

March 4, 2021

**ADDENDUM 2 – JOB 10**

TO: All prospective bidders on Project NHU-6-986(131), Job No. 10 scheduled for the March 12, 2021 bid opening.

The following plans and request for proposal revision shall be made:

Plan Revisions:

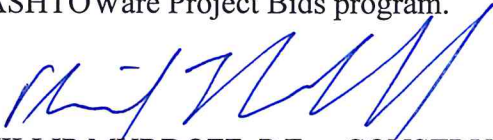
**See attached summary from Paul M. Benning, P.E. dated March 3, 2021 for an explanation.**

Request for Proposal Revisions:

**Remove and replace pages 5 thru 12 of 14 of the Proposal pages located at the beginning of the Request for Proposal with pages revised 3/3/2021.**

**Bid Item Changes are summarized in the Plan Addendum Summary and Approval.**

This addendum is to be incorporated into the bidder's proposal for this project. AASHTOWare Project Bids files should be updated by downloading the addendum file from the Bid Express on-line bidding exchange at <http://www.bidx.com/> and load it into the AASHTOWare Project Bids program.



PHILLIP MURDOFF, P.E. – CONSTRUCTION SERVICES ENGINEER

80: jwj

Enclosure

**PLAN ADDENDUM SUMMARY AND APPROVAL**

PROJECT INFORMATION			
<b>Project:</b>	NHU-6-986(131)	<b>PCN:</b>	22682
<b>Location:</b>	Grand Forks, ND		
<b>Date:</b>	3/3/2020	<b>Lead Designer:</b>	KLJ
<b>Bid Opening Date:</b>	March 12, 2021	<b>JOB#:</b>	10
		<b>Addendum#:</b>	2

PLAN SHEET CHANGES		
Section	Sheet	Description
Special Provision		Remove and replace SP 238(20) Forcemain
6	1	Revised note 202-P01 "REMOVAL OF CONCRETE PAVMENT"
6	6-10	<ul style="list-style-type: none"> <li>• 772-P03 – Updated the controller, controller battery bac-up and cabinet for only site 2.</li> <li>• 772-P06 – Update the note so that the controller, controller cabinet, and battery backup will be moved and reinstalled.</li> <li>• 772-P09 – Added the statement "Zinc5 UPStealth 2 Extended Run Time XRT 3600wh Battery Backup System" to the note.</li> <li>• 772-P11 – Updated conflict monitor statement to match note 772-P02.</li> <li>• 772-P22 – Deleted note</li> <li>• 772-P36 – Added 2 spare pushbuttons</li> <li>• 772-P41 – Added Note</li> <li>• 772-P42 – Added Note</li> </ul>
8	2	<ul style="list-style-type: none"> <li>• Removed bid item 724 9130 "Forcemain ARV Structure".</li> <li>• Added bid item 750 2115 "Detectable Warning Panels"</li> </ul>
20	2	Revised Table 21.07 – "...COMPACTED TO A MINIMUM OF 95% OF MODIFIED PROCTOR AT 2-6%OVER OPTIMUM MOISTURE."
90	2	Added bid item 750 2115 "Detectable Warning Panels"
90	3	Added bid item 750 2115 "Detectable Warning Panels"
100	2	Revised phasing
100	3	Revised phasing
100	5	<ul style="list-style-type: none"> <li>• Revised custom sign for "SIDEWALK CLOSED UTILIZE PEDESTRIAN UNDERPASS OR SKYWAY" from 9"x24" to 18"x24".</li> <li>• Revised phasing</li> </ul>
100	6	<ul style="list-style-type: none"> <li>• Revised custom sign for "SIDEWALK CLOSED UTILIZE PEDESTRIAN UNDERPASS OR SKYWAY" from 9"x24" to 18"x24".</li> <li>• Revised phasing.</li> </ul>
100	7	<ul style="list-style-type: none"> <li>• Revised custom sign for "SIDEWALK CLOSED UTILIZE PEDESTRIAN UNDERPASS OR</li> </ul>

		SKYWAY" from 9"x24" to 18"x24". • Revised phasing.
100	8	• Revised custom sign for "SIDEWALK CLOSED UTILIZE PEDESTRIAN UNDERPASS OR SKYWAY" from 9"x24" to 18"x24". • Revised phasing.
150	8	Updated signal head numbering in lower left corner of sheet.
199	2	Removed "Forcemain ARV Structure"
199	4	Removed "Forcemain ARV Structure"
199	8	Removed sheet
199	9	Removed sheet
199	10	Removed sheet

CHANGES MADE TO BID ITEMS FOR JOB					
Spec	Code	Description	Unit	Previous Quantity	Revised Quantity
724	9130	Forcemain ARV Structure	EA	1	0
750	2115	Detectable Warning Panels	SF	0	240

**APPROVAL**

Should the revisions described above be processed as a plan addendum?

  X   Yes                             No

*Paul M. Benning*

Paul Benning, P.E. – Local Government Engineer

3/3/2021

Date

BID ITEMS

Project: NHU-6-986(131) (PCN-22682)

**Bidder must type or neatly print unit prices in numerals, make extensions for each item, and total. Do not carry unit prices further than three (3) decimal places.**

Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$	000	\$\$\$\$	00
001	103	0100	CONTRACT BOND	L SUM	1.				
002	201	0352	REMOVAL OF TREES & BRUSH	L SUM	1.				
003	202	0105	REMOVAL OF STRUCTURE	L SUM	1.				
004	202	0111	REMOVAL OF CONCRETE	L SUM	1.				
005	202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	12,689.				
006	202	0130	REMOVAL OF CURB & GUTTER	LF	2,687.				
007	202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	225.				
008	202	0151	REMOVE PRECAST CONCRETE BARRIER	LF	78.				
009	202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	992.				
010	202	0210	REMOVAL OF MANHOLES	EA	6.				
011	202	0235	REMOVAL OF CATCH BASIN	EA	9.				
012	203	0101	COMMON EXCAVATION-TYPE A	CY	2,962.				
013	203	0109	TOPSOIL	CY	274.				
014	203	0138	COMMON EXCAVATION-SUBCUT	CY	550.				
015	210	0099	CLASS 1 EXCAVATION	L SUM	1.				
016	210	0210	FOUNDATION FILL	CY	352.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$	000	\$\$\$\$	00
017	251	0300	SEEDING CLASS III	ACRE	.540				
018	253	0201	HYDRAULIC MULCH	ACRE	.540				
019	265	0100	STABILIZED CONSTRUCTION ACCESS	EA	1.				
020	302	0100	SALVAGED BASE COURSE	TON	6,894.				
021	302	0120	AGGREGATE BASE COURSE CL 5	TON	615.				
022	550	0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	9,810.				
023	602	0130	CLASS AAE-3 CONCRETE	CY	66.				
024	602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	121.500				
025	602	7000	SPECIAL SURFACE FINISH	SF	2,165.				
026	612	0115	REINFORCING STEEL-GRADE 60	LBS	11,159.				
027	612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	1,341.				
028	624	0140	PIPE RAIL	LF	30.				
029	702	0100	MOBILIZATION	L SUM	1.				
030	704	0100	FLAGGING	MHR	40.				
031	704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,516.				
032	704	1052	TYPE III BARRICADE	EA	43.				

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						\$\$\$\$	000	\$\$\$\$	00
033	704	1054	SIDEWALK BARRICADE	EA	14.				
034	704	1060	DELINEATOR DRUMS	EA	35.				
035	704	1067	TUBULAR MARKERS	EA	41.				
036	704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2.				
037	708	1540	INLET PROTECTION-SPECIAL	EA	18.				
038	708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	18.				
039	709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	11,031.				
040	714	0110	PIPE CONC REINF 12IN CL III	LF	244.				
041	714	0205	PIPE CONC REINF 15IN CL III	LF	73.				
042	714	0310	PIPE CONC REINF 18IN CL III	LF	52.				
043	714	0820	PIPE CONC REINF 30IN CL III	LF	510.				
044	714	0905	PIPE CONC REINF 36IN CL III	LF	155.				
045	714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	LF	320.				
046	714	9910	FLAP GATE 18IN	EA	1.				
047	722	0110	MANHOLE 60IN	EA	8.				
048	722	0120	MANHOLE 72IN	EA	1.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$	000	\$\$\$\$	00
049	722	0130	MANHOLE 84IN	EA	1.				
050	722	1110	MANHOLE RISER 60IN	LF	84.				
051	722	1120	MANHOLE RISER 72IN	LF	11.				
052	722	1130	MANHOLE RISER 84IN	LF	12.				
053	722	3500	INLET-TYPE 1	EA	8.				
054	722	6140	ADJUST GATE VALVE BOX	EA	11.				
055	722	6160	ADJUST INLET	EA	10.				
056	722	6200	ADJUST MANHOLE	EA	10.				
057	724	0270	REMOVE GATE VALVE & BOX	EA	2.				
058	724	0315	GATE VALVE & BOX 10IN	EA	2.				
059	724	0420	HYDRANT-RELOCATE	EA	1.				
060	724	0891	WATERMAIN MODIFICATIONS	L SUM	1.				
061	724	7150	PLUG VALVE & BOX	EA	1.				
062	724	9024	FORCEMAIN 10IN	LF	90.				
063	724	9032	FORCEMAIN 24IN	LF	175.100				
064	724	9040	FORCEMAIN - BORED	LF	534.800				

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						\$\$\$\$	000	\$\$\$\$	00
065	724	9110	PLUG FORCEMAIN	LF	759.				
066	724	9115	FORCEMAIN CONNECTION	EA	2.				
067	724	9120	FORCEMAIN BYPASS	L SUM	1.				
068	724	9125	FORCEMAIN DRAIN DOWN	L SUM	1.				
069	724	9135	REMOVE FORCEMAIN ARV STRUCTURE	EA	1.				
070	724	9156	24IN 45DEG BEND	EA	4.				
071	724	9168	24IN X 24IN X 10IN TEE	EA	2.				
072	740	0160	WATERPROOFING MEMBRANE	SY	380.				
073	744	0050	INSULATION BOARD	CF	424.				
074	748	0190	CURB & GUTTER-TYPE I 30IN	LF	2,348.				
075	750	0100	SIDEWALK CONCRETE	SY	1,774.				
076	750	0110	SIDEWALK BRICK PATTERN	SY	118.				
077	750	0210	CONCRETE MEDIAN NOSE PAVING	SY	2.				
078	750	0250	CONCRETE MEDIAN PAVING COLORED W/BRICK PATTERN	SY	8.				
079	750	1000	DRIVEWAY CONCRETE	SY	42.				
080	750	2115	DETECTABLE WARNING PANELS	SF	240.				



BID ITEMS

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$	000	\$\$\$\$	00
081	752	0640	FENCE CHAIN LINK RESET	LF	30.				
082	752	0911	TEMPORARY SAFETY FENCE	LF	500.				
083	754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	437.				
084	754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	13.800				
085	754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	107.				
086	754	0592	RESET SIGN PANEL	EA	2.				
087	754	1104	REMOVE SIGN FOUNDATION	EA	1.				
088	762	0112	EPOXY PVMT MK MESSAGE	SF	224.				
089	762	0113	EPOXY PVMT MK 4IN LINE	LF	3,897.				
090	762	0114	EPOXY PVMT MK 6IN LINE	LF	1,048.				
091	762	0117	EPOXY PVMT MK 24IN LINE	LF	318.				
092	770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	9.				
093	770	0210	CABLE TRENCH-TYPE I	LF	2,560.800				
094	770	0330	2IN DIAMETER RIGID CONDUIT	LF	2,560.800				
095	770	0504	UNDERGROUND CONDUCTOR NO4-TYPE RHW	LF	5,601.600				
096	770	0605	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	2,800.800				

BID ITEMS

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$\$	000	\$\$\$\$\$	00
097	770	1666	LT STD 6FT MA 30FT MT HT BREAKAWAY	EA	9.				
098	770	4210	LED LUMINAIRE	EA	1.				
099	770	4211	LED LUMINAIRE - TYPE A	EA	9.				
100	770	4212	LED LUMINAIRE - TYPE B	EA	8.				
101	770	4560	REMOVE LIGHT STANDARD	EA	8.				
102	770	4570	REMOVE STREET LIGHT LUMINAIRE	EA	14.				
103	770	4582	REMOVE CONCRETE FOUNDATION	EA	8.				
104	770	7001	LT POLES & LUMINAIRES-SUPPLY ONLY	EA	1.				
105	770	9270	MODIFY EXISTING FEED POINT	EA	2.				
106	772	9200	IT SYSTEM	EA	1.				
107	772	9811	TRAFFIC SIGNAL SYSTEM - SITE 1	EA	1.				
108	772	9812	TRAFFIC SIGNAL SYSTEM - SITE 2	EA	1.				
109	920	0090	LIFT STATION	EA	1.				
110	920	3018	STAIRWELL MODIFICATION	EA	2.				
111	930	9612	SPALL REPAIR	SF	230.				
112	970	0365	SHELTER	EA	2.				

BID ITEMS

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						\$\$\$\$\$	000	\$\$\$\$\$	00
113	970	1011	LANDSCAPE PLANTINGS	L SUM	1.				
114	970	2017	HOT WING MAPLE	EA	2.				
115	970	2202	SPRING SNOW CRABAPPLE	EA	1.				
116	990	0210	TEMPORARY PEDESTRIAN WALKWAY	L SUM	1.				
			<b>TOTAL SUM BID</b>						

## NOTES

Revised - 3/1/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	6	1

**100-P01 COMPLETION DATES:**

University Avenue/Columbia Road Intersection Closure: The University Avenue/Columbia Road intersection can be closed and detoured as shown in Section 100 of the plans two times during construction for a maximum closure of 20 consecutive days each.

Upon opening the intersection to traffic the University Avenue/Columbia Road intersection must be signalized with either the proposed permanent signal, the existing signal, or a temporary signal. If a temporary signal is used, it will be incidental to other items bid and not paid by the owner.

The 20-day maximum closure will begin on the day that the intersection is closed for each occurrence. Liquidated Damages will be assessed at a rate of \$800 per calendar day for every day that expires after the 20-day closure for each occurrence.

Interim Completion Date 1: Complete all contract work except for the following:

- Finish grading
- Topsoil spreading
- Permanent seeding/mulching
- Landscaping/tree plantings
- Traffic Signal System – Site 1
- Traffic Signal System – Site 2
- IT System

Columbia Road including the intersections of University Avenue/Columbia Road and 2nd Avenue North/University Avenue must be open to traffic and pedestrians. Both intersections are to be signalized with either the proposed permanent signal, the existing signal, or a temporary signal. If a temporary signal is used, it will be incidental to other items bid and not paid by the owner. The Contractor may close a lane of traffic the max length of 2 blocks for short durations of time to complete work. All traffic control required will be incidental to other items bid and not paid by the owner.

Interim Completion Date 1 is August 14, 2021. Liquidated damages will be assessed at a rate of \$2,100 for each calendar day that expires after August 14, 2021.

Final Completion Date: Complete all remaining working included in the contract.

Final Completion is November 1, 2021. Liquidated Damages will be assessed at a rate of \$900 for each calendar day that expires after November 1, 2021.

Liquidated Damages: Liquidated Damages for failing to timely attain any completion dates are not additive and will not be imposed concurrently.

**100-P02 CONSTRUCTION COORDINATION:** There are multiple construction projects within the area. Contractor to coordinate all construction activities with other projects.

**105-P01 PAVEMENT SWEEPING:** Sweep paved areas that were used by construction traffic before opening these areas to public traffic. Sweep any tracking onto streets outside of construction area.

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection.

Use a vacuum or pick-up type sweeper to perform this work.

**105-P02 UTILITY LOCATIONS AND ELEVATIONS:** The approximate location of known existing underground utility lines are shown on the plans. Other unknown utilities may exist. Determine

the exact location and elevation of all existing utilities before commencing work and protect all utilities or repair any damage which occurs because of failure to accurately locate and preserve any and all existing utilities. Perform “potholing” or exploratory excavation as an incidental to the project when needed to verify location, elevation, size, and material at locations of crossing and tie-ins.

**105-P03 UTILITY RELOCATION:** Multiple utilities are impacted by this project. The Contractor will be responsible for working with the individual utility companies to coordinate this work and ensure that continuous service is maintained at all times. Utility relocations may affect grading operations at various locations. Plan drawings show the exiting known utilities.

Prior to construction activities, contractor will schedule a utility coordination meeting include the Contractor, Owner, Engineer, and utility owners affected by the project.

**107-P01 NOISE RESTRICTIONS:** Comply with the City of Grand Forks noise ordinance by scheduling operations between the hours of 6:30 AM and 10:00 PM. Submit written request to the Grand Forks Public Health Department at 151 South 4<sup>th</sup> Street, Suite N-301, Grand Forks, ND 58201-4735 for each occurrence to work outside these hours. Follow procedures in Standard Specification 108.05 “Limitation of Operations” to perform work on holidays.

Submit requests 72 hours prior to beginning work, stating the specific nature of the work, additional hours required and the number of days needed to complete the specified work. Obtain approval from the Health Department 24 hours prior to beginning work.

Furnish a copy of the approved permit to the Grand Forks Police Department a minimum of 24 hours prior to beginning of work and notify the department of the days and hours planned for work under permit.

**201-P01 REMOVAL OF TREES AND BRUSH:** Remove existing shrubs, bushes, wood mulch, landscaping rock, landscaping boulders, stumps, landscaping fabric, and concrete edging located within the limits of construction in boulevards. Include all costs for removals in the price bid for “Removal of Trees and Brush”.

**202-P01 REMOVAL OF CONCRETE PAVEMENT:** Removal of pavement consists of removing concrete pavements, bridge approach slab, sidewalks, and driveways. Existing aggregate base is considered unsuitable. Include all costs associated with removing, hauling, and disposing of existing 12” lime treated subgrade or aggregate base in the price bid for “Removal of Concrete Pavement”.

**202-P02 SALVAGED ITEMS:** Deliver salvaged items to the City of Grand Forks. Include all costs for labor, equipment and materials required to remove and salvage the existing signs, light poles, signals, valves and valve boxes, fire hydrants, manhole castings, and inlet castings in the price bid for the corresponding pay item.

**203-010 SHRINKAGE:** 35 percent additional volume is included for shrinkage in earth embankment.

**203-385 AVERAGE HAUL:** No average haul has been computed for this project.

**203-P01 COMMON EXCAVATION-SUBCUT:** No subcuts are planned. However, if the Engineer determines an area of the subgrade is too wet or unstable, a subcut may be required. A discretionary quantity for subcut has been provided in Section 20 of the plans.

**203-P02 EXCESS MATERIAL:** Excess material listed in the earthwork summary is to be disposed of in accordance with Section 107.17 of the Standard Specifications. Include all costs associated with disposing of excess material and common excavation-subcut in the price bid for “Common Excavation-Type A”.

THIS DOCUMENT WAS  
ORIGINALLY ISSUED AND  
SEALED BY  
JEREMY DEWALD  
REGISTRATION NUMBER  
PE-8769  
ON 03/01/2021 AND THE  
ORIGINAL DOCUMENT IS  
STORED AT THE WEST FARGO  
KLJ OFFICE.

<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>CITY OF Grand Forks, NORTH DAKOTA Columbia Road</small>		
	<b>PLAN NOTES</b>	
DRWN. BY JD	CHKD. BY JK	PROJECT NO. 1904-01703

## NOTES

Revised - 2/24/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	6	6

- 772-P01** Descriptions: The signalized intersections are referred to as the following bid items:
- Traffic Signal System – Site 1: Intersection of N Columbia Road with University Avenue
  - Traffic Signal System – Site 2: Intersection of N Columbia Road with 2<sup>nd</sup> Avenue N
  - IT System: Fiber Optic Interconnect from University Avenue to 2<sup>nd</sup> Avenue N
    - Connect to existing interconnect south of University Ave and north of 2<sup>nd</sup> Ave N
- 772-P02** Equipment: Contractor to provide equipment listed or an equal approved by the City of Grand Forks and NDDOT. Items used on this project include:
- Traffic Signal System:
- Econolite Cobalt RM with Transit Key/2M Series NEMA TS2/INTCIP
  - Emergency Vehicle Preemption and Transit Priority Equipment Global Traffic Technologies' GPS based Opticom Systems
  - Econolite Controller Cabinet 332/332D, pre-wired with ancillary components including RENO A&E Traffic Signal Conflict Monitor with Ethernet
  - Vehicle and Pedestrian Signal Heads – General Electric GTX LED
  - ADA Components including:
    - Polara Bulldog Pedestrian Buttons
    - Polara EZ Comm System
    - Priosk SMP2 High Visibility Pedestrian Station
- IT System
- Ruggedcomm Rugged Switch RS2228 rack mounted
  - Hybrid Single/Multimode Fiber Optic Cable
- 772-P03** Traffic Signal System: The price bid for “Traffic Signal System -Site 1” and “Traffic Signal System -Site 2” to include all labor and equipment necessary for each signal system to be fully operational as shown in the plans upon construction completion. This includes, but is not limited to, the installation of the following features where applicable; traffic signal standards, mast arms, feed point type IV pad mounted, pedestrian pushbuttons, pushbutton posts and signs, vehicular and pedestrian heads, blank out signs, video detection system, controller (Site 2), controller battery back-up (Site 2), cabinet (Site 2), foundations, revisions to the existing fiber optic interconnect system, along with all cable, conduit, junction boxes, pull boxes, and appurtenances to install the traffic signal completely. This also includes the removal of the existing wiring and any other abandoned features that may conflict with the proposed Traffic Signal System improvements. This also includes connections with lighting as noted elsewhere.
- 772-P04** Field Verification: Verify all features labeled “Existing” are approximately located. Verify the location of all proposed signal and lighting features including all proposed conduit to avoid conflict with any utilities or any other features potentially encountered in the field.
- 772-P05** Signal Testing and Initial Operation: When not in operation, the signal head to be hooded with a material that will allow the signal heads to be seen dimly by personnel testing the signals. The hood to remain in place until the signal is authorized to be operated. Do not energize the signal system for public use until the ringout of the field wiring is completed and approved by the City electrical manager. The cost of testing will not be bid separately but be included in the price for “Traffic Signal System -Site 1” and “Traffic Signal System -Site 2”.

- 772-P06** Traffic Signal Controller: The price bid for “Traffic Signal System – Site 1” includes all labor, materials, and equipment required to move and reinstall controller, controller cabinet, and battery backup in new location, as specified in the in plans.
- The price bid for “Traffic Signal System - Site 2” includes all labor, materials and equipment required to install the new controller, including but not limited to the emergency vehicle pre-emption unit, cabinet, new detector amplifiers (furnished and installed), other ancillary signal components (such as load switches, conflict monitors, etc.) and controller cabinet components connected as required to make the new controller equipment operational with the existing and proposed signal equipment.
- 772-P07** Grand Forks Traffic Signal Cabinet: The price bid for “Traffic Signal System – Site 1” includes all costs, labor, materials and equipment necessary to move and reinstall cabinet in location specified in the plans.
- Use Econolite 332D, pre-wired with ancillary components including a RENO A&E Traffic Signal Conflict Monitor with Ethernet port. Adhere to the City of Grand Forks Cabinet Specifications as specified in the plans at Traffic Control Corporation. The price bid for “Traffic Signal System - Site 2” includes all costs, labor, materials and equipment necessary for furnishing and installing the cabinet.
- 772-P08** Concrete Controller Cabinet Pad: The price bid for “Traffic Signal System -Site 1” and “Traffic Signal System -Site 2”, includes a new concrete pad to mount the proposed traffic signal cabinet. Size the concrete pad for a Type 332D Cabinet as specified in the plans.
- 772-P09** Battery Backup System: The price bid for “Traffic Signal System -Site 1” includes all costs, labor, materials and equipment necessary to move and reinstall the battery backup system.
- Provide a battery backup system for the Traffic Signal System. The price bid for “Traffic Signal System -Site 2” includes all costs, labor, materials and equipment necessary for furnishing and installing the battery backup system. Include the following minimum requirements:
- Zinc5 UPStealth 2 Extended Run Time XRT 3600wh Battery Backup System
- Provides full battery backup for the traffic controller in normal or flash operation
  - Flash activation contacts to ensure the longest possible battery life
  - Rack mountable for installation in a 332D Cabinet
  - Power conditioning and transient filtering
  - True Sine wave output with ±2% voltage regulation
  - Power management and diagnostic functions
  - Ethernet port with software to monitor or download data logs of the battery backup system
  - Suitable for operation from -40°F to 120°F
  - Battery backup for a minimum of 3 hours of flash operation
  - Capable of running the intersection for 30 minutes at 1000 watts and then switch to flash operation to conserve power
  - The UPS to include an external bypass switch rated at 30-amp 250 VAC and use 30-amp relays.

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<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>CITY OF Grand Forks, NORTH DAKOTA Columbia Road</small>		
		<b>PLAN NOTES</b>
DRWN. BY JD	CHKD. BY JK	PROJECT NO. 1904-01703

## NOTES

Revised - 2/24/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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**772-P10** Emergency Vehicle Pre-Emption and Transit Priority: Use GTT Global GPS Vehicle Preemption; model 764 phase selector, Model 1010 GPS Radio Unit containing a GPS receiver with Antenna and a 2.4 Ghz Spread Spectrum Transceiver with Antenna and Model 1070 GPS Installation Cable.

The location of the GPS EVP detector as denoted in the plans may vary based upon GPS signal availability. No splices are allowed between the controller cabinet and the EVP Equipment on the pole/arm. All indicator lamps are LED.

Compatible with the other EVP equipment used within the City of Grand Forks. Provide all labor and equipment necessary for the emergency vehicle preemption system to be fully operational. Notify City of Grand Forks fire chief Gary Lorenz (701-746-2566) and city electrician Rick Hanson (701-738-8796) when the proposed signalized intersection EVP system is tested and operable. The price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment necessary for furnishing and installing the EVP system.

**772-P11** Conflict Monitor: Install a RENO A&E Traffic Signal Conflict Monitor with Ethernet. A complete controller conflict monitor test to be performed by the Contractor prior to unveiling the traffic heads. All materials, labor and equipment necessary to conduct the conflict monitor testing to be included in the price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2".

**772-P12** Controller Monitoring Unit and/or Communication Module: Include all costs for labor, materials and equipment necessary to move and reinstall this item to be included in the price bid for "Traffic Signal System -Site 1".

Provide a volume density controller with a communication hookup which provides a duplex data link with a central control computer. The communications hookup to be PC compatible. A controller monitoring unit and/or install communication module in the controller. Install and connect the monitor unit to the controller and conflict monitor so as to monitor conflict monitor flash, pre-emption status, cabinet door open, phase on and status bits required for central control intersection display, and detector diagnostics. The unit to be capable of providing a traffic map and of uploading and downloading information into the controller from a PC, central control computer or a laptop in the field, or a telephone line. Include all costs for labor, materials and equipment necessary for furnishing and installing this item in the price bid for "Traffic Signal System -Site 2".

**772-P13** Shop Drawings: Provide verification that the plans have been submitted to the pole and equipment manufacture and purveyor for review and ordering within two weeks of the contract award. Furnish shop drawings and a complete listing of materials proposed for installation. Provide two copies to the City of Grand Forks Traffic Engineer, plus any additional sets that need approval and that are to be returned for the Contractor's use. Provide the Engineer with proof of purchase, delivery schedules and manufacturing schedules for traffic signal materials indicating that acquisition of these materials is consistent with progress and completion requirements of this contract.

**772-P14** Traffic Signal Head Mountings: Furnish piping to mount the vehicle and pedestrian signal heads to the side of the poles per plan location. Do not mount heads directly to the pole or on the face of the pole directly adjacent to the street. No banding permitted. Schedule an inspection with Rick Hanson (218-779-4362) prior to drilling the holes. The price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment necessary for installing traffic signal heads.

**772-P15** Traffic Signal Standards Base. Provide traffic signal standards with "T" transformer base type standards.

**772-P16** Combination Signal and Light Standard: Provide signal poles with luminaire extensions as shown in plans and NDDOT D-772-3. Luminaire mast arm and scroll to match Lighting Unit Type 'A' Series (See Lighting Plans) or approved equal.

**772-P17** Vehicular Traffic Signal Heads: Use 12-inch vehicular signal heads with aluminum housings for each section. Equip all sections with General Electric GTx LED illuminating elements conforming to the Institute of Transportation Engineers Equipment and Materials Standards and Specifications. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment necessary for furnishing and installing the vehicular traffic signal heads.

**772-P18** Pedestrian Signal Heads: Equip with LED illuminating elements displaying the pedestrian signals to be 2-faced 12" heads, with upper with Walk/Don't Walk symbols and lower with countdown timer. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" include all costs, labor, materials, and equipment necessary for furnishing and installing the pedestrian signal heads.

**772-P19** Conduit: Install conduit at the locations shown on the plans. Bore conduit under existing pavement. Dig potholes to verify that the conduit avoids the existing utility as necessary. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" include furnishing and installing conduit, pushing and boring conduit, digging potholes and restoring the potholes with new material that ties into the existing surround material. Seal all conduits with duct seal at the controller cabinet and at the traffic signal standard foundations. Conduit types may be either schedule 40 PVC or HDPE conduit with a wall thickness equivalent to schedule 40 (Refer to NDDOT specification). HDPE conduit to be UL listed.

**772-P20** Pull Boxes: Follow the specification outlined in the NDDOT standard drawing D770-3 and be PVC with steel casting including a traffic resistant cast iron cover.

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<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>CITY OF Grand Forks, NORTH DAKOTA Columbia Road</small>		
	<b>PLAN NOTES</b>	
DRWN. BY JD	CHKD. BY JK	PROJECT NO. 1904-01703

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**NOTES**

772-P21 Label All Field Cables: All labeling materials must be approved by the City. Labels must be readable without moving the cables. When installing cable bundles in conduit, bundles will not be taped. Label all field cables with the cable designations:

TYPE	LABEL	LABEL LOCATION
Communication Cable	Comm./address of other end	Within 12" of conduit
Pedestrian Push Button	Phase/location (i.e. NW, SW, etc.)	Within 6" of terminals
Video Camera Cables	Detection zone (i.e. D2-1, D2-2, etc.)	Within 6" of terminals
Control Cable	Cable number & location (i.e. NW, SW, etc.)	Within 12" of conduit
Opticom Cable	Pre-empt number/location (i.e. NW, SW, etc.)	Within 6" of terminal

Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment necessary for labeling field cables.

772-P22 Not Used

772-P23 Additional Conduit: Install one additional 4-inch diameter conduit in the controller cabinet/feedpoint foundation. The direction of the conduit will be determined in the field by the engineer. Cap all conduit. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" include all costs to supply and install the additional conduit.

772-P24 Conductor Color Continuity: Maintain conductor color continuity where any 14 AWG 12 conductor cables are connected to 14 AWG 5 and/or 14 AWG 3 conductor cables within the terminal block of a traffic signal standard.

772-P25 Law Enforcement Confirmation Light: Provide blue omni-directional LED law enforcement confirmation lights that are visible from 360° when mounted on the signal heads. Provide one light for each through phase and an additional light at each left turn phase. Provide a lens for the confirmation light in which the blue tint is integrated into the lens. Blue coating is not allowed. Provide lights that are manufactured specifically for use as law enforcement confirmation lights and have been used for that purpose at intersections within the United States. Mount the confirmation lights on a riser to the traffic signal heads. Provide unbrushed aluminum risers that are capable of adjusting the height and angle of the confirmation lights. The confirmation lights must be visible above or below the signal head backplate. The riser must not protrude or be visible above or below the signal head backplate. Provide a connection between the riser and traffic signal head that is weatherproof and will not allow moisture into the traffic signal head. Connect the confirmation lights to the red indication in the corresponding traffic signal head. Place anti-seize compound on all threaded components. Include all costs associated with furnishing and installing the law enforcement confirmation lights in the price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2".

772-P26 IT System: The bid price for "IT SYSTEM" includes all labor and equipment necessary to interconnect the traffic signals at Site 1 (University Ave) and Site 2 (2<sup>nd</sup> Ave N) with the existing interconnect system as shown in plans. This includes but is not be limited to all fiber optic cable, pull boxes, conduit, future conduit, conduit sweeps into existing pull boxes and connections required for the interconnected system to be fully operational, furnishing and installing Ethernet switches and fiber splice boxes/enclosures sized for all fibers at each signalized intersection, and removing a portion of the existing fiber optic cable, protecting it and salvaging it for reinstallation as shown in the plans. All fibers must be terminated.

772-P27 Fiber Optic Pull Boxes: Provide polymer concrete type pull boxes for the fiber optic interconnect. Clearly mark the cover as "Fiber Optic" as required. Provide Fiber Pull Boxes with dimensions no less than 24" x 36" and Fiber Splice Faults with dimensions no less than 30" x

48" for fiber optic cables. Provide pull boxes and splice faults with a bottom extension to obtain a depth of 26". Duct seal all conduits entering and exiting pull boxes. Fiber splicing is not allowed, fanning inside the cabinet is allowed. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for "IT System".

772-P28 Ethernet Switch: Provide RuggedSwitch RS-2228 Ethernet Switch to be produced by RuggedComm. Ethernet Switch to be rack mounted, contain dual fiber optic Gigabit Ethernet ports, and have four (4) single-mode fibers with LC connectors in and out included for the for the connections. Price bid for "IT SYSTEM" includes all costs, labor, materials and equipment necessary for furnishing and installing the Ethernet switch.


772-P29 IP Address: Coordinate with the City of Grand Forks to obtain any required IP addresses during installation.

772-P30 Interconnect Cable: The fiber optics interconnect cable to include one (1) 24 multimode (12 pairs) and 24 single-mode hybrid fiber optic hardwire for aerial and duct application, compatible with Daisy-chain operation, for the purpose of controlling traffic in a coordinated closed-loop system. Use one (1) pair of single-mode fiber for traffic signal controller interconnection and one (1) pair of single-mode fiber for the entire video detection system. Terminate fibers in the appropriate switch within the traffic signal controller and all fiber both single and multi-mode to be terminated in the panel even if the fiber is unused.

The optical cable to be dielectric, loose-tube, dry block, filled with a single polyethylene jacket and reinforced with aramid yarn. The optical specifications to meet RUS 7 CFR 1755.900 (PE-90) and Telcordia GR-20 Standards for single-mode cable. Single mode fiber to be 8.3/125 micrometer in diameter, zero water peak. The attenuation to be less than or equal to 0.4 dB/km at 1310nm; less than or equal to 0.32 dB/km at 1383 nm and less than or equal to 0.3 dB/km at 1550nm. Multimode fiber to be 62.5/125 micrometer in diameter, zero water peak. The attenuation will be less than or equal to 3 dB/km at 850 nm and less than or equal to 1 dB/km at 1550 nm. The temperature range will be -40°C to +70°C. Provide 25 feet of additional interconnect for each incoming and outgoing conduit run at every pull box, traffic signal controller. The cable manufacturer to provide the Engineer with documentation indicating the attenuation and bandwidth for individual fibers on each reel within five business days after delivery of the cable. Test the cable again after connectors are installed.

Contractor will install new interconnect cable between the signal at Demers Ave and the East Columbia Ramp. Include all labor, materials and equipment necessary for fiber optic interconnection in the price bid for "IT SYSTEM."

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	<b>PLAN NOTES</b>	
	<small>DRWN. BY</small> JD	<small>CHKD. BY</small> JK

**NOTES**

Revised - 2/24/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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772-P31 Tracer Conduit: The interconnect cable conduit to have a tracer conductor installed and labeled in each controller cabinet. The tracer conductor to consist of a No. 14 AWG - Type THW single conductor as specified in Standard Specification section 895.03A1. The conductor to be continuously unspliced from control cabinet to control cabinet. The cost of furnishing and installing this conductor will not be bid separately but included in the price bid for "IT SYSTEM."

772-P32 Maximum Tensile Pull Strength: Do not exceed a maximum tensile strength of 600 pounds when pulling the fiber optic interconnect cable.

772-P33 Controller Testing: Deliver the controller and cabinet to the City Electrician, Rick Hanson (701-738-8796), at the Public Works Department located at 724 N 47th Street. The City Electrician will conduct operational tests and operate the controller for a test period of 30 consecutive days at the Public Works Department shop without any malfunctions of the controllers. Any controller that does not operate satisfactorily for the 30 days will be rejected and replaced. After the controller has operated satisfactorily for the 30 days, they will be approved by the City of Grand Forks. The price bid "Traffic Signal System -Site 2" includes all labor, materials and equipment necessary for furnishing and installing the controllers, as well as delivery to City Electrician.

772-P34 Signal Timing and Coordination: The contractor is responsible for inputting all necessary data into the traffic signal controller to achieve a fully operational signal system. Include, but not limited to, installing all necessary time of day plans, video detection functions, emergency vehicle preemption, and signal interconnection and communication. The City of Grand Forks will provide all timing information to the Contractor. Contact KLJ at (701) 232-5353 prior to programming for field verification and calibration. Include all labor, materials and equipment necessary achieve this fully operational coordinated signal system in the price bid "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2".

772-P35 Malfunction Management Unit: Use RENO A&E model with an Ethernet port. Perform a complete controller malfunction management unit test prior to unveiling the traffic heads. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all labor, materials and equipment necessary to furnish and install the unit and to conduct the malfunction management unit testing.

772-P36 Pedestrian Push Button Units: Install A Polara iNS2 2 Wire Navigator System for a 332 Series cabinet per Intersection which includes:

- POL-ICCU-C Rack Mounted (330 Series Cabinet) 1 Total
- POL-iN2 C4Cable-C C4 Cable for iCCU-C 1 Total
- POL-iN2-ICB-C Interconnect Board for iCCU-C 1 Total
- POL-iN2-150WPS-C 150-Watt Power supply for iCCU-2 1 Total
- POL-iN29CB1-B-int-PBS-9x12 Option C (Countdown Signs) Brail Special message Black Pedestrian
- Pushbuttons 10 Total (2 spare)
- Factory Represented Setup

Mount each pedestrian sign and pushbutton on one framed enclosure to the signal pole or bolt directly to the pedestrian pushbutton post. Bandit is not permitted. Do not extend the top of the pushbutton signs above the top of the pedestrian pushbutton post. Include the Advisor Advanced APC Pedestrian Controller and compatibility remote network ether connection for real time monitoring and control of operating parameters. SMP2 High Visibility Pedestrian Station for standalone pushbutton posts. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment necessary for furnishing and installing the pedestrian pushbutton units.


772-P37 Signal Standard Paint Color: Paint all Traffic Signal System components in accordance with the following:

- Transformer base-black
- Mast arm-black
- Signal Standards - black
- Signal head mounting hardware-black
- Signal housing-black
- Pedestrian pushbutton post – black
- Pedestrian pushbutton housing – black
- Use #27038 of Federal Standard No. 595B for the color black.

772-P38 Excavation and Restoration: Any Excavation required to install conduit, connect conduit to existing conduit sweeps, install pull boxes, foundations or any other feature proposed in the plans is included in the prices bid "Traffic Signal System - Site 1", "Traffic Signal System - Site 2", and "IT SYSTEM". This includes restoring the excavated area with the appropriate fill material. The fill material to match the surrounding surface material. At locations where the surrounding material is earth, include earth fill with 6" of topsoil and seed or sod. At locations where the surround material is concrete, tie into the existing concrete. All removed material whether concrete or earth is the property of the Contractor and be disposed of accordingly. Compaction and density controls are in accordance with Section 203.04 E.2 of the Standard Specifications AASHTO T-99.

772-P39 Wire Splicing: No splicing will be allowed in pull boxes. Splicing may only take place in the signal base.

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<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>CITY OF Grand Forks, NORTH DAKOTA</small> <small>Columbia Road</small>		
		
<b>PLAN NOTES</b>		
<small>DRWN. BY</small> JD	<small>CHKD. BY</small> JK	<small>PROJECT NO.</small> 1904-01703



**NOTES**

Revised - 2/24/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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772-P40 Feed Point-Type IV Pad Mounted: Connect the traffic signal controller to the existing feed point. Install a new 50-amp breaker Type BR at the feed point for traffic control signal purposes.

The feed point will have two for Roadway Lighting and Traffic Signals. See the Grand Forks Standard Plate 70.05 for the Combo Light Standard Contact Deb Thompson with Xcel Energy (701-795-5229). Coordinate with the utility company to establish the service connection to ensure a fully operational traffic signal controller feed point at this location.

All utility company costs for the new feed point will be paid by the Contractor. Furnish and install new conduit from the new controller cabinet to the new feed point. Furnish and install #6 U.S.E. cable between the new controller and the new feed point. Price bid for "Traffic Signal System - Site 1" and "Traffic Signal System - Site 2" includes all costs, labor, materials and equipment required for feed point connections.

Provide 14-gauge #304 stainless steel cabinet of adequate size to house the specified number of circuits and equipment shown on the feed point detail. Tie transformer ground into cabinet grounding lug and neutral lug.


Provide enclosures with a subpanel for complete dead-front access to all, main disconnect handles, circuit breaker handles and toggle test switches. Use plug in type breakers with specified amperage, 10,000 AIC.

Mount photoelectric (PE) cells externally on the feed point cabinet, facing east or north. Use EEI/NEMA type PE sockets. Provide PE control with a time delay of at least 15 seconds and rated for 240-volt.

772-P41 Video Detection: Install "Econolight Vision" cameras on all signal poles (4 per intersection) and provide two spare cameras per intersection (6 total) to the City.

772-P42 Training and Warranty: Provide 8 hours of training for all equipment to City staff. Warranty of all signal equipment installed shall last 6 years.

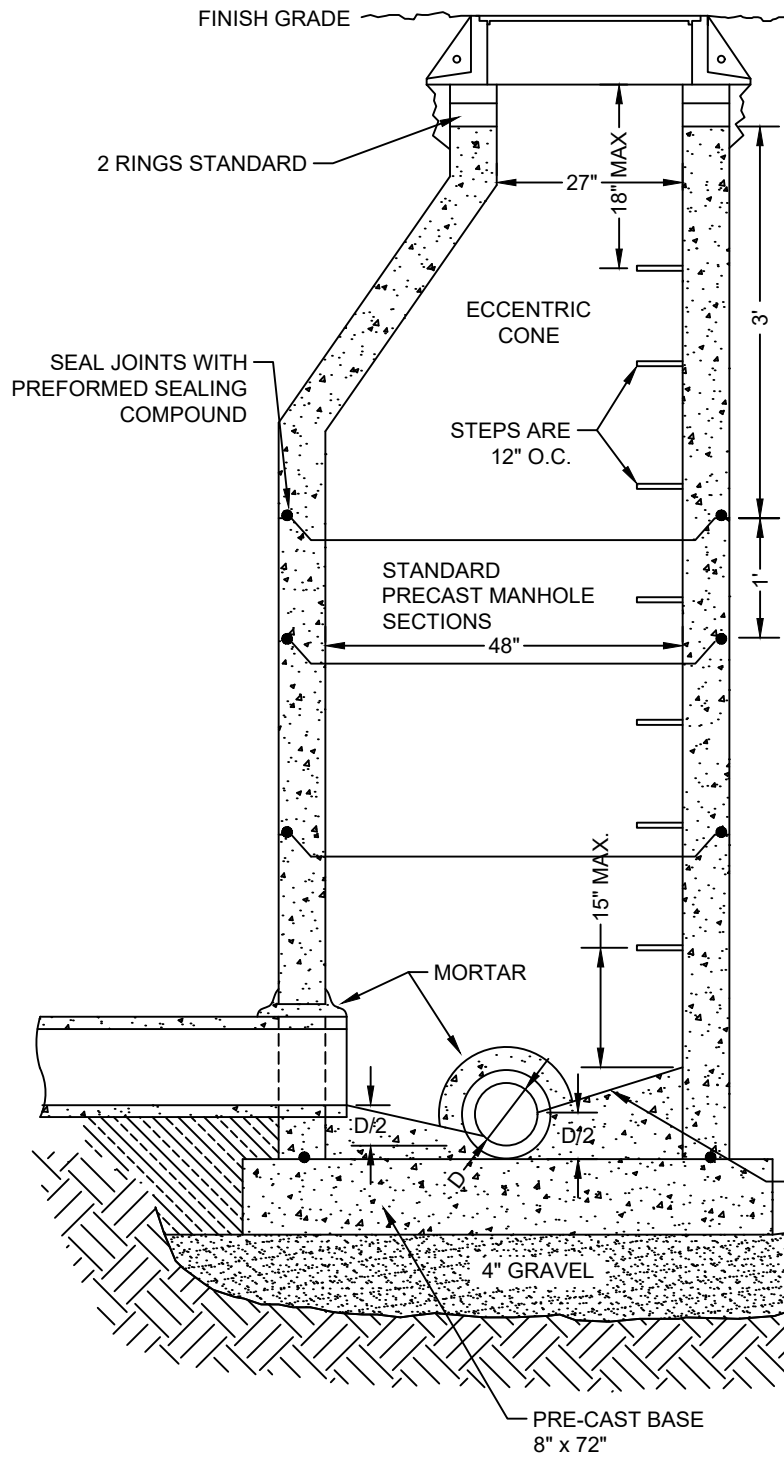
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Estimated Quantities

Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	NON-PARTICIPATING	PARTICIPATING	TOTAL
714	0205	PIPE CONC REINF 15IN CL III	LF	0	73	73
714	0310	PIPE CONC REINF 18IN CL III	LF	0	52	52
714	0820	PIPE CONC REINF 30IN CL III	LF	0	510	510
714	0905	PIPE CONC REINF 36IN CL III	LF	0	155	155
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	LF	0	320	320
714	9910	FLAP GATE 18IN	EA	0	1	1
722	0110	MANHOLE 60IN	EA	0	8	8
722	0120	MANHOLE 72IN	EA	0	1	1
722	0130	MANHOLE 84IN	EA	0	1	1
722	1110	MANHOLE RISER 60IN	LF	0	84	84
722	1120	MANHOLE RISER 72IN	LF	0	11	11
722	1130	MANHOLE RISER 84IN	LF	0	12	12
722	3500	INLET-TYPE 1	EA	0	8	8
722	6140	ADJUST GATE VALVE BOX	EA	0	11	11
722	6160	ADJUST INLET	EA	0	10	10
722	6200	ADJUST MANHOLE	EA	0	10	10
724	0270	REMOVE GATE VALVE & BOX	EA	2	0	2
724	0315	GATE VALVE & BOX 10IN	EA	2	0	2
724	0420	HYDRANT-RELOCATE	EA	0	1	1
724	0891	WATERMAIN MODIFICATIONS	L SUM	0	1	1
724	7150	PLUG VALVE & BOX	EA	1	0	1
724	9024	FORCEMAIN 10IN	LF	90	0	90
724	9032	FORCEMAIN 24IN	LF	175.1	0	175.1
724	9040	FORCEMAIN - BORED	LF	534.8	0	534.8
724	9110	PLUG FORCEMAIN	LF	759	0	759
724	9115	FORCEMAIN CONNECTION	EA	2	0	2
724	9120	FORCEMAIN BYPASS	LSUM	1	0	1
724	9125	FORCEMAIN DRAIN DOWN	LSUM	1	0	1
724	9135	REMOVE FORCEMAIN ARV STRUCTURE	EA	1	0	1
724	9156	24IN 45DEG BEND	EA	4	0	4
724	9168	24IN x 24IN X10IN TEE	EA	2	0	2
740	0160	WATERPROOFING MEMBRANE	SY	380	0	380
744	0050	INSULATION BOARD	CF	0	424	424
748	0190	CURB & GUTTER-TYPE I 30IN	LF	0	2,348	2,348
750	0100	SIDEWALK CONCRETE	SY	0	1,774	1,774
750	0110	SIDEWALK BRICK PATTERN	SY	0	118	118
750	0210	CONCRETE MEDIAN NOSE PAVING	SY	0	2	2
750	0250	CONCRETE MEDIAN PAVING COLORED W/BRICK PATTERN	SY	0	8	8
750	1000	DRIVEWAY CONCRETE	SY	0	42	42
750	2115	DETECTABLE WARNING PANELS	SF	0	240	240



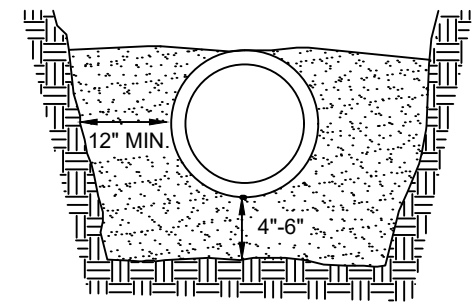
- NOTES:**
1. PLASTIC RINGS SHALL BE REQUIRED.
  2. MANHOLE CASTINGS: NEENAH FOUNDRY NO. R-1733-0067 (LETTERED STORM SEWER) OR EAST JORDAN IRON WORKS 1205. FRAME FLANGES SHALL HAVE 5/8" DRILLED HOLE.
  3. STORM SEWER LIDS SHALL HAVE OPEN PICK HOLES. INSTALL R-1955-1 CASTING IN LIEU OF 1733 WHEN SPECIFIED.
  4. BACKFILL UNDER ALL PIPES WITH 4 BAG CONCRETE MIX UNTIL NORMAL BEDDING IS OBTAINED: SIDES MAY BE FORMED (MINIMUM WIDTH - 12 INCHES).
  5. INSTALL CONCRETE IN THE AREA BETWEEN THE PIPE INVERT & TOP OF BASE AS NECESSARY TO MEET THE TWO RING REQUIREMENT.
  6. STEPS SHALL BE M. A. INDUSTRIES PS1-DI OR APPROVED EQUAL.
  7. INSTALL 2 WRAPS OF 6 MIL POLY ON MH CONE, ADJ. RINGS & CASTING FLANGE (TAPE IN PLACE) FOR MHS NOT IN PAVED AREAS.
  8. FOR MANHOLES IN PAVED SEE DETAIL 65.08 AND 65.08A.

**STANDARD STORM MANHOLE**  
3/28/15 PLATE 65.03

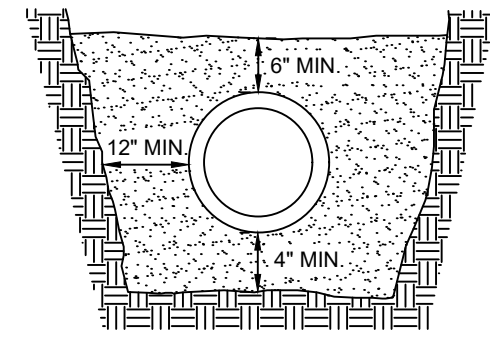
TABLE 21.07 - REQUIRED MIN. DENSITY

		BACKFILL CLASSES							
		AA*	A*	B	C	D	E	F	FF
DEPTH ZONE	X	100	100	100	95	90	85	80	NONE
	Y	100	90	90	90	85	80	80	NONE

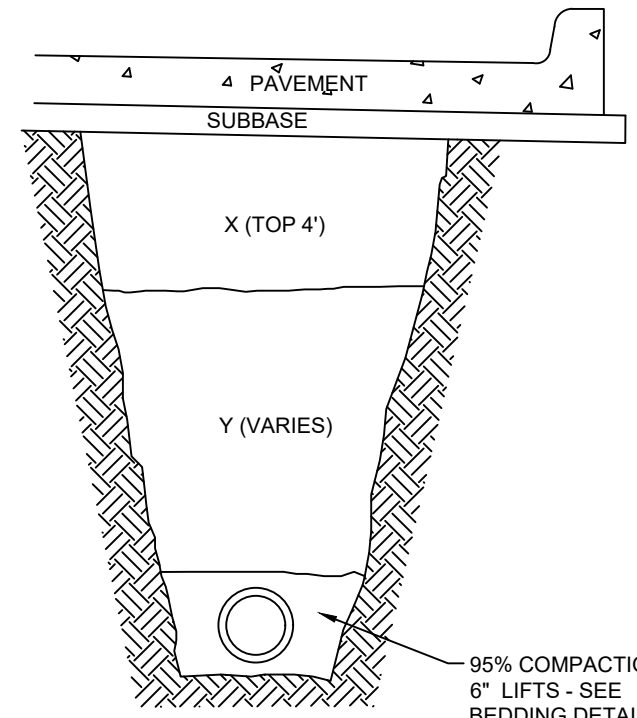
\* ALL GRANULAR MATERIAL - SEE SPEC. 21.07  
\* ON ALL STREET CROSSINGS, GRANULAR BACKFILL WITH A 3' CLAY CAP SHALL BE INSTALLED. CLAY SHALL BE COMPACTED TO A MINIMUM OF 95% OF MODIFIED PROCTOR AT 2-6% OVER OPTIMUM MOISTURE.



**RCP BEDDING**  
CLASS 6 BEDDING AT 95% DENSITY TO TOP OF PIPE



**PVC PIPE BEDDING**  
SPECIALLY PREPARED CLASS 1 BEDDING FOR SAN. SEWER ONLY @ 95% DENSITY.  
CLASS 6 BEDDING FOR WATERMAIN @ 95% DENSITY.



**BACKFILL DETAIL**  
3/28/15 PLATE 68.01

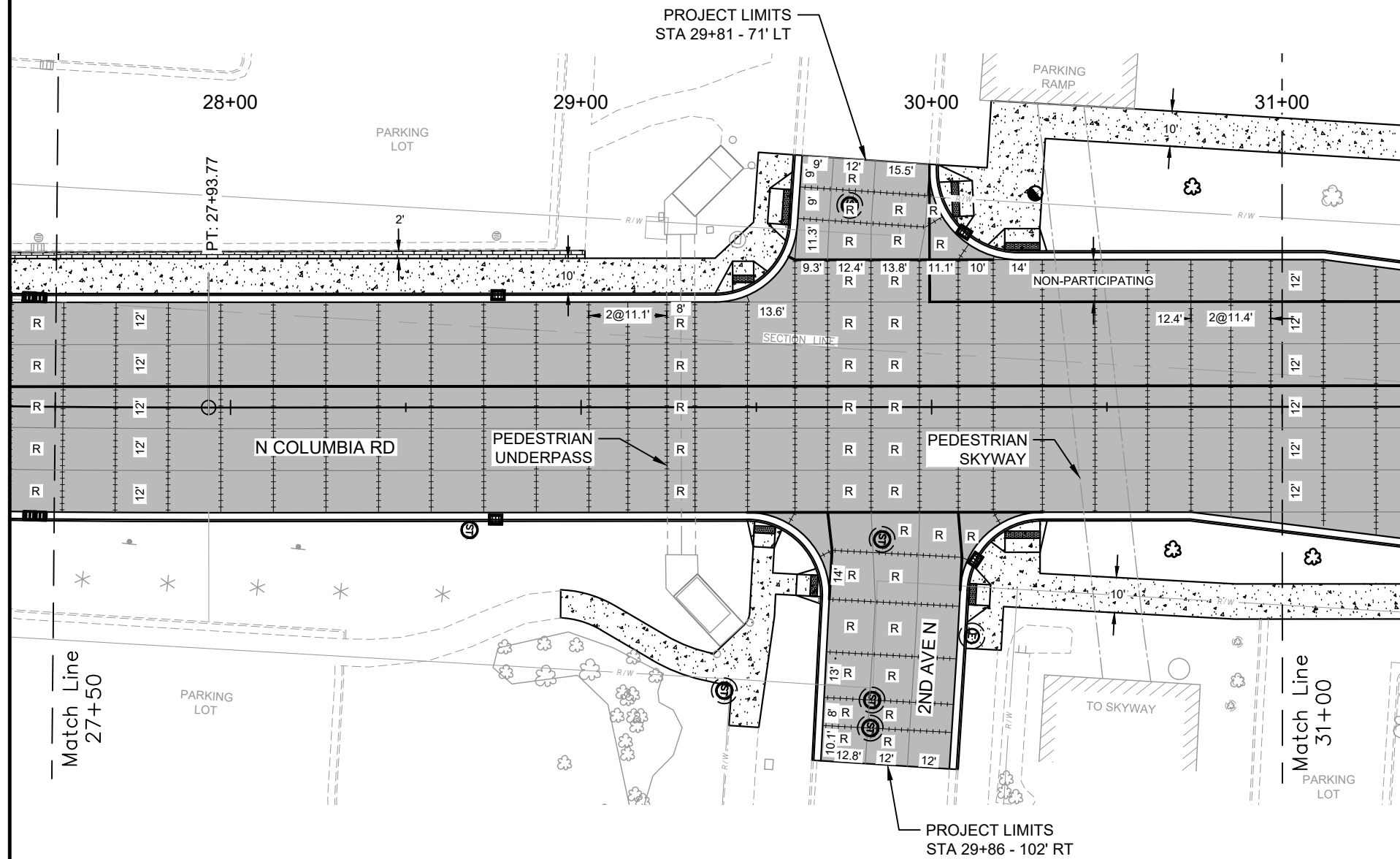
This document was originally issued and sealed by William J Moonen, PE, Registration Number PE-7928 on 3/2/2021 and the original documents are stored at the West Fargo KLJ office.



<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>City of Grand Forks, North Dakota Columbia Road</small>		
	<b>STANDARD DRAWINGS</b>	
	DRWN. BY CTM	CHKD BY WJM

Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	90	2

SPEC CODE	BID ITEM	NON-PARTICIPATING QTY	PARTICIPATING QTY	UNIT
302 0100	SALVAGED BASE COURSE		93	1,967 TON
302 0120	AGGREGATE BASE COURSE CL 5			225 TON
550 0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	150		2,840 SY
709 0100	GEOSYNTHETIC MATERIAL TYPE G		150	3,146 SY
722 6160	ADJUST INLET			4 EA
722 6200	ADJUST MANHOLE			3 EA
748 0190	CURB & GUTTER-TYPE I 30IN			685 LF
750 0100	SIDEWALK CONCRETE			684 SY
750 0110	SIDEWALK BRICK PATTERN			33 SY
750 2115	DETECTABLE WARNING PANELS			128 SF



**LEGEND:**

- |  |                          |  |                            |  |                        |
|--|--------------------------|--|----------------------------|--|------------------------|
|  | CONCRETE PAVEMENT        |  | ADJUST STORM SEWER MANHOLE |  | TYPE 1 - KEYED JOINT   |
|  | SIDEWALK CONCRETE        |  | ADJUST SANITARY MANHOLE    |  | TYPE 4 - TIED JOINT    |
|  | DRIVEWAY CONCRETE        |  | ADJUST UTILITY MANHOLE     |  | TYPE 3 - DOWELED JOINT |
|  | STAMPED CONCRETE         |  | ADJUST GATE VALVE          |  |                        |
|  | DETECTABLE WARNING PANEL |  | ADJUST INLET               |  |                        |
|  | JERSEY BARRIER           |  |                            |  |                        |

**NOTE:**

- JOINT SPACING 15' UNLESS NOTED OTHERWISE.
- CURB & GUTTER TIED JOINT IS 18" #3 BAR PLACED 45" C-C.
- ALL PANELS DESIGNATED **R** TO BE REINFORCED. SEE DETAIL 1/20.3.
- ALL ISOLATION JOINTS SHALL BE TYPE 7. SEE DETAIL 2/20.1.

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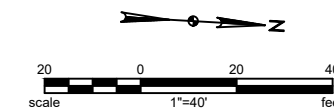
**COLUMBIA ROAD RECONSTRUCTION**

City of Grand Forks, North Dakota  
Columbia Road



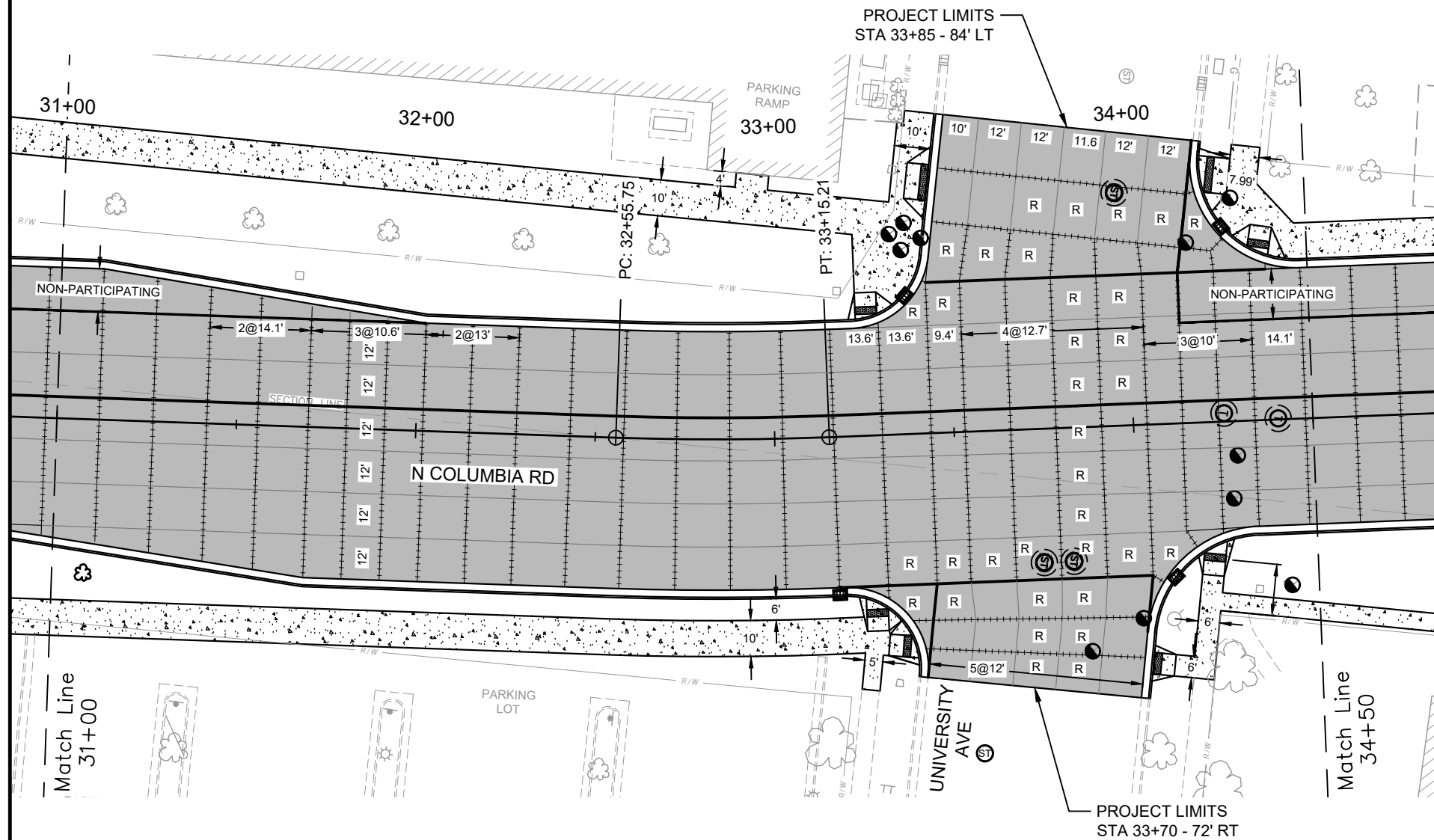
**PAVING LAYOUT  
STA 27+50 TO 31+00**

DRWN BY LM	CHKD BY JD	PROJECT NO. 1904-01703
---------------	---------------	---------------------------



Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	90	3

SPEC CODE	BID ITEM	NON-PARTICIPATING QTY	PARTICIPATING QTY	UNIT
302 0100	SALVAGED BASE COURSE		103	2,264 TON
302 0120	AGGREGATE BASE COURSE CL 5			238 TON
550 0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	165		3,357 SY
709 0100	GEOSYNTHETIC MATERIAL TYPE G	165		3,622 SY
722 6140	ADJUST GATE VALVE BOX			11 EA
722 6160	ADJUST INLET			4 EA
722 6200	ADJUST MANHOLE			5 EA
748 0190	CURB & GUTTER-TYPE I 30IN			677 LF
750 0100	SIDEWALK CONCRETE			724 SY
750 2115	DETECTABLE WARNING PANELS			112 SF



**LEGEND:**

- |  |                          |  |                            |  |                        |
|--|--------------------------|--|----------------------------|--|------------------------|
|  | CONCRETE PAVEMENT        |  | ADJUST STORM SEWER MANHOLE |  | TYPE 1 - KEYED JOINT   |
|  | SIDEWALK CONCRETE        |  | ADJUST SANITARY MANHOLE    |  | TYPE 4 - TIED JOINT    |
|  | DRIVEWAY CONCRETE        |  | ADJUST UTILITY MANHOLE     |  | TYPE 3 - DOWELED JOINT |
|  | STAMPED CONCRETE         |  | ADJUST GATE VALVE          |  |                        |
|  | DETECTABLE WARNING PANEL |  | ADJUST INLET               |  |                        |
|  | JERSEY BARRIER           |  |                            |  |                        |

**NOTE:**

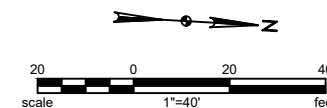
- JOINT SPACING 15' UNLESS NOTED OTHERWISE.
- CURB & GUTTER TIED JOINT IS 18" #3 BAR PLACED 45" C-C.
- ALL PANELS DESIGNATED **R** TO BE REINFORCED. SEE DETAIL 1/20.3.
- ALL ISOLATION JOINTS SHALL BE TYPE 7. SEE DETAIL 2/20.1.

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**COLUMBIA ROAD RECONSTRUCTION**  
City of Grand Forks, North Dakota  
Columbia Road



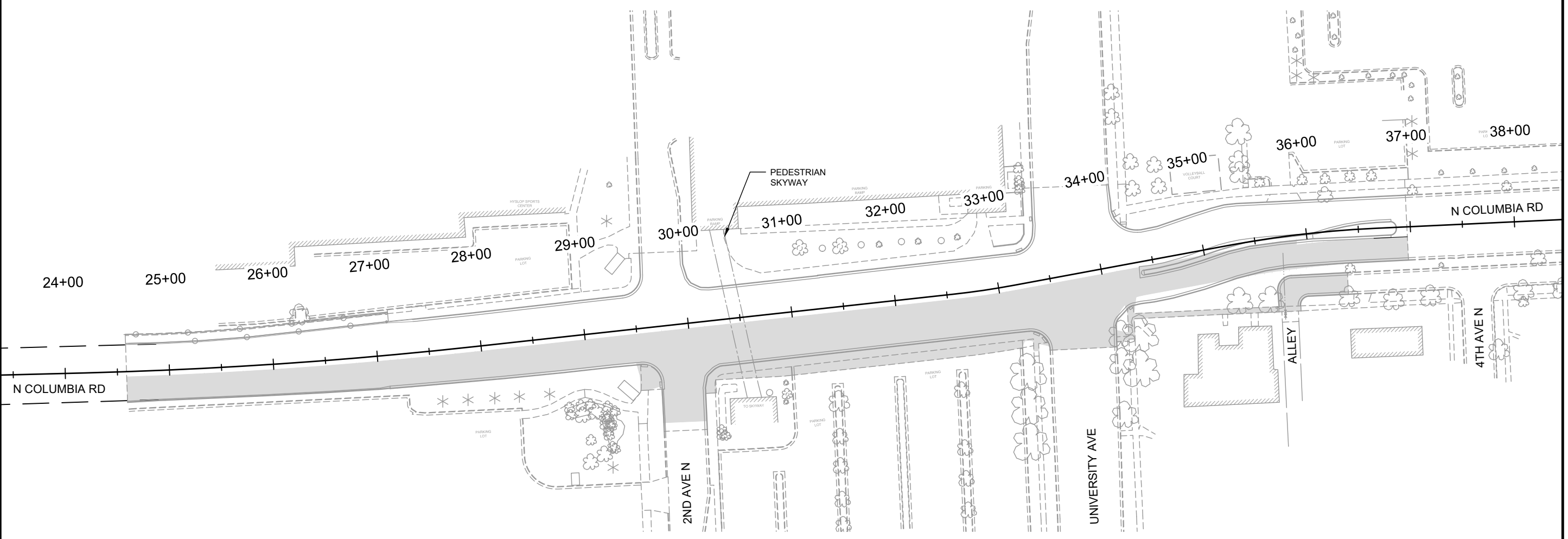
**PAVING LAYOUT**  
STA 31+00 TO 34+50



DRWN BY LM	CHKD BY JD	PROJECT NO. 1904-01703
---------------	---------------	---------------------------

Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	100	2

**WORK ZONE:**  PHASE 1



- Phase 1**
- Close NB traffic on Columbia Rd for project limits.
  - Complete grading, graveling, curb & gutter, paving, sidewalk, sanitary sewer forcemain, and storm sewer for NB traffic.

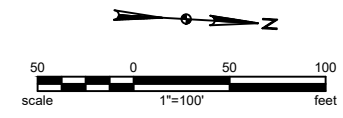
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**COLUMBIA ROAD RECONSTRUCTION**  
*City of Grand Forks, North Dakota*  
 Columbia Road

KLJ

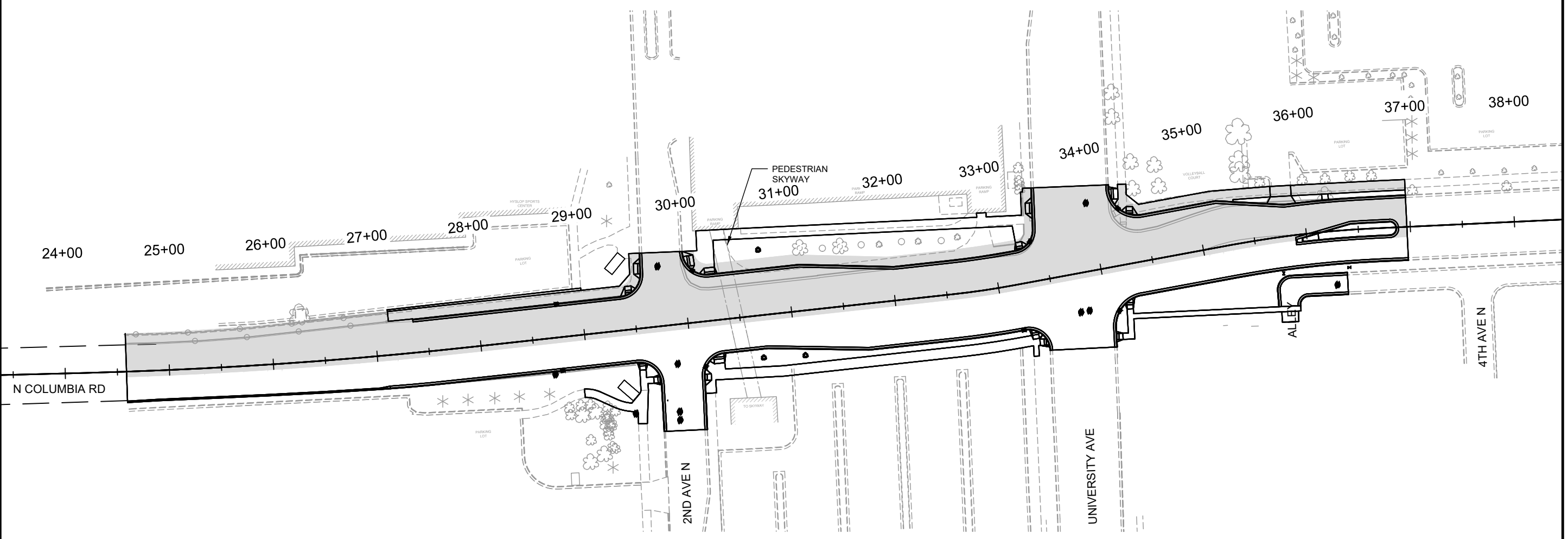
**TRAFFIC CONTROL  
 CONSTRUCTION PHASING  
 PHASE 1 OVERVIEW**

DRWN BY DF	CHKD BY JK	PROJECT NO. 1904-01703
---------------	---------------	---------------------------



Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	100	3

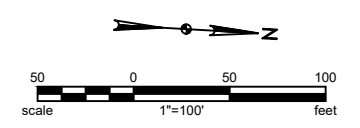
**WORK ZONE:**  PHASE 2



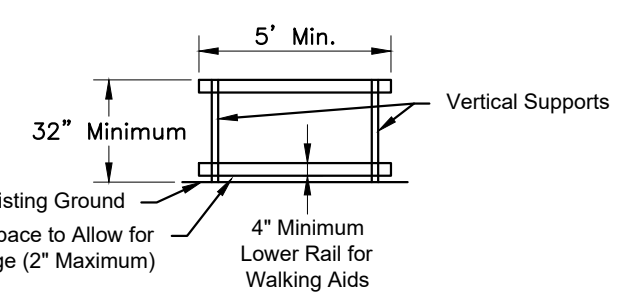
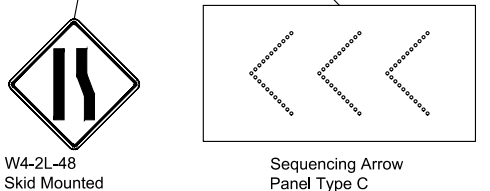
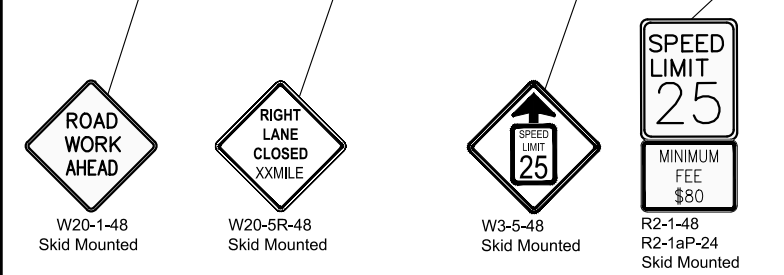
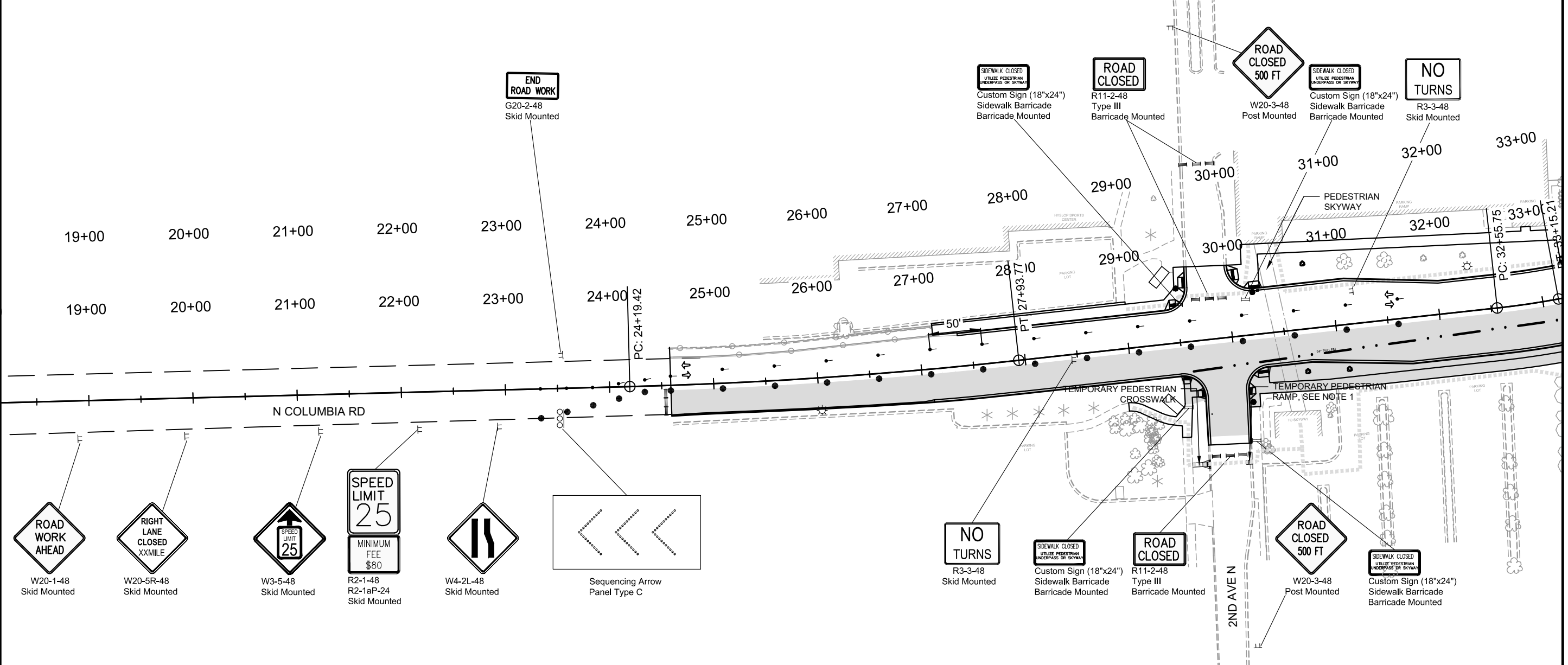
- Phase 2**
- Close SB traffic on Columbia Rd for project limits.
  - Complete grading, graveling, curb & gutter, paving, sidewalk and storm sewer for SB traffic.
  - Limit closure of pedestrian sidewalk/access to N Columbia Rd overpass to 20 days, see Note 704-P02.

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<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>City of Grand Forks, North Dakota Columbia Road</small>		
<b>TRAFFIC CONTROL CONSTRUCTION PHASING PHASE 2 OVERVIEW</b>		
DRAWN BY DF	CHKD BY JK	PROJECT NO. 1904-01703



Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	100	5



**NOTES:**  
 1. TEMPORARY PEDESTRIAN RAMP SHALL PROVIDE ADA COMPLIANT ACCESS WITH SLIP-RESISTANT SURFACING. PRODUCT MAY BE SIMILAR TO BOARDWALK RAMP BY PSS.

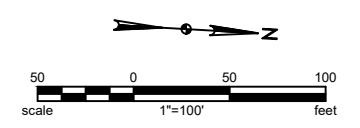
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**COLUMBIA ROAD RECONSTRUCTION**  
 City of Grand Forks, North Dakota  
 Columbia Road

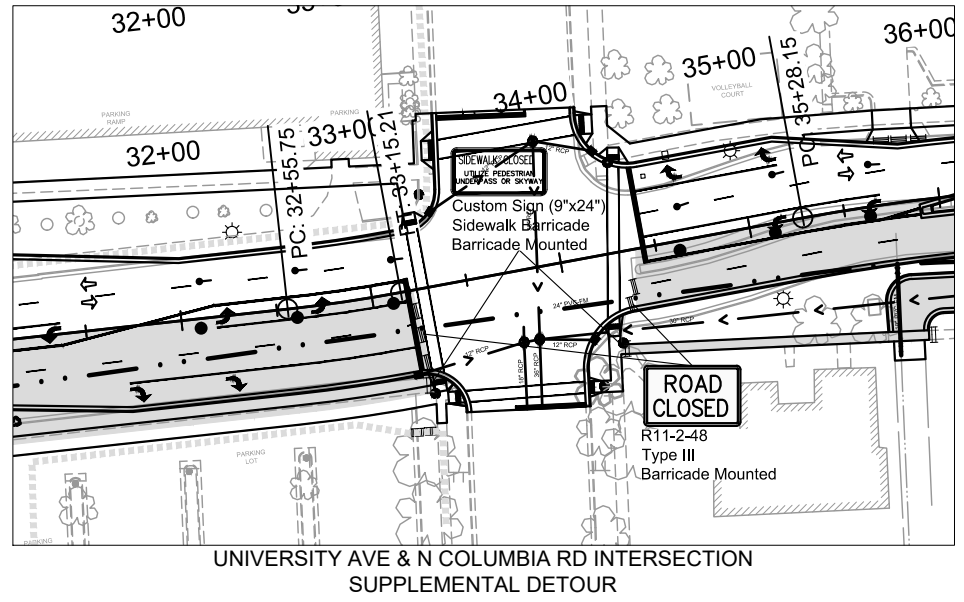
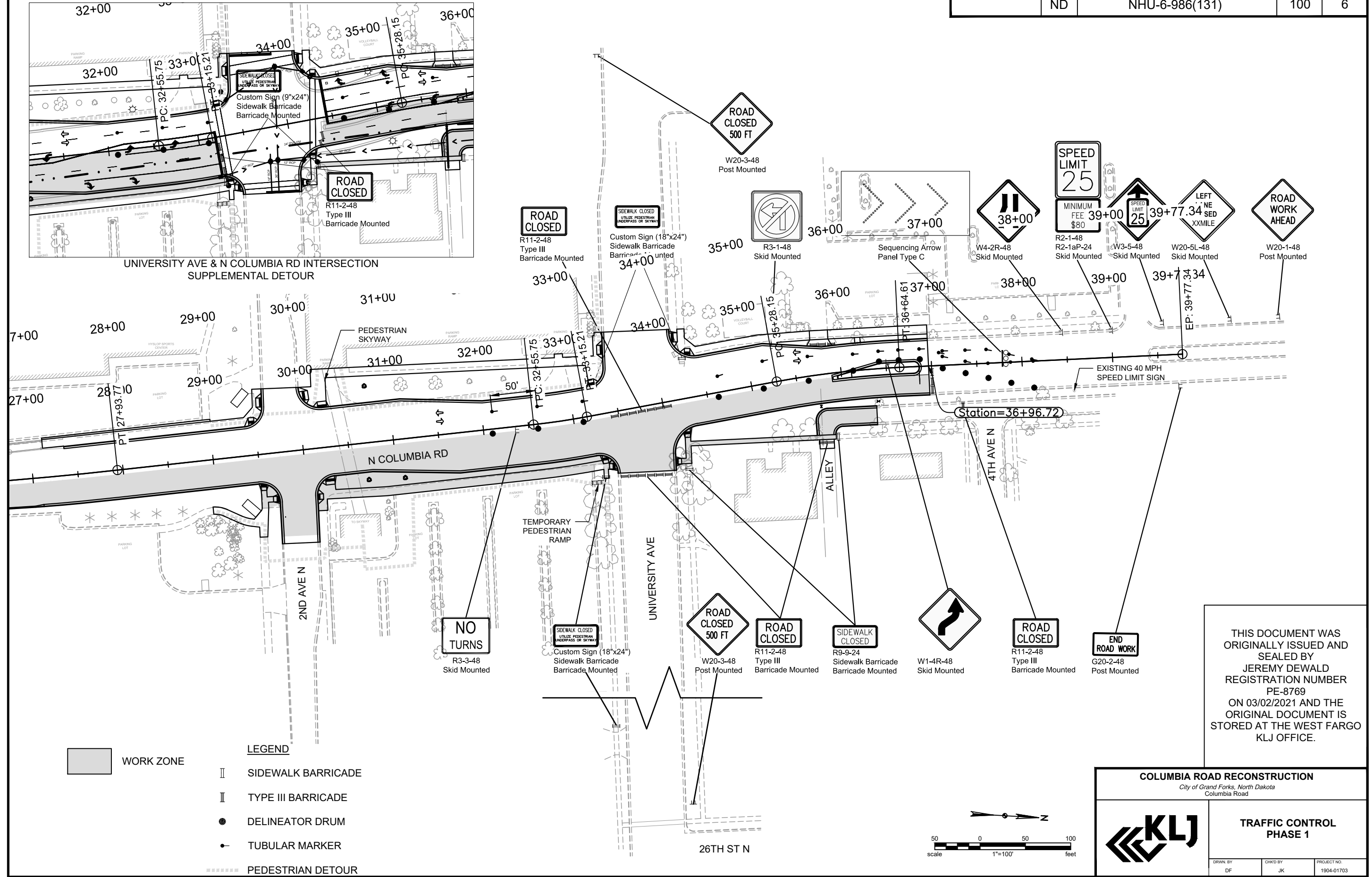
**TRAFFIC CONTROL PHASE 1**

KLJ

DRWN BY: DF    CHKD BY: JK    PROJECT NO.: 1904-01703



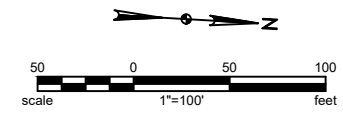




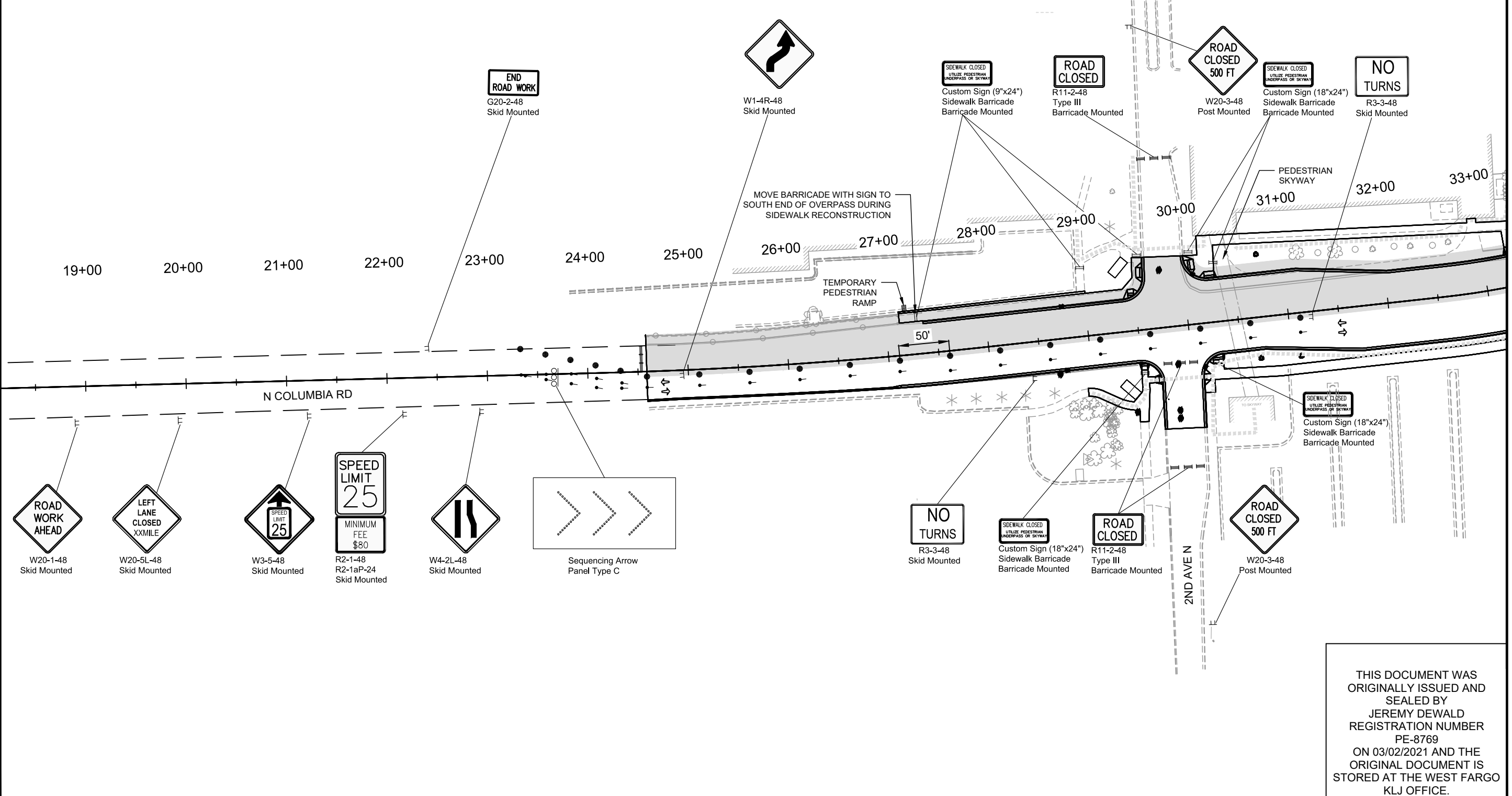
- LEGEND**
- WORK ZONE
  - SIDEWALK BARRICADE
  - TYPE III BARRICADE
  - DELINEATOR DRUM
  - TUBULAR MARKER
  - PEDESTRIAN DETOUR

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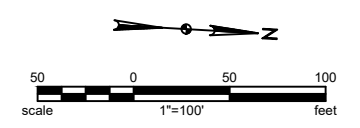
<b>COLUMBIA ROAD RECONSTRUCTION</b> <i>City of Grand Forks, North Dakota Columbia Road</i>		
	<b>TRAFFIC CONTROL PHASE 1</b>	
	<small>DRAWN BY</small> DF	<small>CHKD BY</small> JK



Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	100	7



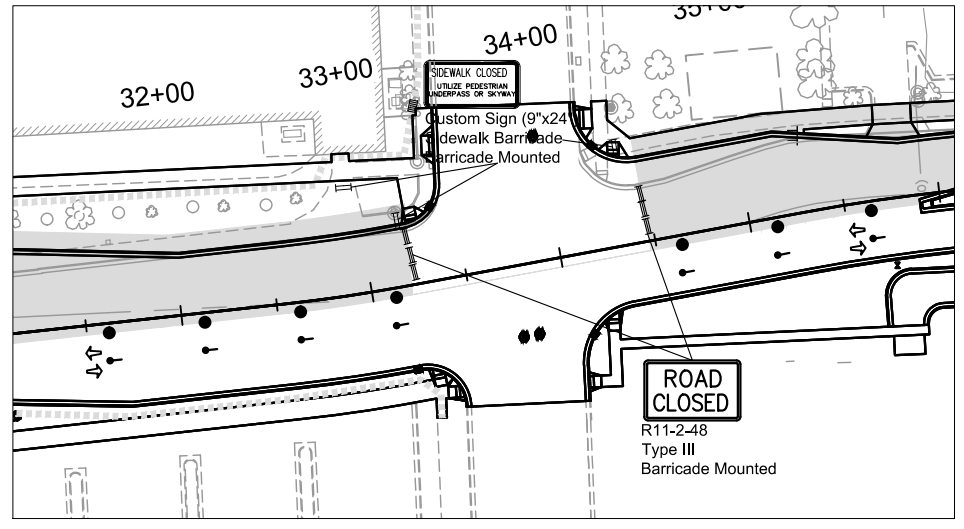
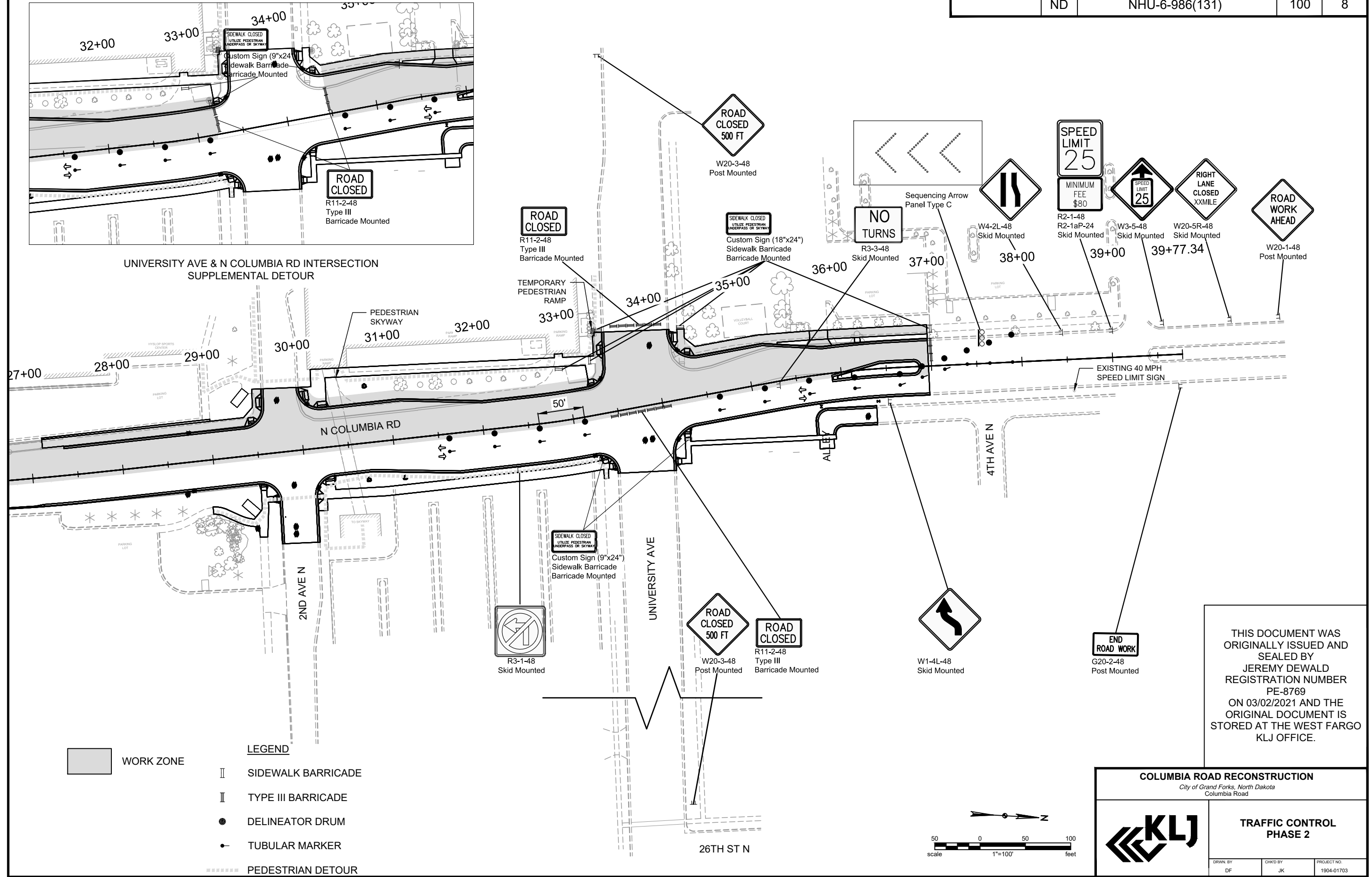
- LEGEND**
- WORK ZONE
  - SIDEWALK BARRICADE
  - TYPE III BARRICADE
  - DELINEATOR DRUM
  - TUBULAR MARKER
  - PEDESTRIAN DETOUR



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<b>COLUMBIA ROAD RECONSTRUCTION</b> City of Grand Forks, North Dakota Columbia Road				
	<b>TRAFFIC CONTROL PHASE 2</b>			
	<table border="1"> <tr> <td>DRWN BY DF</td> <td>CHKD BY JK</td> <td>PROJECT NO. 1904-01703</td> </tr> </table>	DRWN BY DF	CHKD BY JK	PROJECT NO. 1904-01703
DRWN BY DF	CHKD BY JK	PROJECT NO. 1904-01703		

Revised 3/2/2021	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(131)	100	8

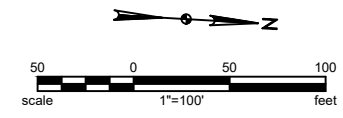


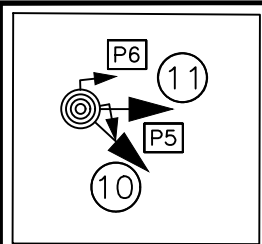
UNIVERSITY AVE & N COLUMBIA RD INTERSECTION SUPPLEMENTAL DETOUR

LEGEND	
	WORK ZONE
	SIDEWALK BARRICADE
	TYPE III BARRICADE
	DELINEATOR DRUM
	TUBULAR MARKER
	PEDESTRIAN DETOUR

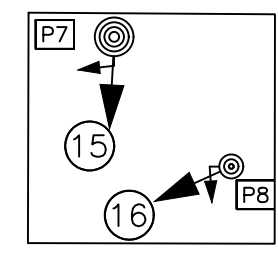
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<b>COLUMBIA ROAD RECONSTRUCTION</b> <i>City of Grand Forks, North Dakota Columbia Road</i>		
	<b>TRAFFIC CONTROL PHASE 2</b>	
	DRWN BY DF	CHKD BY JK
PROJECT NO. 1904-01703		

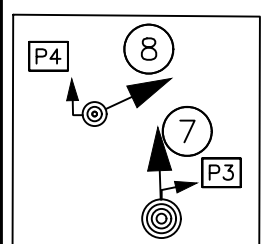




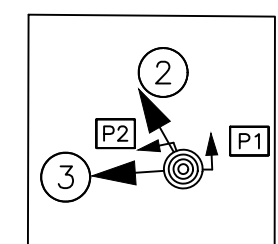
Northwest Inset



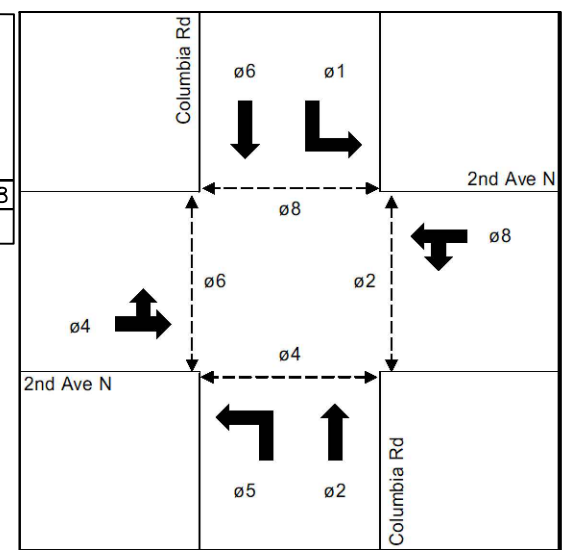
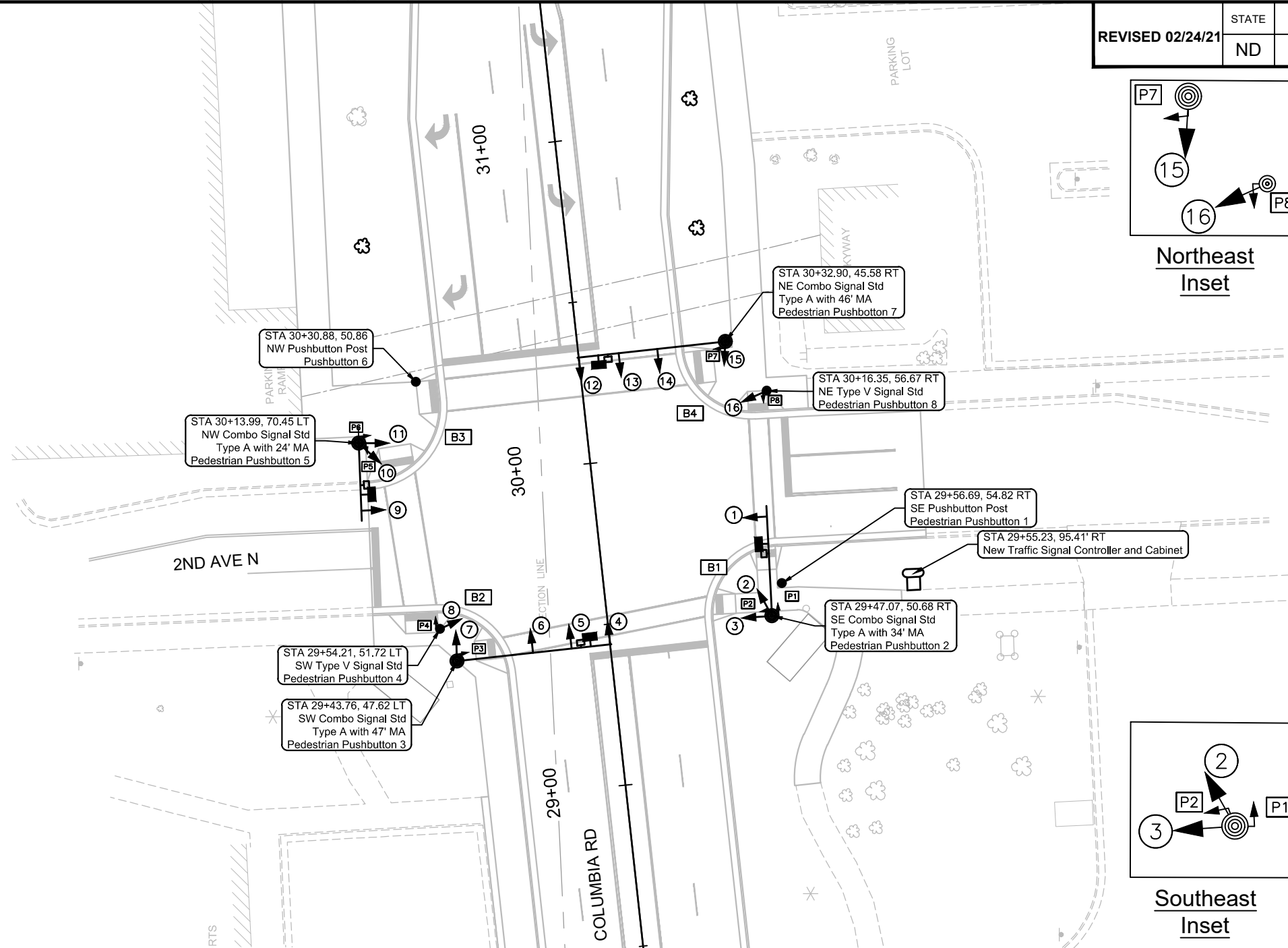
Northeast Inset



Southwest Inset

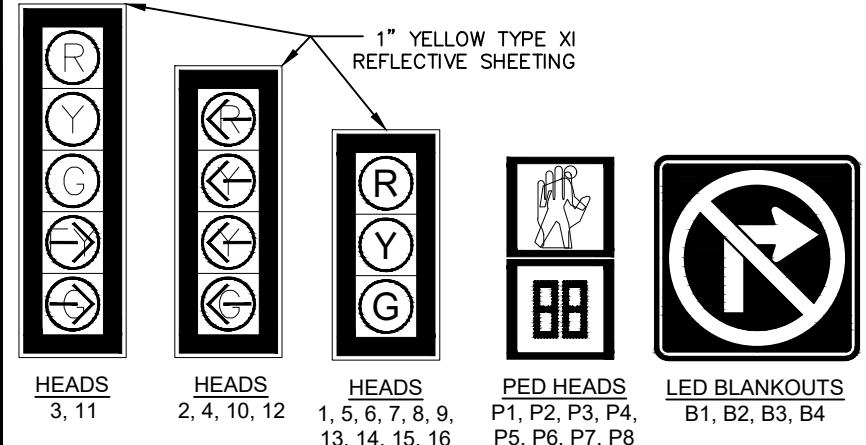


Southeast Inset

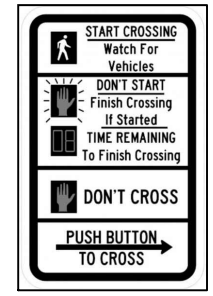


Pedestrian Pushbutton Schedule		
Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
Pushbutton 1	West	Left
Pushbutton 2	North	Right
Pushbutton 3	North	Left
Pushbutton 4	West	Left
Pushbutton 5	East	Left
Pushbutton 6	South	Right
Pushbutton 7	South	Left
Pushbutton 8	West	Right

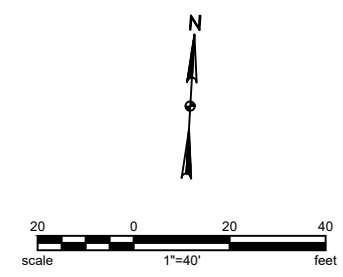
ALL SIGNAL HEADS: 12" LED Lenses & 5" Louvered Backplates



- LEGEND:**
- SIGNAL CONTROLLER
  - SIGNAL HEAD
  - VIDEO DETECTION UNIT
  - FEED POINT
  - SIGNAL STANDARD
  - PEDESTRIAN POLE
  - PEDESTRIAN HEAD
  - LED BLANKOUT
  - EVP



**NOTES:**  
1. Stationing based on PRCOLUMBIA



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**COLUMBIA ROAD RECONSTRUCTION**  
City of Grand Forks, North Dakota  
Columbia Road

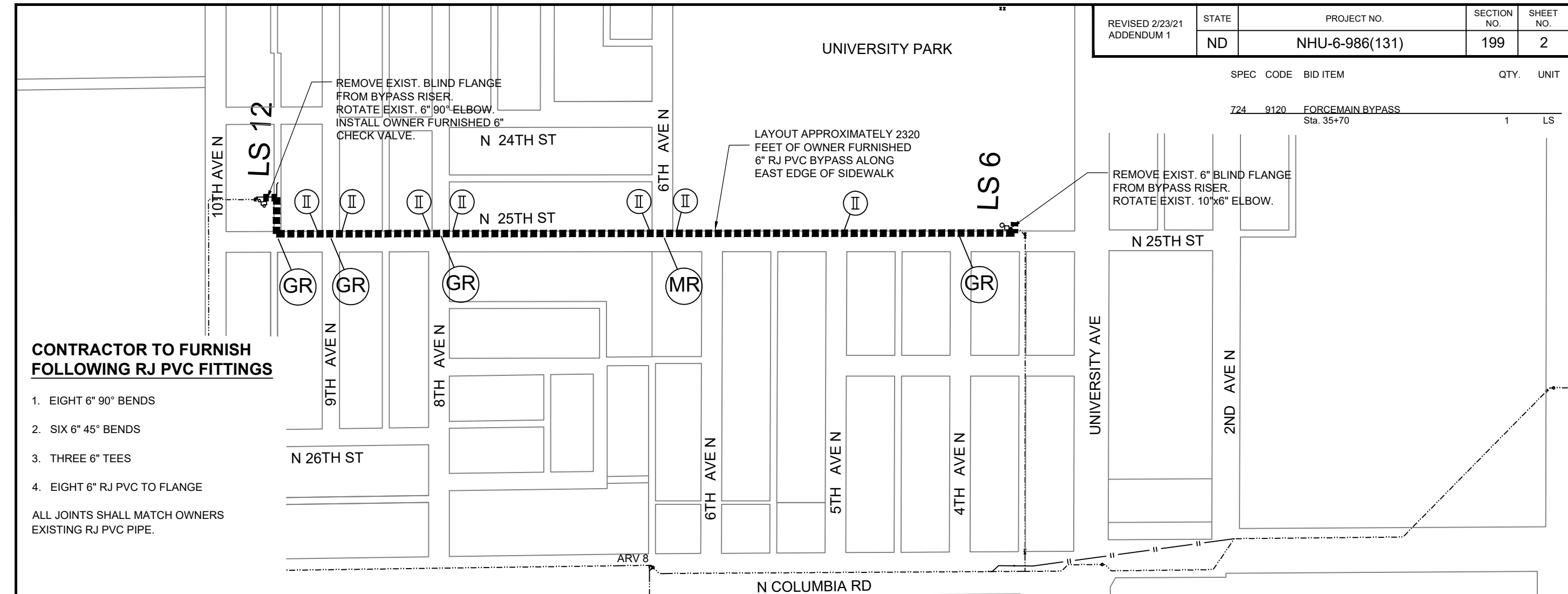
**COLUMBIA RD & 2ND AVE N SIGNAL LAYOUT**

KLJ

DRAWN BY: KR  
CHKD BY: TS  
PROJECT NO.: 1904-01703

REVISED 2/23/21 ADDENDUM 1	STATE ND	PROJECT NO. NHU-6-986(131)	SECTION NO. 199	SHEET NO. 2
-------------------------------	-------------	-------------------------------	--------------------	----------------

SPEC CODE	BID ITEM	QTY.	UNIT
724 9120	FORCEMAIN BYPASS Sta. 35+70	1	LS



**CONTRACTOR TO FURNISH FOLLOWING RJ PVC FITTINGS**

- EIGHT 6" 90° BENDS
  - SIX 6" 45° BENDS
  - THREE 6" TEES
  - EIGHT 6" RJ PVC TO FLANGE
- ALL JOINTS SHALL MATCH OWNERS EXISTING RJ PVC PIPE.

REMOVE EXIST. BLIND FLANGE FROM BYPASS RISER. ROTATE EXIST. 6" 90° ELBOW. INSTALL OWNER FURNISHED 6" CHECK VALVE.

LAYOUT APPROXIMATELY 2320 FEET OF OWNER FURNISHED 6" RJ PVC BYPASS ALONG EAST EDGE OF SIDEWALK

REMOVE EXIST. 6" BLIND FLANGE FROM BYPASS RISER. ROTATE EXIST. 10"x6" ELBOW.

**BYPASS NOTES:**

- CONTRACTOR SHALL COORDINATE WITH CITY WASTEWATER DEPT. (701-738-8782) FOR OPERATION OF LIFT STATIONS AND VALVES.
- CONTRACTOR SHALL LOAD, TRANSPORT, AND INSTALL RJ PVC BYPASS PIPE, AND VALVES FURNISHED BY THE CITY AND INSTALL OWNER FURNISHED METAL RAMPS AND OTHER ITEMS REQUIRED FOR BYPASS OPERATIONS. ALL EXISTING JOINTS IN THE RJPVC SHALL BE DISASSEMBLED AND NEW O-RINGS AND SPLINES INSTALLED. CONTRACTOR SHALL FURNISH AND INSTALL ALL NEW GASKETS, SPLINES, O-RINGS, BOLTS AND NEW FITTINGS TO MATCH OWNERS EXISTING 6" RJ PVC PIPE. ALL MATERIAL FURNISHED BY CONTRACTOR SHALL BE TURNED OVER TO THE CITY AT THE END OF THE PROJECT.
- DO NOT BLOCK STORM WATER DRAINAGE IN STREET FLOWLINES.
- CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS TO CLOSE PRIVATE DRIVES DURING BYPASS OPERATIONS. ALL PROPERTY OWNERS SHALL BE NOTIFIED IN WRITING 7 DAYS PRIOR TO CLOSING DRIVES. TRAFFIC CONTROL CONES SHALL BE PLACED ADJACENT TO PIPE AT CLOSED DRIVEWAYS.
- CONTRACTOR SHALL RESTRAIN BYPASS PIPING FROM VERTICAL AND HORIZONTAL DISPLACEMENT. BYPASS PIPING TO BE PLACED ON EAST EDGE OF SIDEWALK. PROVIDE BLOCKING AS REQUIRED.
- CONTRACTOR SHALL CLEAN, FLUSH, DELIVER AND STACK BYPASS PIPING, FITTINGS, VALVES, METAL RAMPS AND OTHER ITEMS USED IN BYPASS OPERATIONS IN THE CITY WASTEWATER YARD AT 2220 N 20TH ST WHEN BYPASS OPERATIONS ARE NO LONGER NEEDED.

**RECOMMENDED SCHEDULE:**

- CONTRACTOR TO COORDINATE WITH ENGINEER AND PARK DISTRICT ON SCHEDULE. THE BYPASS PIPING CAN NOT BE IN PLACE DURING MAJOR PARK EVENTS.
- DELIVER AND SPREAD BYPASS PIPING MATERIAL ALONG N 25TH STREET WITHOUT CLOSING OF ANY DRIVES OR STREETS.
- EXCAVATE AND EXAMINE EXISTING JOINT LAYOUT. VERIFY THAT ALL NECESSARY NEW PIPING, FITTINGS AND VALVES ARE CORRECT FOR WORK TO BE DONE.
- PRE-ASSEMBLE AS MUCH TIE-IN FITTINGS PIPING ABOVE GROUND AS POSSIBLE. INSTALL TRENCHLESS INSTALLATION PIPE AND OPEN CUT PIPE UP TO TIE IN POINTS.
- INSTALL AND PRESSURE TEST BYPASS PIPING ON N 25TH ST. TO ALLOW LS 6 TO PUMP TO LS 12.
- CUT EXISTING FM AND PUMP DRAIN-DOWN SEWAGE TO SAN. MH ADJACENT TO SITE. CONTRACTOR TO MONITOR AND ADJUST PUMP DOWN RATE AS TO NOT OVERLOAD SANITARY SEWER SYSTEM. CONTRACTOR IS RESPONSIBLE FOR ALL COST IF BACKUP OCCURS.
- PRESSURE TEST NEW FORCEMAIN BEFORE MAKING FINAL CONNECTIONS.
- COMPLETE FINAL INSTALLATION AND TIE INS OF NEW FORCEMAIN ALONG N-COL. RD WORK SITE.
- REMOVE N 25TH STREET BYPASS PIPING.

**LEGEND**

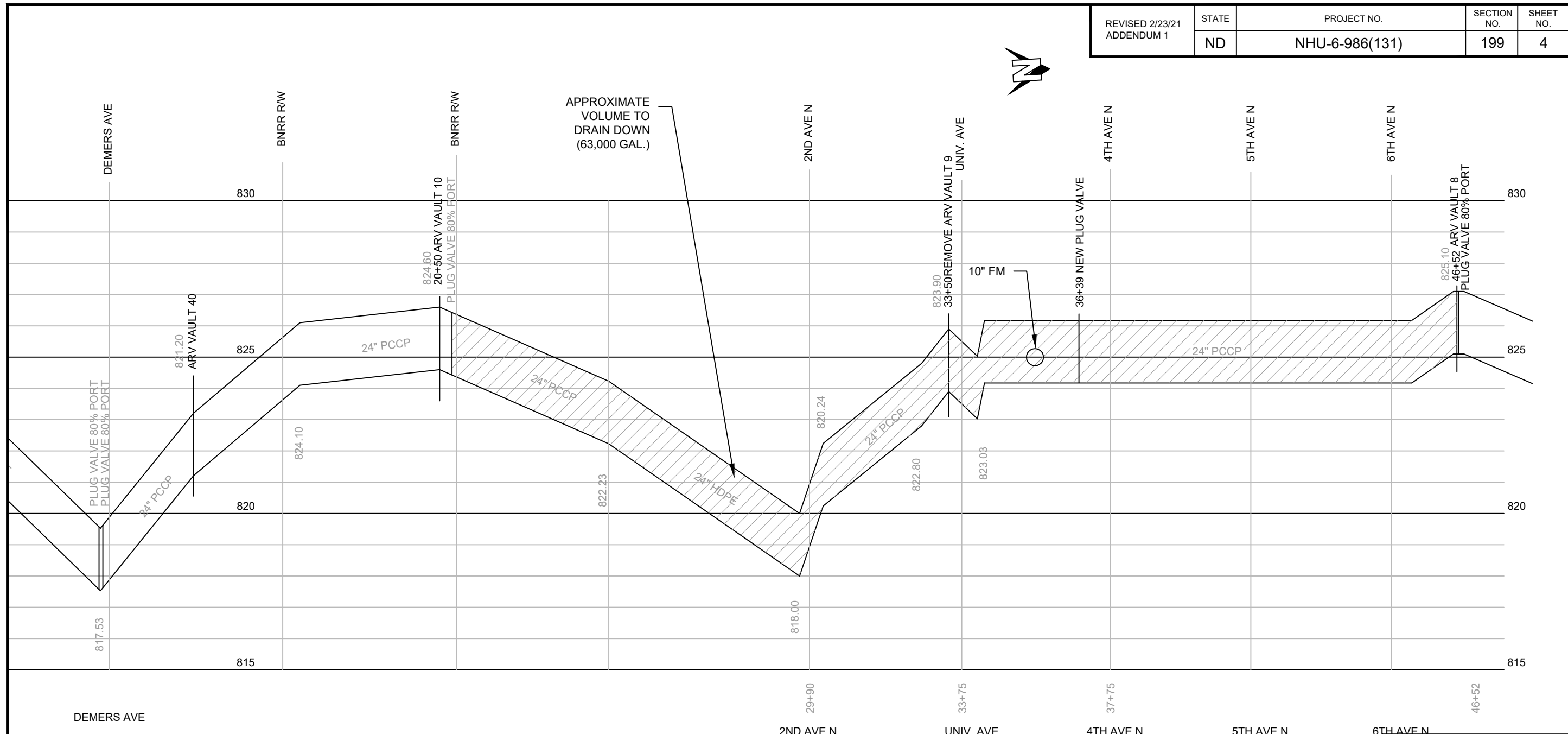
- || — PROPOSED FORCEMAIN
- - - - - EXISTING FORCEMAIN
- ABOVE GROUND BYPASS PIPE ROUTE
- (MR) - METAL RAMP - STREETS TO BE RAMPED FOR 2 WAY TRAFFIC WITH 2 METAL ROAD RAMPS AS PER DETAIL ON SHEET 5.
- (GR) - GRAVEL RAMP - STREETS AND ALLEYS TO BE RAMPED FOR THROUGH TRAFFIC AS PER GRAVEL RAMP DETAIL.
- (II) -TYPE 2 BARRICADE WITH FLASHER AT SIDEWALK CROSSINGS.



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<b>COLUMBIA ROAD RECONSTRUCTION</b> <i>City of Grand Forks, North Dakota Columbia Road</i>		
		<b>FORCEMAIN BYPASS PLAN</b>
DRWN BY KLE	CHKD BY BEW	PROJECT NO. 1904-01703


REVISED 2/23/21 ADDENDUM 1	STATE ND	PROJECT NO. NHU-6-986(131)	SECTION NO. 199	SHEET NO. 4
-------------------------------	-------------	-------------------------------	--------------------	----------------



**LEGEND**

 EXISTING FORCEMAIN TO DRAIN DOWN

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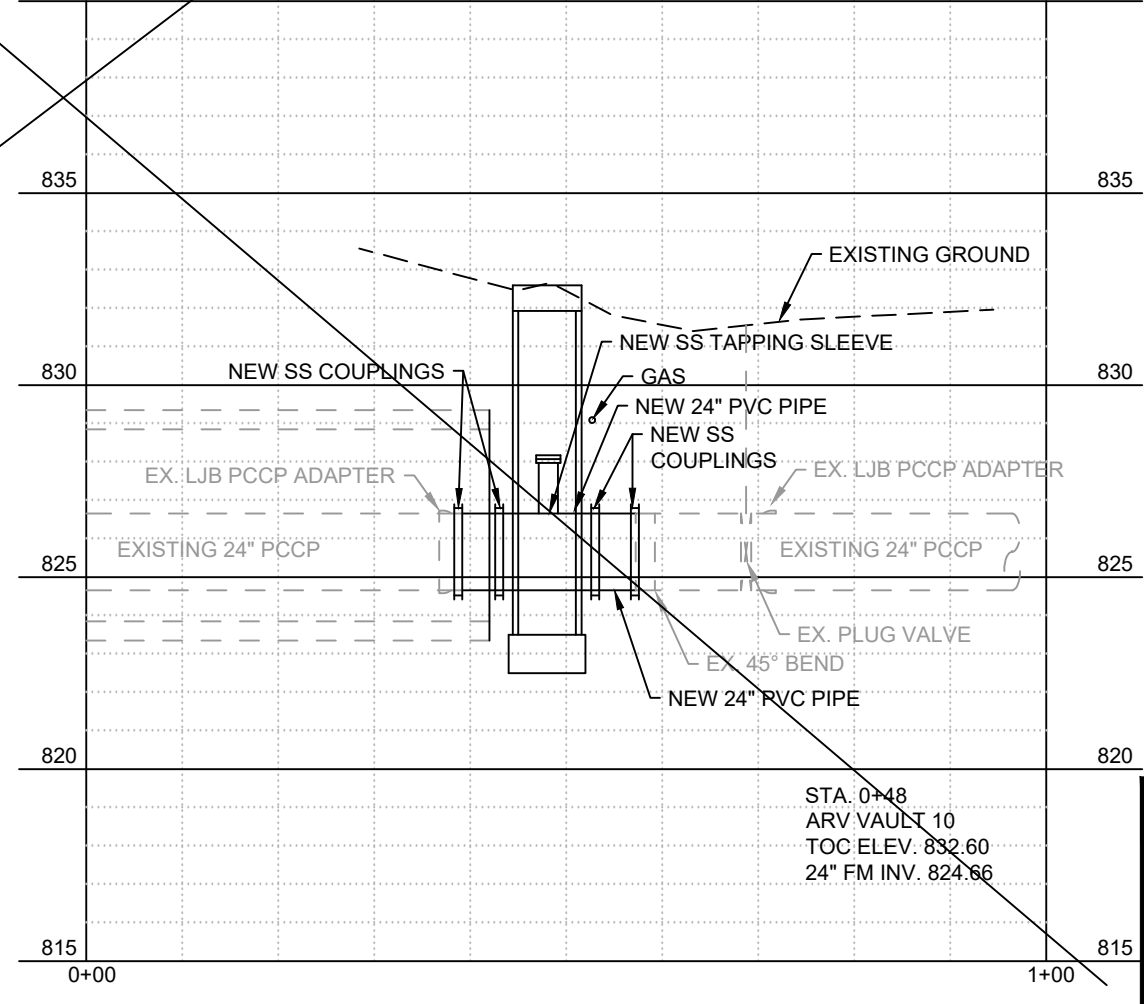
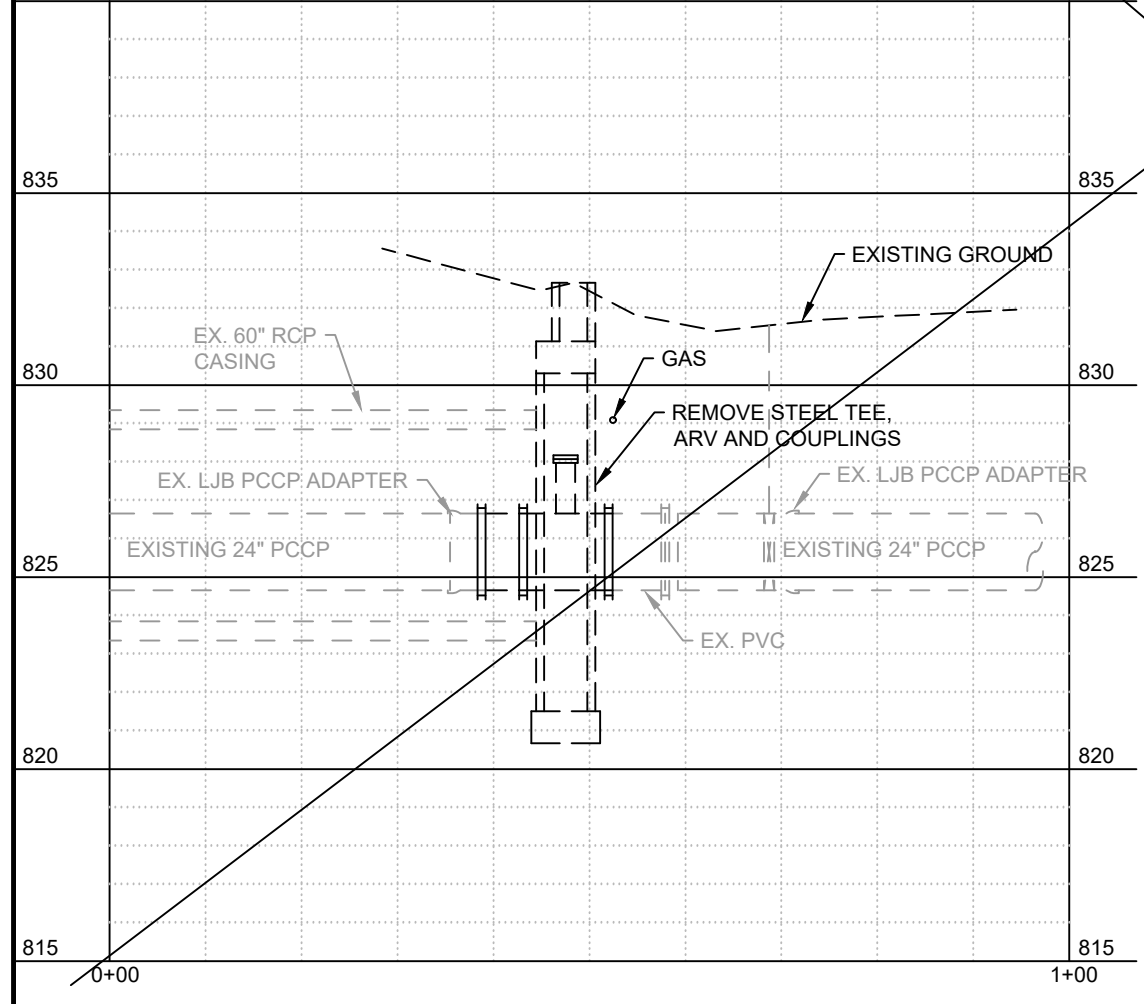
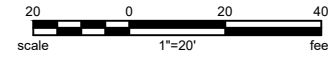
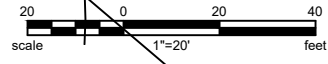
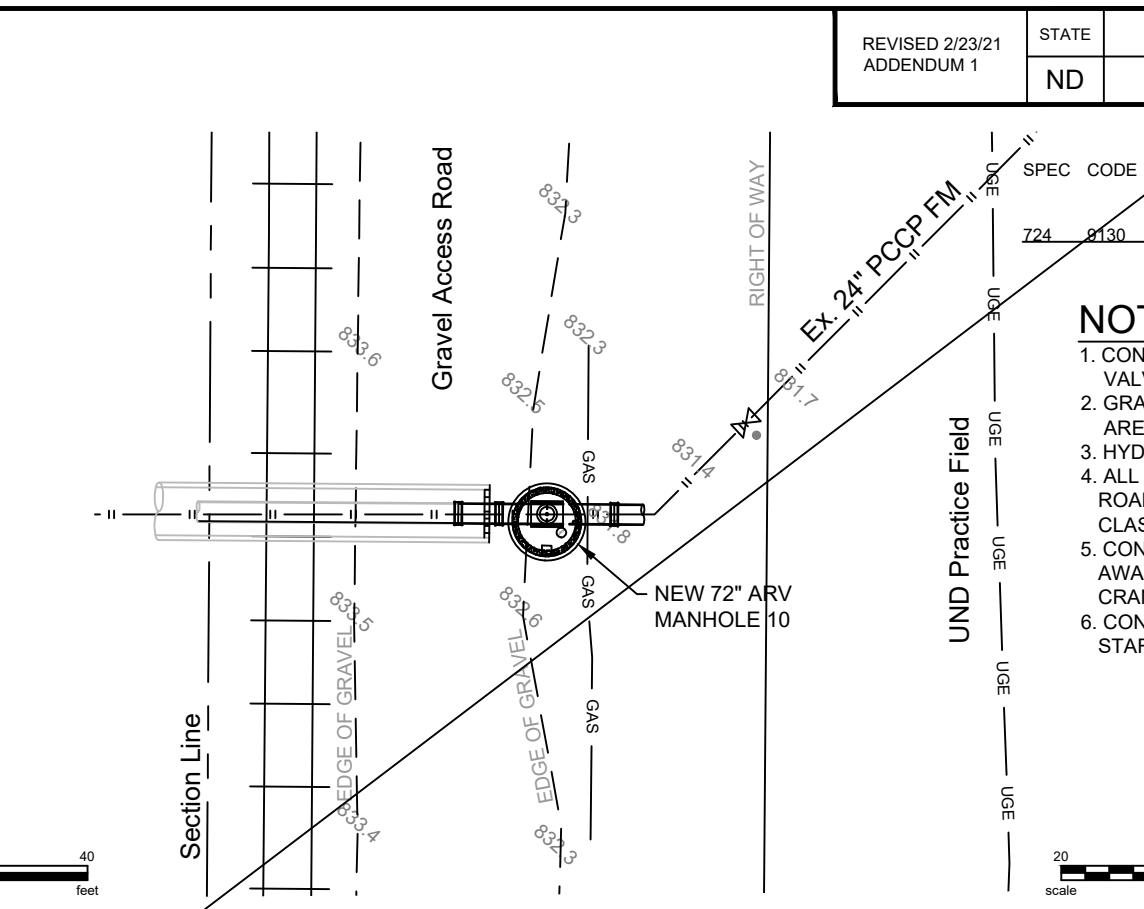
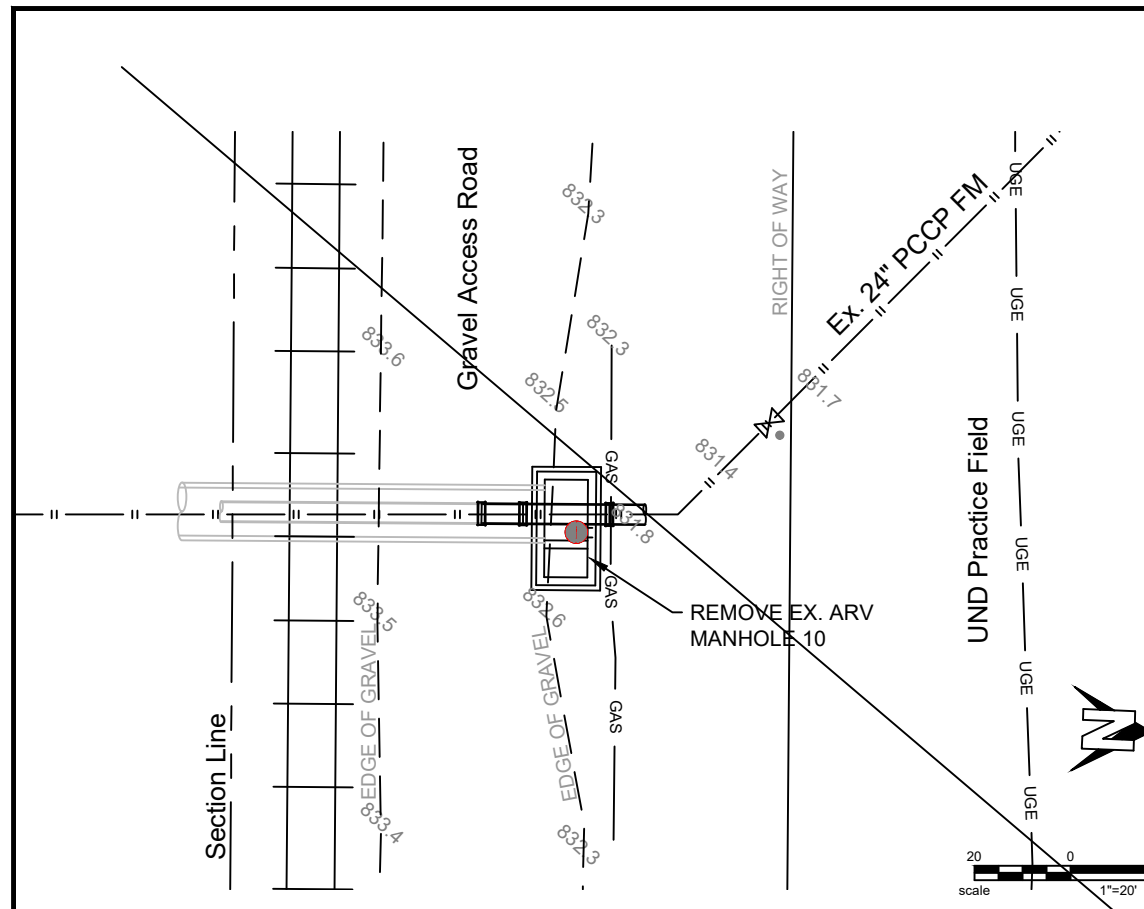
<b>COLUMBIA ROAD RECONSTRUCTION</b> <small>City of Grand Forks, North Dakota Columbia Road</small>		
 <b>EXISTING FORCEMAIN DRAIN DOWN</b>		
<small>DRWN. BY</small> KLE	<small>CHKD. BY</small> BEW	<small>PROJECT NO.</small> 1904-01703

REVISED 2/23/21  
ADDENDUM 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(131)	199	8

SPEC CODE	BI ITEM	QTY.	UNIT
724	8130 FORCEMAIN ARV STRUCTURE STA. 0+48 RT	1	EA

- NOTES:**
1. CONTRACTOR TO SALVAGE ARV, CAMLOCKS AND VALVE AND DELIVER TO OWNER.
  2. GRASS SEEDING AND GRAVEL RESTORATION ARE INCIDENTAL TO ARV REPLACEMENT.
  3. HYDRO SEED ALL DISTURBED GRASS AREAS.
  4. ALL CONTRACTOR CONTAMINATED GRAVEL ON ROAD SHALL BE REMOVED AND REPLACED WITH CLASS 13 AGGREGATE.
  5. CONTRACTOR SHALL MAINTAIN 25' CLEARANCE AWAY FROM RR TRACKS AT ALL TIME, INCLUDING CRANE OR OVERHEAD OPERATION OF EQUIPMENT.
  6. CONTACT NELS CHRISTIANSON OF RR PRIOR TO STARTING (701)-795-1266.

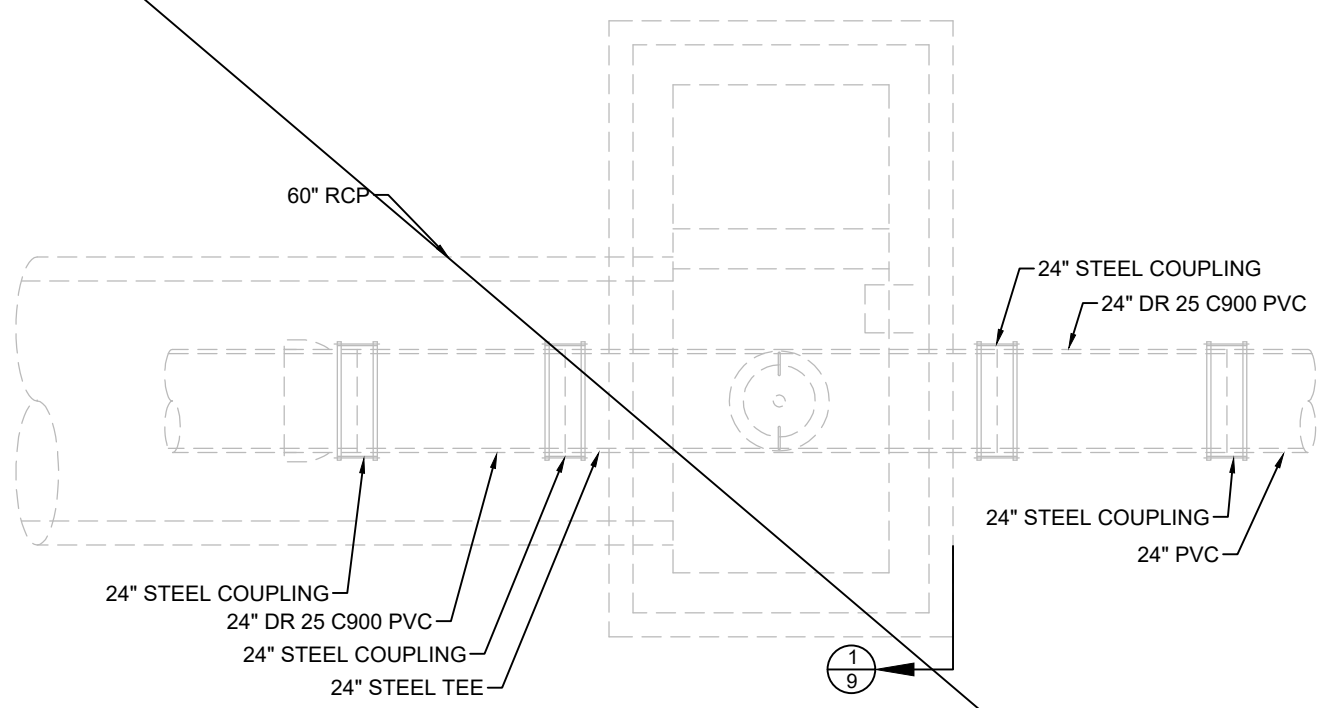


STA. 0+48  
ARV VAULT 10  
TOC ELEV. 832.60  
24" FM INV. 824.66

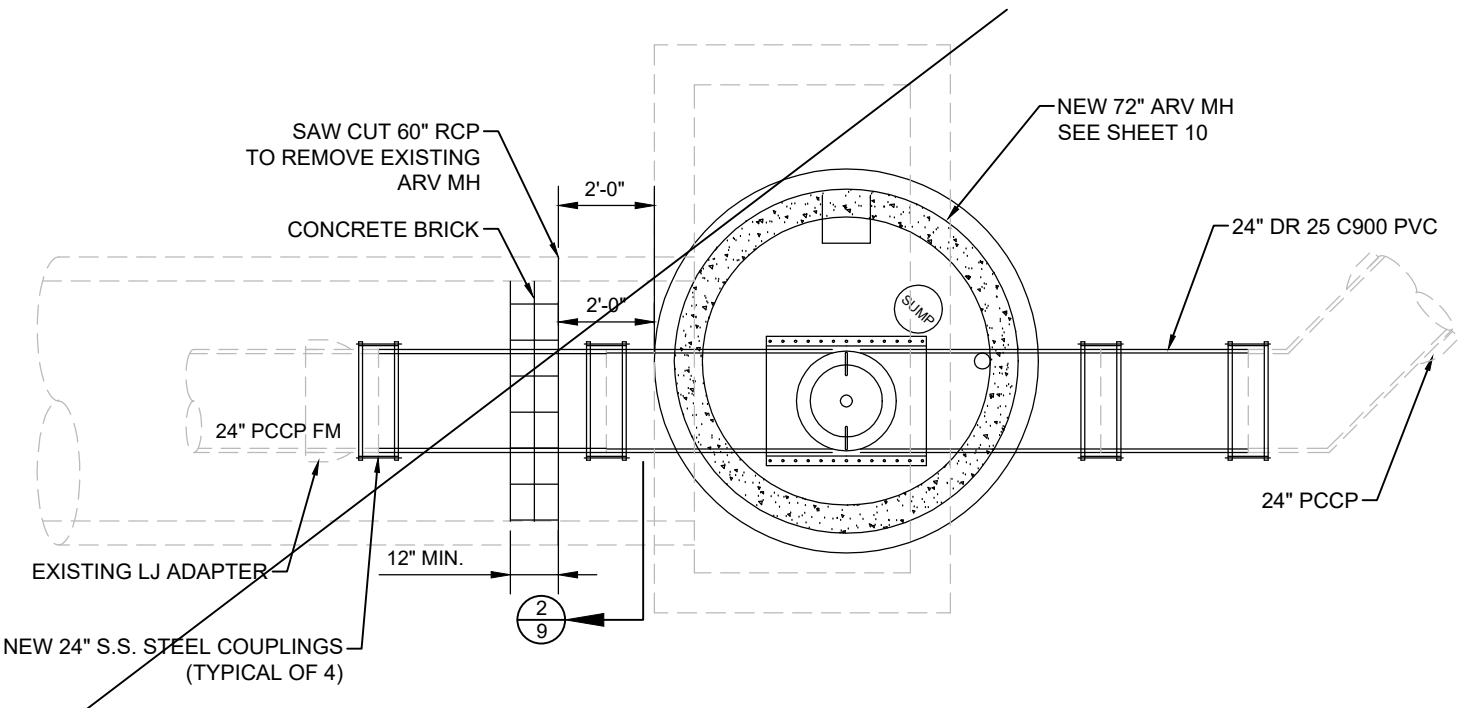
This document was originally issued and sealed by Dale Bergum Registration Number PE- 3713, on 2/23/21 and the original document is stored at the office of Webster Foster & Weston Consulting Engineers

<b>COLUMBIA ROAD RECONSTRUCTION</b> <i>City of Grand Forks, North Dakota Columbia Road</i>		
<b>ARV VAULT 10 SO. OF MEMORIAL STADIUM</b>		
DRWN. BY KLE	CHKD BY BEW	PROJECT NO. 1904-01703

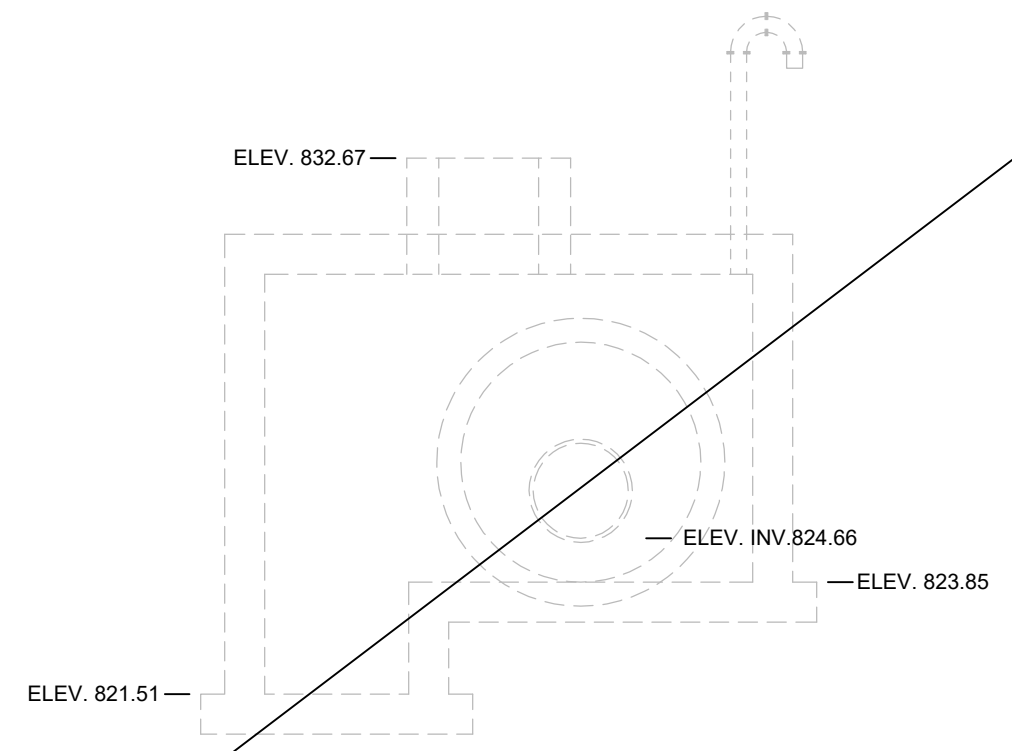
REVISED 2/23/21 ADDENDUM 1	STATE ND	PROJECT NO. NHU-6-986(131)	SECTION NO. 199	SHEET NO. 9
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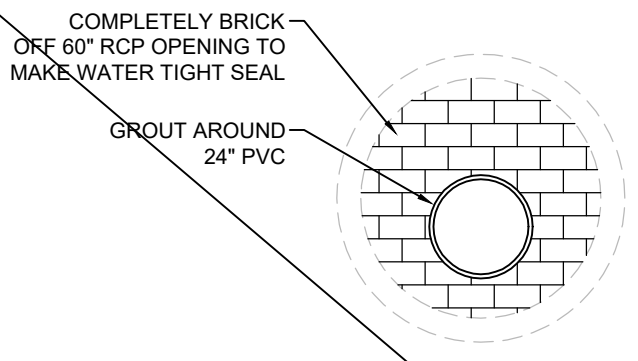
**EXISTING A.R.V. MH 10 PLAN VIEW**  
N.T.S.



**NEW 72" A.R.V. STRUCTURE 10 PLAN VIEW**  
N.T.S.



**EXISTING A.R.V. MH 10 NORTH OF B.N.R.R. TRACKS**  
N.T.S.



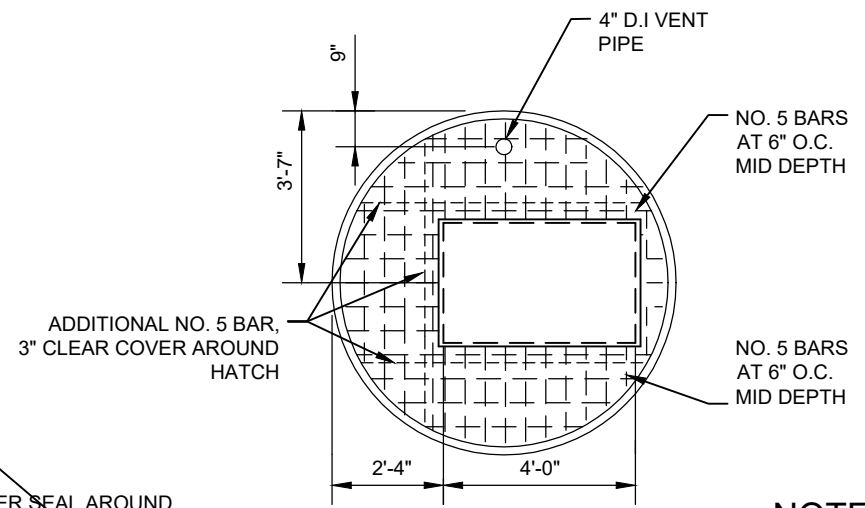
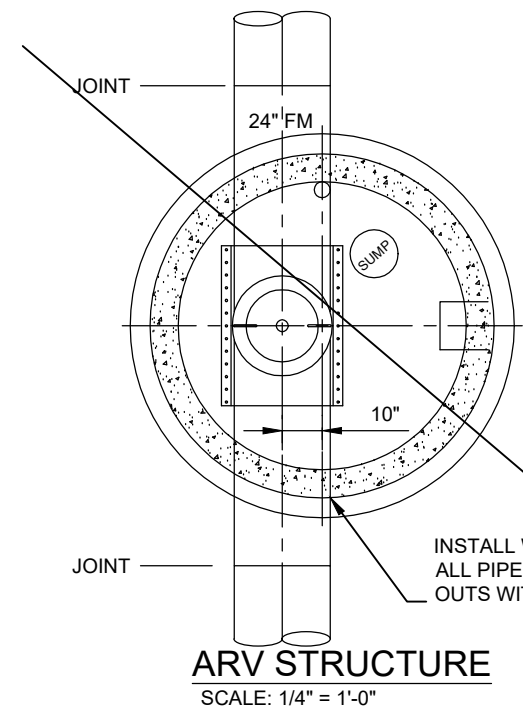
**60" RCP CASING SECTION VIEW**  
N.T.S.

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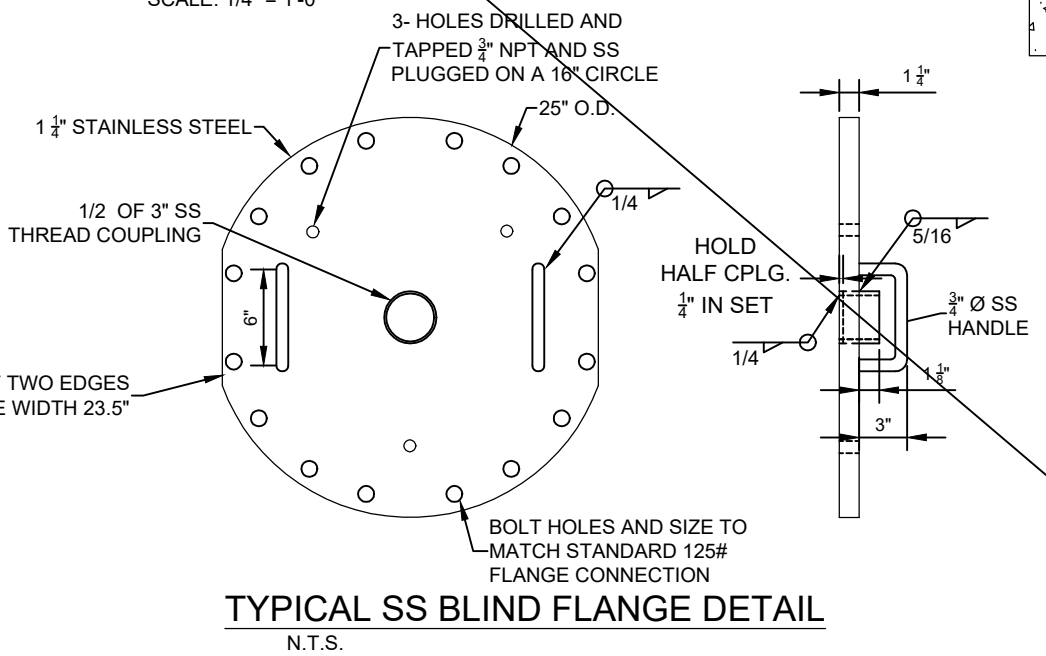
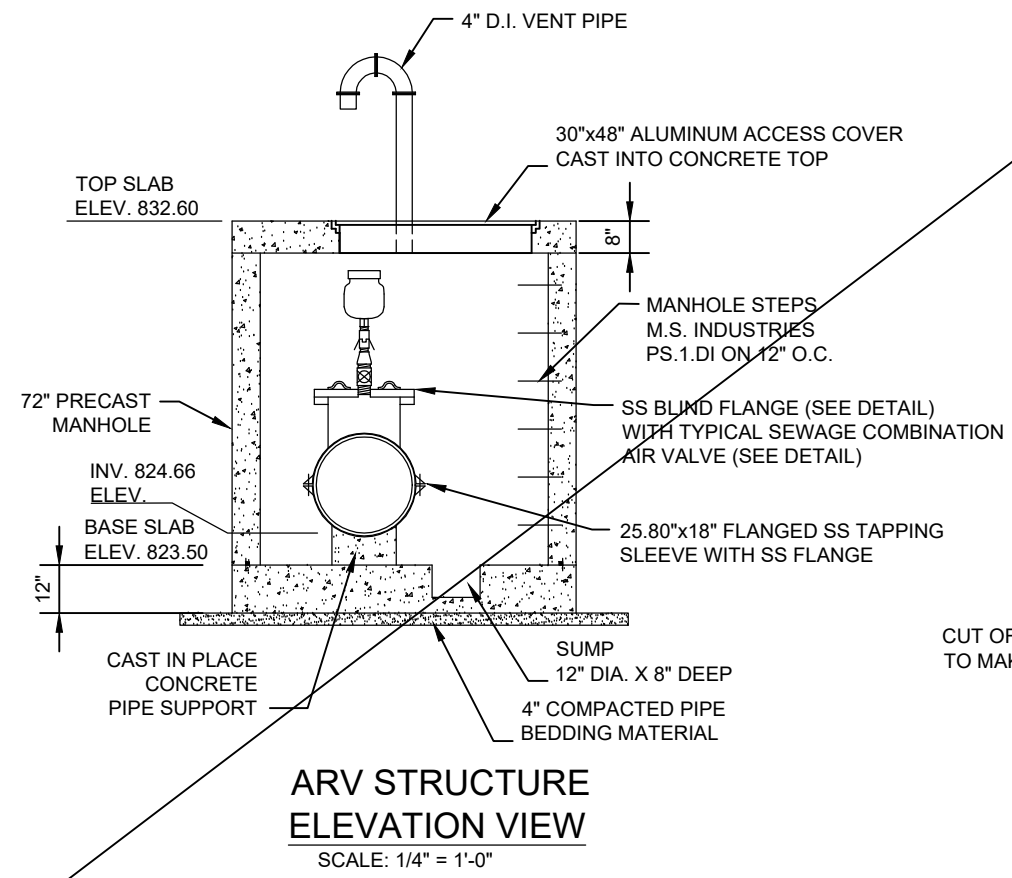
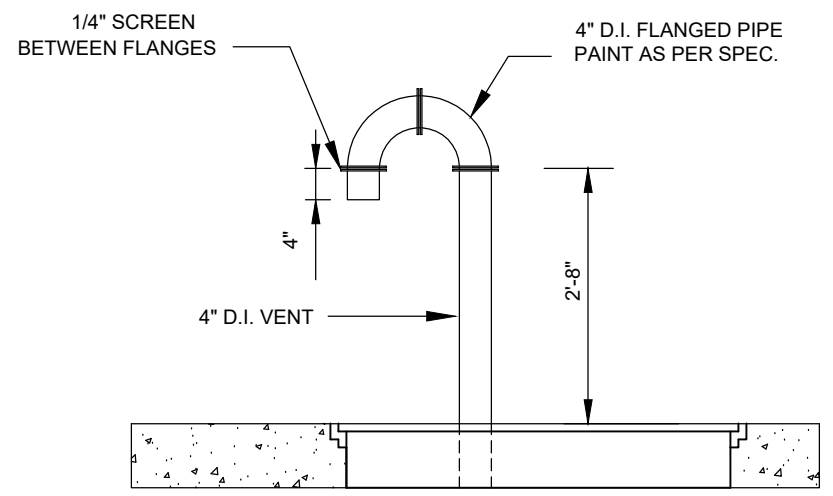
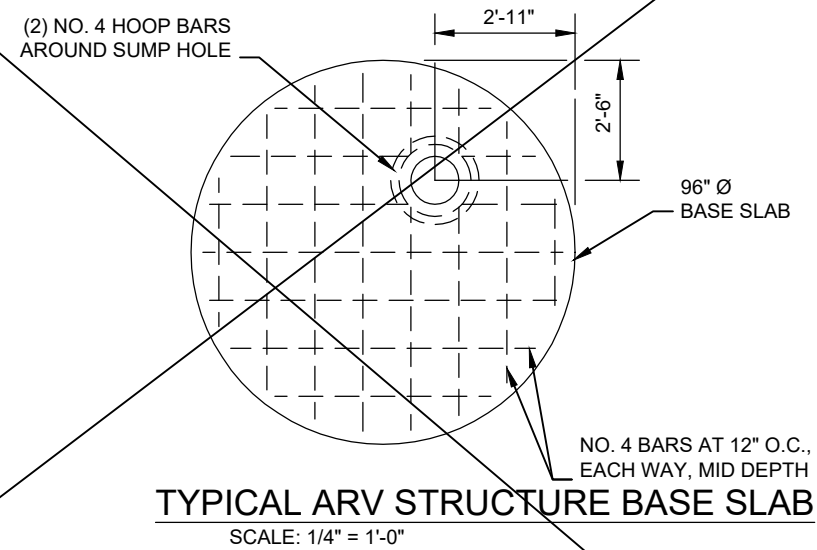
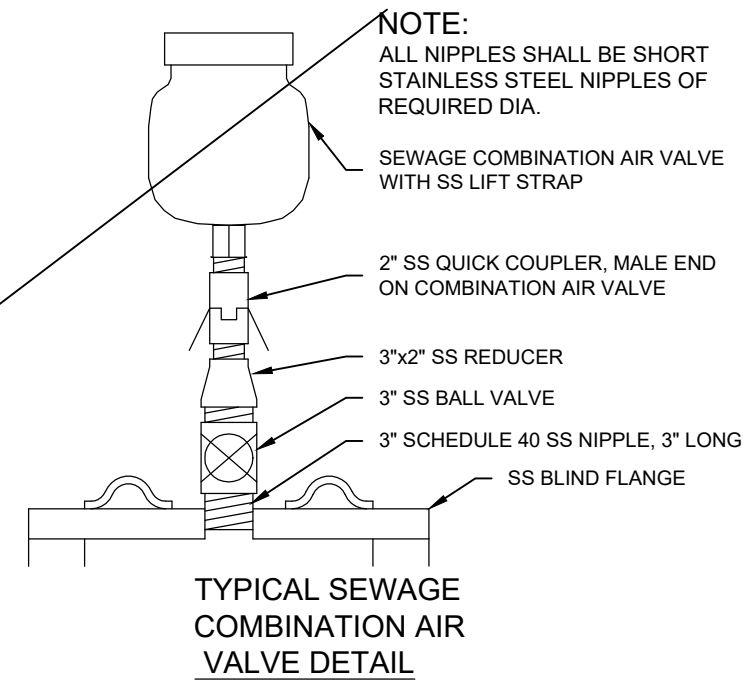
<b>COLUMBIA ROAD RECONSTRUCTION</b> <i>City of Grand Forks, North Dakota Columbia Road</i>		
<b>ARV MH REPLACEMENT DETAILS</b>		
DRWN. BY KLE	CHKD BY BEW	PROJECT NO. 1904-01703



REVISED 2/23/21 ADDENDUM 1	STATE ND	PROJECT NO. NHU-6-986(131)	SECTION NO. 199	SHEET NO. 10
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**NOTES:**  
1 MANHOLE COVER TO BE CAST INTO TOP SLAB.



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**COLUMBIA ROAD RECONSTRUCTION**  
*City of Grand Forks, North Dakota  
Columbia Road*

**WFW**

**TYPICAL ARV STRUCTURE DETAILS**

DRWN. BY KLE	CHKD BY BEW	PROJECT NO. 1904-01703
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**NORTH DAKOTA DEPARTMENT OF TRANSPORTATION**  
**SPECIAL PROVISION**  
**CITY OF GRAND FORKS STANDARD SPECIFICATIONS**

**Project: NHU-6-986(131); PCN 22682**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of North Dakota.

City of Grand Forks Standard Specifications	Dale R. Bergum  WFW Engineers	<i>This document was originally issued and sealed by Dale R. Bergum, Registration Number PE-3713, on 02/23/2021 and the original document is stored at the office of Webster Foster &amp; Weston Consulting Engineers</i>
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**1. SUMMARY**

- A. The City of Grand Forks has Standard Specifications to cover the domestic wastewater collection portions of the project.

**2. GENERAL**

- A. All related requirements in these portions of the City of Grand Forks Standard Specifications not included in this special provision will default to the NDDOT Standard Specifications for Road and Bridge Construction. This includes references to legal requirements, quality assurance, product delivery, storage, and handling, submittals, substitutions, and other references omitted from the City of Grand Forks Standard Specifications.

- B. Payment and measurement for sanitary forcemain items shall be in accordance with the City of Grand Forks Standard Specifications for the following items:

SPEC	CODE	NDDOT PAY ITEM	CITY OF GRAND FORKS SPECIFICATION
724	6874	24IN 45 DEG BEND	33 31 01 - Underground Sewage Piping
724	6989	24IN X 24IN X 10IN TEE	33 31 01 - Underground Sewage Piping
724	7150	PLUG VALVE & BOX	33 31 01 - Underground Sewage Piping
724	9024	FORCEMAIN 10IN	33 31 01 - Underground Sewage Piping
724	9032	FORCEMAIN 24IN	33 31 01 - Underground Sewage Piping
724	9040	FORCEMAIN - BORED	33 31 01 - Underground Sewage Piping 33 05 23.13 - Horizontal Directional Drilling
724	9110	PLUG FORCEMAIN	33 31 01 - Underground Sewage Piping
724	9115	FORCEMAIN CONNECTION	33 31 01 - Underground Sewage Piping
724	9120	FORCEMAIN BYPASS	33 31 01 - Underground Sewage Piping
724	9125	FORCEMAIN DRAIN DOWN	33 31 01 - Underground Sewage Piping
724	9135	REMOVE FORCEMAIN ARV STRUCTURE	33 05 16 - ARV Structures

- C. Pay item names comply with standard NDDOT naming conventions as listed above.

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#### DIVISION 33 – UTILITIES

33 05 23.13	Horizontal Directional Drilling
33 31 01	Underground Sewage Piping

**SECTION 33 05 23.13**

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## SECTION 33 05 23.13

### HORIZONTAL DIRECTIONAL DRILLING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Work Included: The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring or guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.
- B. Related Work:
  - 1. Section 33 31 01 "Underground Sewage Piping".

##### 1.02 QUALITY ASSURANCE

- A. Requirements: The personnel performing horizontal directional drilling operations shall prove they have successfully installed a minimum 10,000 feet of pipe to line and grade.
- B. Comply with requirements of railway, highway, utility or other agency as applicable having jurisdiction with right-of-way.

##### 1.03 SUBMITTALS

- A. Work plan: Prior to beginning work, the Contractor must submit to the Engineer a general work plan outlining the procedure and schedule to be used to execute the project. Plan should document the thoughtful planning required to successfully complete the project.
- B. Material: Shop Drawings on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.
- C. References: Contractor shall submit a minimum of three references that he has completed installations to line and grade by horizontal directional drilling method. References shall contain client's name, address, phone number, contact person and project name.
- D. Records: Contractor shall maintain a daily project log of drilling operations and a guidance system log with a copy given to Engineer at completion of project.

#### PART 2 - EQUIPMENT REQUIREMENTS

##### 2.01 DESCRIPTION

- A. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

## HORIZONTAL DIRECTIONAL DRILLING

### 2.02 DRILLING SYSTEM

- A. Drilling Rig: The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pullback pressure during pullback operations. The rig shall be grounded during drilling and pullback operations.
- B. Drill head: The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.

### 2.03 GUIDANCE SYSTEM

- A. The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.

### 2.04 DRILLING FLUID SYSTEM

- A. Mixing System: A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. Mixing system shall continually agitate the drilling fluid during drilling operations.
- B. Drilling Fluids: Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 – 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
- C. Delivery System: The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. A berm, minimum of 12" high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps and or vacuum trucks(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage facilities.

### 2.05 OTHER EQUIPMENT

- A. Pipe Rollers: Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe during pullback operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.
- B. Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

**HORIZONTAL DIRECTIONAL DRILLING**

**PART 3 - EXECUTION**

**3.01 DESCRIPTION**

- A. The Engineer must be notified 48 hours in advance of starting work. The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.

**3.02 PERSONNEL REQUIREMENTS**

- A. All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety, and be familiar with "Horizontal Directional Drilling Good Practices Guidelines" by the HDD Consortium.

**3.03 DRILLING PROCEDURE**

- A. Location: Install pipe by horizontal directional drilling where shown on Drawings. Open excavation at these locations will not be allowed.
- B. Site Preparation: Prior to any alterations to worksite, Contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to Engineer and one copy to remain with Contractor for a period of one year following the completion of the project. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas. No push or receiving pits will be allowed under proposed pavement areas.
- C. Drill Path Survey: Drill path will be surveyed by Engineer with entry and exit stakes placed in the appropriate locations as requested by Contractor. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies by Contractor. Pipe shall be installed at the grade as shown on Drawings. Any deviation from the specified grade shall be corrected by Contractor if requested by Engineer.
- D. Environmental Protection: Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200' of any water-body or wetland.
- E. Safety: Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly.
- F. Pipe: Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excess sagging of pipe. Every precaution for keeping the pipe clean and for proper assembly of joints shall be taken while installing pipe
- G. Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from bore path more than 5% of depth of 100', Contractor will pull-back and re-drill from the location along bore path before the deviation. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another 30 minutes.



**HORIZONTAL DIRECTIONAL DRILLING**

- H. Reaming: Upon successful completion of pilot hole, Contractor will ream bore hole.

<u>Pipe Diameter</u>	<u>Reamer Diameter</u>
< 8"	Product + 4"
8" to 24"	Product x 1.5
> 24"	Product + 12"

- I. Pull-Back: After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor will not apply more than the maximum safe pipe pull pressure at any time. In the event that pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will notify Engineer. Engineer and Contractor will discuss options and then work will proceed accordingly.

**3.04 SITE RESTORATION**

- A. Following drilling operations, Contractor will de-mobilize equipment and restore the work site to original condition. All excavations will be backfilled with pipe bedding material to a depth of 6 inches above newly installed pipe and compacted to 95% of modified proctor. Landscaping will be restored to original.

**PART 4 - MEASUREMENT**

**4.01 DESCRIPTION**

- A. Measure the Section items listed in the bid schedule and the following as applicable.
- B. Earthwork associated with these bid items are incidental to the bid items and shall not be paid for separately.

**PART 5 - PAYMENT**

**5.01 DESCRIPTION**

- A. The accepted quantities will be paid at the contract price per unit of measurement as follows:

<b>Pay Item</b>	<b>Pay Unit</b>
Forcemain – Bored	LF

- B. Include the cost of all bore pits, pipe, and all fittings in the Forcemain – Bored bid item.

**END OF SECTION 33 05 23.13  
Horizontal Directional Drilling**

**HORIZONTAL DIRECTIONAL DRILLING**

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**SECTION 33 31 01**

**UNDERGROUND SEWAGE PIPING**

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**PART 5 - PAYMENT**

**5.01 DESCRIPTION**

**14**

## SECTION 33 31 01

### UNDERGROUND SEWAGE PIPING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Provide underground piping for sewer system including pipe, fittings, valves, connections and miscellaneous materials required where shown on Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Section 33 05 23.13 "Horizontal Directional Drilling".

##### 1.02 SUBMITTALS

- A. Submit manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- B. Submit joint type and associated materials for all piping.

##### 1.03 PRODUCT HANDLING

- A. Pipe shall be stored, handled, and installed in conformance to pipe manufacturer's recommendations.
- B. Use proper unloading and handling procedures to prevent damage to pipe and coating.
- C. Carefully protect joint material from injury while handling and storing pipe. Support pipe to keep weight off joint material. Pipe with joints deformed, gouged or otherwise impaired, shall not be used.

##### 1.04 WARRANTY

- A. Contractor shall replace at no additional cost to Owner, any equipment, valves or pipe that is defective, misaligned, deflected beyond limits, or otherwise not conforming to the specifications contained herein.

#### PART 2 - PRODUCTS

##### 2.01 PIPE BEDDING MATERIAL

- A. Pipe bedding material shall be as follows:

	Less than 21
Pipe type	feet deep
Pressure Pipe	Crushed

- B. Bedding material for under manholes and structures shall meet the requirements of NDDOT Class 4.

UNDERGROUND SEWAGE PIPING

- C. If removal of unsuitable material is authorized, replace with "Granular Fill Material" meeting the requirements as specified here in. "Granular Fill Material" shall be completely encapsulated in Geotextile Fabric.

2.02 BACKFILL AND FILL MATERIAL

- A. Granular materials shall meet the following requirements:

1.

	<u>Crushed Bedding Material</u>	
	<u>Sieve Size</u>	<u>% Passing by Weight</u>
	1 inch	100
	3/4 inch	92-100
	3/8 inch	36-64
	No. 4	19-28
	No. 16	9-16
	No. 100	0-2

This material is a blend of 4 parts coarse aggregate and 1 part fine aggregate as per Section 802.01. C. of the North Dakota Department of Transportation Specifications. The fractured faces particles shall have at least two fractured faces. Only material larger than the No. 8 sieve is tested and is considered as the total sample.

2.

	<u>Granular Fill Material</u>	
	<u>Sieve Size</u>	<u>% Passing by Weight</u>
	2 inches	100
	1 1/2 inches	90-100
	1 inch	20-55
	3/4 inch	0-15

3.

	<u>Class 6</u>	
	<u>Sieve Size</u>	<u>% Passing by Weight</u>
	3/4 inch	100
	3/8 inch	90-100
	No. 30	35-75
	No. 200	0-8

- B. Dry Mix concrete bedding material shall be provided at locations shown on Drawings and shall meet the following requirements:
  - 1. Dry mix concrete bedding material shall consist of a mixture of pipe bedding material and cement without the addition of water. The type of pipe bedding material shall be as specified for the type of pipe being used at less than 21 feet deep.
  - 2. Unless otherwise directed by Engineer, the cement used shall be Standard Type I Portland Cement.
  - 3. Aggregates and cement may be measured by volume utilizing any uniform method of measurement approved by the Engineer. Unless otherwise specified, the job mix shall be on the basis of three sacks of cement per cubic yard of dry mix concrete bedding material.
  - 4. For small quantities of dry mix concrete bedding material prepared in the field, hand mixing operations will be permitted provided that thorough mixing of the components is obtained. Mixing by mechanical mixers or central plant mixing of the dry mix concrete bedding material is the preferred method.
- C. Impervious material excavated or borrowed used for backfill shall be free of large stones, large clods, organic matter, rubbish, debris or frozen materials.

**UNDERGROUND SEWAGE PIPING**

**2.03 CONTROLLED DENSITY FILL**

- A. Contractor shall furnish and provide Controlled Density Fill (CDF) material to be used for applications as shown on Drawings and as specified herein. CDF shall be a mixture of water, sand, cement, fly ash and other products selected by Contractor, but approved by Engineer.
- B. Composition of materials shall be such that it will have the ability to be deposited in a plastic state having good flowability characteristics. It shall be capable of completely filling voids encountered without vibrating. After the composition cures and consolidates it shall have the characteristics of a solid. The solid form shall attain a compressive strength of at least 35 P.S.I. but shall not be greater than 100 P.S.I.
- C. Mix design testing of CDF shall be conducted by an approved qualified testing laboratory. Laboratory shall produce mix design, taking into consideration the factors effecting design such as, the requirements mandated by its intended use, time of placing, required flowability, etc. Prior to placing CDF, a certified laboratory testing report and mix design shall be submitted to Engineer for approval. Mix design may be altered to decrease flowability to enable forming of CDF material where conditions warrant. Dry CDF without addition of water may be used for backfill at locations approved by Engineer. Dry CDF shall be compacted to specified densities as shown on Drawings.
- D. The intended use of CDF shall be to provide a more stable bedding and backfill material for those locations where settlement must be minimized. Such locations may include sanitary sewer or force main crossing rigid pipe, bedding for newly installed pipe, or other locations as shown on Drawings or as directed by Engineer.
- E. Where flowability is required, utilize Darafill produced by Grace Construction Products to reduce water required in flowable CDF.

**2.04 BYPASS RESTRAINED JOINT PVC PIPE (RJ PVC) AND FITTINGS**

- A. Restrained Joint PVC Pressure Pipe provided by City meets the dimensional requirements of ASTM D2241 Pipe and is SDR 21, Class 200 for above ground temporary piping. Pipe conforms to ASTM S1748 and utilize only type 1, grade 1, 2,000 psi hydrostatic design stress PVC material.
- B. Couplings shall be manufactured from a specially formulated PVC compound which contains impact modifiers and ultraviolet inhibitors, to give higher impact strength over an extended period of time.
- C. The restrained joint shall utilize precision machined grooves on the pipe and in the coupling which, when aligned, allow a nylon splice to be inserted locking the pipe and coupling together. A flexible elastomeric seal (O-Ring) in the coupling provides a hydraulic seal. O-Rings shall meet the requirements of ASTM F477. Provide Teflon coated O-Rings, recommended for non-permanent use. Joints shall be designed to meet the zero leakage test requirements of ASTM D3139.
- D. Fittings shall have pressure rating at least equal to that of the pipe.
- E. MINIMUM TYPICAL PROPERTY VALUES

PROPERTY	MIN. VALUE	ASTM NO.
Tensile Strength	7,000 psi	D638
Modulus of Elasticity	400,000 psi	D638
Izod Impact	0.65 ft. lbs/in. of notch	D256
Deflection Temp.	150 F	D648
Flammability	Self-extinguishing	D635
Chemical Resistance	B	D543

**UNDERGROUND SEWAGE PIPING**

- F. Fittings shall be:
1. Certa-Lok Yelomine as manufactured by CertainTeed;
  2. Aquamine manufactured by Victaulic; or
  3. Approved equal that matches City's existing RJPVC.

**2.05 RUBBER VIBRATION PIPE AND ELBOWS**

- A. Rubber vibration pipe and elbows shall consist of an elastomer inner tube, a fabric reinforced body section with a helical wire reinforcement imbedded in the body from flange to flange. The vibration pipe shall be covered with a synthetic rubber cover stock for protection against abrasion and gouging. Special covers shall be applied as specified on the purchase order.
- B. The temperature and chemical compatibility requirements as specified in the purchase order shall determine the elastomer and fabric materials. Pipe shall be Class II, rated to 250° F, and shall be Chlorobutyl, EPDM with polyester reinforcement.
- C. Flanges shall be constructed integrally with the body to reduce stresses. Flanges shall be full flatfaced rubber so that gaskets are not necessary. Flanges shall be ANSI Class 125# /150# standard drilling. The Vibration Pipe shall be rated at 30" Hg vacuum.
- D. Control units shall be specified if the pipeline is not anchored to eliminate excessive elongation of the rubber pipe. Standard pipe dimensions, movement, and spring rates shall follow Fluid Sealing Association guidelines, unless otherwise specified in the purchase order. Joint shall be manufactured in the USA.
- E. All Vibration Pipe shall be Redflex™ Series P-5 as manufactured by the Red Valve Company, Inc. of Carnegie, PA 15106, USA, or approved equal.

**2.06 HIGH DENSITY POLYETHYLENE (HDPE) PIPE**

- A. Pipe shall be Ductile Iron Pipe Size (DIPS). Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-7. The resin material will meet the specifications of ASTM D 3350 with a cell classification of 445574C. Pipe shall have a manufacturing standard of ASTM F 714. Pipe shall be DR 13.5 (160psi WPR) unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.
- B. Fittings:
1. Butt Fusion Fittings – Fittings shall be PE 4710 HDPE, minimum cell classification of 445574C as determined by ASTM D 3350. Molded butt fusion fittings shall have a manufacturing standard of ASTM D 3261. Molded fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings are to be manufactured using a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.
  2. Electrofusion Splice Fittings - Fittings shall be PE 4710 HDPE, minimum cell classification of 445574C as determined by ASTM D 3350. Electrofusion Fittings shall have a manufacturing standard of ASTM F 1055. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.
  3. Flanged and Mechanical Joint Adapters - Flanged and Mechanical Joint Adapters shall be PE 4710 HDPE, minimum cell classification of 445574C as determined by ASTM D 3350. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D 3261. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.



**UNDERGROUND SEWAGE PIPING**

**2.07 POLYVINYL CHLORIDE (PVC) FORCEMAIN**

- A. Furnish Polyvinyl Chloride (PVC) pipe for open cut sewage forcemain at locations as shown on Drawings.
- B. PVC pressure pipe shall conform to AWWA C900. Pipe up to 24-inch diameter shall have integral bell gasketed joints and couplings conforming to ASTM D-3139.
  - 1. Pipe 12 inches or less in diameter shall be Class 185, DR 25, unless otherwise shown on Drawings.
  - 2. Pipe 14 inches or greater in diameter shall be Class 165, DR 25, unless otherwise shown on Drawings.

**2.08 DUCTILE IRON FITTINGS (FORCEMAIN)**

- A. Fittings shall have a working pressure of 250 psi, conforming with AWWA C110, C111, or C153. Mechanical joints shall be in accordance with applicable requirements of AWWA C110 and C111. Flanged fittings shall be American Standard Class 125 and shall be installed with ring gaskets.
- B. Mechanical joints, flange joints or similar bolted connections shall be connected using all stainless steel bolts with anti-seize material.
- C. Fittings type shall be as shown on Drawings.
- D. All ductile iron fittings shall be bituminous coated on the outside and shall be Protecto 401 Ceramic Epoxy lined on the inside in accordance with the manufacturers recommendations. Fittings shall be polyethylene encased unless embedded in C.D.F. or dry mix concrete bedding material.
- E. Lining shall be checked for thickness and tested pinholes in accordance with manufacturer's recommendations. Any defects found shall be repaired prior to shipment. Each fitting shall be marked with the date of application of lining system along with its numerical sequence of application on that date and records maintained by the applicator of the lining.
- F. The fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification. And that the material used was as specified.
- G. Protecto lined fittings must be handled only from the outside. No forks, chains, straps, hooks, etc. shall be placed inside the fitting for lifting, positioning, or laying. The lined fitting shall not be dropped, hammered, or allowed to strike fixed or hard objects while being moved. Protecto lined fittings should never be forced to grade by impact or hydraulic pressure since this may damage the lining
- H. All mechanical joints used with C900 PVC pipe shall use Mega-Bond coated EBAA Iron series 2000PV restraint, coated PVC Stargrip series 4000 by Star Pipe Products, coated SIGMA One-Lok by Sigma Corporation or approved equal.
- I. Contractor shall furnish and install all transition fittings and appurtenances required for transitions from varying pipe materials and joint types.

**2.09 FLANGED TEE LATERALS**

- A. General
  - 1. Furnish fabricated Flanged SS Tapping Sleeve as shown on Drawings.
  - 2. Working pressure shall be a minimum of 100 P.S.I.
  - 3. All bolts, nuts and washers shall be stainless steel with anti-seize material.

**UNDERGROUND SEWAGE PIPING**

- B. SS Tapping Sleeve.
  - 1. Tapping sleeves shall be stainless steel with a stainless steel flange, as shown on drawings.
  - 2. Tap to mainline pipe shall be completed using equipment designed for pipe tapping that will not induce stress into the mainline pipe.
  - 3. Tapping sleeve shall be SST-III stainless steel tapping sleeve by Romac Industries Inc., 3490AS Tapping Sleeve by PowerSeal, or approved equal.
  - 4. Tapping can be completed on pipe prior to putting into service. Live tap not required.

**2.10 MJ TAPPING SLEEVE**

- A. General
  - 1. Furnish fabricated SS Tapping Sleeve as shown on Drawings.
  - 2. Provide with SSMJ outlets as required.
  - 3. Working pressure shall be 100 P.S.I.
  - 4. All bolts, nuts and washers shall be stainless steel with anti-seize material.
  - 5. Tapping can be completed on pipe prior to putting into service. Live tap not required.
  - 6. Tapping sleeve shall be SSTIII stainless steel tapping sleeve by Romac Industries Inc., 3480AS Tapping Sleeve by PowerSeal, or approved equal.
  - 7. It shall be stainless steel with a stainless steel branch outlet.

**2.11 WARNING TAPE**

- A. Warning tapes shall be of the detectable type and shall be extended above ground at valves and manholes.

**2.12 RESILIENT SEATED WEDGE GATE VALVES**

- A. Valve shall be manufactured in accordance with AWWA C509. Valve shall be furnished with bronze non-rising stem, O-ring seals, Ductile Iron 2 inch operating nut conforming to AWWA C500-86, and shall open counter clockwise.
- B. Valve shall have a cast iron gate having a vulcanized synthetic rubber coating or a rubber seat mechanically retained on the gate. Valve shall be water tight under a test pressure of 250 psi. Valve shall be coated inside and out with a coating as described in AWWA C-550-81.
- C. Approved Gate Valves:
  - 1. American Flow Control Series 2500 gate valve; or
  - 2. Approved equal.
- D. Buried valves shall each be provided with a valve box adapter and valve box.
- E. Bolts, studs and nuts for bonnet shall be fabricated of stainless steel material.

**2.13 VALVE BOXES**

- A. Boxes shall be cast iron, 5 ¼ inch shaft, screw type valve box consisting of base, a center section, a top section and a cover. The cover shall be plainly marked "SEWER".
- B. Approved Valve Boxes:
  - 1. Star Pipe Products cast iron, heavy duty three piece;
  - 2. Tyler Pipe 6860 Series with a No. 6 base;
  - 3. Sigma Corporation cast iron, heavy duty three piece; or
  - 4. Approved equal.

**UNDERGROUND SEWAGE PIPING**

**2.14 PLUG VALVE**

- A. Plug valves shall be provided where shown on Drawings and shall be DeZurik Eccentric, Dresser X-Centric, Valmatic, GA Industries, Milliken Valve Co. or approved equal. Flow through area of the valve shall be at least 80% of the full pipe area. All bolts shall be stainless steel.
- B. Valves shall be resilient seated, quarter-turn type and provided with joint ends as shown on Drawings. The valve body shall be cast iron conforming to ASTM A 126, Class B. Valve shall be coated inside and out with epoxy to meet AWWA C-550-17 coating.
- C. Each plug valve shall be provided with a gear-operated actuator having a 2-inch ductile iron operating nut conforming to AWWA C500-86. Valves shall open by turning counterclockwise on actuator. Valves shall be able to achieve "dead-tight" shutoff when pressurized from either direction.
- D. The input torque required to unseat a valve at 75 psi differential pressure shall not exceed 80 foot-pounds. Overload protection shall be provided to allow 450 foot-pounds of input torque to be applied without damage to valve or actuator. The input shaft shall be 1-inch minimum diameter.
- E. Gear sector shall be fabricated of ductile iron in accordance to ASTM A536 Grade 65-45-12. The upper and lower bushings shall be bronze manufactured in accordance to ASTM 30. Stainless steel bolts shall be used to assemble the actuator. Underground actuators shall be permanently lubricated and sealed from ground water. Exterior of actuator to be coated with AWWA C-550-81 coating.
- F. Buried valves shall be provided with a valve box. The base of box shall firmly attach to top of actuator. Box to be provided as recommended by valve and actuator manufacturer. The cover shall be plainly marked "SEWER".
- G. Mechanical joints used with C900 PVC pipe shall use Mega-Bond coated EBAA Iron series 2000PV restraint glands, coated PVC Stargrip series 4000 by Star Pipe Products, coated SIGMA One-Lok by Sigma Corporation or approved equal.

**2.15 STAINLESS STEEL COUPLINGS**

- A. Couplings shall be:
  - 1. Nominal Versa-Max all stainless steel repair coupling as manufactured by Krausz USA;
  - 2. X411 all stainless steel coupling with a 3/8-inch X 7-inch or 12-inch or 16-inch sleeve, Buna-N gaskets and 304 SS bolts by Smith Blair;
  - 3. Armor Link Stainless Steel Coupling by Romac; or,
  - 4. Approved equal.
- B. Furnish with all gaskets, stainless steel bolts and nuts with anti-seize material.
- C. Size as shown on drawings.

**2.16 PCCP ADAPTERS**

- A. Furnish new adapters for SP-5 pre-stressed concrete cylinder pipe by mechanical joint spigot or bell. Furnish lock joint spigot or lock joint bell as shown on drawings and match existing pipe.
- B. Provide with gaskets and diaphragms. Size of adapters shall be as shown on drawings. All exposed steel shall be painted with appropriate protective epoxy coating.
- C. PCCP adapters shall be as supplied by Hanson Heidelberg Cement Group or approved equal.

**UNDERGROUND SEWAGE PIPING**

**2.17 POLYETHYLENE WRAPPING MATERIAL**

- A. Polyethylene used for wrapping buried metal components shall be 8 mil thick and shall meet the specifications of ANSI A21.5.

**2.18 SEWAGE COMBINATION AIR VALVES**

- A. Provide sewage combination air valves to be installed in each air release valve (ARV) manhole. Provide stainless steel lifting strap with each ARV.
- B. Valves shall be Vent-Tech Model SDG Series C, Part #02SDG10TCS as manufactured by International Valve with 2-inch NPT inlet. Provide with 1-inch stainless steel ball valve on upper and lower ports. Provide one spare ARV.
- C. Inlet piping of each valve, including the spare, shall have a 2-inch stainless steel Cam-Lock, 3-inch Watts series S-FBV stainless steel ball valve and stainless steel nipples and reducer with anti-seize

**2.19 OTHER MATERIALS**

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by Contractor but subject to the approval of the Engineer.

**PART 3 - EXECUTION**

**3.01 LINE AND GRADE**

- A. Engineer will provide benchmarks and base lines and will set offset hubs as required.
- B. Contractor shall set all batter boards and keep 3 batter boards adjacent to consecutive hubs in place at all times. Contractor shall set batter boards at convenient height in feet above flow line grade. Set additional intermediate boards at 25 feet intervals as required. Carry centerline on all batter boards, adjacent to offset hubs.
- C. Contractor shall provide men, tools, stakes, and materials as required for batter boards and temporary reference marks in connection with work. Contractor shall preserve benchmarks, stakes, and other reference points and if disturbed, replace them at no cost to Owner.
- D. Contractor shall check grade of each pipe with grade rod and check line of every other length of pipe with plumb bob.
- E. Use of other methods, such as laser, may be accepted. Laser shall be checked for accuracy at intervals not to exceed 100 feet.

**3.02 PIPE INSTALLATION**

- A. Before installation, verify all measurements at site. Make necessary field measurements to accurately determine sewer make-up length or closures.
- B. Check each length of pipe for defects and hairline cracks at ends prior to lowering into trench. No defective pipe shall be used.
- C. Compact pipe bedding material below pipe to 95% of modified proctor.
- D. Lower pipe carefully into trench. Pipe shall be laid true to line and grade.

**UNDERGROUND SEWAGE PIPING**

- E. Commence at lowest point in line. Lay spigot ends pointing in direction of flow.
- F. Keep pipe clean of dirt and foreign matter. Clean surfaces of pipe ends to be connected and paint with approved lubricant prior to jointing pipe. Jointing shall conform to manufacturer's recommendations.
- G. Provide a smooth and uniform invert. The spigots shall bear against bell shoulders.
- H. Check alignment of pipe. Misaligned, displaced or otherwise defective pipe shall be remedied at Contractor's expense.
- I. Contractor shall comply with all ductile iron pipe corrosion requirements as recommended by DI pipe manufacturers and ductile iron pipe research association.
- J. All excavations will be backfilled with pipe bedding material to a depth of 6 inches above newly installed pipe and compacted to 95% of modified proctor. Remainder of excavation shall be backfilled with native material and compacted to 95% of modified proctor.

**3.03 FUSION OF HDPE PIPE**

- A. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint with weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records.
- B. Mechanical joining will be used where the butt fusion method can not be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a ductile iron back-up ring or HDPE Mechanical Joint adapter with a ductile iron back-up ring.
- C. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

**3.04 FORCEMAIN INSTALLED BY OPEN-CUT METHOD**

- A. Install pipe by open-cut method where shown on Drawings.
- B. Pipe shall be installed at the grade as shown on Drawings. The maximum allowable deviation shall be  $\pm 0.1$ -foot vertical and  $\pm 0.5$ -foot horizontal. Any deviation exceeding the allowable value shall be corrected.
- C. Pipe installed with reverse grade shall not be permitted and shall be corrected at the Contractor's expense.

**3.05 FORCEMAIN INSTALLED BY TRENCHLESS TECHNOLOGY**

- A. Install pipe by Trenchless Technology method where shown on Drawings. Open excavation at these locations will not be allowed.
- B. Wet-boring or jetting will not be permitted.

**UNDERGROUND SEWAGE PIPING**

- C. No push or receiving pits may be dug under proposed pavement locations unless authorized in advance by Engineer in writing. Limit size of pits to prevent damage to nearby facilities and surroundings.
- D. Pipe shall be installed at the grade as shown on Drawings. The maximum allowable deviation shall be  $\pm 0.2$ -foot vertical and  $\pm 0.5$ -foot horizontal. Any deviation exceeding the allowable value shall be corrected.
- E. Pipe installed with reverse grade shall not be permitted and shall be corrected at the Contractor's expense.
- F. Every precaution for keeping the pipe clean and for proper assembly of joints shall be taken while installing pipe by push and bore method.
- G. Push pits and other similar excavations shall be backfilled with pipe bedding material to a depth of 6 inches above newly installed carrier pipe. Backfill and compact as required for nearby trench excavation.
- H. Any couplings needed to connect to trenchless installation shall be Stainless Steel.

**3.06 PROTECTION OF BURIED METAL COMPONENTS**

- A. All steel and iron components to be buried, including pipe, fittings, valves, and other steel and iron appurtenance used in the piping system shall be double wrapped with polyethylene to completely isolate the piping.
- B. All nuts, bolts and rods shall be greased prior to wrapping.

**3.07 BYPASS SEWAGE**

- A. The Contractor shall provide for the flow of sewage around immediate construction area. Contractor shall provide bypass sewage operations as shown on Drawings.
- B. Under no circumstances will the dumping of raw sewage on private property or in City streets be allowed. Contractor is responsible to repair leaky pumps, pipe, hoses or connections.
- C. Contractor shall coordinate bypass sewage operations with Owner.
- D. Pumps, hoses and barricades shall be installed so as to affect traffic and general public as little as possible.

**3.08 (P & A) PLUG AND ABANDONMENT OF PIPES**

- A. All pipes to be abandoned or previously abandoned, shall be plugged as herein specified before backfilling. Plug both ends and all exposures unless inaccessible.
- B. Concrete shall occupy the full diameter of the pipe and shall extend the full distance of the pipe that is to be abandoned.
- C. All pipes shall be completely filled with CDF.

**3.09 SANITARY SEWER CROSSING STORM SEWER**

- A. Unless otherwise shown on Drawings, Contractor shall temporarily support inlet leads and storm leads within trench as required to perform work. Contractor may remove and replace inlet leads and

**UNDERGROUND SEWAGE PIPING**

storm sewer to expedite construction at no expense to Owner. Existing RCP shall be composed of PVC as specified. Other existing pipe types may be replaced with PVC. Size of replacement pipe shall match existing.

- B. Where elevation of storm sewer is in conflict with the proposed elevation of new gravity sanitary sewer, remove top of storm sewer pipe as required to install new gravity sewer. Sanitary Sewer passing through storm shall be composed of PVC C900 pipe to provide structural support and to prevent contaminating storm sewer with raw sewage.
- C. PVC C900 pipe shall be installed through the storm sewer and grouted in place. No PVC joint will be allowed in the storm sewer.
- D. Make connection from PVC C900 to gravity sewer with approved type of repair coupling.

**3.10 SANITARY SEWER CROSSING WATER MAINS**

- A. Notify Engineer if sewer being installed does not have a minimum of 18 inches vertical clearance and a minimum of 10 foot horizontal distance between the outside of the sewer pipe and the outside of a water main.
- B. One full length of sewer pipe shall be installed crossing a water main so both joints will be equidistant and as far from the water main as possible.

**3.11 FORCEMAIN PRESSURE TESTS**

- A. Pressure test new pipe prior to connecting to existing systems to a hydrostatic pressure of 50 psi with all affected corporations closed. Test at lowest point in line.
- B. The duration of each pressure test shall be at least 60 minutes.
- C. All air shall be expelled from pipe before starting pressure test.
- D. Where polyethylene pipe is part of section to be tested, maintain hydrostatic pressure of 60 psi for 4 hours adding make-up water as required every hour. After four hours of stabilizing, the test can be performed. Decrease pressure to 50 psi and isolate the system for 1 hour. If pressure at end of test is 47.5 psi or less, the test fails.
- E. Any leaking joints, cracked or defective pipes, fittings or valves discovered in consequence of pressure test shall be removed and replaced by Contractor at no cost to Owner. Pressure test shall then be repeated until satisfactory to Engineer.
- F. During testing, the test pressure shall be maintained by the addition of water. The volume of water used shall be recorded.
- G. Allowable leakage in gallons per hour per 1000 feet for PVC, FPVC, and CCFRPM pressure pipe:

Pipe Size Inches	Allowable Leakage Gallons
4	0.19
6	0.29
8	0.38
10	0.48

**UNDERGROUND SEWAGE PIPING**

Pipe Size <u>Inches</u>	Allowable Leakage <u>Gallons</u>
12	0.57
14	0.67
16	0.76
18	0.86
24	1.15
30	1.43

- H. Saddles, corporations and pipe or hose required for testing are to be furnished and installed by contractor and are incidental to the forcemain item.

**PART 4 - MEASUREMENT**

**4.01 DESCRIPTION**

- A. Measure the Section items listed in the bid schedule and the following as applicable.
- B. Earthwork associated with these bid items are incidental to the bid items and shall not be paid for separately.

**PART 5 - PAYMENT**

**5.01 DESCRIPTION**

- A. The accepted quantities will be paid at the contract price per unit of measurement as follows:

<b>Pay Item</b>	<b>Pay Unit</b>
24IN 45 DEG Bend	EA
24IN x 24IN x 10IN Tee	EA
Plug Valve & Box	EA
Plug Forcemain	LF
Forcemain 10IN	LF
Forcemain 24IN	LF
Forcemain Connection	EA
Forcemain Bypass	LS
Forcemain Drain Down	LS

- B. All exploratory excavation, cutting and removal of existing pipe, adapters, bends, elbows, thrust blocking, testing, fusion welding, fittings, and couplings necessary to complete Forcemain Connection shall be incidental to Forcemain Connection bid item. Include all CDF needed to completely fill abandoned pipe in Plug Forcemain bid item. New rubber pipe, rubber elbow, RJ PVC coupling, splines, gaskets, traffic control devices, and gravel for gravel ramps necessary to complete Forcemain Bypass shall be incidental to Forcemain Bypass. New RJ PVC coupling, splines, gaskets, traffic control devices, and gravel for gravel ramps necessary to complete Forcemain Drain Down shall be incidental to Forcemain Drain Down. New 10" forty-five degree bend, 10" wye, and 10" stainless steel coupling shall be incidental to Forcemain 10IN.

**END OF SECTION 33 31 01  
Underground Sewage Piping**