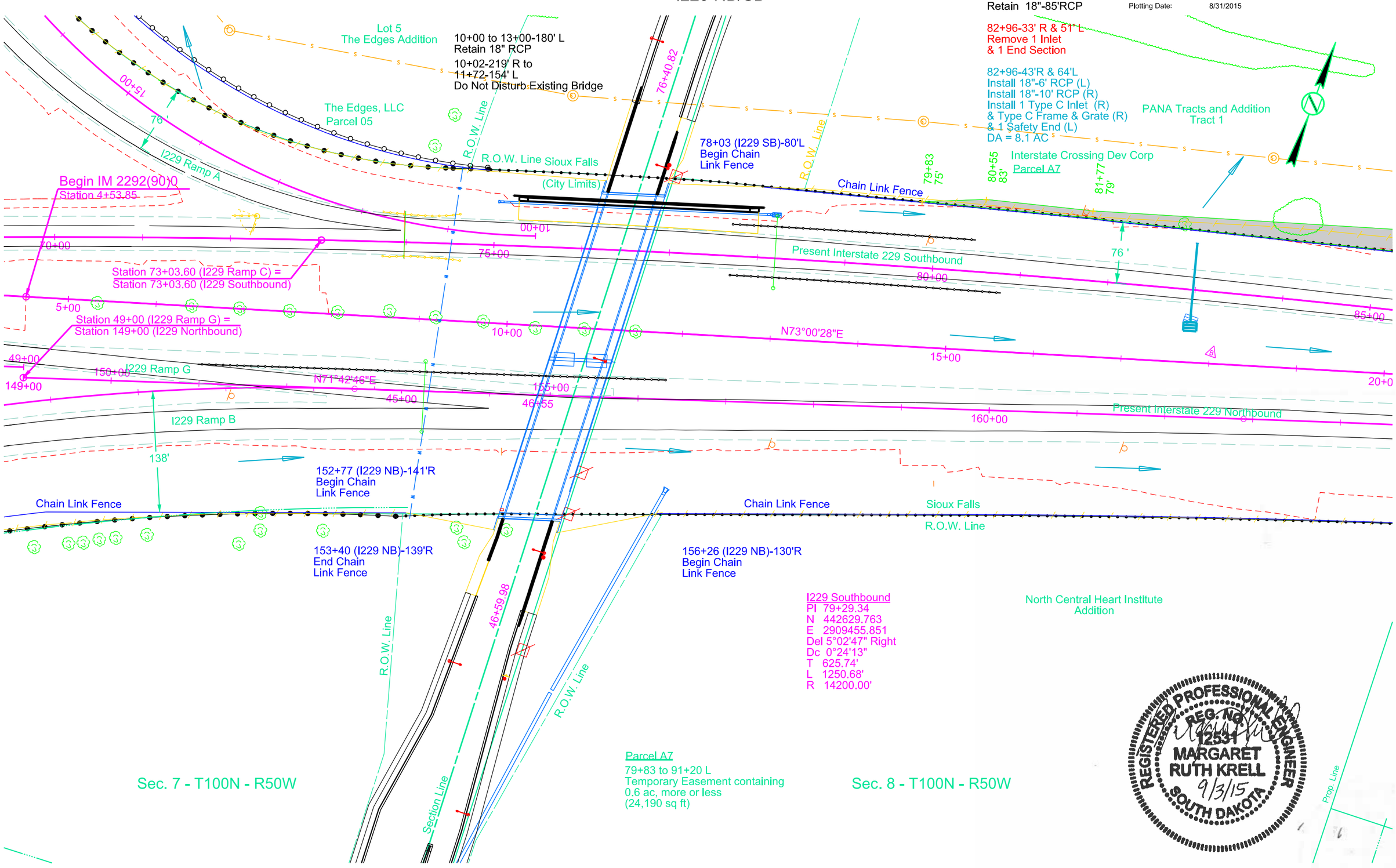
Plotted From - geoff_babovec

Plot Name - 29

FILE - ...\rdtpn\LINC01QS1160v.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B47	B128

Plotting Date: 8/31/2015



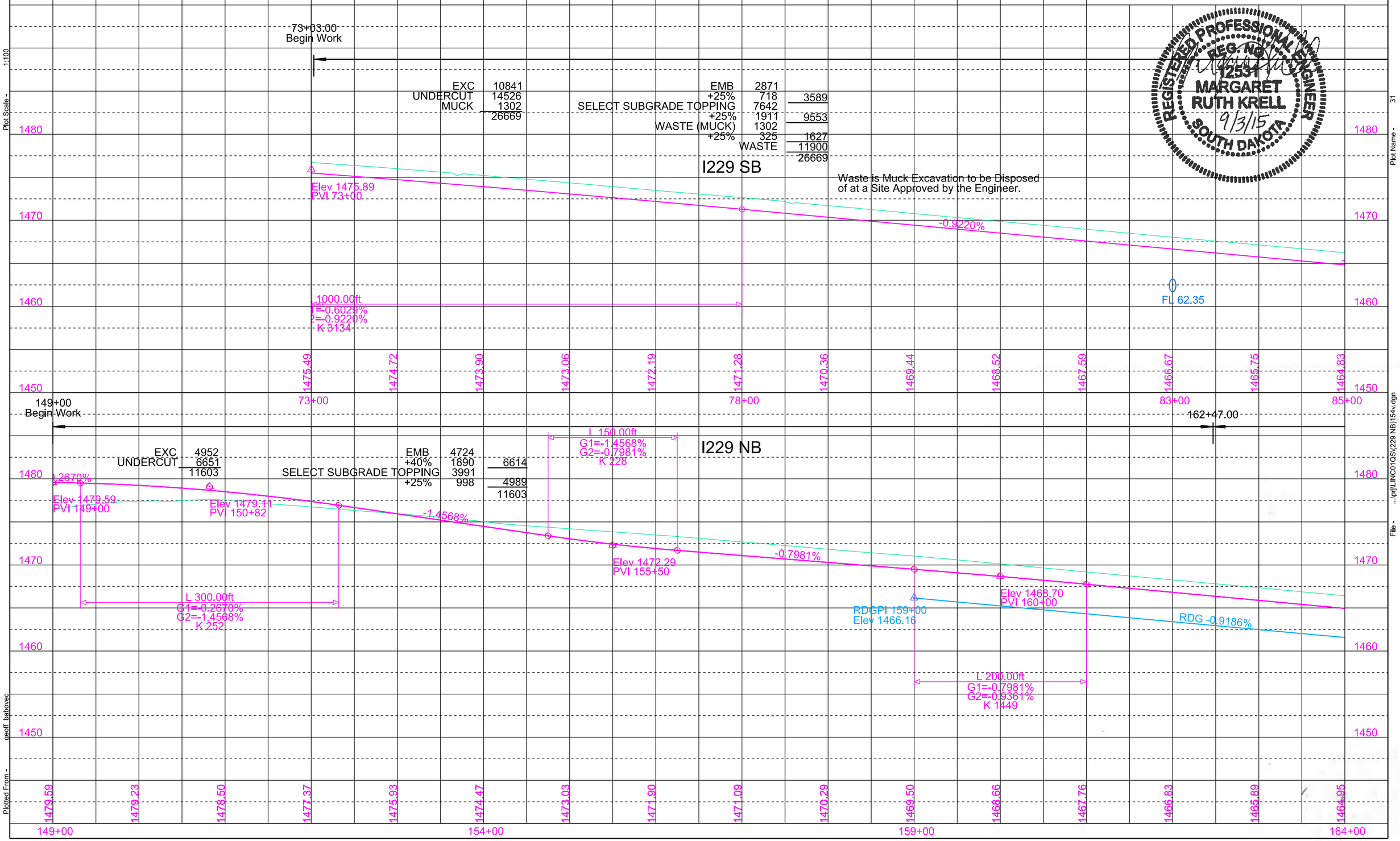
Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 30
File - ...\rdprj\LINC01QS\(229)10.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B48	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA



Plot Scale - 1:100
Plot Name - 31
File - ...\prj\LINC01GS\(229 NB)154v.dgn
Plotted From - geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B49	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

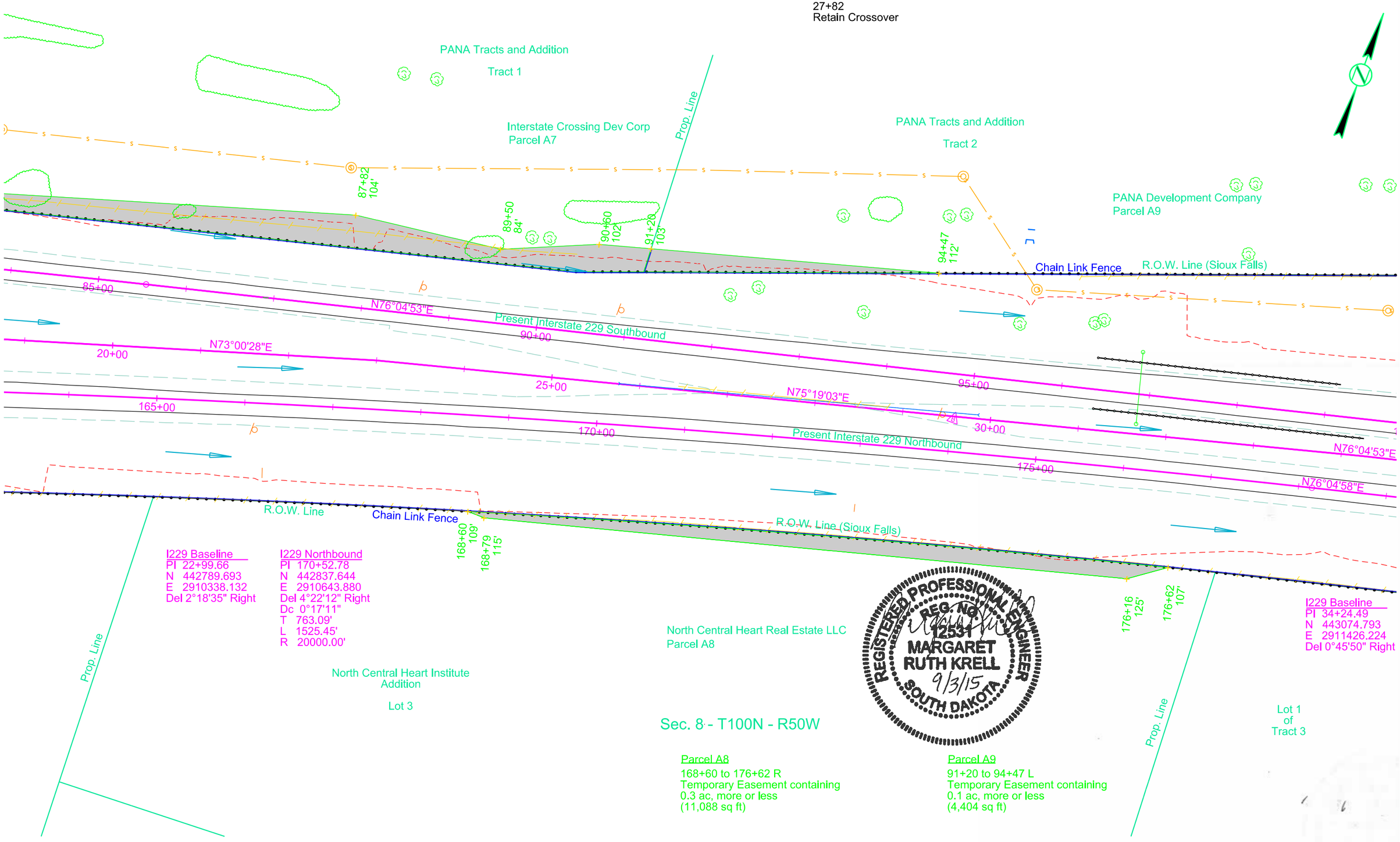
I229 NB/SB

79+83-75' L to 94+47-112' L
Do Not Disturb Existing
Cedar Trees

168+60-109' R to 176+62-107 R
Do Not Disturb Existing
Cedar Trees

25+78 To 29+85
Retain 15"-406' CMP
& 2 End Sections

27+82
Retain Crossover



I229 Baseline
PI 22+99.66
N 442789.693
E 2910338.132
Del 2°18'35" Right

I229 Northbound
PI 170+52.78
N 442837.644
E 2910643.880
Del 4°22'12" Right
Dc 0°17'11"
T 763.09'
L 1525.45'
R 20000.00'

I229 Baseline
PI 34+24.49
N 443074.793
E 2911426.224
Del 0°45'50" Right

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Parcel A8
168+60 to 176+62 R
Temporary Easement containing
0.3 ac, more or less
(11,088 sq ft)

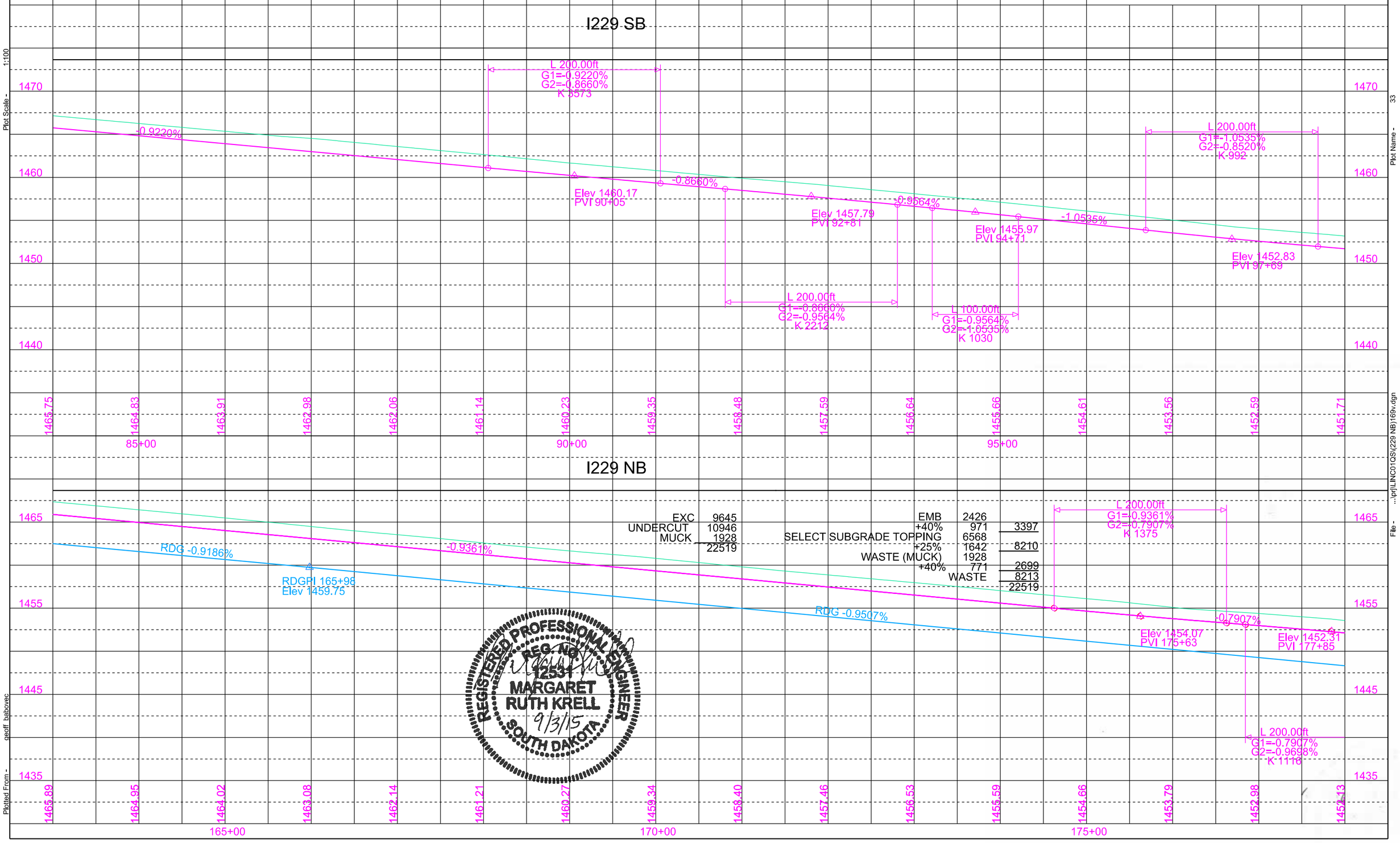
Parcel A9
91+20 to 94+47 L
Temporary Easement containing
0.1 ac, more or less
(4,404 sq ft)

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 32
File - ...\rdprj\LINC01OS\(229)20.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B50	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



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MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

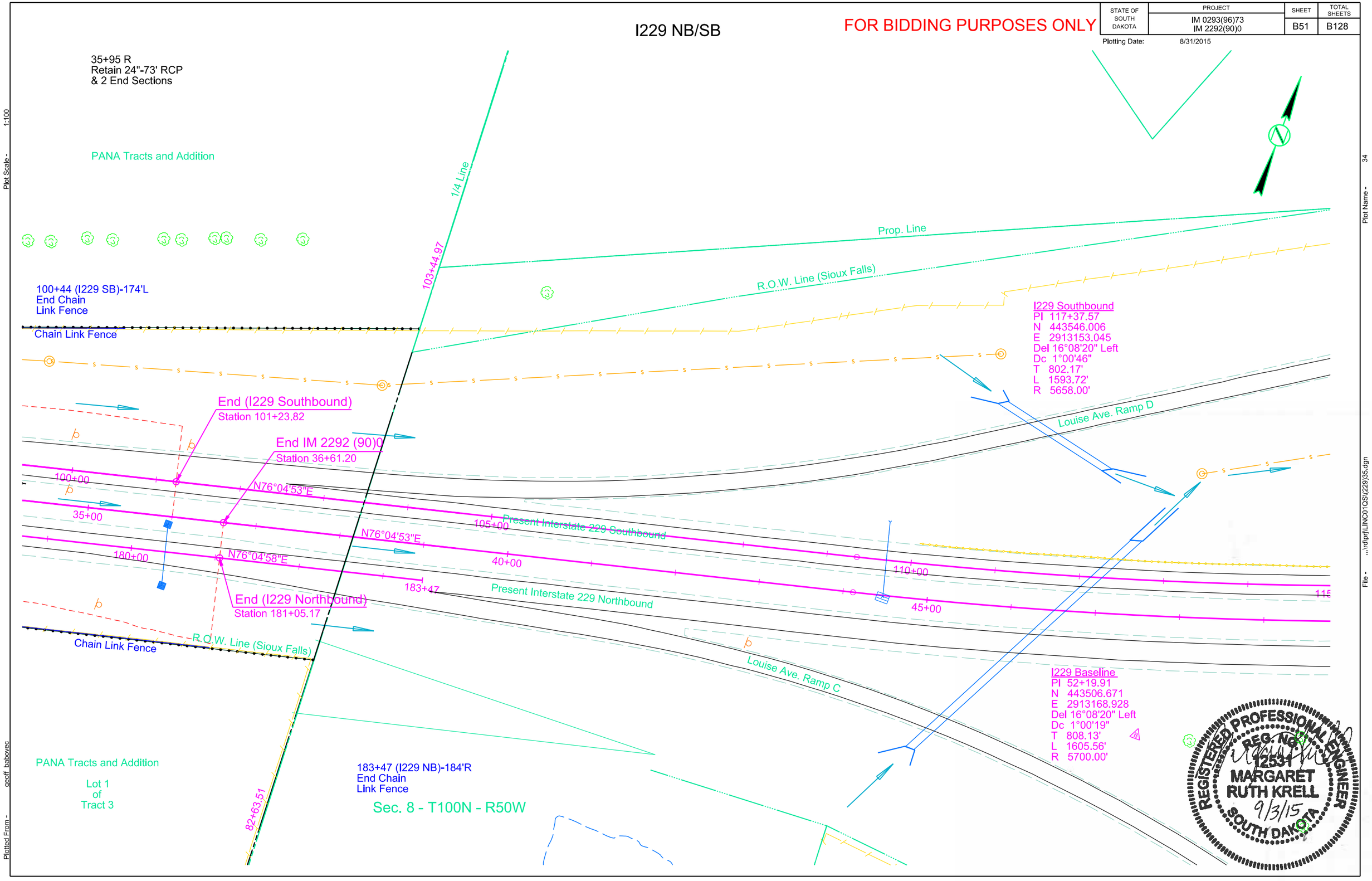
Plot Scale - 1:100
Plot Name - 33
File - ...\prj\LINC01GS\229 NB\169v.dgn
Plotted From - geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B51	B128

Plotting Date: 8/31/2015

I229 NB/SB

FOR BIDDING PURPOSES ONLY



Plot Scale - 1:100

Plotted From - geoff_babovec

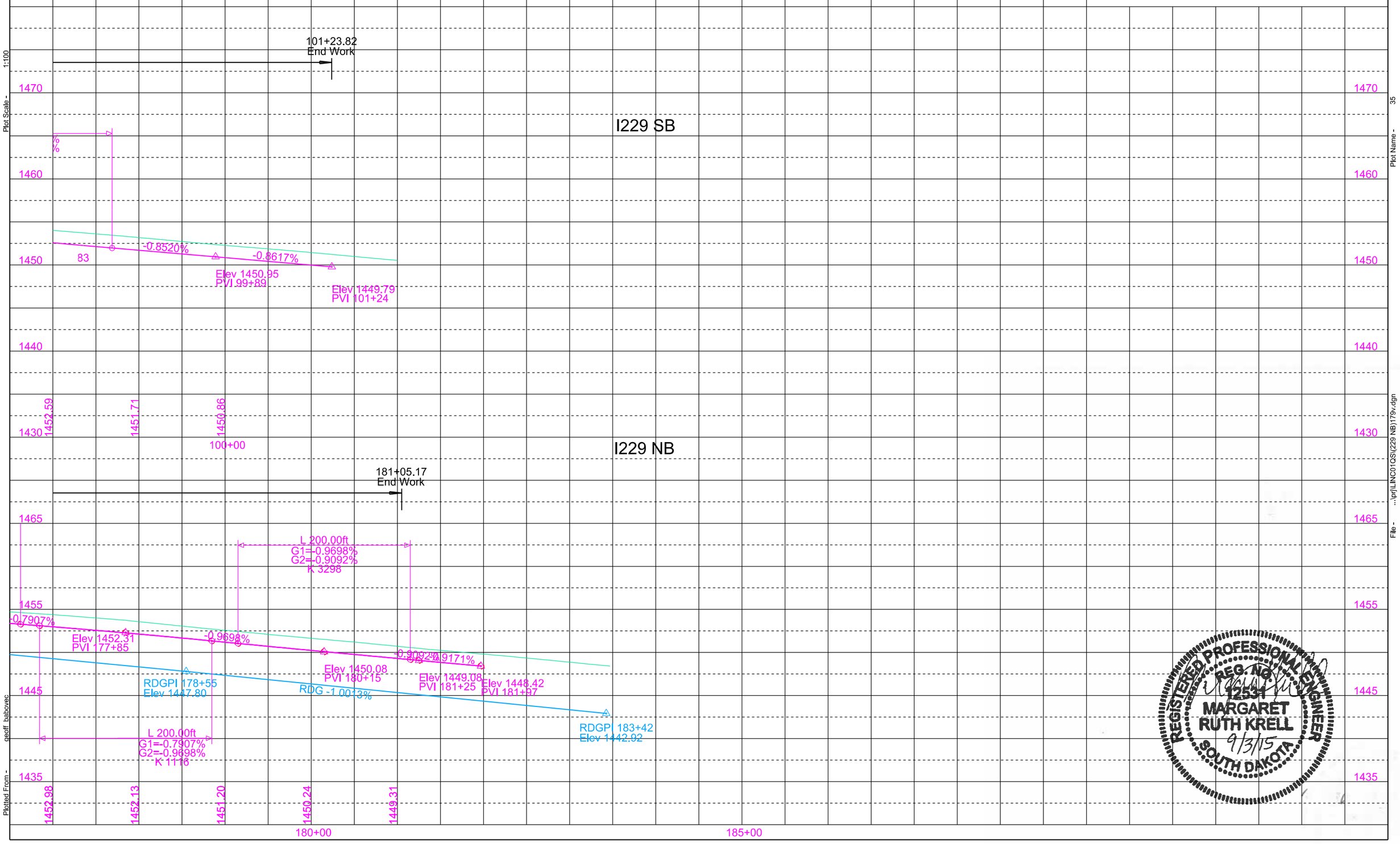
File - ...\rdlprj\LINC01GS\(229)35.dgn

Plot Name - 34

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B52	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

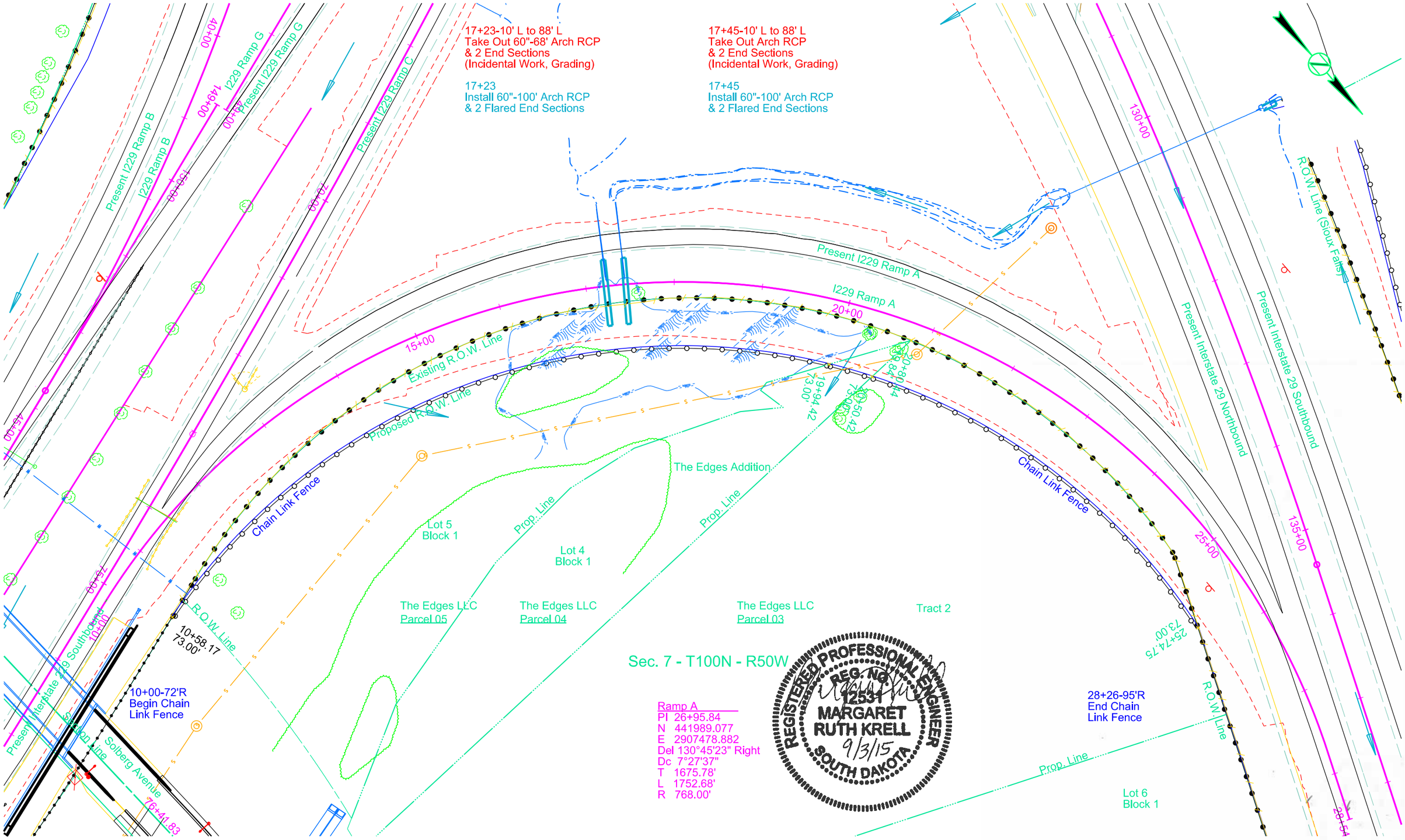
Plot Scale - 1:100
Plot Name - 35
File - ...\prj\LINC01GS\I229 NB\179v.dgn
Plotted From - geoff_babovec

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B53	B128

Plotting Date: 8/31/2015

I229 Ramp A



Plot Scale - 1:100
Plotted From - geoff babovec
File - ...\LINC01GS\(229 Ramp A)10.dgn
Plot Name - 36

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B54	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp A

11+63.00
Begin Work

Excavation	14169		Embankment	13191	
Undercut	643		+25%	3298	16489
Muck	6458		Select Subgrade Topping	2879	
Out of Balance Excavation	6891		+25%	720	3599
	28161		Waste	6458	
			+25%	1615	8073
					28161

Waste is Muck Excavation to be Disposed of at a Site Approved by the Engineer.

Out of Balance Excavation is to be Obtained as Follows and Will be Paid For Only Once as Unclassified Excavation:
6891 Cu Yd from I29 NB

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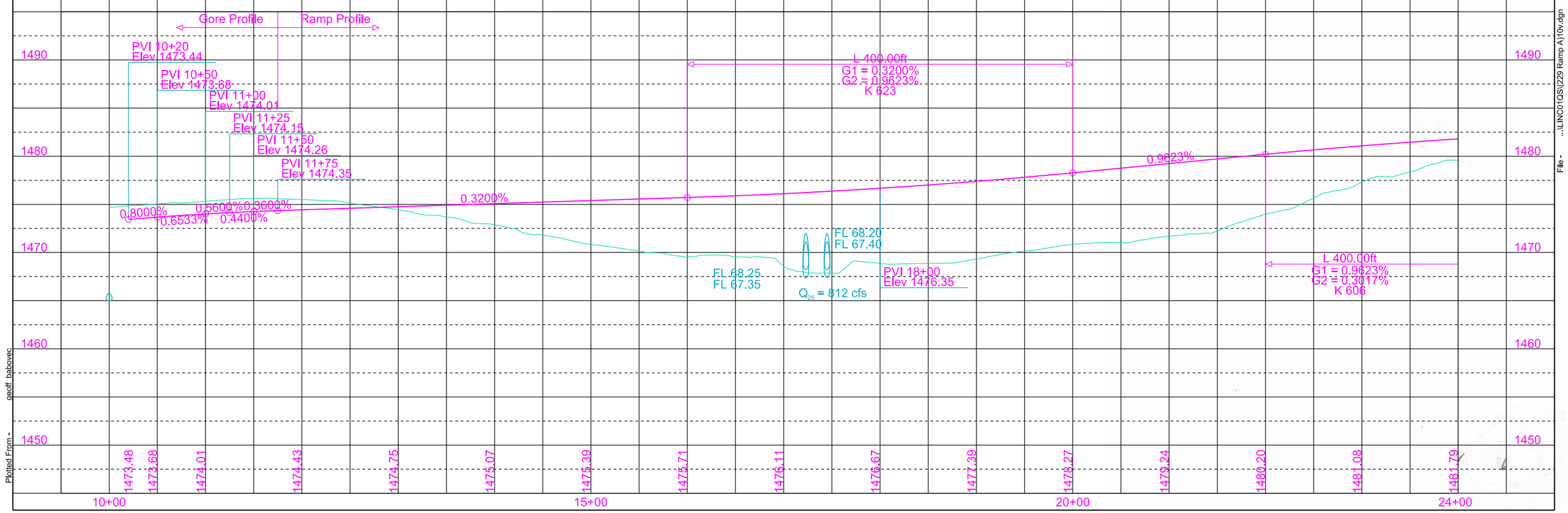
9/3/15
SOUTH DAKOTA



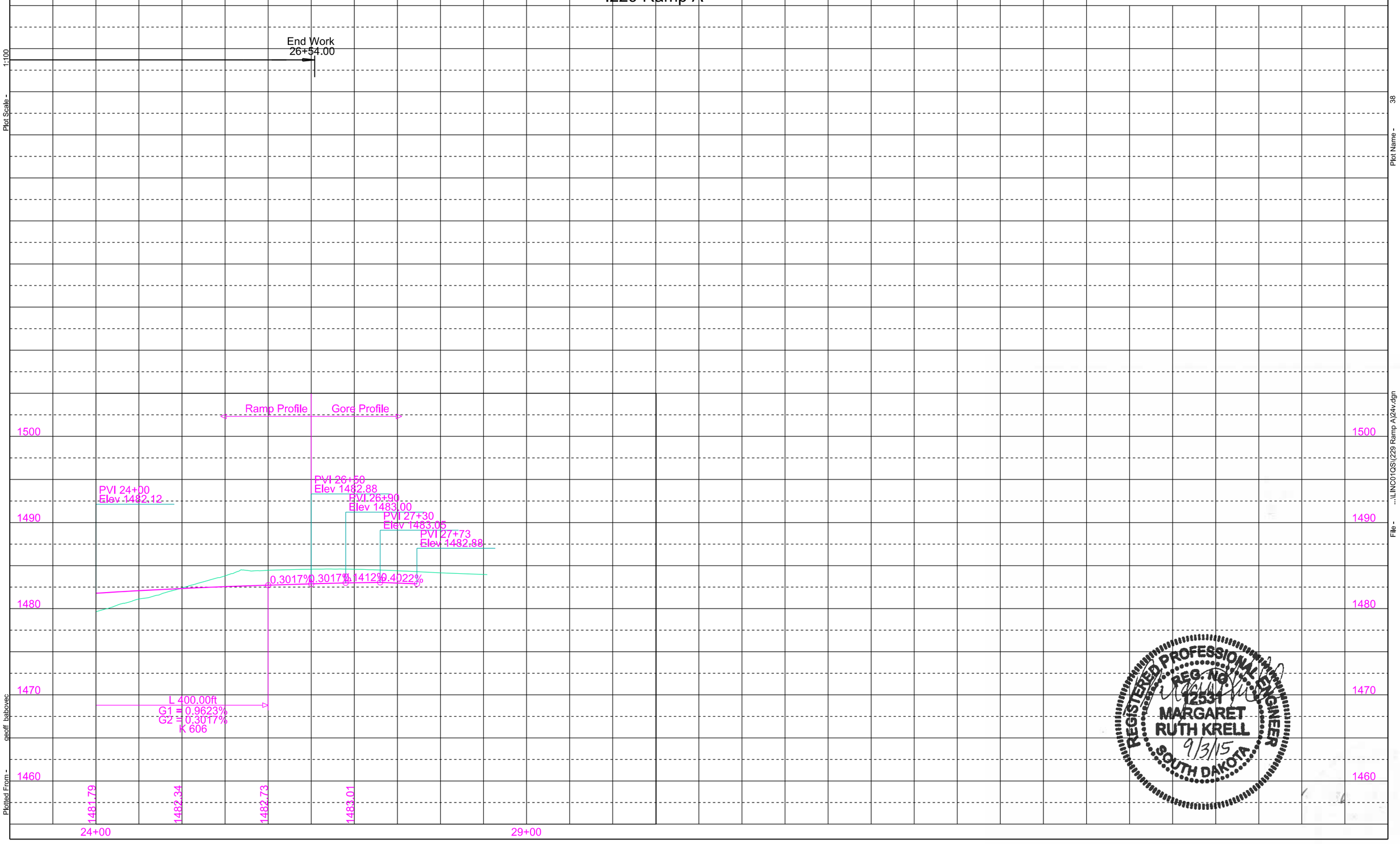
Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 37
File - ...\LINC01QS\I229 Ramp A\10v.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B55	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp A



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MARGARET
RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100

Plotted From - geoff_babovec

Plot Name - 38

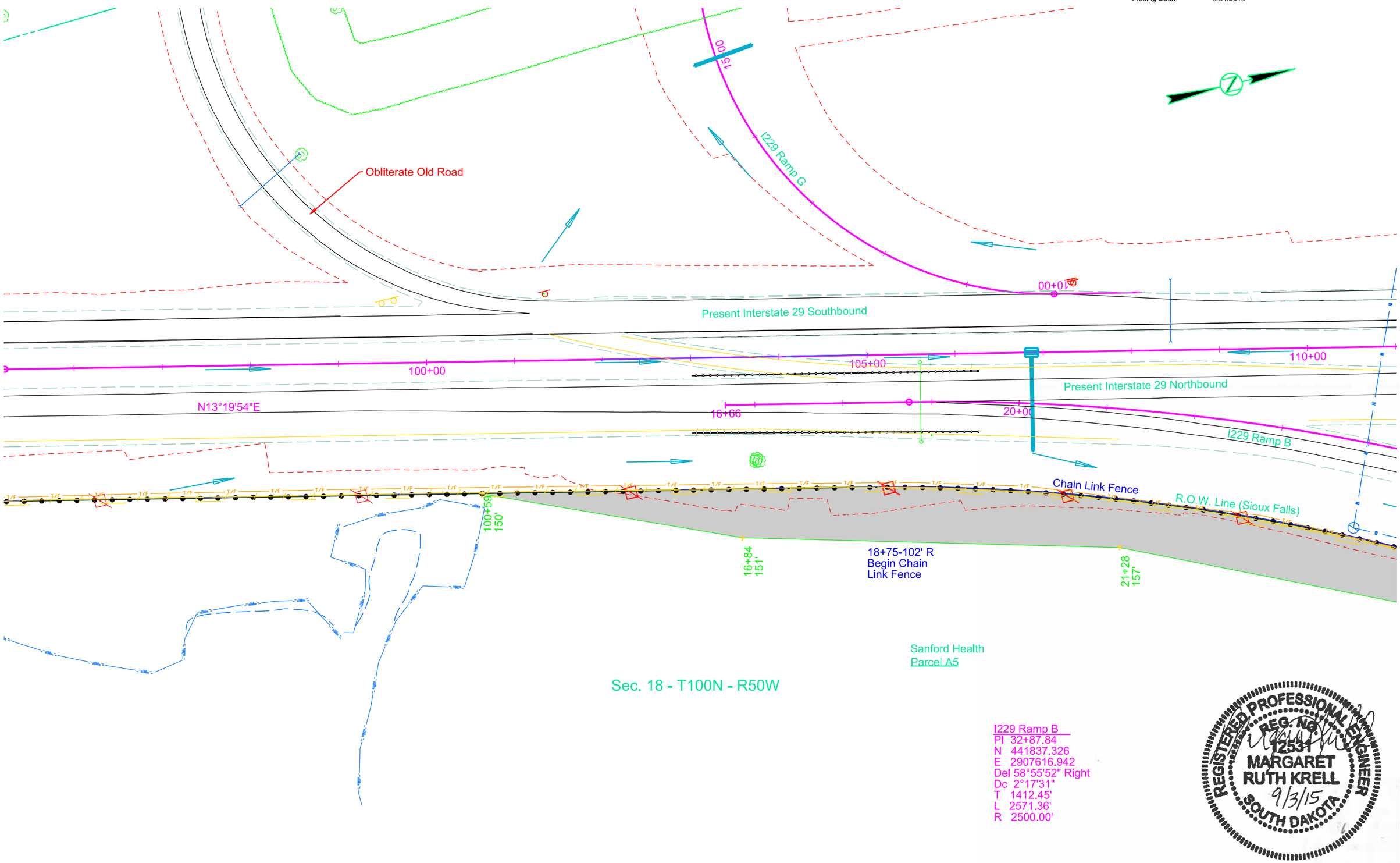
File - ...\LINC01GS\I229 Ramp A\24v.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B56	B128

Plotting Date: 8/31/2015

I229 Ramp B

FOR BIDDING PURPOSES ONLY



I229 Ramp B
PI 32+87.84
N 441837.326
E 2907616.942
Del 58°55'52" Right
Dc 2°17'31"
T 1412.45'
L 2571.36'
R 2500.00'

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SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 39
File - ...\LINC01QS\(229 Ramp B)10.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B57	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp B

16+66.00
Begin Work

Excavation	3094	Embankment	2220	
Undercut	3445	+30%	666	
	6534	Select Subgrade Topping	2810	2886
		+30%	843	3653
				6539

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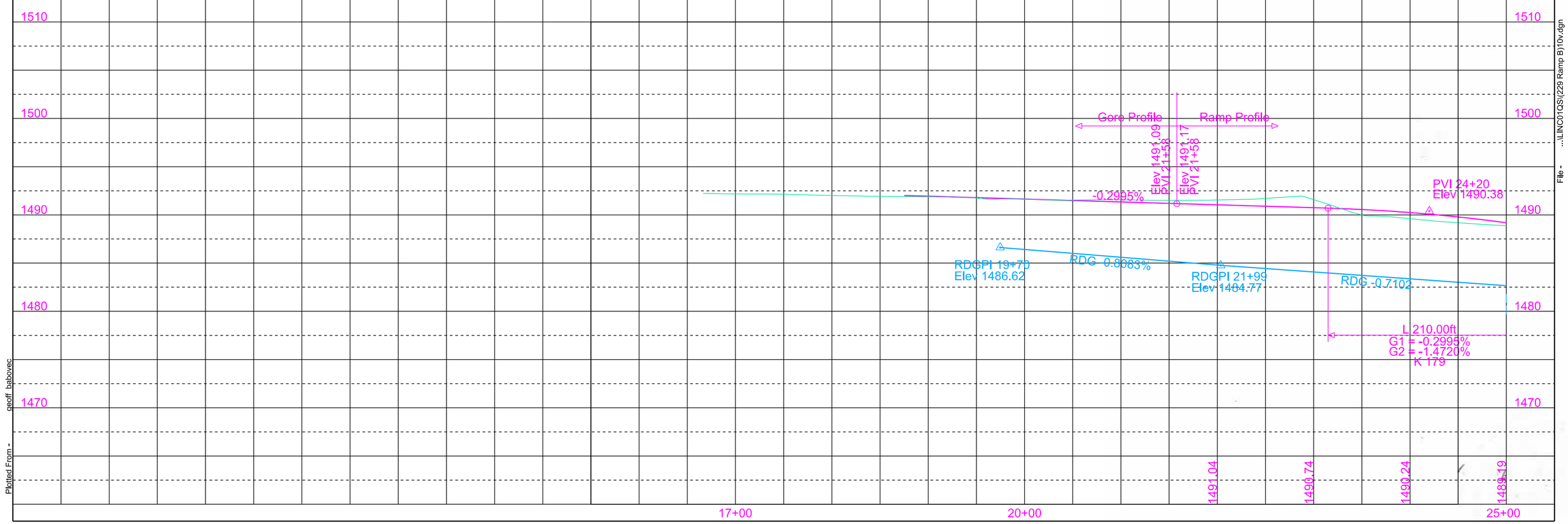


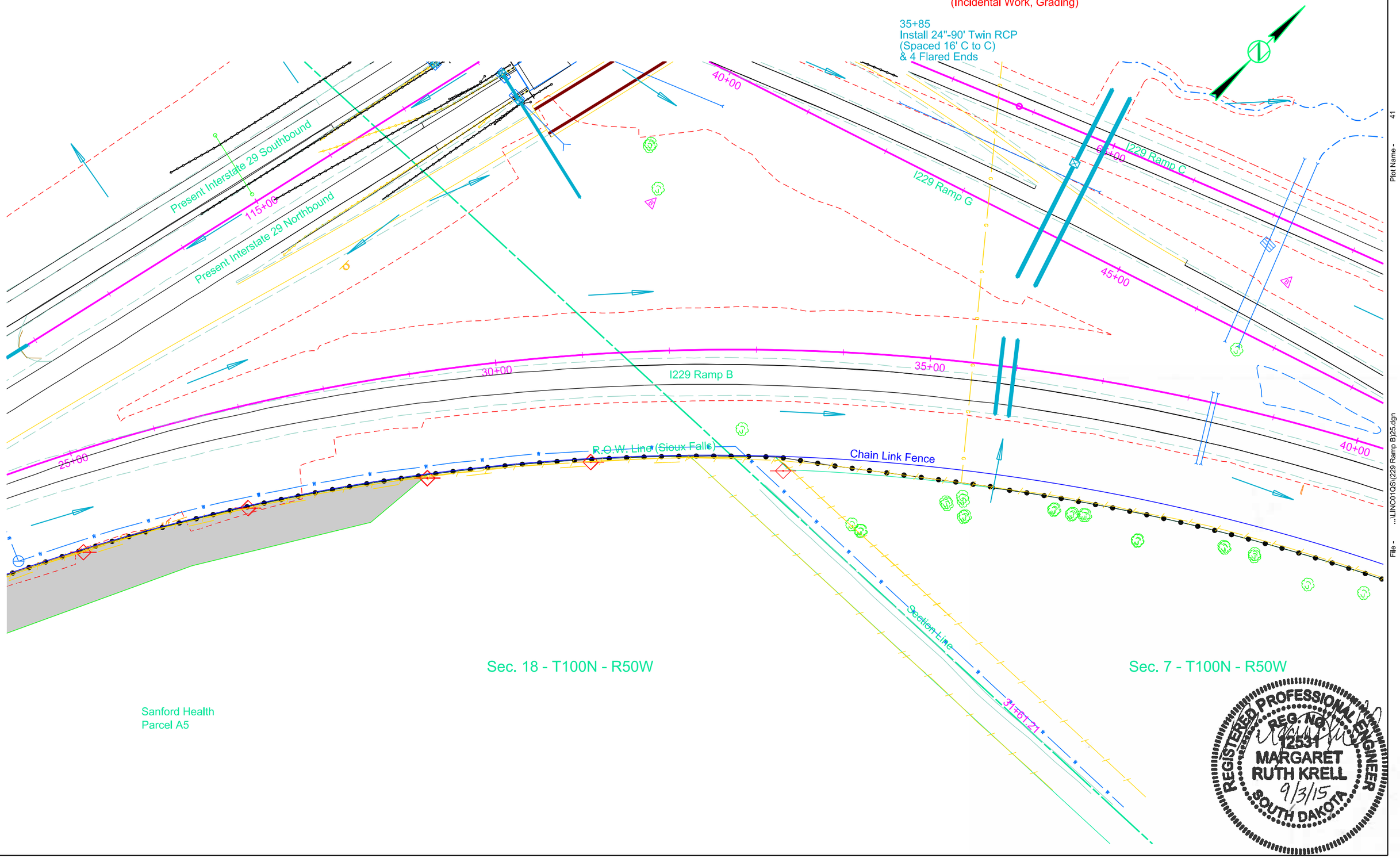
Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 40
File - ...\LINC01QS\I229 Ramp B\10v.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B58	B128

Plotting Date: 8/31/2015

I229 Ramp B

FOR BIDDING PURPOSES ONLY



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9/3/15
SOUTH DAKOTA

Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 41
File - ...\LINC01GS\I229 Ramp B\25.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B59	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp B

30+98.27

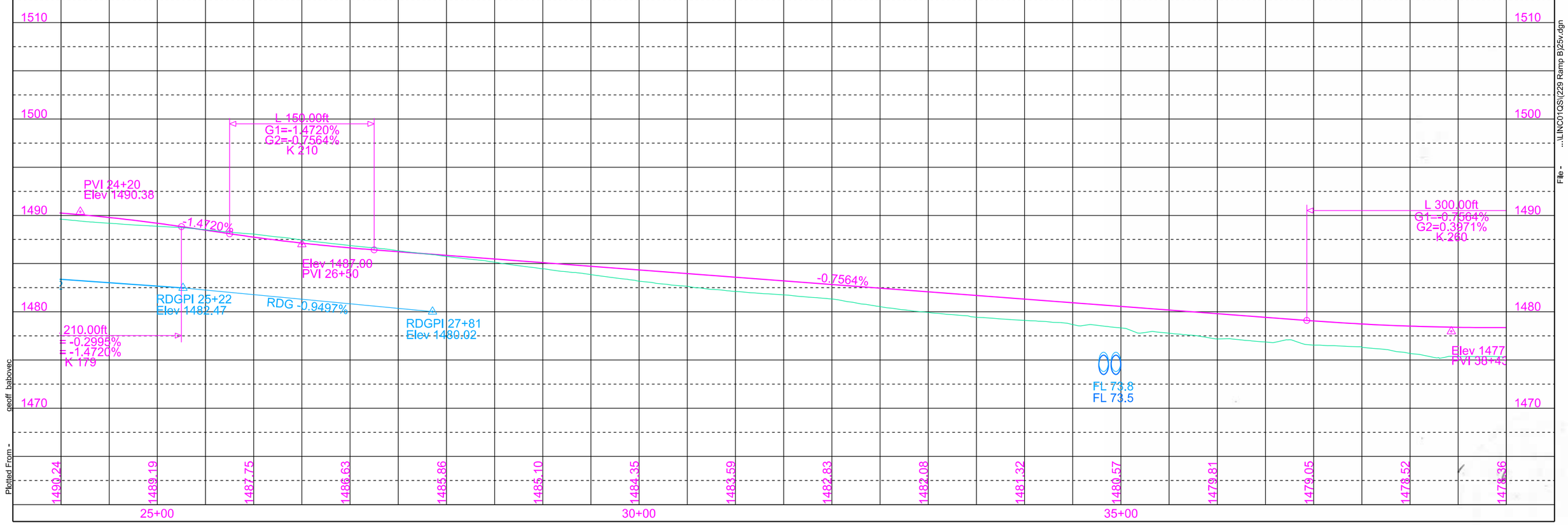
Excavation	2204
Undercut	4345
Muck	759
Out of Balance Excavation	4583
	11891

Embankment	5507	
+30%	1517	6574
Select Subgrade Topping	43332	
+30%	999	4331
Waste	759	
+30%	228	986
		11891

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Waste is Muck Excavation to be Disposed of at a Site Approved by the Engineer.

Out of Balance Excavation is to be Obtained as Follows and Will be Paid For Only Once as Unclassified Excavation:
4583 Cu Yd from I29 SB



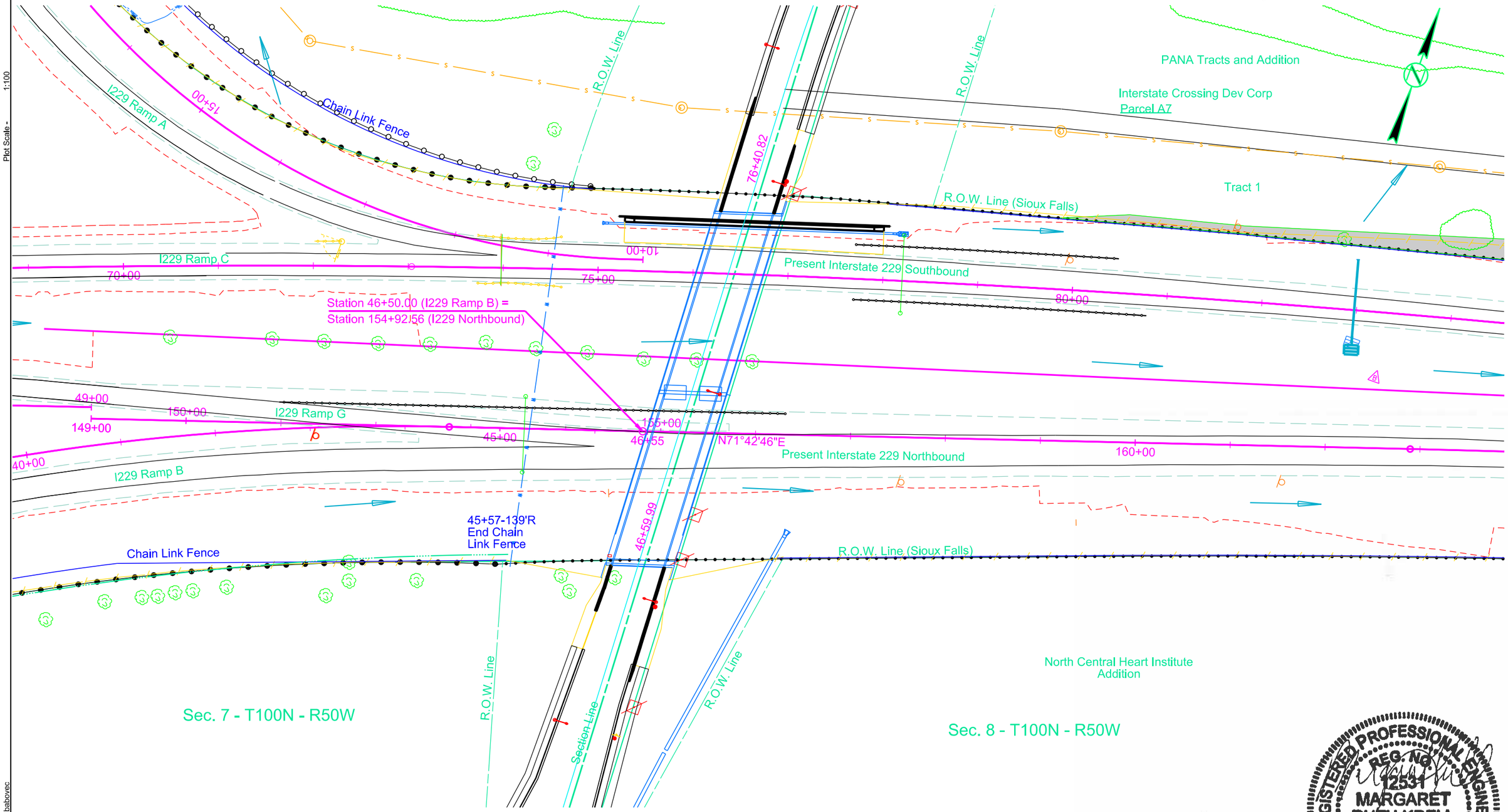
Plot Scale - 1:100
Plotted From - geoff_babovec
File - ...\LINC01QS\I229 Ramp B\25v.dgn
Plot Name - 42

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B60	B128

Plotting Date: 8/31/2015

I229 Ramp B

FOR BIDDING PURPOSES ONLY



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REG. NO. 12531
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9/3/15
SOUTH DAKOTA

Plot Scale - 1:100

Plotted From - geoff babovec

File - ...\LINC01GS\(229 Ramp B)\0.dgn

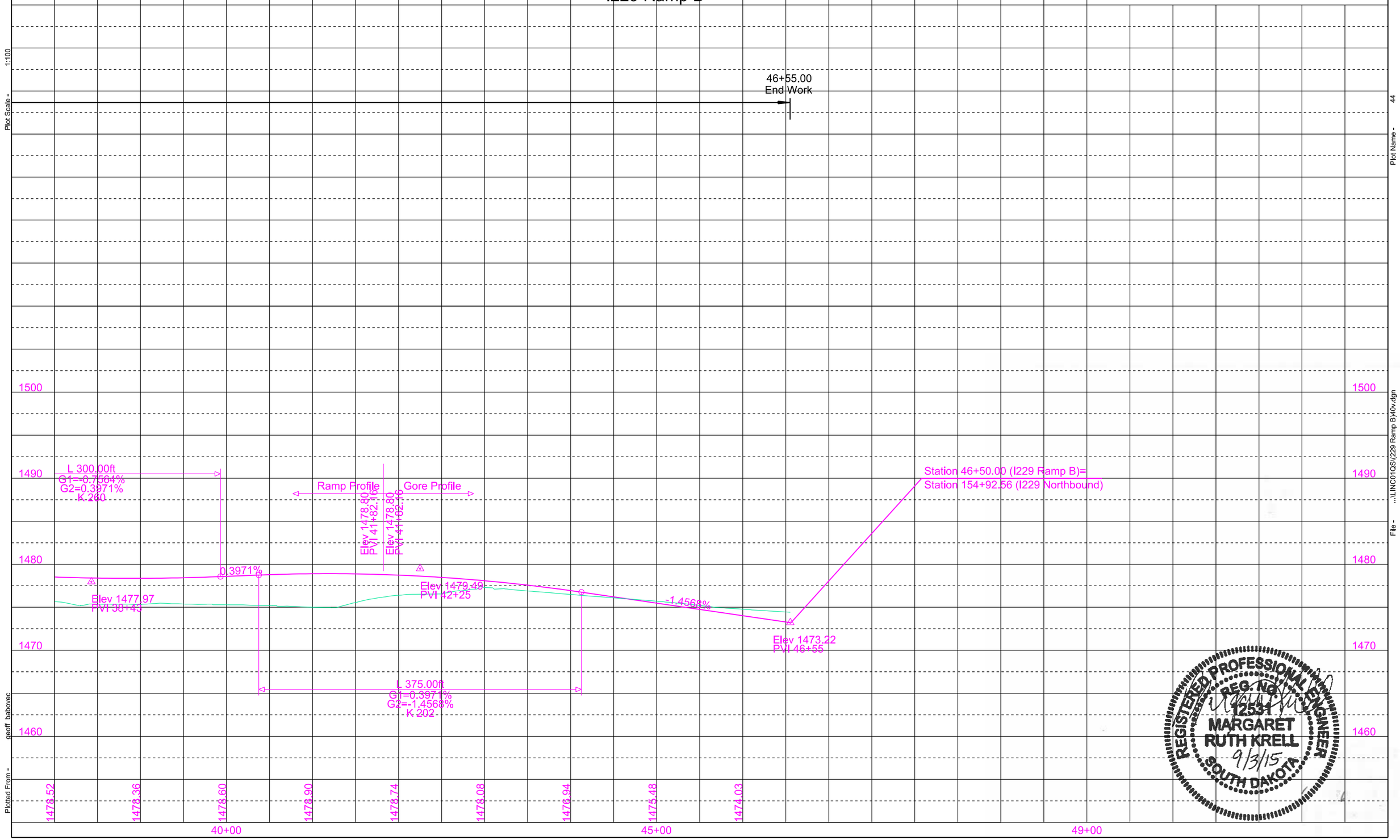
Plot Name - 43

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B61	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp B



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9/3/15
SOUTH DAKOTA

Plot Scale - 1:100

Plot Name - 44

File - ...\LINC01GS\I229 Ramp B\40v.dgn

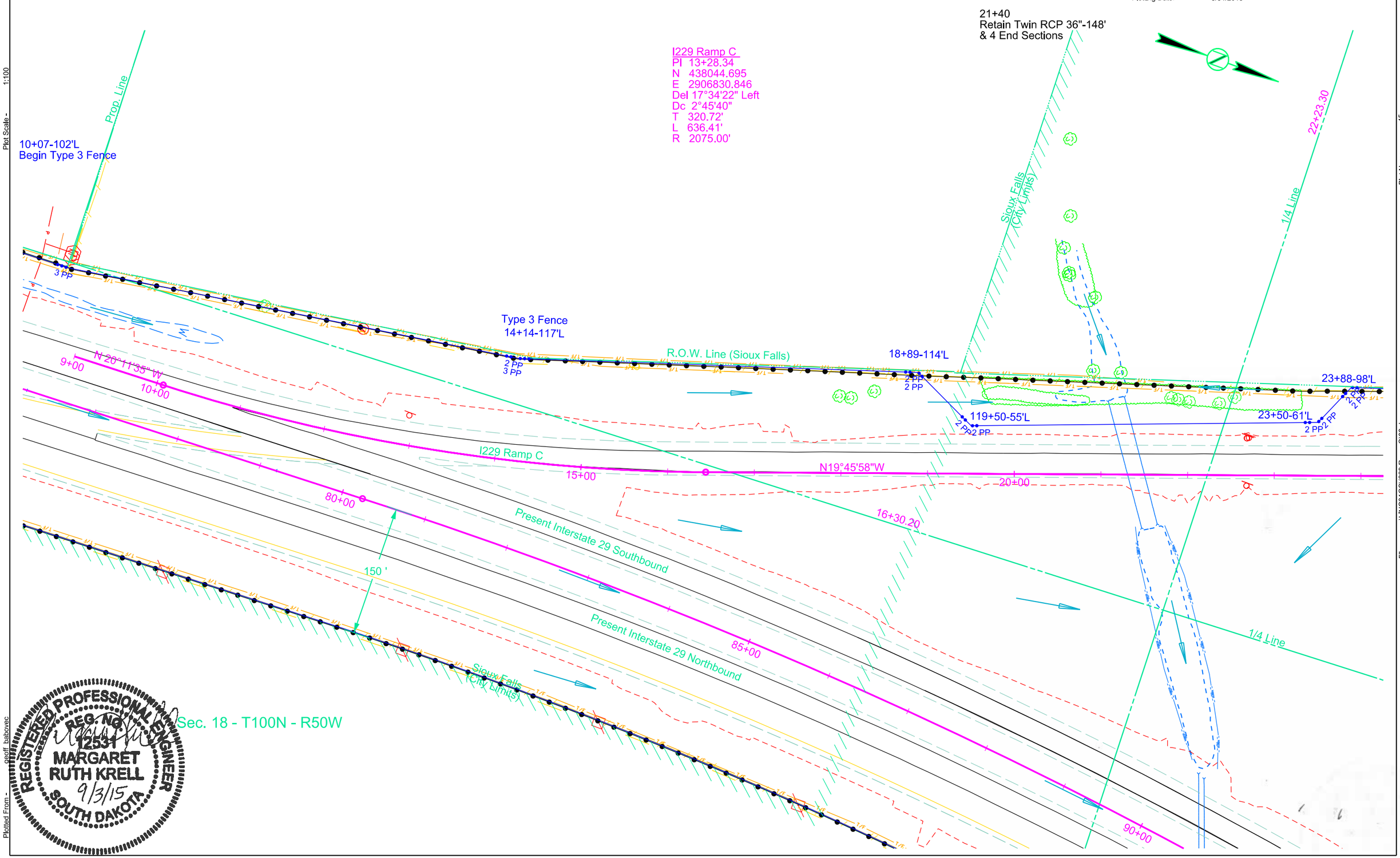
Plotted From - geoff_babovec

I229 Ramp C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B62	B128

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plotted From - geoff_babovec

Plot Name - 45

File - ...\LINC01GS\I229 Ramp C\08.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B63	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp C

12+95.00
Begin Work

Excavation	2877	Embankment	0	
Undercut	8933	Select Subgrade Topping	5360	
	11810	+25%	1334	6700
		Waste	5110	
			11810	

Waste is to be wasted as follows:
5110 Cu Yd to I29 SB

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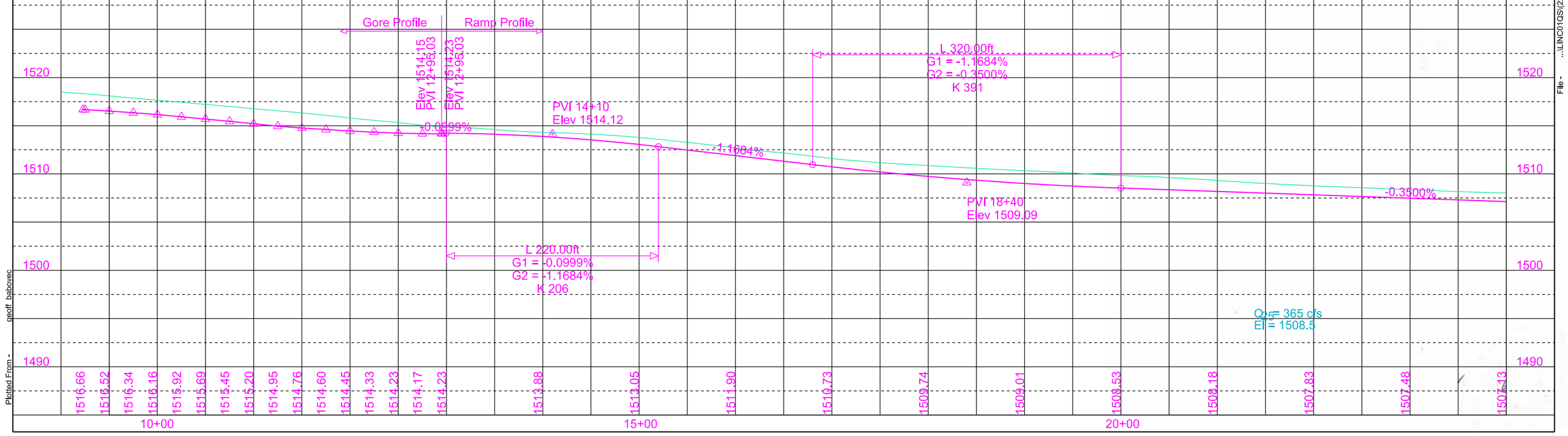

Plot Scale - 1:100
Plotted From - ceoff_babovec
Plot Name - 46
File - ...\LINC01GS\I229 Ramp C\08v.dgn

I229 Ramp C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B64	B128

Plotting Date: 8/31/2015

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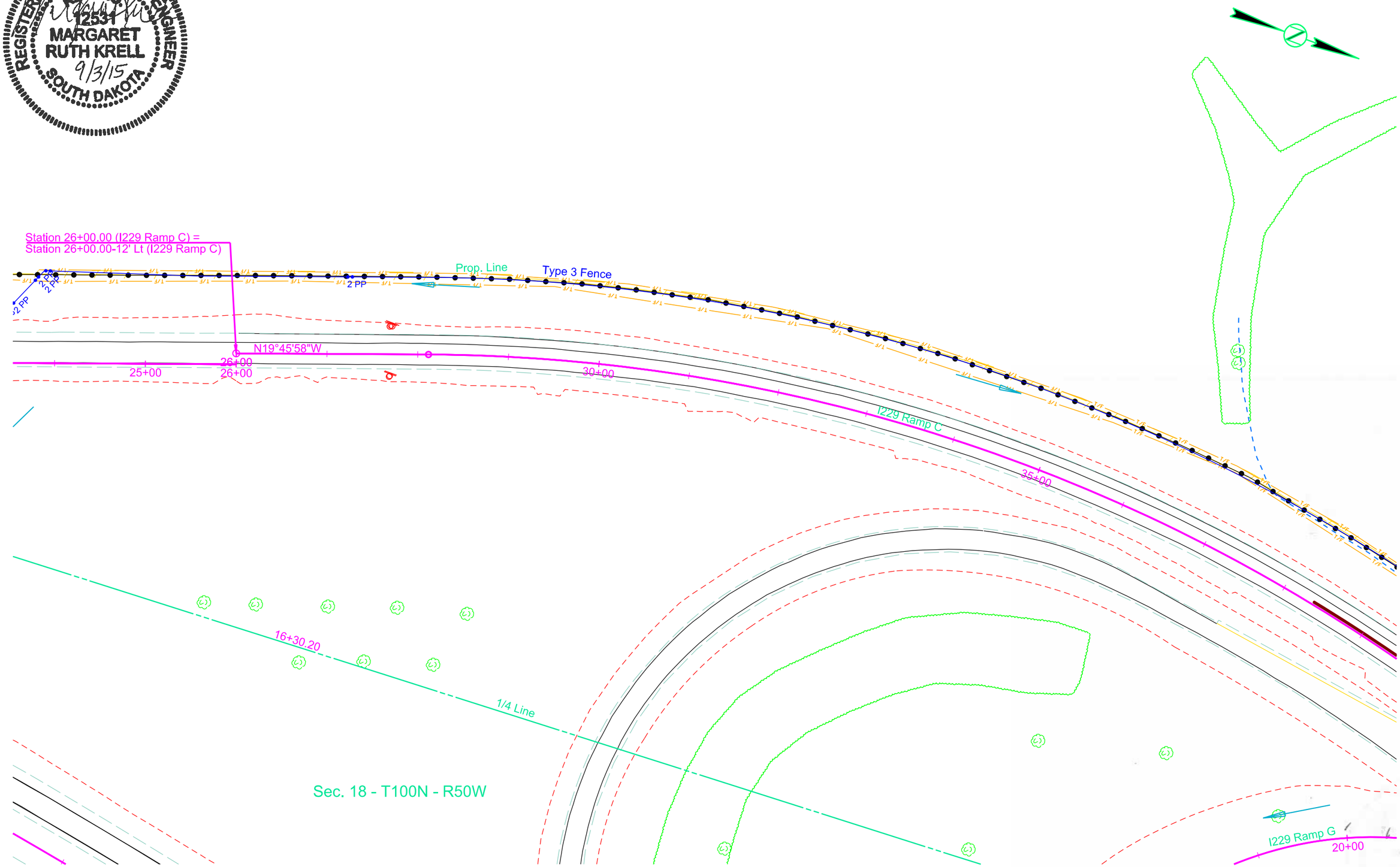
SOUTH DAKOTA



Plot Scale - 1:100

Plotted From - geoff babovec

Plot Name - 47

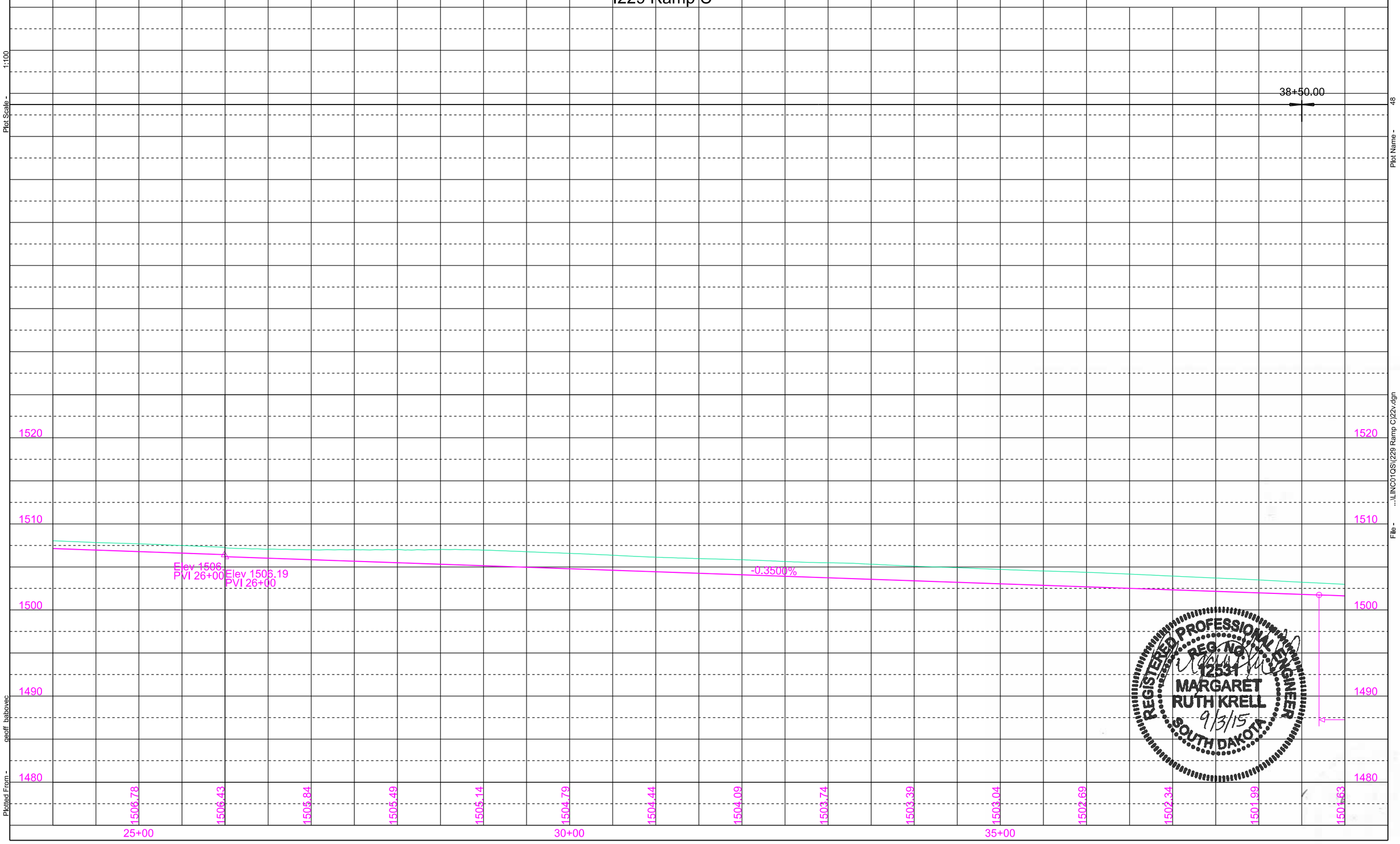
File - ...\LINC01GS\(229 Ramp C)25.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B65	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp C



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9/3/15
SOUTH DAKOTA

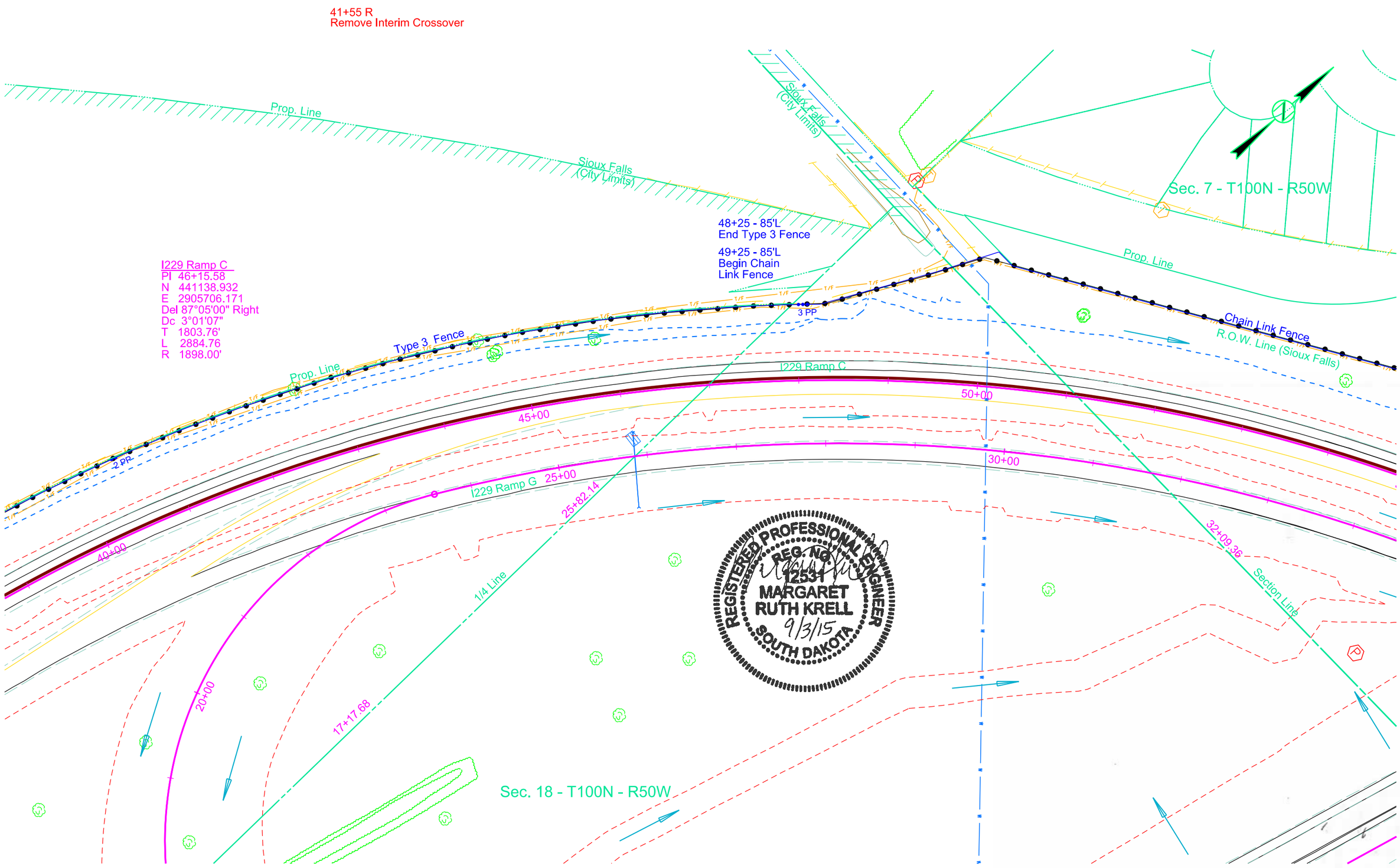
Plot Scale - 1:100
Plot Name - 48
File - ...\LINC01GS\I229 Ramp C\I22v.dgn
Plotted From - geoff_babovec

I229 Ramp C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B66	B128

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plotted From - geoff_babovec

Plot Name - 49

File - ...\LINC01QS\I229 Ramp C\40.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B67	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp C

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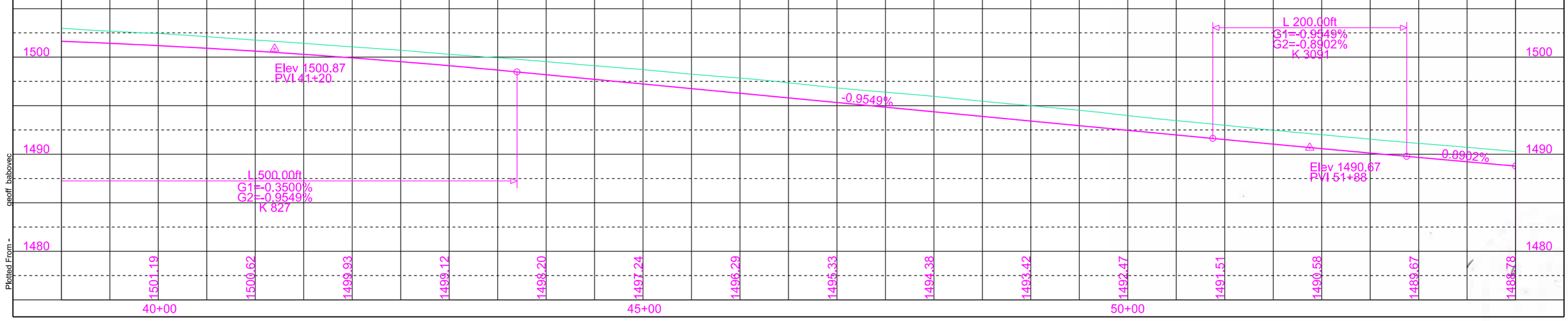
9/3/15
SOUTH DAKOTA

42+00.00

Excavation	252		
Undercut	1323		
	1575		
Embankment		0	
Select Subgrade Topping		794	
+25%		199	993
WASTE			582
			1575

Waste is to be wasted as follows:
582 Cu Yd to I29 SB



Plot Scale - 1:100

Plotted From - ceoff_bajovec

File - ...\LINC01GS\I229 Ramp C\35v.dgn

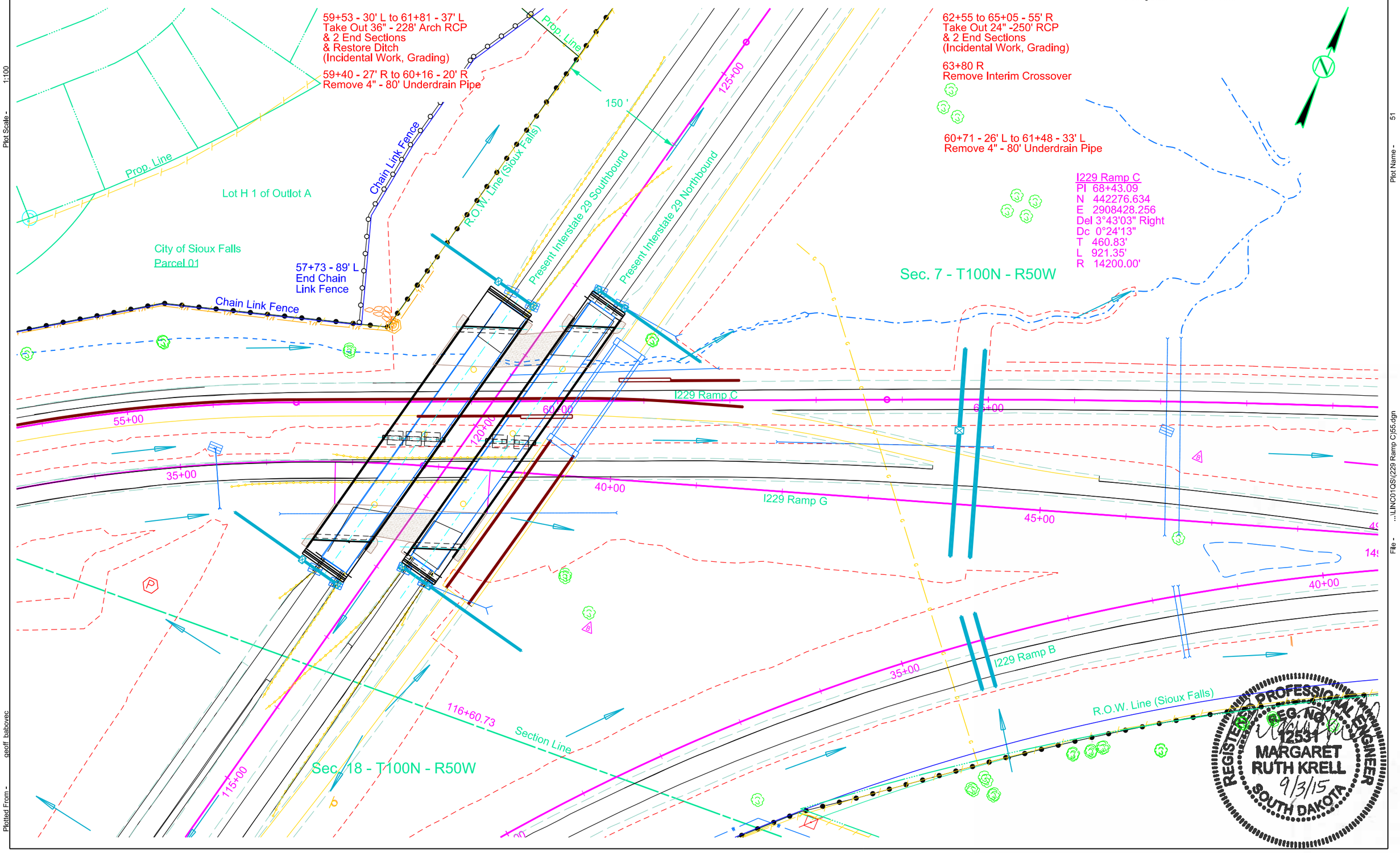
Plot Name - 50

I229 Ramp C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B68	B128

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plotted From - geoff_babovec

File - ...\LINC01GS\I229 Ramp C\55.dgn

Plot Name - 51

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B69	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

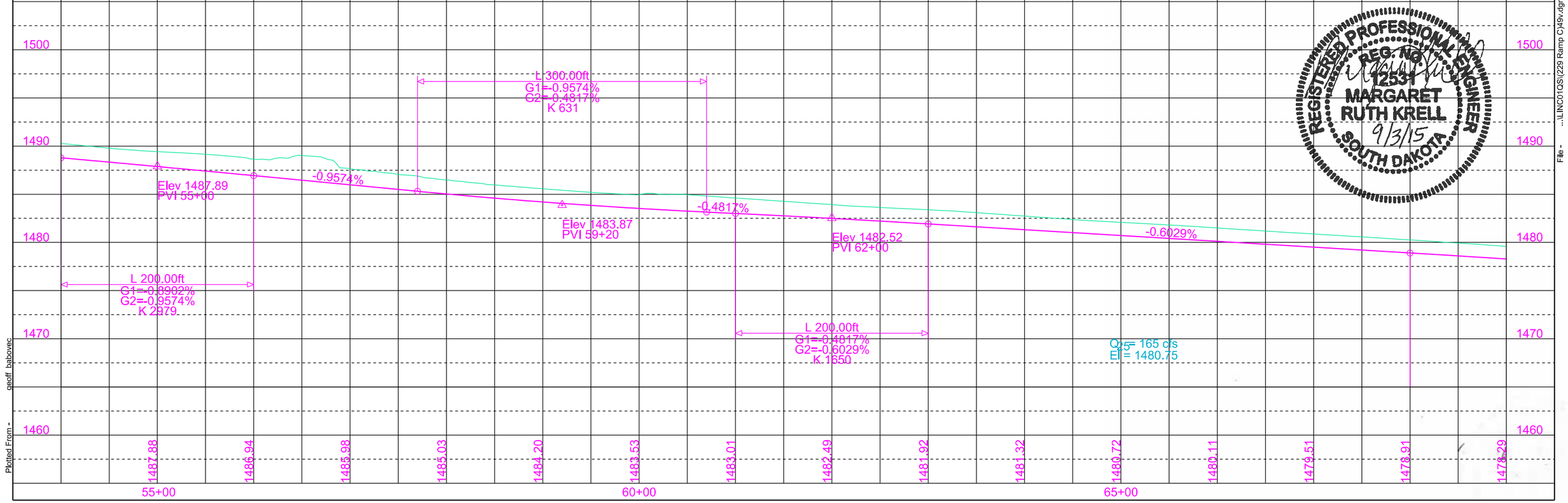
I229 Ramp C

64+00.00

Excavation	1181		
Undercut	3284		
	4465		

Embankment	0		
Select Subgrade Topping	2143		
+25%	536		2679
WASTE			1786
			4465

Waste is to be Stockpiled
at a Site Approved by the Engineer.



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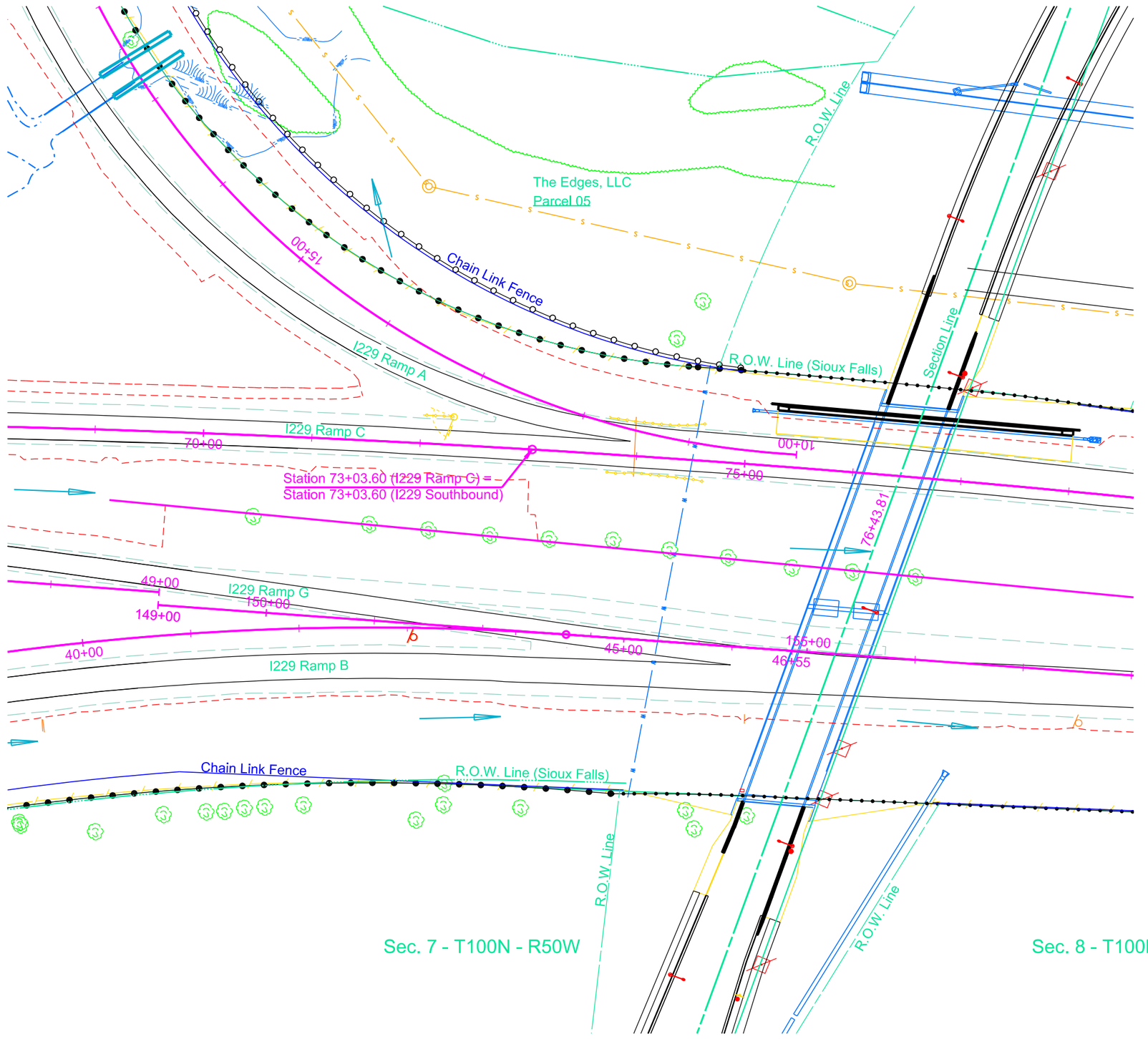
Plot Scale - 1:100
Plotted From - ceoff_babovec
Plot Name - 52
File - ...\LINC01GS\I229 Ramp C\49v.dgn

I229 Ramp C FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B70	B128

Plotting Date: 8/31/2015



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9/3/15
SOUTH DAKOTA

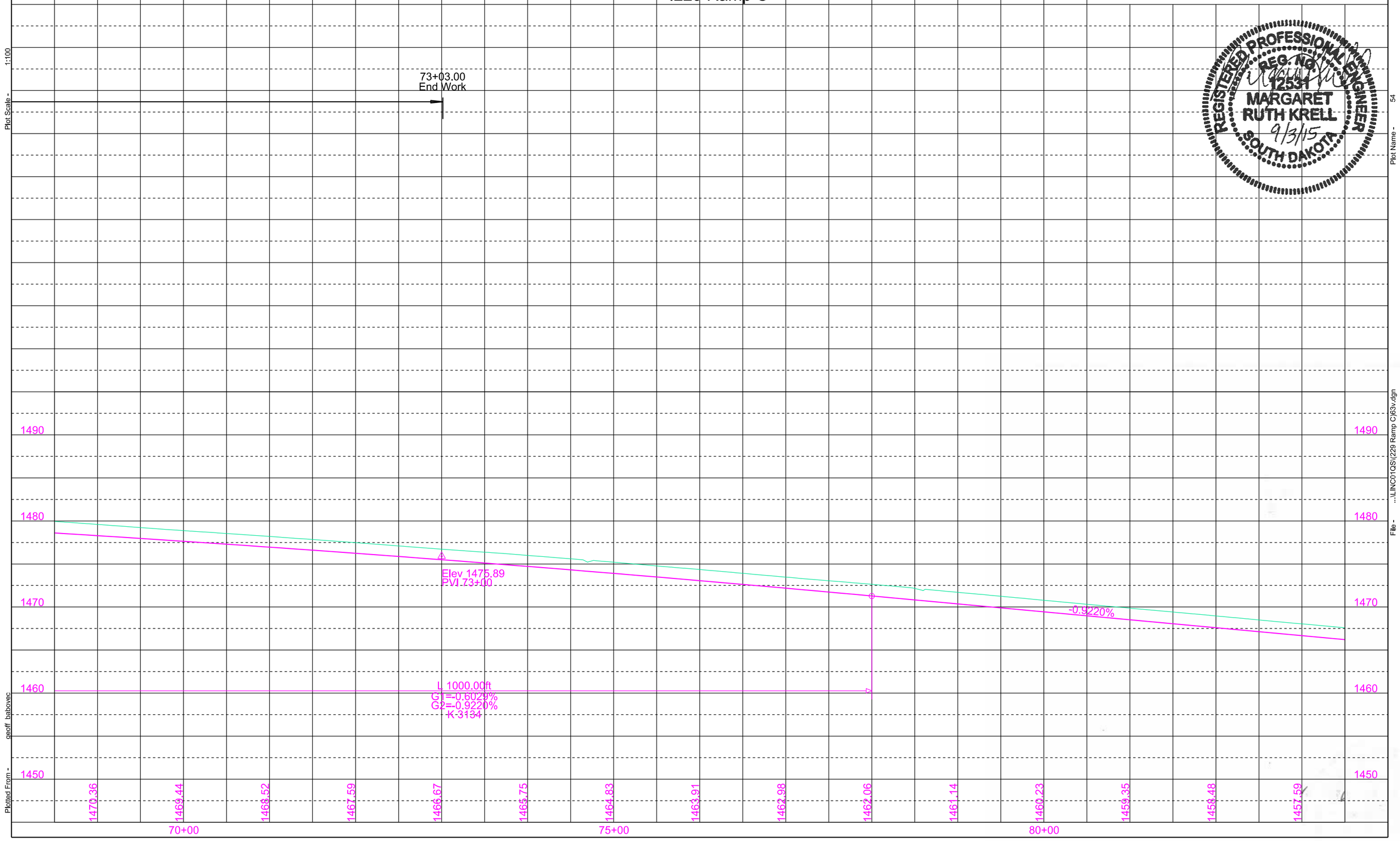
Plot Scale - 1:100
Plotted From - geoff_babovec
Plot Name - 53
File - ...\LINC01GS\I229 Ramp C\70.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B71	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp C



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9/3/15
SOUTH DAKOTA

Plot Scale - 1:100

Plotted From - ceoff_babovec

Plot Name - 54

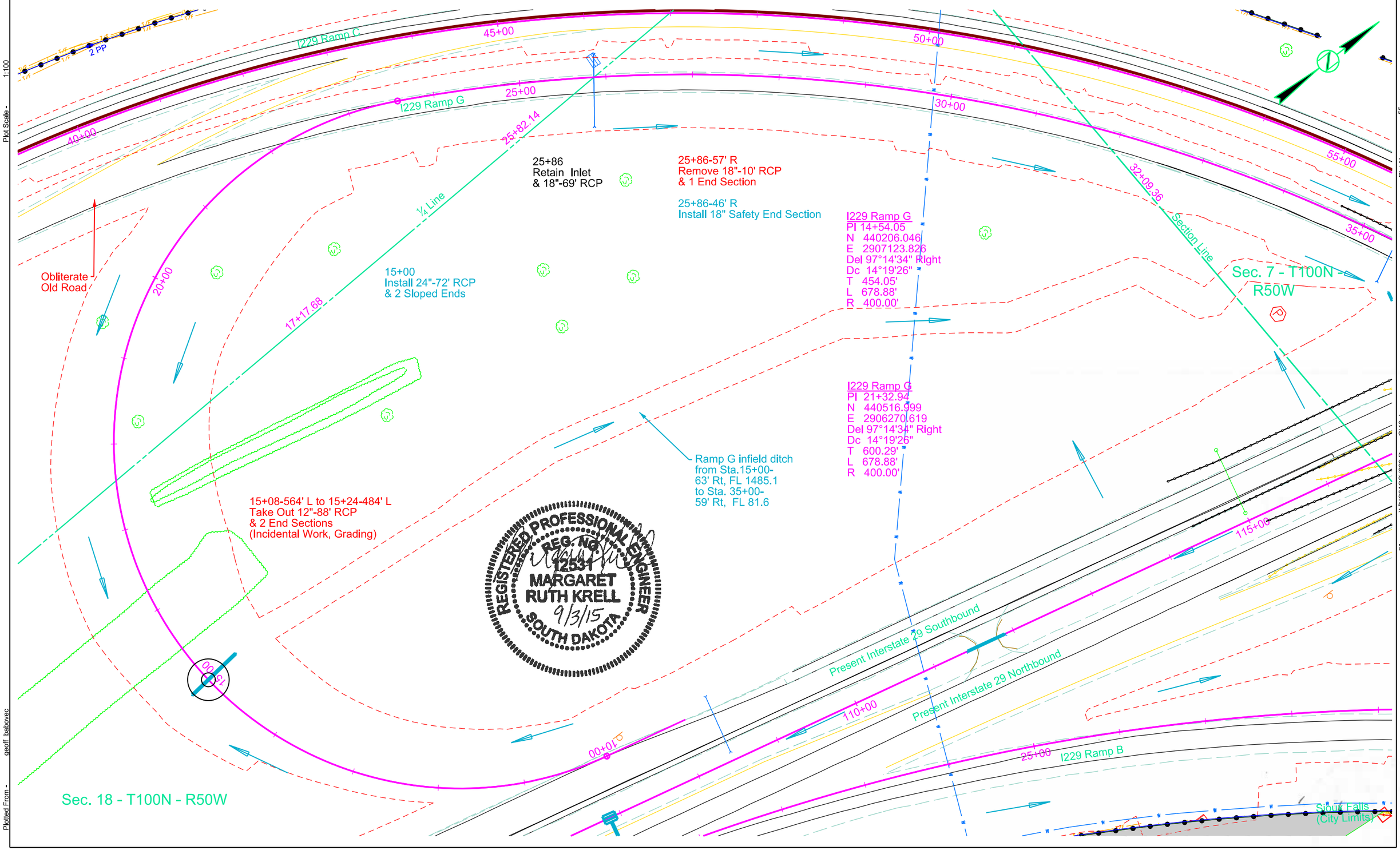
File - ...\LINC01GS\I229 Ramp C\63v.dgn

I229 Ramp G

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B72	B128

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plotted From - geoff_babovec

Plot Name - 55

File - ...\LINC01GS\I229 Ramp G\10.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B73	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp G

10+00.00
Begin Work

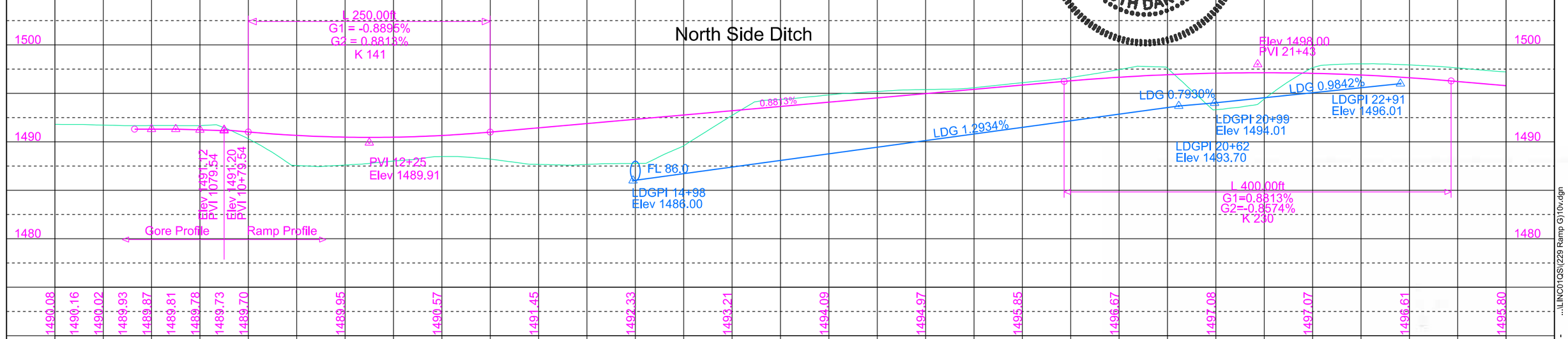
17+26.00

Excavation	6696			
Undercut	805			
	7501			
Embankment		3703		
+35%		1296	4999	
Select Subgrade Topping		1853		
+35%		649	2502	
			7501	

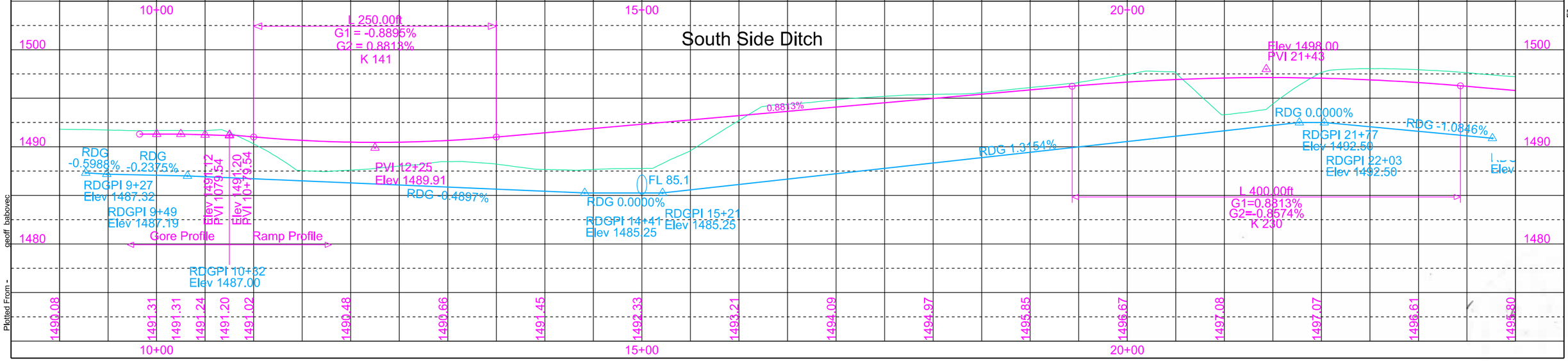
Excavation	17745			
Undercut	7464			
	25209			
Embankment		2171		
+35%		760	2931	
Select Subgrade Topping		5128		
+35%		1795	6923	
Waste			15355	
			25209	

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

North Side Ditch



South Side Ditch



Plot Scale - 1:100

Plot Name - 56

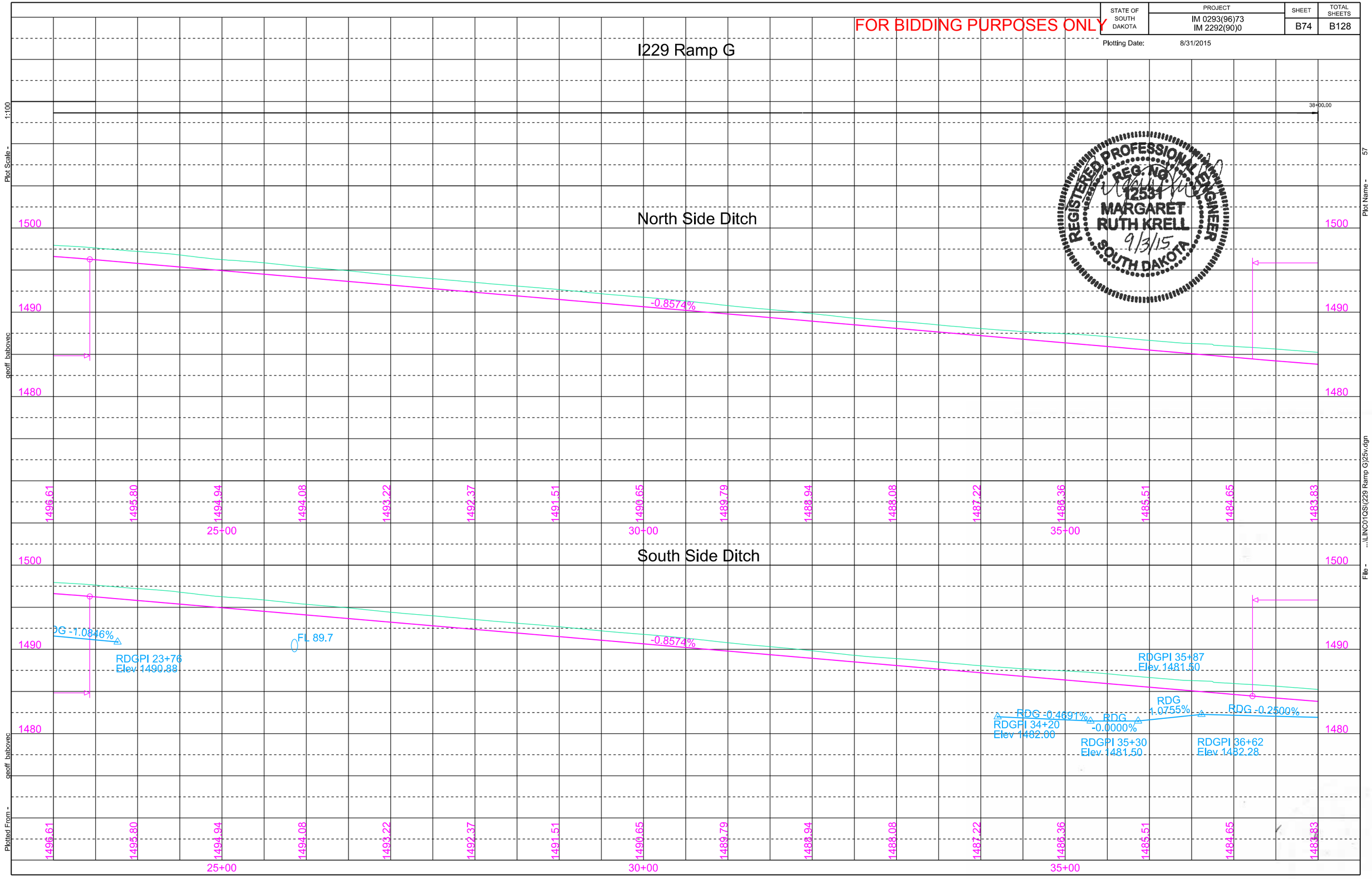
File - ...\LINC01QS\229 Ramp G\10v.dgn

Plotted From - ceoff babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B74	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015



Plot Scale - 1:100

Plot Name - 57

File - ...\LINC01GS\229 Ramp G\25v.dgn

Plotted From - geoff_babovec

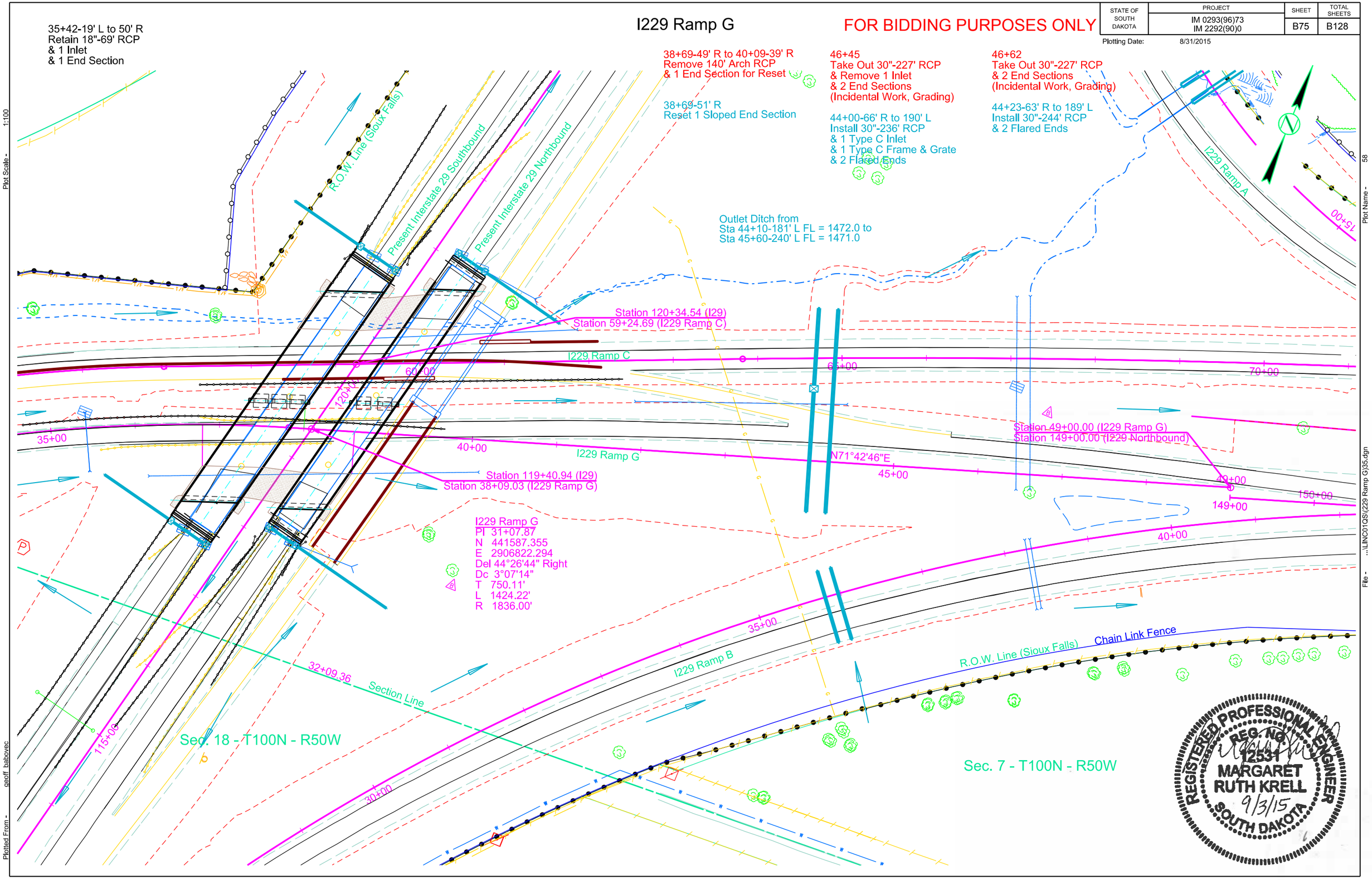
geoff_babovec

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B75	B128

Plotting Date: 8/31/2015

I229 Ramp G

FOR BIDDING PURPOSES ONLY



Plot Scale - 1:100

Plotted From - geoff_babovec

File - ...\LINC01GS\(229 Ramp G)35.dgn

Plot Name - 58

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B76	B128

FOR BIDDING PURPOSES ONLY

Plotting Date: 8/31/2015

I229 Ramp G

38+00.00 — 39+60.00 — 49+00.00 End Work

Excavation	23306			
Undercut	1240			
	24546			
Embankment		0		
Select Subgrade Topping		744		
+35%		261	1005	
Waste			23541	
			24546	

Excavation	11756			
Undercut	1191			
Muck	5009			
Option Borrow	25483			
	43439			
Embankment		24990		
+35%		8746	33736	
Select Subgrade Topping		2178		
+35%		763	2941	
Waste		5009		
+35%		1753	6762	
			43438	

Waste is Muck Excavation to be Disposed of at a Site Approved by the Engineer.

Out of Balance Excavation is to be Obtained as Follows and Will be Paid For Only Once as Unclassified Excavation:
25482 Cu Yd from I29 SB

North Side Ditch

L 500.00ft
G1=-0.8574%
G2=-0.2667%
K 846

LDGPI 38+74 Elev 1482.29
LDGPI 39+02 Elev 1482.05
LDGPI 40+16 Elev 1481.59
LDGPI 40+73 Elev 1481.00
LDGPI 41+19 Elev 1480.82
LDGPI 42+59 Elev 1480.00
LDGPI 41+70 Elev 1480.42
Top of Wall 79.0
Elev 1482.31 PVI 39+72
Elev 14 PVI 49+
LDG -0.8398% LDG -0.4037% LDG -1.0370% LDG -0.3973% LDG -0.7738% LDG -0.4704% -0.2667%
FL 73.2 FL 73.5
Q25 = 165 cfs
EI = 1480.75

South Side Ditch

L 500.00ft
G1=-0.8574%
G2=-0.2667%
K 846

LDG -0.2500% RDG -2.6243% RDG -2.1120% RDG -0.6205% RDG 0.4974% RDG 1.7844% RDG 1.6138% -0.2667%
36+62 32.28
RDGPI 38+24 Elev 1481.88
RDGPI 39+51 Elev 1478.50
Elev 1482.31 PVI 39+72
RDGPI 41+04 Elev 1475.25
RDGPI 44+18 Elev 1473.30
RDGPI 45+57 Elev 1474.00
RDGPI 46+96 Elev 1476.50
RDGPI 48+64 Elev 1479.23
Elev 1479.84 PVI 49+00
FL 72.0 FL 72.1

1490 1480 1470

1484.65 1483.83 1483.12 1482.53 1482.06 1481.71 1481.44 1481.17 1480.91 1480.64 1480.37 1480.11 1479.84

40+00 45+00 50+00

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:100
Plot Name - 59
File - ...\LINC01GS\I229 Ramp G\40v.dgn
Plotted From - geoff_babovec
geoff_babovec

GUARDRAIL LAYOUT

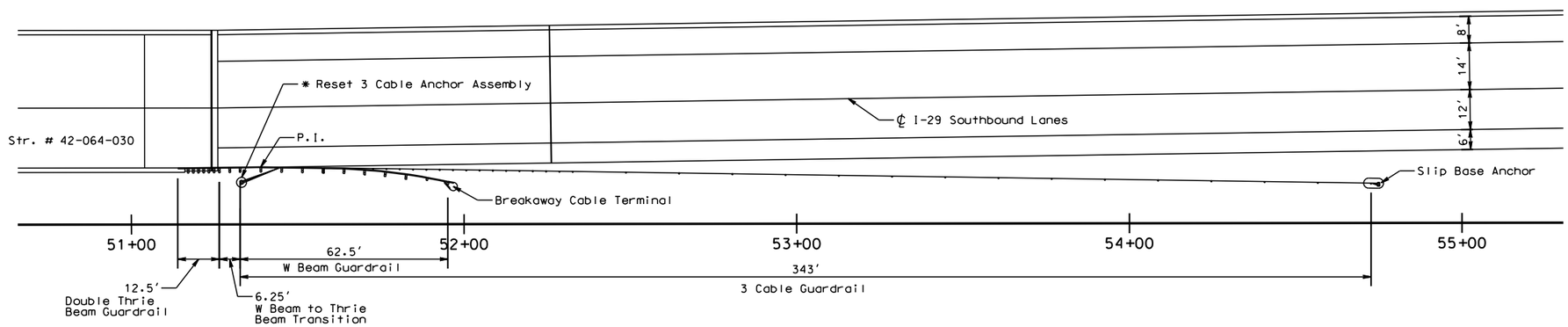
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		B77	B128

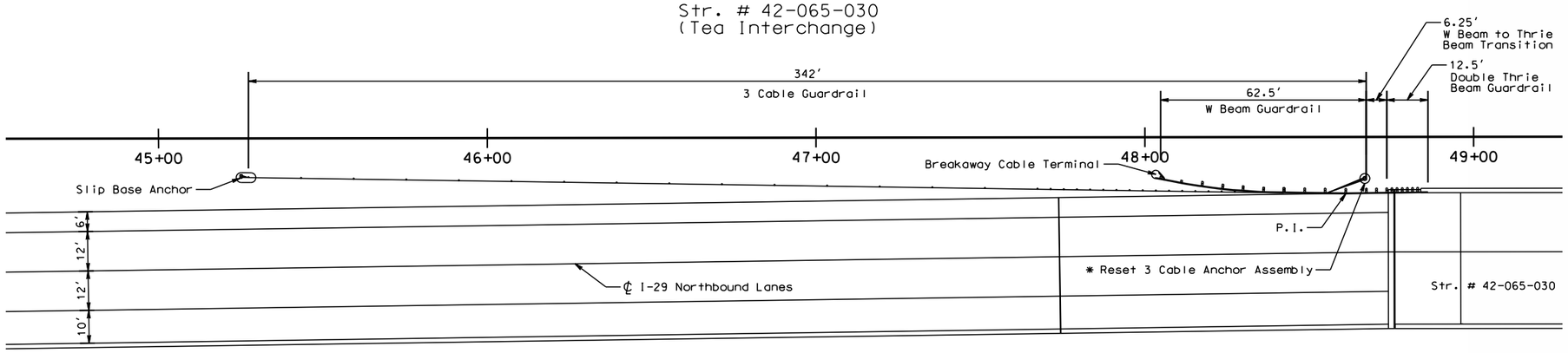
Plotting Date: 08/17/2015

Scale 1 Inch = 40 Feet

Str. # 42-064-030
(Tea Interchange)



Str. # 42-065-030
(Tea Interchange)



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

* Concrete Anchor will remain in place, only hardware will be removed and reset.

PLOT SCALE - 1:40

PLOT NAME - 1

FILE - ...\MS\PRJXLINC01GS\GUARDRAIL.DGN

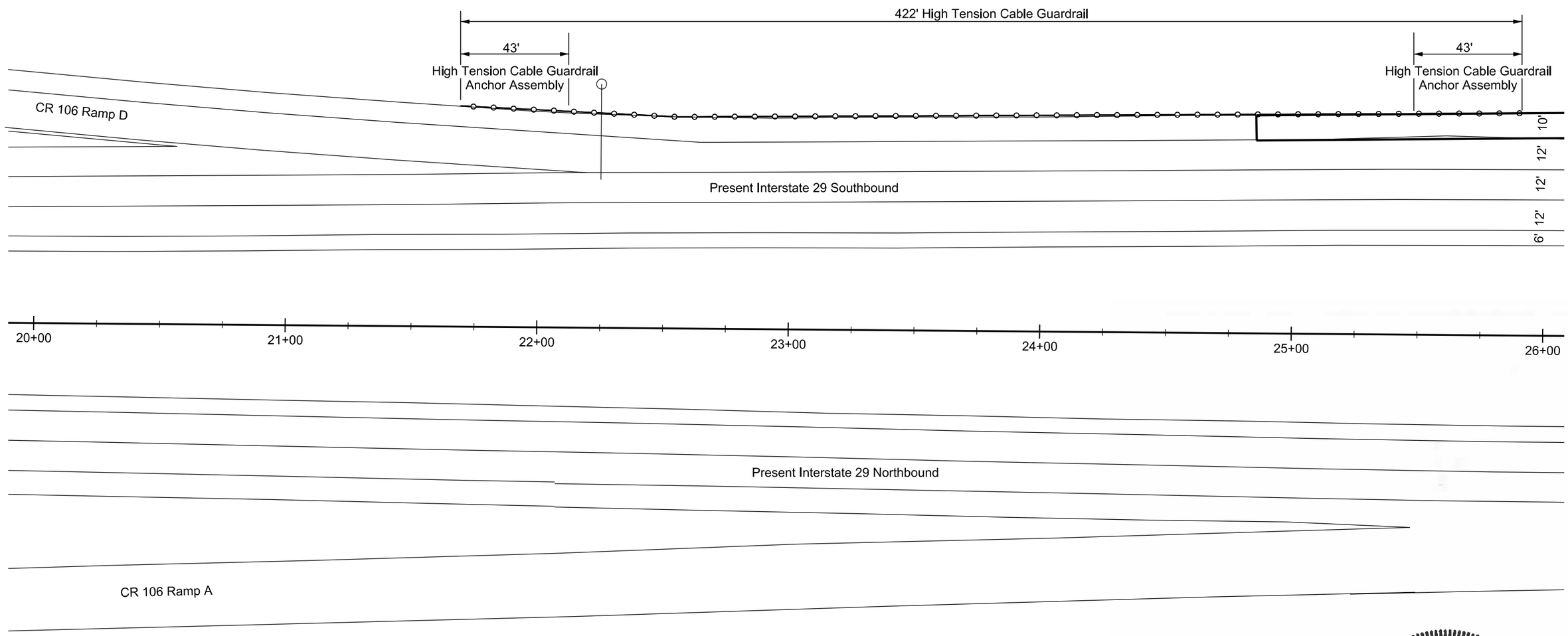
PLOTTED FROM - TRPR16032

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B78	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plotted From - geoff babovec

Plot Scale - 1:40

Plot Name - 60

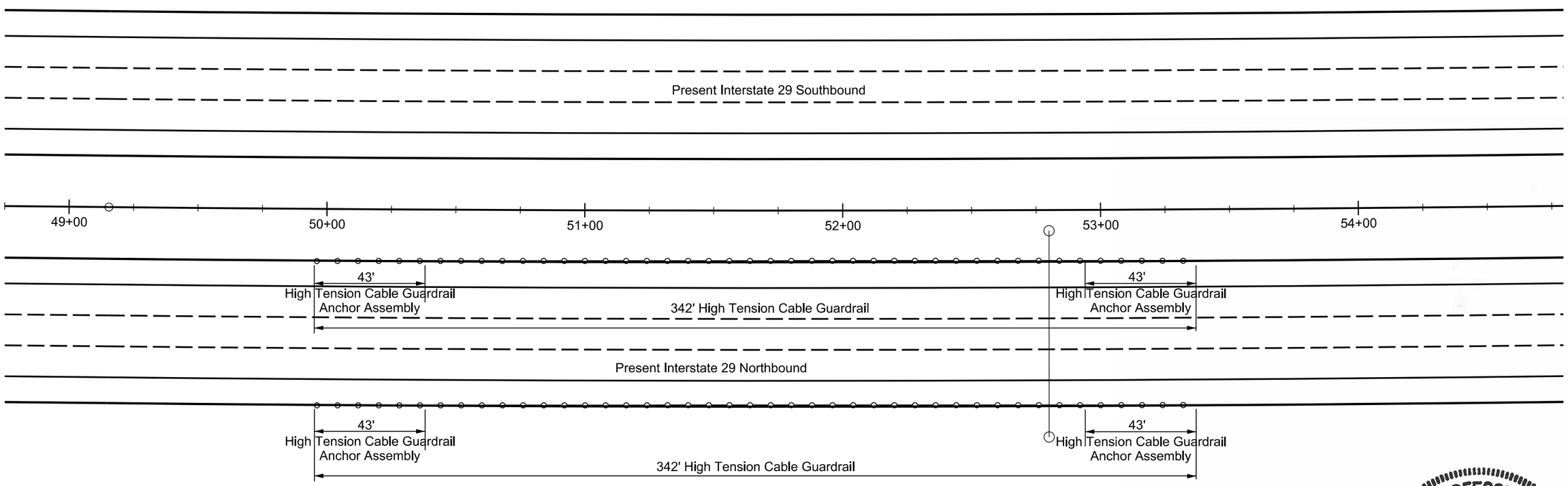
File - ...\rdprj\LINC01QS\020gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B79	B128

Plotting Date: 8/31/2015



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

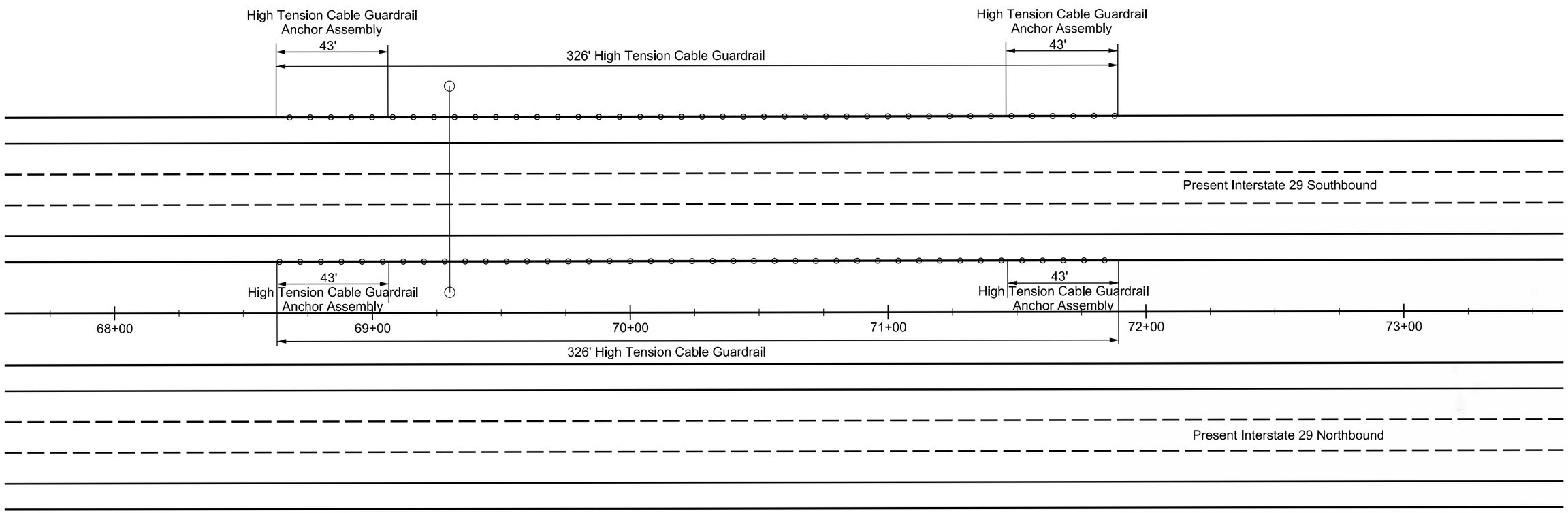
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 61
File - ...\rd\prj\LINC01QS\049gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B80	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

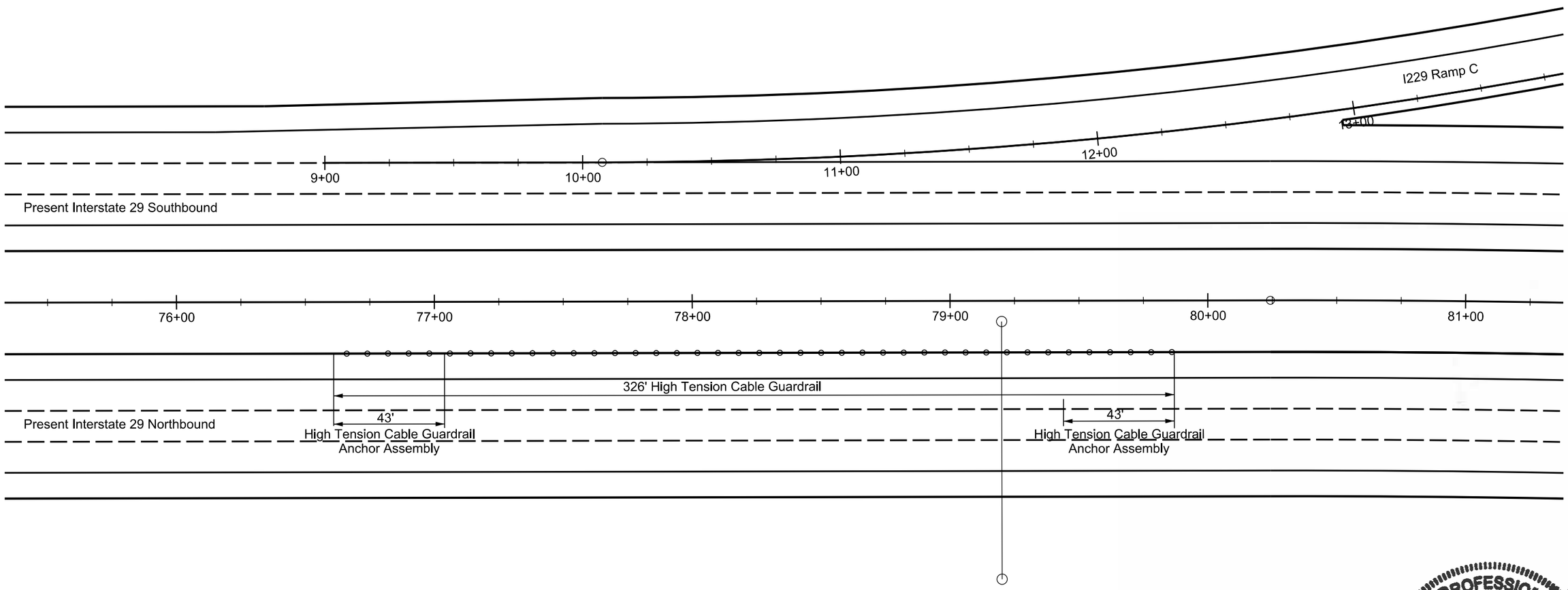
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 62
File - ...\rd\prj\LINC01QS\068gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B81	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

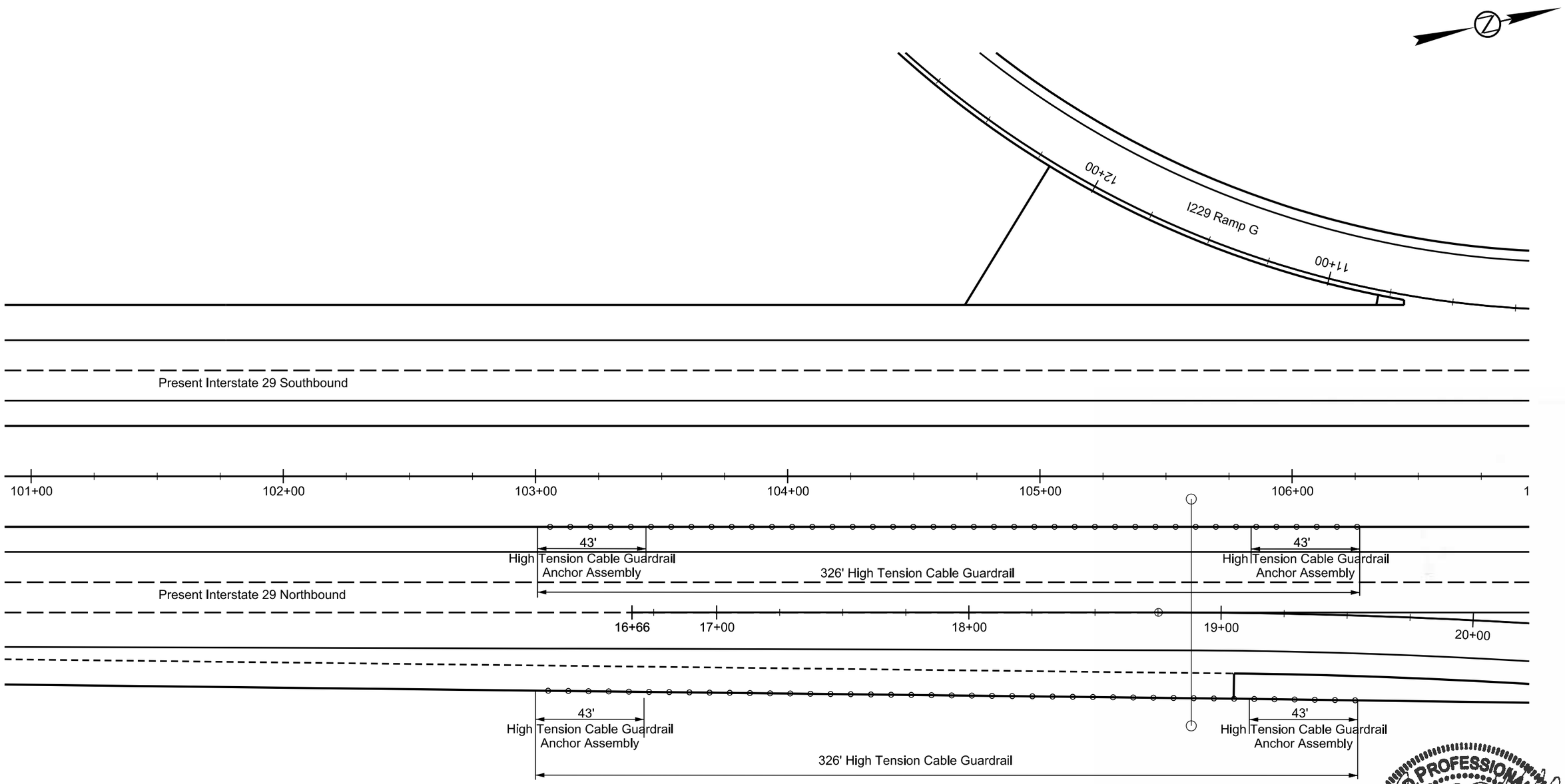
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 63
File - ...\rd\prj\LINC01QS\075gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B82	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

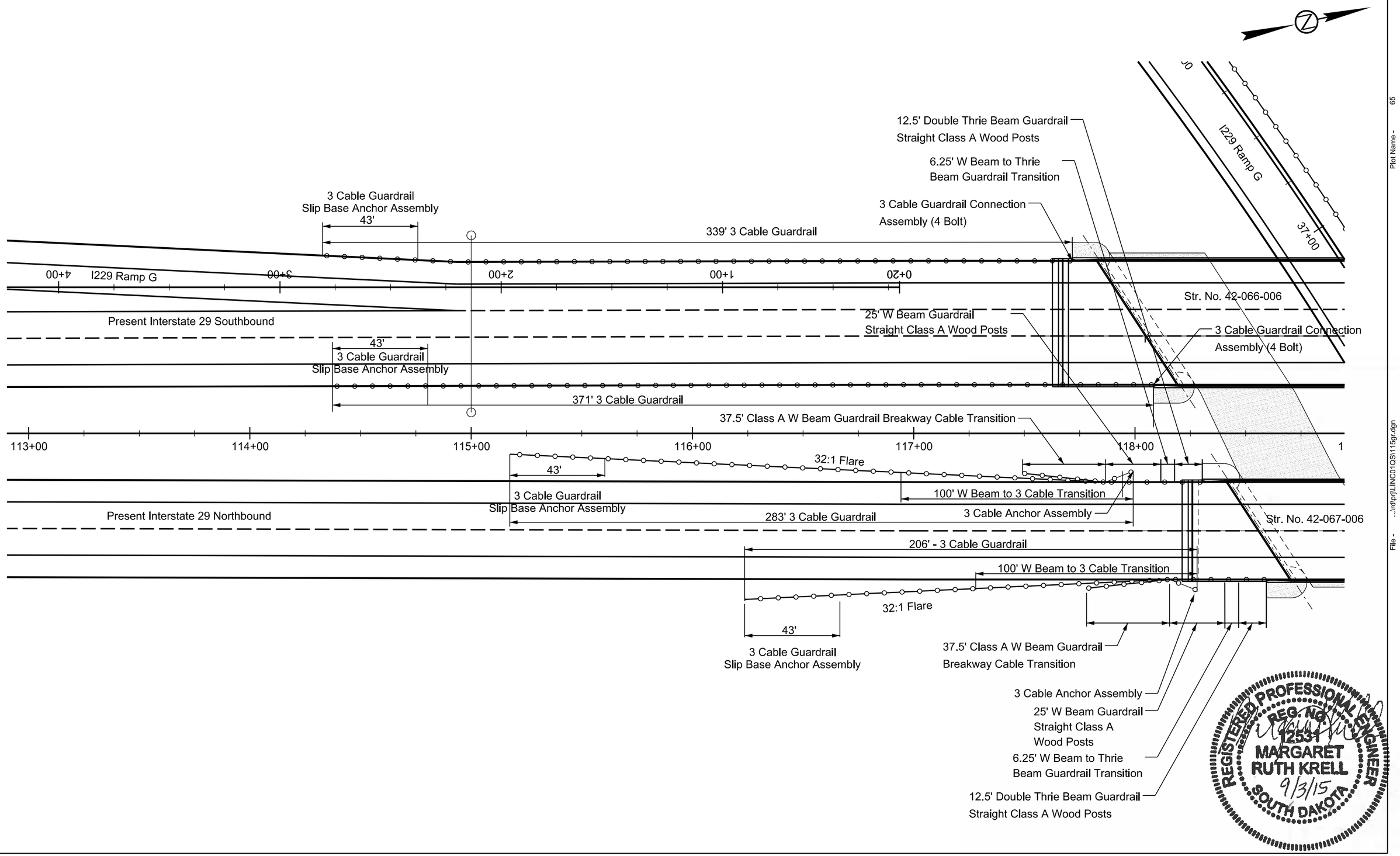
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 64
File - ...\rdprj\LINC01QS\101gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B83	B128

Plotting Date: 8/31/2015



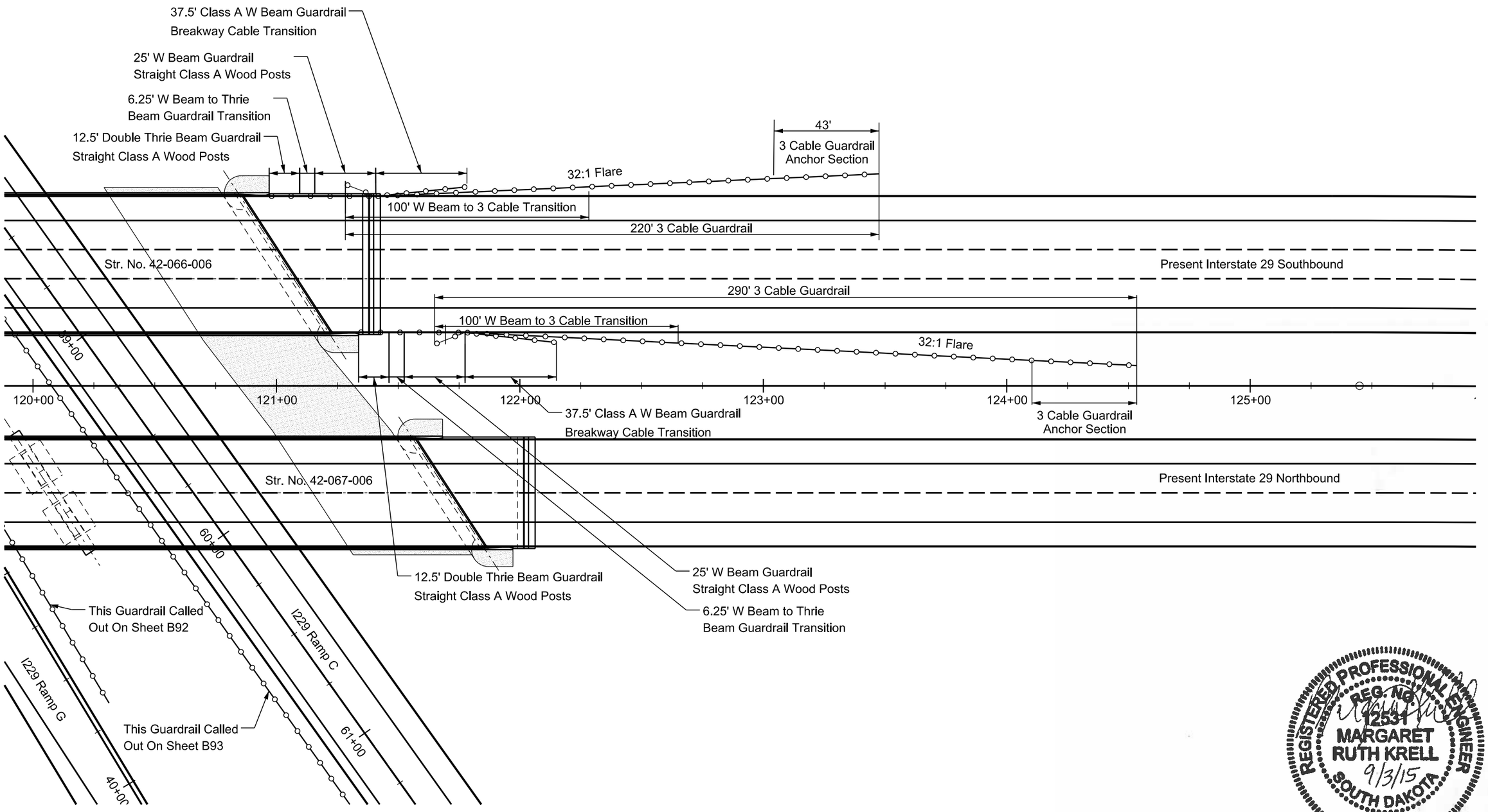
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 65
File - ...\rdtprj\LINC01QS\115gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B84	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

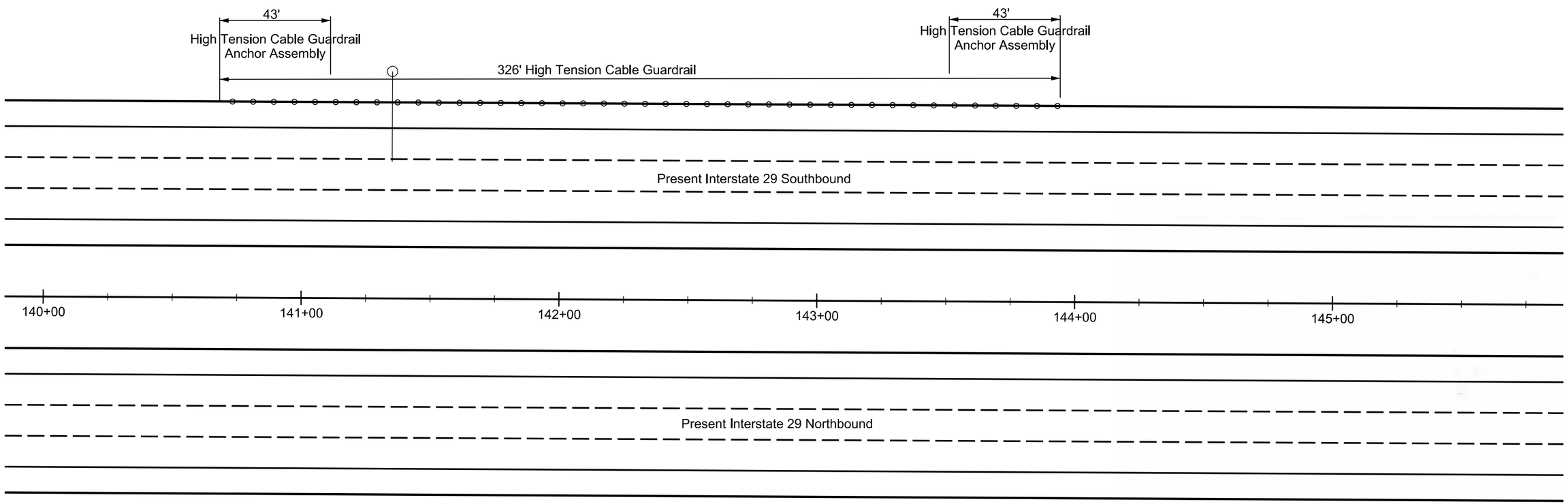
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 66
File - ...\rd\prj\LINC01GS\120gr.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B85	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

GUARDRAIL LAYOUT



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

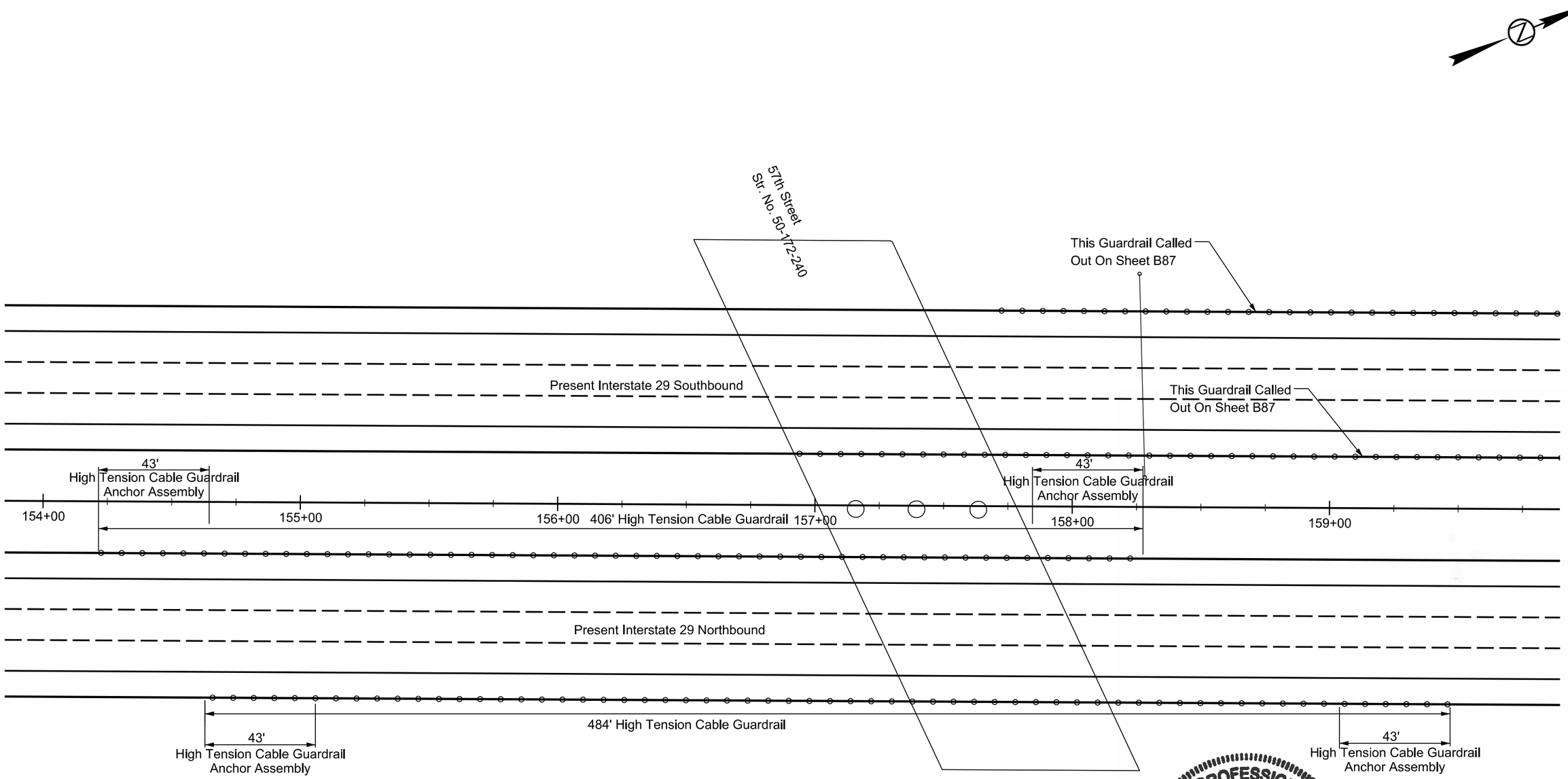
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 67
File - ...\rd\prj\LINC01QS\140gr.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B86	B128

Plotting Date: 8/31/2015

FOR BIDDING PURPOSES ONLY

GUARDRAIL LAYOUT



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

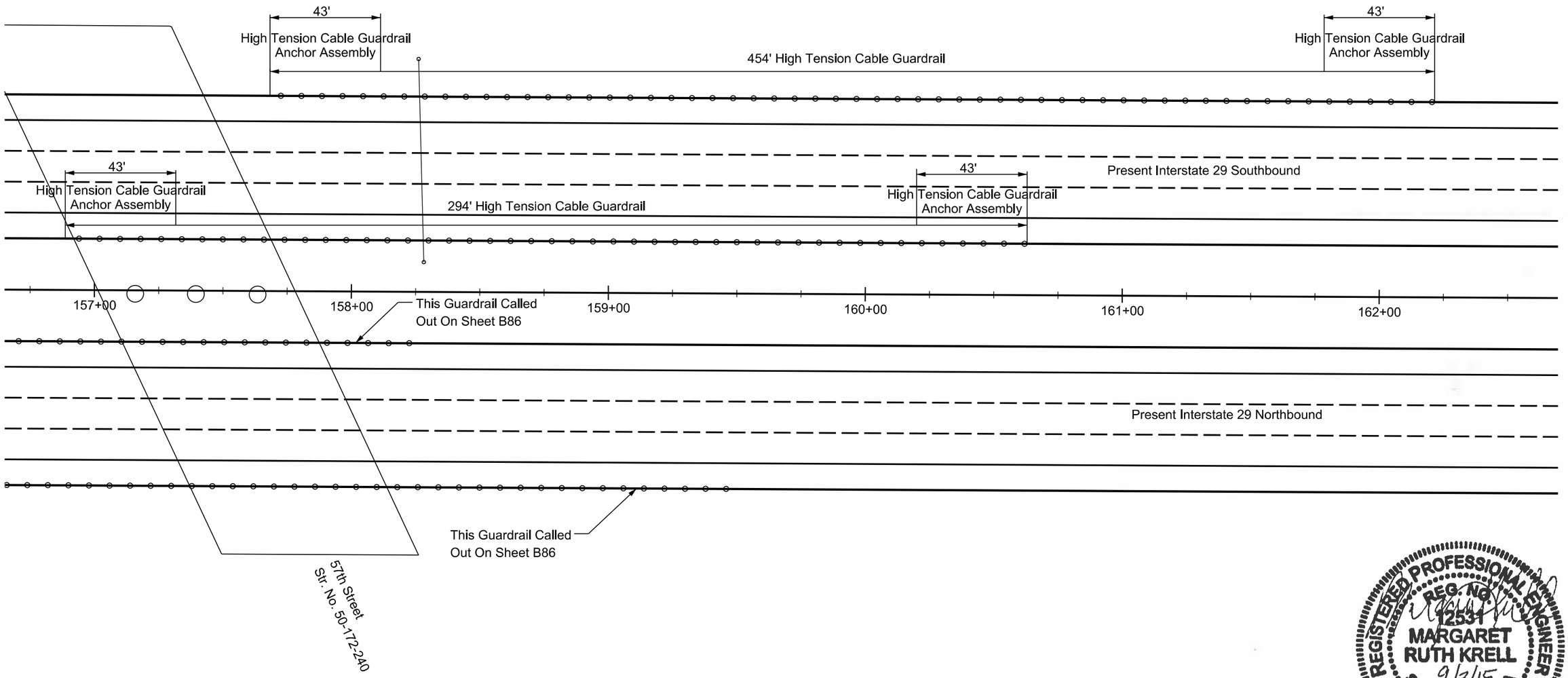
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 68
File - ...\rd\prj\LINC01QS\154gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B87	B128

Plotting Date: 8/31/2015



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

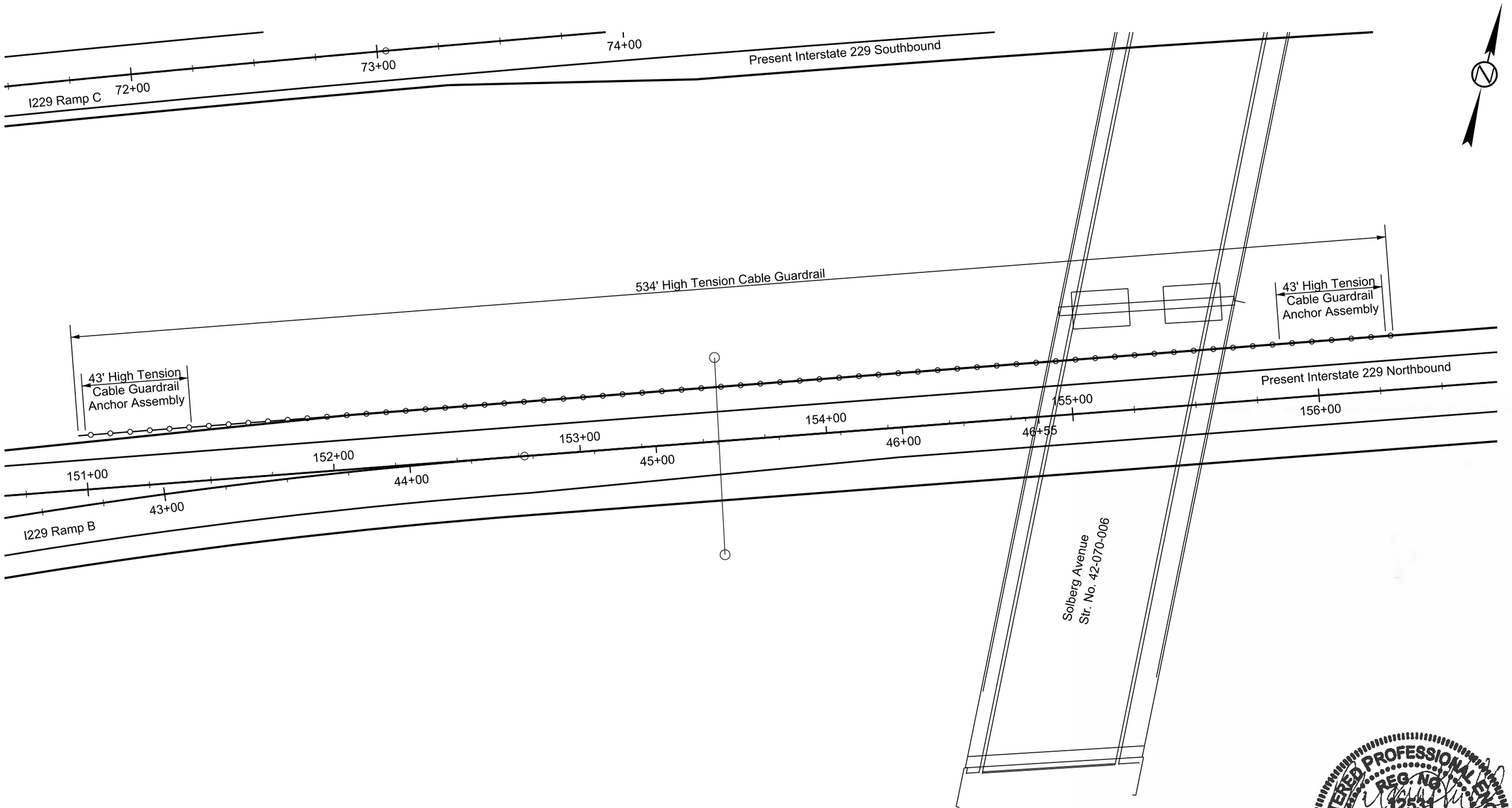
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 69
File - ...\rd\prj\LINC01QS\157gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B88	B128

Plotting Date: 8/31/2015



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REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

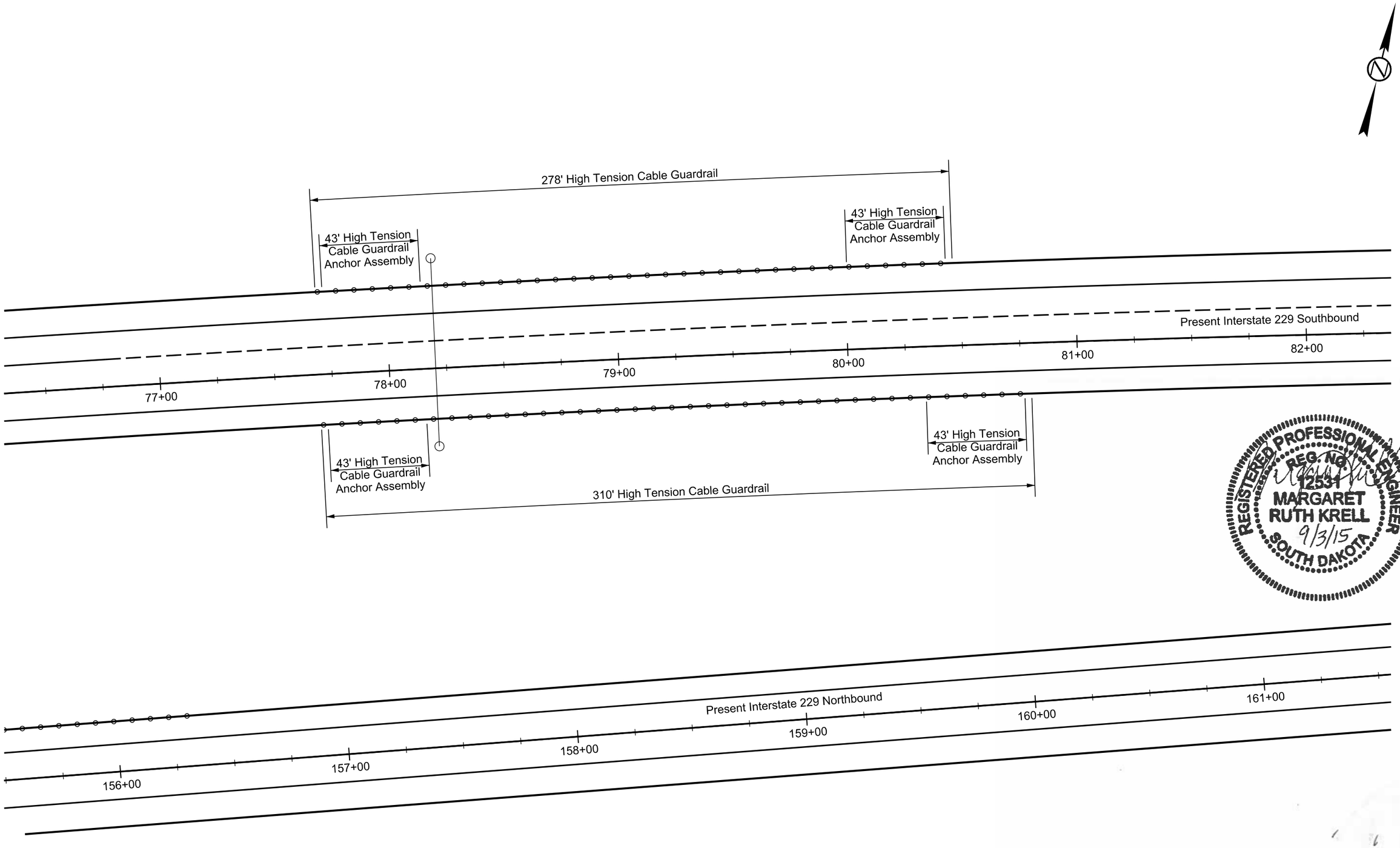
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 70
File - ...\rd\prj\LINC01QS\(229)151gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B89	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

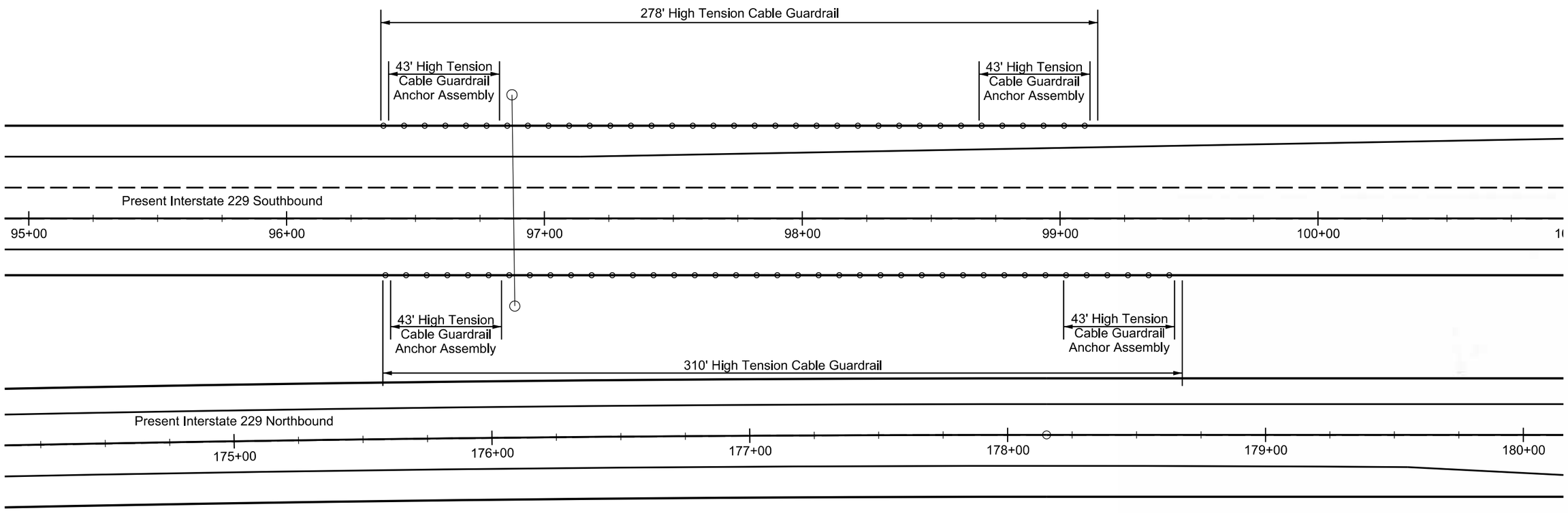
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 71
File - ...\rdtprj\LINC01QS\(229)077gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B90	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

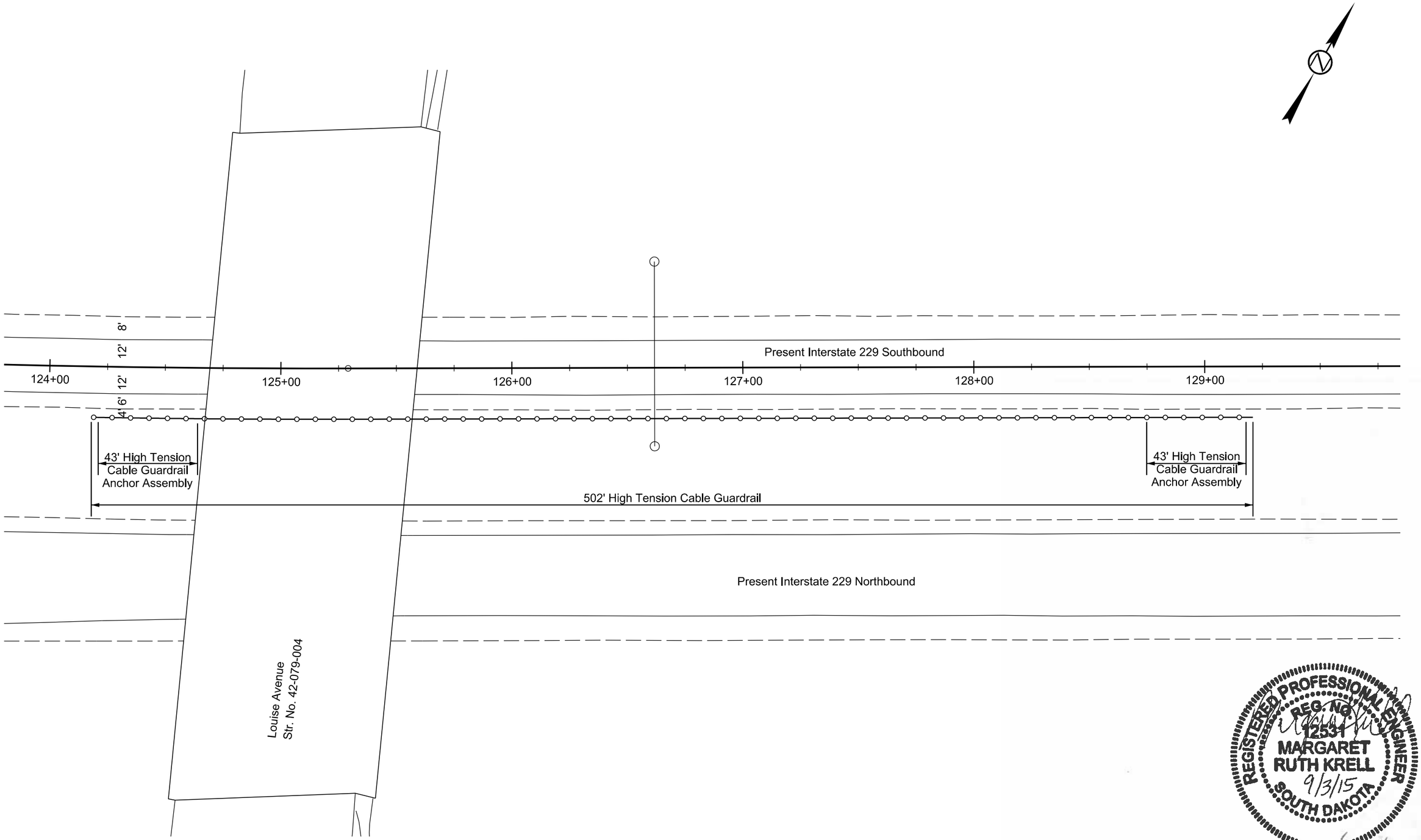
Plot Scale - 1:40
Plotted From - geoff_babovec
File - ...\rd\prj\LINC01GS\(229)095gr.dgn
Plot Name - 72

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B91	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

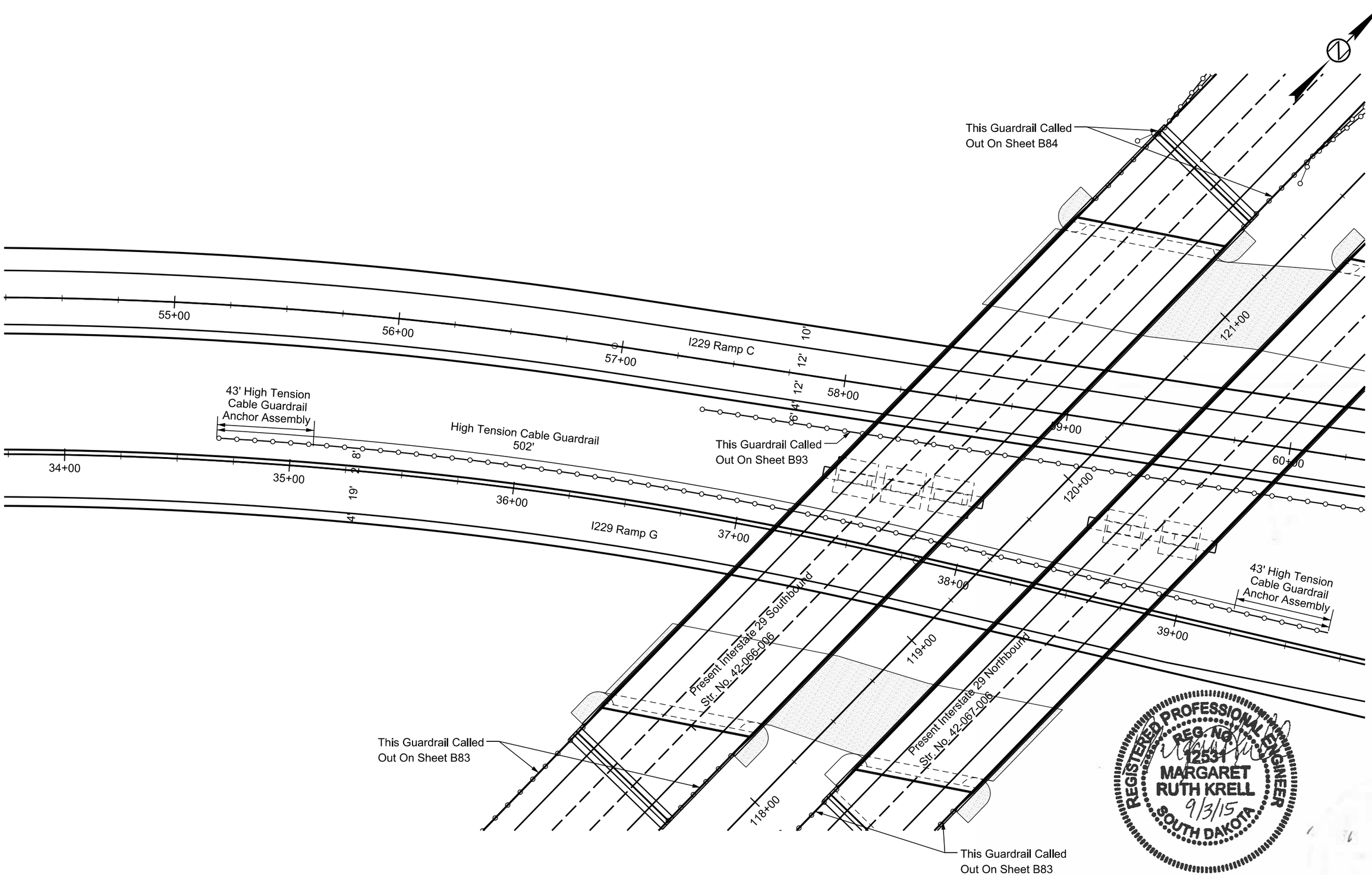
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 73
File - ...\rdpr\LINC01GS\(229)125gr.dgn

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B92	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. No.
12531
MARGARET
RUTH KRELL
9/3/15
SOUTH DAKOTA

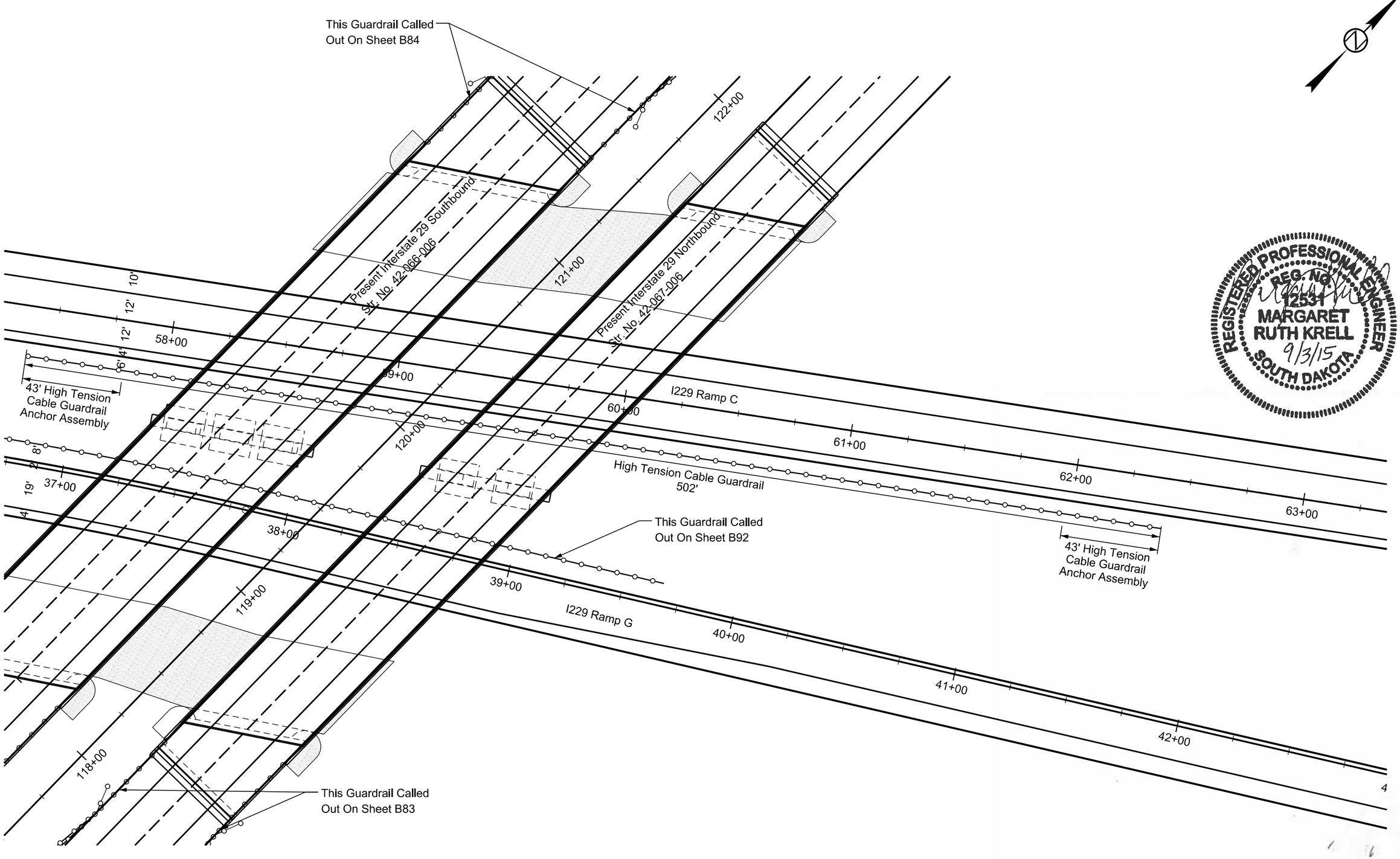
Plot Scale - 1:40
Plotted From - geoff_babovec
File - ...\LINC01GS\I229 Ramp G\35gr.dgn
Plot Name - 74

GUARDRAIL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B93	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
12531
MARGARET
RUTH KRELL
9/3/15
SOUTH DAKOTA

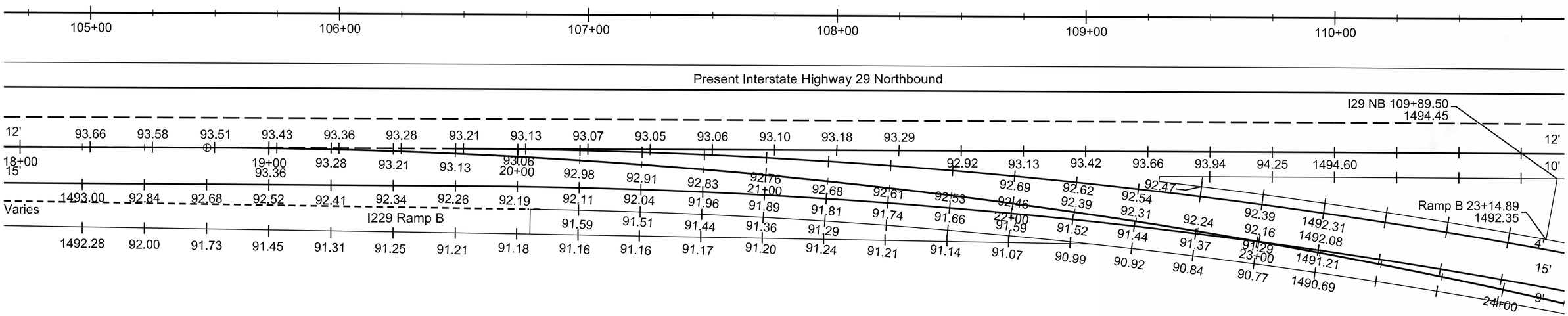
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 75
File - ...\LINC01GS\I229 Ramp C\55gr.dgn

RAMP GORE LAYOUT
I29 / I229 Ramp B

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B94	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

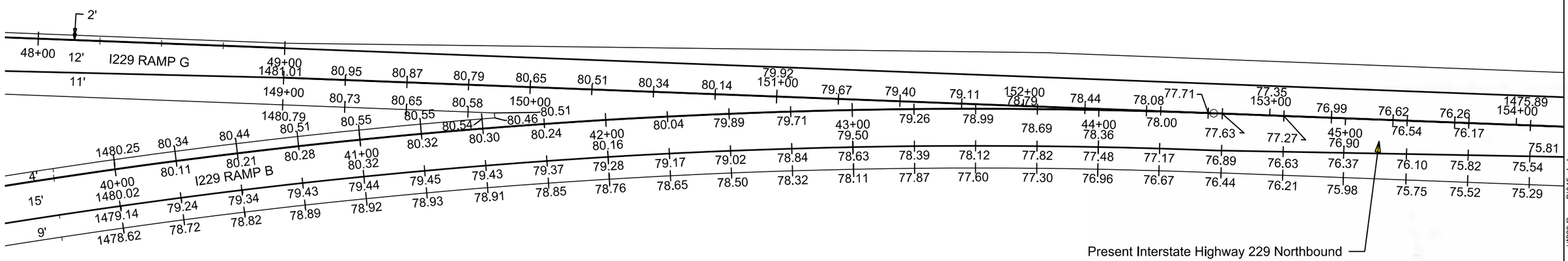
Plot Scale - 1:40
Plot Name - 76
File - ...\I229 Ramp B\010rgb.dgn
Plotted From - geoff babovec

RAMP GORE LAYOUT
I229 NB / I229 Ramp B / I229 Ramp G

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B95	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

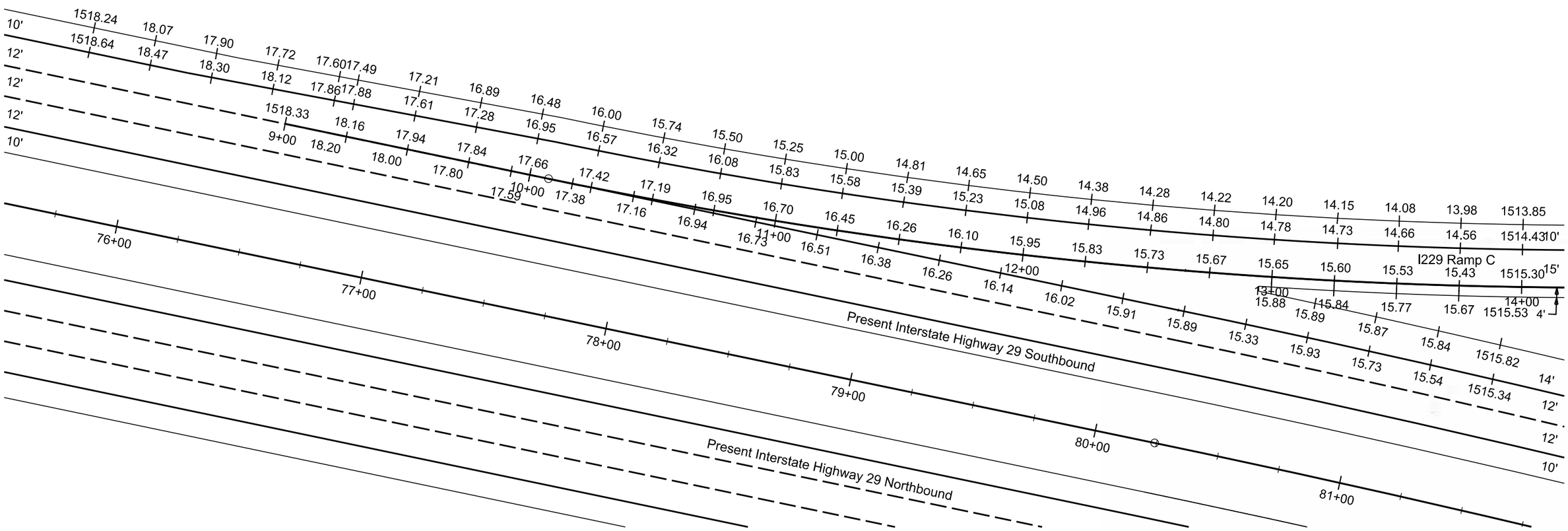
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 77
File - ...\I229 Ramp B\045rgb.dgn

RAMP GORE LAYOUT
I29 / I229 Ramp C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B96	B128

Plotting Date: 8/31/2015



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 78
File - ...\I229 Ramp C\I010rgc.dgn

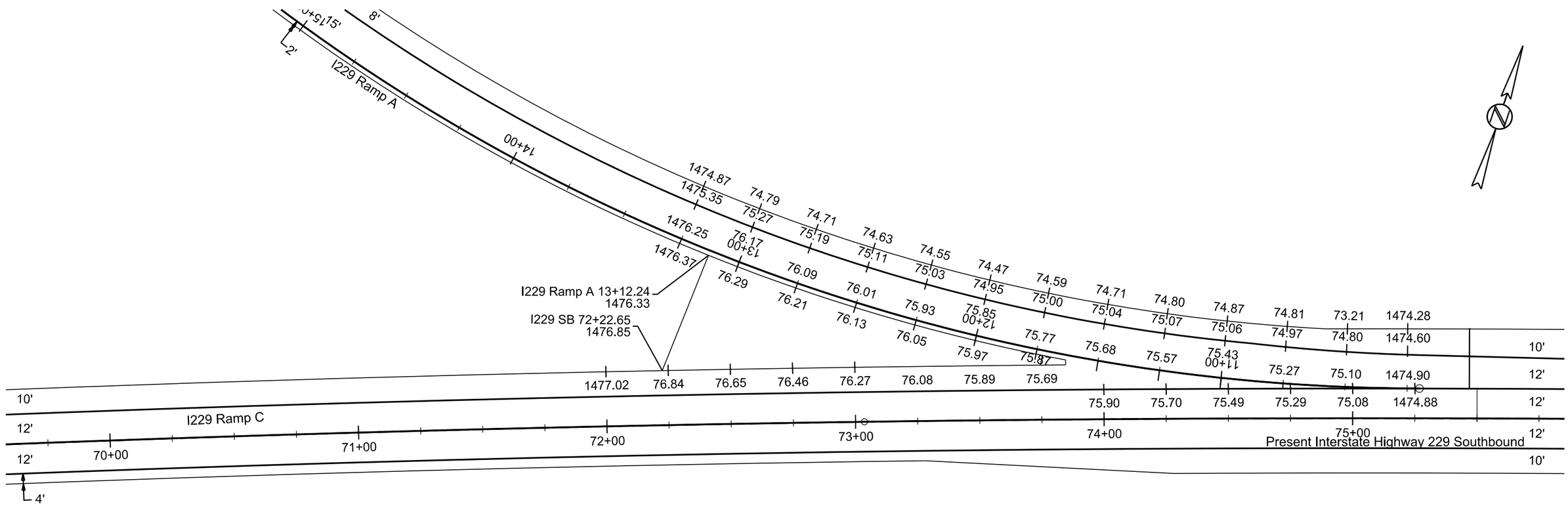
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B97	B128

Plotting Date: 8/31/2015

RAMP GORE LAYOUT

I229 SB / I229 Ramp C / I229 Ramp A

FOR BIDDING PURPOSES ONLY



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

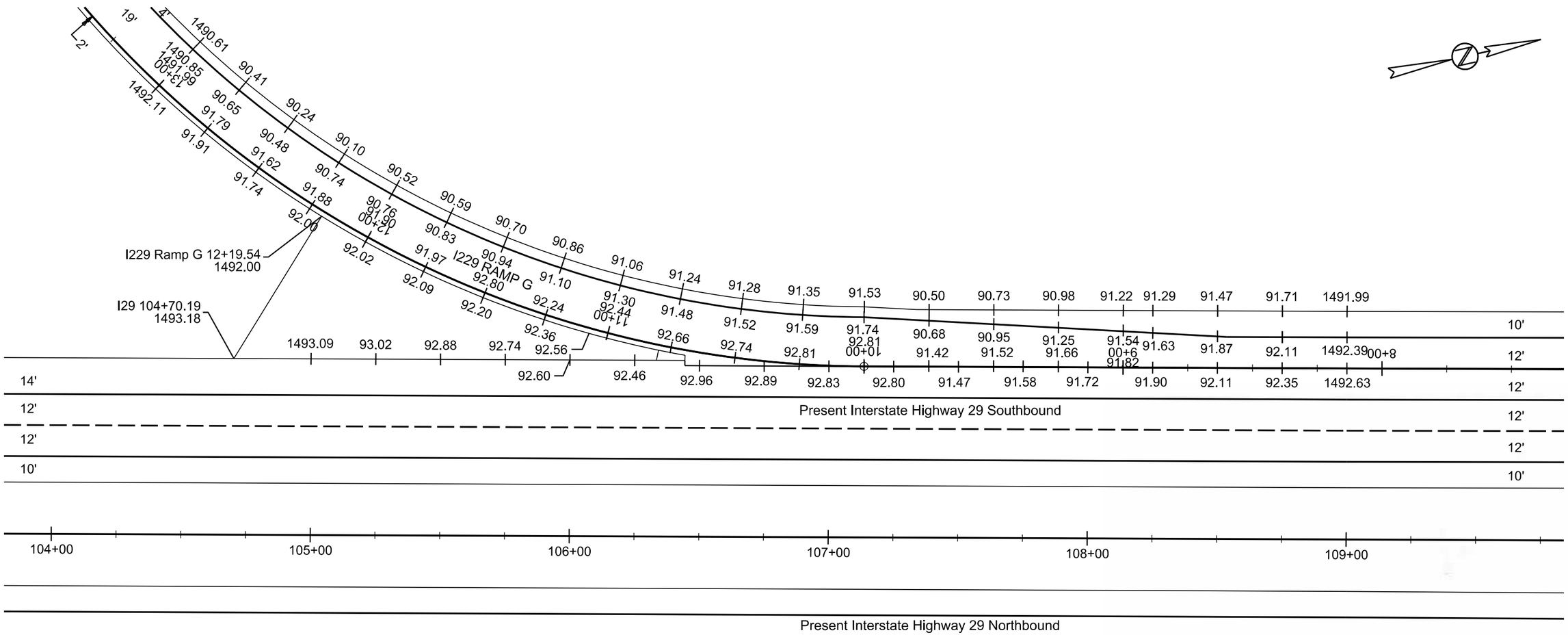
Plot Scale - 1:40
Plotted From - geoff babovec
Plot Name - 79
File - ...\I229 Ramp C\120rga.dgn

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B98	B128

Plotting Date: 8/31/2015

RAMP GORE LAYOUT
I29 / I229 Ramp G



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

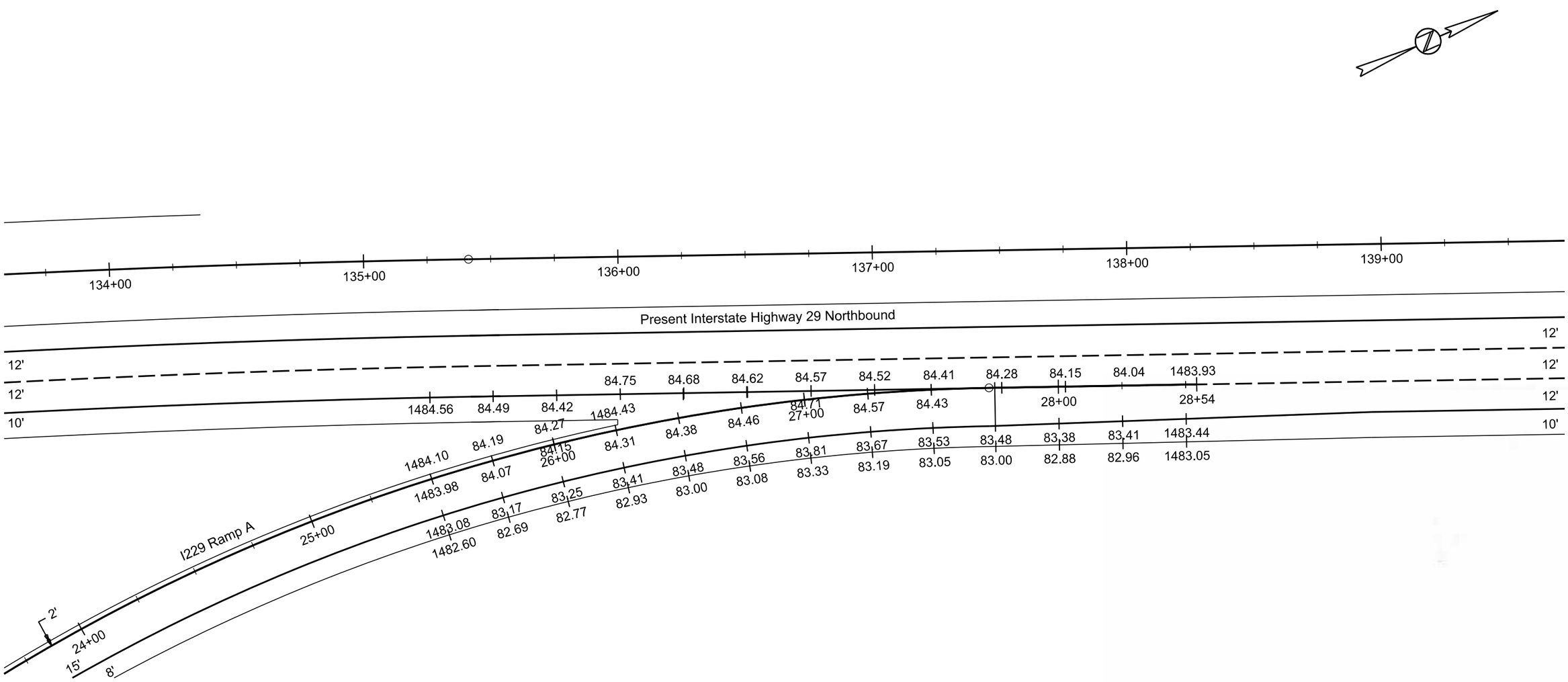
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 80
File - ...\I229 Ramp G\010rgg.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0293(96)73 IM 2292(90)0	B99	B128

Plotting Date: 8/31/2015

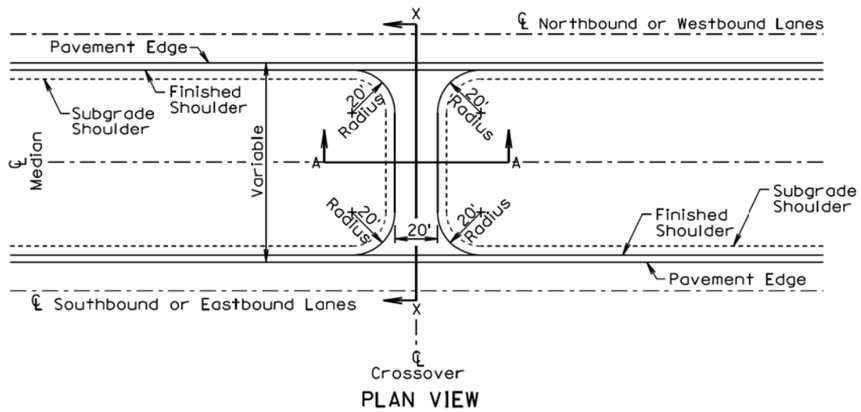
RAMP GORE LAYOUT
I29 NB / I229 Ramp A

FOR BIDDING PURPOSES ONLY

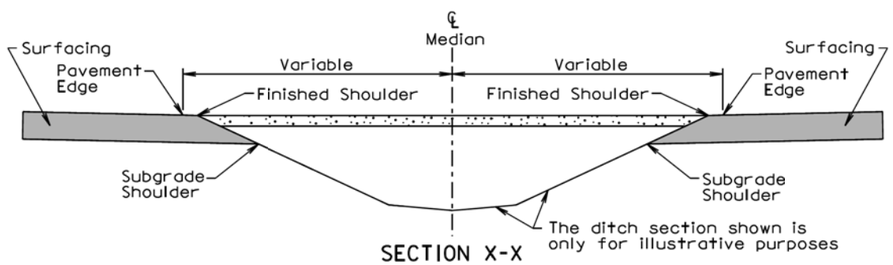


REGISTERED PROFESSIONAL ENGINEER
REG. NO. 12531
MARGARET RUTH KRELL
9/3/15
SOUTH DAKOTA

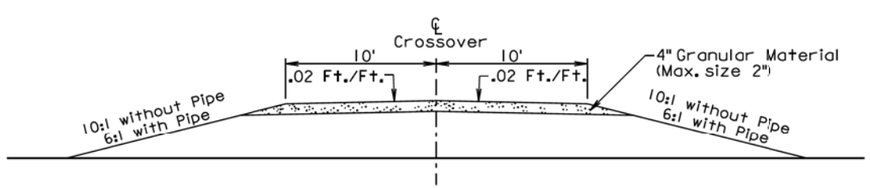
Plot Scale - 1:40
Plotted From - geoff_babovec
Plot Name - 81
File - ...\(I229 Ramp A)135rga.dgn



PLAN VIEW



SECTION X-X



SECTION A-A

GENERAL NOTES:

The inslopes of the maintenance crossovers shall be 6:1 when there is a pipe, 10:1 without pipe, or as specified in the plans.

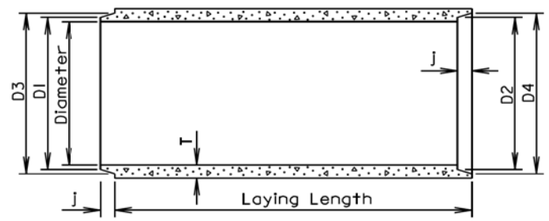
The quantities of materials necessary for construction of the maintenance crossovers are as provided in the plans and shall be paid for at their respective contract unit prices for the various materials used.

February 14, 2011

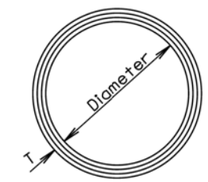
Published Date: 2nd Qtr. 2015 | SDDOT | **STANDARD MAINTENANCE CROSSOVER FOR INTERSTATE HIGHWAYS** | PLATE NUMBER 120.04 | Sheet 1 of 1

TOLERANCES IN DIMENSIONS

Diameter: ±1.5% for 24" Dia. or less and ±1% or 3/8" whichever is more for 27" Dia. or greater.
Diameters at Joints: ±3/16" for 30" Dia. or less and ±1/4" for 36" or greater.
Length of joint (j): ±1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

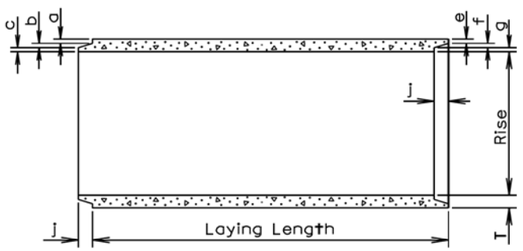
Construction of R. C. P. shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

Not more than 2 four foot sections shall be permitted near the ends of any culvert. Four foot lengths shall be used only to secure the required length of culvert.

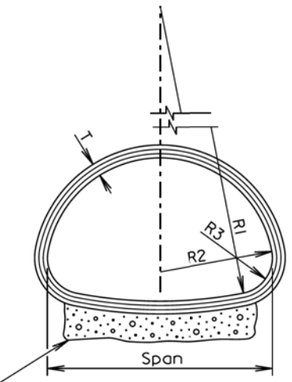
Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 7/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

March 31, 2000

Published Date: 2nd Qtr. 2015 | SDDOT | **REINFORCED CONCRETE PIPE** | PLATE NUMBER 450.01 | Sheet 1 of 1



LONGITUDINAL SECTION



END VIEW

TOLERANCES IN DIMENSIONS

Radial dimensions at joints: ±1/8 " for 65" span or less and ±1/4 " for longer spans.
Rise and Span: ±2% of tabular values.
Length of Joint (J): ±1/4 ".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".

Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements for gravel surfacing except material may be screened or may be plan provided material.

* Size (in.)	Approx. Wt./Ft. (lb.)	Rise (in.)	Span (in.)	T (in.)	a (in.)	b (in.)	c (in.)	j (in.)	e (in.)	f (in.)	g (in.)	R1 (in.)	R2 (in.)	R3 (in.)
18	170	13 1/2	22	2 1/2	1 3/8	3/8	3/4	2	1 1/8	3/8	1	27 1/2	13 3/4	5 1/4
24	320	18	28 1/2	3 1/2	1 5/8	1/2	1 3/8	3	1 3/8	1/2	1 5/8	40 11/16	14 3/4	4 5/8
30	450	22 1/2	36 1/4	4	1 13/16	5/8	1 9/16	3 1/2	1 9/16	5/8	1 13/16	51	18 3/4	6 1/8
36	600	26 5/8	43 3/4	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	62	22 1/2	6 1/2
42	740	31 5/16	51 1/8	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	73	26 1/4	7 3/4
48	890	36	58 1/2	5	2 1/4	3/4	2	5	2	3/4	2 1/4	84	30	8 7/8
54	1100	40	65	5 1/2	2 1/2	3/4	2 1/4	5	2 1/4	3/4	2 1/2	92 1/2	33 3/8	10
60	1400	45	73 1/2	6	3 5/16	3/4	1 15/16	5	2 3/4	3/4	2 1/2	105	37 1/2	11
72	1900	54	88	7	3 11/16	1	2 3/16	6	3 1/4	1	2 3/4	126	45	13 5/16
84	2500	62	102	8	4 1/8	1	2 7/8	6	3 1/2	1	3 1/2	162 1/2	52	14 1/2
96	3300	78	122 3/8	9	4 1/2	1	3 1/2	7	4	1	4	218	62	20
108	4200	88	138 1/2	10	5	1	4	7	4 1/2	1	4 1/2	269	70	22
120	5100	96 7/8	154	11	5 1/2	1	4 1/2	7	5	1	5	301 3/8	78	24
132	5100	106 1/2	168 3/4	10		1	4	7	4 1/2	1	4 1/2	329	85 5/8	26 7/8

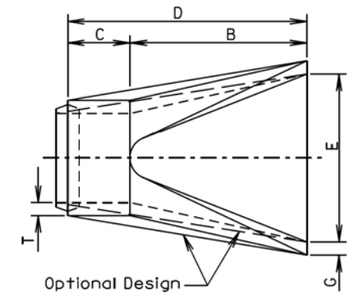
* Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

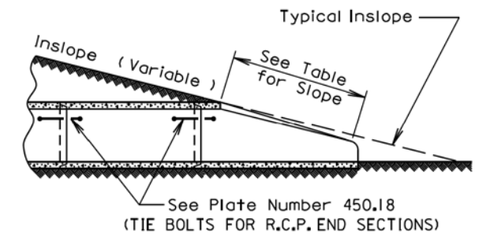
Construction of R.C.P. Arch shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges. Not more than 2 four foot sections shall be permitted near the ends of any culvert. Four foot lengths shall be used only to secure the required length of culvert.

March 31, 2000

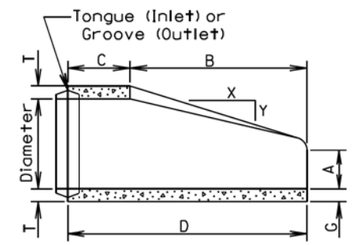
Published Date: 2nd Qtr. 2015 | SDDOT | REINFORCED CONCRETE PIPE ARCH | PLATE NUMBER 450.02 | Sheet 1 of 1



TOP VIEW



SLOPE DETAIL

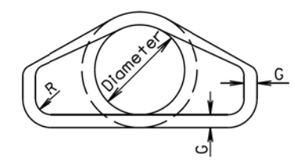


LONGITUDINAL SECTION

GENERAL NOTES:

Lengths of concrete pipe shown on Plan Sheets are between flared Ends only.

Construction of R.C.P. Flared End shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

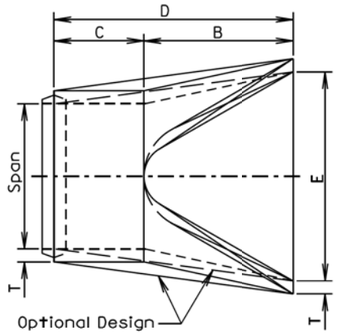


END VIEW

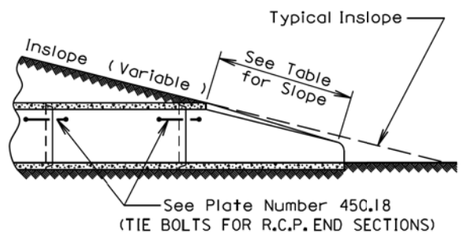
Dia. (in.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	R (in.)
12	530	2.4:1	2	4	24	48 7/8	72 7/8	24	2	1 1/2
15	740	2.4:1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3:1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4:1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5:1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5:1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5:1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5:1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5:1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5:1	5	24	72	26	98	84	5	1 1/2
54	8240	2:1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9:1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7:1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8:1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8:1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6:1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5:1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

March 31, 2000

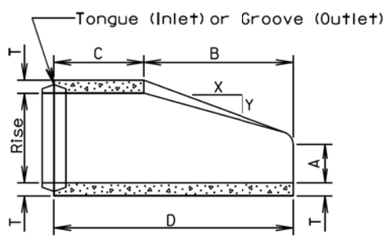
Published Date: 2nd Qtr. 2015 | SDDOT | R. C. P. FLARED ENDS | PLATE NUMBER 450.10 | Sheet 1 of 1



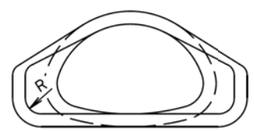
TOP VIEW



SLOPE DETAIL



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

Lengths of concrete pipe shown on Plan Sheets are between Flared Ends only.

Construction of R. C. P. Arch Flared End shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

* Size (in.)	Approximate Weight of Section (lbs.)	Rise (in.)	Span (in.)	Slope (X:Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	R (in.)
18	1100	13 1/2	22	3:1	2 1/2	7	27	45	72	36	2
24	1750	18	28 1/2	3:1	3 1/2	8 1/2	39	33	72	48	3
30	3300	22 1/2	36 1/4	3:1	4	9 1/2	50	46	96	60	3
36	4350	26 5/8	43 3/4	3:1	4 1/2	11 1/8	60	36	96	72	6
42	5250	31 5/16	51 1/8	3:1	4 1/2	15 13/16	60	36	96	78	6
48	6400	36	58 1/2	3:1	5	21	60	36	96	84	6
54	7850	40	65	3:1	5 1/2	25 1/2	60	36	96	90	6
60	9500	45	73 1/2	3:1	6	31	60	36	96	96	6
72	13550	54	88	2:1	7	31	60	39	99	120	6
84	17950	62	102	2:1	8	28 1/2	83	19	102	144	6

*Equivalent Diameter of Circular R. C. P.

March 31, 2000

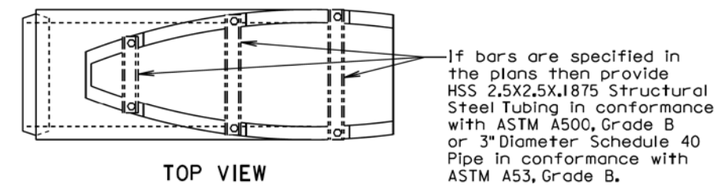
Published Date: 2nd Qtr. 2015

SDDOT

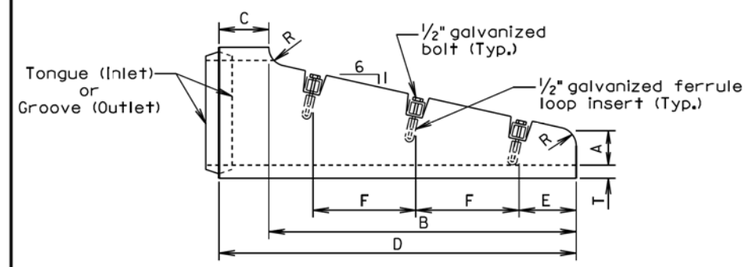
R. C. P. ARCH FLARED ENDS

PLATE NUMBER 450.11

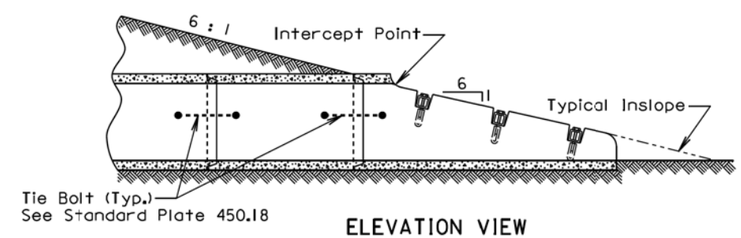
Sheet 1 of 1



TOP VIEW



SIDE VIEW



ELEVATION VIEW

Dia. (in.)	T (in.)	R (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	No. Sections	No. Bars
FOR CIRCULAR PIPE										
15	2 1/4	3	6	48	9	57	6	18	1	3
18	2 1/2	3	6	69	9	78	9	24	1	3
*24	3	3	6	111	9	120	6	24	1 or 2	5
FOR ARCH PIPE										
**18	2 1/2	1	6	39	33	72	6	24	1	2

*The use of 2 sections must be an approved design.
**Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

The length of concrete pipe shown on the plans is between safety ends.

Safety ends without bars are acceptable with or without the bar notches.

Bars shall be galvanized after fabrication in accordance with ASTM A123.

August 31, 2013

Published Date: 2nd Qtr. 2015

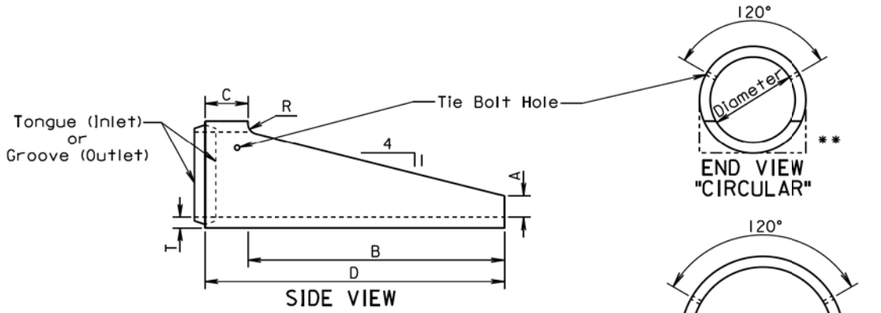
SDDOT

R. C. P. SAFETY ENDS WITH OR WITHOUT BARS

PLATE NUMBER 450.12

Sheet 1 of 1

Plot Scale - 1:200
Plotted From - geoff babovec
Plot Name - 84
File - ...\rdprj\LINC01QS\PlateB-3.dgn



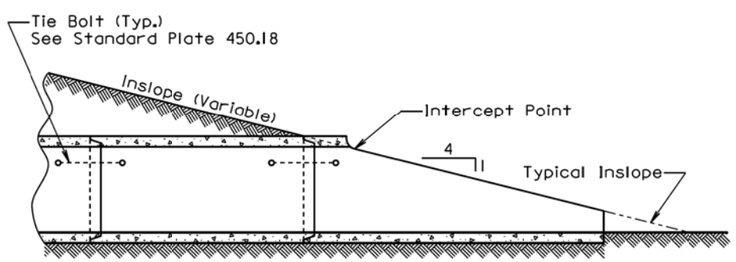
Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	6	72	12	84	3
30	3½	7½	90	12	102	3½
FOR ARCH PIPE						
* 24	3	6	48	12	60	3
* 30	3½	7½	60	12	72	3½
* 36	4½	8⅝	66	30	96	0
* 42	4½	10	77¼	18¾	96	0

ALTERNATE

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	9	72	12	84	0
30	3½	11	90	12	102	0
FOR ARCH PIPE						
* 24	3	9	48	12	60	0
* 30	3½	11	60	12	72	0

* Equivalent Diameter of Circular R.C.P.

** Acceptable Flat Bottom Alternate.



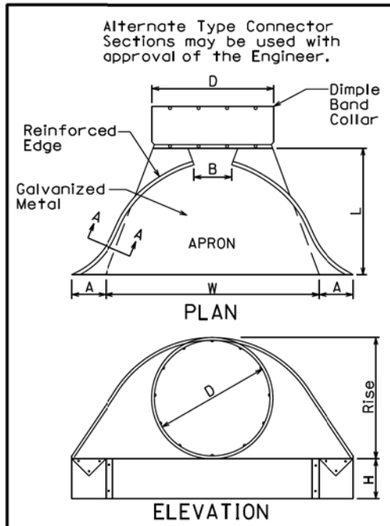
SECTION
(Along Centerline of Pipe)

GENERAL NOTE:

The length of concrete pipe shown in the construction plans is between sloped ends.

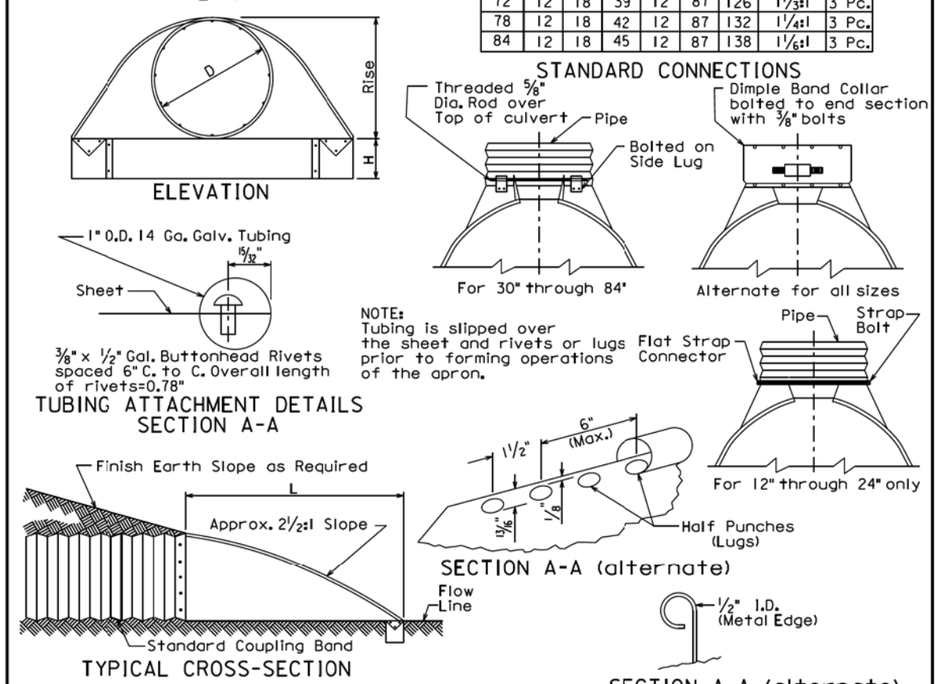
September 22, 2006

Published Date: 2nd Qtr. 2015	SDDOT	R. C. P. SLOPED ENDS	PLATE NUMBER 450.13 Sheet 1 of 1



Dia. D (in.)	Ga.	DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
12	16	6	6	6	21	24	2½:1	1 Pc.
15	16	7	8	6	26	30	2½:1	1 Pc.
18	16	8	10	6	31	36	2½:1	1 Pc.
21	16	9	12	6	36	42	2½:1	1 Pc.
24	16	10	13	6	41	48	2½:1	1 Pc.
30	14	12	16	8	46	60	2½:1	1 Pc.
36	14	14	19	9	51	72	2½:1	2 Pc.
42	12	16	22	11	60	84	2½:1	2 Pc.
48	12	18	27	12	69	90	2¼:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1¾:1	3 Pc.
66	12	18	36	12	87	120	1½:1	3 Pc.
72	12	18	39	12	87	126	1⅓:1	3 Pc.
78	12	18	42	12	87	132	1¼:1	3 Pc.
84	12	18	45	12	87	138	1⅙:1	3 Pc.

STANDARD CONNECTIONS



GENERAL NOTES:

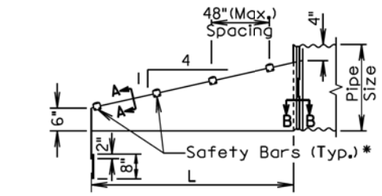
All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by ⅜" Dia. galvanized rivets or bolts.

For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x ¼" for 60" through 72" diameters and 2½" x 2½" x ¼" for 78" and 84" diameters. The angles shall be attached by ⅜" diameter galvanized nuts and bolts.

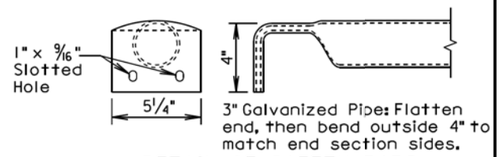
Rivets and Bolts shall be ⅜" Dia. Min. for 10 Ga. and 12 Ga. sheet, and 5/16" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

March 31, 2000

Published Date: 3rd Qtr. 2015	SDDOT	C.M.P. FLARED ENDS	PLATE NUMBER 450.35 Sheet 1 of 1

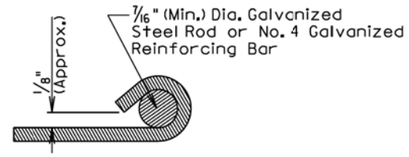


ELEVATION VIEW

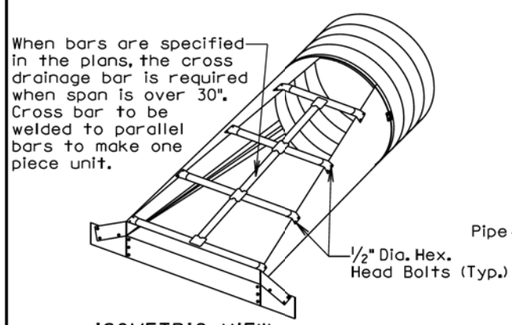


DETAIL OF SAFETY BARS

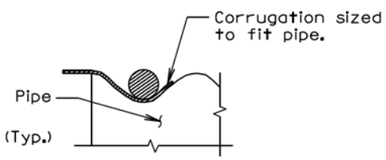
* Number of bars required will vary depending on the length of the end section.



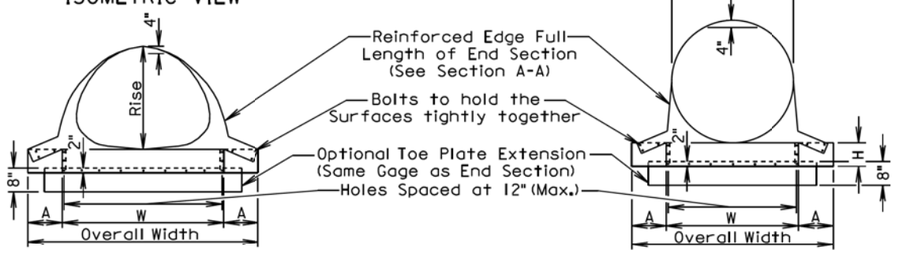
SECTION A-A



ISOMETRIC VIEW

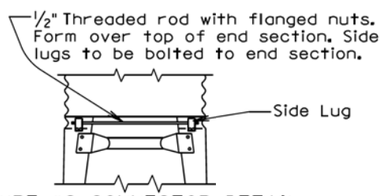


SECTION B-B

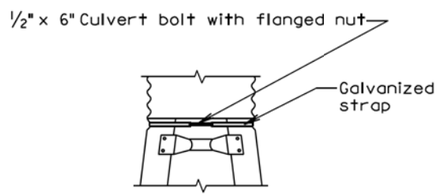


FRONT VIEW

FRONT VIEW



TYPE #2 CONNECTOR DETAIL
(For 30" and Larger)
(For 21" X 15" and Larger)



TYPE #1 CONNECTOR DETAIL
(For 15" Through 24")

February 10, 2014

Published Date: 3rd Qtr. 2015	SDDOT	C. M. P. SLOPED ENDS	PLATE NUMBER 450.37
			Sheet 1 of 2

ARCH C.M.P. SLOPED ENDS										
Equv. Dia. (Inch)	(Inches)		Min. Thick.		Dimensions (Inches)				L Dimensions	
	Span	Rise	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
18	21	15	.064	16	8	6	27	43	4:1	20
21	24	18	.064	16	8	6	30	46	4:1	32
24	28	20	.064	16	8	6	34	50	4:1	40
30	35	24	.079	14	12	9	41	65	4:1	56
36	42	29	.109	12	12	9	48	72	4:1	76
42	49	33	.109	12	16	12	55	87	4:1	92
48	57	38	.109	12	16	12	63	95	4:1	112
54	64	43	.109	12	16	12	70	102	4:1	132
60	71	47	.109	12	16	12	77	109	4:1	148
72	83	57	.109	12	16	12	89	121	4:1	188

CIRCULAR C.M.P. SLOPED ENDS								
Pipe Dia. (Inch)	Min. Thick.		Dimensions (Inches)				L Dimensions	
	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
15	.064	16	8	6	21	37	4:1	20
18	.064	16	8	6	24	40	4:1	32
21	.064	16	8	6	27	43	4:1	44
24	.064	16	8	6	30	46	4:1	56
30	.109	12	12	9	36	60	4:1	80
36	.109	12	12	9	42	66	4:1	104
42	.109	12	16	12	48	80	4:1	128
48	.109	12	16	12	54	86	4:1	152
54	.109	12	16	12	60	92	4:1	176
60	.109	12	16	12	66	98	4:1	200

GENERAL NOTES:

Safety bars shall be attached to sloped ends over 30" in diameter only when specified in the plans.

Sloped ends shall be fabricated from galvanized steel and shall conform to the requirements of the Specifications.

Safety bars shall be fabricated from steel schedule 40 pipe in conformance with ASTM A53, grade B or HSS 3.5X.216 in conformance with ASTM A500, grade B.

Slotted holes for safety bar attachment shall be provided for all end sections.

Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs.

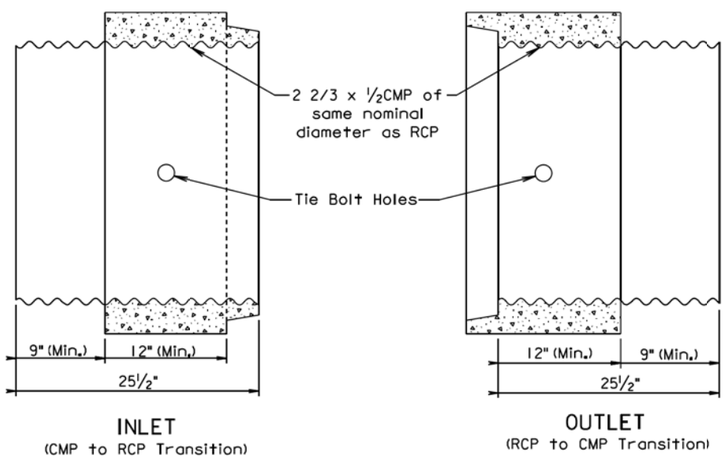
When stated in the plans, optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high.

Installation shall be performed in accordance with the Specifications.

Cost of all work and materials required for fabrication and installation of sloped ends shall be incidental to the bid items for the various sizes of sloped ends.

February 10, 2014

Published Date: 3rd Qtr. 2015	SDDOT	C. M. P. SLOPED ENDS	PLATE NUMBER 450.37
			Sheet 2 of 2



INLET
(CMP to RCP Transition)

OUTLET
(RCP to CMP Transition)

GENERAL NOTE:

Arch pipe transitions shall be fabricated similar to the round transition shown above.

March 31, 2000

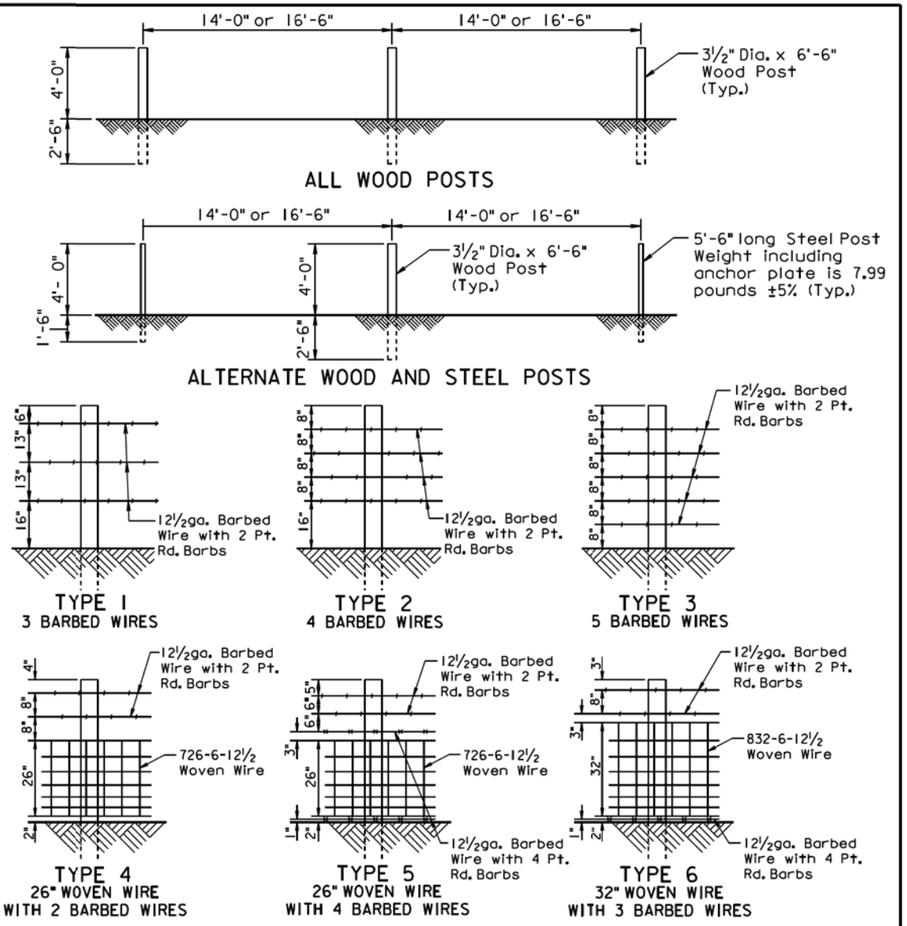
Published Date: 3rd Qtr. 2015

SDDOT

C.M.P. TO R.C.P. TRANSITION AND R.C.P. TO C.M.P. TRANSITION

PLATE NUMBER 450.50

Sheet 1 of 1



TYPE OF FENCE		LINE POST SPACING	BARBED WIRE		WOVEN WIRE
TYPE	DESCRIPTION		WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.
1	3 Barbed Wires	16'-6"	12½	2 Point Round	—
2	4 Barbed Wires	16'-6"	12½	2 Point Round	—
3	5 Barbed Wires	16'-6"	12½	2 Point Round	—
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12½	2 Point Round	726-6-12½
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 2 wires with 4 Pt. Rd.	726-6-12½
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 1 wire with 4 Pt. Rd.	832-6-12½

GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S shall have smooth (barbless) wires.

When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

All degrees of curvature stated for fence are at centerline of roadway.

September 14, 2009

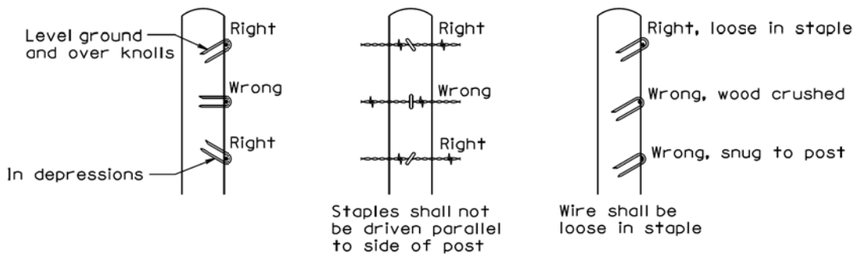
Published Date: 2nd Qtr. 2015

SDDOT

RIGHT-OF-WAY FENCE

PLATE NUMBER 620.01

Sheet 1 of 1



STAPLE INSTALLATION

GENERAL NOTES:

The Right-of-Way fence shall consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire shall be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts shall be used for brace panels. Gates shall be of the type designated in the plans or as otherwise directed by the Engineer. Fence shall be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.

Right-of-Way fence on Interstate Projects shall be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

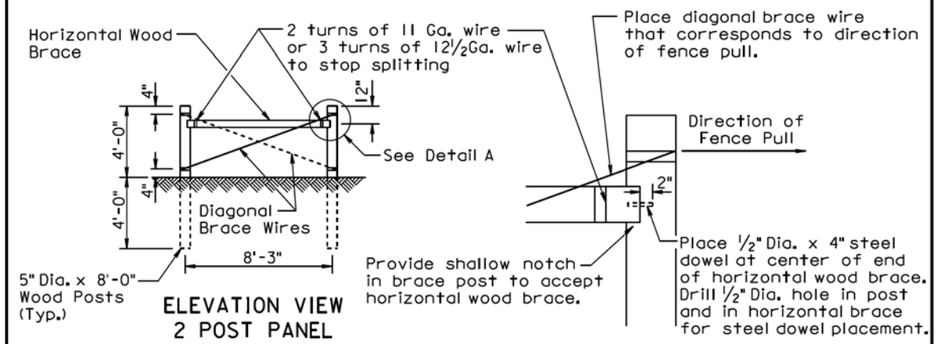
Right-of-Way fence other than on Interstate Projects shall be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Barbs shall be fabricated from zinc coated 14 ga. wire. Two point barbs shall be wrapped twice around one main strand at 4" spacings and the four point barbs shall be interlocked and wrapped around both main strands at 5" spacings.

The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts shall be as stated in AASHTO M281. Woven wire shall conform to design and specifications of ASTM A116 and barbed wire shall conform to ASTM A121.

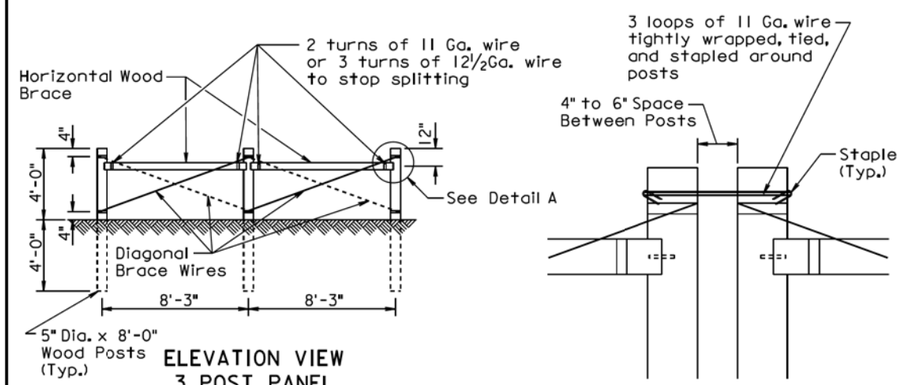
December 23, 2004

Published Date: 2nd Qtr. 2015	SDDOT	STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES	PLATE NUMBER 620.02 Sheet 1 of 1



ELEVATION VIEW
2 POST PANEL

DETAIL A



ELEVATION VIEW
3 POST PANEL

DETAIL B

GENERAL NOTES:

Two Post Panels shall be installed at least every 1320' between corners.

Two Post Panels shall be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces shall consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires shall be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires shall be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

December 23, 2004

Published Date: 2nd Qtr. 2015	SDDOT	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03 Sheet 1 of 3

SPACING OF 2 POST PANELS WITHIN CURVES	
DEGREE OF CURVE	SPACING OF 2 POST PANEL
less than 3°15'	** 1320'
3°15' and greater	**At P.C., P.T., and at every 1320' between P.C. and P.T.

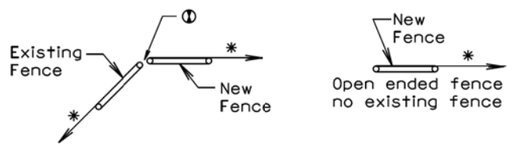
GENERAL NOTE:

All degrees of curvature stated for fence are at centerline of roadway.

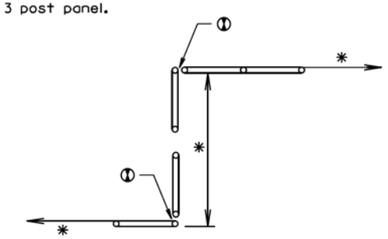
* If fence length is less than 600' to next corner use a 2 post panel.
If fence length is greater than 600' to next corner use a 3 post panel.

** Fence lengths greater than 1320' and less than 2640' place 2 Post Panel approximately at midpoint.

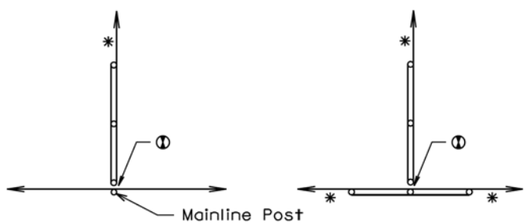
① See Detail B on Sheet 1 of 3.



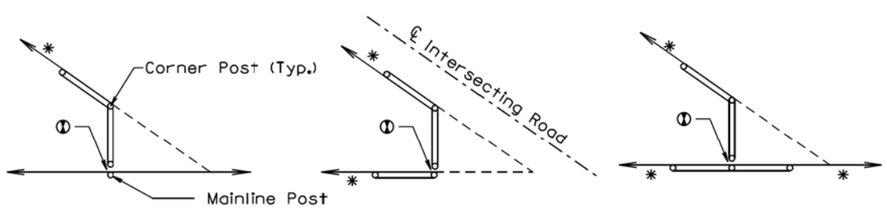
BEGIN OR END FENCE
(where new fence ties into existing fence)



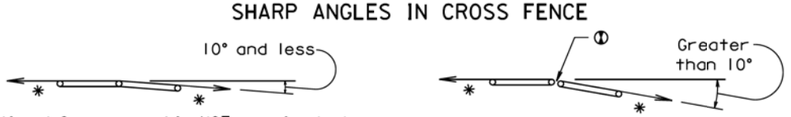
SHORT JOGS IN FENCE



CROSS FENCE



SHARP ANGLES IN CROSS FENCE



Additional fence panel is NOT required when an angle in the mainline fence is 10° and less.

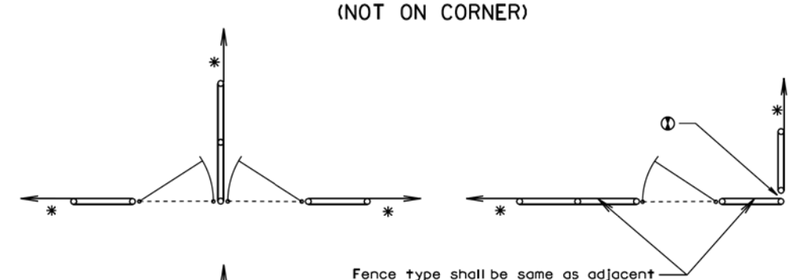
Additional fence panel is required when an angle in the mainline fence is greater than 10°.

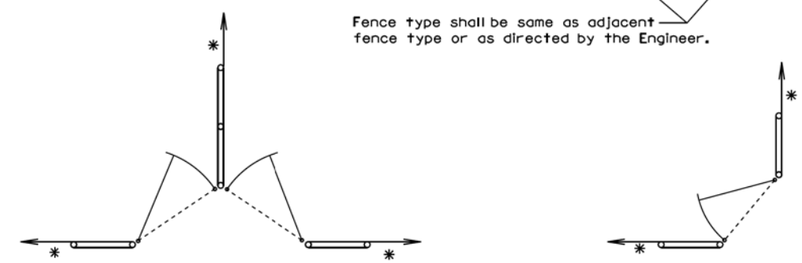
ANGLES IN MAINLINE FENCE

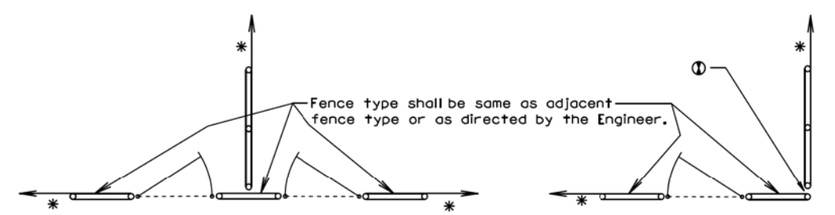
December 23, 2004

Published Date: 2nd Qtr. 2015	SDDOT	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03
			Sheet 2 of 3

ENTRANCE
(NOT ON CORNER)







DOUBLE ENTRANCES

ENTRANCES AT CORNERS

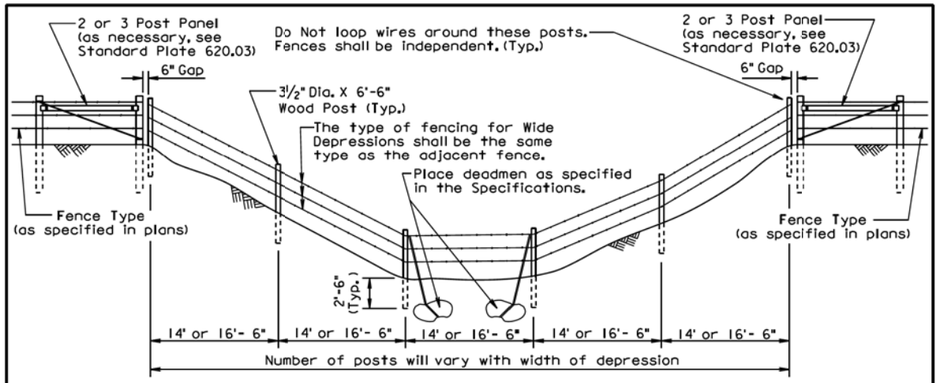
GATES

* If fence length is less than 600' to next corner use a 2 post panel.
If fence length is greater than 600' to next corner use a 3 post panel.

① See Detail B on Sheet 1 of 3.

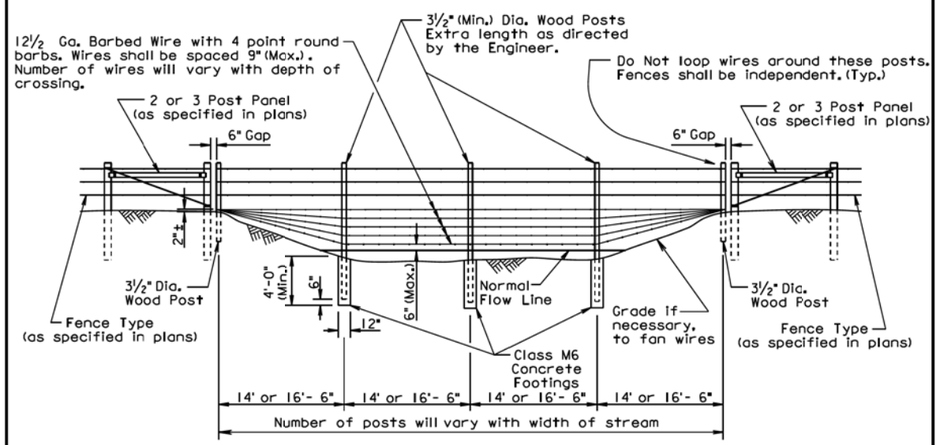
December 23, 2004

Published Date: 2nd Qtr. 2015	SDDOT	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03
			Sheet 3 of 3



This installation shall be made when requested by the Engineer.

FENCING AT WIDE DEPRESSION (SUBJECT TO FLOODING)



This installation shall be made only when stated in the plans.

FENCING AT STREAM CROSSING

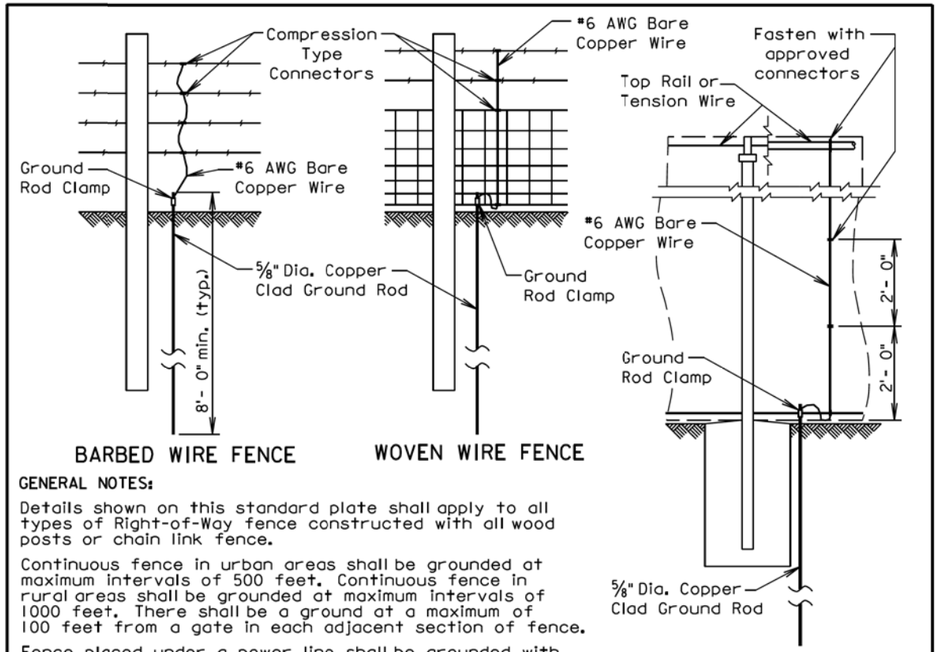
GENERAL NOTES:

There will be no extra payment for the additional work and materials required to construct the fencing at the wide depression(s) and/or the fencing at the stream crossing(s). The deadmen shall be paid for in accordance with 620.5 A. of the Specifications.

Measurement and payment for the fencing at the wide depression(s) and/or the fencing at the stream crossing(s) shall be at the contract unit price per foot for the corresponding Right-of-Way fence bid item.

February 14, 2015

Published Date: 3rd Qtr. 2015	SDDOT	FENCING AT WIDE DEPRESSION(S) AND STREAM CROSSING(S)	PLATE NUMBER 620.10
			Sheet 1 of 1



BARBED WIRE FENCE

WOVEN WIRE FENCE

CHAIN LINK FENCE

GENERAL NOTES:

Details shown on this standard plate shall apply to all types of Right-of-Way fence constructed with all wood posts or chain link fence.

Continuous fence in urban areas shall be grounded at maximum intervals of 500 feet. Continuous fence in rural areas shall be grounded at maximum intervals of 1000 feet. There shall be a ground at a maximum of 100 feet from a gate in each adjacent section of fence.

Fence placed under a power line shall be grounded with three grounds. One ground shall be placed directly below the crossing and the other two shall be placed 25 feet to 50 feet away, one on each side.

One ground shall be placed directly below each telephone or cable crossing.

Ground rods shall be located on the post side of the fence and shall be as close as possible to the post and fence.

The cost of furnishing and placing all materials for grounding shall be incidental to the contract unit price per Ft for the respective Right-of-Way fence or chain link fence bid item.

The approximate quantites of materials per each installation of a ground are:

- 1 ground rod clamp.
- 1 5/8" dia. X 8' long copper clad ground rod
- 1 #6 AWG bare copper wire; 7' long for Right-of-Way fence or 10' long for chain link fence.

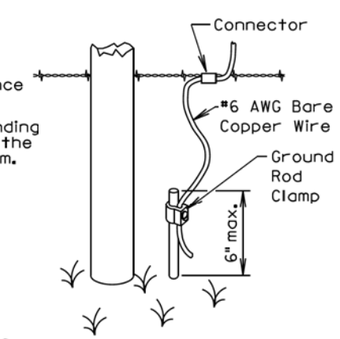
Compression type or other type of connectors:

26" woven wire shall have a total of two connectors, one secured to the top and one secured to the bottom.

32" woven wire shall have a total of three connectors, one secured to the top, one secured to the middle, and one secured to the bottom.

One connector shall be used for each strand of barbed wire.

A minimum of 3 connectors shall be installed on chain link fence, the connectors shall be placed vertically at every two foot increment and connectors shall be placed on the top and bottom tension wires or top rail.

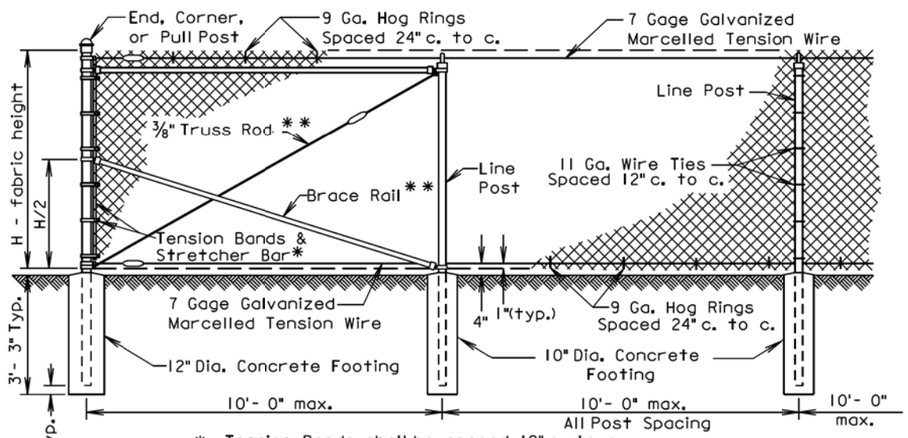


GROUND ROD DETAIL

March 31, 2000

Published Date: 3rd Qtr. 2015	SDDOT	FENCE GROUNDING	PLATE NUMBER 620.11
			Sheet 1 of 1

Plot Scale - 1:200
Plotted From - geoff babovec
Plot Name - 90
File - ...\rdprj\LINC01QS\PlateB-9.dgn



* Tension Bands shall be spaced 12" c. to c.
** Are not required for 3' thru 5' fences.
⬭ Tightening Device such as shown on Plate No. 621.03

Component	End, Corner & Pull Post		Line Post			Top & Brace Rail	
Type of Fabrication	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H-Beam Steel	Round Pipe Nominal	Roll Formed Steel
Size	3.00" O. D.	3.5" x 3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.	1.625"x1.25"
Weight (lb. / ft.)	5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84	1.35

GENERAL NOTES:

Specific details of manufacture of component parts of the complete fence construction shall be subject to the approval of the Engineer. Commercially available items produced specifically for the use intended shall be used wherever possible in the construction of the fence.

"H" (Height of Fabric) shall be as shown on the Plans. Fabric is available in the the following heights; 36", 42", 48", 60", 72", 84", 96", 108", 120", & 144". Fabric heights 60 inches and under shall be knuckled at both selvages. Fabric heights 72 inches and over shall be knuckled at one selvage and twisted at the other selvage.

Chain Link Fabric shall be 2" mesh, No. 9 gage galvanized wire securely fastened to Tension Wire, Line Post, Rails, Braces and Stretcher Bars spaced as shown hereon.

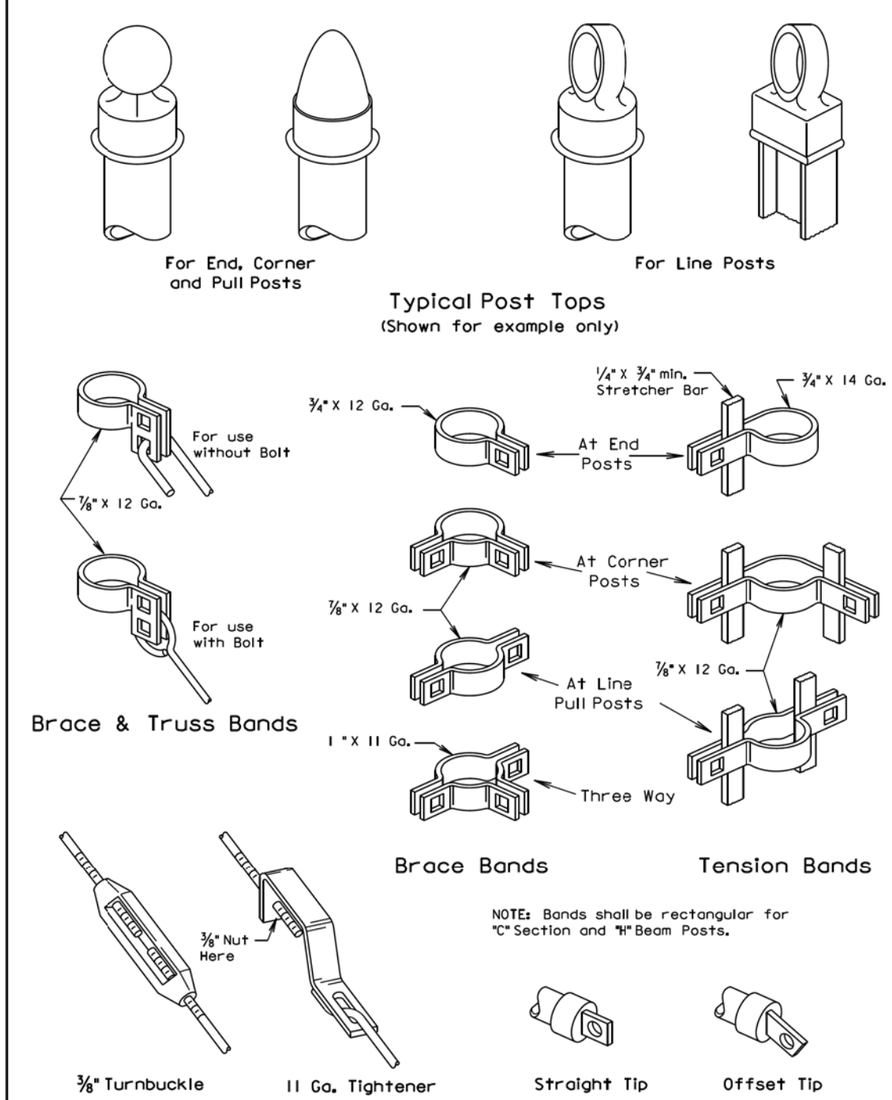
Fence may be constructed with either Round Pipe, "C" Section, "H" Beam, or roll Formed Steel components as shown in the table above. Line post may be Round Pipe, "C" Section, or "H" Beam. The Corner Post and Rails shall be either Round Pipe or Roll Formed Steel. The type of components used shall have prior approval by the Engineer before construction.

All post shall have a means to securely hold the top tension wire in position and allow for the removal and replacement of a post without damaging the top tension wire.

Where fence must cross small bodies of water (such as drainage areas or ponds) that could freeze during the winter, use 11 gage Hog Rings. Provide only two ties per Tension Wire and Top Rail between line posts.

March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	CHAIN LINK FENCE WITH TENSION WIRED TOP	PLATE NUMBER 621.02
			Sheet 1 of 1



March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	HARDWARE FOR CHAIN LINK FENCE	PLATE NUMBER 621.03
			Sheet 1 of 1

Plot Scale - 1:200
Plotted From - geoff.babovec
Plot Name - 91
File - ...\rd\prj\LINC01QS\PlateB-10.dgn

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent thoughout the project. The S3x5.7 Steel I Beam post shall be used for the end posts.

All costs associated with furnishing and constructing the 3 cable guardrail anchor assembly including the concrete anchor, cable anchor bracket, compensating device, steel turnbuckle cable assembly, and necessary hardware shall be incidental to the contract unit price per each for "3 Cable Guardrail Anchor Assembly".

All costs associated with furnishing and constructing the 3 cable guardrail including posts, cable, cable splices, and hardware shall be incidental to the contract unit price per foot for "3 Cable Guardrail".

The following table and criteria shall apply to the arrangement of the Spring Cable End Assemblies (Compensation Devices) and Turnbuckle Cable End Assemblies:

LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
Less than 500'	Use turnbuckle on the approaching traffic end and compensating device on the other end of each individual cable, except in the W Beam to 3 Cable Transition where all compensating devices shall be provided at the bridge ends.
Greater than 500' to 1000'	Use compensating device on each end of each individual cable.
Greater than 1000'	Start new run by interlacing at last parallel post as shown on sheet 2 of 6.

All Compensating Devices shall be attached to the cable anchor bracket when one end of the run is attached to a bridge.

Compensating Devices must have a spring rate of 450 ± 50 pounds per inch and shall have a total available travel of 6 inches minimum.

The cable shall be retensioned after the initial 2 week pretension period in accordance with the following table:

CABLE TENSIONING SPECIFICATIONS

Temperature Range (Degree F)	-20 to -11	-10 to -1	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 120
Spring Compression (Inch)	4¼	4	3¾	3½	3¼	3	2¾	2½	2¼	2	1¾	1½	1¼	1

POST SPACING FOR HORIZONTAL CURVES

Roadway ℄ Curvature	Maximum Post Spacing (Ft)
1° and Less	16'
Greater than 1° to 8°	12'
Greater than 8° to 13°	8'
Greater than 13°	NOT ALLOWED

December 16, 2014

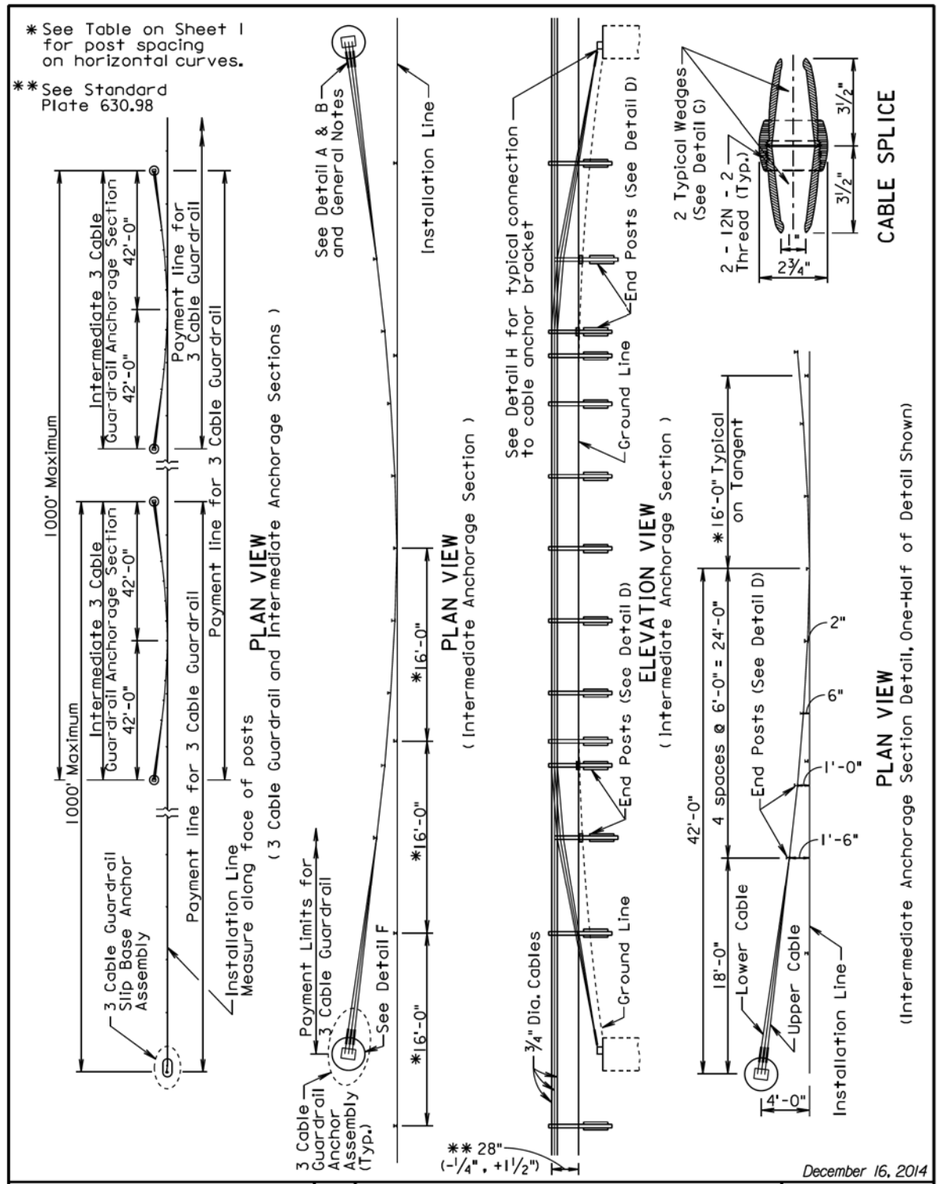
Published Date: 2nd Qtr. 2015

SDDOT

3 CABLE GUARDRAIL (LOW TENSION)

PLATE NUMBER 629.01

Sheet 1 of 6



December 16, 2014

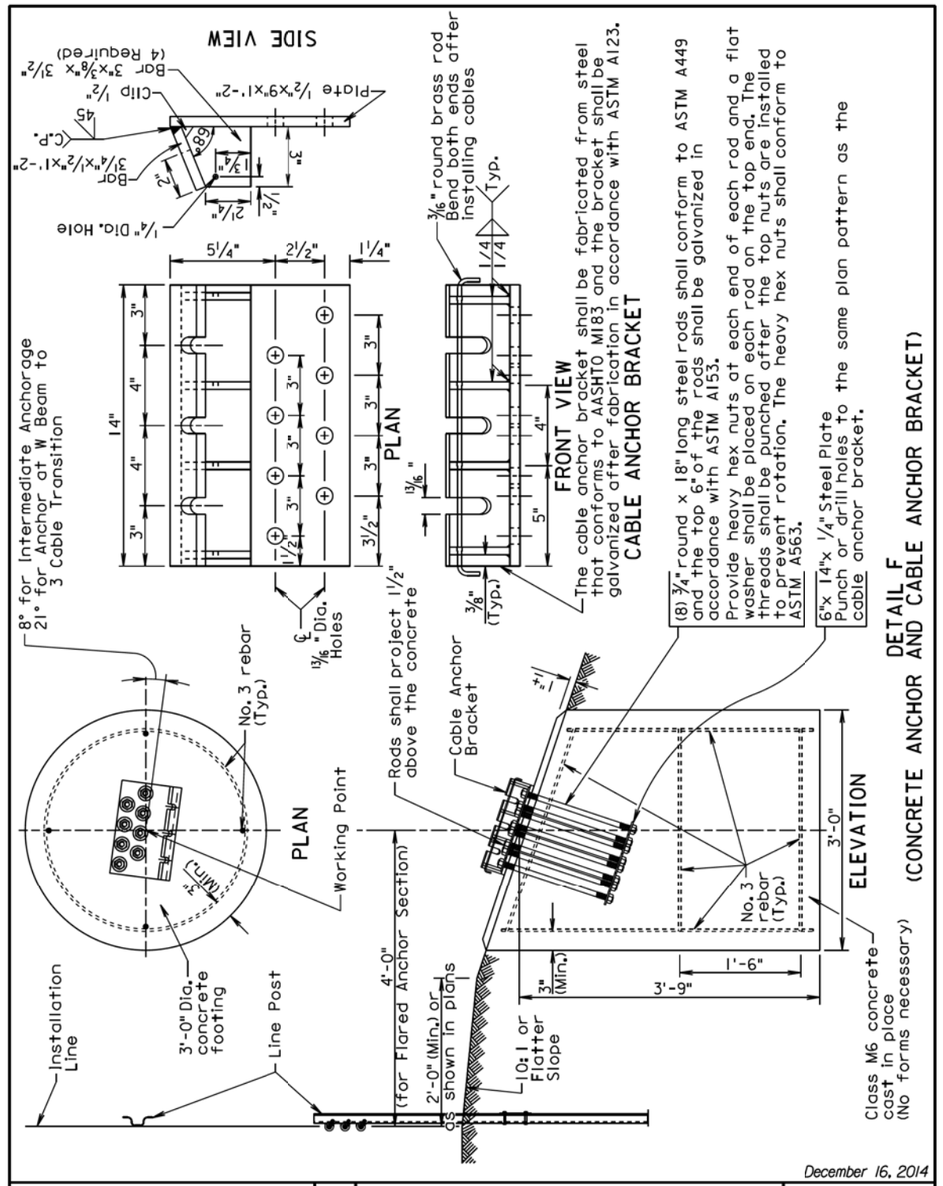
Published Date: 2nd Qtr. 2015

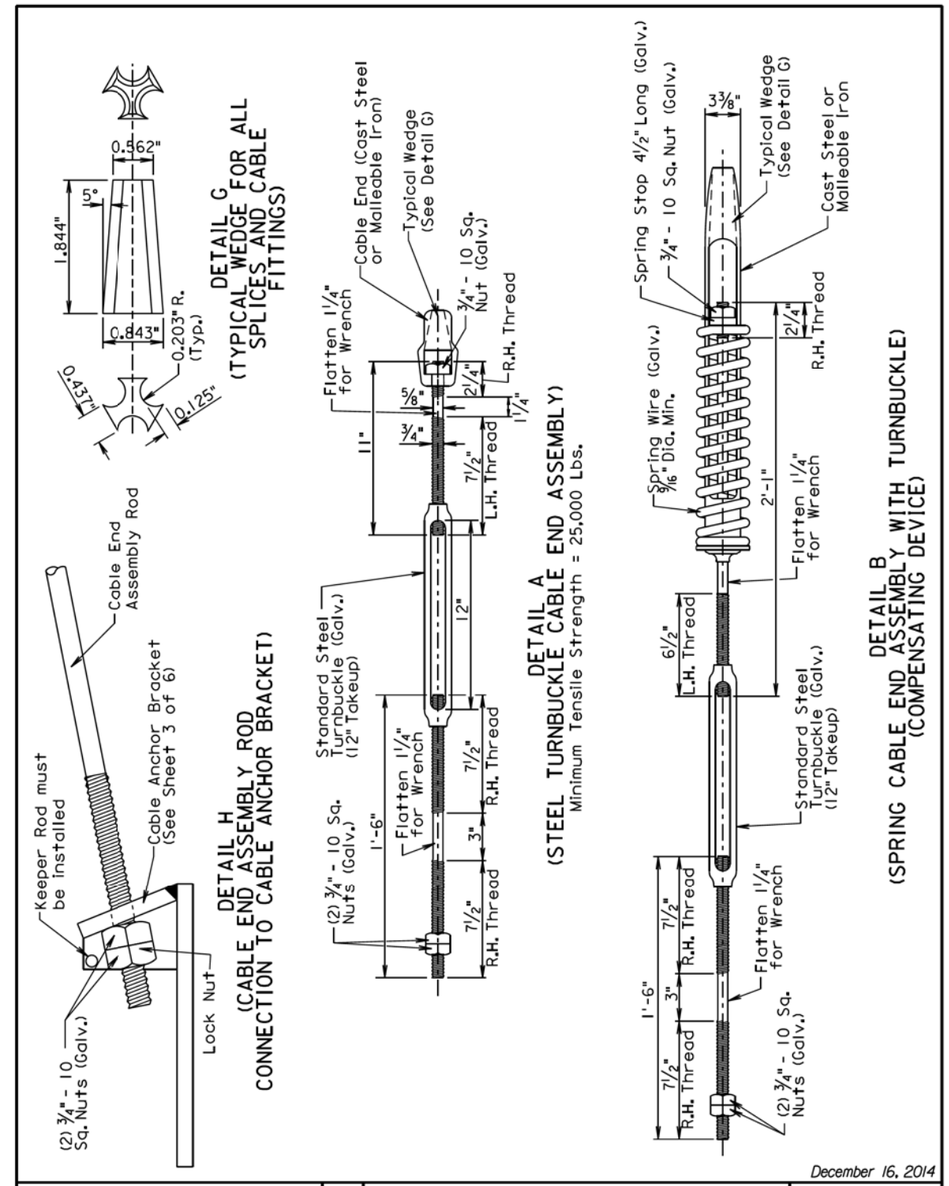
SDDOT

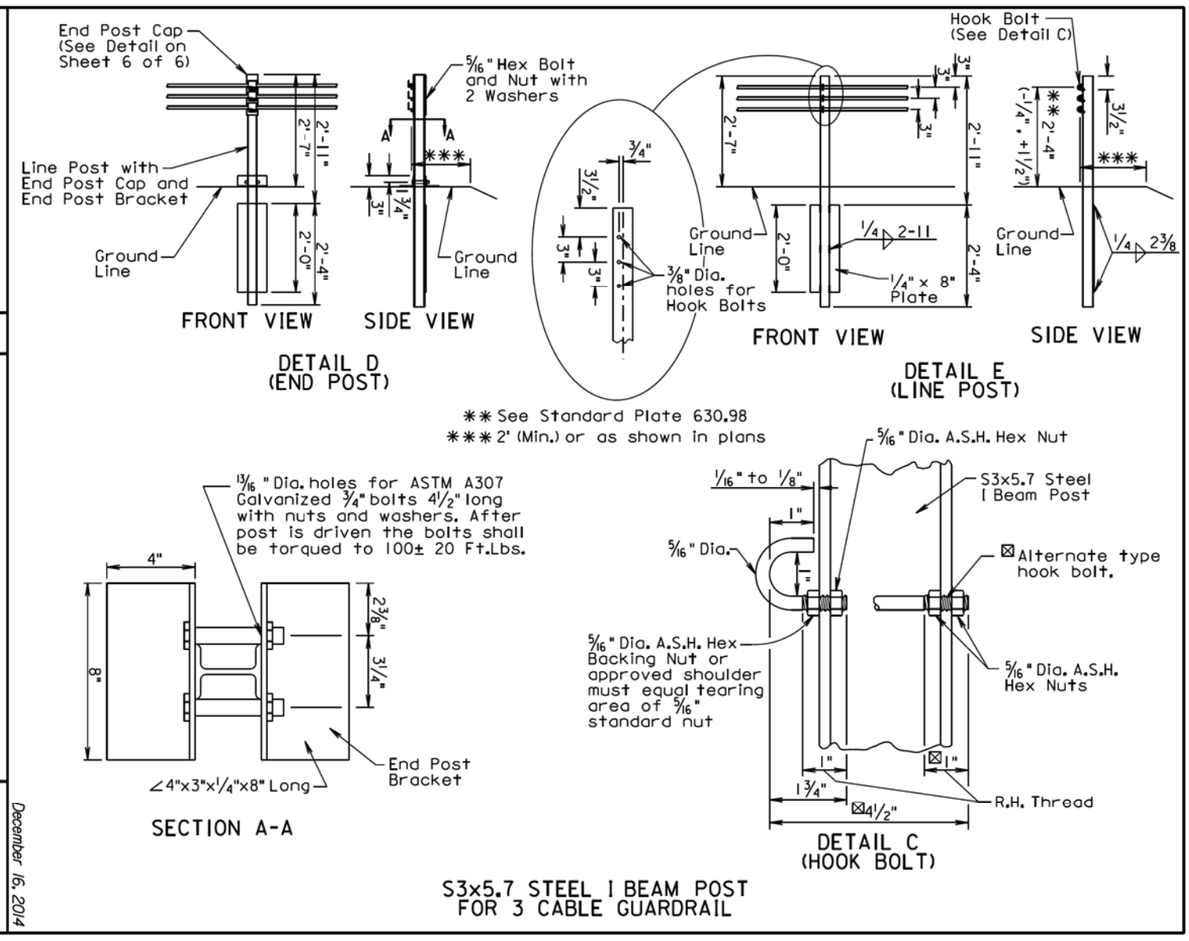
3 CABLE GUARDRAIL (LOW TENSION)

PLATE NUMBER 629.01

Sheet 2 of 6


SIDE VIEW
Plate 1/2"x9"x1'-2"
Bar 3"x3/8"x 3 1/2" (4 Required)
Clip 1/2"
45°
(C.P.)
Bar 3 1/4"x1/2"x1'-2"
1/4" Dia. Hole
5 1/4"
2 1/2"
1 1/4"
PLAN
8" for Intermediate Anchorage
21° for Anchor at W Beam to 3 Cable Transition
No. 3 rebar (Typ.)
13/16" Dia. Holes
Working Point
3'-0" Dia. concrete footing
Installation Line
Line Post
3/16" round brass rod Bend both ends after installing cables
Typ.
FRONT VIEW
The cable anchor bracket shall be fabricated from steel that conforms to AASHTO M183 and the bracket shall be galvanized after fabrication in accordance with ASTM A123.
(8) 3/4" round x 18" long steel rods shall conform to ASTM A449 and the top 6" of the rods shall be galvanized in accordance with ASTM A153.
Provide heavy hex nuts at each end of each rod and a flat washer shall be placed on each rod on the top end. The threads shall be punched after the top nuts are installed to prevent rotation. The heavy hex nuts shall conform to ASTM A563.
6"x 14"x 1/4" Steel Plate Punch or drill holes to the same plan pattern as the cable anchor bracket.
Rods shall project 1 1/2" above the concrete
Cable Anchor Bracket
ELEVATION
No. 3 rebar (Typ.)
3'-0"
1'-6"
3'-9"
3" (Min.)
4'-0" (for Flared Anchor Section)
2'-0" (Min.) or as shown in plans
10:1 or Flatter Slope
Class M6 concrete cast in place (No forms necessary)
DETAIL F
(CONCRETE ANCHOR BRACKET AND CABLE ANCHOR BRACKET)
December 16, 2014
Published Date: 2nd Qtr. 2015
SDDOT
3 CABLE GUARDRAIL
(LOW TENSION)
PLATE NUMBER
629.01
Sheet 3 of 6


0.562"
1.844"
5°
0.843"
0.203" R. (Typ.)
0.437"
0.125"
DETAIL G
(TYPICAL WEDGE FOR ALL SPLICES AND CABLE FITTINGS)
Cable End Assembly Rod
Keeper Rod must be installed
Cable Anchor Bracket (See Sheet 3 of 6)
Lock Nut
(2) 3/4" - 10 Sq. Nuts (Galv.)
DETAIL H
(CABLE END ASSEMBLY ROD CONNECTION TO CABLE ANCHOR BRACKET)
Cable End (Cast Steel or Malleable Iron)
Typical Wedge (See Detail G)
3/4" - 10 Sq. Nut (Galv.)
Flatten 1 1/4" for Wrench
R.H. Thread
L.H. Thread
Standard Steel Turnbuckle (Galv.) (12" Takeup)
(2) 3/4" - 10 Sq. Nuts (Galv.)
DETAIL A
(STEEL TURNBUCKLE CABLE END ASSEMBLY)
Minimum Tensile Strength = 25,000 Lbs.
Spring Stop 4 1/2" Long (Galv.)
3/4" - 10 Sq. Nut (Galv.)
Spring Wire (Galv.) 3/16" Dia. Min.
Cast Steel or Malleable Iron
DETAIL B
(SPRING CABLE END ASSEMBLY WITH TURNBUCKLE (COMPENSATING DEVICE)
December 16, 2014
Published Date: 2nd Qtr. 2015
SDDOT
3 CABLE GUARDRAIL
(LOW TENSION)
PLATE NUMBER
629.01
Sheet 4 of 6



Published Date: 2nd Qtr. 2015

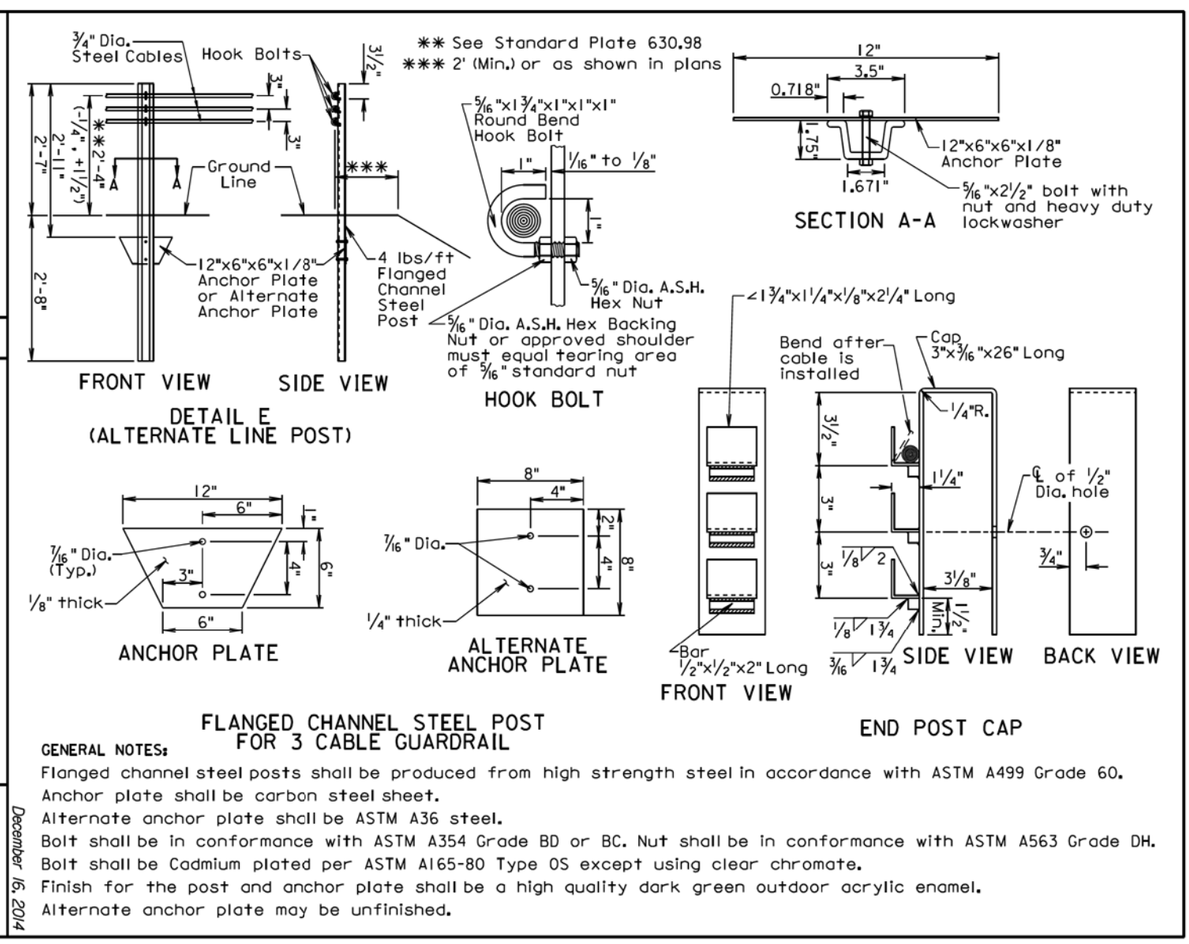
S D D O T

3 CABLE GUARDRAIL (LOW TENSION)

PLATE NUMBER 629.01

Sheet 5 of 6

December 16, 2014



GENERAL NOTES:

Flanged channel steel posts shall be produced from high strength steel in accordance with ASTM A499 Grade 60.
Anchor plate shall be carbon steel sheet.
Alternate anchor plate shall be ASTM A36 steel.
Bolt shall be in conformance with ASTM A354 Grade BD or BC. Nut shall be in conformance with ASTM A563 Grade DH.
Bolt shall be Cadmium plated per ASTM A165-80 Type OS except using clear chromate.
Finish for the post and anchor plate shall be a high quality dark green outdoor acrylic enamel.
Alternate anchor plate may be unfinished.

Published Date: 2nd Qtr. 2015

S D D O T

3 CABLE GUARDRAIL (LOW TENSION)

PLATE NUMBER 629.01

Sheet 6 of 6

December 16, 2014

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA

Plotting Date: 8/31/2015

PROJECT IM 0292(96)073 IM 2292(90)0

SHEET B112

TOTAL SHEETS B128

Published Date: 2nd Qtr. 2015

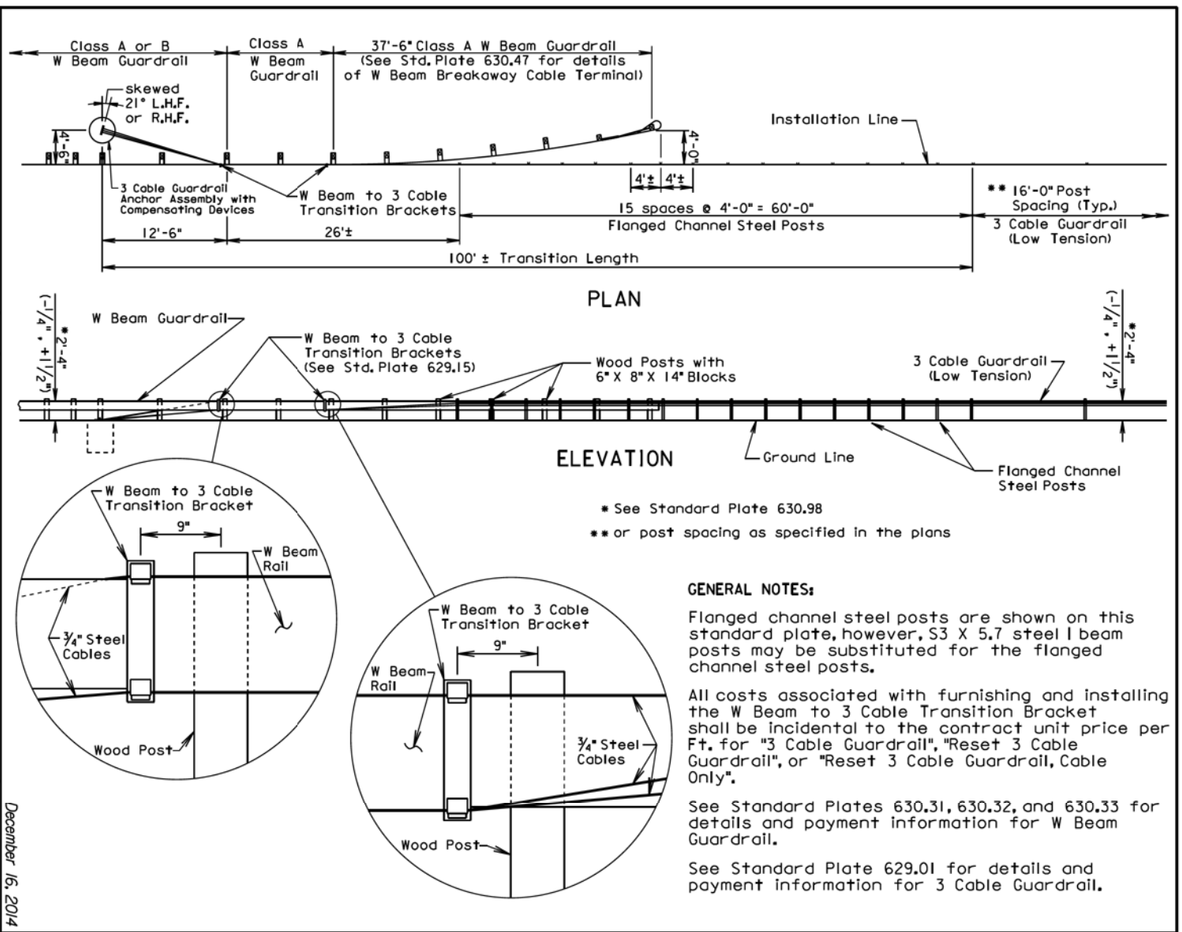
SDDOT

W BEAM TO 3 CABLE TRANSITION

PLATE NUMBER 629.05

Sheet 1 of 1

December 16, 2014



GENERAL NOTES:

Flanged channel steel posts are shown on this standard plate, however, S3 X 5.7 steel I beam posts may be substituted for the flanged channel steel posts.

All costs associated with furnishing and installing the W Beam to 3 Cable Transition Bracket shall be incidental to the contract unit price per Ft. for "3 Cable Guardrail", "Reset 3 Cable Guardrail", or "Reset 3 Cable Guardrail, Cable Only".

See Standard Plates 630.31, 630.32, and 630.33 for details and payment information for W Beam Guardrail.

See Standard Plate 629.01 for details and payment information for 3 Cable Guardrail.

Published Date: 2nd Qtr. 2015

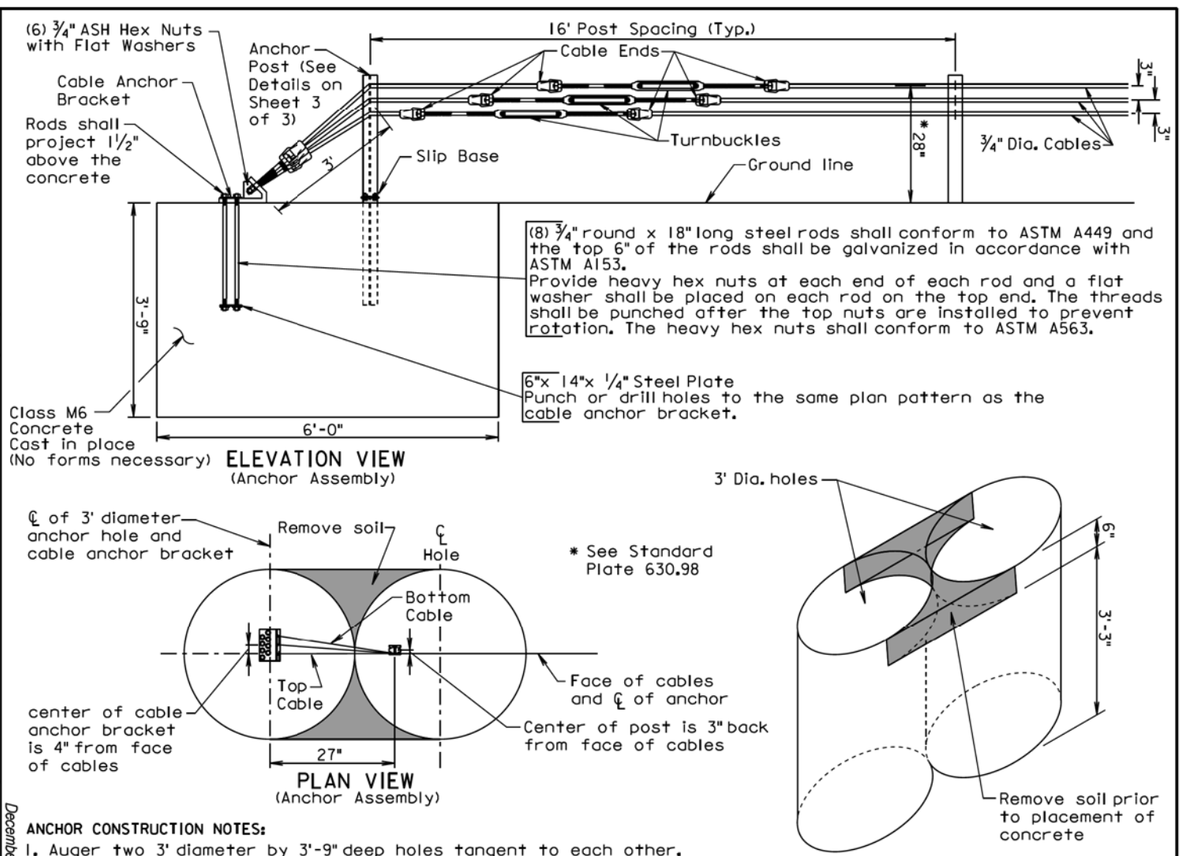
SDDOT

3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY

PLATE NUMBER 629.10

Sheet 1 of 3

December 16, 2014



ANCHOR CONSTRUCTION NOTES:

1. Auger two 3' diameter by 3'-9" deep holes tangent to each other.
2. Clean out the top 6 inches of soil between the holes.
3. Place concrete in holes with anchor bolts and slip base stub post in place.
4. For informational purposes the neat line concrete volume of the anchor is 1.9 cubic yards.

FOR BIDDING PURPOSES ONLY

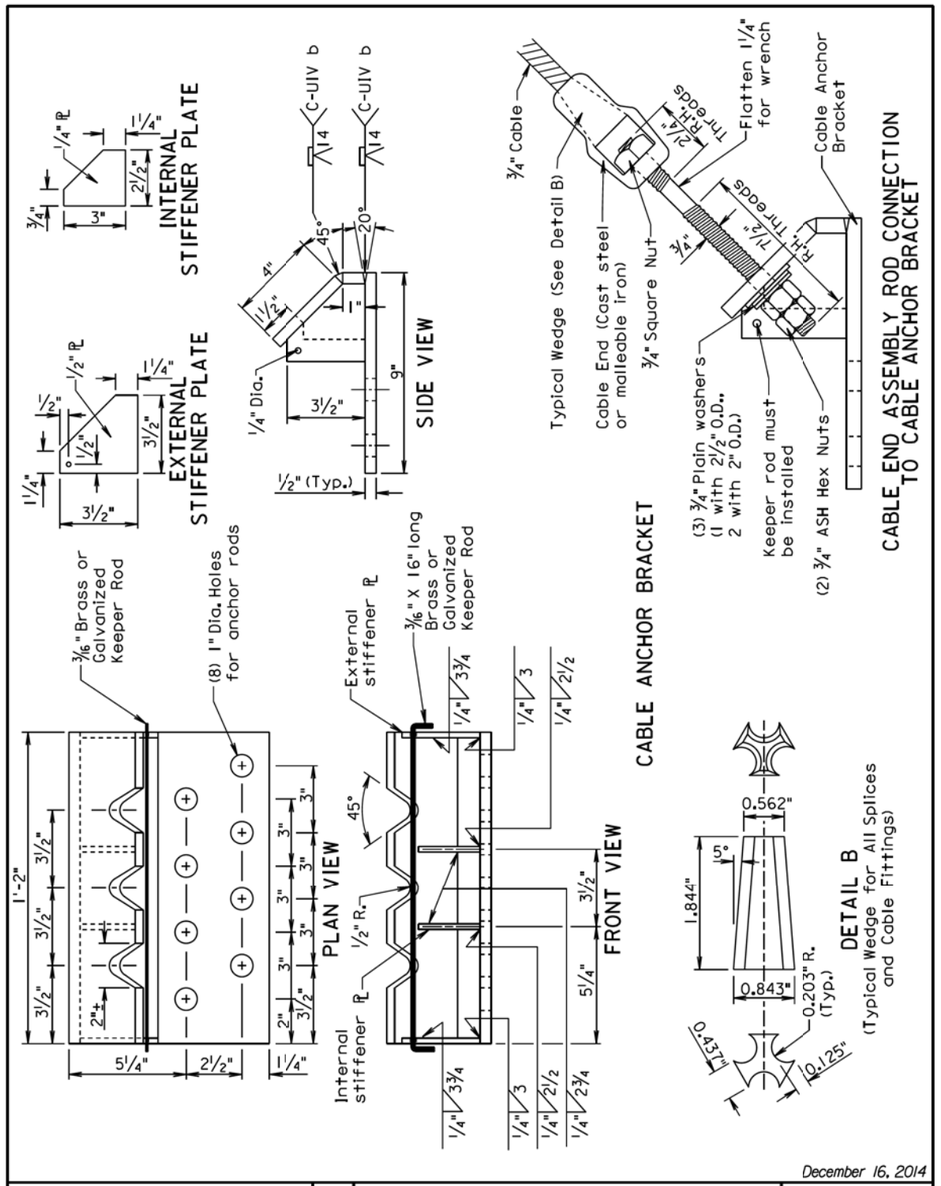
STATE OF SOUTH DAKOTA

Plotting Date: 8/31/2015

PROJECT IM 0292(96)073 IM 2292(90)0

SHEET B113

TOTAL SHEETS B128



December 16, 2014

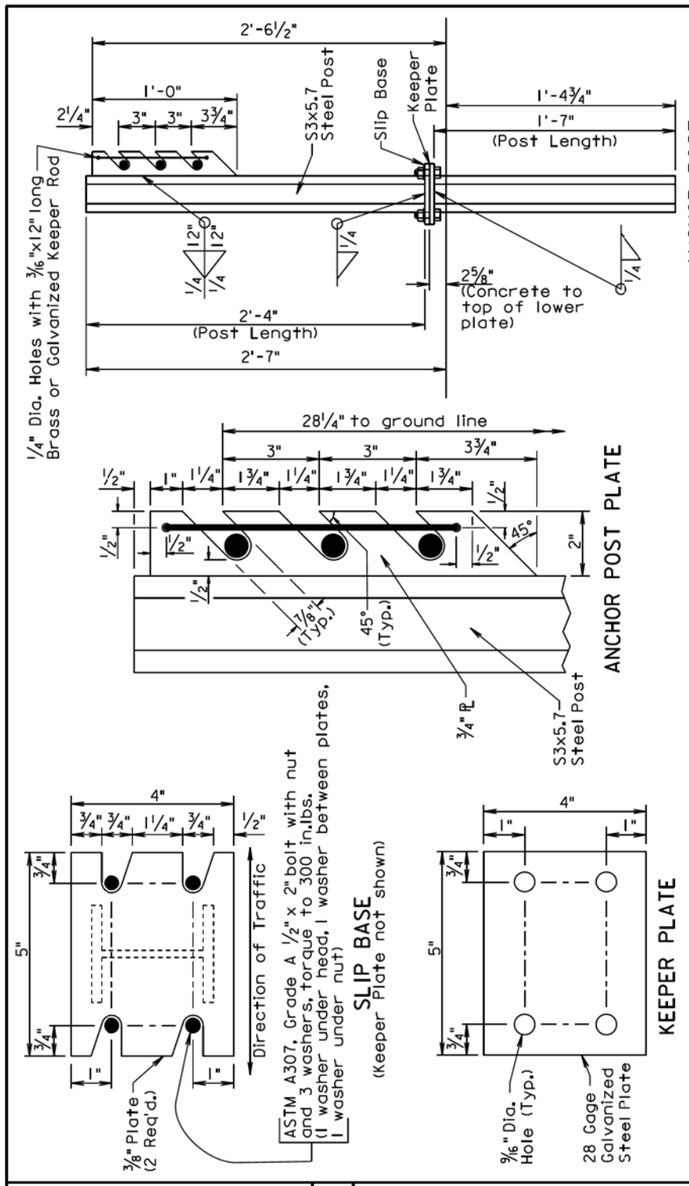
Published Date: 2nd Qtr. 2015

SDDOT

3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY

PLATE NUMBER 629.10

Sheet 2 of 3



GENERAL NOTES:

Anchor post shall be a S3x5.7 rolled steel section. Post and plates shall conform to ASTM A36 and shall be galvanized in accordance with ASTM A123.

3/4" round wire cable shall consist of three strands (7 wires per strand) and have a minimum tensile strength of 25,000 pounds.

Cast steel elements shall conform to AASHTO M103 (ASTM 27-73) grade U-60-30.

All costs associated with furnishing and constructing the 3 cable guardrail slip base anchor assembly including the concrete anchor, cable anchor bracket, anchor bolts, plates, slip base stub post, anchor post, steel turnbuckles, cable ends, U-bolt cable clips, and necessary hardware shall be incidental to the contract unit price per each for "3 Cable Guardrail Slip Base Anchor Assembly".

December 16, 2014

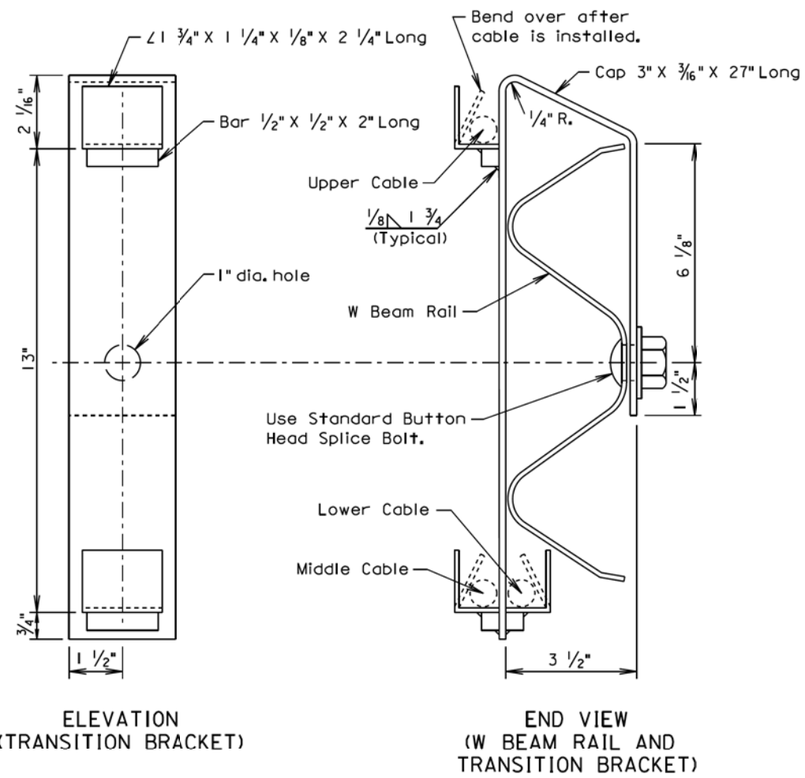
Published Date: 2nd Qtr. 2015

SDDOT

3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY

PLATE NUMBER 629.10

Sheet 3 of 3

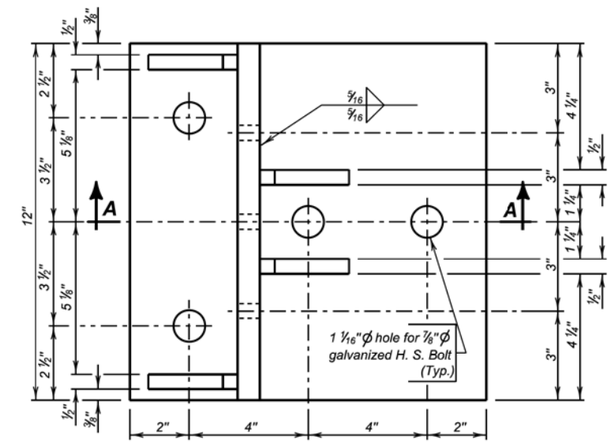


GENERAL NOTES:

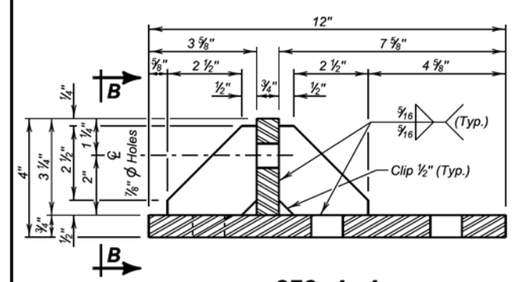
Steel used in the fabrication of the bracket shall conform to ASTM A36 and the bracket shall be galvanized after fabrication in accordance with ASTM A123.

March 31, 2000

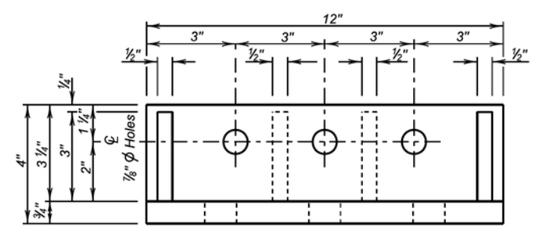
Published Date: 2nd Qtr. 2015	SDDOT	W BEAM TO 3 CABLE TRANSITION BRACKET	PLATE NUMBER 629.15 Sheet 1 of 1



PLAN



SEC. A - A



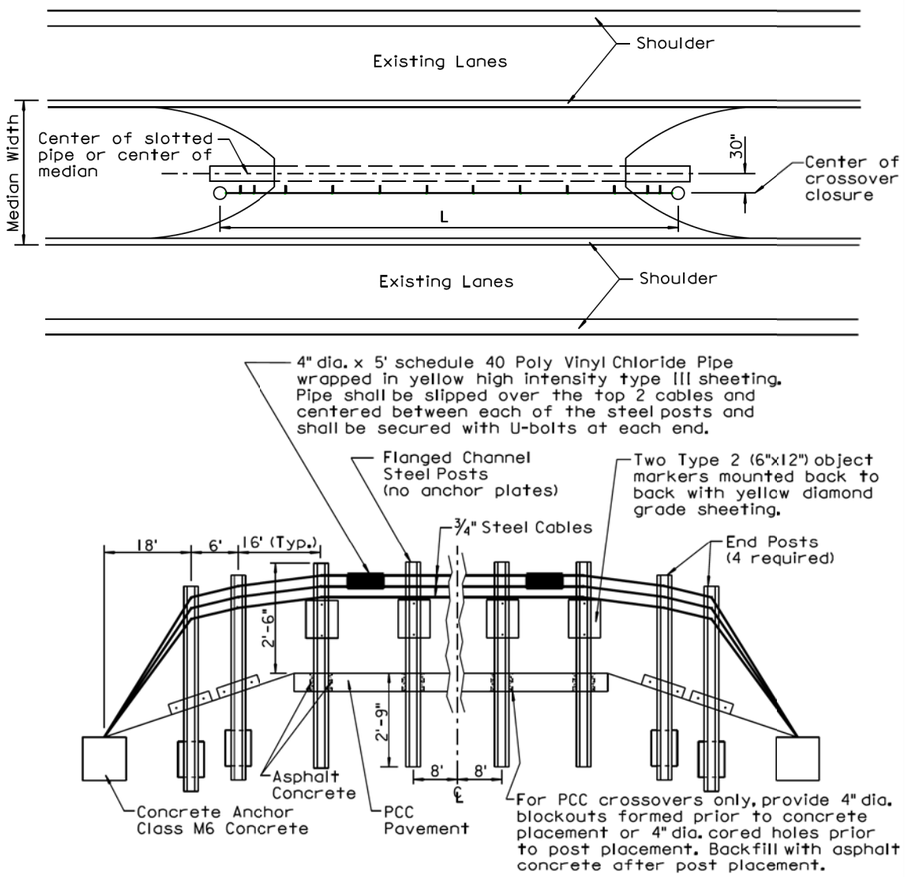
VIEW B - B

GENERAL NOTES:

1. All steel shall conform to ASTM A709 Grade 36.
2. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 (Current Year) Structural Welding Code - Steel.
3. After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).
4. When required, provide ⅞ inch diameter x 2 ½ inch high strength cap screws with heavy hex heads and plate washers. Cap screws shall be galvanized and conform to the requirements of ASTM A307 or A449. Plain washers shall be galvanized and conform to ASTM F844.
5. All Costs associated with furnishing and installing the 3 cable guardrail connection assembly shall be incidental to the contract unit price for the bid items "Class A45 Concrete, Bridge Deck", "Class A45 Concrete, Bridge Repair", or "3 Cable Guardrail", as applicable.

June 26, 2012

Published Date: 2nd Qtr. 2015	SDDOT	3 CABLE GUARDRAIL CONNECTION ASSEMBLY	PLATE NUMBER 629.31 Sheet 1 of 1



MEDIAN WIDTH	NO. OF PVC PIPES	NO. OF U-BOLTS	NO. OF FLANGED CHANNEL STEEL POSTS	NO. OF TYPE 2 OBJECT MARKERS	NO. OF BLOCKOUTS OR CORED HOLES (PCC CROSSOVERS)	PAY LENGTH L
60' and 66'	9	18	10	20	10	224'
80'	7	14	8	16	8	192'

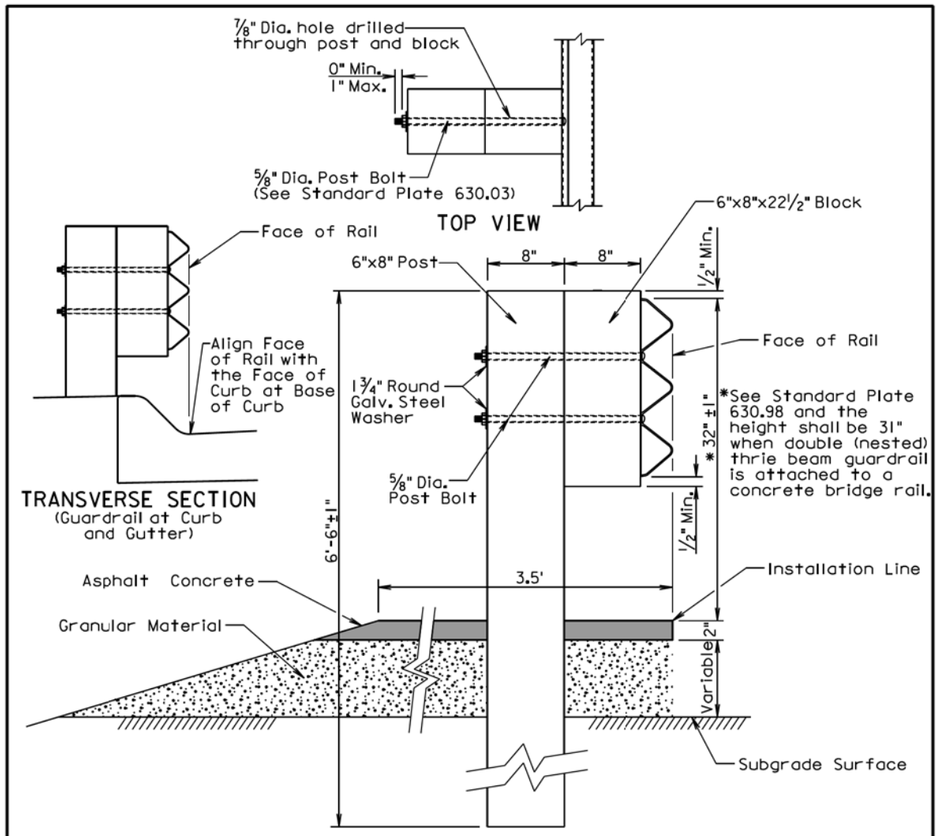
GENERAL NOTES:

All costs for materials, backfilling holes with asphalt concrete, labor, equipment, and incidentals necessary to construct the crossover closure shall be incidental to the contract unit price per Ft for "Crossover Closure". The costs of coring holes or providing blockouts in the surfacing shall be incidental to the surfacing bid item(s).

The Crossover Closure shall be constructed using 3 cable guardrail hardware. For specific details of the 3 cable guardrail hardware and installation, see Standard Plate 629.01 sheets 1 through 6.

March 31, 2000

Published Date: 3rd Qtr. 2015	SDDOT	CROSSOVER CLOSURE	PLATE NUMBER 629.40 Sheet 1 of 1



GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

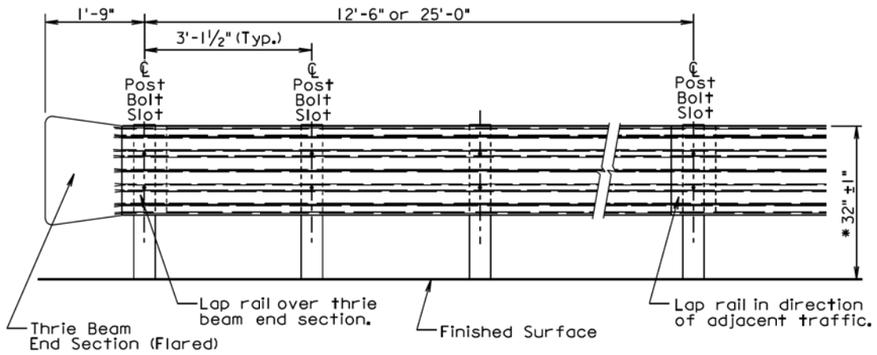
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

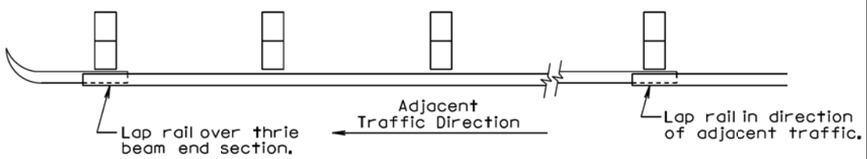
December 23, 2010

Published Date: 2nd Qtr. 2015	SDDOT	THRIE BEAM GUARDRAIL POST INSTALLATION	PLATE NUMBER 630.01 Sheet 1 of 1



ELEVATION

* See Standard Plate 630.98 and the height shall be 31" when double (nested) thrie beam guardrail is attached to a concrete bridge rail.



PLAN

THRIE BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	2'-6"
3'-1½"	1'-9"

For Informational Purposes Only

GENERAL NOTES:

All thrie beam rail shall be Type I.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors. All costs for the Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Thrie beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

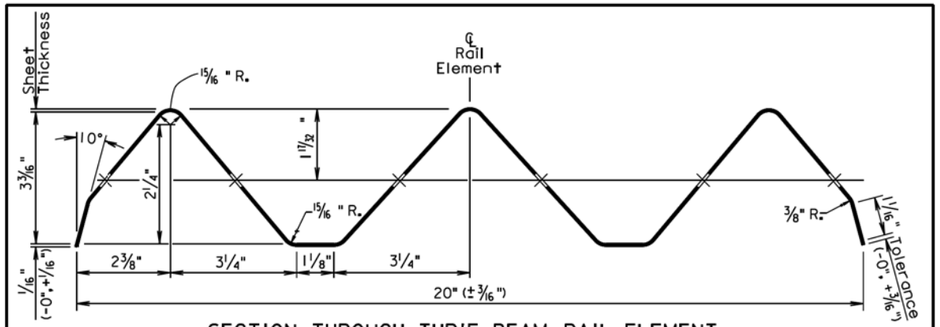
Thrie Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing thrie beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

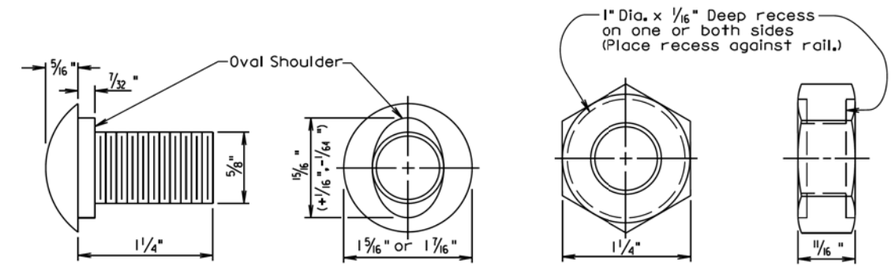
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

December 23, 2010

Published Date: 2nd Qtr. 2015	SDDOT	THRIE BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.02 Sheet 1 of 1

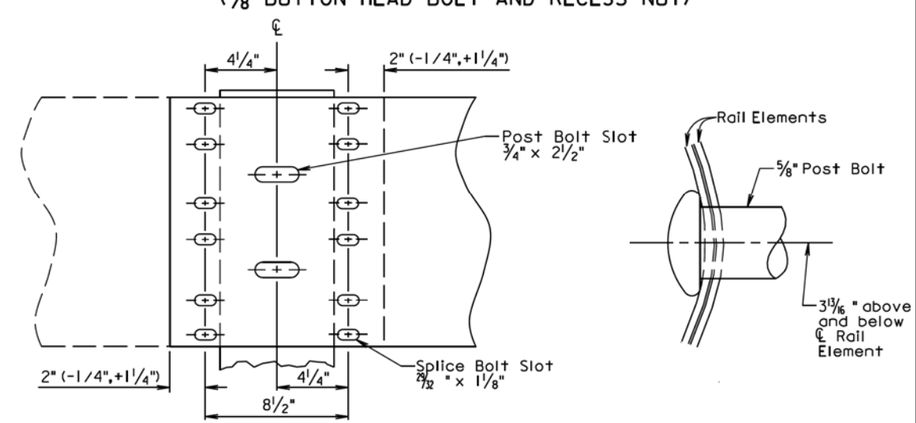


SECTION THROUGH THRIE BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)

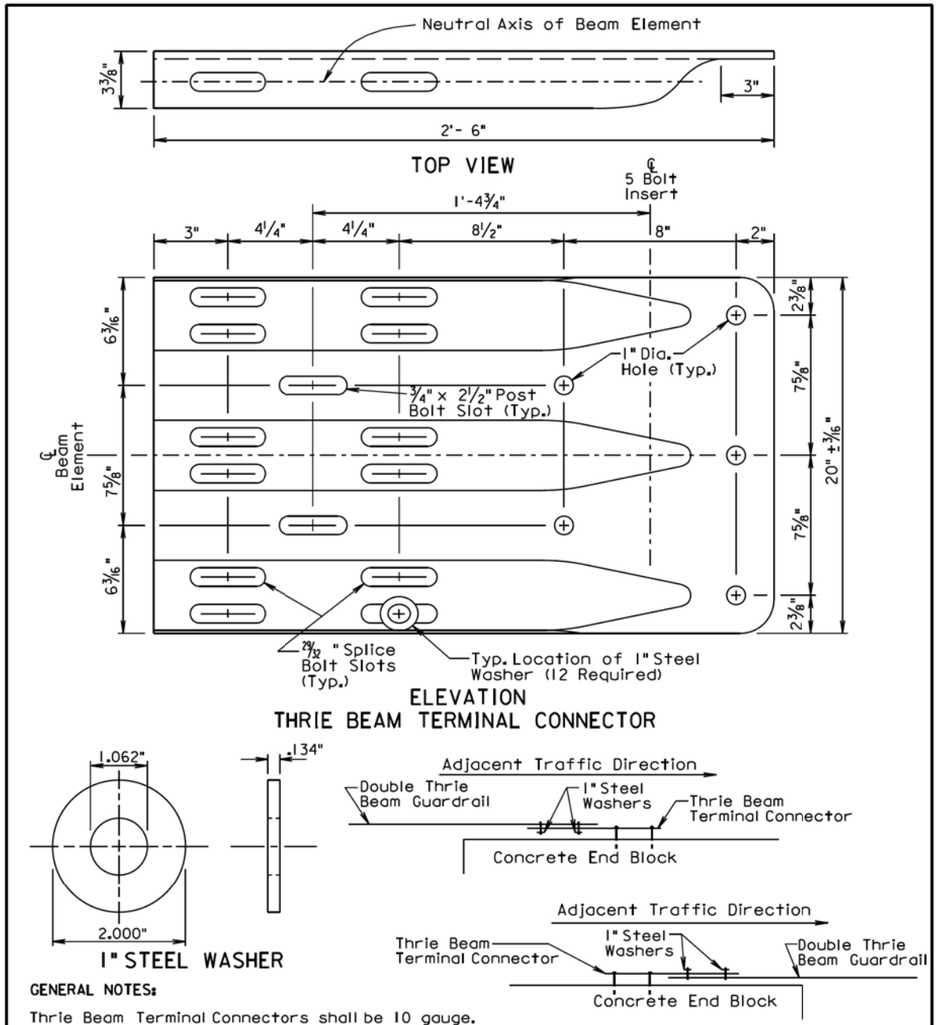


Lap in direction of traffic.

RAIL SPLICE

March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.03 Sheet 1 of 1



GENERAL NOTES:

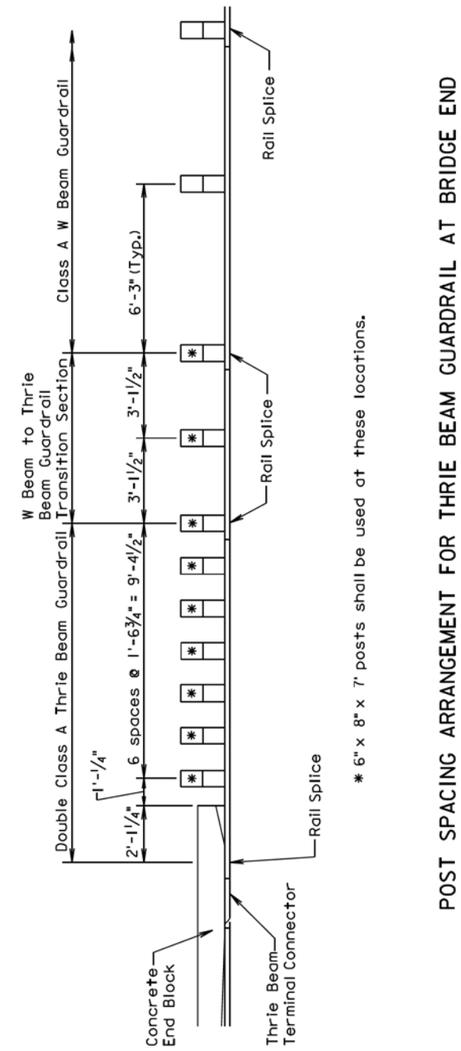
Thrie Beam Terminal Connectors shall be 10 gauge.

When the thrie beam terminal connector is used to connect the rail to the bridge, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the thrie beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the Thrie Beam Terminal Connector. All costs for the Thrie Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

September 14, 2001

Published Date: 2nd Qtr. 2015	SDDOT	THRIE BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER	PLATE NUMBER 630.05 Sheet 1 of 1

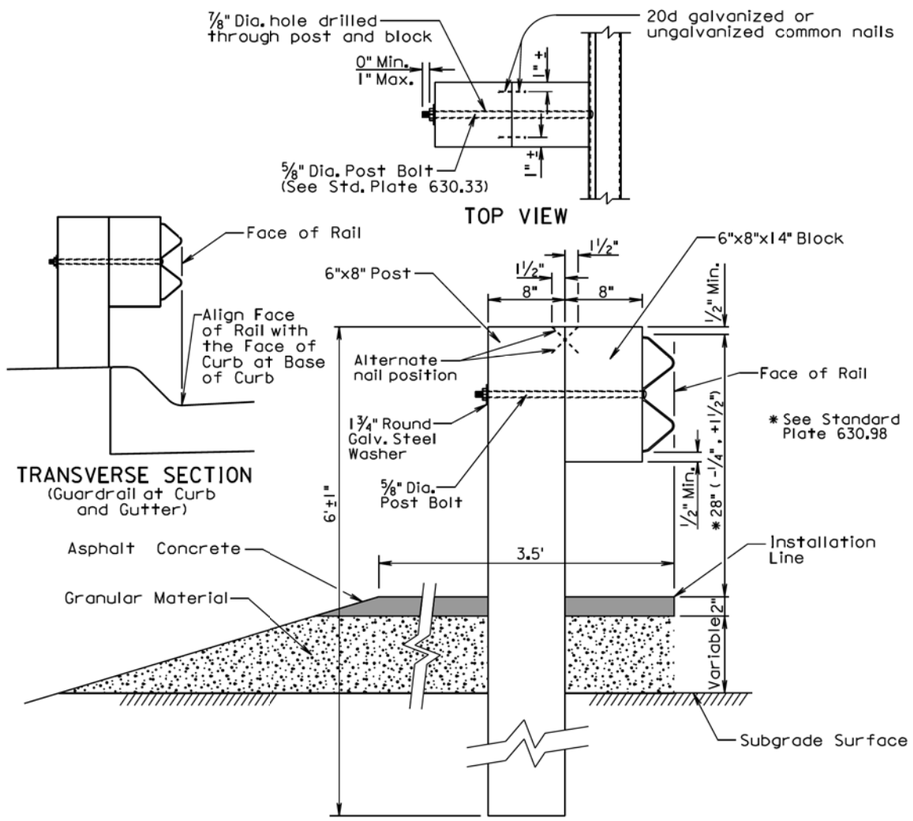


* 6" x 8" x 7' posts shall be used at these locations.

POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

Published Date: 2nd Qtr. 2015	SDDOT	POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END	PLATE NUMBER 630.15 Sheet 1 of 1



TRANSVERSE SECTION

GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

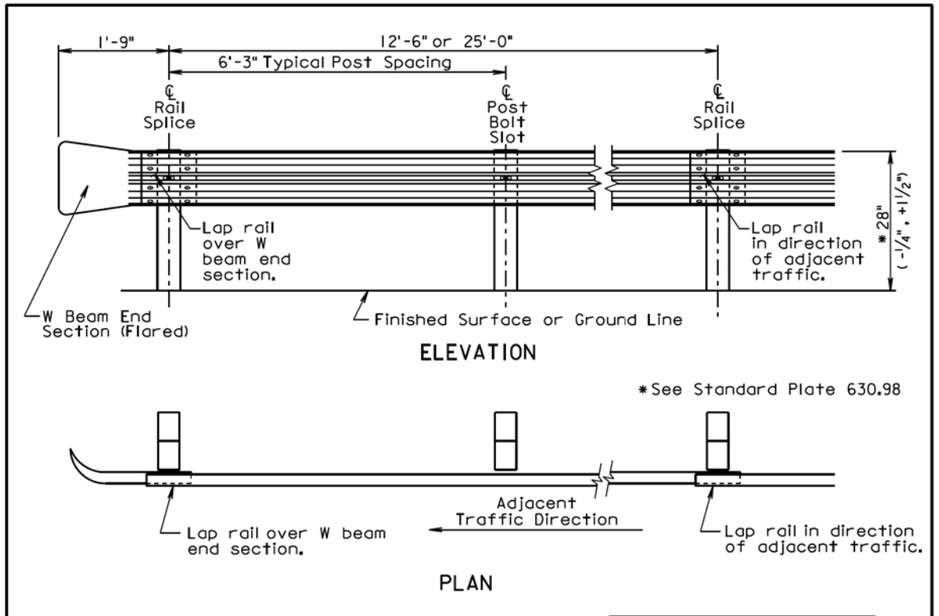
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

December 23, 2010

Published Date: 2nd Qtr. 2015	SDDOT	W BEAM GUARDRAIL POST INSTALLATION	PLATE NUMBER 630.31
			Sheet 1 of 1



W BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	5'-0"
3'-1 1/2"	3'-9"

For Informational Purposes Only

GENERAL NOTES:

All W beam rail shall be Type 1.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared) and W Beam Terminal Connectors. All costs for the W Beam End Sections (Flared) and W Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

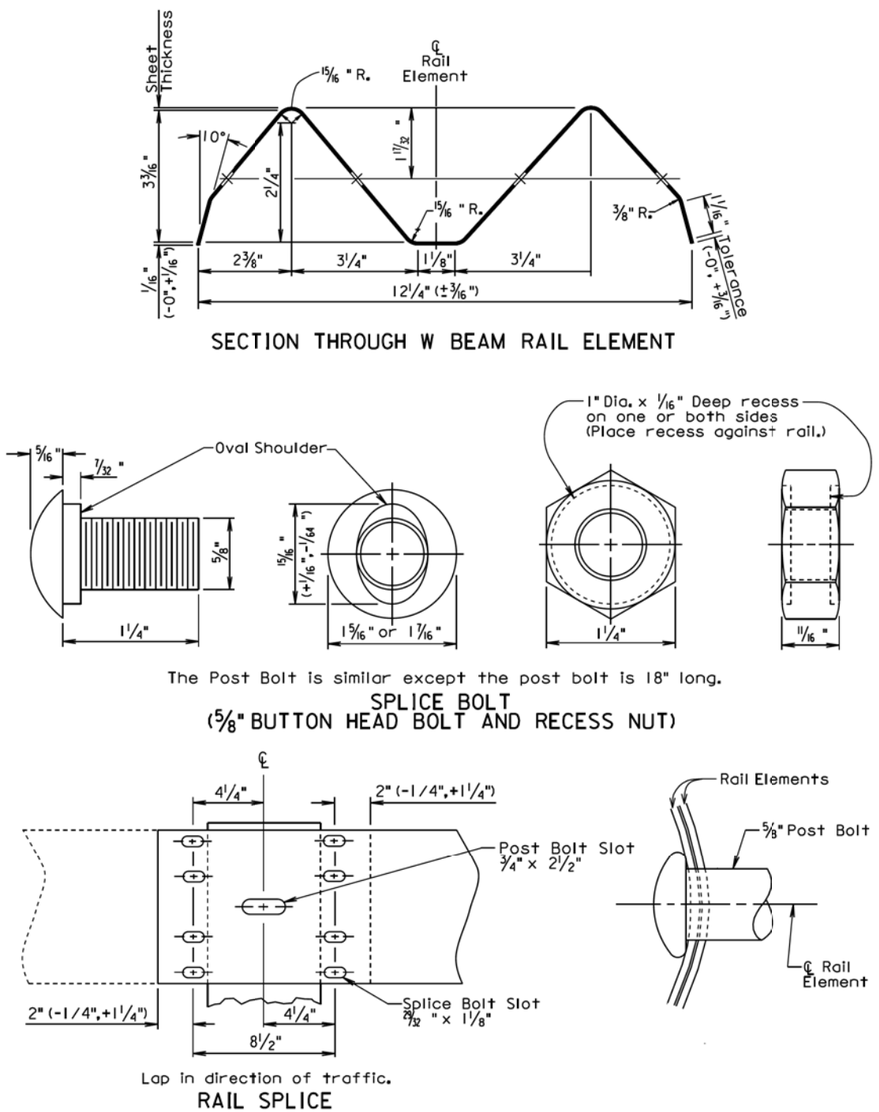
W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing W beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

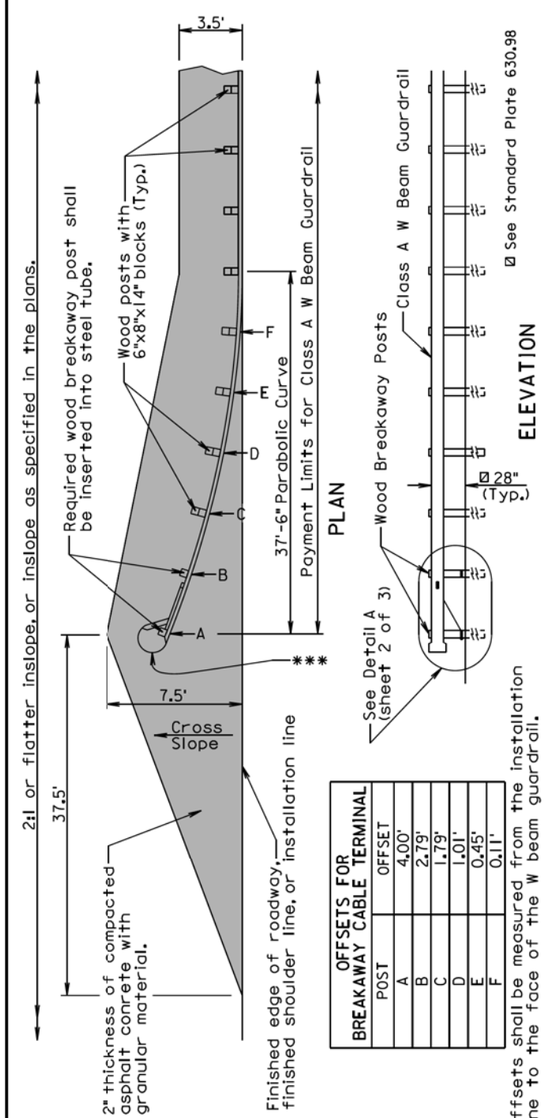
December 16, 2014

Published Date: 2nd Qtr. 2015	SDDOT	W BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.32
			Sheet 1 of 1



December 23, 2004

Published Date: 2nd Qtr. 2015	SDDOT	W BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.33 Sheet 1 of 1



OFFSETS FOR BREAKAWAY CABLE TERMINAL

POST	OFFSET
A	4.00'
B	2.79'
C	1.79'
D	1.01'
E	0.45'
F	0.11'

Offsets shall be measured from the installation line to the face of the W beam guardrail.

GENERAL NOTES:

The finished embankment surfacing cross slope shall match the roadway cross slope; however, if a steeper cross slope is necessary the steepest allowable cross slope is 10:1.

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."

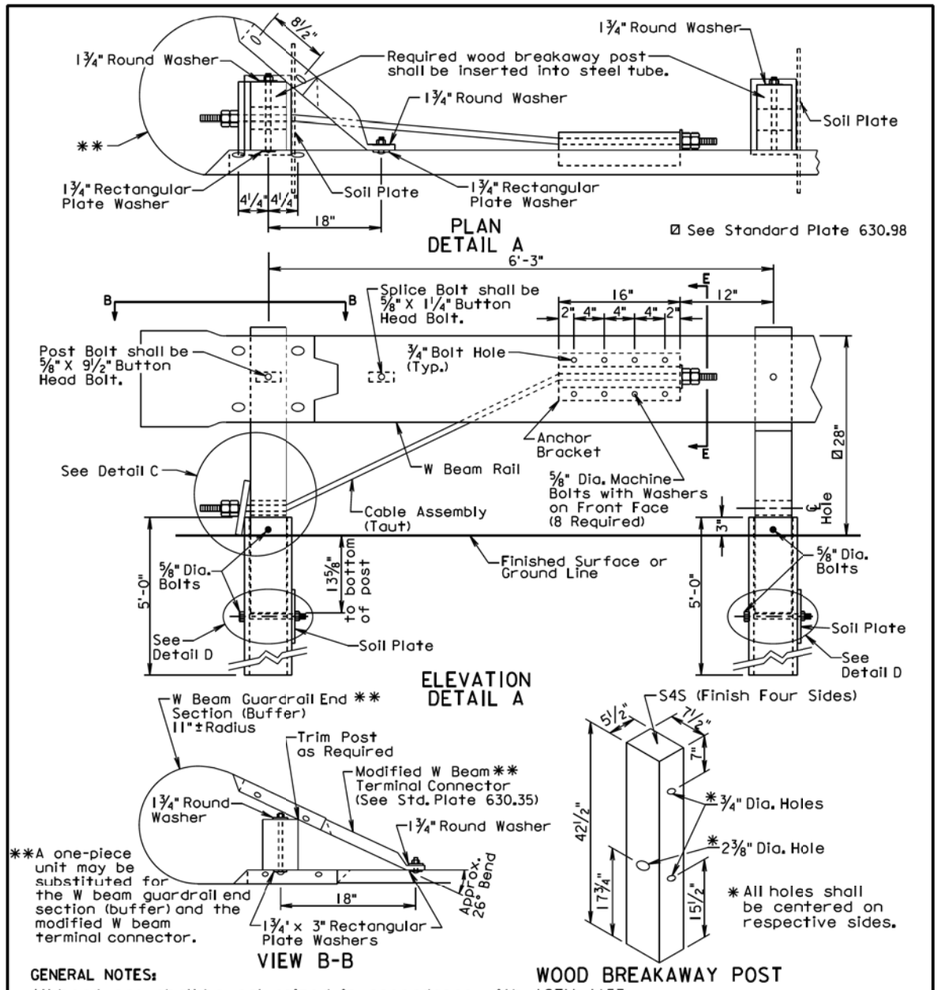
Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

***An adhesive object marker shall be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.

Costs for constructing the W Beam Guardrail Breakaway Cable Terminal including labor, equipment, and materials including the anchor bracket, cable assembly, steel tubes, soil plates, bearing plate, pipe sleeve, W beam end section buffer, modified W beam connector, and all necessary hardware shall be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

December 16, 2014

Published Date: 3rd Qtr. 2015	SDDOT	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47 Sheet 1 of 3



GENERAL NOTES:

All hardware shall be galvanized in accordance with ASTM A153.

The steel tubes shall meet the requirements of ASTM Specification A500, Grade B, and shall be galvanized after fabrication in accordance with the requirements of AASHTO Specification M111.

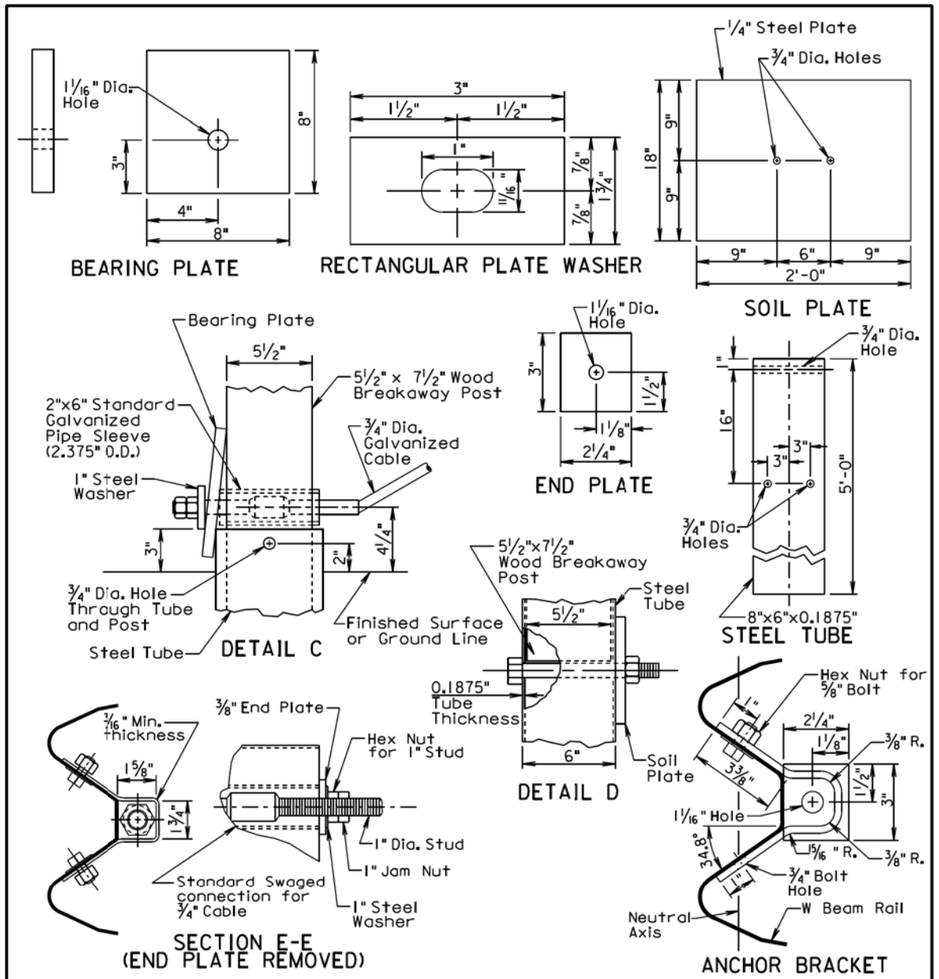
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

The W Beam End Section (Buffer) shall be 12 gage galvanized steel.

The cable shall be ¾", Type II, with Class A coating in conformance with AASHTO M30.

December 16, 2014

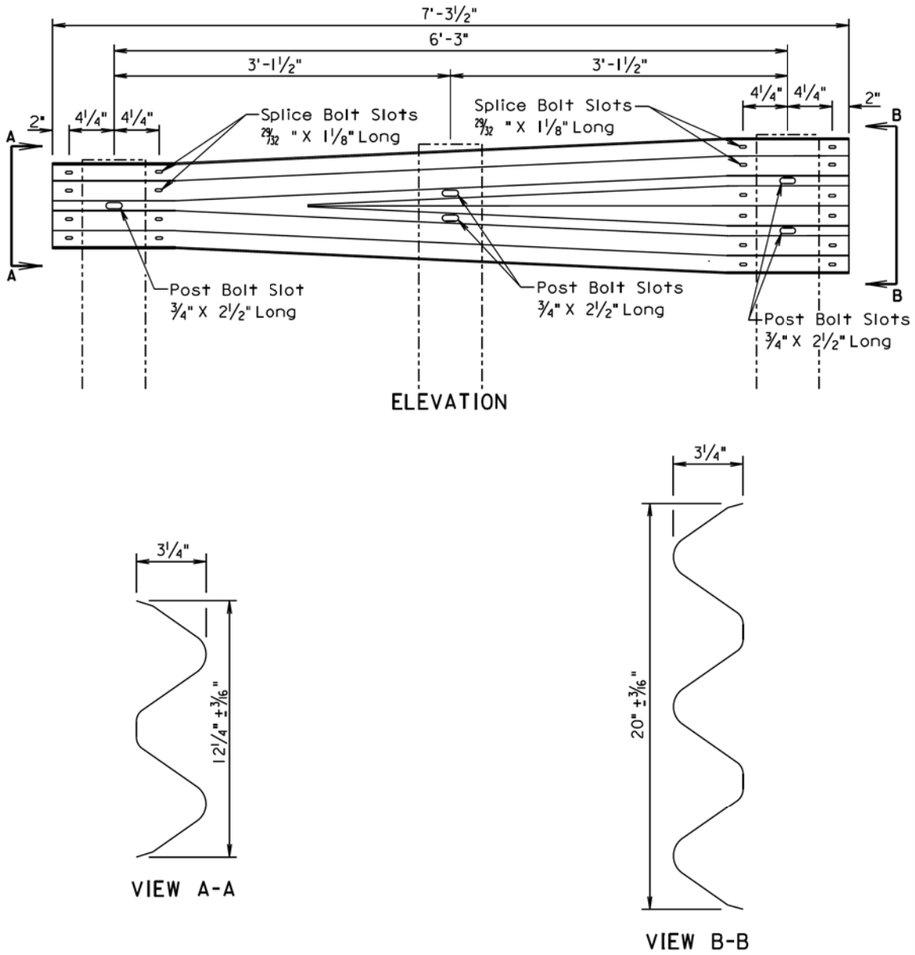
Published Date: 3rd Qtr. 2015	SDDOT	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 2 of 3



December 16, 2014

Published Date: 3rd Qtr. 2015	SDDOT	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 3 of 3

Plot Scale - 1:200
Plotted From - geoff babovec
Plot Name - 103
File - ...\rdprj\LINC01QS\PlateB-22.dgn

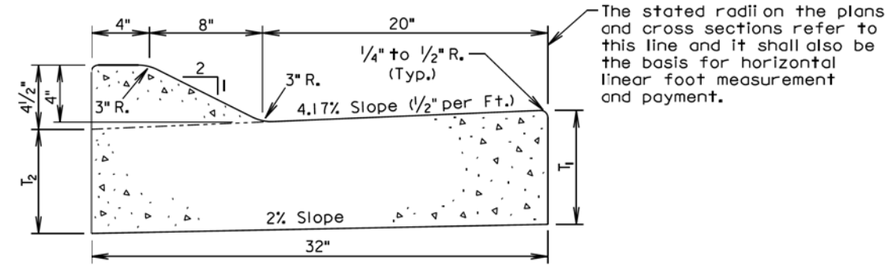


GENERAL NOTE:

All costs for constructing the W Beam to Thrie Beam Guardrail Transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION	PLATE NUMBER 630.82 Sheet 1 of 1



Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
D46	6	5 5/16	0.056	18.0
D47	7	6 5/16	0.064	15.7
D48	8	7 5/16	0.072	13.9
D48.5	8.5	7 13/16	0.076	13.1
D49	9	8 5/16	0.080	12.5
D49.5	9.5	8 13/16	0.084	11.9
D410	10	9 5/16	0.088	11.3
D410.5	10.5	9 13/16	0.093	10.8
D411	11	10 5/16	0.097	10.3
D411.5	11.5	10 13/16	0.101	9.9
D412	12	11 5/16	0.105	9.5

GENERAL NOTES:

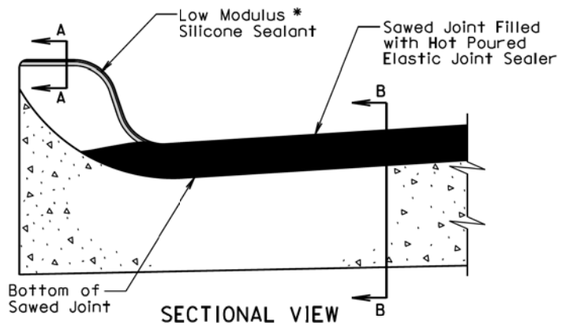
When concrete curb and gutter longitudinally adjoins new concrete pavement, the method of attachment shall be by one of the methods shown on Standard Plate 380.11.

See Standard Plate 650.90 for expansion and contraction joints in the curb and gutter.

September 6, 2006

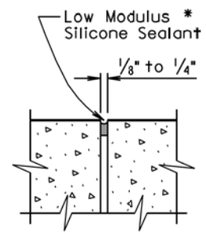
Published Date: 3rd Qtr. 2015	SDDOT	TYPE D CONCRETE CURB AND GUTTER	PLATE NUMBER 650.15 Sheet 1 of 1

Plotted From - geoff babovec
Plot Scale - 1:200
Plot Name - 104
File - ...\rdproj\LINC01QS\PlateB-23.dgn

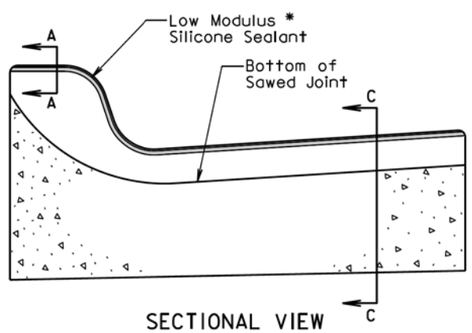


SECTIONAL VIEW

(Curb and Gutter Placed Monolithic with Adjacent Mainline PCC Pavement)

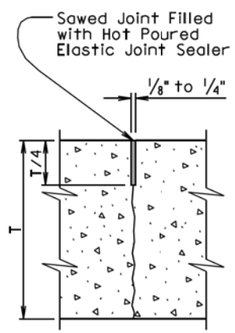


SECTION A-A

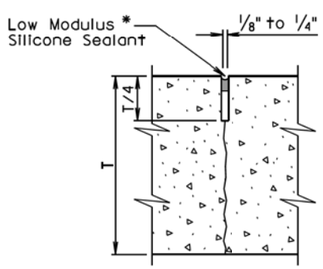


SECTIONAL VIEW

(Curb and Gutter not Placed Monolithic with Adjacent Mainline PCC Pavement or Mainline Surfacing is not PCC Pavement)



SECTION B-B

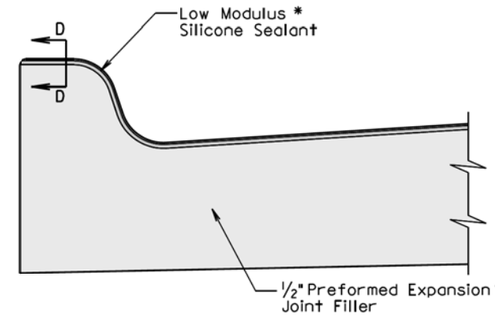


SECTION C-C

* The silicone sealant shall be placed such that it completely seals the joint and is bonded to the sides of the clean joint as approved by the Engineer.

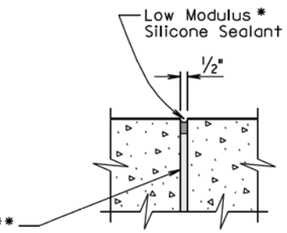
September 6, 2013

Published Date: 3rd Qtr. 2015	SDDOT	JOINTS IN CONCRETE CURB AND GUTTER	PLATE NUMBER 650.90
			Sheet 1 of 2



SECTIONAL VIEW

(Curb and Gutter at 1/2" Preformed Expansion Joint Filler Location)



SECTION D-D

* The silicone sealant shall be placed such that it completely seals the joint and is bonded to the sides of the clean joint as approved by the Engineer.

GENERAL NOTES:

For illustrative reason, only the type B curb and gutter is shown.

** A 1/2" preformed expansion joint filler shall be placed transversely in the curb and gutter at the following locations:

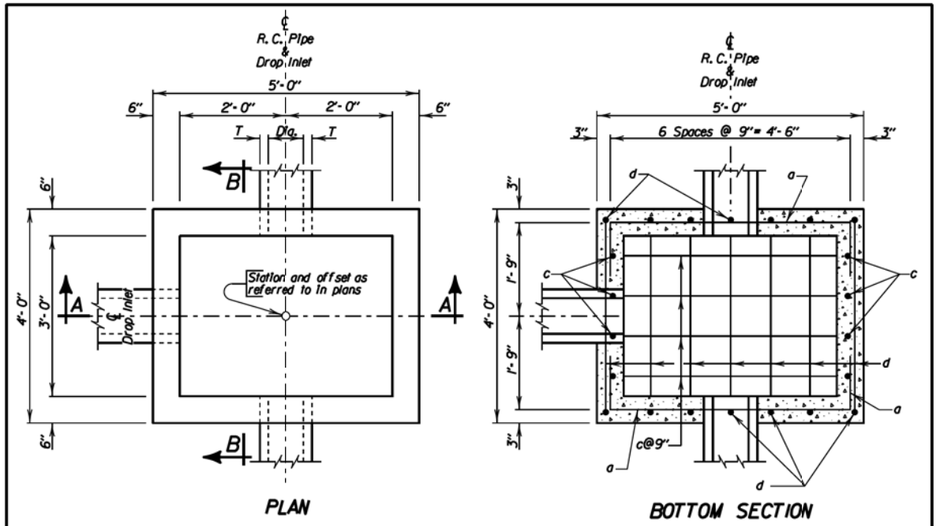
1. At each junction between the radius return of curb and gutter and curb and gutter which is parallel to the project centerline.
2. At each junction between new curb and gutter and existing curb and gutter.

Transverse contraction joints shall be constructed at 10' intervals in the concrete curb and gutter except when the concrete curb and gutter is constructed adjacent to mainline PCC pavement. When concrete curb and gutter is constructed adjacent to mainline PCC pavement, a transverse contraction joint shall be constructed in the concrete curb and gutter at each mainline PCC pavement transverse contraction joint location.

When concrete curb and gutter is not placed monolithically with the mainline PCC pavement or when the adjacent mainline surfacing is not PCC concrete, the transverse contraction joints in the concrete curb and gutter shall be 1 1/2 inches deep if formed in the fresh concrete using a suitable grooving tool. If a saw is used to cut the contraction joints, then the depth of the joint shall be at least 1/4 the thickness of the concrete and the joint shall be sealed in accordance with the details shown above.

September 6, 2013

Published Date: 3rd Qtr. 2015	SDDOT	JOINTS IN CONCRETE CURB AND GUTTER	PLATE NUMBER 650.90
			Sheet 2 of 2



PIPE DISPLACEMENT REDUCTIONS		
R.C. Pipe Diameter Inches	T Inches	Class M6 Concrete Cu'd
12	2	0.03
15	2 1/4	0.04
18	2 1/2	0.05
24	3	0.09
30	3 1/2	0.14
36	4	0.20

ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
✳ Class M6 Concrete	Cu'd	0.43	0.29H
Reinforcing Steel	Lb	57	26.72H
Frame and Grate	Each	1	———

DROP INLETS FOR 12" TO 36" DIAMETER PIPE

GENERAL NOTES:

✳ Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts.

Reinforcing steel shall conform to ASTM A615 Grade 60. The b bars shall be lapped 12 inches. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Pipe shall not enter through a corner of the drop inlet.

Use 2" clear cover on all reinforcing steel unless otherwise noted.

Precasting of reinforced drop inlets will be permissible. Prior to precasting, the Contractor shall submit details to the Engineer for approval.

Maximum pipe diameter shall not exceed 27 inches on the 4 foot wide side and shall not exceed 36 inches on the 5 foot wide side of the drop inlet.

The dimension of H is in feet.

December 23, 2009

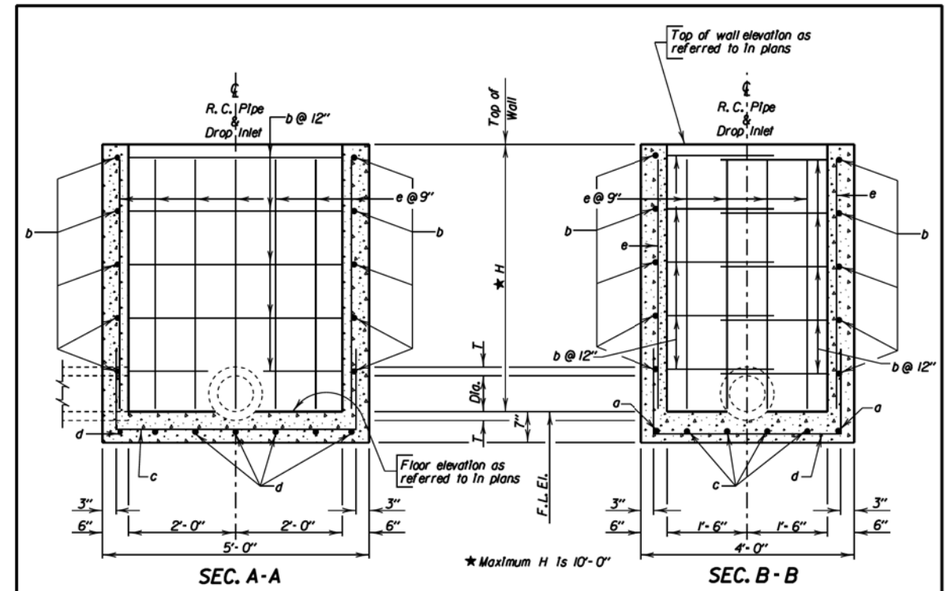
Published Date: 2nd Qtr. 2015

SDDOT

3'X 4' TYPE C
REINFORCED CONCRETE DROP INLET

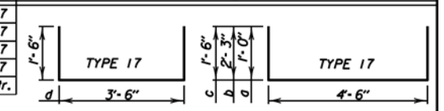
PLATE NUMBER
670.10

Sheet 1 of 2



DROP INLETS FOR 12" TO 36" DIAMETER PIPE

REINFORCING SCHEDULE					
Mk.	No.	Size	Length	Type	Bending Details
a	2	4	6'-6"	17	
b	2H	4	9'-0"	17	
c	4	4	7'-6"	17	
d	7	4	6'-6"	17	
e	22	4	H - 2"	Str.	



NOTE: All dimensions are out to out of bars.

December 23, 2009

Published Date: 2nd Qtr. 2015

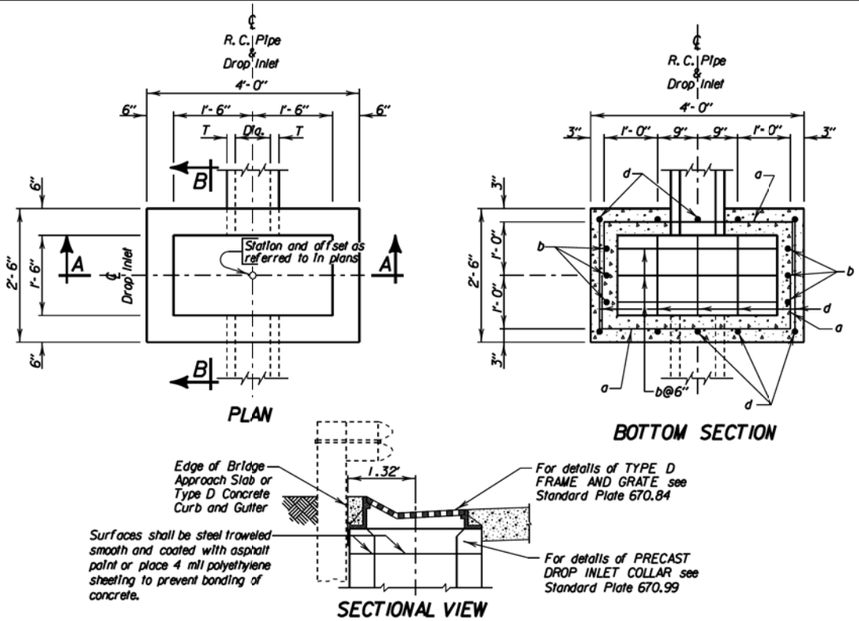
SDDOT

3'X 4' TYPE C
REINFORCED CONCRETE DROP INLET

PLATE NUMBER
670.10

Sheet 2 of 2

Plotted From - geoff babovec
Plot Scale - 1:200
Plot Name - 106
File - ...\rdprj\LINC01QS\PlateB-25.dgn



ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
✳ Class M6 Concrete	Cu Yd	0.22	0.20H
Reinforcing Steel	Lb	37	19.37H
Frame and Grate	Each	1	———

DROP INLETS FOR 12" TO 27" DIAMETER PIPE

GENERAL NOTES:

✳ Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts.

Reinforcing steel shall conform to ASTM A615 Grade 60. The b bars shall be lapped 12 inches. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Pipe shall not enter through a corner of the drop inlet.

Use 2" clear cover on all reinforcing steel unless otherwise noted.

Precasting of reinforced drop inlets will be permissible. Prior to precasting, the Contractor shall submit details to the Engineer for approval.

Maximum pipe diameter shall not exceed 12 inches on the 2.5 foot wide side and shall not exceed 27 inches on the 4 foot wide side of the drop inlet.

The dimension of H is in feet.

PIPE DISPLACEMENT REDUCTIONS

R.C. Pipe Diameter Inches	T Inches	Class M6 Concrete Cu Yd
12	2	0.03
15	2 1/4	0.04
18	2 1/2	0.05
24	3	0.09
27	3 1/4	0.11

December 23, 2009

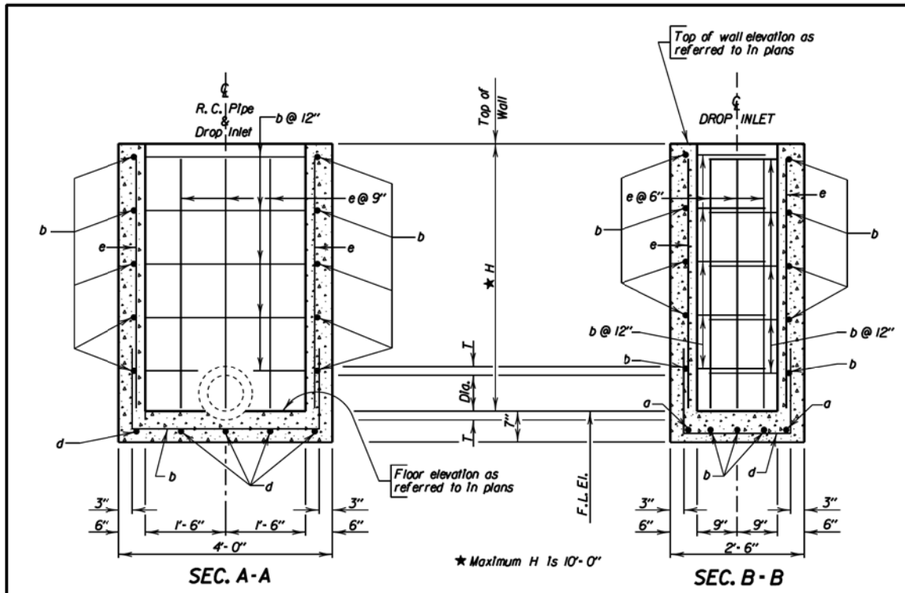
Published Date: 2nd Qtr. 2015

SDDOT

1.5' X 3' TYPE D
REINFORCED CONCRETE DROP INLET

PLATE NUMBER
670.20

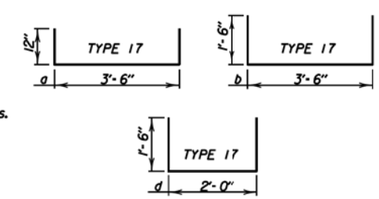
Sheet 1 of 2



DROP INLETS FOR 12" TO 27" DIAMETER PIPE

REINFORCING SCHEDULE

MK.	No.	Size	Length	Type	Bending Details
a	2	4	5'-6"	17	
b	3+2H	4	6'-6"	17	
d	5	4	5'-0"	17	
e	16	4	H - 2"	Str.	



NOTE:
All dimensions are out to out of bars.

December 23, 2009

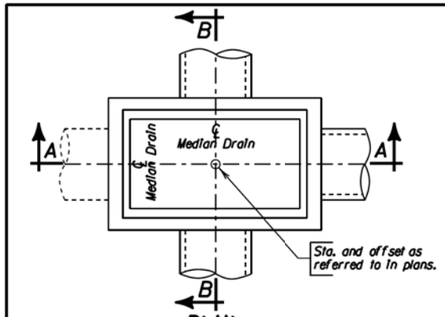
Published Date: 2nd Qtr. 2015

SDDOT

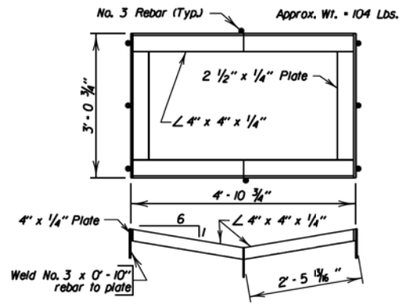
1.5' X 3' TYPE D
REINFORCED CONCRETE DROP INLET

PLATE NUMBER
670.20

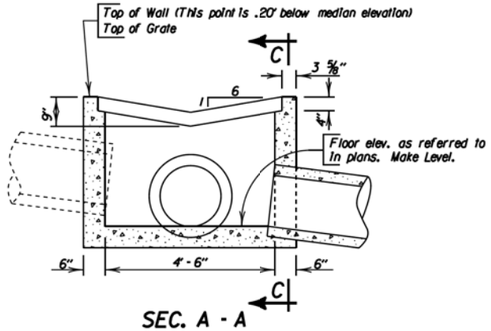
Sheet 2 of 2



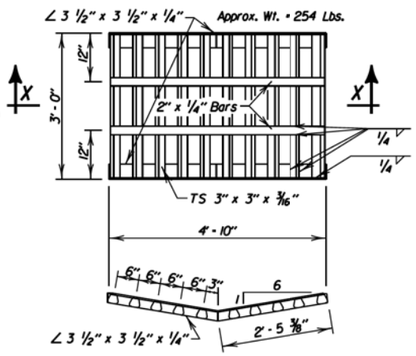
PLAN
(FRAME AND GRATE ASSEMBLY NOT SHOWN)



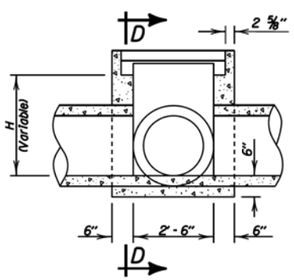
FRAME DETAIL



SEC. A - A



SEC. X - X
GRATE DETAIL



SEC. B - B

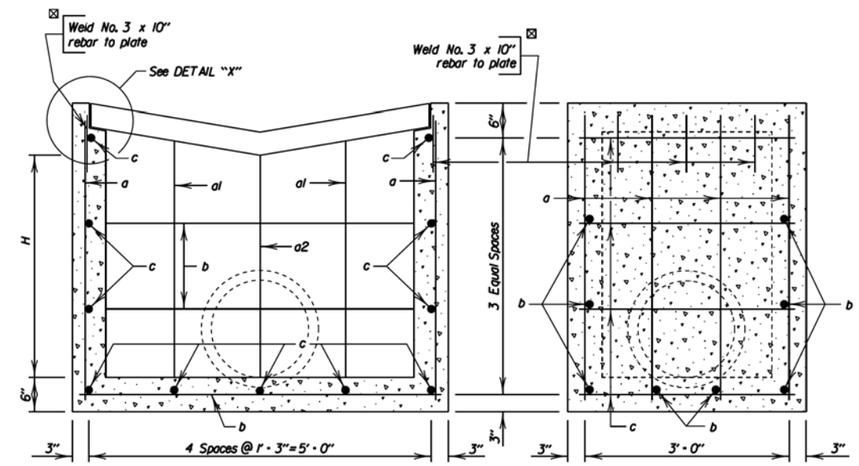
ESTIMATED QUANTITIES			
Item	Unit	Constant Quantity	Variable Quantity
✳ Class M6 Concrete	Cu Yd	0.49	0.30H
Reinforcing Steel	Lb	61	9.35H
Type M Frame and Grate Assembly	Each	1	——

✳ Reduce total quantities of concrete by the volume displaced by the pipe.

PIPE DISPLACEMENT REDUCTIONS		
R.C. Pipe Diameter Inches	T Inches	Class M6 Concrete Cu Yd
12	2	0.026
15	2 1/4	0.038
18	2 1/2	0.053
24	3	0.091
30	3 1/2	0.138
36	4	0.196
42	4 1/2	0.263

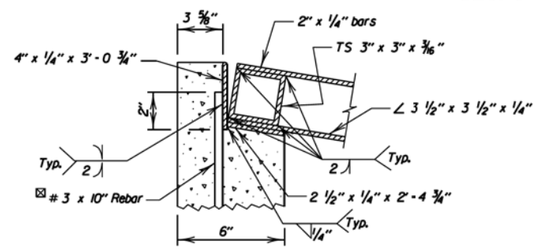
September 6, 2014

Published Date: 3rd Qtr. 2015 | SDDOT | TYPE M MEDIAN DRAIN | PLATE NUMBER 670.65 | Sheet 1 of 2



SEC. D - D

SEC. C - C



DETAIL "X"

GENERAL NOTES:

Maximum H = 4'-0"

The dimension of H is in feet.

The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Cut and bend reinforcing steel during construction as necessary to accommodate pipe outlet.

All Concrete shall be Class M6.

All reinforcing steel shall conform to ASTM A615 Grade 60.

☒ The No. 3 X 10" rebar may conform to ASTM A706.

All structural steel shall conform to ASTM A36. Tubes shall conform to ASTM A500 or A501.

All exposed edges shall be chamfered 3/4 inch.

Use 1 1/2 inch clear cover on all reinforcing steel except as shown.

After welding is complete, galvanize the frame and grate assembly in accordance with AASHTO M111 (ASTM A123).
For information only, the estimated weight of the frame and grate assembly is 358 pounds.

Type M Median Drain shall be paid for at the contract unit price per each or by the individual bid items as shown in the plans, which shall be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.

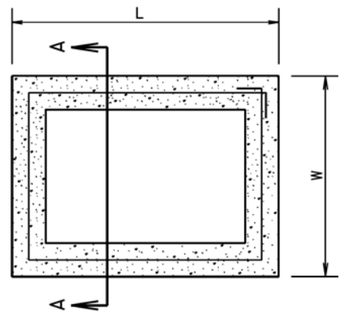
The location and size of pipe outlet from the drain shall be as noted on cross section sheets.

REINFORCING SCHEDULE (For 1 drain)				
Mk.	No.	Size	Length	Type
a	8	4	H + 12"	Str.
a1	4	4	H + 10"	Str.
a2	2	4	H + 9"	Str.
b	8	4	5'-3"	Str.
c	11	4	3'-3"	Str.

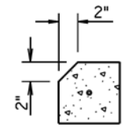
NOTE:
All dimensions are out to out of bars.

September 6, 2014

Published Date: 3rd Qtr. 2015 | SDDOT | TYPE M MEDIAN DRAIN | PLATE NUMBER 670.65 | Sheet 2 of 2

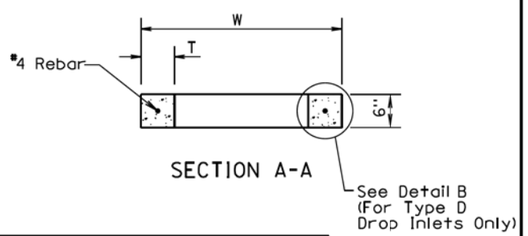


PLAN VIEW



For Type D Drop Inlets only:
Use Precast Drop Inlet Collar with 2" chamfer on L sides only.

DETAIL B



SECTION A-A

INFORMATIONAL QUANTITIES

FRAME AND GRATE TYPE	L Ft-In	W Ft-In	T In	CLASS M6 CONCRETE CuYd	REINFORCING STEEL Lb
TYPE B	4'-0"	3'-0"	6	0.11	9
TYPE C	5'-0"	4'-0"	6	0.15	11
TYPE D	4'-0"	2'-6"	6	0.10	8

GENERAL NOTES:

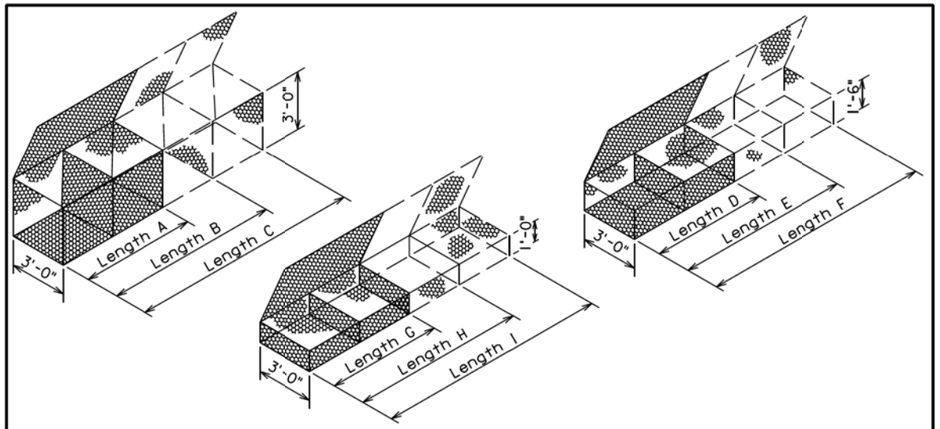
All reinforcing steel shall conform to ASTM A615, Grade 60.

The ½" diameter bar shall lap 6"± and shall be centered in the concrete.

The cost of furnishing and installing Precast Drop Inlet Collars, including labor, materials, and incidentals shall be incidental to the contract unit price per Each for "Precast Drop Inlet Collar".

March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	***PRECAST DROP INLET COLLAR***	*PLATE NUMBER* 670.99 *Sheet 1 of 1*



GABION DETAILS

STANDARD SIZES

SIZE	LENGTH	WIDTH	HEIGHT	NUMBER OF CELLS	CAPACITY, Cu. Yd.
A	6'-0"	3'-0"	3'-0"	2	2.0
B	9'-0"	3'-0"	3'-0"	3	3.0
C	12'-0"	3'-0"	3'-0"	4	4.0
D	6'-0"	3'-0"	1'-6"	2	1.0
E	9'-0"	3'-0"	1'-6"	3	1.5
F	12'-0"	3'-0"	1'-6"	4	2.0
G	6'-0"	3'-0"	1'-0"	2	0.7
H	9'-0"	3'-0"	1'-0"	3	1.0
I	12'-0"	3'-0"	1'-0"	4	1.3

Above Dimensions subject to mill tolerances.

GENERAL NOTES:

Lacing and internal connecting wire shall be 0.0866 inch diameter steel wire ASTM A641 Class 3 soft temper measured after galvanizing and for PVC coated gabions shall be 0.0866 inch diameter steel wire measured after galvanizing but before PVC coating.

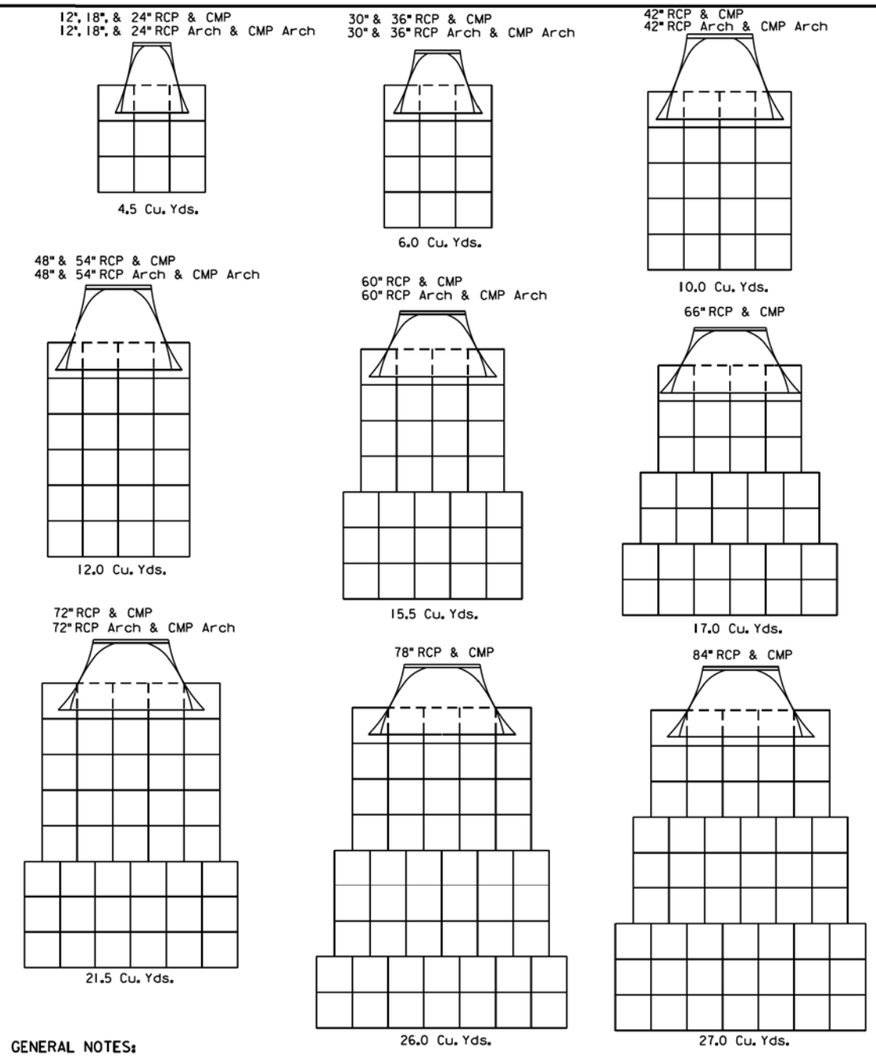
The lacing procedure is as follows:
1. Cut a length of lacing wire approximately 1 ½ times the distance to be laced but not exceeding 5 feet.
2. Secure the wire terminal at the corner by looping and twisting.
3. Proceed lacing with alternating single and double loops at a spacing not to exceed 6 inches.
4. Securely fasten the other lacing wire terminal.

Wire lacing or interlocking type fasteners shall be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions shall be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing shall conform to ASTM A641-92 Class 3 coating. Fasteners shall also be in accordance with ASTM A764, Class II, Type III.

Interlocking fasteners for PVC coated gabions shall be high tensile 0.120 inch diameter stainless steel wire conforming to ASTM A313, Type 302, Class I. The spacing of the interlocking fasteners during all phases of assembly and construction shall not exceed 6 inches.
All fasteners shall be placed where the mesh weaves around the selvage wire at the vertical and horizontal joints.

June 26, 2001

Published Date: 3rd Qtr. 2015	SDDOT	BANK AND CHANNEL PROTECTION GABIONS	PLATE NUMBER 720.01
			Sheet 1 of 1



GENERAL NOTES:

Gabions at outlets of C. M. pipe and R. C. pipe shall be placed under the end section a distance of 2' from the outlet end of the section. For C. M. pipe end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section in a manner approved by the Engineer.

Quantities shown on this standard plate are based on standard gabion sizes D, E, and F (See Standard Plate 720.01).

June 26, 2001

Published Date: 3rd Qtr. 2015	SDDOT	BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS	PLATE NUMBER 720.03
			Sheet 1 of 1