

East Bay Charter Township

6

2008 Proposed Grand Traverse County Sewer and Water
Specifications Review

Motion by: _____ Second by: _____

To

Approve

Table

Deny

AYE: _____

NAY: _____

ABSTAIN: _____

ABSENT: _____

Motion


Passed

Failed



MEMORANDUM

TO: East Bay Township Board

FROM: Brian C. Sousa 

DATE: August 15, 2008

SUBJECT: Proposed 2008 Grand Traverse County
Sewer and Water Specifications Review

At the request of the Township, we have reviewed the proposed changes to the 2005 Grand Traverse County Standard Specifications for Sanitary Sewer and Water Main.

The documents reviewed consist of 22 pages of changes with the heading "Changes to Section 11 & Section 14 made on 03-03-08" as provided to us by the County Department of Public Works. Page one is unnumbered, the remaining are numbered 1-21 of 21.

We understand that these changes have been made in accordance with new State requirements and that a review by the specific State agency having jurisdiction of the municipal system has completed their review and has agreed with the proposed changes. We also understand that one or more proposed projects have been permitted based on the new specifications with changes noted in the document referenced above.

Based on our review, we do not find any significant technical issues with the changes. There are some minor "administrative" improvements we feel could be made to improve the specifications, and we will work directly with the DPW to investigate implementing those specifically.

EBT 1067-07C-001

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241 East State Street
Traverse City, MI 49684

231.947.7400
800.968.6660
231.946.1000 fax
www.wadetrim.com

CHANGES TO SECTION 11 & SECTION 14 MADE ON 03-03-08

SECTION 11 - WELL HOUSE EQUIPMENT

11.05 PRESSURE RELIEF VALVE/SURGE ANTICIPATOR

A.

Added: This equipment must be approved for application by the Grand Traverse County DPW and/or Township Engineer.

A.4. Products

Old: a. Cla-Val Model No. 52-03

New: a. Cla-Val Model No. 52-03/652-03

SECTION 14 - PRESSURE REDUCING VALVE STATION EQUIPMENT

14.01 SCOPE

Added: Refer to Standard Details for Pre-Fabricated Station Specifications.

14.02 PIPING AND FITTINGS:

D.

Added: Materials supplied and installed for the Pre-fabricated Steel Station shall conform to the Standard details.

14.03 Pressure Reducing Valves

Old: Pressure reducing valves shall meet the requirements of a Clayton 90G-01 AB (Adjustment Range 30-300 psi) Pressure Reducing Valve as manufactured by Cla-Val Company.

New: Pressure reducing valves shall meet the requirements of an Ames Co. Model (Adjustment Range 30-300 psi) 910G (Globe or G10G (Angle)) Epoxy coated interior with Stainless Steel Seat.

ON COVER AND IN ALL FOOTERS - CHANGED DATE TO 2008 FROM 2005

SECTION 1 – GENERAL REQUIREMENTS

1.04 LINES AND GRADES FOR CONSTRUCTION

Old: The Owner (his Contractor and/or Engineer) shall provide adequate lines and grades for construction of the sanitary sewer and/or watermain prior to installing the utilities. The Township Engineer shall be given 48 hours notice for review of these lines and grades prior to the start of construction.

New: The Owner (his Contractor and/or Engineer) shall provide adequate lines and grades for construction of the sanitary sewer and/or watermain prior to installing the utilities.

1.11 STREAM CROSSINGS

Old: Stream crossings shall be performed in accordance with all permit requirements of the regulatory agencies (P.A. 346 or 98 requirements). Casings shall be provided for all sanitary sewer crossings under streams.

New: Stream crossings shall be performed in accordance with all permit requirements of the regulatory agencies and Grand Traverse County Technical Specifications.

SECTION 2 - STANDARDS AND REGULATIONS

2.01 REFERENCE STANDARDS

Old: The following specifications and standards form part of this specification to the extent indicated by reference thereto or for quality of workmanship and materials required under the contract.

American Society of Testing Materials	(ASTM)
American Water Works Association	(AWWA)
American National Standards Institute, Inc.	(ANSI)
Michigan Department of Transportation	(MDOT)
American Concrete Institute	(ACI)
National Concrete Masonry Association	(NCMA)
Truss Plate Institute	(TPI)
National Electrical Code	(NEC)
Michigan Department of Environmental Quality	(MDEQ)

Added: National Fire Code (NFC)

SECTION 3 - PROJECT CLOSE OUT

3.04 FINAL COMPLETION/ACCEPTANCE OF PROJECT BY TOWNSHIP

B. Private Projects

Old: The Township will not accept the facility or allow connections to or use of the facilities until the following items have been received by the Township:

1. Punch list items satisfactorily completed.
2. Maintenance bond. (Valid for a period of one year from the date of Township acceptance of the system).

3. Letter of guarantee (format provided by Township Engineer).
4. Easement descriptions.
5. Descriptions of the facilities for a bill of sale.
6. Certification by the Engineer reviewing the installation.
7. Sanitary Sewer Lead Reports (as applicable).
8. Water Service Lead Reports (as applicable).
9. Water Valve Reports (as applicable).
10. Hydrant Reports (as applicable).
11. Operation and Maintenance Manuals
12. Record Drawings
- 12A. Record Drawings (as-constructed) must include a reproducible set of 24" x 36" mylars or vellums and a digital copy (formats listed below) including a .pdf copy of each sheet.

Digital Submittal Format Requirements: The developer shall submit to the Township a digital copy of the Record Drawings (as described in Section 3.04.B Item 12B of the Technical Specifications) in one of the following formats:

- a. Drawing Interchange File (.DXF)
- b. AutoCAD (.DWG) release 2000 or higher
- c. ArcView GIS format (.SHP)

New: 12A. b. AutoCAD (.DWG) release 2004 or higher

SECTION 4 - EXCAVATION, TRENCHING AND BACKFILLING No Changes Made

SECTION 5 - CONCRETE WORK

5.01 SCOPE OF WORK

Old: All procedures and materials under this section, where not specifically stated, shall be in accordance with standards and recommendations of the American Concrete Institute's Building Code Requirements for reinforced concrete (ACI 318 - latest edition).

New: All procedures and materials shall be in accordance with the American Concrete Institute "Building Code Requirements for Structural Concrete" (ACI 318 – latest edition) and "Specifications for Structural Concrete" (ACI 301– latest edition).

5.02 MATERIALS

A. Cement:

Old: Portland cement shall conform to "Standard Specifications for Portland Cement" (ASTM C150 - latest edition) and shall be Type I, IA, III or IIIA.

New: Portland cement shall conform to "Specification for Portland Cement" (ASTM C150 – latest edition).

Removed: D. Admixtures: Air-entraining admixtures shall conform to "Standard Specifications for Air-Entrained Admixtures for Concrete" (ASTM C260 - latest edition).

E. Concrete Mix Proportions

Old: Section 4.3.1. (ACI-318) shall be used for developing mixture portions. The Contractor shall furnish, for the Engineer's approval, all records to show that his concrete supplier is in compliance with all provisions of Section 4.3.1. If the concrete supplier is unable to furnish all records to comply with Section 4.3.1, Sections 4.3.1.2 and 4.3.2.2 can be used. If no records are available for any of the above ACI Sections, Section 4.3.3.2 shall be used to develop a concrete mix design.

New: ACI 318 – latest edition shall be used for selecting concrete proportions. The Contractor shall furnish, for the Engineer's approval, all information necessary to show compliance with ACI 318 – latest edition.

5.03 EXECUTION

A. Concrete Quality

Old: All concrete shown on the working drawings or referred to in the specifications shall be from an approved batch plant and shall have a minimum compressive strength of 2500 psi and a maximum water-cement ratio of 0.64.

Air entrainment shall be 5%, more or less, 1% for concrete with maximum aggregate size of 1-1/2 inches and shall be 6%, more or less, 1% for concrete with a maximum aggregate size of 3/4 inch.

The concrete shall be of a consistency to work easily into corners, angles of forms and around reinforcement. The slump shall not exceed 4 inches.

New: All concrete shall meet the requirements of ACI 318 – latest edition and shall have a minimum compressive strength of 3000 psi.

Air entrainment for exposed concrete shall be per ACI 318 – latest edition for Severe Exposure.

The concrete shall be of a consistency to work easily into corners, angles of forms and around reinforcement.

B. Mixing and Placing Concrete

1. Preparation of Equipment and Place of Deposit:

Old: a. Before placement, all equipment for mixing and transporting the concrete shall be cleaned and all debris and ice shall be removed from the places to be occupied by the concrete. Forms shall be thoroughly wetted (except in freezing weather) or oiled and masonry filler units that will be in contact with concrete shall be well drenched (except in freezing weather).

New: a. Before placement, all equipment for mixing and transporting the concrete shall be cleaned and all debris and ice shall be removed from the places to be occupied by the concrete.

2. **Mixing:**

Old: a. Ready mixed concrete shall be mixed and delivered in accordance with "Standard Specification for Ready Mixed Concrete (ASTM C94 - latest edition). Mixing and transporting equipment shall be capable of providing concrete which meets the ASTM C94 requirements for uniformity.

New: a. Before placement, all equipment for mixing and transporting the concrete shall be cleaned and all debris and ice shall be removed from the places to be occupied by the concrete.

3. **Conveying:**

Old: b. Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials.

New: b. Conveying equipment shall be of such size and design as to ensure a nearly continuous flow of concrete at the delivery point without separation of materials or loss of plasticity.

4. **Placing: Renamed to Depositing:**

Old: a. Concrete shall be deposited, as nearly as *practicable*, in its final position to avoid segregation due to rehandling or flowing. Concrete shall be placed at such a rate that it is at all times plastic and flows readily. No concrete contaminated by foreign material shall be used nor shall retempered concrete be used unless approved by the Engineer.

New: Changed "practicable" to "possible"
Removed "unless approved by the Engineer"

Old: b. When placing is started, it shall be carried on as a continuous operation until placement is completed.

New: b. When placing is started, it shall be carried on as a continuous operation until placement of a well defined section is completed.

5. **Cold Weather Requirements: Renamed to Hot & Cold Weather Requirements:**

Old: a. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. No frozen materials or materials containing snow or ice shall be used.

b. All reinforcement, forms, fillers and ground with which the concrete is to come in contact shall be free from snow and ice.

- c. Construction during cold weather shall be performed in accordance with ACI 306, "Recommended Practice for Cold Weather Concreting", or as directed by the Engineer.

New: a. Concrete placement during hot weather shall be in accordance with "Hot Weather Concreting" (ACI 305 – latest edition). Concrete placement during cold weather shall be in accordance with "Cold Weather Concreting" (ACI 306 – latest edition).

SECTION 6 - SANITARY SEWER MAIN

6.02 MATERIALS

A. Sewer Pipe

3. PVC Sewer Pipe

Old: The use of PVC sewer pipe requires special attention to proper subgrade and backfilling procedures. Failure of the Contractor to provide proper construction will result in probable excessive deflection of the PVC pipe and require replacement by the Contractor at no additional cost to the Owner.

New: PVC sewer pipe joints shall be either elastomeric gasket type, in accordance with ASTM D3212 (elastomeric gasket type).

6.03 EXECUTION

B. Laying Sewer Main

Old: Any section of pipe found to be defective, either before or after laying, shall be replaced with new pipe at the Contractor's expense. If repairs are necessary, Fernco adaptors will not be allowed for main line pipe. Similar material shall be utilized.

New: Any section of pipe found to be defective, either before or after laying, shall be replaced with new pipe at the Contractor's expense. If repairs are necessary, Fernco adaptors will not be allowed for main line pipe. The same pipe material must be used including a PVC sleeve for all repairs.

SECTION 7 - SANITARY SEWER APPURTENANCES

7.02 MATERIALS

4. Cast Iron Frames and Covers:

Added: Hinged Manhole units may be used for certain applications. Openings must meet the same specifications as above. The use of this type of Manhole frame and covers must be approved by Township Engineer and the owner.

C. Clean-Outs

Old: Clean-outs shall consist of pipe and fittings of the same type as the sewer main materials they connect to as required to provide a clean-out installation as shown in the standard details. The maximum distance between clean-outs is 75 lineal feet.

New: Clean-outs shall consist of pipe and fittings of the same type as the sewer main materials they connect to as required to provide a clean-out installation as shown in the standard details. Clean-outs are to be placed at the end of a sanitary sewer main stub where a future extension is anticipated.

7.03 CONSTRUCTION METHODS

F. Placing Castings

Added: In high ground water applications it may be required to utilize WrapidSeal (or equal). This shrinkable material shall create a barrier to water infiltration to protect the manhole support and structure from ground moisture.

G. Connection to Existing Sanitary Sewer Systems

Old: When a new manhole is to be installed over an existing line, it shall be initially placed without damaging the existing pipe. The existing pipe shall not be damaged until the new lines are ready to be placed in operation and the new flow channel is ready to be formed to connect with the existing flow lines.

New: When a new manhole is to be installed over an existing line, it shall be initially placed without cutting into the existing pipe. The existing pipe shall not be cut into until the new lines are ready to be placed in operation and the new flow channel is ready to be formed to connect with the existing flow lines.

H. Sewer Wyes and Leads

Old: Sanitary sewer saddles shall be SDR-25 wye assembly with stainless steel straps and shall meet ASTM 3034 specifications.

New: Sanitary sewer saddles shall be SDR-35 wye assembly with stainless steel straps and shall meet ASTM 3034 specifications.

SECTION 8 - FORCEMAINS

8.02 MATERIALS

A. Pipe Materials

Added: 3. High Density Polyethylene Pipe (HDPE) for river crossings or wetland crossings shall be DR 9, Class 3408 as supplied by Driscoplex PW 4000 by Performance Pipe or equal, and meet the following conditions.

Pipe Size Standard	Dimension Ratio (DR)	Working Pressure	Working Pressure + Surge Pressure
DIPS	9	200 psi	300 psi

All HDPE pipe shall be joined by heat fusion per manufacturer's requirements. River crossing section shall be pressure tested independently of other Forcemain. See Section 8.04 of these

specifications. This method and locations must be approved by the Township Engineer. Refer to standard details for the connection of ductile iron pipe to HDPE. This connection, a mechanical joint (gate or butterfly valve, and corporations on the ductile iron) shall be enclosed in a pre-cast concrete manhole. The size of the manhole will be determined by the Engineer and a standard EJIW 1040 shall be utilized for this structure and shown in the standard detail.

Refer to MDOT specification BJ-2D, Special Provisions for Directionally Bored Pipe.

HDPE pipe shall be inspected prior to installation by a qualified person or by the Township Engineer. If damage is found to be unacceptable according to the manufacturer, then suitable efforts shall be made to repair the damaged pipe or the pipe shall be rejected from use.

This pipe must be approved by the Township Engineer.

- Added:** 4. Fusible Polyvinyl Chloride Pipe (PVC) for river crossings or wetland crossings shall be DR 14, Class 12454 per ASTM D1784 as supplied by Underground Solutions, or equal, and meet the following conditions.

Pipe Size Standard	Dimension Ratio (DR)	Working Pressure	Working Pressure + Surge Pressure
DIPS	14	200 psi	300 psi

All Fusible PVC pipe shall be joined by heat fusion per manufacturer's requirements. Fusible PVC pipe must meet the requirements of NSF Standard 14 and NSF Standard 61 to be used for potable water systems. The exterior wall print line of all Fusible PVC pipe proposed for installation and potable use must bear the NSF-PW identification. River crossing section shall be pressure tested independently of other watermain. See Section 9.07 of these specifications. This method and locations must be approved by the Township Engineer. Refer to standard details for the connection of ductile iron pipe to Fusible PVC. This connection, a mechanical joint (gate or butterfly valve, and corporations on the ductile iron) shall be enclosed in a pre-cast concrete manhole. The size of the manhole will be determined by the Engineer and a standard EJIW 1040 shall be utilized for this structure and shown in the standard detail.

Refer to MDOT specification BJ-2D, Special Provisions for Directionally Bored Pipe.

Fusible PVC pipe shall be inspected prior to installation by a qualified person or by the Township Engineer. If damage is found to be unacceptable according to the manufacturer, then suitable efforts shall be made to repair the damaged pipe or the pipe shall be rejected from use.

The pipe should all be approved by the Township.

C. Valves and Appurtenances

Old: 1. Gate valves shall meet the requirements of AWWA C500 of the American Water Works Association. Valves shall be designed for not less than 150 psi working pressure and shall be tested for leakage and distortion under a hydraulic pressure of not less than 150 psi. Under such pressure, the valves shall show no leakage or distortion.

New: 1. Gate valves shall meet the requirements of AWWA Standard C500-02 or C515-01 of the American Water Works Association. Valves shall be designed for not less than 150 psi working pressure and shall be tested for leakage and distortion under a hydraulic pressure of not less than 150 psi. Under such pressure, the valves shall show no leakage or distortion.

Added:8.04 DIRECTIONALLY DRILLED FORCEMAIN

A. Description

This work shall consist of constructing underground crossings of rivers or wetlands using the directional drilling method of placing pipe to serve as carrier pipe.

B. Depth of Bore

The minimum depth of drill using this method shall be six feet (6') of cover below existing grade, and a minimum depth of three feet (3') under any existing stream.

C. Construction Method

This method consists of auguring or jacking a steerable rod; then pulling back a cone that expands the soil or a wing cutter, which cuts a hole big enough to obtain the desired diameter. The diameter of the reamer or wing cutter is not to exceed the diameter of the pipe being placed plus two inches (2").

A drilling fluid of water and bentonite may be used in all operations of a directional drill. The use of a polymer for lubrication in the drilling fluid is acceptable.

Connection to HDPE and PVC Pipe shall not be made immediately after the pipe has been installed. It is recommended to wait overnight so that the pipe can approach an equilibrium temperature with its surrounding environments. Linear dimensions will vary with temperature changes. A tracer wire, adequate for future location of the pipe, shall be installed with all HDPE and PVC projects, in accordance with Section 8.09 of these Specifications.

8.05 HYDROSTATIC TESTS FOR FORCEMAIN

Old: The leakage per hour under the conditions of test shall not exceed the values shown in the following table:

<u>Size of Pipe</u>	<u>Maximum Leakage Gallions Per Hour Per 100 Joints</u>
2"	0.34
3"	0.50
4"	0.67
6"	1.00
8"	1.35
10"	1.66
12"	2.00
14"	2.34
16"	2.65
18"	3.02
20"	3.32

New: The leakage per 1,000 feet under the conditions of test shall not exceed the values shown in the following table, in accordance with AWWA Standard C600-05 for Ductile Iron and C605-05 for Plastic Pipe:

Hydrostatic testing allowance per 1,000 ft of pipeline-gph
Test Pressure 150 psi

<u>Nominal Pipe diameter</u>	<u>Maximum Leakage Gallions Per Hour Per 1,000 Feet of Pipeline</u>
6"	0.50
8"	0.66
10"	0.83
12"	0.99
14"	1.16
16"	1.32
18"	1.49
20"	1.66
24"	1.99

8.09 PIPE LOCATOR

Old: A continuous, insulated 10-gauge wire shall be laid in the trench along with the plastic pipe. Contractor shall verify continuity of the locator wire prior to acceptance by the engineer. The 10 gauge wire shall be looped at 400' intervals and installed within a tracer wire access box. This tracer wire box shall be made of cast iron with a permanently attached 3"x12" ABS tube with a flared end to secure it in the ground. It shall be tamper resistant, with a cast iron locking lid and stainless steel terminal connections on the bottom side to which the tracer wires are attached. Lid will open using a standard AWWA pentagon key. Tracer

wire access box as distributed by USA BlueBook shall be utilized or equal. Located at each tracer wire access box a flexible rebounding marking post must be installed. This marking post must be able to snap back to its normal position when hit. It must extend at least 3' above ground for visibility and have a width of 4". This flexible green rebounding marking post must have a permanent decal applied indicating "Warning Forcemain Pipeline". This marker size and type must be approved by the Township Engineer.

A 2" wide metallic lined marking tape, which meets the latest APWA specifications, similar to Seton Detection Tape Type 2 SEW, is to be installed. The detection tape shall be buried for the full length of the forcemain at a depth prescribed by the manufacturer.

New: A continuous ¼-inch diameter stainless steel cable shall be installed along with the plastic pipe for use as a locator wire on all directionally drilled projects. Contractor shall verify continuity of the locator wire prior to acceptance by the engineer. The ¼-inch stainless steel cable locator wire shall be looped at 400' intervals and installed within a tracer wire access box. This tracer wire box shall be made of cast iron with a permanently attached 3"x12" ABS tube with a flared end to secure it in the ground. It shall be tamper resistant, with a cast iron locking lid and stainless steel terminal connections on the bottom side to which the tracer wires/cables are attached. Lid will open using a standard AWWA pentagon key. Tracer wire access box as distributed by USA Blue Book shall be utilized or equal. Located at each tracer wire access box a flexible rebounding marking post must be installed. This marking post must be able to snap back to its normal position when hit. It must extend at least 3' above ground for visibility and have a width of 4". This flexible brown rebounding marking post must have a permanent decal applied indicating "Warning Forcemain Pipeline". This marker size and type must be approved by the Township Engineer.

A 2" wide metallic lined marking tape, which meets the latest APWA specifications, similar to Seton Detection Tape Type 2 SEW, will be installed in addition to the magnetic markers described above, as applicable for pipe installed by means of open excavation. The detection tape shall be buried for the full length of the forcemain at a depth prescribed by the manufacturer.

SECTION 9 - WATERMAINS AND APPURTENANCES

Updated Standards Referenced:

AWWA Standard C111-00 to C111-07
AWWA Standard C502-94 to C502-05
AWWA Standard C504-00 to C504-06
AWWA Standard C600-99 to C600-05
AWWA Standard C605-99 to C605-05
AWWA Standard C651-99 to C651-05
AWWA Standard C800-01 to C800-05
ANSI Standard A21.11-00 to A21.11-07

9.02 **MATERIALS**

A. **Pipe Materials**

2. **High Density Polyethylene Pipe**

Old: Refer to MDOT specification BJ-2D, Special Provisions for Directionally Bored Pipe.

New: Refer to MDOT specification BJ-2D, Special Provisions for Directionally Bored Pipe and MDEQ DWRP-03-009, Requirements for Use of HDPE Watermain.

F. **Fire Hydrants**

Old: 1. Hydrant barrel inside dimension to be 8-inches I.D. from top to bottom.

New: 1. Hydrant barrel inside dimension to be a minimum of 7 ¼ inches I.D. from top to bottom.

Old: 5. They shall be East Jordan Iron Works Model 5-BR Water Master, or approved equal.

New: 5. They shall be East Jordan Iron Works Model 5-BR Water Master or WaterMaster 5BR250 or approved equal.

G. **Water Service Connections**

2. **Corporation Stops**

Old: One-inch and two-inch corporation stops shall be Mueller series H-15000, or equal, for copper service pipe.

New: One-inch and two-inch corporation stops shall be ball style Mueller series B-25000 series, A.Y. McDonald 4100 series or equal, or equal, for copper service pipe.

3. **Curb Stops**

Old: Curb stops shall be Mueller Oriseal curb valves series H-15204 or equal. Curb stops shall be of the quarter turn, positive shut-off type.

New: Curb stops shall be Mueller B-25204, A.Y. McDonald 6100 or approved equal. Curb stops shall be of the quarter turn, ball style, positive shut-off type.

9.04 **SETTING HYDRANTS**

Old: Under each hydrant the ground shall be excavated to a depth of at least one (1) foot below the hydrant base and over an area approximately three (3) feet square. This excavation shall be filled up to the elevation of the hydrant base with well compacted, clean, coarse gravel or crushed stone. Refer to the standard details.

New: Deleted the sentence "This excavation shall be filled up to the elevation of the hydrant base with well compacted, clean, coarse gravel or crushed stone."

9.06 DIRECTIONALLY DRILLED WATERMAIN

A. Description

Old: This work shall consist of constructing underground crossings of a wetland using the directional drilling method of placing pipe to serve as carrier pipe. Refer to Michigan Department of Environmental Quality Water Division Procedure and Policy DWRP-03-009.

New: This work shall consist of constructing underground crossings of a wetland using the directional drilling method of placing pipe to serve as carrier pipe.

C. Materials

Old: Plastic Pipe: Section 9.02 A.2. High Density Polyethylene Pipe.

New: Plastic Pipe: Section 9.02 A.2. High Density Polyethylene Pipe or Fusible PVC C900.

9.07 ACCEPTANCE TESTING WATERMAIN

C. Hydrostatic Testing

Old: Testing allowance. No pipe installation will be accepted if the amount of makeup water is greater than that determined by the following formula:

In inch-pound units,

$$L = \frac{SD\sqrt{P}}{133,200}$$

Hydrostatic testing allowance per 1,000 ft of pipeline-gph
Test Pressure 150 psi

Nominal Pipe diameter	Maximum Leakage Gallons Per Hour Per 1,000 Feet of Pipeline
6"	0.55
8"	0.74
10"	0.92
12"	1.10
14"	1.29
16"	1.47
18"	1.66
20"	1.84
24"	2.21

New: Testing allowance. No pipe installation will be accepted if the amount of makeup water is greater than that determined by the following formula:

In inch-pound units,

$$L = \frac{SD\sqrt{P}}{148,000}$$

Hydrostatic testing allowance per 1,000 ft of pipeline-gph
Test Pressure 150 psi

Nominal Pipe diameter	Maximum Leakage Gallons Per Hour Per 1,000 Feet of Pipeline
6"	0.50
8"	0.66
10"	0.83
12"	0.99
14"	1.16
16"	1.32
18"	1.49
20"	1.66
24"	1.99

Added: 9.12 PIPE LOCATOR

A continuous ¼-inch diameter stainless steel cable shall be installed along with the plastic pipe for use as a locator wire on all directionally drilled projects. Contractor shall verify continuity of the locator wire prior to acceptance by the engineer. The ¼-inch stainless steel cable locator wire shall be looped at 400' intervals and installed within a tracer wire access box. This tracer wire box shall be made of cast iron with a permanently attached 3"x12" ABS tube with a flared end to secure it in the ground. It shall be tamper resistant, with a cast iron locking lid and stainless steel terminal connections on the bottom side to which the tracer wires/cables are attached. Lid will open using a standard AWWA pentagon key. Tracer wire access box as distributed by USA Blue Book shall be utilized or equal. Located at each tracer wire access box a flexible rebounding marking post must be installed. This marking post must be able to snap back to its normal position when hit. It must extend at least 3' above ground for visibility and have a width of 4". This flexible blue rebounding marking post must have a permanent decal applied indicating "Warning Water Main Pipeline". This marker size and type must be approved by the owner.

A 2" wide metallic lined marking tape, which meets the latest APWA specifications, similar to Seton Detection Tape Type 2 SEW, will be installed in addition to the magnetic markers described above, as applicable for pipe installed by means of open excavation. The detection tape shall be buried for the full length of the watermain at a depth prescribed by the manufacturer.

SECTION 10 - WATER WELL SUPPLY

Updated Standards Referenced:
AWWA Standard C645-97 to C654-03

Added:10.06 PRODUCTION WELL PUMP INSTALLATIONS AND START UP

A. General

All equipment shall be installed in a neat, workmanlike manner, acceptable to the Design Engineer with concurrence of the Township Engineer and in conformance with all applicable Local, State and Federal codes and requirements.

B. Systems Start Up

It shall be the Contractor's responsibility to coordinate work between his subcontractors, equipment suppliers and utility companies to insure that all components of the system function properly as described herein. When the system or a major component of the system is entirely installed and ready for testing, the Contractor shall notify the Township Engineer and operation/maintenance personnel, in writing, of the time and date the start-up testing will be done. The Contractor, subcontractor, and equipment supplier's representatives shall be present for final start-up testing. During the start-up test, the Contractor shall operate all equipment in such a manner to demonstrate that all components are functioning properly.

If the equipment fails to perform, it will be the responsibility of the Contractor to arrange for repair or replacement of the defective parts and scheduling of a new start-up session.

Should the equipment pass its initial start-up testing but fails during the one-year guarantee period, the Contractor shall coordinate the necessary repairs or replacements with the subcontractors and suppliers.

Added:10.07 ELECTRICAL WORK

A. Site Electrical Requirements

1. General

The Contractor shall supply and install all site electrical wiring and equipment necessary to operate the wells in accordance with all federal, state, and local requirements and as described in these specifications and shown on the plans.

Note: If the pump horsepower proposed by Contractor is greater than the maximum specified, then the cost to increase the electrical service of the wells shall be borne by the Contractor.

2. Contractor Responsibility

It shall be the Contractor's responsibility to have utility installations and hookups for electrical service.

Added:10.08 OPERATION AND MAINTENANCE INSTRUCTIONS

Written instructions for the operation and maintenance of the production well pumps and associated equipment shall be furnished in quadruplicate for each piece of equipment in this section. The instructions shall be easy to understand with directions specifically written for this project describing the various possible methods of operating the equipment.

The instructions shall include procedures for tests required, pump curves, adjustments to be made, and trouble and safety precautions to be taken with the equipment.

Maintenance instructions shall include test and calibration charts, exploded views of assembled components, spare parts lists and wiring diagrams.

These instructions shall be submitted to the Design Engineer and Township Engineer for approval at the same time the shop drawings are submitted.

Added:10.09 RECORD DRAWINGS

Any changes that are made in equipment, wiring, etc. from that shown in the plans and specifications shall be made only by approved shop drawings. After such changes are made, the Contractor shall submit to the Design Engineer and Township Engineer, record drawings which show these changes in equipment installation. Contractor shall supply "record" electrical schematic drawing to Design Engineer to be included in final close-out package delivered to the Township.

Added:10.10 GUARANTEE

The Contractor shall furnish a manufacturer's guarantee covering all material and equipment that he furnishes. He shall guarantee his workmanship and material for a period of one year from the date of acceptance. Such guarantee shall provide for the replacement of defective workmanship, together with the restoration of any related materials or workmanship that are disturbed as a result of such imperfections in the work. All such replacements or repairs shall be done without expense to the Owner. All guarantees shall be in written form and submitted to the Owner in triplicate.

SECTION 11 - WELL HOUSE EQUIPMENT

Updated Standards Referenced:
AWWA Standard C651-99 to C651-05

11.02 PIPING AND FITTINGS

C. Materials

Added: 4. Brass Pipe and Fittings: Conform to current ASTM Standards.

Added: 9. Pressure Gauges

The gauges shall be 3-inch diameter (minimum) and read pump discharge pressure in "feet of water". Liquid filled gauges shall incorporate a flexible diaphragm seal between the water discharge line and the pressure gauge. The diaphragm seal shall be either the inline-saddle type design with a minimum diaphragm surface of five (5) square inches or the complete flow-thru type design with flange connection. Inline-saddle diaphragms and housing parts exposed to the water shall be 316 ss. The flexible cylinder protecting the sensing liquid on the flow-thru design shall be Buna N and the flanges shall be 316 ss. The inside diameter of the flow-thru assembly shall be the same as the adjacent discharge piping. Use Model R or RP by Ametek, Model Iso-Spool (flanged) or Iso-Ring (wafer) by Ronninger-Peter or equal. Gauge shall be mounted on a tap equipped with a valve to allow complete isolation and removal of the gauge without wellhouse shut down.

Deleted: E. Pipe Taps

Wherever indicated or required, pipe or fittings shall be tapped to receive a small pipe or special fittings.

Added: 11.07 ELECTRICAL WORK

A. Factory Wiring and Equipment

1. General

The wellhouse control panel shall be completely wired in accordance with National Electrical Code and carry an Underwriters Laboratory certification. It shall be adjusted and ready for operation. All wiring in the panel shall be color coded and numbered as indicated on the wiring diagram portion of the shop drawings. All wiring outside the panel shall be in rigid conduit. It is the Contractor's responsibility to ensure that electrical equipment complies with all federal, state, and local requirements.

(A large, clear, color coded and numbered wiring diagram shall be provided in triplicate with each unit. Wiring diagram shall comply with the latest Township requirements).

2. Control Panel

The control panel shall include a circuit breaker and magnetic starter for each pump motor. The magnetic starters shall be Square "D" and have thermal overload protection on all three phases. The control assembly shall provide a convenient means to operate each pump manually or automatically. When operated in the automatic mode, the control assembly shall automatically alternate the position of the "lead" and "lag" pumps after each pumping cycle.

Control panel shall be equipped with a step-down transformer to supply 120/240 volts for control and auxiliary circuits, as applicable. Primary side of auxiliary power transformers shall be protected by a thermal/magnetic air circuit breaker specifically sized to meet power requirements of the transformer. A 120-volt, 20-amp, duplex receptacle shall be provided with ground fault circuit interruption.

Pump run indicator lights shall be mounted on the control panel.

The control panel shall also incorporate an hour meter to register the elapsed running time for each pump. Meters shall be resettable and utilize a digital readout.

A time delay relay shall be provided for the pump motor controls to insure that both motors will not start at the same time.

Controls for the pump motors shall be designed to protect the electric motors from low line voltage, single phase start-up and phase reversal. A phase sequence and under voltage relay shall be installed in the control panel. The unit shall be connected to the wellhouse alarm circuitry to provide a 0.5 second time delay to prevent nuisance tripping of the relay caused by a momentary transient drop in the line voltage. Upon resumption of normal line conditions, the unit shall automatically restore the motors to a running condition.

3. Alarm Contacts for Rapid Telemetry (or Alarm Monitoring) and Exterior Alarm Light

The wellhouse shall be provided with alarm contacts terminal board control panel by the control panel manufacturer for energizing of the telemetering relays.

- a. Telemetering (dry) contacts shall be provided for the following conditions:
 1. Well Pump No. 1 on.*
 2. Well Pump No. 2 on.*
 3. Low pressure.
 4. High pressure.
 5. Power Failure

6. Security.
7. Flow meter.

*Additional contacts shall be installed for additional wells.

4. Telemetry Equipment

Telemetry equipment will be supplied and installed by the agency performing operation and maintenance for the facility. Battery back-up must be included.

5. Temporary Power Supply

The wellhouse shall be provided with a means to accommodate temporary power supply including transfer switch. The type of power supply (permanent or portable power generation) shall be dependant upon wellhouse size and importance and shall be determined by the Township. It is the Contractor's responsibility to ensure that equipment is properly sized for electrical loads into wellhouse, compatibility with Grand Traverse County DPW equipment, and complies with all federal, state, and local requirements.

B. Site Electrical Requirements

1. General

The Contractor shall supply and install all site electrical wiring and equipment necessary to operate the wellhouse in accordance with all federal, state, and local requirements and as described in these specifications and shown on the plans.

2. Contractor Responsibility

It shall be the Contractor's responsibility to have utility installations and hookups for electrical service.

11.09 SHOP DRAWINGS

Added: B. A large, clear, color coded and numbered wiring diagram shall be prepared showing the as-built wiring of the complete wellhouse installation including all control and alarm wiring. Provide four (4) copies.

Added: 11.10 OPERATION AND MAINTENANCE INSTRUCTIONS

Written instructions for the operation and maintenance of the wellhouse equipment shall be furnished in quadruplicate for each piece of

equipment in this section. The instructions shall be easy to understand with directions specifically written for this project describing the various possible methods of operating the equipment.

The instructions shall include procedures for tests required, pump curves, adjustments to be made, and trouble and safety precautions to be taken with the equipment.

Maintenance instructions shall include test and calibration charts, exploded views of assembled components, spare parts lists and wiring diagrams.

These instructions shall be submitted to the Design Engineer and Township Engineer for approval at the same time the shop drawings are submitted.

SECTION 12 - SUBMERSIBLE SEWAGE PUMPING STATION

12.03 SUBMERSIBLE SEWAGE PUMPS

L. Spare Pump and Motor

Added: Additionally one spare mechanical seal kit and wear rings per pump shall be provided.

12.04 WET WELL

A. General

Added: 2. A pump station module, one piece molded fiberglass product mounted to a concrete wet well may be used as a substitution to the field built pump station, as approved by the Township. The module shall conform to all applicable Grand Traverse County Standards and include:

- a. Wet well access compartment
- b. Valve vault compartment

12.05 PUMPING STATION PIPING, VALVES AND FITTINGS

A. The piping shall conform to the sizes and configurations shown on the plans and the following materials specifications.

Added: 4. Brass Pipe and Fittings: Conform to current ASTM Standards.

B. Installation of Piping, Valves and Fittings

Old: 2. Galvanized or Wrought Iron Piping

Galvanized steel pipe fittings shall be used for all interior piping less than 4 inches in diameter.

New: 2. Galvanized Steel Pipe and Fittings shall be used for all interior piping less than 4 inches in diameter or as approved by the Township Engineer.

Deleted: 3. Pipe Taps

Wherever indicated or required, pipe or fittings shall be tapped to receive small pipe or special fittings.

12.06 SEWAGE FLOW METER

A. Scope of Work

Old: The flow meter must be suitable for use in NEC, Class 1, and Division 1 locations.

The ultrasonic level measuring device shall be capable of providing pump on/off signals to the control panel and be manufactured by Milltronics.

New: The flow meter must be suitable for use in NEC, Class 1, and Division 1 locations and be UL listed.

The ultrasonic level measuring device shall be capable of providing pump on/off signals to the control panel and be manufactured by Drexelbrook or ABB.

12.07 ELECTRICAL WORK

A. Factory Wiring and Equipment

2. Pump Motors

Old: The motors shall have squirrel cage windings and rated at 240 volts, 60 cycle, 3 phase and shall be NEMA Code "G" design or better.

New: The motors shall have squirrel cage windings and rated at 240 or 460 volts, 60 cycle, 3 phase and shall be NEMA Code "G" design or better.

Added: 7. Temporary Power Supply

The lift station shall be provided with a means to accommodate temporary power supply including transfer switch. The type of power supply (permanent or portable power generation) shall be dependant upon lift station size and importance and shall be determined by the Township. It is the Contractor's responsibility to ensure that equipment is properly sized for electrical loads into wellhouse, compatibility with Grand Traverse County DPW equipment, and complies with all federal, state, and local requirements.

SECTION 13 - REPLACEMENT AND CLEANUP

No Changes Made

SECTION 14 - PRESSURE REDUCING VALVE STATION EQUIPMENT

No Changes Made

SECTION 15 - SUPPLEMENTAL TECHNICAL SPECIFICATIONS
No Changes Made