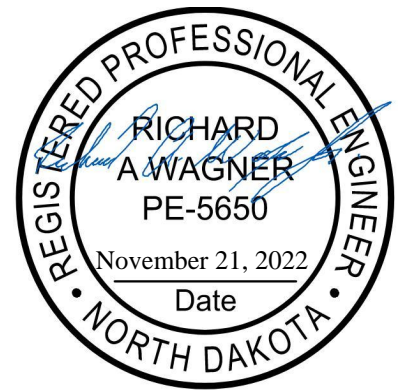


ADDENDUM NO. 2
NOVEMBER 21, 2022
TO
PROJECT MANUAL
FOR
FARGO REGIONAL EMERGENCY WATER SUPPLY LS AND PIPELINE
FOR
CITY OF FARGO
NORTH DAKOTA
OCTOBER 2022



The following changes, additions, and deletions are hereby made a part of the Bidding Documents for the Fargo Regional Emergency Water Supply LS and Pipeline project as fully and completely as if the same were set forth therein. Acknowledge receipt of this addendum in the space provided on the Bid Form and also on the outside of the Bid envelope. Failure to do so may result in rejection of bid.

This addendum consists of five (5) pages and four (4) attachments.

CLARIFICATIONS

Reference Plans:

The following construction plans have been posted to Quest:

Sheyenne River Raw Water Intake Structure Improvement District 4557	1997	Intake Structure
Fargo Emergency Water Supply Pump Station Project No. 3762-2	1983	Pump Station and Supply Pipeline

Ad for Bid:

Sealed Bids will be received at the Auditor's Office until **Wednesday, November 30, 2022 at the hour of 11:30 AM** local time, for the purpose of furnishing all materials, labor, equipment, and skill required for the construction of the Fargo Regional Emergency Water Supply LS and Pipeline.

PreBid Meeting:

A PreBid meeting was conducted at the Water Treatment Plant on Tuesday, November 15. A copy of the meeting notes have been posted to Quest for download.

Project Completion Dates:

Adjust the project completion dates to the following:

Substantial Completion:	September 1, 2024
Final Completion:	December 1, 2024

SPECIFICATIONS

SECTION 00 73 40 – FUNDING AGENCY REQUIREMENTS

1. Page 25 of the SRF Specification Insert; Remove the Wage Determination General Decision Number “ND20220050 10/07/2022” and replace with the attached Wage Determination General Decision Number “ND20220050 10/14/2022”. Refer to Attachment No. 1.

SECTION 01 14 00 – WORK RESTRICTIONS

1. Specification Section 01 14 00 Paragraph 1.2 B., Add the following paragraph
 4. Any project work activities that remove the existing Sheyenne River Intake and Pump Station from service, except for the time period of September 15 through November 15, will require the Contractor to submit a schedule and plan for the shutdown that must be reviewed and accepted by the Owner and Engineer. The plan shall include emergency provisions to permit water to reach the existing Pump Station and ultimately the Fargo WTP. Emergency provisions may include flooding of the control structure work, temporary pumps, or other Owner accepted backup strategy. The plan shall be provided to the Engineer and Owner for reviewed three weeks prior to disruption of water supply service.

SECTION 03 35 11 – CONCRETE FLOOR FINISHES

1. Specification Section 03 35 11 Paragraph 2.1 A. 1., Delete Paragraph 2.1 A. 1., Liquid Densifier and Hardener is not used on the project.

SECTION 05 51 10R – ACCESS LADDER (Revised)

1. Specification Section 05 51 10R Paragraph 2.3 C. 1., add the following paragraph:
 - a. The Fargo WTP Davit Crane has the following items listed on the nameplate:
 - Brand: DBI Sala
 - Serial Number: 1687891
 - MFRD(Y/Mo): 17/Oct
 - Model No: 8518385

SECTION 31 66 15 – HELICAL FOUNDATIONS PILES

1. Specification Section 31 66 15 – Helical Foundations Piles, Page 4, Paragraph 1.8: Add the following paragraph after 1.8 B.
 - C. Singular Responsibility
 1. It is the intent of this Section to create singular responsibility for design, fabrication, installation, and testing of the helical foundation piles.
 2. Design, fabrication, installation, and testing of helical foundation piles shall be performed by helical foundation pile contractor using helical foundation pile contractor's employees, and helical foundation pile manufacturer's licensed installers and equipment.
 3. No portion of the Work may be subcontracted by helical foundation pile contractor unless:
 4. Description of subcontracting arrangements shall be submitted to and approved by Engineer before Work commences
 5. For subcontracted design engineer, helical pile foundation contractor shall submit statement and evidence that proposed engineer of record has completed helical pile manufacturer's training in design of helical pile foundations, and has experience specified herein in the design of helical pile foundations for the loads and soil conditions expected for this Work;
 6. For subcontracted installer, helical pile foundation contractor shall submit statement and evidence that proposed installer is an approved certified installer of the helical pile manufacturer, has completed helical pile manufacturer's training in installation and testing of piles of the type to be installed for this Work, and has a successful record of installation experience specified herein for helical foundation piles installed under conditions and in soil types similar to those expected for this Work.
 7. Engineer's review of drawings and calculations submitted by helical foundation pile contractor will not, in any way, relieve helical foundation pile contractor of full responsibility for accuracy and completeness of design, or for construction and performance of the helical foundation piles.
2. Specification Section 31 66 15 – Helical Foundations Piles, Page 8, Paragraph 3.4: Add the following paragraph after 3.4 B.
 - C. Helical foundation pile load testing program:
 1. Perform on not less than one (1) pile, installed at a location acceptable to Engineer and to Contractor's helical pile foundation engineer of record

SECTION 33 13 00 – DISINFECTION OF WATER SYSTEM

1. Delete Specification Section 33 13 00 – Disinfection of Water System in its entirety and replace with Section 33 13 00R – Disinfection of Water System (Revised). Refer to Attachment No. 2.

SECTION 33 13 10 – PIPELINE PRESSURE AND LEAKAGE TESTING

1. Delete Specification Section 33 13 10 – Pipeline Pressure and Leakage Testing in its entirety and replace with Section 33 13 10R – Pipeline Pressure and Leakage Testing (Revised). Refer to Attachment No. 3.

SECTION 40 63 13 – PROCESS CONTROL PANELS AND HARDWARE

1. Specification Section 40 63 13 – Process Control Panels and Hardware, Page 4, Paragraph 2.2: Delete the text “NEMA Type 12 Painted Steel Enclosure Setup” immediately following paragraph 2.2:
2. Specification Section 40 63 13 – Process Control Panels and Hardware, Page 5, Paragraph 2.2 C. 1. a.: Remove the text “NEMA Type 12 Painted Steel” and replace with the following text:
 - a. NEMA Type 3R Stainless Steel
3. Specification Section 40 63 13 – Process Control Panels and Hardware, Page 11, Paragraph 3.1: Delete Paragraph 3.1 “Factory Witness Test” in its entirety, including the associated subparagraphs.

SECTION 43 23 31 – AXIAL FLOW PUMPS

1. Specification Section 43 23 31 – Axial Flow Pumps, Page 5, Paragraph 2.02 A. : Add the following paragraph:
 4. Cascade Pump Company.

SECTION 40 63 43 – PROGRAMMABLE LOGIC CONTROLLERS

1. Specification Section 40 63 43 – Programmable Logic Controllers, Page 4, Paragraph 3.3 D.: Delete Paragraph D. “Provide four (4) additional week(s) field I/O testing with Engineer” in its entirety.

DRAWINGS

SHEET GEN S001 – STRUCTURAL GENERAL NOTES – FOUNDATIONS

1. Sheet GEN S001 STRUCTURAL GENERAL NOTES: Add the following notes under the “Foundations” heading:
 10. Contractor shall provide (1) soil boring for the use of helical pile delegated designer. Contractor shall follow minimum soil boring requirements herein and shall coordinate all additional needs not expressly listed below with helical pile delegated designer. The minimum requirements are as follows:
 - Boring Depth: 100ft
 - Sample: (1) split spoon sample within each respective soil stratum
 - Visual and Manual classification of each split spoon sample according to ASTM D2487 and D2488
 - In-situ water content from each split spoon sample
 - Backfill and seal each boring

SHEET PP C109 – EXISTING 36” RAW WATER RE-ALIGNMENT

1. Sheet PP C109 EXISTING 36” RAW WATER RE-ALIGNMENT: Replace this plan sheet with the attached sheet PP C109 labeled with “Sheet Re-Issued by Addendum No. 2. Refer to Attachment No. 4

SHEET PP C110 – 4” WATERMAIN PLAN & PROFILE

1. Sheet PP C110 4” WATERMAIN PLAN & PROFILE: Replace this plan sheet with the attached sheet PP C110 labeled with “Sheet Re-Issued by Addendum No. 2. Refer to Attachment No. 4.

SHEET LS E602 – SLS-CP01 CONTROL PANEL LAYOUT

1. Sheet LS E602 SLS-CP01 CONTROL PANEL LAYOUT: Remove CONTROL PANEL NOTES No. 1 and replace with the following:
 1. NEMA TYPE 3R, 12 GAUGE STAINLESS STEEL FLOOR STANDING ENCLOSURE WITH SUB PANEL AND INNER DOOR.

SHEET DTL C501 – Details

1. Sheet DTL C501 – Details: Replace this plan sheet with the attached sheet DTL C501 labeled with “Sheet Re-Issued by Addendum No. 2. Refer to Attachment No. 4.

END OF ADDENDUM NO. 2
(See Attachments)

Attachment No. 1

"General Decision Number: ND20220050 10/14/2022

Superseded General Decision Number: ND20210050

State: North Dakota

Construction Type: Heavy
HEAVY CONSTRUCTION PROJECTS

County: Cass County in North Dakota.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Modification Number	Publication Date
0	01/07/2022
1	02/25/2022
2	07/22/2022

3 10/07/2022
4 10/14/2022

ELEC0714-014 08/30/2021

	Rates	Fringes
ELECTRICIAN.....	\$ 35.58	11.65+10.5%

* ENGI0049-022 05/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Bulldozer).....	\$ 35.05	21.60

* ENGI0049-026 05/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR Crane.....	\$ 38.30	21.60
Forklift.....	\$ 35.05	21.60

ENGI0049-027 10/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR Mechanic.....	\$ 31.20	19.85
Scraper.....	\$ 31.20	19.85

IRON0512-033 05/01/2022

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 35.95	33.11
IRONWORKER, STRUCTURAL.....	\$ 35.95	33.11

TEAM0638-003 10/01/2022

	Rates	Fringes
TRUCK DRIVER (Dump Truck).....	\$ 31.30	16.00

SUND2017-013 07/31/2020

	Rates	Fringes
CARPENTER.....	\$ 26.68	5.60
CEMENT MASON/CONCRETE FINISHER...	\$ 24.00	0.00
LABORER: Common or General.....	\$ 18.79	0.00
LABORER: Pipelayer.....	\$ 23.14	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 24.91	14.85
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 20.01	0.00
OPERATOR: Grader/Blade.....	\$ 24.29	0.00

OPERATOR: Loader.....\$ 26.10 14.85

OPERATOR: Roller.....\$ 28.00 0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing

this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

Attachment No. 2

SECTION 33 13 00R – DISINFECTION OF WATER SYSTEMS (REVISED)

PART 1 GENERAL

1.1. SUMMARY

- A. Section includes:
 - 1. Disinfection of potable water system.
 - 2. Testing and reporting results.
- B. Related Sections include, but are not limited to:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 45 00 – Quality Control.
 - 3. Section 01 77 00 – Closeout Procedures.
 - 4. Section 33 13 10 – Pipeline Pressure and Leakage Testing

1.2. REFERENCES

- A. American Water Works Association (AWWA):
 - 1. B300, Hypochlorites.
 - 2. B301, Liquid Chlorine.
 - 3. B302, Ammonium Sulfate.
 - 4. B303, Sodium Chlorite.
 - 5. C651, Disinfecting Water Mains.
 - 6. C652, Disinfection of Water Storage Facilities.
 - 7. C653, Disinfection of Water Treatment Plants.
- B. NSF International (NSF):
 - 1. NSF/ANSI 61, Drinking Water System Components - Health Effects.
 - 2. NSF/ANSI 372, Drinking Water System Components - Lead Content.
- C. Standard Methods for the Examination of Water and Wastewater, as published by American Public Health Association, American Water Works Association, and the Water Environment Federation.

1.3. SUBMITTALS FOR INFORMATION

- A. Informational Submittals:
 - 1. Plan describing and illustrating conformance to appropriate AWWA standards and this Specification.
 - 2. Procedure and plan for cleaning system.
 - 3. Procedures and plans for disinfection and testing.
 - 4. Proposed locations within system where Samples will be taken.
 - 5. Type of disinfecting solution and method of preparation.
 - 6. Method of disposal for highly chlorinated disinfecting water.
 - 7. Independent Testing Agency: Certification that testing agency is qualified to perform chlorine concentration testing, and bacteriological testing in

accordance with AWWA standards, State of North Dakota requirements, and this Specification.

8. Certified Bacteriological Test Results:
 - a. Facility tested is free from coliform bacteria contamination.
 - b. Forward results directly to Owner and Engineer.

1.4. DEFINITIONS

- A. Disinfectant Residual means the concentration of disinfectant in the treated water.
- B. PPM means parts per million.

1.5. QUALITY ASSURANCE

- A. Regulatory Agency Requirements: Comply with North Dakota Department of Environmental Quality requirements.
- B. Perform work in accordance with AWWA C651 for the disinfection of water mains.
- C. Testing Firm: Company specializing in testing potable water systems, approved by the North Dakota Department of Environmental Quality. Contractor shall notify the Public Works Department to come out and collect samples for the bacteriological test. Contractor shall coordinate sampling and testing schedule with the Owner and the laboratory. Contractor shall pay all testing fees and lab costs.
- D. Submit bacteriologist's signature and authority associated with testing.
- E. The cleaning and disinfection work shall be conducted prior to connection to the existing water lines or to any portion that has been put into service. Unless otherwise approved, hydrostatic testing shall be completed prior to final cleaning and disinfection.

1.6. DELIVERY, STORAGE, AND HANDLING

- A. Protect against damage and contamination.
- B. Maintain caution labels on hazardous materials.
- C. Maintain storage room dry and with temperatures as uniform as possible between 60- and 80-degrees F.
- D. Provide necessary signs, barricades, and notices to prevent any person from accidentally consuming water or disturbing system being treated.

1.7. PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures and Section 01 77 00 – Closeout Procedures.
- B. Disinfection report:
 1. Type and form of disinfectant used.

2. Date and time of disinfection.
 3. Test locations.
 4. Initial and final disinfectant residuals (quantity in treated water) in ppm for each test.
 5. Date and time of flushing start and completion.
 6. Disinfectant residual after flushing in ppm for each location test.
- C. Bacteriological report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
 2. Time and date of water sample collection.
 3. Name of person collecting samples.
 4. Test locations.
 5. Initial and final disinfectant residuals in ppm for each test location.
 6. Coliform bacteria test results for each test.

PART 2 PRODUCTS

2.1. ACCEPTABLE DISINFECTION CHEMICALS

- A. Components and Materials in Contact with Water for Human Consumption:
1. Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - a. Use or reuse of components and materials without a traceable certification is prohibited.
- B. AWWA B300, Hypochlorite: Shall conform to Federal Specification O-C-114a, Type II, Grade B, or Federal Specification O-C-602b.
- C. AWWA B301, Liquid Chlorine: Shall conform to Federal Specification BB-C-120a.

PART 3 EXECUTION

3.1. GENERAL

- A. Conform to AWWA C651 for pipes and pipelines, except as modified in these specifications.
- B. Contractor's Equipment:
1. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
 2. Water used to fill pipeline may be supplied using a temporary connection to existing distribution system. Provide protection against cross-connections as required by AWWA C651.

- C. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:
 - 1. Pipelines: Disinfect new pipelines that connect to existing pipelines up to point of connection.
 - 2. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and AWWA C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.
- D. The basic disinfection procedure for new mains consists of:
 - 1. Inspecting materials to be used to ensure their integrity.
 - 2. Preventing contaminating materials from entering the water main during storage, construction, or repair and noting potential contamination at the construction site.
 - 3. Removing, by flushing or other means, those materials that may have entered the water main or appurtenances.
 - 4. Preventing contamination of existing mains from cross-connection during flushing, pressure testing, and disinfection.
 - 5. Pressure testing the water main to ensure the main meets the purchaser's allowable leakage rate. Hydrostatic pressure tests should be conducted with potable water.
 - 6. Chlorinating and adequately documenting the process used for disinfection.
 - 7. Flushing the chlorinated water from the main. Refer to ANSI/AWWA C655 Field Dechlorination for dechlorination procedures, if dechlorination is required.
 - 8. Determining the bacteriological quality of water samples collected from the pipe by laboratory test after disinfection.
 - 9. Final connecting of the newly disinfected water main to the active distribution system without sacrificing sanitary practices and conditions.

3.2. CLEANING AND FLUSHING

- A. Before disinfecting, clean foreign matter from pipe.
- B. Potable water shall be used for disinfection, hydrostatic pressure testing, and flushing.
- C. If continuous feed method or slug method of disinfection, as described in AWWA C651, are used flush pipelines with potable water until clear of suspended solids and color.
- D. Drainage should take place away from the construction or work area. Adequate drainage must be provided during flushing. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties
- E. If applicable, the valve(s) isolating the main from existing system should be locked out and tagged out to prevent unintentional release of the elevated chlorine residual water used for disinfection.

- F. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections. Operate valves during flushing process at least twice during each flush.
- G. Flush pipe through flushing branches and remove branches after flushing is completed.

3.3. DISINFECTION OF WATER SYSTEMS

- A. Perform disinfecting in accordance with AWWA C651 and Paragraph 3.9, Section 1300, City of Fargo Standard Specifications for Construction prior to start-up. Coordinate with other Contractors, Engineer, and Owner.
- B. There are four methods of chlorination available: tablet/granule, continuous feed, slug, and spray. However, the Engineer has written the spec assuming the tablet/granule chlorination method will be utilized. Contractor shall consult with the Engineer if another chlorination method will be utilized.
 - 1. Tablet/granule method gives an initial chlorine dose of 25 mg/L;
 - 2. Continuous-feed method gives a 24-hr chlorine residual of not less than 10 mg/L;
 - 3. Slug method gives a 3-hr exposure of not less than 50 mg/L free chlorine;
 - 4. Spray method gives a 30-min exposure of not less than 200 mg/L free chlorine.
- C. For wells, add the required amount of chlorination material into the casing before installation of pumping equipment. Agitate as required for thorough mixing.
- D. The tablet method consists of placing calcium hypochlorite granules or tablets in the water main during installation and then filling the main with potable water to create a chlorine solution. This method may be used only if the pipes and appurtenances are kept clean and dry during construction.
 - 1. WARNING: This procedure must not be used on solvent-welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.
- E. Placement of calcium hypochlorite granules during construction.
 - 1. Calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft intervals.
 - 2. The quantity of granules at each location shall be as shown in Table 1.

Table 1 Weight of calcium hypochlorite granules to be placed at beginning of main and at each 500-ft (150-m) interval

Pipe Diameter (<i>d</i>)		Calcium Hypochlorite Granules	
<i>in.</i>	<i>(mm)</i>	<i>oz</i>	<i>(g)</i>
4	(100)	1.7	(48)
6	(150)	3.8	(108)
8	(200)	6.7	(190)
10	(250)	10.5	(298)
12	(300)	15.1	(428)
14 and larger	(350 and larger)	$D^2 \times 15.1$	$D^2 \times 428$

Where *D* is the inside pipe diameter, in feet $D = d/12$

- F. Placement of calcium hypochlorite tablets during construction.
1. Calcium hypochlorite tablets (5-grams) shall be placed in the upstream end of each section of pipe to be disinfected, including branch lines.
 2. Also, at least one tablet shall be placed in each hydrant branch and in other appurtenances.
 3. The number of 5-g tablets required for each pipe section shall be $0.0012 d^2 L$ rounded to the next higher integer, where *d* is the inside pipe diameter, in inches, and *L* is the length of the pipe section, in feet.
 4. Table 2 shows the number of tablets required for commonly used sizes of pipe.
 5. Calcium hypochlorite tablets shall be attached by an adhesive meeting the requirements of NSF/ANSI 61.
 6. There shall be adhesive only on the broadside of the tablet attached to the surface of the pipe.
 7. Attach tablets inside and at the top of the main.
 8. If the tablets are attached before the pipe section is placed in the trench, their positions shall be marked on the pipe exterior to indicate that the pipe has been installed with the tablets at the top.

Table 2 Number of 5-g calcium hypochlorite tablets required for dose of 25 mg/L*

Pipe Diameter		Length of Pipe Section, <i>ft (m)</i>				
		13 (4.0) or less	18 (5.5)	20 (6.1)	30 (9.1)	40 (12.2)
<i>in.</i>	<i>(mm)</i>	Number of 5-g Calcium Hypochlorite Tablets				
4	(100)	1	1	1	1	1
6	(150)	1	1	1	2	2
8	(200)	1	2	2	3	4
10	(250)	2	3	3	4	5
12	(300)	3	4	4	6	7
16	(400)	4	6	7	10	13

*Based on 3.25-g available chlorine per tablet

G. Filling and contact time.

1. When installation has been completed, the main shall be filled with water such that the full pipe velocity is no greater than 1 ft/sec (0.3 m/sec).
2. Fill rate must be carefully controlled to ensure tablets do not come loose from pipe.
3. Precautions shall be taken to ensure that air pockets are eliminated.
4. Water used to fill the new main shall be supplied through a temporary connection that shall include an appropriate cross-connection control device, consistent with the degree of hazard, for backflow protection of the active distribution system.
5. The chlorinated water shall remain in the pipe for at least 24 hr. If the water temperature is less than 41 oF (SaC), the water shall remain in the pipe for at least 48 hr. A detectable free chlorine residual (~0.2 mg/L) shall be found at each sampling point after the 24- or 48-hr period.
6. Test for disinfectant residual at each of the following locations:
 - a. End of piping runs.
7. All water supply and distribution mains shall be disinfected with chlorine prior to acceptance by the owner.
8. As chlorinated water flows past new fittings and valves, related valves shall be operated so as to disinfect appurtenances and pipe branches. All valves shall be opened and closed a minimum of two times during the contact period.

H. Draining, Flushing and Dechlorination

1. After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. To prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system or that is acceptable for domestic use.
2. Drain and flush using fresh water pumped through the system.

3. Properly dispose of heavily chlorinated water supply in an environmentally acceptable manner. Do not allow flow into a waterway without neutralizing disinfectant residual.
 - a. Refer to ANSI/AWWA C655 Field Dechlorination for dechlorination procedures.
 - b. It is recommended that any high-velocity flushing be completed prior to disinfection. Dechlorination equipment may not be capable of handling high flows with high levels of chlorine.

3.4. BACTERIOLOGICAL TESTING

- A. After disinfection and flushing, test water for bacteriological contamination.
- B. Bacteriological testing is required on all new and replaced water main before the water main is placed in service. The tests ensure that the water being introduced into the system has been properly disinfected and is free of contamination.
- C. Notify Owner and Engineer when ready for sampling so personnel from the City Public Works Department could come out and collect the samples for the bacteriological test.
- D. All water samples for bacteriological testing shall be collected from a newly installed water service.
 1. If a project does not include newly installed water services, the Contractor shall supply all labor and materials necessary to collect the sample.
 2. The materials, location, and method for abandonment/removal of necessary materials shall be approved by the Engineer.
 3. Water samples may not be collected from a fire hydrant.
- E. After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main.
 1. At least one set of samples shall be collected from every 1,200 feet of new water main.
 2. All samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and show the absence of coliform organisms and the presence of a chlorine residual.
 3. The basic procedure is as follows:
 - a. Insert litmus paper test strip in the discharge stream of the hydrant while it is being flushed. The color change will indicate that there is residual chlorine content.
 - b. Before the valves are opened, obtain a sterile sample of the disinfected main. This water sample will be taken after the completion of the pressure test.
 - c. 100-ml samples will be taken with a chlorine neutralizer tablet in the container.
 - d. The sample must be taken to the water plant immediately for testing. If this is not possible, the sample must be kept in a

refrigerated container, however, the test must begin within 24 hours.

- e. Results will be available approximately 24 hours from the time the test is admitted.
 - f. A second sample is obtained from the same location at least 24 hours after the first sample. This sample indicates that the residual chlorine content is such that verification is obtained that the pipe, newly introduced water, and any debris are disinfected. As such, the sample must be obtained from water that has remained in the new pipe for at least 24 hours.
 - g. Both samples must pass the test before the new water main may be opened and put in use in the distribution system.
 - h. When flushing the mains, care must be taken to ensure that flow is away from the existing mains. This may involve flushing $\frac{1}{2}$ block in one direction until the water is clear, and then closing that valve and flushing from the other end of the block for a mid-block hydrant.
- F. If the initial disinfecting fails to produce satisfactory results, the main shall be reflushed and re-sampled.
- G. If check samples also fail, the main shall be rechlorinated by the continuous feed or slug method until satisfactory results are obtained.
- H. The Contractor should note that the testing tank may require sterilization in order to avoid contamination of the mains during the testing process.
- I. The pipe installation crews will need to ensure that the pipes are free of dirt, debris and other matter.
- J. It must be remembered that the final water quality test is not the primary means for certifying the sanitary condition of the main. The sanitary handling of materials, the construction practices, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main.
- K. The Contractor shall assist as necessary to obtain the samples.

3.5. FIELD QUALITY CONTROL

- A. Section 01 45 00 - Quality Control: Field inspection and testing.
- B. Samples for bacteriological analysis shall be collected in sterile bottles.
- C. Two or more successive test samples indicating bacteriological satisfactory water shall be obtained a minimum of 24 hours apart, before any system is placed into operation.

END OF SECTION

Attachment No. 3

SECTION 33 13 10R – PIPELINE PRESSURE AND LEAKAGE TESTING (REVISED)

PART 1 GENERAL

1.1. SUMMARY

- A. Section Includes:
 - 1. Field hydrostatic pressure and leakage testing of water mains, force mains, and associated appurtenances.
- B. Related Sections included, but not limited to:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 45 00 – Quality Control.
 - 3. Section 01 77 00 – Closeout Procedures.
 - 4. Section 33 05 31 – Thermoplastic Utility Piping.
 - 5. Section 33 05 37 – Centrifugally Cast Fiberglass-Reinforced Polymer Mortar Utility Pipe.
 - 6. Section 33 05 39 – Concrete Pipe.
 - 7. Section 33 11 14 – Ductile Iron Pipe and Fittings.
 - 8. Section 33 13 00 – Disinfection of Water Systems.

1.2. SUBMITTALS FOR INFORMATION

- A. Section 01 33 00 – Submittal Procedures.
- B. Testing Schedule and Procedure - A testing schedule and test procedure shall be submitted to the Engineer for review and acceptance not less than 21 days prior to commencement of testing work. The schedule shall indicate the proposed time and sequence of testing of the pipeline.
- C. The testing procedure shall establish the limits of the pipeline to be tested, the position of all valves during testing, the location of temporary bulkheads, disposal of test water, and all other methods and procedures to be followed in performing the required testing work.

1.3. QUALITY ASSURANCE AND SPECIAL REQUIREMENTS

- A. All pipelines and appurtenances shall be pressure and leakage tested in accordance with AWWA C600 for Ductile Iron Pipes, AWWA C604 for Steel Pipes, AWWA C605 for PVC Pipes and these specifications.
- B. During testing of the water line, all valves shall be in the open position.
- C. Temporary bulkheads shall be provided during testing so that the test pressures are not applied to existing or new valves and hydrants, or to existing water lines or to any portion that has been put into service of new lines installed under this Contract.

- D. The tests shall be conducted before connections are made to existing water lines or to any portion that has been put into service or new water lines installed under this Contract.
- E. Upon completion of testing, connections made to existing water lines or to any portion that has been put into service of new water lines installed under this Contract shall be visually inspected for leakage after placing the water line into service and before backfilling the connection.

PART 2 PRODUCTS

2.1. TEST EQUIPMENT

- A. All necessary piping connections between the line to be tested and the water source, together with pumping equipment, water meter, pressure gauges, backflow protection, and other equipment, materials, and facilities required to perform the specified tests, shall be provided. All flanges, valves, bulkheads, bracing, blocking, and other sectionalizing devices shall be provided. All temporary sectionalizing devices shall be removed upon completion of testing. Vents shall be provided in test bulkheads where necessary to expel air from the line to be tested.
- B. Test pressures to be applied by means of a force pump sized to provide and maintain the required pressure without interruption during the test.
- C. Water meters and pressure gauges shall be accurately calibrated and shall be subjected to review and acceptance by the Engineer.
- D. Permanent gauge connections shall be installed at each location where test gauges are connected to the pipeline in manholes during performance of required tests. Drilling and tapping of pipe walls will not be permitted. Upon completions of testing work, each gauge connection shall be fitted with a removable plug or cap acceptable to the Engineer.

PART 3 EXECUTION

3.1. PREPARATION

- A. When filling the line with water, care shall be taken to ensure that all air release valves, and other venting devices are properly installed in the open position. Hand-operated vent valves shall not be closed until water flows in an uninterrupted stream from each valve. Care shall be taken to ensure that the rate at which the line is filled with water does not exceed the venting capacity of the installed air vent valves and devices.
- B. Piping shall be adequately blocked, anchored, and supported before the test pressure is applied. Underground piping shall be tested before the joints are covered.

3.2. FLUSHING

- A. Foreign material left in pipelines during installation can result in valve or hydrant seat leakage during pressure tests. Every effort shall be made to keep lines clean during installation. Thorough flushing is recommended prior to a pressure test; flushing shall be accomplished by partially opening and closing valves several times under expected line pressure, with flow velocities adequate to flush foreign material out of the valves

3.3. HYDROSTATIC FIELD TESTING

- A. The pipeline shall be filled and allowed to stand for 24-hour prior to testing if lining is cement-mortar.
- B. After the pipeline to be tested has been filled with water, a 150-psi test pressure shall be applied and maintained without interruption for 2-hours plus the additional time required by the Engineer to examine all piping undergoing the test and for the Contractor to locate all defective joints and pipe materials.
- C. The hydrostatic test pressure shall not be less than 1.25 times the stated anticipated maximum sustained working pressure of the pipeline measured at the highest elevation along the test section and not less than 1.5 times the stated sustained working pressure at the lowest elevation of the test section. However, in no case shall the test pressure exceed the rated pressure for any joint, thrust restraint, valve, fitting, or other connected appurtenance of the test section
- D. Before applying the specified test pressure, air shall be expelled from all air vents along the section of pipe being tested. Measurements of leakage shall not be attempted until all trapped air has been vented and a constant test pressure has been established.
- E. After the pressure has stabilized, line leakage shall be measured by means of a suitable water meter installed in the pressure supply piping on the pipeline side of the force pump.
- F. Test the pipeline in sections, limiting each test section to a maximum of 1,500 linear feet.
- G. Any exposed pipe, fittings, valves, and joints shall be examined carefully during the test. In addition, the entire length of the pipeline shall be examined for movement, defects, and leaks that may appear on the surface. Any revealed damage or defective pipe, fittings, valves, or joints shall be repaired or replaced with sound material, and the test shall be repeated until satisfactory results are obtained.

3.4. ALLOWABLE MAKEUP WATER

- A. Makeup water shall be defined as the quantity of water that must be supplied into a newly laid pipe or any valved section thereof to maintain pressure within 5 psi

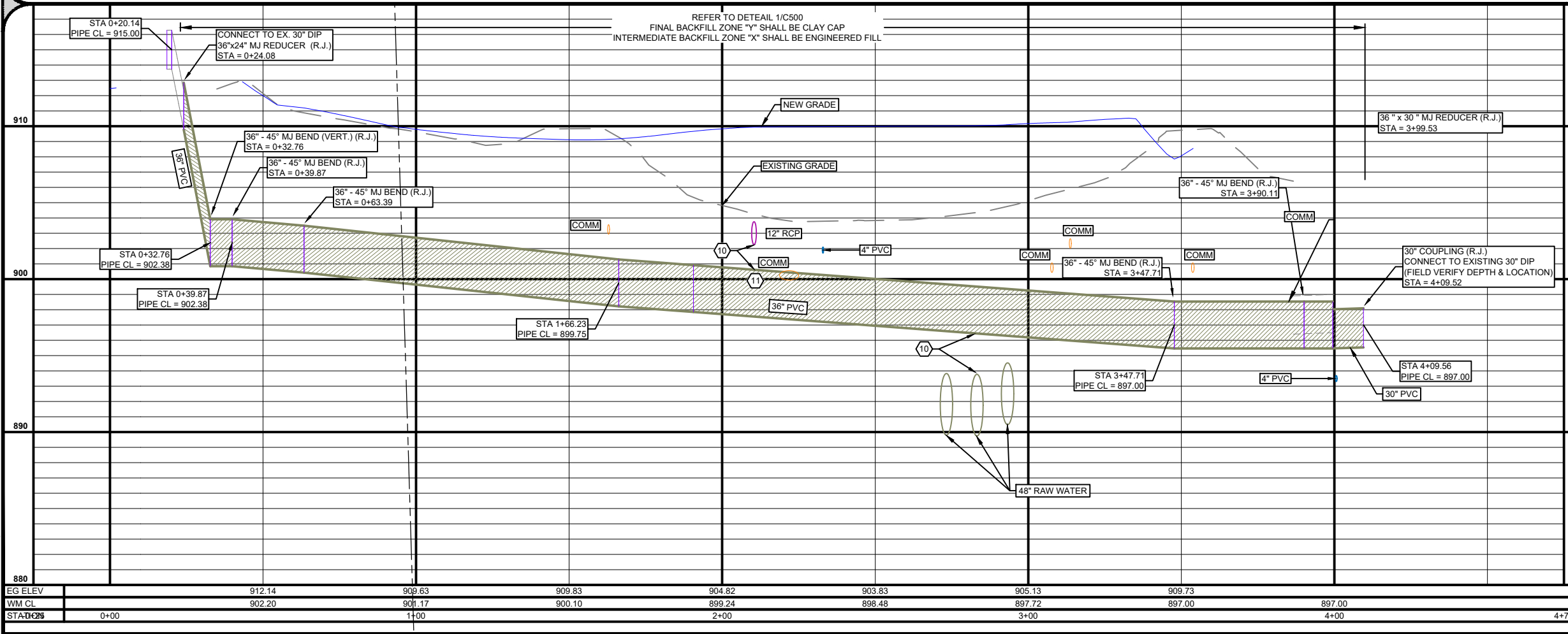
(34.5 kPa) of the specified test pressure after pipe has been filled with water and the air has been expelled.

- B. Makeup water shall not be measured by a drop in pressure in a test section over a period of time. Measurements of leakage shall not be attempted until all trapped air has been vented and a constant test pressure has been established. After the pressure has stabilized, line leakage shall be measured by means of a suitable water meter installed in the pressure supply piping on the pipeline side of the force pump.
- C. The quantity of allowable makeup water shall not exceed the test allowance specified in AWWA C600 for Ductile Iron Pipes, AWWA C604 for Steel Pipes or AWWA C605 for PVC Pipes. For Ductile Iron and PVC pipes, leakage shall not exceed the rate established by the following formula:
 - 1. $Q = (LD\sqrt{P})/148,000$, in which:
 - a. Q= maximum permissible leakage rate in gallons per hour for the length of line being tested.
 - b. L= length of the line being tested in feet.
 - c. D= internal diameter of the pipe in inches.
 - d. P= average test pressure in psig.
- D. These formulas are based on a testing allowance of 10.5 gpd/mi/in. (0.978 L/day/km/mm) of nominal diameter at a pressure of 150 psi (1,030 kPa).
 - 1. Note: The makeup water allowance is provided to account for the losses that may occur because of the expulsion of entrapped air, movement because of seating of valves or joint restraints, and a slight increase of pipe diameter because of internal pressure. There may also be losses associated with connected appurtenances and accessories.
- E. Allowance tables. Makeup water allowances for various pipe diameters and test pressures are provided in Tables 4a and 4b of AWWA C605, and Tables 5a and 5b of AWWA C600.
- F. Metal-seated valves. When testing against closed metal-seated valves, an additional allowance per closed valve of 0.0078 gph/in. (0.0012 L/h/mm) of nominal valve size shall be allowed. When testing against existing valves is necessary, some leakage can be expected and should not be the sole basis for rejection.
- G. Hydrant. When hydrants are in the test section, the test shall be made against closed hydrant valves.
- H. Whenever the pipeline to be tested contains pipe of different diameters, joint types and material, the allowable makeup water shall be calculated separately for type and corresponding length of line. The resulting allowable makeup water rates shall be added to obtain the total allowable leakage for the entire pipeline.

- I. All joints in piping shall be watertight and free from visible leaks during the hydrostatic field test. All visible leaks shall be repairs regardless of the amount of leakage.
- J. Acceptance shall be determined based on the hydro test. If any test of laid pipe requires makeup water greater than that specified, repairs or replacements shall be accomplished, and the pipe retested.

END OF SECTION

Attachment No. 4



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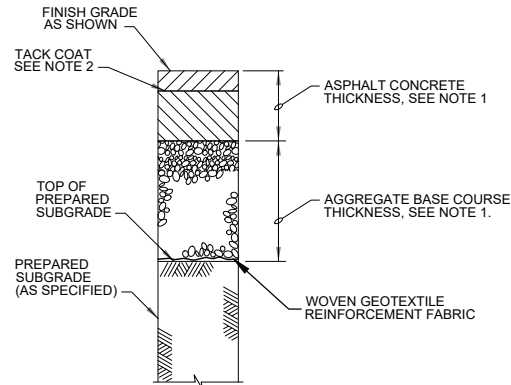


TABLE 1 - BITUMINOUS PAVEMENT SCHEDULE

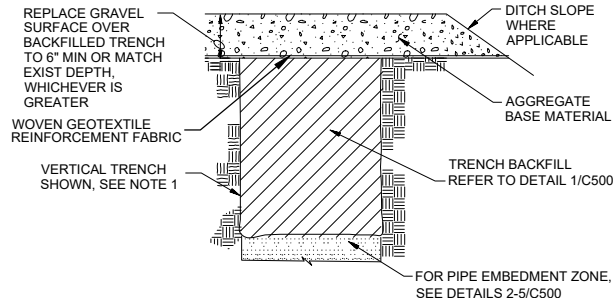
SECTION	ASPHALT CONCRETE THICKNESS (IN)	AGGREGATE BASE COURSE THICKNESS(IN)
PUMP STATION DRIVE	5	12
GENSLER PRIVATE DRIVE	4	12 EXISTING (SEE NOTE 3)

NOTE:

1. PROVIDE BITUMINOUS PAVEMENT AND BASE COURSE THICKNESS AS SHOWN IN TABLE 1 FOR EACH ROAD SHOWN ON PLANS.
2. TACK COAT BETWEEN LIFTS.
3. CONTRACTOR SHALL SHAPE EXISTING AGGREGATE ROAD MATERIAL TO SLOPE TO DRAIN. CONTRACTOR SHALL ALSO PROOF ROLL AGGREGATE ROAD AND REMOVE AND REPLACE SOFT SPOTS.

1 BITUMINOUS PAVEMENT

C501 NO SCALE

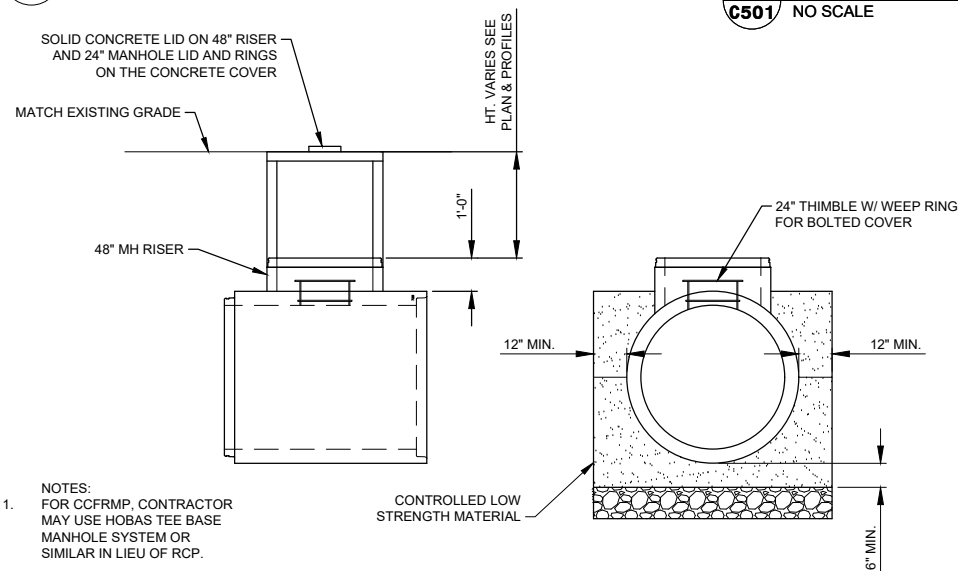


NOTES:

1. APPLICABLE NOTES ARE PROVIDED ON DETAIL 1 / C500.

3 GRAVEL SURFACE TRENCH BACKFILL SECTION

C501 NO SCALE



1. NOTES: FOR CCFRMP, CONTRACTOR MAY USE HOBAS TEE BASE MANHOLE SYSTEM OR SIMILAR IN LIEU OF RCP.

6 48" RISER 72" RCP CLEANOUT TEE

C501 NO SCALE

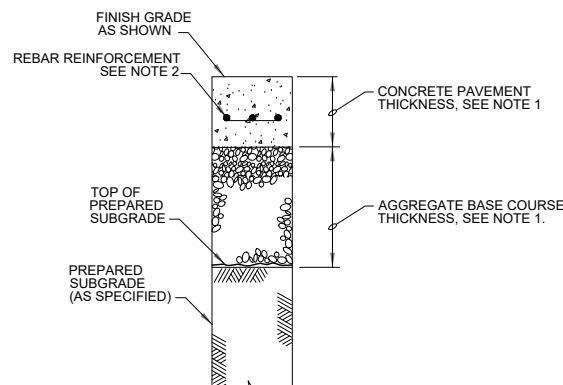


TABLE 1 - CONCRETE PAVEMENT SCHEDULE

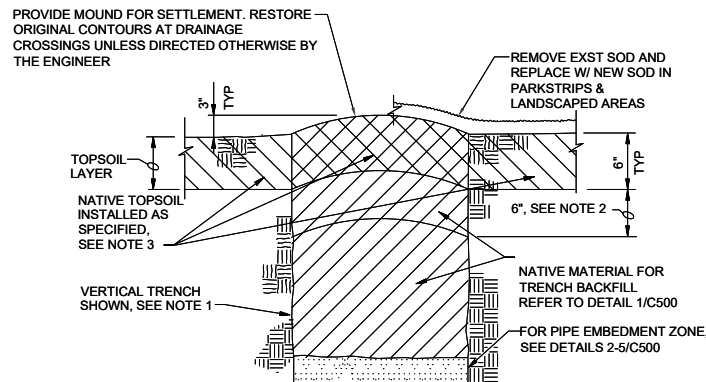
SECTION	CONCRETE THICKNESS (IN)	AGGREGATE BASE COURSE THICKNESS(IN)
PUMP STATION DRIVE	6	12

NOTE:

1. PROVIDE CONCRETE PAVEMENT AND BASE COURSE THICKNESS AS SHOWN IN TABLE 1 FOR EACH ROAD SHOWN ON PLANS.
2. CONTRACTOR SHALL PROVIDE NO. 4 REBAR @ 18" O.C. E/W FOR PAVEMENT REINFORCEMENT UNLESS OTHERWISE SHOWN ON PLANS.

2 CONCRETE PAVEMENT

C501 NO SCALE

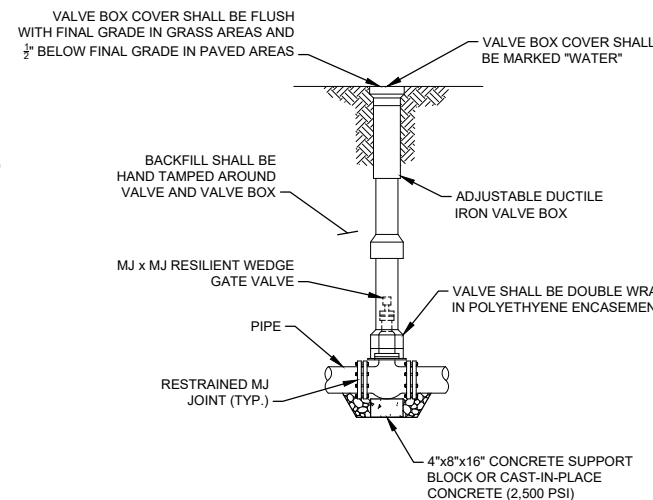


NOTES:

1. APPLICABLE NOTES ARE PROVIDED ON DETAIL 1 / C500.
2. THE TOP 6" OF TRENCH BACKFILL, BENEATH THE TOPSOIL LAYER, SHOULD BE INSTALLED, SMOOTHED, BUT LEFT UN-COMPACTED.
3. TOPSOIL SHALL EXTEND BEYOND TOP OF TRENCH AND TO THE LIMITS SPECIFIED.

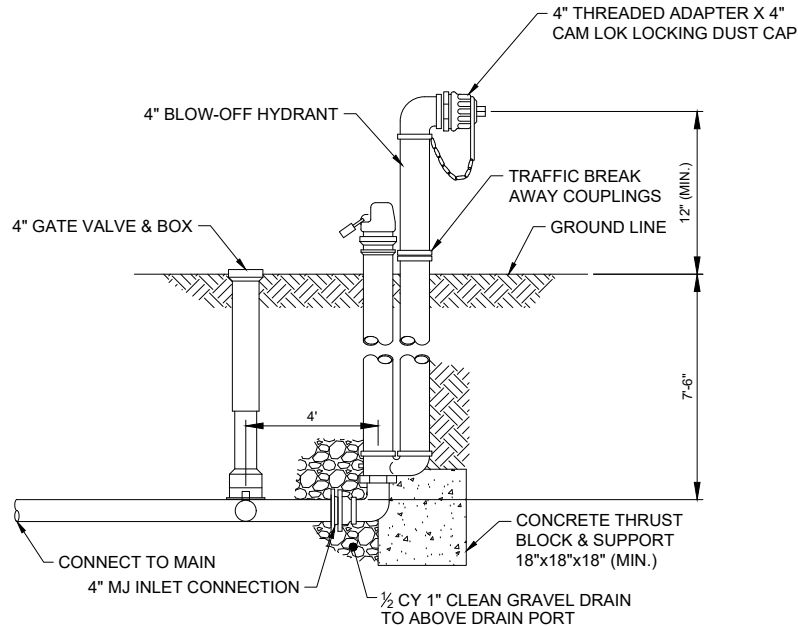
4 UNIMPROVED AREA OR LAWN AREA TRENCH BACKFILL SECTION

C501 NO SCALE



7 16" AND SMALLER GATE VALVE

C501 SCALE: NONE

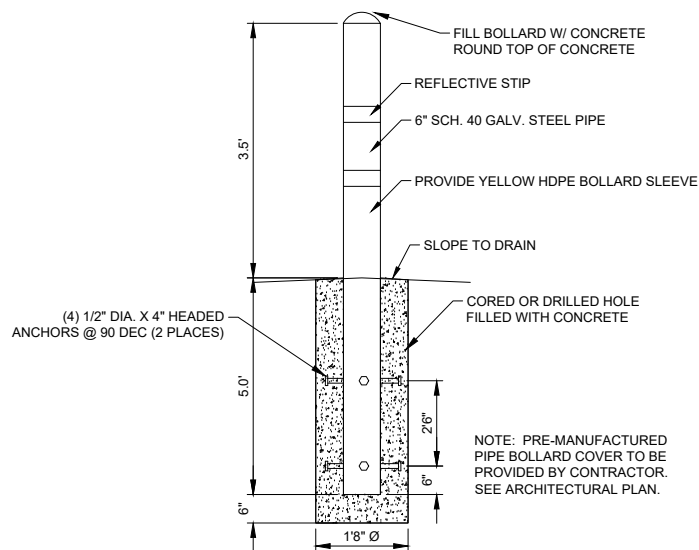


NOTES

1. BLOW-OFF HYDRANT SHALL BE SELF-DRAINING, NON-FREEZING TYPE. HYDRANT SHALL BE FURNISHED WITH A 4" MJ INLET CONNECTION, A NON-TURNING OPERATING ROD AND SHALL OPEN TO THE LEFT. OUTLET SHALL BE 4" FIP AND EXTEND A MINIMUM OF 12" ABOVE THE GROUND.
2. ALL WATER FLOW SHALL PASS THRU A 4" STEEL PIPE AND CAST IRON TOP STOCK WATERWAY. THE OPERATING DRIVE MECHANISM SHALL RAISE AND LOWER A PLUNGER TO CONTROL THE FLOW OF WATER AND SHALL BE SERVICEABLE FROM THE ABOVE GROUND WITH NO DIGGING OR REPLACEMENT NEEDED. SAID OPERATING DRIVE SHALL OPERATE WITH A STANDARD 2" GATE VALVE WRENCH. WHEN OPEN THE FLOW OF WATER SHALL BE UNOBSTRUCTED AND THE DRAIN HOLE SHALL BE COVERED.
3. HYDRANT SHALL BE SET IN 4 CUBIC FEET OF CRUSHED STONE TO ALLOW FOR PROPER DRAINAGE OF HYDRANT. RECOMMENDATION OF THE AWWA SHOULD BE FOLLOWED WHEN INSTALLING THE HYDRANT.
4. THE MAINGUARD #7500 BLOW-OFF HYDRANT AS MANUFACTURED BY THE KUPFERLE FOUNDRY, ST. LOUIS MO. 63102 OR APPROVED EQUAL.

5 BLOW OFF HYDRANT ASSEMBLY

C501 NO SCALE



8 TYPICAL STEEL PIPE BOLLARD

C501 NO SCALE



Certification of Individual Project Design Disciplines Are Included On Their Individual Drawings, Respectively



**SHEET RE-ISSUED BY
ADDENDUM 2**

DETAILS			
CLIENT:	CITY OF FARGO FARGO, NORTH DAKOTA	PREPARED BY: RF	CHECKED BY: BG
PROJECT NO: P00803-2021-028	SHEET DESIGNATOR:	SHEET NO:	APPROVED BY: BG
DATE: OCTOBER 2022	DTL	C501	
ALT. PROJECT NO: WA2158			

STATUS: CONSTRUCTION

11/21/22 ADDENDUM #2

DATE

SYM

REGIONAL EMERGENCY WATER SUPPLY LS AND PIPELINE

Advanced Engineering and Environmental Services, LLC www.ae2s.com

Printed By: Carl Dam Date: Monday, November 21, 2022