



HIGHWAY PLANS READING COURSE

SOUTH DAKOTA DEPARTMENT
OF TRANSPORTATION

OFFICE OF ROAD DESIGN/UTILITIES SECTION

1

Title Sheet

Learn what information is shown on the title sheet

2

Plan View

Learn what information is shown in the plan view

3

Profile View

Learn what information is shown in the profile view

4

Section View

Learn what information is shown in the typical section, cross section, and pipe section

5

Section U

Section of plan set containing utility specific information

COURSE OUTLINE

COURSE PROGRESS

Title Sheet

Plan View

Profile View

Section View

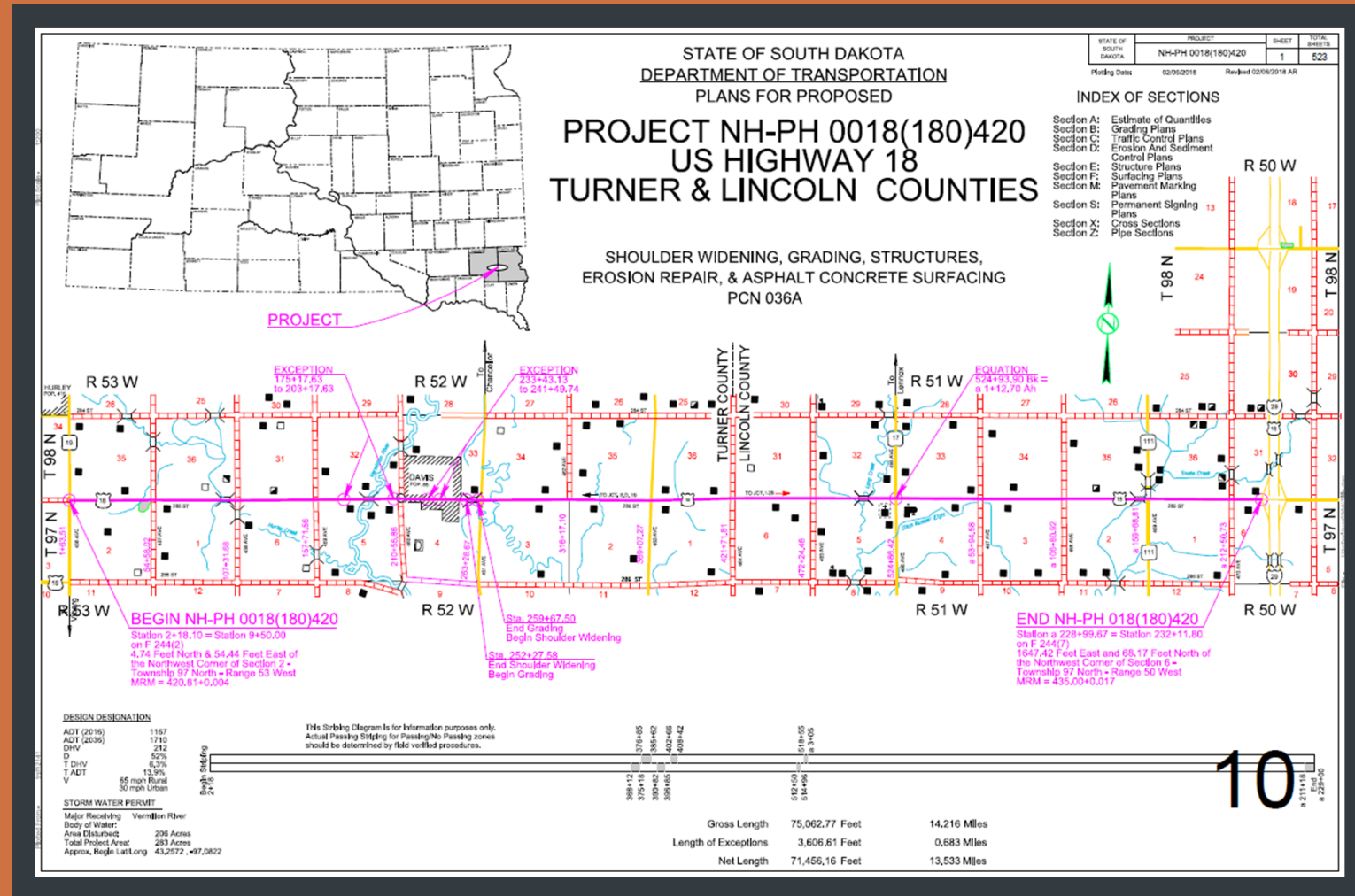
Section U



TITLE SHEET

The title sheet contains the following information.

- Title Block – includes project number, highway number, county, construction or maintenance activity, and PCN (project control number)
- Layout Map
- Begin and End Notes – shows project stationing, distance from nearest quarter or section corner, and mile reference marker (MRM)
- Index of Sections – shows which sections are included in the plan set

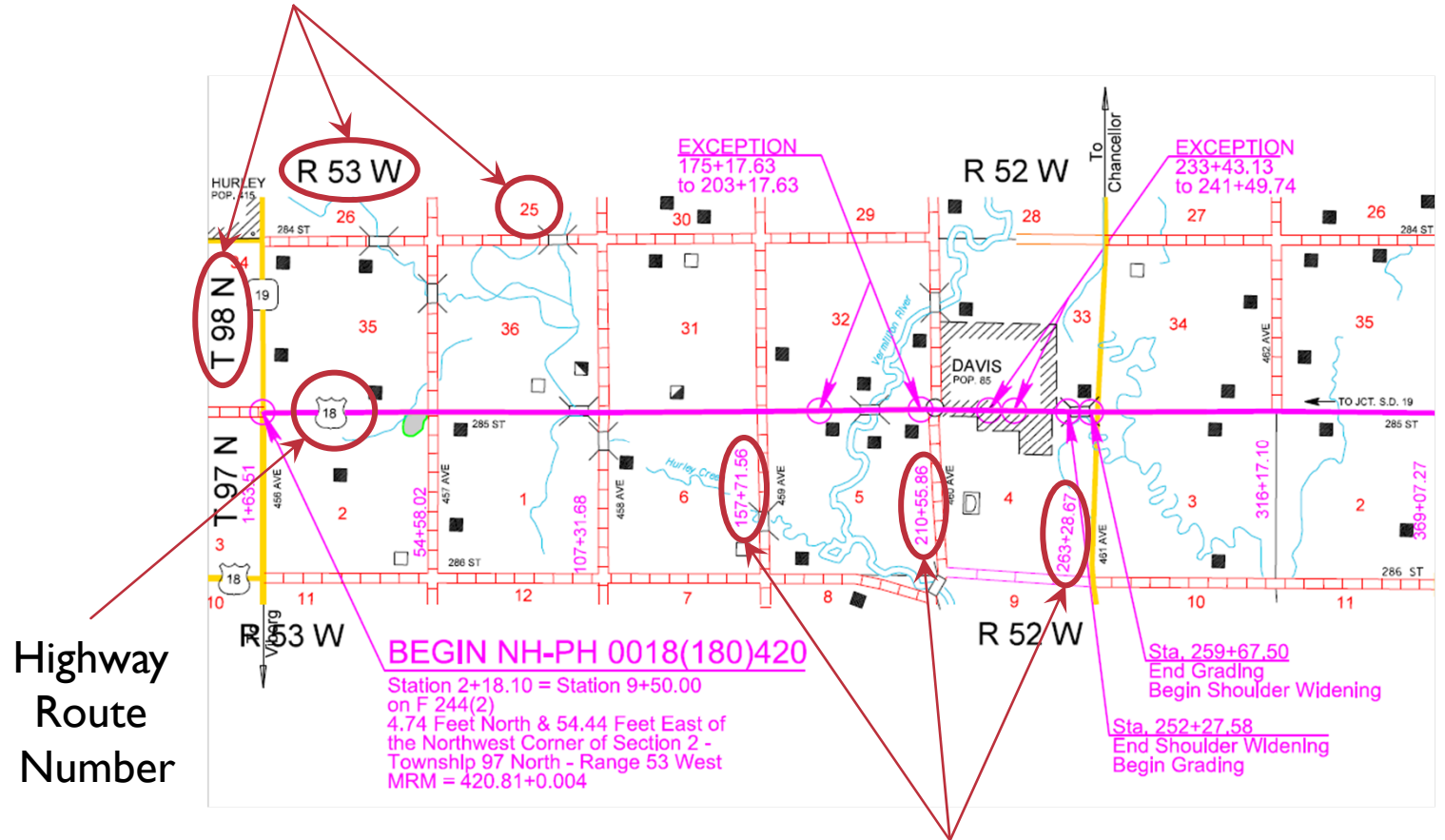


LAYOUT MAP

The layout map contains the following information.

- Highway route number
- Section-Township-Range
- Station where section line intersects construction line
- Station equations (if necessary)
- Exceptions where no work occurs
- Reference points to other highways, nearby cities, and other landmarks to help identify project location

Section-Township-Range



Highway
Route
Number

Centerline Stationing at Section Lines

Questions:

1. If you have a facility in the SE ¼ of Sec 31 – T98N – R53W, what would be the nearest centerline station?

Answers on sheet 26

COURSE PROGRESS

Title Sheet

Plan View

Profile View

Section View

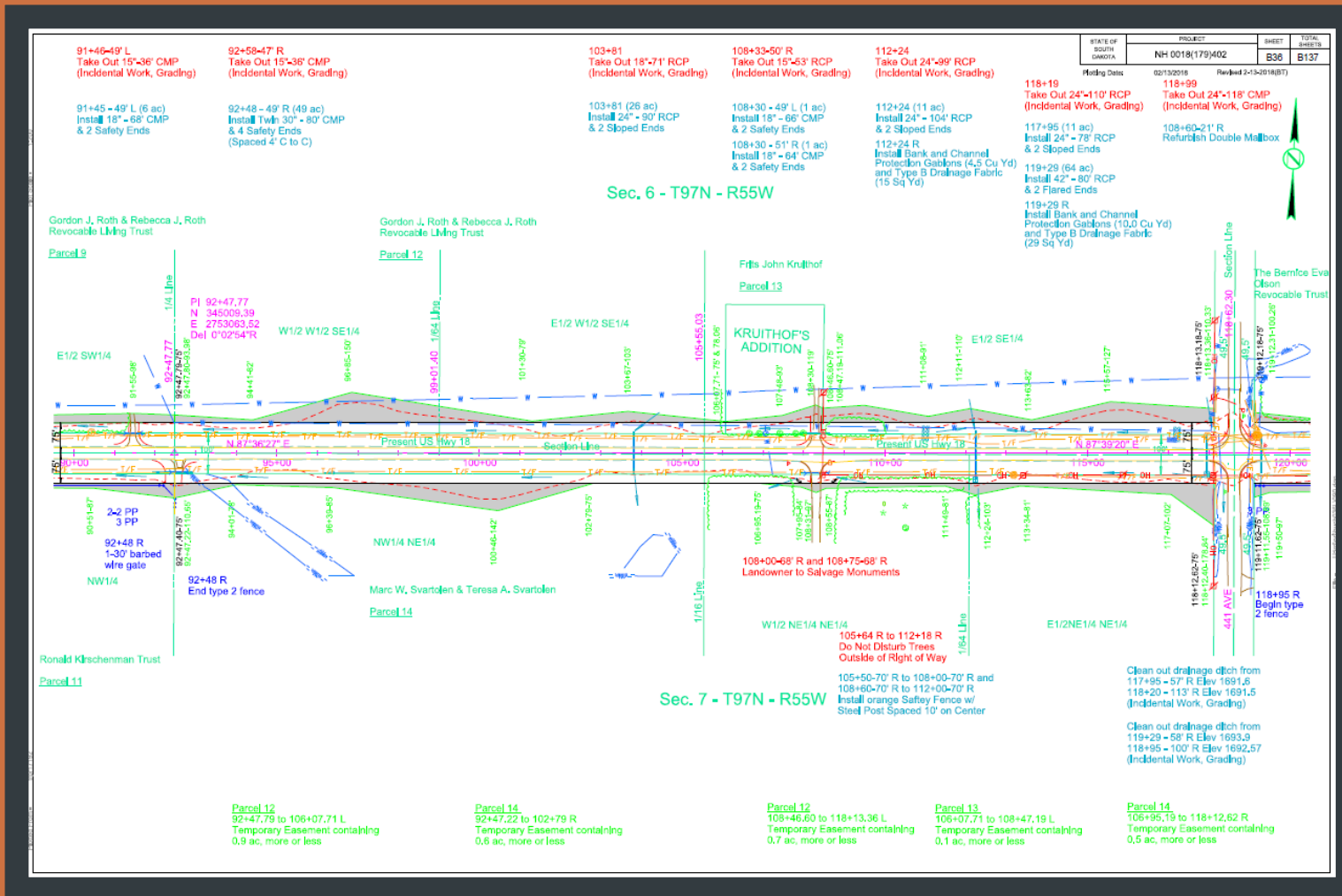
Section U



PLAN VIEW

This section will cover typical information shown on the plan sheet.

- Legend
- Project Centerline
- Centerline Stationing
- Existing/New Right-of-Way (ROW) Widths
- Cut and Fill Limits



LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(179)402	B29	B137
Posting Date:	11/29/2017		

The legend is organized into several columns. The first column lists various symbols for features like 'Anchor', 'Antenna', 'Approach', etc. The second column lists symbols for 'Hedge', 'Highway R.O.W. Marker', 'Interstate Close Gate', etc. The third column lists symbols for 'Shrub Tree', 'Sidewalk', 'Sign Face', etc. The fourth column lists symbols for 'State and National Line', 'County Line', 'Section Line', etc. The fifth column lists symbols for 'Drainage Arrow', 'Remove Concrete Pavement', 'Remove Concrete Driveway Pavement', etc. The sixth column lists symbols for 'Underground Electric Line', 'Underground Gas Line', 'Underground High Pressure Gas Line', etc. The seventh column lists symbols for 'Warning Sign One Post', 'Warning Sign Two Post', 'Water Fountain', etc. The eighth column lists symbols for 'Detectable Warning Pedestrian Push Button Pole and 30" x 48" Clear Space with 1.5% slope'. The ninth column lists line styles for 'Overhead Utility Line', 'Parking Meter', 'Pipe With End Section', etc. The tenth column lists line styles for 'Underground Electric Line', 'Underground Gas Line', 'Underground High Pressure Gas Line', etc. The eleventh column lists line styles for 'Underground Telephone Line', 'Underground Television Cable', 'Underground Water Line'.

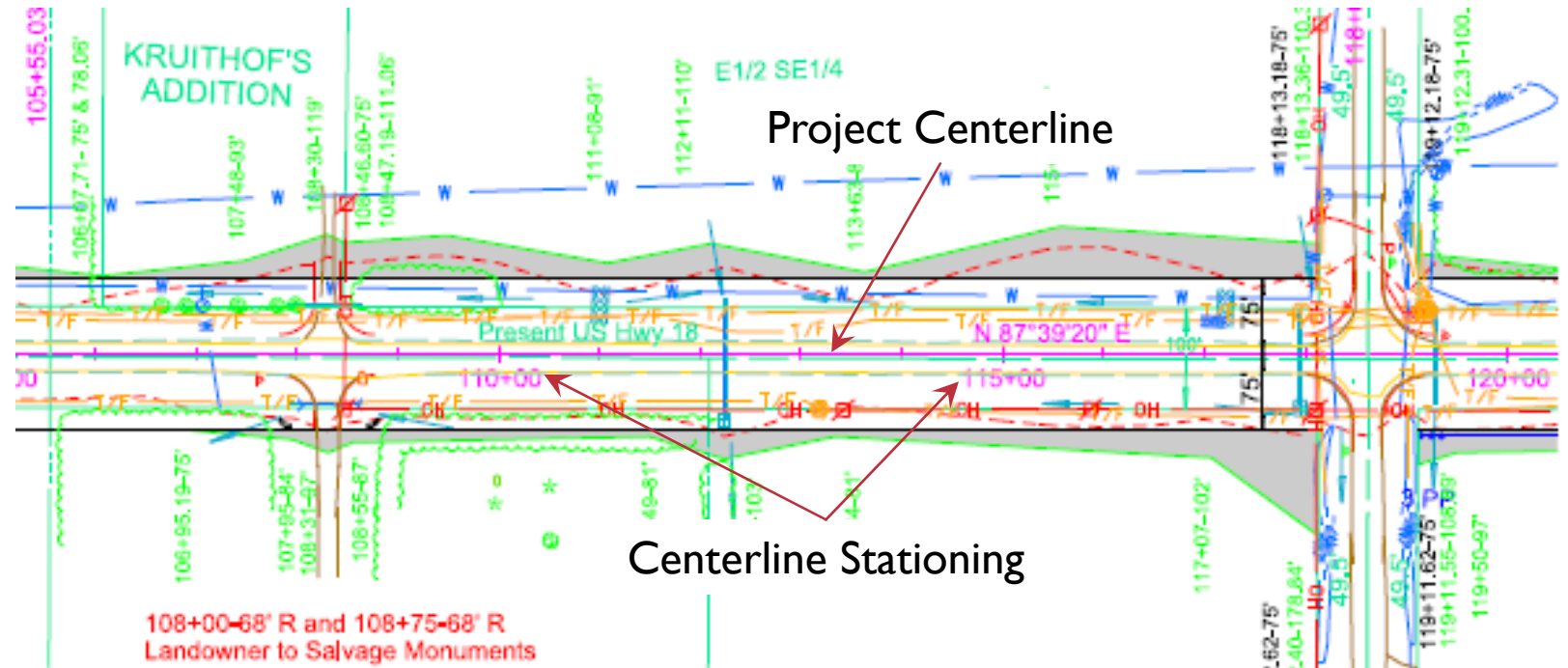
LEGEND

The legend shows the existing topography symbology and the line styles used for state, county, section, quarter, sixteenth, property, construction, right of way lines, cut and fill limits and control of access. The legend also contains other various line styles and symbology that can be found on the plan view.



SCALES/STATIONING

- Rural projects – those outside municipal corporate limits
 - Scale 1" = 200'
 - Stations labeled every 500'
- Suburban locations – portions that are on fringe of development
 - Scale 1" = 100'
 - Stations labeled every 500'
- Urban projects – those inside municipal corporate limits
 - Scale 1" = 40'
 - Stations labeled every 100'
- 1 Station = 100 Feet



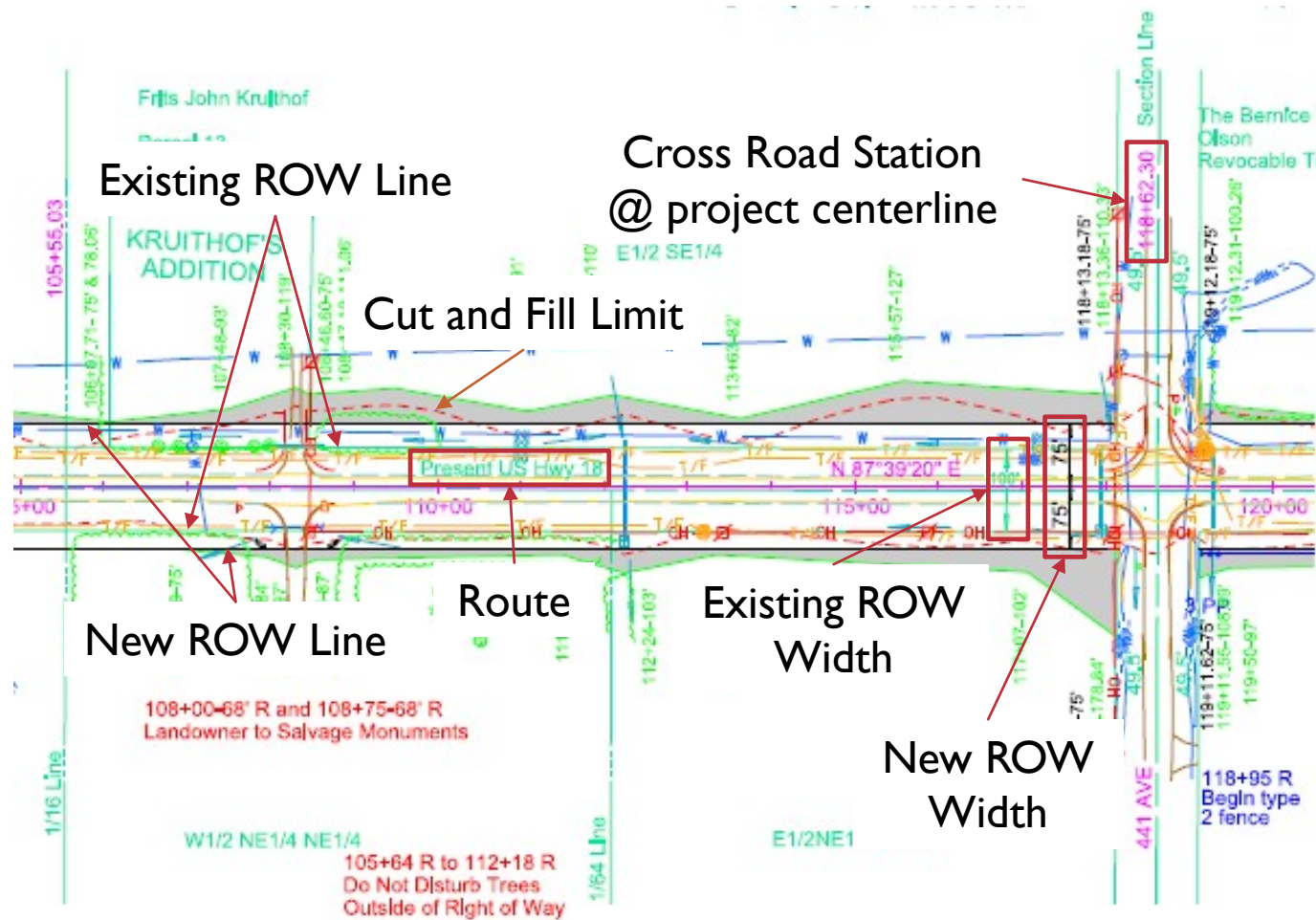
Questions:

2. What utility feature is shown approximately 50' right of Sta. 113+50?
3. What utility feature crosses the project centerline at approximate Sta. 107+00?
4. What type of cable is shown to the left of Sta. 113+00?

Answers on sheet 26



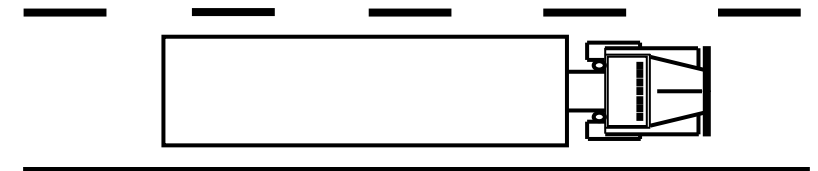
EXISTING AND NEW RIGHT OF WAY (ROW)



Questions:

5. What is the total width of the existing ROW at Sta. 113+00?
6. What is the total width of the new ROW at Sta. 113+00?

Answers on sheet 26



COURSE PROGRESS

Title Sheet

Plan View

Profile View

Section View

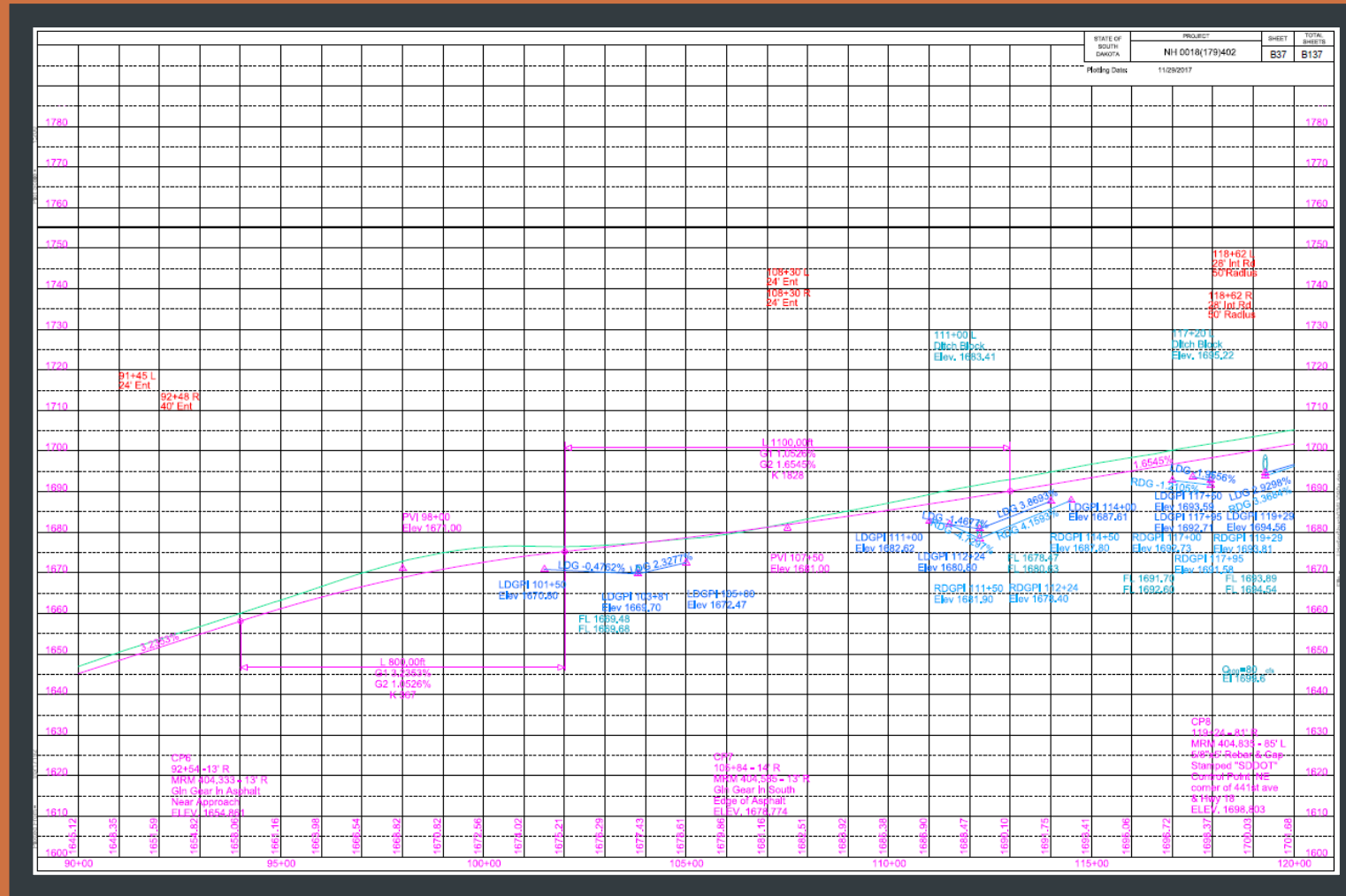
Section U



PROFILE VIEW

This section will cover typical information shown on the profile sheet.

- Existing and Proposed ground lines
- Centerline Stationing
- Elevations
- Cut and Fill

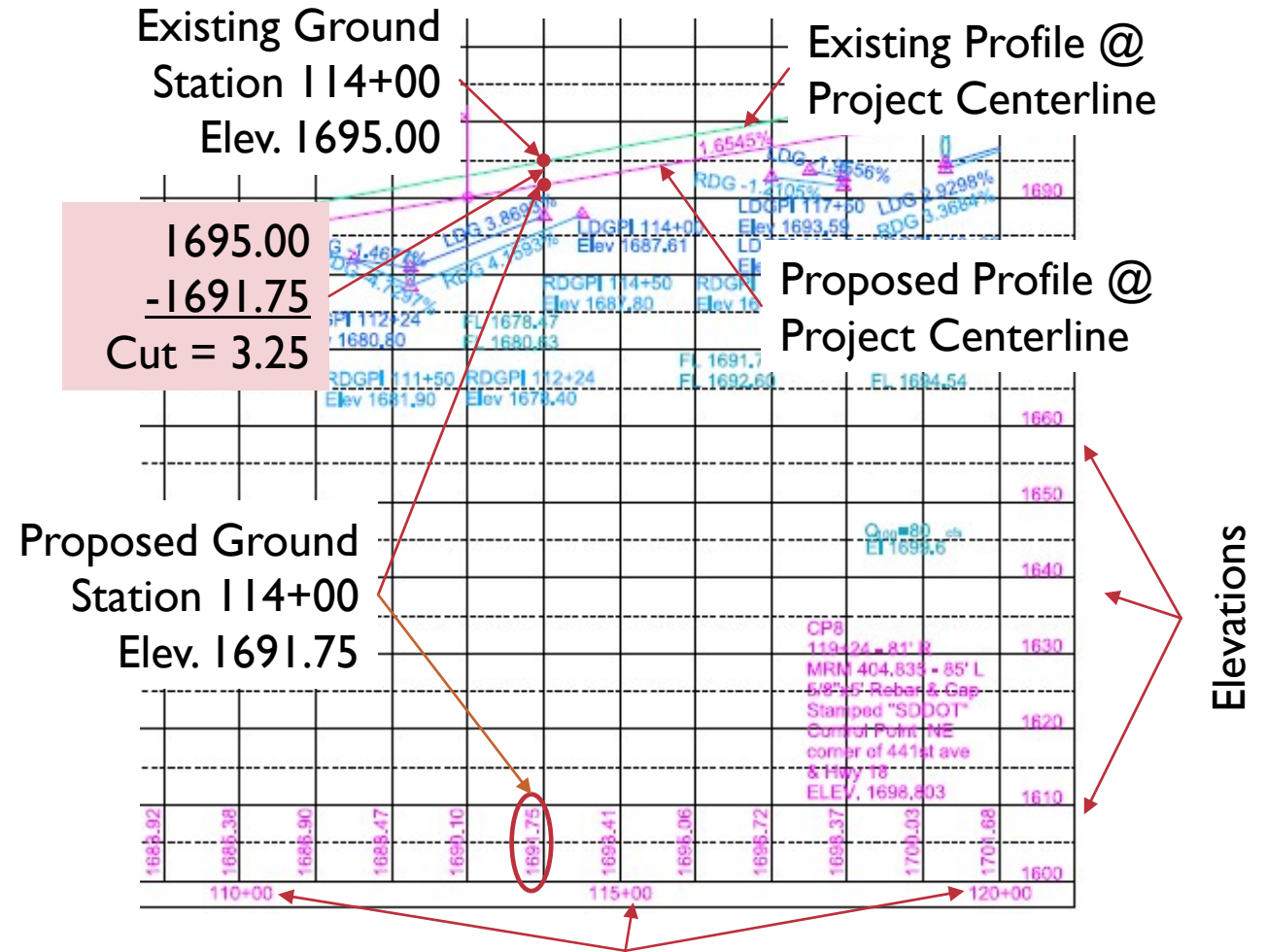


ELEVATIONS

- Shown in increments of 10 Feet on Rural and Suburban projects (1" = 20')
- Shown in increments of 5 Feet on Urban projects (1" = 10')
- Proposed ground elevations shown every 100' for rural, 50' for suburban, and 20' for urban projects (corresponds to plan view scale)
- Proposed profile is top of subgrade on rural projects and top of surfacing on urban projects
- Excavation (cut) occurs when existing profile is above proposed profile
- Embankment (fill) occurs when proposed profile is above existing profile

Questions:

7. What is the proposed ground elevation at Sta. 117+00?



Answers on sheet 26



COURSE PROGRESS

Title Sheet

Plan View

Profile View

Section View

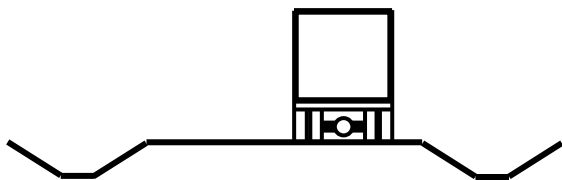
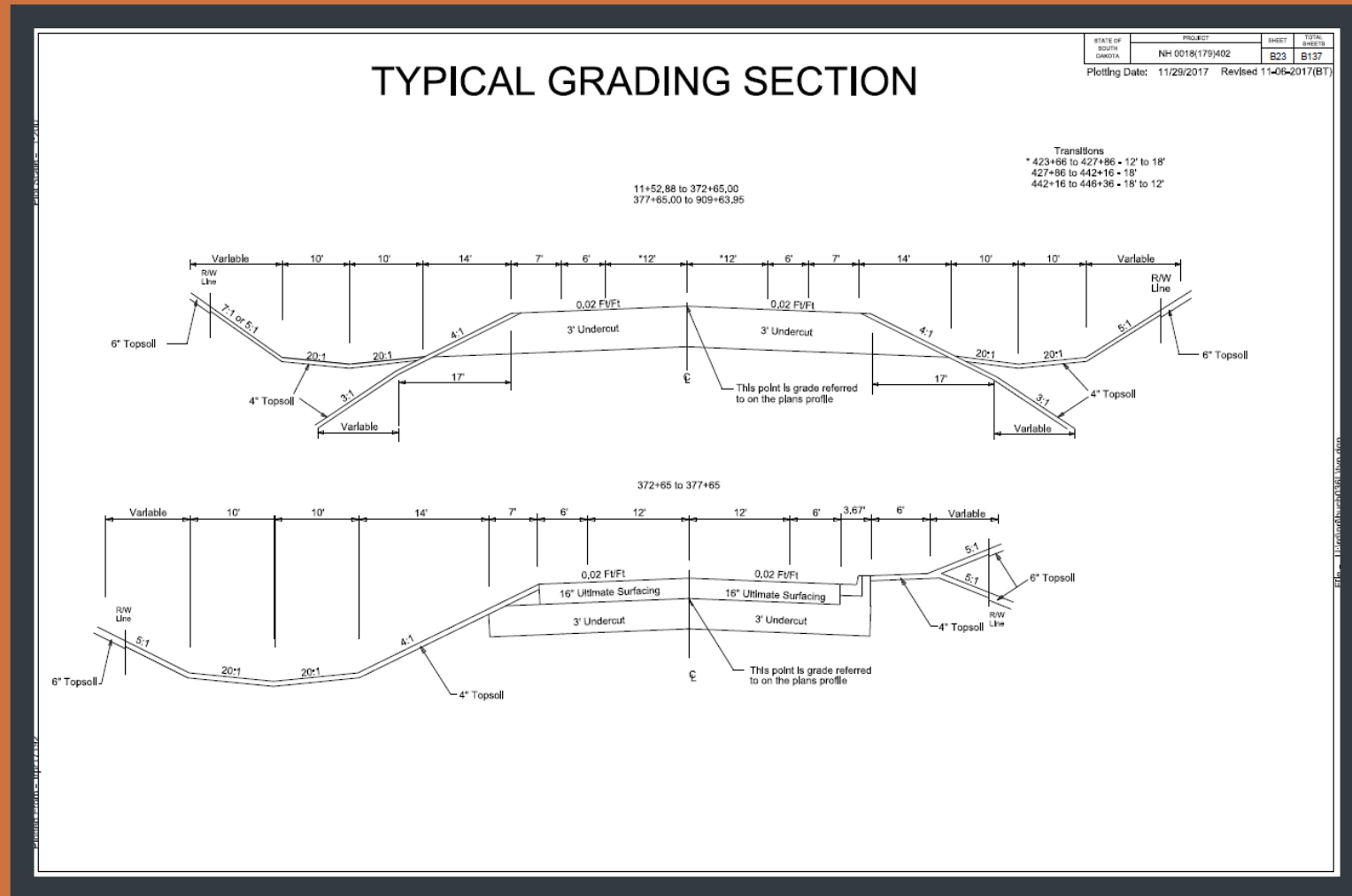
Section U



SECTIONS

This section will cover typical information shown on the typical section, cross section, and pipe section.

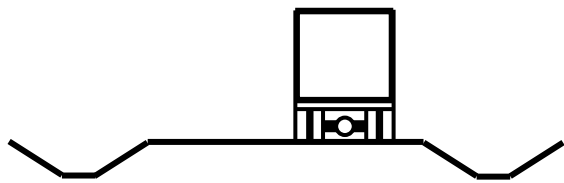
- Typical Grading Section
- Cross Section
- Pipe Section



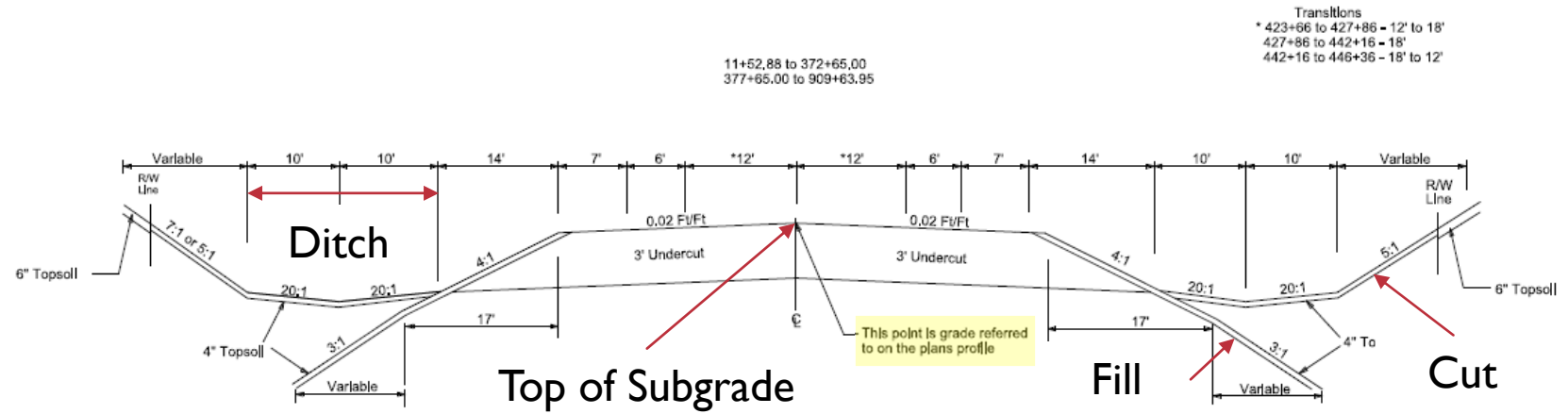
TYPICAL SECTIONS

Typical grading section shows:

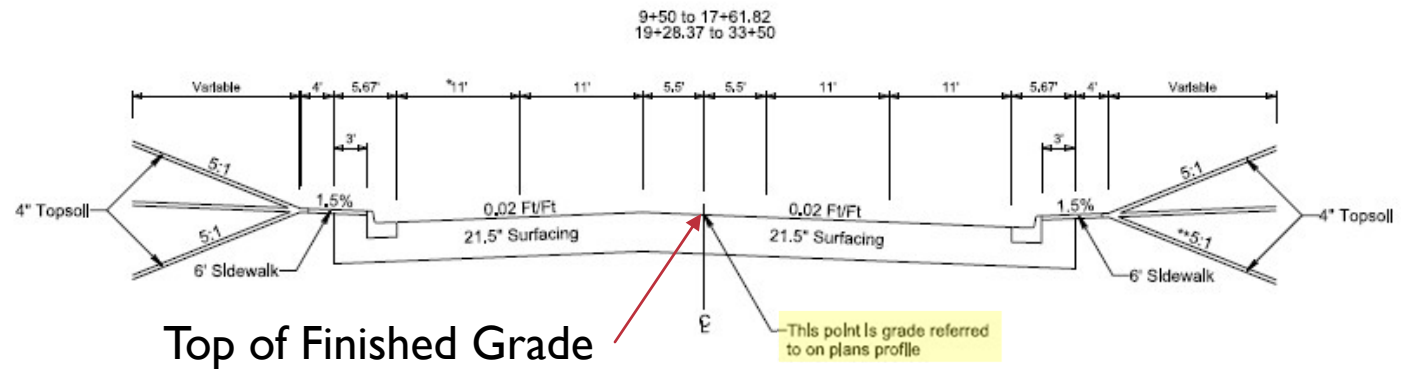
- Centerline of roadway
- Width of subgrade
- Depth of undercut
- Depth of topsoil
- Roadway cross slope (shown as ft/ft)
- Cut and fill slopes (shown as ratio, e.g. 4:1)
- Point where elevation is referred to on profile view
- Depth of surfacing (typically urban project)



RURAL



URBAN



Questions:

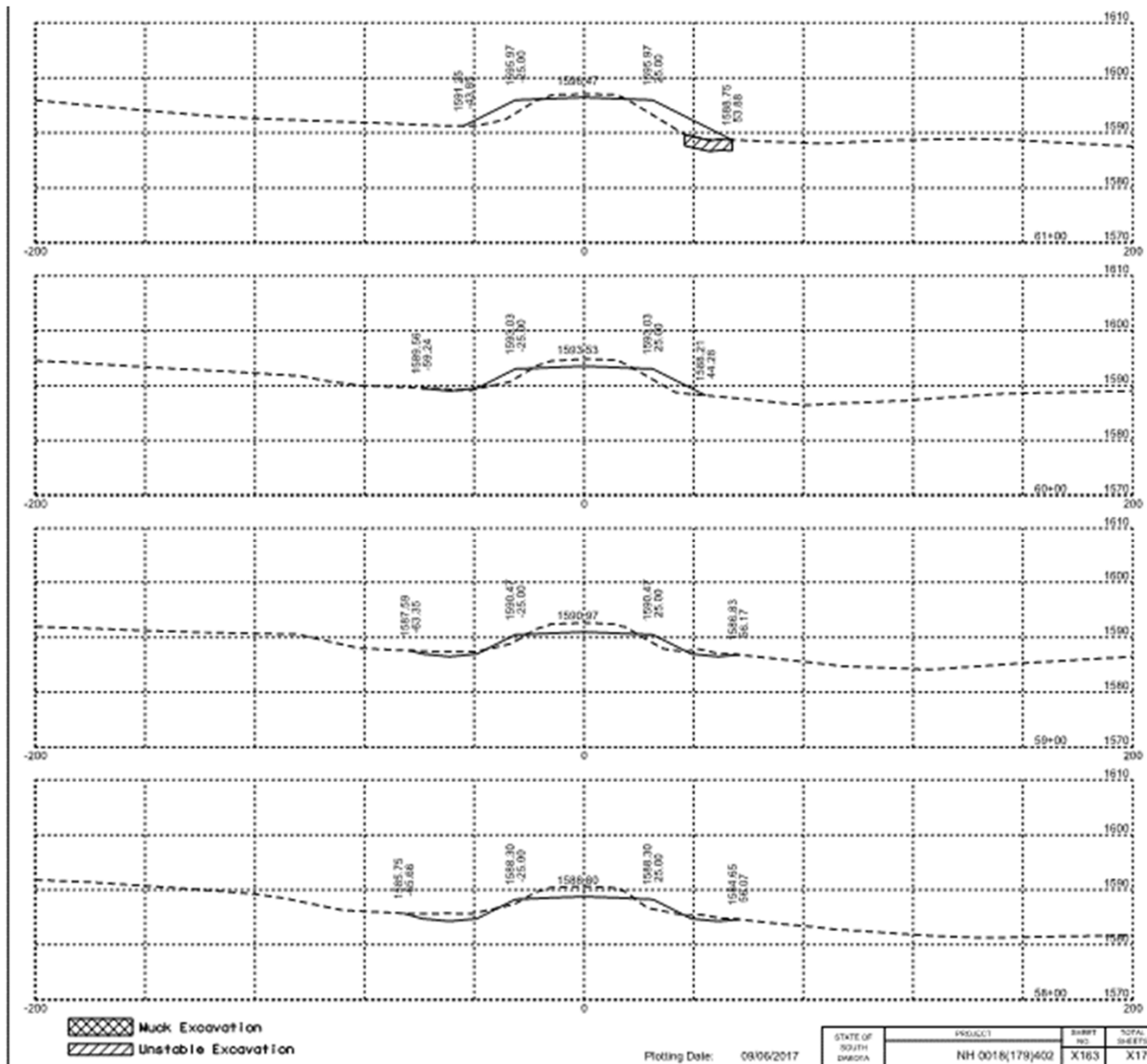
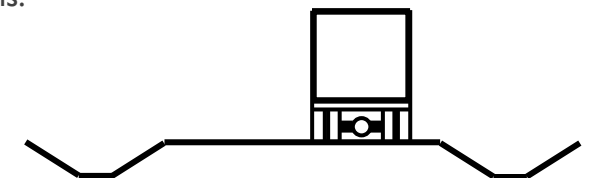
8. How far is the edge of the subgrade from the project centerline?

CROSS SECTIONS

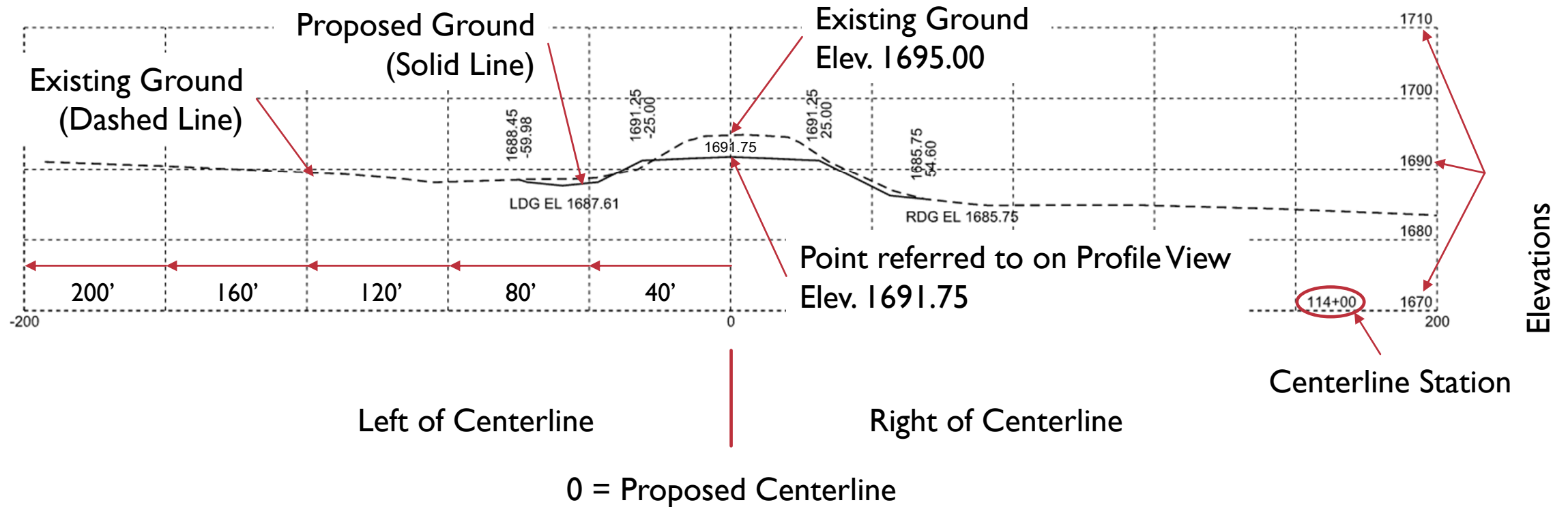
Cross sections are shown a minimum of every 100' (1 station) for rural and suburban projects and every 50' (0.5 stations) for urban projects. Information shown includes:

- Centerline elevation
- Offsets and elevations for subgrade shoulders and where proposed ground intersects existing ground
- Special ditch grades
- Areas of extra excavation (muck and unstable)

Note: Some projects may not have typical sections, cross sections, and/or pipe sections.

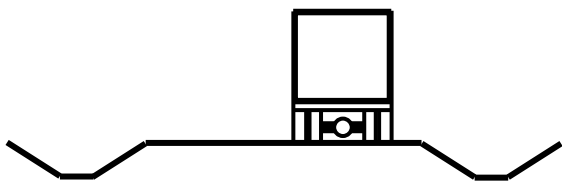


CROSS SECTIONS



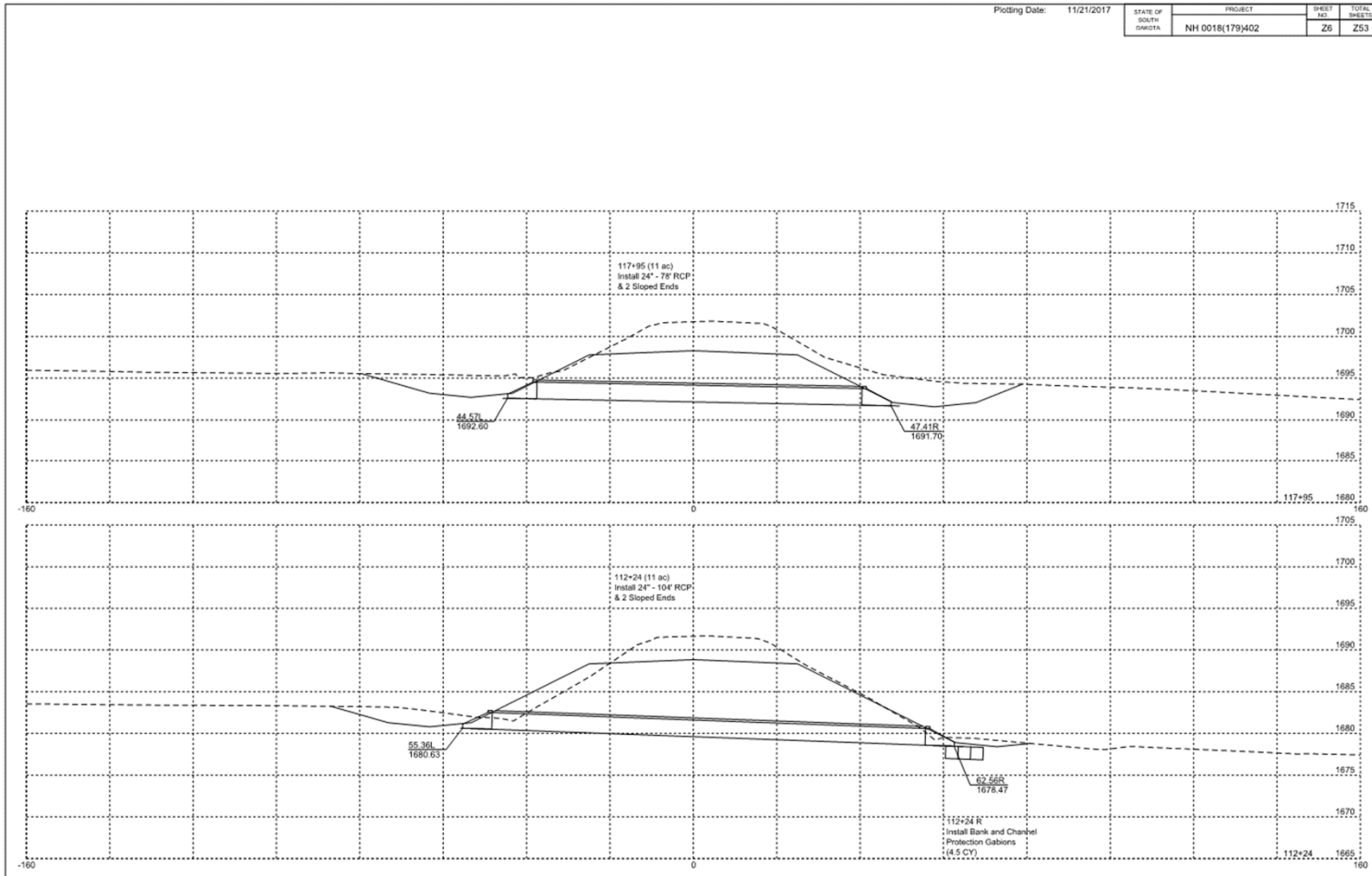
Questions:

9. Is the above cross section a cut or fill section?
10. What is the difference between existing and proposed ground elevations?
11. How far right are the work limits?



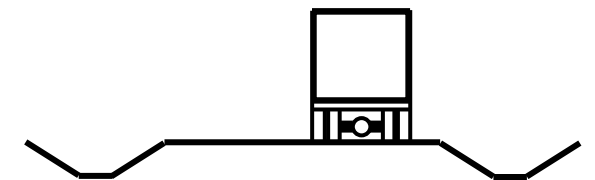
Answers on sheet 26

PIPE SECTIONS

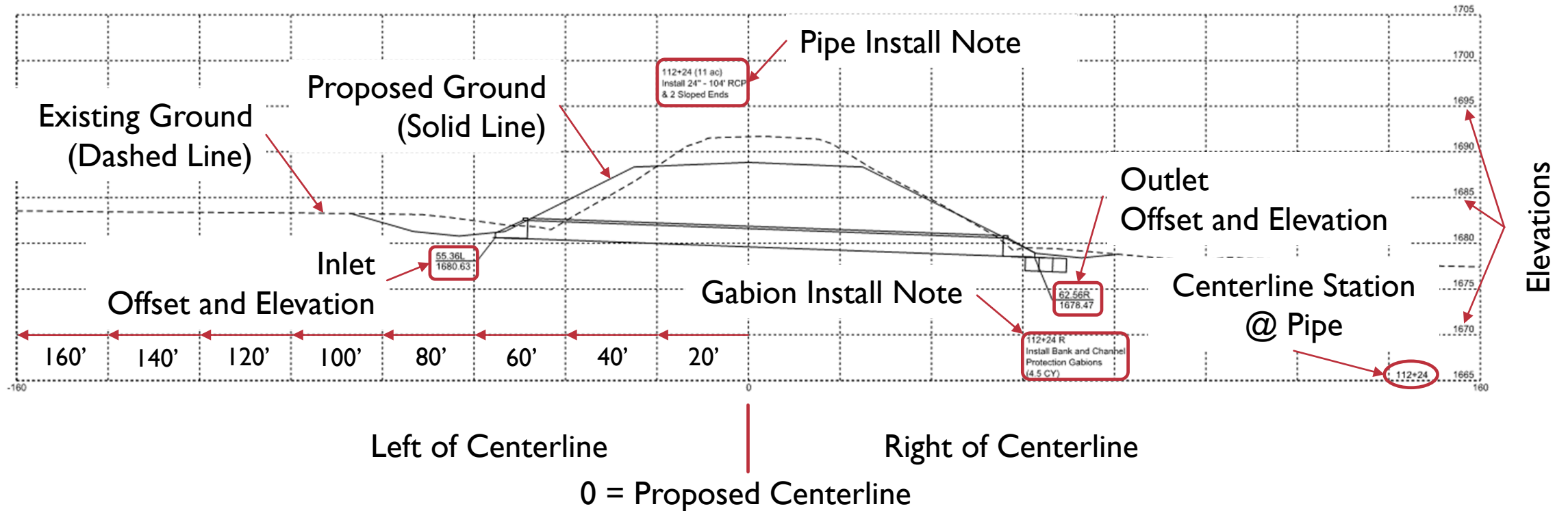


Pipe sections are shown all mainline and approach pipe. Information shown includes:

- Existing and proposed ground lines
- Pipe installation note showing:
 - Station and offset
 - Type, size, and length of pipe
 - Type of end section
- Offset and elevation for inlet and outlet
- Bank and channel protection gabions (if needed)

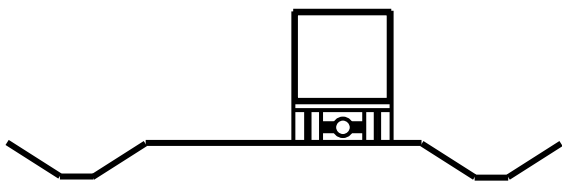


PIPE SECTIONS



Questions:

- 12. What size and type of pipe is being installed?
- 13. What is the outlet offset and elevation?



Answers on sheet 26

COURSE PROGRESS

Title Sheet

Plan View

Profile View

Section View

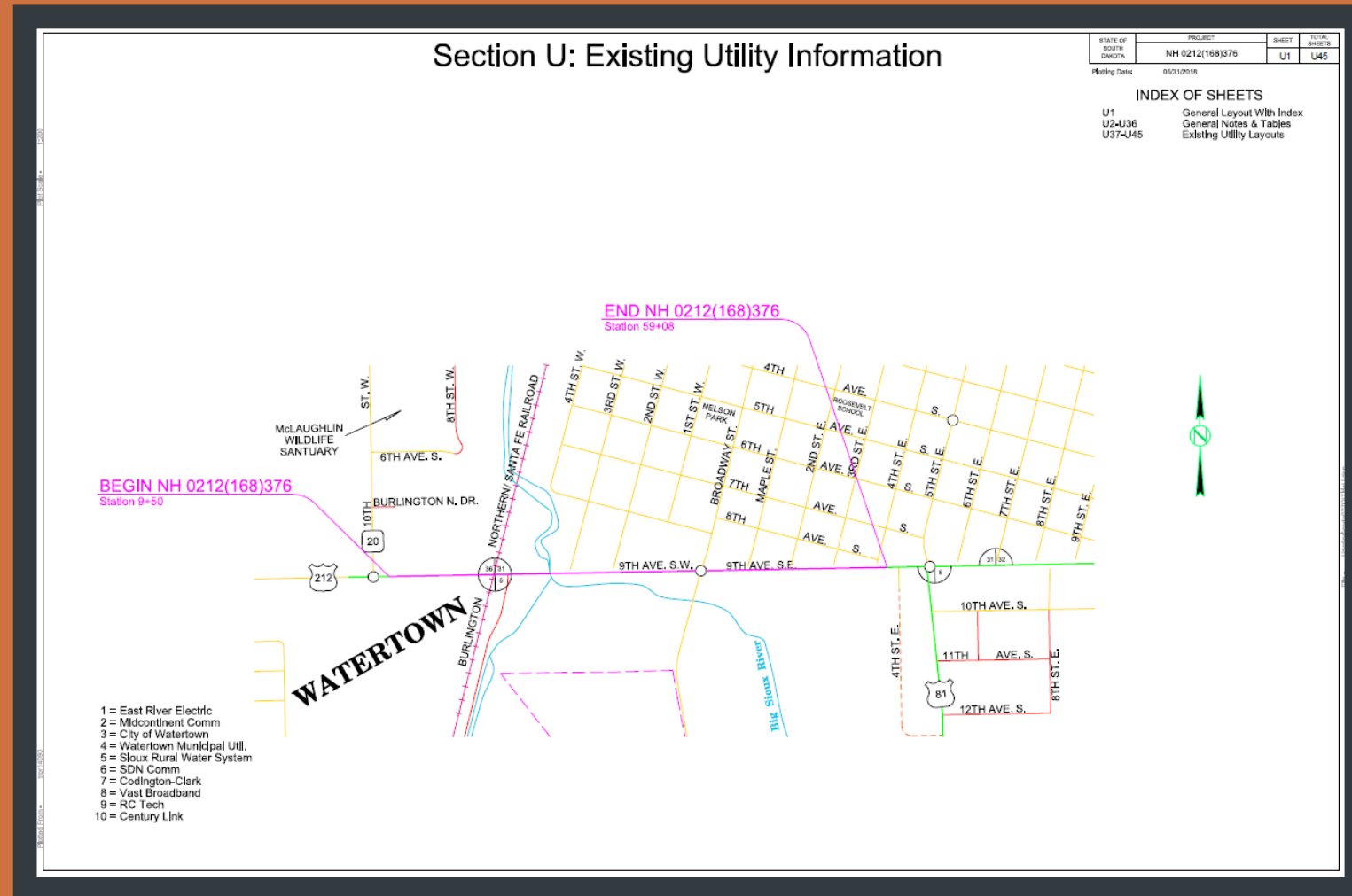
Section U



SECTION U

This section will cover typical information that may be included in Section U: Existing Utility Information.

- Subsurface Utility Locations
- Conflict Resolution
- Utility Layouts



SUBSURFACE UTILITY LOCATIONS

Subsurface utility locations table shows:

- Test hole identification number
- Station and offset
- Finding
- Existing ground and utility elevation
- Utility depth
- Coordinates (northing and easting)
- Test hole owner

SUBSURFACE UTILITY LOCATIONS

STATE OF SOUTH DAKOTA	PROJECT NH 0212(168)376	SHEET U35	TOTAL SHEETS U45
Posting Date 05/31/2018			

Subsurface utility explorations were done at the following locations. The information below states what was located in the specified areas. This table is provided to aid the Contractor during construction and does not substitute or replace the requirements of SD One Call. All information is approximate and the Contractor shall verify all utility locations before construction in those areas as mandated in SDCL 49-7A.

Baseline Alignment: Mainline (US HWY 212)								
Test Hole	Station	Offset	Finding	Existing Ground Elev.	Utility Depth (Ft.)	Utility Elevation	Northing	Easting
TH57A - 2	26+41.57	41.84' L	Buried fiber optic line	1716.655	5.88	1710.775	398563.575	2713747.042
TH111 - 6	31+59.24	35.53' R	Buried fiber optic line	1716.995	2.75	1714.245	398503.267	2714266.975
TH18A - 3	31+59.75	26.61' L	RCP Sanitary Sewer 21" pipe	1717.397	5.92	1711.477	398566.651	2714265.399
TH18 - 3	31+60.11	26.61' L	RCP storm Drainage 18" pipe	1716.88	2.70	1714.180	398565.399	2714265.806
TH18B - 2	31+60.18	28.37' L	Conduit (poly pipe)	1717.681	2.61	1715.071	398567.164	2714265.812
TH18C - 2	31+60.20	28.39' L	Conduit (poly pipe)	1717.66	2.61	1715.050	398567.188	2714265.831
TH21 - 3	36+98.34	26.89' L	RCP Sanitary Sewer 21" pipe	1717.16	6.18	1710.980	398583.383	2714803.729
TH22 - 3	37+09.39	32.61' R	PVC Sanitary Sewer 8" pipe	1717.611	5.02	1712.591	398524.281	2714816.734
TH102A - 4	39+59.03	29.54' L	Buried power	1717.436	3.70	1713.736	398594.606	2715064.428
TH102B - 3	39+59.15	29.45' L	Buried power - street lighting (possibly abandoned)	1717.436	1.70	1715.736	398594.5161	2715064.318
TH102 - 2	39+59.26	29.53' L	Buried coaxial cable	1717.436	3.60	1713.836	398594.606	2715064.428
TH101 - 1	39+74.78	30.10' R	Duct - appeared to be MTD/Clay Duct material	1717.437	3.90	1713.537	398535.51	2715081.899
TH10 - 1	39+88.29	0.62' L	6-way duct (concrete)	1717.605	2.44	1715.165	398566.653	2715094.392
TH108 - 4	39+90.60	28.00' R	Steel pipe (Natural Gas)	1717.319	2.60	1714.719	398538.118	2715097.587
TH107 - 1	40+02.18	27.29' L	Located what appears to be the top of a concrete cap	1717.211	2.00	1715.211	398593.734	2715107.448
TH109 - 1	40+05.97	34.16' R	Concrete duct or cap	1717.755	4.75	1713.005	398532.437	2715113.135
TH81 - 4	40+06.31	0.69' R	Steel pipe (Natural Gas)	1717.655	2.80	1714.855	398565.897	2715112.444
TH11 - 1	40+13.00	1.08' R	9x4 inch pvc duct	1717.546	4.65	1712.896	398565.718	2715119.142
TH106 - 4	40+13.26	26.81' L	Steel pipe (Natural Gas)	1717.261	3.57	1713.691	398593.604	2715118.539
TH100 - 1	40+19.97	27.94' L	Encountered top of concrete duct or concrete cap	1717.198	1.10	1716.098	398594.94	2715125.213
TH120 - 6	40+51.31	29.60' R	2ea 3" conduit w/ fiber optic cable	1718.077	3.20	1714.877	398538.394	2715158.313
TH114A - 4	42+22.76	34.57' R	Steel pipe (Natural Gas)	1717.42	2.90	1714.520	398538.73	2715329.838
TH114 - 3	42+23.01	33.33' R	RCP Sanitary Sewer 8" pipe	1717.467	6.10	1711.367	398539.973	2715330.053
TH121 - 6	42+41.74	29.07' R	Buried fiber optic cable	1718.157	4.40	1713.757	398544.819	2715348.644
TH26 - 3	43+56.09	26.28' L	PVC Storm Drainage 12" pipe	1716.991	1.25	1715.741	398603.676	2715461.219
TH26A - 3	43+56.47	27.88' L	RCP Sanitary Sewer 21" pipe	1717.57	7.60	1709.970	398605.288	2715461.55
TH26B - 2	43+56.47	28.25' L	Conduit (poly pipe)	1717.599	2.10	1715.499	398605.658	2715461.542
TH115A - 3	43+59.68	31.09' R	Excavated two test holes targeting sanitary sewer lines (TH115 & TH115A). One excavated on one call marks, one excavated on a manhole offset provided by City of Watertown. Neither found the sanitary pipeline.	1717.913	N/A	N/A	398546.445	2715466.584

Test Hole Owner Identification Number Codes (Last number denotes utility ownership)
 1 = Century Link, 2 = Midco, 3 = City of Watertown, 4 = Watertown Municipal Util., 5 = SDN Communications,
 6 = Vast Broadband, 7 = Unknown

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/11); epoch 2010.00; Geoid 12A; SF = 0.99986554
 The elevations shown on this sheet are based on NAVD 88.

CONFLICT RESOLUTION

STATE OF SOUTH DAKOTA	PROJECT: NH 0212(168)376	SHEET: U2	TOTAL SHEETS: U45
Filing Date:	05/31/2018		

Conflict ID Number	Existing Utility Owner	Description	Alignment	Conflict Beginning Station	Offset Direction Begin (R=Right, L=Left)	Offset Distance Begin (FT)	Conflict Ending Station	Offset Direction End (R=Right, L=Left)	Offset Distance End (FT)	RESOLUTION(S) #	Utility Action to be Taken (See Resolution(s) for Details):
<p>REMAIN IN PLACE = Protect in Place</p> <p>**REMAIN IN PLACE** = Protect in Place and See Resolution(s) for Specific Considerations/Requirements for installation to remain in place.</p> <p>ADJUST = Utility Installation requires adjustment to remain in the same approximate location. See Resolution(s) for adjustment description.</p> <p>ABANDON IN PLACE = Highway Contractor to Coordinate with Utility and Remove as necessary.</p> <p>RELOCATE = See Resolution(s) for Details and Responsibilities. Some Relocations may result in Utility Features being Abandoned in Place, Highway Contractor to Coordinate with Utility and Remove as necessary.</p>											
A1001	BNSF	SIDEWALK CONFLICT	HWY 212	1825	R	38	1825	R	45	325	N/A - TO BE COORDINATED BETWEEN BNSF AND CITY OF WATERTOWN DESIGNERS
A1002	BNSF	SIDEWALK AND CURB AND GUTTER CONFLICT	HWY 212	1838	R	28	1838	R	45	325	N/A - TO BE COORDINATED BETWEEN BNSF AND CITY OF WATERTOWN DESIGNERS
A1003	BNSF	ROADWAY CONFLICT	HWY 212	1843	R	31	1858	L	31	325	N/A - TO BE COORDINATED BETWEEN BNSF AND CITY OF WATERTOWN DESIGNERS
A1004	BNSF	SIDEWALK AND CURB AND GUTTER CONFLICT	HWY 212	1858	L	30	1858	L	28	325	N/A - TO BE COORDINATED BETWEEN BNSF AND CITY OF WATERTOWN DESIGNERS
B1001	CENTURYLINK	ROADWAY CONFLICT	HWY 212	710	L	52	945	R	47	318	REMAIN IN PLACE
B1002	CENTURYLINK	SIDEWALK AND CURB AND GUTTER CONFLICT	HWY 212	941	R	30	941	R	36	318	REMAIN IN PLACE
B1003	CENTURYLINK	ADJACENT TO PROPOSED GRADING LIMITS	HWY 212	947	R	50	1490	R	49	318	REMAIN IN PLACE
B1004	CENTURYLINK	SIDEWALK CONFLICT	HWY 212	643	R	32	1766	R	32	319	ADJUST/RELOCATE
B1005	CENTURYLINK	SIDEWALK CONFLICT	HWY 212	643	R	33	1766	R	33	319	ADJUST/RELOCATE
B1006	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINES (INLET2, SD1 AND SD2)	HWY 212	953	R	34	1110	R	34	319	ADJUST/RELOCATE
B1007	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINES (INLET2, SD1 AND SD2)	HWY 212	953	R	34	1110	R	34	319	ADJUST/RELOCATE
B1008	CENTURYLINK	CURB AND GUTTER AND SIDEWALK CONFLICT	HWY 212	1766	R	33	0	0	0	320	ADJUST/RELOCATE (SDDOT APPROVAL NEEDED TO ADJUST)
B1009	CENTURYLINK	SIDEWALK & STORM SEWER CONFLICT	HWY 212	1766	R	33	2794	R	31	319	RELOCATE
B1010	CENTURYLINK	SIDEWALK & STORM SEWER CONFLICT	HWY 212	1766	R	33	2794	R	31	319	RELOCATE
B1011	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINES (INLET10, SD10 AND SD12)	HWY 212	2118	R	32	2310	R	31	319	RELOCATE
B1012	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINES (INLET10, SD10 AND SD12)	HWY 212	2118	R	32	2310	R	32	319	RELOCATE
B1013	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINE (INLET13, SD13)	HWY 212	2603	R	31	2603	R	31	319	RELOCATE
B1014	CENTURYLINK	STORM DRAIN DROP INLET AND STORM DRAIN LINE (INLET13, SD13)	HWY 212	2603	R	32	2603	R	32	319	RELOCATE
B1015	CENTURYLINK	STORM DRAIN DROP INLET	HWY 212	2692	R	31	2692	R	31	319	RELOCATE
B1016	CENTURYLINK	STORM DRAIN DROP INLET	HWY 212	2692	R	33	2692	R	33	319	RELOCATE
B1017	CENTURYLINK	STORM DRAIN LINE	HWY 212	2726	R	31	2726	R	31	319	RELOCATE
B1018	CENTURYLINK	STORM DRAIN LINE	HWY 212	2726	R	32	2726	R	32	319	RELOCATE
B1019	CENTURYLINK	CURB & GUTTER	HWY 212	2794	R	30	-	-	-	320	ADJUST
B1020	CENTURYLINK	SIDEWALK AND CURB AND GUTTER CONFLICT	HWY 212	2794	R	30	3968	R	45	319	ADJUST/RELOCATE
B1021	CENTURYLINK	SIDEWALK AND CURB AND GUTTER CONFLICT	HWY 212	2794	R	30	3968	R	45	319	ADJUST/RELOCATE

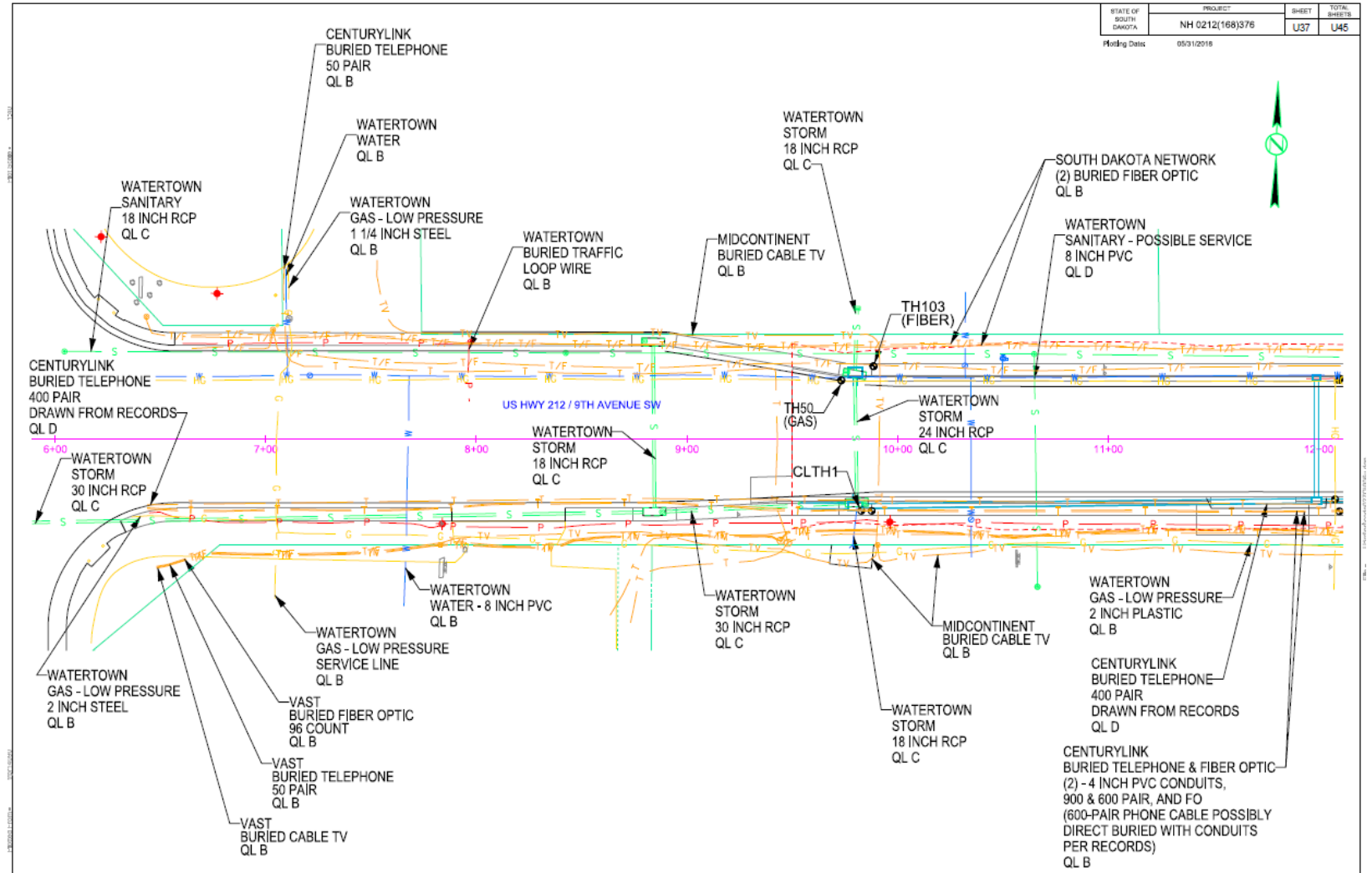
Conflict resolution table shows:

- Conflict identification number
- Name of existing utility owner
- Description of conflict
- Location information (station range and offset)
- Resolution number corresponding to the conflict resolution report
- Brief description of resolution

UTILITY LAYOUTS

Utility layout shows:

- Test hole identification number
- Utility facility label showing:
 - Owner
 - Type and size of facility
 - Utility information quality level
 - QLA – precise horizontal and vertical location obtained by actual exposure of utility
 - QLB – approximate horizontal location obtained through geophysical methods
 - QLC – information obtained by surveying visible above-ground utility features
 - QLD – information derived from existing records





ANSWERS

1. $157+71.56$ (sheet 5)
2. Power Pole (sheet 9)
3. Underground Waterline (sheet 9)
4. Telephone Fiber Optics (sheet 9)
5. 100' (sheet 10)
6. 150' ($75'+75'$) (sheet 10)
7. 1695.72 (sheet 13)
8. 25' ($12'+6'+7'$) (sheet 16)
9. Cut (sheet 18)
10. 3.25' ($1695.00-1691.75$) (sheet 18)
11. 54.60' (sheet 18)
12. 24" RCP (sheet 20)
13. 62.56' R, 1676.47 (sheet 20)

ELECTRONIC PLANS

- Contact the Office of Road Design/Utilities Section for electronic copies of plans. Contact information can be found on sheet 28.
- When requesting plans, please include as much project information as possible (project number, county, highway route number, etc.).
- Electronic plans will be made available through SharePoint in one of the following formats:
 - MicroStation (.dgn)
 - AutoCad (.dwg)
 - Portable Document Format (PDF)
- An email will be sent with a link to the project folder on the Department's SharePoint site. The Utilities Section will work with utility companies to get them access if needed.





CONTACT INFORMATION

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THANK YOU!