



Request For Proposal

Grand Traverse County Board of Public Works Crown Booster Station Abandonment (Garfield Township) Request For Proposal (RFP)

Proposals Due:

10:00 AM, Friday, February 2, 2024

Sealed Proposals shall be Delivered and/or Mailed to:

Crown Booster Station Abandonment Proposal
Grand Traverse County
2650 LaFranier Road
Traverse City, MI 49686
Attn: John Divozzo, Director
jdivozzo@grand-traverse.org
Phone: 231-995-6039
Fax: 231-929-7226

Address Questions to:

GFA
Jennifer Graham (Hodges), P.E. (Engineer)
123 West Front Street
Traverse City, MI 49684
Email: jennifer@gfa.tc
Phone: 231-946-5874
Fax: 231-946-3703

General Scope:

The DPW is requesting proposals to provide services to facilitate the removal and abandonment of the existing Crown Booster Station located at 2400 East Crown Drive, Traverse City. The station is a prepackage unit that is to be salvaged and relocated to DPW Building located on Welch Court, Traverse City with this project.

Requirements - General:

- Work must comply with all applicable laws, regulations
- All labor and materials shall be installed compliant with Township, DPW and manufacturer's recommendations.
- Contractor shall be responsible for obtaining all local regulatory permits, completing inspections and payment of all associated fees which include but are not limited to County Soil Erosion Control and Township Building Code for Demolition.
- Provide, a one (1) year full labor and material warranty on all workmanship, material and equipment furnished for this project.
- It is strongly recommended that you make a site visit and perform an evaluation of the existing conditions and proposed scope of work. Coordinate with the DPW for site access:
 - Kent Nothstine, DPW Manager: (231) 493-2994



Terms of Agreement:

General:

- To hold bid open for 60 consecutive calendar days from the bid due date
- To enter into and execute a contract with the Grand Traverse County Board of Public Works.

Insurance:

- Contractor will have Worker's Compensation Insurance in limits required by state law and Comprehensive General Liability Insurance coverage in force for all of its operations under this contract.

Bonds:

- The Contractor shall include in the proposal price the cost to provide the following:
 - Maintenance and Guarantee Bond in the amount of 50% of the proposal amount, guarantying for a period of one (1) year from final acceptance of the project work
 - Letter of Surety, licensed to business in the State of Michigan, stating ability to obtain a Performance Bond, and Labor and Material Bond for 100% of the proposal amount.

Schedule:

- To be completed by May 1, 2024
- All work must be completed within twenty (20) calendar days from the beginning of removal to final clean up. Delays by inclement weather shall be approved by the DPW manager.

Services/Materials to be Provided:

Contractor shall provide all equipment and materials necessary to complete the work described herein. The Contractor shall provide a detailed summary of the equipment and services to be provided. The scope of work shall include but shall not be limited to the following:

General:

- Removal of Booster Station, associated piping, and appurtenances including electrical control panel, concrete foundation pad, anchors, bolts etc. as to facilitate the removal and salvage of the existing booster station in accordance with the attached plans and specifications.
 - All items noted to be salvaged on plans and specifications are to be transported, at contractors expense, to DPW storage facility located on Welch Court, coordinate all work with DPW. All licensing and permits required for transport are the responsibility of contractor.
- Disconnect and decommission existing electrical including transformer, meter, wiring, conduit, and concrete pad (as applicable). Coordinate all work with Consumers Energy.
- Contractor shall be responsible to conduct field exploration to verify all conditions prior to beginning work.
 - All work shall remain within confines of existing West Crown Drive ROW and existing 55'x10' easement. All staging, storage and equipment shall remain within the limits of this ROW.
- Disconnect and decommission existing SCADA including radio, antenna, coax and controls as applicable. Coordinate all work with Topline Electric (Steve King, 231-590-0005).
- Complete Miss Dig prior to any underground excavation.



- Mobilization, demolition, offsite disposal, offsite transportation of salvaged equipment, restoration, and cleanup per the attached drawings be included.
- Disposal of existing equipment to be removed at the direction of the DPW.
- Coordination of delivery and unloading of materials
- Traffic Control and property owner coordination related to driveway access.

Services / Materials Not To Be Included:

- Site accessibility and potable water supply (provided by owner).
- Contractor shall be responsible to coordinate and provide construction schedule and minimum 24 hour notice before completing work.

Contractors Proposal Form

Bidders are instructed to submit bids for this project on a unit cost basis as stated in the Proposal. All labor, materials and equipment are considered incidental and to be included in total bid price. All work shall be in compliance with bid drawings and specifications, terms identified in the RFP and applicable laws.

No.	Item	Unit	Est. Qty.	Unit Price	Item Cost
1	Mobilization	LS	1		
2	Traffic Control	LS	1		
3	Field Exploration	LS	1		
4	Booster Station Abandonment	LS	1		
5	Electrical & SCADA Service Abandonment	LS	1		
6	Cut & Cap Watermain, 8"	EA	2		
7	Site Removals & Restoration	LS	1		
				TOTAL BID	



Bidders Signature

Printed Name:

Business Name:

Address:

MI Contractor License No.:

Telephone:

Email:

The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any / all bids if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the work as requested.

Grand Traverse County Board of Public Works reserves the right to accept or reject any or all proposals.

SECTION 1

GENERAL REQUIREMENTS

1.01 PROJECT DESCRIPTION

Work includes the following major items:

Removal and abandonment of the existing Crown Booster Station and accessories.

1.02 DEFINITIONS

The intent of this section is to identify certain persons involved in the project.

DPW	The agency performing the system operations and maintenance typically identified as a Department of Public Works.
Township Engineer	Engineer whose services are procured by the Township to review sanitary sewage and/or water system plans and installation methods. When the Township is the owner, the engineer will function as the owner's engineer.
Design or Owner's Engineer	Engineer who provided the sanitary sewage and/or water system design, plans and specifications for the owner.
Owner	Project developer or Township who is having sanitary sewage and/or water facilities installed.
Contractor	Contractor is prime Contractor who is so identified by the Owner and is responsible for the sanitary sewage and/or water system facilities installation.
Township	The governing Township (Acme, East Bay, Garfield, Peninsula, Elmwood) that the work is being performed in.

1.03 PRECONSTRUCTION CONFERENCE

Prior to commencement of any construction activities involving the sanitary sewer system and/or water system, a principal member representing the Owner, the Contractor, the Design Engineer, the Township Engineer and the County DPW shall meet at a pre-determined location and time to discuss the project. It shall be the responsibility of the Owner or his/her Design Engineer to organize this meeting. At that time, the Contractor schedule, as well as the Township Engineer's requirements, will be discussed to obtain a mutual understanding of the project and the Township's inspection process.

1.04 LINES AND GRADES FOR CONSTRUCTION

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

1.05 PROGRESS SCHEDULE

The Owner shall, as soon as practical, prepare and submit to the Township Engineer three (3) copies of the Progress Schedule regarding sanitary sewer and/or water main construction. This schedule shall show in a clear, graphical manner the proposed date for commencement, progress and completion of the work.

1.06 INTERFERENCE WITH EXISTING SEWAGE TREATMENT WORKS

No bypassing of untreated sewage will be allowed during the construction of this project. The Contractor shall provide a plan of work to the Township Engineer for approval before starting work on any phases of the project which might involve existing sewage facilities.

1.07 RELATIONS TO OTHER CONTRACTORS AND UTILITY FORCES

The Contractor shall so conduct his operations as not to interfere with or injure the work of other contractors or adjacent force account work, and he shall promptly make good any injury or damage which may be done to such work by him or his employees or agents.

The Contractor shall grant to other contractors and forces necessary means of access to their work.

1.08 PERMITTING AGENCIES

The Contractor shall perform all work in accordance with any and all applicable permit requirements. The Owner or his Design Engineer shall present the Township Engineer with a copy of all documentation and calculations for the permit process. The Township, with the assistance of the Township Engineer, will obtain the necessary permit for construction/installation prior to commencement of any work.

1.09 ACCESS TO WORK

The Township Engineer or Township Resident Project Representative shall have access maintained to all sanitary sewer or water main work at all times. Proper notification (48 hours) shall be given to the Township Engineer prior to the start of any construction or testing.

1.10 SHOP DRAWINGS

Shop drawings of all equipment shall be issued to the Design Engineer during the shop drawing review stage for his approval. The Design Engineer shall forward these to the Township Engineer for his review regarding compliance with the Township requirements. The Township Engineer will not perform a technical review. That shall remain the responsibility of the Design Engineer. The Contractor should supply copies* of all equipment shop drawings to the Design Engineer. Final record shop drawings shall be issued to the Township Engineer as part of the close-out procedure in accordance with the close-out section of these specifications. *Digital or hard copies are acceptable, as coordinated with Design/Township Engineer.

1.11 STREAM CROSSINGS

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

1.12 DUST AND NOISE REDUCTION

The Contractor shall keep dust and noise from construction operations to a minimum. A dust palliative shall be used on disturbed road sections prior to surfacing if so determined by the Township Engineer.

1.13 MATERIAL CERTIFICATION

Manufacturer's certification slips shall be submitted to the Township Engineer for all pipe, manholes, fittings, etc. used in the installation of sanitary sewer or water mains. This is to verify that the product meets applicable standard specifications required.

1.14 MAINTENANCE BOND REQUIREMENTS

The Contractor shall supply the Owner and Township with a maintenance bond for 50% of the cost of the installation of the sanitary sewer and/or water system that is to be turned over to the Township. The maintenance bond shall be effective from the date of Township acceptance for a period of one (1) year.

1.15 INSURANCE REQUIREMENTS

Where the contract involves construction in a public right-of-way, the Contractor shall provide proof of insurance in the type and amounts required by the Township prior to start of the construction. In addition to the Township, the Grand Traverse County DPW and Township Engineer shall be named as additional insured.

1.16 ESCROW FOR TELEMETRY REQUIREMENTS

When telemetry equipment is required, the owner of the project will be required to provide an account above and beyond the construction contract price in the amount of \$10,500.00 for standard telemetry equipment. This equipment will be integrated into the Grand Traverse County DPW network of monitoring systems. The types of units this may apply to include submersible lift stations, well houses, water booster stations, and pressure reducing valve vaults.

STANDARDS AND REGULATIONS

2.01 REFERENCE STANDARDS

- A. Throughout these specifications, reference is made to various standard specifications. Such reference gives the serial designation. The latest revised specification shall apply in all cases. These standard specifications, where applicable, shall be binding on all construction activities.
- B. 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 Society of Mechanical Engineers	(ASME)
American Concrete Institute	(ACI)
National Concrete Masonry Association	(NCMA)
Truss Plate Institute	(TPI)
National Electrical Code	(NEC)
MI Dept of Environment, Great Lakes, & Energy	(EGLE)
National Fire Code	(NFC)
Underwriters Laboratories	(UL)
National Sanitation Foundation	(NSF)

2.02 REGULATORY REQUIREMENTS

- A. All construction work, alterations, repairs or mechanical installations and appliances connected herewith shall comply with all the State Rules and Regulations and local ordinances and such other statutory provisions pertaining to this class of work. Such Rules and Regulations and local ordinances are to be considered a part of these specifications by reference.
- B. All electrical work shall be in accordance with the latest edition of the National Electrical Code, the National Electrical Safety Code and applicable state and local codes. This shall not be construed to permit a lower grade of construction where the plans and specifications require workmanship or materials in excess of code requirements. All electrical equipment, wiring, cable, pre-assembled electrical panels, and materials shall be listed by Underwriters Laboratories, Inc.

3.01 CLEANUP

Before final acceptance of the sanitary sewer system or water main system work, the Contractor shall remove all false work, excavated or useless materials, and rubbish, and restore to presentable condition per the restoration specifications and satisfactory to the Township Engineer, all property, both public and private, which may have been used or damaged during the installation of the sanitary sewer or water system work.

3.02 OPERATING AND MAINTENANCE DATA

The Contractor shall furnish written instructions for the operation and maintenance of the equipment furnished at the time of submittal of shop drawings. The instructions shall be short, 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, adjustments to be made and safety precautions to be taken with the equipment. Maintenance instructions shall include test and calibration charts, exploded views of assembled components and spare parts lists. At least four (4) and one (1) copy on CD instruction booklets shall be furnished for each separate piece of equipment. These shall be transmitted to the Township Engineer as part of the close out of the project. Record drawings (1 set of paper copy (24" x 36"), one (1) digital copy and one (1) in pdf and AutoCad / ArcView GIS format) shall be submitted to the Township along with hydrant and valve reports, water service lead reports, and sanitary sewer lead reports, as applicable to the project.

A. Pumps

Include the manufacturer's technical specification of the pump along with the application for the pump, the manufacturer's warranty certificate, installation instructions, serial numbers for all pumps, pump performance curve, pump trouble shooting guide and the pump efficiency rating.

B. Control Panel Operation and Maintenance Manual

Include the electrical panel legend, bill of material report, catalog cut sheets indicating make and model of all general accessories, installation instructions for the control panel, recommended spare parts, installation instructions for general accessories and a maintenance frequency chart.

C. Electrical Wiring

A color coded drawing of the as-installed electrical schematic shall be submitted for all electrical work performed as part of the project.

3.03 GUARANTEE

The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of Township Acceptance. The Contractor shall warrant and guarantee for a period of one (1) year from the date of Township Acceptance of the system that the completed system is free from all defects due to faulty materials or workmanship. The Contractor shall promptly make such corrections, as may be necessary including the repairs of any damage to other parts of the system resulting from such defects. The Owner or Township, if they have taken over the system, will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner or Township may do so and charge the Contractor the cost thereby incurred. Refer to the form Letter of Guarantee to be included with final close-out documents.

The Contractor shall supply a one (1) year maintenance bond per the "General" section of these specifications.

3.04 FINAL COMPLETION/ACCEPTANCE OF PROJECT BY TOWNSHIP

A. Township Projects

Final payment will not be made to the Contractor until all close out documents have been received and approved by the Township Engineer. These items are listed in Section 3.04.C

B. Private Projects

The Township will not accept the facility or allow connections to or use of the facilities until all close out documents have been received and approved by the Township Engineer. These items are listed in Section 3.04.C

C. Closeout Documents (As applicable)

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.

8. Water Service Lead Reports.
9. Water Valve Reports.
10. Hydrant Reports.
11. Operation and Maintenance Manuals
12. Record Drawings
- 12A. Record Drawings (as-constructed) must include a paper copy (24" x 36") 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. AutoCAD (.DWG) release 2004 or higher
- b. ArcView GIS format (.SHP)

All digital record drawings must be submitted utilizing the appropriate Michigan State Plane coordinate system (i.e. NAD 1983 State Plane Michigan Central). No local coordinate systems are allowed.

- 12B. Record Drawings: Record drawings shall consist of plan and profile. Sanitary sewer leads and water service leads shall be re-drawn in the new location along with the mainline structures and piping. Hydrant, valve and manhole numbering sequences shall be obtained from the Township Engineer. Each structure installed, such as manholes, water service leads, hydrants, valves, sewer leads, bends, tees, or other structures placed shall have 3 physical measurements from structures which are to be shown on the plans along with survey and/or gps coordinates and elevations. Lead measurements are to be placed on the individual reports. Survey and/or gps information shall be included in the digital record drawing or provided in shapefile format. Sanitary sewer profiles shall include manhole number, rim and invert elevations, distances between structures, size and type of pipe. Water main profiles shall include hydrant and valve number and rim elevations, all fittings, horizontal/vertical, and the accurate depth of placement. All profiles shall show conflict with existing utilities. Sanitary sewer lead and water service lead information shall be placed in a table format on the record drawings. Each plan sheet shall have a separate table for the type of lead shown on that sheet. See Table 3.1 and Table 3.2 for examples.

Table 3.1

SECTION 3
PROJECT CLOSE OUT

SEWER LEAD NUMBER	DISTANCE FROM DOWNSTREAM MANHOLE	DISTANCE FROM SEWER TO END OF LEAD AT PROPERTY LINE OR EASEMENT LINE	DEPTH BELOW GRADE

Table 3.2

WATER SERVICE LEAD NUMBER	DISTANCE FROM GATE VALVE OR FIRE HYDRANT. INCLUDE VALVE OR HYDRANT NUMBERS.	DISTANCE FROM WATER MAIN TO END OF LEAD AT PROPERTY LINE OR EASEMENT LINE	CURB STOP RIM ELEVATION	CURB STOP COORDINATES

GRAND TRAVERSE COUNTY

WATER/SEWER SYSTEM CLOSEOUT CHECKLIST

Section 3 of the current specifications outline in detail the information to be submitted for close out of the project. The following checklist is being provided as a convenience to the developer completing the project and does not relieve the developer from reviewing the appropriate section (s) in the specifications.

Check If Completed:

Letter of Guarantee (see attached format)	
1-Year Maintenance Bond Valid for 1-Year from Township Acceptance of System	
Material Certifications	
Shop Drawings	
Letter from Developer Outlining Project Costs (Including permitting, engineering and Construction (without service leads)	
Affidavit of Completion/Consent of Surety (See attached format)	
Inspector Daily Reports	
Description of facilities for a Bill of Sale	
Certification of Acceptance by Developer or Developer's Engineering Reviewing Installation	
Water Service Lead Reports	
Water Valve Reports	
Fire Hydrant Reports	
Sanitary Sewer Lead Reports	
Operation and Maintenance Manuals (if applicable)	
Water Main Pressure Test Results	
Water Sample Analytical Results	
Survey Field Notes	
Electronic Copy of Record Drawings in AutoCAD .dwg or Arcview GIS and .pdf Formats (See Section 3 of specification for additional requirements)	
Paper Copy of Record Drawings (See Section 3 of specification for additional requirements)	
Easement Descriptions	
Sanitary Sewer Mandrel Test Results	
Sanitary Sewer Air Test Results	

EXCAVATION, TRENCHING AND BACKFILLING

4.01 SCOPE OF WORK

The work covered by this section shall consist of furnishing all materials, equipment and labor for the excavating, trenching, backfilling, and bore and jack required to install or repair sanitary sewers, water mains and other structures as shown on the plans and referred to in these specifications.

4.02 MATERIALS

A. Backfill Material

All backfill material shall be free from cinders, ashes, refuse, sod, frozen lumps, vegetable or organic material, boulders, rocks or stones or other material which, in the opinion of the Design Engineer, is unsuitable. However, from one foot above the top of the pipe to the subgrade of the pavement, material containing stones up to three (3) inches in their greatest dimension may be used.

Where the type of backfill material is not specified, the Contractor may backfill with the excavated material provided that such material meets the requirements described above. Where excavated material is to be used for backfill and there is a deficiency due to a rejection of part thereof, the Contractor shall furnish the required amount of sand, gravel or other approved material at no additional cost.

B. Bore and Jack Materials

1. Steel Pipe

Jacked in place steel pipe shall meet the requirements of either ASTM A53, Type E or S, Grade B or ASTM A139, Grade B.

The ends of all steel pipe to be jacked shall be prepared for field welding at joints.

The nominal outside diameter and minimum wall thicknesses of steel pipe to be jacked in place shall be as shown below. Minimum wall thickness for railroad crossings may be reduced by 0.063 inch if cathodic protection is provided per railroad specifications.

Nominal Size	Nominal Outside Diameter (inches)	Minimum Wall Thickness Required (inches)	
		M.D.O.T.	Railroads
2"	2.375	0.154	0.251
4"	4.500	0.188	0.251
6"	6.625	0.188	0.251
8"	8.625	0.188	0.251
10"	10.750	0.188	0.251
12"	12.750	0.188	0.251
14"	14.000	0.250	0.282
16"	16.000	0.250	0.282
18"	18.000	0.250	0.313
20"	20.000	0.250	0.344
22"	22.000	0.250	0.375
24"	24.000	0.250	0.407
26"	26.000	0.312	0.438
28"	28.000	0.312	0.469
30"	30.000	0.312	0.469
34"	34.000	0.312	0.532

2. Grout:

Grout shall consist of a mixture of Portland cement and sand in any proportion which does not have more than 50 percent sand by volume.

C. Directional Drill Materials

1. Refer to Sections 8 and 9.

4.03 EXECUTION

A. Excavation

Excavation includes clearing the site of the proposed work and removal of all materials to a depth which is sufficient to permit the construction of the structure or utility in accordance with the plans. Excavated materials may be temporarily stored along the trench in a manner that will not cause damage to trees, shrubbery, or other properties and that will not endanger the banks of the trench by imposing too great a load thereon.

B. Length and Width of Trench

Not more than 200 feet of open trench will be permitted at a time without approval from the Design Engineer and Township Engineer, unless

pedestrian bridges are maintained at 200-foot intervals and vehicular crossings of at least one lane are maintained at 300 foot intervals.

Streets shall not be completely blocked without written permission from the Design Engineer and roadway officials. All fire alarm boxes and fire hydrants must be kept clear and accessible at all times.

The width of the trench shall be ample to permit the pipe to be laid and joined properly and the backfill to be placed and compacted as specified.

In order to limit excessive loads on the pipe, the maximum width of trench shall not be more than two feet greater than the nominal inside diameter of the pipe. This limitation shall apply to the width of the trench at the top of the pipe. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting and bracing and handling of special conditions.

C. Bracing, Sheeting and Shoring

Open cut trenches shall be sheeted and braced as required by any governing federal or state laws and municipal ordinances and as may be necessary to protect life, property or the work. When close sheeting is required, it shall be so driven as to prevent adjacent soil from entering the trench either below or through such sheeting. Where sheeting and bracing are used, the trench width shall be increased accordingly. An approved pipe laying trench box may be used in lieu of sheeting where safety of the workmen and/or protection of the work is the sole consideration, if allowed by governing authorities.

Sheeting and bracing left in place must be removed for a depth of three (3) feet below the established finish grade or the existing surface, whichever is lower.

Trench bracing, except that which must be left in place, may be removed when the backfilling has reached the respective levels of such bracing. Sheeting, except that which has been ordered left in place, shall be removed as the backfilling progresses.

D. Dewatering

The Contractor shall provide and maintain adequate dewatering facilities for removal and disposal of water from trenches or other excavations. The Contractor shall provide dewatering facilities for bulkheaded sewer sections and shall operate same until bulkheads have been removed or construction is completed, if bulkheads are to be left in place. The dewatering system must be maintained until the pipe has been covered with sufficient backfill material to prevent floating of the installed pipe sections.

Where work is in ground containing an excessive amount of water, the Contractor shall provide, install and maintain a suitable dewatering system and shall so operate it to insure proper construction of the work. Monitoring wells shall be provided as necessary to determine the groundwater levels along the alignment and shaft locations. The determination of whether an excessive groundwater condition exists, that is, or might be detrimental to the sewer or water main construction will be made by the Design Engineer. Proper disposal of the dewatering discharge (necessary easements, permits, erosion control, etc.) shall be the responsibility of the Contractor. Dewatering operations shall conform to the requirements of all federal, state, and local agencies having jurisdiction. Dewatering water discharged to streams, drains or sewers may require permits from federal, state or local agencies having jurisdiction. The CONTRACTOR shall comply with all water quality requirements prior to discharging dewatering water. The CONTRACTOR shall be responsible for all testing and treatment required to meet water quality requirements prior to discharge. CONTRACTOR must take all steps necessary, during dewatering, to protect surrounding property and adjacent buildings, private water supplies, roads, drains, sewers, structures and appurtenances. Adequate measures shall be taken to protect such property and construction from the effects of the dewatering operations. Contractor shall not discharge or allow any groundwater to enter existing sanitary sewage system. Any water which does enter the existing sewage system shall be the Contractor's responsibility and he will pay any and all transporting and treatment costs involved with this water according to the local municipal authority. Cost of pumping, bailing and draining shall be incidental to and included in the price of the pipe or structure placed in the excavation.

E. Excavation to Grade

The trench shall be excavated to the depth required so as to provide a uniform and continuous bearing and support for the pipe barrel. The Contractor shall excavate the last four inches of depth to grade using hand tools.

Any part of the bottom of the trench excavated below the specified grade shall be refilled with approved materials and thoroughly compacted to a minimum of 95% of the maximum dry density as determined by ASTM D698 or the Michigan Cone Method. The finished subgrade shall be prepared accurately by means of hand tools. Blocking to bring the pipe to grade will not be permitted. Bell holes in the subgrade must be provided to allow for continuous support of the pipe barrel when bell type pipe is used.

If, in the opinion of the Design Engineer (with concurrence of the Township Engineer), subgrade pipe support conditions at some locations are found to be unsatisfactory, they shall have the authority to order subgrade

preparation at these locations in accordance with the provisions for special foundations in clay, rock or poor soils.

F. Special Foundation in Clay or Rock

Subgrade consisting of clay or rock shall be excavated to at least four inches and not more than six (6) inches below the specified grade. Before the pipe is laid, the subgrade shall be prepared by backfilling with an approved granular material in three inch compacted layers. The layers shall be thoroughly tamped as directed by the Design Engineer so as to provide a uniform and continuous bearing and support for the pipe barrel with a minimum compaction of 95% of the herein defined maximum dry density. The Contractor will not be allowed extra compensation for this work.

G. Special Foundations in Poor Soil

Where the bottom of the trench at subgrade is found to consist of unstable material which will, in the opinion of the Design Engineer, not provide adequate pipe support, the Design Engineer shall have authority to require either the removal of the unstable material and replacement with approved materials or require the Contractor to construct a foundation for the pipe consisting of piling timber or other materials in accordance with plans prepared by the Design Engineer. The use of stone bedding by the Contractor to reduce dewatering requirements will not be paid as an extra.

H. Backfilling around Pipes

From the bottom of the trench to a depth of one (1) foot above the top of the pipe, the trench shall be backfilled by hand with sand or approved excavated materials and tamped to a minimum of 95% of the herein defined maximum dry density.

The Contractor shall use care in placing this portion of the backfill to make sure sufficient material has been worked under the pipe and also avoid damaging or moving the pipe. Backfilling around PVC pipe shall be done in accordance with ASTM D2321 "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe".

I. Backfilling to Natural Grade

From one (1) foot above the pipe to the grade shown on the drawing or specified herein, the trench shall be backfilled by mechanical methods approved by the Design Engineer. A minimum compaction of 85% of maximum unit weight is required, unless otherwise noted.

Provide 30 inches of cover above the top of the pipe before application of wheel loading and 48 inches before use of heavy compactors.

J. Backfill under Structures

Where the excavation is made through or under existing or proposed pavement, curb, shoulders, driveways or sidewalks or where such structures are undercut by the excavation or where noted on the plans, the entire backfill to the subgrade of the structure shall be made with granular material. The granular material backfill shall be placed in layers and compacted to 95% of the herein defined maximum dry density throughout. This requirement shall apply to any trench that is within a one-on-three slope beneath the road from the shoulder point or back of curb line. Extra compensation will not be allowed for this work.

Granular material is defined as a material meeting granular material Class II as defined in M.D.O.T. Standard Specifications.

K. Special Backfilling Requirements

The Contractor will be required to comply with the regulations of the State Highway, Municipal or County Road Engineering Departments with regard to backfilling in their respective right-of-ways and beneath the roads, and shall be responsible for determining these regulations prior to bidding.

L. Compaction Testing

Compaction testing may be periodically performed by a source and method approved by the Township Engineer to insure that compaction requirements are being met. Compaction percentage is based on the maximum dry density as determined by ASTM D698 or the Michigan Cone Method.

M. Boring and Jacking

The following provisions apply to the construction of sewers, force mains, water mains and house leads which cross pavements under the control of the Michigan Department of Transportation, County Road Commission, or under railroads.

1. General

Steel pipes shall be jacked in place under highways as specified in the current standards published by the Michigan Department of Transportation. Pipe jacked in place under railroads shall meet the current standards established by the affected railroad. The Design Engineer shall incorporate bore and jack requirements into the contract documents. After the pipe has been installed in the steel casing pipe, the casing pipe shall be pressure grouted with an MDOT

approved flowable fill or blown full of pea stone and the ends sealed with concrete.

2. Location of Jacking Pits:

a. State Highways

The minimum distance of the jacking pit to the edge of pavement will be specified by the M.D.O.T. and placed on the plans or contract documents by the Design Engineer.

b. County Roads

On all highways, a minimum distance of 15 feet shall be provided from edge of pavement to the face of boring pits. Any variances from these distances will require tight sheeting and if a traffic hazard, permanent guard rail will be required.

c. Railroads

The location of the jacking pit will be specified by the Railroad and/or the Design Engineer.

3. The boring machine shall be capable of assuring a crossing with no voids.

a. In solid clay soils the cutting head or the auger, if no head is used, may be allowed to within one inch of the front of the casing.

b. In sandy soils the cutting head or the auger, if no head is used, must be inside the casing at least 1/2 the diameter of the casing.

c. If the soil is both clay and sand, the same procedure as for sand shall apply.

d. In wet, sandy or gravelly type soils that have a tendency to move or run, the cutting head and/or auger shall be pulled back to at least three feet from the front of the casing.

e. When boring is used to facilitate jacking pipe in place, the minimum diameter of the lead auger section shall be 1/2 inch smaller than the inside diameter of the pipe being jacked.

f. Trenchless pipe placement - methods such as trenchless pneumatic piercing tools utilized to perform horizontal bores must be approved by the Township Engineer prior to its use.

N. Directional Drilling

This Section includes work required to place a specified size and type of pipe under an existing structure, roadway, wetland, body of water, railroad or as specified on the Engineering Drawings by horizontal directional drilling, or Bore & Jack without disturbing their condition or use.

1. Preparation
 - A. Clearing: Clear all areas as necessary.
 - B. Drilling Fluid Pits:
 1. Line pits with necessary lining to prevent seepage into native soils.
 2. Comply with applicable codes and regulations.
2. Launching
 - A. Allow for connection to existing/proposed utility with necessary cover and/or grade.
 - B. Penetration Angle:
 1. Acceptable Range-8°-20° measured from horizontal.
 2. Comply with drilling equipment manufacturer's recommendations.
3. Tracking
 - A. Monitor Progress of Drilling Unit:
 1. Maintain scheduled line and grade within 0.5 ft. on vertical and ± 1 ft. on horizontal.
 2. Maintain scheduled line and grade within 0.02 ft. on vertical and 0.2 ft. on horizontal for the gravity sewer portion to be directionally drilled only
 3. Adjust pipe location (horizontal and vertical) accordingly throughout the process to maintain tolerances.
 - B. Isolated High Points: Not acceptable.
4. Receiving
 - A. Exit angle to be between 5° and 12° measured from horizontal.
5. Accuracy
 - A. If greater than 10 lineal feet to right or left, or more than 10 lineal feet short or 50 feet long, consult Owner and Engineer for approval.

WATER MAINS AND APPURTENANCES9.01 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all plant, labor, materials, and equipment and in performing all operations for the proper installation of the water mains and appurtenances in strict accordance with these specifications and applicable contract drawings.

NOTE:

When selecting pipe materials for water main the Design Engineer should clearly understand that the Township Engineer that reviews the final plans, and the Michigan Department of Environmental Quality (DEQ) Office of Drinking Water and Municipal Assistance, will have the final say as to which type is preferred for any given location.

9.02 MATERIALS

A. Pipe Materials: Ductile Iron Pipe (DIP) and fittings are the preferred water main pipe material. DIP should be used as often as possible, with exceptions only granted by the individual Township, in writing, on a case-by-case basis.

1. Ductile Iron Pipe and Fittings shall be designed in accordance with American Water Works Association (AWWA) Standards C150 and C151 also ANSI Standards A21.50 and A21.51. The pipe shall be designed to withstand a minimum working pressure of 200 psi and a minimum hydrostatic test pressure of 300 psi. The pipe shall also be designed for a laying depth of a minimum of six feet (6') of cover. All ductile iron pipe shall meet the requirements of NSF International (NSF) Standard 61.

All ductile iron pipe and fittings shall be coated on the outside with an asphaltic coating of asphalt base one mil thick at the point of manufacture in accordance with the specifications of the AWWA Standard C151 and ANSI Standard A21.51.02. Cement lining requirement shall conform to AWWA Standard C104 and ANSI Standard A21.4. The spigot ends of all pipe lengths which have been cut in the field shall be ground to a smooth surface, tapered back about one-eighth inch ($\frac{1}{8}$ ") at an angle of 30° with the pipe centerline, and painted with two coats of asphaltum metal protective paint.

Ductile iron pipe shall conform to the dimensions set forth in the table below (Design Engineer shall verify expected pressure range with Township Engineer during design phase).

Pipe Size Nominal Inside Diameter in Inches	Outside Diameter in Inches	Pipe Barrel Thickness in Inches	Thickness Class
6"	6.90	.31	52
8"	9.05	.33	52
10"	11.10	.35	52
12"	13.20	.37	52
16"	17.40	.40	52
20"	21.60	.42	52

2. Polyvinyl Chloride Pipe (PVC) and Fittings for Open Cut Construction:

Rigid polyvinyl chloride bell and spigot type pressure pipe and fittings shall be Ductile Iron Pipe Size (DIPS), conform to AWWA C900/C905 Standards, pressure class 235 psi, and DR 18, unless otherwise by the Township Engineer for the application being proposed. PVC water mains shall be designed in accordance with the latest revision of AWWA Standards as follows:

- *C900 for 6-inch through 12-inch diameter pipe
- *C905 for 14-inch through 36-inch diameter pipe

The pipe shall also be designed for a laying depth of a minimum of six feet (6') and meet the following conditions: Be rated at a Working Pressure of 200 psi and have a Surge Pressure Rating of at least 300 psi. Pipe joints shall be in accordance with ASTM D3139 (latest revision).

Pipe must meet the requirements of NSF Standard 14 and NSF Standard 61 to be used for potable water systems. The pipe shall be blue in color and the exterior wall print line of all pipe proposed for installation and potable use must bear the AWWA and NSF-PW identification. Refer to standard details for the connection of ductile iron pipe to PVC.

Pipe joint gaskets for PVC pipe shall be elastomeric seal type conforming to ASTM F477. Pipe joint lubricants shall be manufacturer's standard nontoxic material conforming to AWWA C900 Standards.

Use of PVC water main shall be treated on a case-by-case situation. The pipe must be approved by the Township Engineer prior to permitting.

3. High Density Polyethylene Pipe (HDPE) for directional drilling applications shall be Ductile Iron Pipe Size (DIPS) and shall meet either of the following two (2) pressure class rating systems:

AWWA C906 or ASTM F714:

Working Pressure of at least 200 psi

Working Pressure and Surge pressure of at least 300 psi

All HDPE pipe shall be joined by heat fusion per manufacturer's requirements. HDPE pipe must meet the requirements of NSF Standard 14 and NSF Standard 61 and AWWA C906. The exterior wall print line of all HDPE pipe proposed for installation and potable use must bear the AWWA C906 and NSF-PW identification.

HDPE sections shall be pressure tested independently of other water main. See Section 9.07 of these specifications for the Acceptance Testing of Water Main. The method and locations must be approved by the Township Engineer. Refer to standard details for the connection of ductile iron pipe to HDPE. Thrust restraint devices must be used and located as recommended by the pipe manufacturer to account for HDPE pipe expansion and contraction due to changes in temperature and internal surges.

Refer to Section 4 – Excavation, Trenching and Backfilling and MDEQ Suggested Practice for Water Works Design, Construction and Operation for Type I Public Water Supplies – Fusible thermoplastic pipe requirement for use of HDPE water main.

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.

The pipe, standard details, and type of bedding shall be approved by the Township Engineer.

Use of HDPE water main shall be treated on a case-by-case situation. The pipe must be approved by the Township Engineer prior to permitting.

4. Fusible Polyvinylchloride (PVC) Pipe for directional drills shall conform to AWWA C900 or C905, ASTM D1784, and cell classification 12454. Pipe shall be in accordance with ASTM D2241 for Ductile Iron Pipe Size (DIPS) standard dimensions as indicated in these specifications. Compound formulation shall be in accordance with PPI TR-2/2006. Fusible PVC shall meet the same pressure class as specified in 9.02.A.1.

Pipe shall be manufactured with 100% virgin resin. Fusible PVC pipe must meet the requirements of NSF Standards 14 and 61 to be used for potable water systems and must bear the NSF-PW identification.

Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

Fusible polyvinylchloride pipe shall be manufactured in a standard 20', 30' or 40' nominal lengths and shall be blue in color.

Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal size
2. Dimension Ratio (DR18), Standard Dimension Ratio
3. AWWA pressure class or rating
4. AWWA Standard designation number
5. All pipe shall be stamped to indicate compliance with NSF Standard pw.
6. Extrusion production-record code
7. Trademark or trade name
8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Refer to Section 4 – Excavation, Trenching and Backfilling and MDEQ Suggested Practice for Water Works Design, Construction and Operation for Type I Public Water Supplies – Part 11 (9) Fusible thermoplastic pipe requirements.

Use of Fusible PVC water main shall be treated on a case-by-case situation. The pipe must be approved by the Township Engineer prior to permitting.

B. Joints for water main pipe shall conform to the following:

DUCTILE IRON:

1. Flanged joints for ductile iron pipe shall be made with flanges, bolts, nuts, washers and gaskets conforming to AWWA Standard C110 and ANSI Standard A21.10.
2. Mechanical joints shall conform to AWWA Standards C110 and C111 along with ANSI Standards A21.10 and A21.11. Rubber gaskets shall conform to manufacturer's standards.
 - a. Retainer glands shall be utilized on all mechanical joint fittings.
 - b. Lead tip gaskets will not be allowed for providing metal to metal contact at joints.
3. Rubber gasket joints for ductile iron pipe shall be of a bell and spigot type which employs a single rubber gasket to affect the joint seal. These joints shall conform to AWWA Standard C111 and ANSI Standard A21.11. These joints shall be similar to "Tyton" as manufactured by U.S. Pipe and Foundry Co., "Bell-Tite" as manufactured by James B. Clow and Sons, Inc. or approved equal.
4. Bell joints shall be cast iron, mechanical, flexible joint tube designed to withstand a working pressure of 200 pounds and a hydrostatic test pressure of 300 pounds. Joints shall be similar to "Molox" as manufactured by the American Cast Iron Pipe Company, "Usiflex" as manufactured by U.S. Pipe and Foundry Co., "River Crossing Pipe" James B. Clow & Sons, Inc. or an approved equal.
5. Field-Loc gaskets/Fast-Grip or equal are accepted for the use of Tyton push on joints for fittings.
6. Ductile sleeves shall have "cookie" piece inserted between two pipes if there is any separation between the two pipes.

PVC PIPE:

1. Compact or short body joints and fittings for ductile iron and PVC pipe shall be made conforming to AWWA Standard C153 and ANSI Standard A21.53.

2. PVC pipe specified in 9.02.A.1 may be used for directional drill pipe, with approval of Township Engineer, using a Diamond Loc-21, or approved equal restraint joint.
3. Rubber gasket joints for PVC pipe shall be of a bell and spigot type compliant with ASTM D-3139 and the joint gasket shall conform to ASTM F-477. These joints shall be as manufactured by National Pipe & Plastics, Inc. or approved equal.

C. Gate Valves

Gate valves shall meet the requirements of AWWA or C515. Valves shall be designed for not less than 250 psi working pressure and shall be tested for leakage and distortion under a hydraulic pressure of not less than 500 psi. Under such pressure, the valves shall show no leakage or distortion.

All gate valves shall be EJIW Flowmaster resilient wedge gate valves. The wedge casting shall be of a solid design and 100% encapsulated with nitrile rubber. Hollow wedges are not allowed and no epoxy coating is allowed in wedge. There shall be 3 stem seal o-rings; two in the seal plate which shall be replaceable with the valve in the full open position at rated working pressure, and one under the stem thrust collar. All gaskets shall be o-ring seals. O-rings set in a cartridge shall not be allowed. Each valve shall have a clear waterway equivalent in area, when open, to that of the connecting pipe. **Valves shall be made to open right (clockwise).** All valves shall be connected to the pipeline by mechanical joints. All valves shall be operated by non-rising stems and shall have square wrench nuts.

All valves shall be furnished with a three piece adjustable valve box as specified herein unless the valve is housed in a manhole.

The operating nut on all valves including hydrant valves will be located with five feet (5') of the finished grade. If the valves operating nuts are greater than five feet (5') below finished grade a fixed stationary rod shall be required in the valve box to allow the valve to be operated with a standard valve wrench.

D. Butterfly Valves

Butterfly valves, as called out on the plans, shall be so designed and fabricated that they will conform to AWWA Standard C504 for Class 150B valves. The rubber valve seat shall cover the entire interior surface of the valve body and the face of the body. The valve disc shall be streamlined, free of external ribs, keyed to the shaft, provided with suitable means for positioning and shall utilize wedge type closing against the rubber liner at a

full close seating angle of 90° to the axis of the pipe. Valves shall be as manufactured by Dresser Manufacturing Division, Keystone International, Inc. or an approved equal.

All Butterfly valves shall be installed in a manhole per the Standard Detail Sheet (for stream crossing only). Caution is advised when cleaning the mains with a poly pig to insure that all gravel and sediment is removed from the main, valves and appurtenances.

E. Valve Boxes

Valve boxes shall be cast iron, three-piece, adjustable type, with a five and one-quarter inches (5¼") shaft. Covers shall be furnished with finger holes and marked "WATER". Valve boxes shall be similar to that as manufactured by the East Jordan Iron Works or an approved equal. Contractors shall be responsible for adjusting valve boxes to meet finish grades once finish grades are established.

F. Fire Hydrants

At the points indicated on the drawings, there shall be installed a hydrant assembly consisting of a hydrant, a six-inch (6") gate valve, a cast iron valve box and all piping and fittings necessary for a complete job. Gate valves shall be as specified above. Valves shall be located three feet (3'), plus or minus, from the hydrant as shown on typical hydrant setting on drawings.

1. Hydrant barrel inside dimension to be seven and one-quarter inches (7¼") I.D. from top to bottom.
2. Nozzles to be on a removable head so that they may be rotated by changing the position of the top flange without removing the barrel.
3. Hydrant to be fully bronze mounted including top of operating stem where it passes through the double "O" ring seal in the bronze packing gland. Operating stem in base and valve seat shall be made of bronze. No "V" type threads are allowed for the operating stem or nut.
4. The drain valve shall be unplugged in all well drained, porous, well drained, soil locations. The plug shall be installed in all groundwater and/or areas of known high water tables, heavy soils, muck soils, or clay soils.
5. Hydrant nozzle shall be located 2'-8" to 3'-2" above breakaway flange.

6. Hydrants furnished for this work shall meet the requirements of AWWA Standard C502 (latest edition). They shall be East Jordan Iron Works Model 5BR Water Master or Water Master 5BR250, or approved equal. Hydrants shall be designed for installation with six feet (6') of cover over the connection. Threads shall conform to national standard threads. Hydrant stems shall be built to open left (counter clockwise).
7. Hydrants shall be of the "break flange" type. Bottom of "break flange" shall be four inches (4") above finished grade. The hydrant shall be so designed that all working parts, including valve and drip mechanism, may be removed from the hydrant through the barrel without the necessity of excavation. The hydrant shall be designed for a working pressure of 150 psi. Operating nuts shall be pentagon one and one-half inch (1½") size, as measured point to opposite flat.
8. **The diameter of the valve port in the hydrant shall be at least five inches (5"). The following Fire Departments require that the hydrants shall be equipped as follows:**

Grand Traverse Metro Fire Department: One (1) four-inch (4") and two (2) two and one-half inch (2½") pumper connections.

Peninsula Township Rural Department: Two (2) four-inch (4") pumper connections with 5" Storz hydrant converters with nut caps.

Elmwood Township Rural Department: Two (2) four-inch (4") pumper connections.

G. Water Service Connections

Water service connections are the water line connections which extend from the water main to the property line or easement line of water system customers. A water service connection shall consist of a corporation stop in the water main, a small diameter water line to the property line, a curb stop at the property line and curb box and cover. The Contractor shall place the water service connections where directed by the Design Engineer. The service line piping and fittings shall be either one-inch or two-inch (1" or 2") size as called out on the plans.

1. Service Line Pipe and Fittings

Pipe material shall be Type K Copper, annealed and soft temper ASTM B.88. Joints shall be flared and/or compression style, as approved by the Engineer. Must conform to AWWA Standard C800.

Service saddles are required on ductile iron pipe for all service taps greater than one-inch (1") and on PVC pipe for all service taps. All service saddles shall be double strap shall be 100% stainless steel. Services larger than two inches (2") shall be constructed in accordance with water main pipe and valve requirements, using a tapping valve and sleeve for the connection to the existing main.

2. Corporation Stops

Ductile Iron Water main Installation: One-inch and two-inch (1" and 2") corporation stops shall be ball style Mueller series B-25000 series, A.Y. McDonald 4100 series, or equal, for copper service pipe. Corporation stops shall be in the "open" position after the service connection is complete. Must conform to AWWA Standard C800.

PVC Water main Installation: One-inch and two-inch (1" and 2") stops shall be Ford B1000 Series, or equal, for copper service pipe. Corporation stops shall be in the "open" position after the service connection is complete. Must conform to AWWA Standard C800.

3. Curb Stops

Curb stops shall be Mueller B-25204, Ford B22 or approved equal. Curb stops shall be of the quarter turn, ball style, positive shut-off type. Must conform to AWWA Standard C800.

4. Curb Boxes

Curb boxes shall be adjustable in height to allow for variable grade elevations. Curb boxes shall be all cast iron construction and coated inside and out with tar base enamel. A cast iron lid shall be furnished with finger holes, or plug in center (with rod) and shall have "WATER" permanently stamped.

Curb boxes for one inch (1") services shall be furnished with a stationary operating rod inside the box and arch pattern base equal to Mueller series H-10314.

Curb boxes for one and one-half inch and two inch (1½" and 2") services shall be the arched pattern base with rod, equal to Mueller series H-10386. Must conform to AWWA Standard C800.

5. Water Service Saddles

Water service saddles shall be compatible with the main and service lead, with straps of a ductile iron material to avoid crushing the main out-of-round. A molded gasket of rubber or neoprene shall completely encircle the tapped opening to ensure a watertight connection. The use of lead gaskets is not allowed. Water service saddles shall be bronze with AWWA tapped threads.

Service saddles used with PVC water main shall be double strap, full circular and provide uniform bearing around the circumference. U-bolt type straps and service taps to HDPE pipe are not allowed.

Saddles shall be manufactured by Mueller BR2S or approved equal.

H. Tapping Sleeve and Valve

Where shown on the plans or where a tee and valve are to be installed on an existing main under pressure, a tapping sleeve and drilling machine shall be used. After installing the sleeve and prior to drilling, the sleeve shall be pressure tested at 150 psi for five minutes. The Township Resident Project Representative and the Grand Traverse County DPW Water Department Operator shall be given 48 hours-notice of all water main live taps. Tapping sleeves for taps smaller than the main line, ex: 8"x10", 10"x12" utilize a stainless steel (vega type) wrap around sleeve. For taps which are size on size ex: 12"x12", 10"x10", use class 250 EJIW cast iron sleeves. Tapping sleeve and valve shall be mechanical joint, class 250, as manufactured by East Jordan Iron Works, or an approved equal. Stainless steel (vega type) wrap around sleeve is also allowed for size on size taps. Tapping sleeves for HDPE shall use spring style washers to accommodate for expansion and contraction of the pipe.

I. Water main Stubs

At the end of a stub, the last three (3) pipe joints shall have Field-Loc gaskets/Fast-Grip gaskets or equal. No galvanized pipe materials shall be allowed. A corporation shall be placed for the use of flushing and sampling.

J. Tracer Wire Box

The tracer wire access box shall be stock number 22408 as distributed by USA Blue Book, or approved equal.

9.03 INSTALLATION OF PIPE AND FITTINGS FOR WATER MAINS

All pipe and fittings shall be installed in strict accordance with the recommendations of the manufacturer and AWWA Standard C600 for Ductile Iron pipe, or AWWA C605 for PVC pipe (latest editions). Piping and fittings for water mains shall be of the types and materials hereinbefore specified. The pipe and accessories shall be new and unused. Before installation, the pipe shall be inspected for defects and any section of pipe or fittings found to be defective, before or after laying, will be rejected and replaced with sound pipe without additional expense to the Owner.

All water main shall be placed with a depth of bury, measured from the top of the pipe to final finished grade, with a minimum of six feet (6') of cover. Depth of cover greater than six feet (6') of cover may require additional easement width be granted to the Township and/or may require developer to assume some future restoration costs.

Water main along private roads shall not be placed in the fore slope of ditches and shall be a minimum of twenty three feet (23') from the centerline of the road.

All water main shall be laid with a continuous one-quarter-inch (1/4") diameter, woven wire, stainless steel cable tracer wire, per Section 9.12. Tracer wire shall be laid six inches (6") above water main. Tracer wire shall terminate in a tracer wire box. Tracer wire box shall be placed at each hydrant or approximately every four hundred feet (400').

The interior of the pipe and fittings shall be thoroughly cleaned of foreign matter before being lowered into the trench with an approved method and shall be kept clean during laying operations by plugging the ends or other approved methods. The plug shall be fitted with a means for venting. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth, animals or other substance will enter the pipes. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe floatation, if the trench fills with water. No pipe or fittings shall be laid in water or when the trench or weather conditions are unsuitable for work except by permission of the Township Engineer. Valves shall be installed in the closed position.

Ductile iron pipe and fittings used on ductile iron (except flanged pipe) shall be provided with three brass wedges at each joint, Fastite conductive (American Pipe)

or equal, "Electro-bond" strips of "Cadweld" connectors or other means of providing metal-to-metal contact at the joint to allow an electric current to flow through the joint.

Trench widths shall meet all standards, such as OSHA and AWWA Standard C600 or AWWA C605. The full length of each section of pipe shall rest solidly upon the pipe bed with recesses provided to accommodate the bells and joints. Refer to AWWA Standard C600 or C605 for maximum allowable joint deflection.

When pipe is cut in the field, the outside of the cut end shall be tapered back about one-eighth-inch ($\frac{1}{8}$ ") at an angle of 30° with the centerline of the pipe to remove any sharp, rough edges. Exposed edges shall be coated with two coats of asphaltum metal protective paint.

Fittings at bends in the pipe line shall be firmly wedged against the undisturbed vertical face of the trench to prevent the fittings from being blown off the lines when under pressure. Concrete thrust blocks shall be provided as shown in the standard details or directed by the Township Engineer.

Where pipe ends are left for future connections, they shall be valved, plugged, or capped as called for on the drawings. Where connections are made between new work and existing mains, the connections shall be made by using special pipes and fittings as required to suit the actual conditions.

All temporary and permanent water main stubs shall be restrained with Field-Loc gaskets/Fast-Grip or equal for at least three (3) pipe joints prior to the stub end, including mechanical fittings. This will allow for a connection to the main without removing or reducing the existing water pressure. It is required that a gate valve be installed at the end of the stub.

9.04 SETTING HYDRANTS

Under each hydrant the ground shall be excavated to a depth of at least one foot (1') below the hydrant base and over an area approximately three feet (3') 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.

The length of a hydrant lead shall not exceed one-half ($\frac{1}{2}$) of the Road right-of-way width or twenty feet (20') if water main is located within a private easement. Each hydrant shall be set truly plumb and held firmly braced in this position. The connection of the hydrant to the branch shall be made by mechanical joint as herein specified under jointing. After the joining has been made, a concrete thrust block shall be poured on the side opposite the branch connection, from the hydrant to the solid undisturbed earth of the excavation wall.

When the concrete has become sufficiently hard, an additional one foot depth of gravel shall be spread and tamped around the hydrant. When this has been done, the remaining backfill shall be placed and compacted, taking care at all times to avoid jarring the hydrant.

Wherever it is necessary to adjust the length of the barrel to meet variations in elevation of the ground surface over the water main and at the hydrant location, suitable extensions shall be provided for the hydrant barrel and operating stem. In all cases, the break flange shall be located at grade.

Contractor shall remove all water from fire hydrants. Water left remaining in each fire hydrant assembly will be removed by pumping prior to acceptance by the Township. Thawing and/or repair of frozen hydrants shall be performed by the Contractor at no additional expenses to the Owner.

In addition to pumping any new hydrant prior to Township acceptance the Contractor shall winterize any new hydrant installed or existing hydrant used during construction, if work done between October 1 and March 31.

9.05 CONNECTING TO EXISTING WATER MAINS

Where connections are made between new work and existing water mains, the connections shall be made by using special pipes and fittings as required to suit the actual conditions. No connections to existing mains shall be made until the new main has been pressure tested; continuity tested chlorinated, and sampled and is ready to be placed into service. When making the connection, swab pipe and fittings with four percent chlorine solution. The Township Engineer shall witness all connections and shall be notified 48 hours prior to the connection of new pipe to existing pipe. Bacteriological samples shall be taken before connection to existing is completed to provide a record for determining the procedures effectiveness per AWWA Standard C651. Conform to AWWA Standards C600 and C651.

9.06 DIRECTIONALLY DRILLED WATER MAIN

A. Description

This work shall consist of constructing underground crossings of a wetland 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. Materials

Plastic Pipe: Section 9.02 A.3 High Density Polyethylene Pipe or Section 9.02 A.4 for Fusible Polyvinyl Chloride Pipe.

D. Construction Method

This method consists of auguring or jacking a steerable rod under the wetland; 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 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 projects.

9.07 ACCEPTANCE TESTING WATER MAIN

A. General

Prior to connecting the new water main to an existing water main, the new main shall be flushed, chlorinated, and pressure tested as outlined herein.

The Township Engineer shall be notified 48 hours prior to the start of a pressure test. All acceptance testing shall be witnessed by the Township Engineer or Township Resident Project Representative.

A physical gap of at least three feet (3') must be left between the existing and new water main until all testing results are satisfactory. The testing sequence shall be: 1) flushing, 2) pressure test, and 3) chlorination. Water for testing may be taken from a nearby hydrant or tee connection by using fittings to accommodate a standard fire hose connection. A reduced pressure principle backflow prevention assembly must be used on the two and one-half inch (2½") connection to the main being tested.

B. Flushing of Mains

The water main shall be flushed clean of sand and debris. Flushing shall be done using the "poly-pig" method of flushing. The Contractor shall furnish the brand new, unused, foam "poly-pig" swabs to be used. Prior to pigging and flushing the water main must be charged with water.

Contractor shall insert "poly-pig" swab in the end of the new main nearest the existing water main (or where shown on the plans). The swab shall be passed through the new main using water pressure. The swab shall be recovered at the end of the main through the blow-off assembly.

C. Hydrostatic Testing

The water main or sections thereof shall be tested by the Contractor in the presence of the Township Engineer and all leaks shall be made tight to meet the requirements below. The Contractor shall furnish all piping, bulkheads, pumps, gauges and other equipment required to carry out the test and shall obtain Township Engineer's approval of same prior to testing.

The section of main to be tested shall be slowly filled with water at least 24 hours prior to starting the test. Expel air through corporation stops installed at high points in line. The Contractor shall make arrangements with the operation/maintenance personnel for obtaining water for testing.

All water used shall be metered and quantities reported to the operation/maintenance personnel.

At the start of testing, the main shall be pumped up to a pressure of 150 psi and the test period shall start immediately thereafter. Test pressure shall not be less than 1.25 times the working pressure at the highest point along the test section. The line shall then be maintained under this test pressure for a continuous period of two hours by pumping water into the line at frequent intervals. The test pressure shall not vary by more than +5 psi for the duration of the test. The volume of water so added shall be measured and considered to represent the leakage from the line under test during the intervals. All water service leads shall be tested with the mainline pipe. Conform to AWWA standard C600 or C605.

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,

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

Where:

- L=Testing allowance (makeup water), in gallons per hour
- S=Length of pipe tested, in feet
- D=Nominal diameter of the pipe, in inches
- P=Average test pressure during the hydrostatic test, in pounds per square inch (gauge)

The leakage per 1,000 feet under the conditions of the test shall not exceed the values shown in the following table, in accordance with AWWA Standard C 600 for ductile Iron and C605 for Plastic Pipe.

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

In the event that the leakage exceeds the specified amount, the joints in the line shall be carefully inspected for leaks and repaired where necessary. Any pipes or special casting found to be cracked shall be removed and replaced with new pieces by the Contractor. No repair clamps or bell clamps can be utilized for repairs on new construction. After this work has been done, the tests shall be repeated. Final acceptance of the lines will not be made until satisfactory tests have been passed.

Water service leads installed with mainline pipe will be included in the water main pressure test. Installed water service leads shall have a riser (extension of water service) placed at the downstream side of the curb box.

For flushing, testing, and sampling, once all tests are completed, this riser must be removed or buried 6' below grade.

Not more than 1,200 LF of water main shall be tested at one time, plus one set from the end of the line and at least one from each branch greater than one pipe length. If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.

Where there is a considerable elevation difference in the section of water main being tested, the test pressure shall average 150 psi over the length of main, but shall be not less than 140 psi at the highest elevation.

All main line valves and hydrant lead valves within the test section shall remain open during the pressure test.

After completion of the two hour pressure test, each valve shall be checked against test pressure.

D. Disinfecting Water mains

After completion of pressure testing and flushing of the water main, the disinfection of the water main shall be carried out in accordance with AWWA Standard C651-14.

The method of chlorination chosen for disinfection of the water main shall be one of the four methods specified under Section 4.4 of AWWA Standard C651-14. Sampling requirements stipulated by the City of Traverse City Water Treatment Department shall also be followed for new construction or extensive repair for all water systems that are operated and maintained by the Grand Traverse County Department of Public Works. This procedure is as follows:

- a) After disinfecting, flush the system until the chlorine residual equals the source water and then allow the water to remain static for 24 hours before drawing the first sample. Submit the first sample which will then be tested using the Colilert procedure.
- b) There are two sampling options: (1) Option A – Samples are taken 16 hours apart and (2) Option B – Samples are taken 15 minutes apart after a 16 hour rest period. The initial sample shall be done using the Colilert procedure and the second shall entail two (2) samples from the same sample point, one of which will be tested using the Colilert procedure and the other using the Membrane Filter procedure. If both of the second samples are negative, authorization

will be given to use the new construction or repair. If the second Colilert sample is negative but the Membrane Filter sample produces background growth, resampling for the Membrane Filter testing shall only be required until no growth occurs on the Membrane Filter sample.

Note: If the system is re-chlorinated or re-pigged the sampling procedure shall be started over as listed above in paragraphs "a)" and "b)". When no growth occurs on the Membrane Filter, approval will be given to activate the system.

- c) The Contractor shall discuss his proposed disinfection procedure and sample locations with the Township Engineer and have it approved prior to beginning the process.
- d) The Contractor shall supply the chlorine, all necessary equipment and labor necessary for its application. The Contractor shall make suitable arrangements with the Township Engineer for bacteriological analysis and shall be responsible for all cost incurred from bacteriological testing. Bacteriological analysis shall conform to the requirements of the Michigan Safe Drinking Water Act and be performed by the City of Traverse City Water Department. Prior approval from the DPW must be obtained before an alternate State approved drinking water testing laboratory can be used.
- e) One (1) sample shall be taken of the source water prior to connecting the new water main to the existing. The procedure and analysis shall be compliant with the City of Traverse Water Department requirements stated above.
- f) Dechlorination: Contractor shall comply with AWWA C655 on proper dechlorination and disposal of heavily chlorinated water.

9.08 TRANSFER OF WATER SERVICES

Where water services are to be transferred from an existing water main to a new water main, as shown on the plans, Contractor shall provide corporation stop and necessary pipe and fittings. Work shall be scheduled in such manners that transfer of service to any residence or water customer will result in the least possible interruption of water supply service. All services are one inch (1") unless otherwise shown on the plans.

9.09 TRANSFER OF EXISTING HYDRANTS

Where indicated, existing hydrants are to be transferred from an existing main to a new main, as shown on the plans. Contractor shall excavate and reset the hydrant, as shown on Hydrant Assembly Detail, provide new six inch (6") hydrant gate valve, six inch (6") hydrant lead to new main and all fittings required for a complete installation.

9.10 HANDLING PIPE AND STORAGE

All pipes and special castings shall be unloaded and distributed along the line of work in such a manner and with such care as will effectively avoid the cracking of any pipe or casting. Dropping directly from the truck will not be permitted. Care must also be exercised on the inside of the pipe. Wherever the outside coating may be found to have rubbed off, the part shall be thoroughly cleaned by brushing and shall then be recoated with an approved asphaltic paint or as may be required by the nature of the pipe coating. The Contractor shall keep on hand a supply of paint for such purposes.

If stored, materials shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

9.11 MARKING PIPE

Each cast iron fitting shall have its weight and class designation conspicuously painted or cast on it. All other pipe materials shall have the class designation painted thereon. Where required, other designation marks shall be painted on the pipe or fittings to indicate correct location in the pipe section in conformity to a detailed layout plan.

All PVC pipe shall be marked as required by AWWA C900 and shall be stamped to indicate compliance with NSF Standard pw.

9.12 PIPE LOCATOR

Directional Drilled

A continuous one-quarter inch (1/4") 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 Township Engineer. The one-quarter inch (1/4") stainless steel cable locator wire shall be looped at four hundred foot (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 three feet (3') above ground for visibility and have a width of four inches (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.

Open-Cut

Tracer wire (#10 solid copper insulated trace wire) must be brought up into all valve boxes, fire hydrant valve boxes, metering houses, metering pits, and blow offs. The 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 three feet (3') above ground for visibility and have a width of four inches (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. All underground splices shall be butt spliced, sealed, and waterproofed. This will be done using the heat shrink method and electrical coating, or approved equal. Wire nuts and black tape will not be allowed. Underground caution tape must also be used. Must read "Caution Water Main Buried Below". This must be at a minimum depth of one foot (1') and no more than two feet (2') below finished grade.

9.13 PIPE TAPS

Pipe lines shall be tapped for corporation cocks where shown or required for testing of completed water mains. For ductile iron or steel pipe, cocks shall be threaded directly into the pipe.

9.13 BLOWOFF

Blowoffs shall be placed on all dead-end mains and shall be as shown on the plans. Permanent blow-off assemblies shall be cut off below grade after testing is

complete. Standing water within the blowoff shall be pumped out of the riser, capped, bolted, and buried.

9.14 THRUST BLOCKS

Concrete thrust blocks shall be poured on hand-excavated, undisturbed soil bearing surfaces of a minimum size as shown on the standard details or increased in size according to the actual bearing values of the soil in each location, in accordance with the instructions of the Design Engineer.

Thrust blocks shall be made of 3,000 psi concrete, wet mix. Concrete thrust blocks shall be placed at all 22-1/2° bends or greater, dead ends, tees, reducers, hydrants and crosses, as required. Pre-cast thrust blocks may be utilized for certain applications, if approved by the Township Engineer. Retainer glands and/or mega lugs shall be utilized on all mechanical joint fittings.

9.15 PAINTING

All pipe, valves, bolts and any other portions of water main exposed inside manholes and other structures shall be painted. If necessary, heat shall be provided to maintain good drying conditions. All items to be painted shall be dry and clean before application of the paint. Any rust or scale shall be removed by wire brushing or scraping.

9.16 FIRE HYDRANT SIGNS

Contractor shall be responsible for the purchase and installation. The sign and its post shall be installed directly behind the hydrant. The sign shall be parallel to the street, and within the road right-of-way or easement. There shall be two feet (2') distance from the center of the top nut of the hydrant to the front face of the sign. The finish elevation of the sign shall not be less than five feet (5') to the top of the sign from grade at the base of the post and no more than six feet (6') to the top of the sign from grade at the base of the post. The post shall extend into the ground a minimum of two feet (2') below grade at the base of the post. Signs shall be constructed according to the Grand Traverse Fire Department Standards for Fire Hydrants. Signs and posts are available to be picked up at the Fire Department for a nominal fee.

9.17 WATER MAIN VALVES

Contractor shall place a four-inch (4") wide fiberglass blue marking post at each main line valve. Marking posts shall be Rhino Fibercurve or approved equal. Valve marking post are available to be picked up at the Township Water Department for a nominal fee.

9.18 SHOP DRAWINGS

The Contractor shall furnish, as prescribed under Section "General Requirements" dimension and erection drawings and details of the water main, valves, and other appurtenances furnished under this section. Complete details of all pipe deflections and ties to adjoining pipe shall be submitted to the Township Engineer for approval.

9.19 CERTIFICATION

The manufacturer of pipe and fittings shall furnish a certified statement that all pipe and fittings furnished by him have been inspected and tested in accordance with the applicable specifications. Pipe will be subject to inspection and approval upon delivery and no cracked, broken, damaged or defective pipe or fittings shall be laid in the work. Any piece that is found to be defective after it has been laid shall be removed by the Contractor and replaced by a sound and perfect piece.

REPLACEMENT AND CLEANUP

13.01 SCOPE OF WORK

Under this item, the Contractor will restore all lawns, trees, gardens, landscape plantings, sidewalks, ramps, trails, fences, commercial signs, water courses and sand, gravel, dirt, asphalt and concrete roads, catch basins, storm sewers, building sewers, water services, water valve boxes, meter vaults, property markers (such as concrete monuments, irons, stakes, pipes, etc.), mailboxes and other items which may be damaged during the course of construction. All replacement and cleanup work will be incidental to the project except those items of work that are delineated in the bid proposal.

All restoration work shall attempt to return the existing facilities to their original condition. Substitutions, such as gravel instead of grass, will not be allowable.

The Contractor shall pay special attention to the requirements of Act 347, "Soil Erosion and Sedimentation Control". In all construction work the Contractor shall take all precautions necessary to prevent erosion and to conform to the requirements of Act 347. Should erosion occur within the guarantee period, the Contractor shall regrade and reseed the disturbed area at no additional cost to the Owner.

Replacement and cleanup operations shall follow immediately behind the construction work. The Contractor shall make every effort to keep the job site clean and free of trash and miscellaneous building materials. The Contractor shall pay special attention in order to restore commercial signs, fences, etc. and to patch and repair pavement, driveways and sidewalks immediately after the construction work. In the event that replacement and cleanup work does not proceed in a satisfactory manner, the Owner may withhold periodic payments or close the construction area until such time as the replacement and cleanup is satisfactory. An exception may be made if there are physical limitations which do not allow for immediate replacement and cleanup.

13.02 PAVEMENT RESTORATION

A. General

All permanent pavement restoration shall be done over compacted backfill and a minimum six (6) inches thick compacted M.D.O.T. 22A gravel base. The gravel base shall be placed and maintained in accordance with the M.D.O.T. Standard Specifications. All patches shall have square, neat, saw cut edges regardless of the final surfacing method planned for that section of the pavement restoration.

No patching work shall be started until the subgrade has been properly prepared. Prior to laying the bituminous patch, the adjacent road surfaces shall be swept clean of all foreign materials and the patch area and pavement primed with Michigan Department of Transportation's approved prime coat.

A bituminous bond coat shall be placed between successive lifts of the bituminous patch and bituminous surfacing. Each lift shall be thoroughly compacted before adding the next lift. This includes running the compaction roller longitudinally along the entire length of the joints between the patch and the existing pavement.

The bituminous mixture to be furnished under these specifications shall be delivered to the paver at a temperature no lower than 250 F. Any mixture that has a temperature below 250 F at the time of "laying" shall be rejected and hauled from the project.

Temporary road patches shall be gravel or bituminous cold patch. The patches shall be maintained in a smooth condition until final repairs are made.

The Design Engineer, Township Engineer and the County Road Commission shall be notified at least two (2) working days prior to the placement of any and all final pavement overlays.

Aggregate for mixes shall conform to Grand Traverse County Road Commission/Leelanau County Road Commission current standards where applicable.

B. Bituminous Patching

Existing asphalt roads and driveways shall be patched using the current Road Commission standards. All patches shall be placed in two lifts of 165 pounds per square yard, each using LVSP.. A bituminous prime coat of 0.25 gallons per square yard and a tack coat of 0.10 gallons per square yard shall be used for all bituminous patches. Shoulders shall be restored to their original width and depth in accordance with M.D.O.T. Standard Specifications using M.D.O.T. 23A gravel.

C. Gravel Roads, Driveways and Shoulders

All gravel roads shall be restored in accordance with M.D.O.T. Standard Specifications using six (6) inches of M.D.O.T. 22A gravel. Shoulders shall be restored to their original width and depth in accordance with the current M.D.O.T. Standard Specification 3.09 using M.D.O.T. 23A gravel. Shoulders shall be raised on the side opposite of sewer construction to match new pavement surfaces.

D. Concrete Pavement, Sidewalk and Driveways

Concrete for restoring pavement, sidewalks, and driveways shall attain a 28-day strength of 3,500 pounds per square inch. Neat edges of patch areas shall be obtained by the use of a concrete saw. Concrete mixing aggregates and curing methods shall conform to Concrete section. Concrete patches shall match the original width and depth and in no case, a depth less than four (4) inches. Sidewalks shall have contraction joints a distance apart equal to the width of the slab.

13.03 GRASS AREA

Grass areas shall be considered as two types: A) Type 1, areas which had lawns before construction, and B) Type 2, open fields or ditches not adjacent to established lawns. The plans may specifically call for Type 1 mixtures in which case the plans will govern. If there is a question as to which mixture to use, the Design Engineer shall make the final decision.

Terraces, lawns, ditches, open fields and other grassy areas shall be topsoiled, fertilized, seeded and mulched in such a manner that a grass approximately equal in type and density of the original is obtained. Slopes between 1:3 and 1:2 shall be sodded and staked or receive seed with mulch blankets.

A. Topsoil

Topsoil furnished shall consist of dark brown or black loam, clay loam, silt loam, or sandy loam surface of fertile, friable humus soil of mineral organics, not including peat or muck. Soil shall be screened topsoil, free of stones, roots, sticks and any other extraneous materials. All topsoil furnished shall be approved by the Design Engineer. Type 1 areas shall be topsoiled to a depth of four (4) inches and Type 2 areas to a depth of two (2) inches.

B. Seeding and Fertilizing

Areas to be seeded and fertilized shall be carefully raked to even surfaces and all stones, sticks and other debris removed.

The area to be seeded shall be fertilized with agricultural fertilizer 12-12-12 analysis, Davco or Agrico or equal, applied on the prepared surface at the rate of 20 pounds per 1,000 square feet. Fertilizer shall be harrowed or raked into the soil to a depth of not less than one (1) inch.

Seeds shall be furnished in durable bags. On each bag of seed, the vendor shall attach a tag giving name, lot number, net weight of contents, purity and germination. All seed shall be thoroughly mixed and sown in a method which will ensure uniform distribution. Seeding during high winds or inclement weather will not be permitted. All seed is to be raked in and

compacted. The seed shall be sown at the rate of five (5) pounds per 1,000 feet. The seeding mixtures shall be composed of certified seed of the purity, germination and proportions by weight as specified in the following table:

Kind	SEEDS		MIXTURES	
	Minimum Purity	Minimum Germination	Type I	Type 2
Perennial Rye Grass	98%	90%	20%	50%
Kentucky Blue Grass	90%	75%	60%	15%
Creeping Red Fescue	98%	80%	20%	35%

C. Mulching

Immediately after seeding all seeded areas, Type 1 and Type 2 shall be mulched with unweathered small grain straw or hay spread uniformly at a rate of 100 pounds per 100 square feet (two tons per acre). Hydroseeding method with similar application rate will be allowed.

D. Mulching Anchoring

All mulch shall be anchored using one of the following methods. The Contractor may use either method unless otherwise shown on the plans.

1. Method "A": The straw mulch shall be anchored by applying one of the following asphalt products at the rate shown. The asphalt may be blown on with the mulch or sprayed on immediately after the mulch is spread.

<u>Asphalt Product</u>	<u>Application Rate</u>
Liquid Asphalt R.C. 1, 2 or 3; M.C. 2 or 3	0.10 gal. per S.Y.
Emulsified Asphalt R.S. 1 or 2; M.S. 2; or S.S. 1	0.04 gal. per S.Y.

2. Method "B": A "Terra-Tak" mulch binder may be used in lieu of asphalt. Mixing and application shall be done in accordance with the manufacturer's recommendations.
3. Method "C": In areas with slopes greater than 10% or where shown on the plans, the Contractor shall place mulch netting or excelsior blanket mulch.

- a. Mulch Netting: Mulch shall be anchored by the use of mulch netting. The light weight fibrous netting shall be properly placed over the mulch and secured to the ground using wire staples, spaced per manufacturer's recommendations.
- b. Excelsior Blanket Mulch: An excelsior blanket shall be used in lieu of other mulch. The excelsior blanket shall be a consistent thickness of evenly distributed wood excelsior fibers, 80% of which are six (6) inches or more in length. The top side of the blanket shall be covered with a coarse net of twisted Kraft paper or biodegradable extruded plastic mesh. Ends and sides shall be securely butted and stapled with U-shaped wire staples of a size and length suited to the soil conditions.

13.04 DITCHES

Ditches which have been grassed and maintained by the abutting property owner shall be restored to the current Grand Traverse County/Leelanau County (where applicable) specifications.

Ditches in which culverts or drain tile have been installed shall have the same tile replaced, if in good condition, or a tile satisfactory to the Design Engineer installed in its place at the original line and grade.

Catch basins shall be reconstructed, if removed or damaged.

13.05 FENCE REPLACEMENT

- A. Chain Link Fence shall be replaced according to M.D.O.T. specifications.
- B. Other Fences shall be replaced equal to and of the same type as existing.
- C. Salvaged material, if approved by the Engineer, may be used for replacement.

13.06 COMMERCIAL SIGNS

Commercial signs, which must be removed by the Contractor in order for work to proceed, shall be replaced and reconstructed to original condition. It is very important that replacement follow immediately behind the construction work.

13.07 BUILDING SEWERS

Building sewers shall include any and all parts of private residential, commercial or industrial sewage disposal system such as sewer pipe, septic tanks, drainfield, etc. Whenever the service of any such facility is interrupted because of the Contractor's operations, he shall provide such interim methods of sewage disposal as are required to maintain a safe, nuisance free, non-polluting construction operation.

13.08 OTHER DEBRIS

The Contractor shall remove, at his own expense from the site, any and all broken pipe, bricks, blocks, lumps of concrete, broken machinery, cans, containers, and other trash and debris.

13.09 TREES

The Contractor shall endeavor to save as many trees as possible. Cut trees, including stumps, shall be disposed of by the Contractor. Any elm tree which is removed must be burned. Tree branches which become broken shall be removed by cutting off flush with trunk and the cut on the trunk shall be painted with an approved tree paint. Where removal of a stump would result in damage to existing utilities, the stump may be removed by chipping to a depth of at least one foot below the finished ground surface.

Trees removed by the Contractor and where approved by the Engineer shall be replaced with a reasonably sized tree of the same variety. Trees along the State Highways and County Roads that fall on the property line or in the road right-of-way shall be replaced at a new location off the right-of-way.

Replacement trees of the deciduous or hardwood type shall be furnished from nursery stock, at least 2 to 2½ inches in diameter, and shall have the roots contained in a ball of soil and wrapped in burlap.

Replacement trees of the evergreen type may be furnished from either nursery or native stock, at least 8-10 feet in height, and shall have roots contained in a ball of soil and wrapped in burlap.

PLANS PREPARED FOR: GRAND TRAVERSE COUNTY DEPT. OF PUBLIC WORKS THE CROWN BOOSTER STATION ABANDONMENT

CLIENT / AGENCY

GRAND TRAVERSE COUNTY DEPT. OF PUBLIC WORKS
2650 LAFRANIER ROAD
TRAVERSE CITY, MI 49686
231.995.6039

ENGINEER

ENGINEERING
SURVEYING
TESTING & OPERATIONS

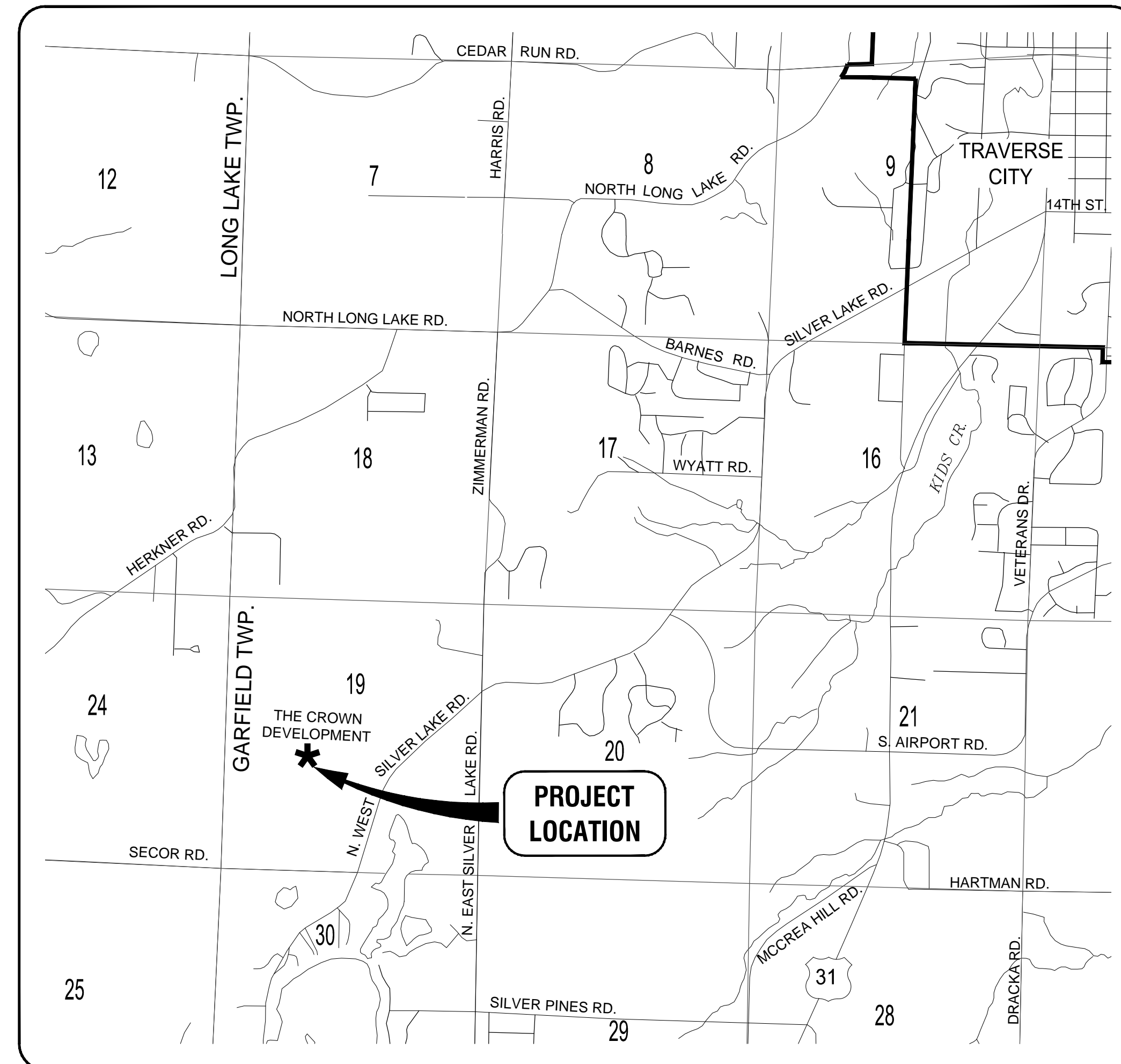


123 West Front Street
Traverse City, MI 49684

 <http://gfa.tc>

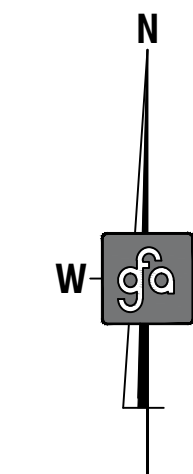
 231.946.5874 (p)

 231.946.3703 (f)



LOCATION MAP

GARFIELD TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN
SCALE: 1" = 2,000'



SHEET INDEX

- C1.1 COVER SHEET
- C1.2 GENERAL NOTES
- C2.1 SITE DEMOLITION PLAN
- C3.1 BOOSTER STATION DETAILS

PUBLIC AGENCIES AND UTILITIES

PUBLIC AGENCIES

- | | |
|--|---|
| CHARTER TOWNSHIP OF GARFIELD
Telephone: 231.941.1620 | GRAND TRAVERSE COUNTY DRAIN COMMISSION
Telephone: 231.922.4807 |
| GRAND TRAVERSE COUNTY D.P.W.
Telephone: 231.922.4896 | MICHIGAN DEPARTMENT OF TRANSPORTATION (M.D.O.T.)
Telephone: 231.941.1986 |
| GRAND TRAVERSE COUNTY ROAD COMMISSION
Telephone: 231.922.4848 | MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, & ENERGY (E.G.L.E.)
Telephone: 1.800.292.4706 |
| GRAND TRAVERSE COUNTY SOIL EROSION
SEDIMENTATION CONTROL DEPT.
Telephone: 231.995.6042 | |

UTILITY AGENCIES

- | | |
|--|---|
| CHERRYLAND ELECTRIC COOPERATIVE
Telephone: 231.943.8377 | CHARTER COMMUNICATIONS
Telephone: 231.929.7012 |
| CONSUMERS ENERGY
Telephone: 231.929.6242 | AT&T MICHIGAN
Telephone: 231.941.2707 |
| TRAVERSE CITY LIGHT & POWER
Telephone: 231.922.4942 | |
| DTE ENERGY
Telephone: 231.592.3244 | |

EMERGENCY SERVICES

- | | |
|--|--|
| EMERGENCY CALLS
911 | FIRE DEPARTMENTS
EMERGENCY SERVICE: 911 |
| EMERGENCY AMBULANCE SERVICE
911 | City of Traverse City: Telephone: 231.941.2340
Grand Traverse County: Telephone: 231.941.2238 |
| POLICE AGENCIES
EMERGENCY SERVICE: 911 | MISS DIG
EMERGENCY SERVICE: 811
Telephone: 1.800.482.7171 |
| City of Traverse City: Telephone: 231.941.2300
Grand Traverse County Sheriff: Telephone: 231.941.2225
Michigan State Police: Telephone: 231.946.4646 | |



GRAND TRAVERSE COUNTY DEPT. OF PUBLIC WORKS:
THE CROWN BOOSTER STATION ABANDONMENT

These documents are prepared in accordance with the contractual terms and conditions for this project.

GENERAL NOTES

- ALL ELEVATIONS ARE BASED ON N.G.V. DATUM
- SPECIAL CARE SHALL BE TAKEN IN EXCAVATING IN THE PROXIMITY OF ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL SECURE ASSISTANCE FROM THE APPROPRIATE UTILITY COMPANY IN LOCATING ITS LINES. THE CONTRACTOR SHALL ALSO: PROVIDE SUPPORT FOR ANY UTILITY WITHIN THE EXCAVATION, PROVIDE PROPER COMPACTION UNDER ANY UNDEMINED UTILITY STRUCTURE AND, IF NECESSARY, INSTALL TEMPORARY SHEETING OR USE A TRENCH BOX TO MINIMIZE THE EXCAVATION. THE CONTRACTOR SHALL PROTECT AND SAVE HARMLESS FROM DAMAGE ALL UTILITIES, WHETHER PRIVATELY OR PUBLICLY OWNED, ABOVE OR BELOW GROUND SURFACE, WHICH MAY BE ENCOUNTERED DURING CONSTRUCTION, AT NO ADDITIONAL COST TO THE OWNER.
- THE LOCATION OF EXISTING PUBLIC UTILITIES AND UNDERGROUND STRUCTURES SUCH AS PIPE LINES, ELECTRIC CONDUITS, SEWERS AND WATER LINES, OF RECORD ARE SHOWN ON THE PLANS. THE INFORMATION SHOWN IS BELIEVED TO BE REASONABLY CORRECT AND COMPLETE. HOWEVER, NEITHER THE CORRECTNESS NOR THE COMPLETENESS OF SUCH INFORMATION IS GUARANTEED. PRIOR TO THE START OF ANY OPERATIONS IN THE VICINITY OF ANY UTILITIES, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES AND MISS DIG AND REQUEST THAT THEY STAKE OUT THE LOCATIONS OF THE UTILITIES IN QUESTION. THE CONTRACTOR SHALL COORDINATE THE RELOCATION OF ANY UTILITIES WITH THE UTILITY PROVIDOR. COST OF REPAIR FOR ANY DAMAGED UTILITY LINES THAT IS PROPERLY STAKED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS GOVERNING THE FURNISHING AND USE OF SAFEGUARDS, SAFETY DEVICES AND PROTECTION EQUIPMENT. THE CONTRACTOR SHALL TAKE ANY NECESSARY PRECAUTIONS TO PROTECT THE LIFE AND HEALTH OF EMPLOYEES AND THE PUBLIC IN THE PERFORMANCE OF THE WORK.
- FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, 1974, THE CONTRACTOR SHALL DIAL 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE PART OF THE "MISS DIG" ALERT SYSTEM.
- EXISTING PROPERTY CORNERS ARE IDENTIFIED ON THE PLANS. IF A PROPERTY CORNER IS DISTURBED DURING CONSTRUCTION IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE BY A PROFESSIONAL LAND SURVEYOR.
- CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT TO ANY MAILBOXES DISTURBED DURING CONSTRUCTION AND SHALL NOT INTERFERE WITH MAIL SERVICE. ALL DISTURBED MAILBOXES SHALL BE PLACED IN ORIGINAL LOCATION AND AT AN ELEVATION DETERMINED BY THE POSTAL SERVICE.
- CONTRACTOR SHALL RESTORE ALL LAWNS, LANDSCAPE PLANTINGS, SIDEWALKS, COMMERCIAL SIGNS, ROAD SIGNAGE, ETC., AS REQUIRED AT NO ADDITIONAL COST TO THE PROJECT.
- CONTRACTOR SHALL PROVIDE ADEQUATE SUPPORT FOR UTILITY POLES AS NECESSARY. CONTRACTOR SHALL CONSULT WITH THE UTILITY COMPANY PRIOR TO ANY DISTURBANCE OF UTILITY POLE OR ANCHORING SYSTEM.
- CONTRACTOR SHALL PERFORM ALL WORK WITHIN THE EXISTING EASEMENT. NO WORK OUTSIDE THIS AREA WILL BE ALLOWED WITHOUT WRITTEN PERMISSION FROM PROPERTY OWNER. COPIES SHALL BE GIVEN TO GARFIELD TOWNSHIP AND THE ENGINEER.

WATERMAIN NOTES

- ALL CONSTRUCTION MATERIALS AND PROCEDURES MUST CONFORM WITH CURRENT GRAND TRAVERSE COUNTY D.P.W. STANDARDS, SPECIFICATIONS AND DETAILS.
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER 48 HOURS PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL ISSUE A WORK SCHEDULE TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
- ALL WATER MAIN SHALL BE CLASS 52 DUCTILE IRON, MEETING CURRENT AWWA STANDARDS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- WATER MAIN SHALL HAVE A MINIMUM OF SIX (6) FEET OF COVER BELOW EXISTING OR PROPOSED GRADE, UNLESS NOTED OTHERWISE ON THE PLANS.
- RETAINER GLANDS SHALL BE USED ON ALL MECHANICAL JOINT FITTINGS.
- BURLAP, PLASTIC OR POLY (20 MILLS) OR APPROVED EQUAL SHALL BE PLACED BETWEEN THE CONCRETE THRUST BLOCK AND DEAD-END MAINS OR DEAD-END PLUGS, TEES, HYDRANTS AND CROSSES TO FACILITATE THE REMOVAL OF THE THRUST BLOCK FOR FUTURE EXTENSION AND MAINTENANCE.
- A PHYSICAL GAP SHALL BE MAINTAINED BETWEEN THE PROPOSED WATER MAIN AND THE EXISTING WATER MAIN UNTIL ALL WATER MAIN TESTING HAS BEEN COMPLETED AND APPROVED BY THE ENGINEER AND THE GRAND TRAVERSE COUNTY D.P.W.
- THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE GRAND TRAVERSE COUNTY D.P.W. AND THE ENGINEER. THE D.P.W. SHALL BE GIVEN A MINIMUM OF 24 HOURS NOTICE PRIOR TO THIS CONNECTION.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN WATER FOR FLUSHING AND TESTING PURPOSES. CONTRACTOR SHALL COORDINATE WITH THE D.P.W. IF WATER IS OBTAINED FROM THE TOWNSHIP WATER SYSTEM. THE D.P.W. SHALL BE GIVEN 24 HOURS NOTICE PRIOR TO USING ANY WATER FROM THE TOWNSHIP WATER SYSTEM.
- ACTUAL WATER MAIN, HYDRANT AND GATE VALVE LOCATIONS SHALL BE FIELD STAKED PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANTS AND VALVE BOXES TO THE FINISHED GRADE AT NO ADDITIONAL COST TO THE PROJECT.
- THE CONTRACTOR SHALL OBTAIN APPROVAL BEFORE DIRECTING ANY FLUSHING AND TESTING WATERS TO THE COUNTY STORM WATER DRAINAGE DITCH SYSTEM. CONTRACTOR SHALL PROTECT THE DITCH FROM EROSION WHICH MAY REQUIRE THE USE AN ENERGY DISSIPATER ON THE DISCHARGE OF THE FLUSHING VALVE. ALL FLUSHING WATERS SHALL BE CONTAINED WITHIN THE DITCH AND SHALL NOT IMPACT THE ROADWAY OR ADJACENT LANDOWNERS. IF NOT APPROVED AN ALTERNATE METHOD MUST BE DETERMINED AND APPROVED. ALL COSTS ASSOCIATED WITH FLUSHING, TESTING, AND DISCHARGING ARE INCLUDED IN HE COST OF THE PROJECT.

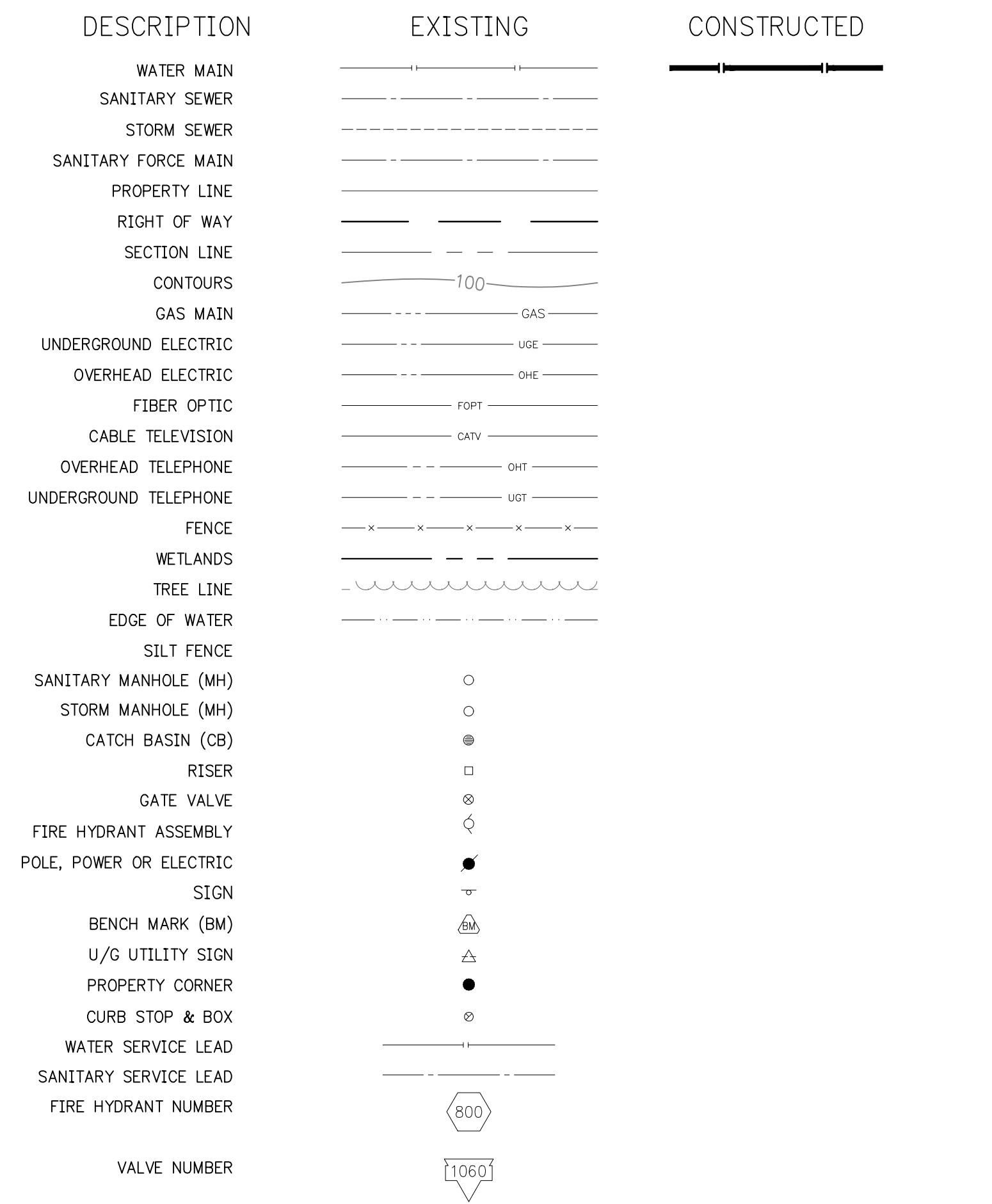
SOIL EROSION AND STORM WATER CONTROL NOTES

- THE CONTRACTOR SHALL PROVIDE TEMPORARY SOIL EROSION CONTROL MEASURES PER P.A. 451 AS AMENDED. WITH THE USE OF SILT FENCE AND OTHER TEMPORARY MEASURES THE CONTRACTOR SHALL PROTECT THE ADJACENT AREA FROM ACCELERATED EROSION AND SEDIMENTATION FLOWS RESULTING FROM CONSTRUCTION. THE CONTRACTOR SHALL INSTALL ADDITIONAL TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES, IF DIRECTED BY THE ENGINEER OR SOIL EROSION CONTROL OFFICER, AT NO ADDITIONAL COST TO THE PROJECT.
- INSTALLATION AND MAINTENANCE OF TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- SHOULD ADDITIONAL SOIL EROSION CONTROL MEASURES BE DETERMINED TO BE NECESSARY BY EITHER THE SOIL EROSION CONTROL OFFICER OR THE OWNER'S ENGINEER THEY SHALL BE IN PLACE NO LATER THAN 24 HOURS FROM THE TIME OF NOTIFICATION TO THE GENERAL CONTRACTOR FOR THE PROJECT. IF NOT PLACED IN 24 HOURS OR LESS ALL ON SITE CONSTRUCTION WILL BE HALTED UNTIL SUCH MEASURES ARE INSTALLED AND APPROVED BY EITHER THE SOIL EROSION CONTROL OFFICER OR THE OWNER'S ENGINEER.
- ALL DISTURBED NON-HARD SURFACE AREAS TO BE STABILIZED WITH TOPSOIL, SEEDED, FERTILIZED, MULCHED, AND ANCHORED. CONTRACTOR SHALL FOLLOW THE 2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR THIS WORK. MULCH BLANKET MAY BE REQUIRED IN AREAS AS DETERMINED BY THE ROAD COMMISSION. PRIOR TO PLACEMENT OF THE SEED, THE CONTRACTOR SHALL SUBMIT THEIR MIX TICKET FOR REVIEW AND APPROVAL BY THE TOWNSHIP AND ROAD COMMISSION.
- IF REQUESTED BY THE ENGINEER OR SOIL EROSION CONTROL OFFICER, A WATER TRUCK SHALL BE KEPT ON STAND-BY ON SITE DURING THE CONSTRUCTION PHASE OF THE PROJECT. THE WATER TRUCK SHALL BE USED AS DIRECTED BY THE ENGINEER OR SOIL EROSION CONTROL OFFICER TO CONTROL WIND EROSION.
- ALL STORM DRAINAGE PIPE SHALL BE CORRUGATED GALVANIZED STEEL PIPE OR APPROVED EQUAL UNLESS OTHERWISE INDICATED ON THE PLANS.
- A MINIMUM OF TWO (2) FEET OF COVER FROM FINISHED ELEVATIONS SHALL BE MAINTAINED OVER ALL STORM DRAIN PIPES.
- ALL DRAINAGE PIPES THAT OUTLET AT GROUND SURFACE SHALL INCLUDE END SECTIONS.
- EXISTING STORM DRAINAGE DITCHES SHALL BE REBUILT IF FILLED IN OR REMOVED DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE NEW CULVERTS IF EXISTING ARE ENCOUNTERED AND REPLACE ALL DRAINAGE CULVERTS DAMAGED DURING CONSTRUCTION AT NO ADDITIONAL COST TO THE PROJECT. ALL CULVERTS SHALL INCLUDE END SECTIONS.
- THE CONTRACTOR SHALL REMOVE OR CAUSE TO BE REMOVED ALL SEDIMENT OR SOILS THAT HAVE BEEN DROPPED, WASHED ONTO OR TRACKED OUT ONTO PUBLIC RIGHT-OF-WAY OR PRIVATE ROADS AT THE END OF EACH WORKING DAY OR AFTER EACH RAIN EVENT ON NON-WORK DAYS.
- ALL REMOVED TOPSOIL WILL BE STOCKPILED WITHIN THE PROJECT AREA. IF ADDITIONAL TOPSOIL IS AVAILABLE AFTER TOPSOILING THE CONSTRUCTION AREA, IT WILL BE STOCKPILED WITHIN 1000 FEET OF THE CONSTRUCTION AREA AS DIRECTED BY THE OWNER OR ENGINEER.
- THE CONTRACTOR SHALL REPAIR ALL WASHOUTS AND EROSION DURING THE GUARANTEE PERIOD OF ONE (1) YEAR AT NO ADDITIONAL COST TO THE OWNER.

CONSTRUCTION SCHEDULE NOTES

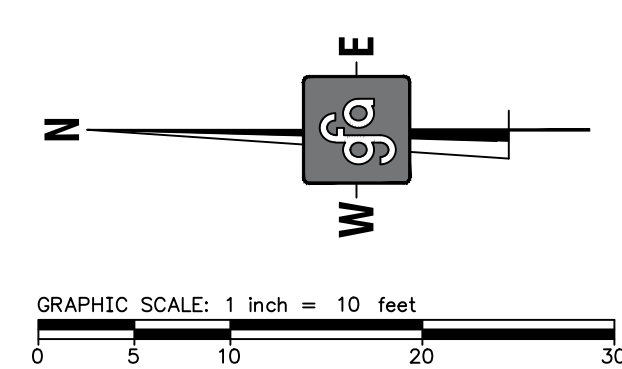
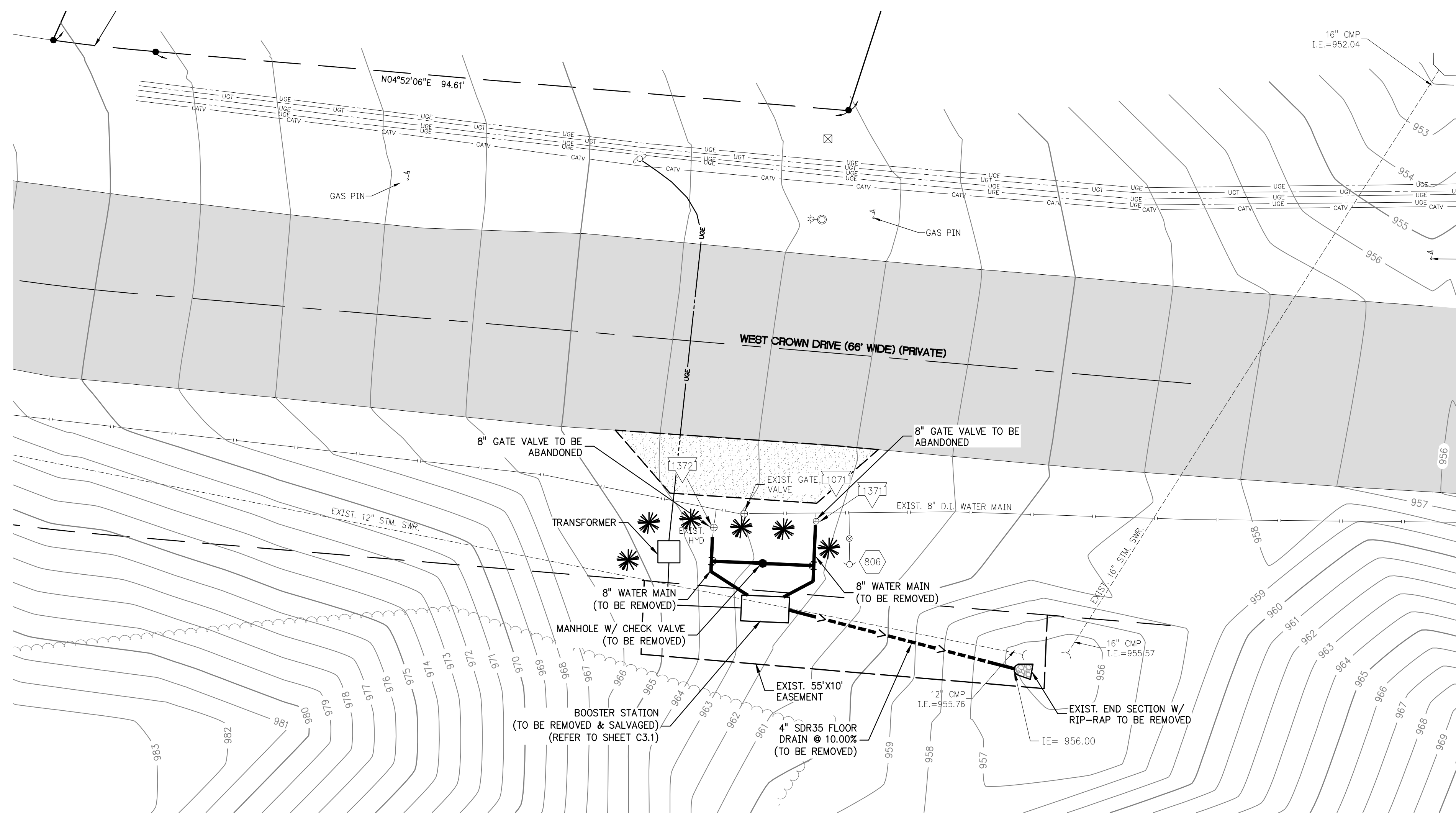
- THE BOOSTER STATION PACKAGE IS TO BE SALVAGED AND RELOCATED. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH TOWNSHIP/ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECT, LOADING, OFFLOADING, TRANSPORTING, PROTECTION AND STORAGE IN COMPLIANCE WITH THE MANUFACTURERS INSTRUCTIONS. CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED PERMITTING.
- ALL WORK SHALL BE COORDINATED WITH THE GRAND TRAVERSE COUNTY DPW. ALL EQUIPMENT OPERATIONS AND VALVE MANIPULATIONS SHALL BE PERFORMED BY THE DPW.
- CONTRACTOR IS RESPONSIBLE FOR DISCONNECT/REMOVAL OF ELECTRICAL SERVICE, INCLUDING TRANSFORMER AND PAD AND COORDINATION WITH ELECTRICAL SERVICE PROVIDER.
- CONTRACTOR IS RESPONSIBLE FOR DISCONNECT/REMOVAL OF SCADA INCLUDING ANTENNA AND COORDINATE WITH TOPLINE ELECTRIC.

PLAN LEGEND



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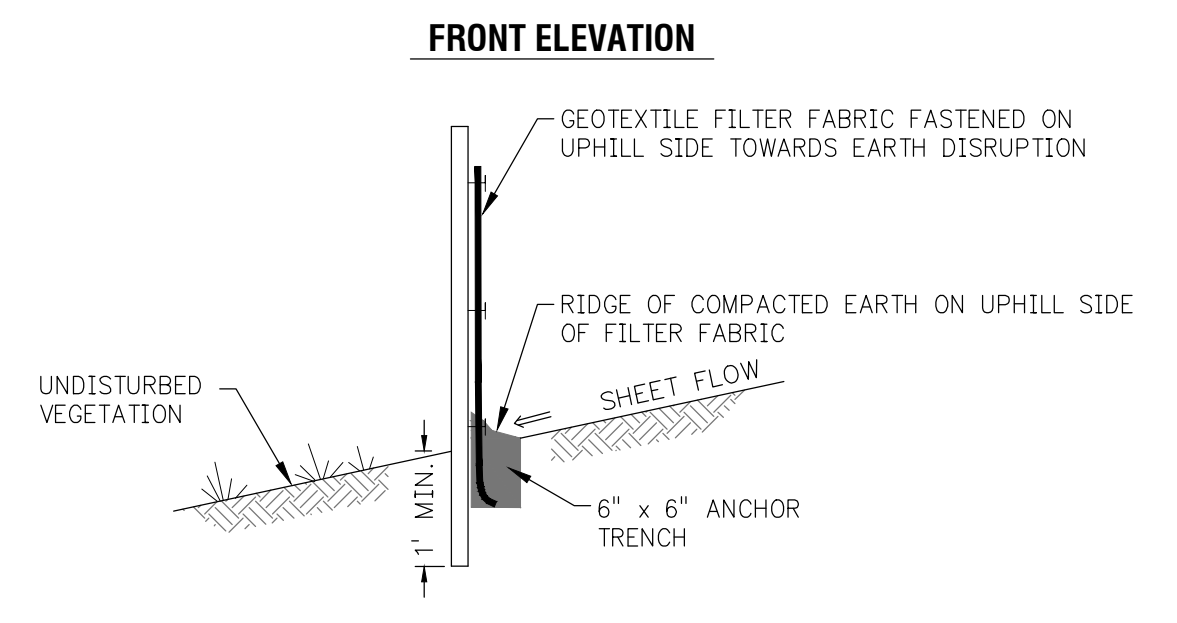
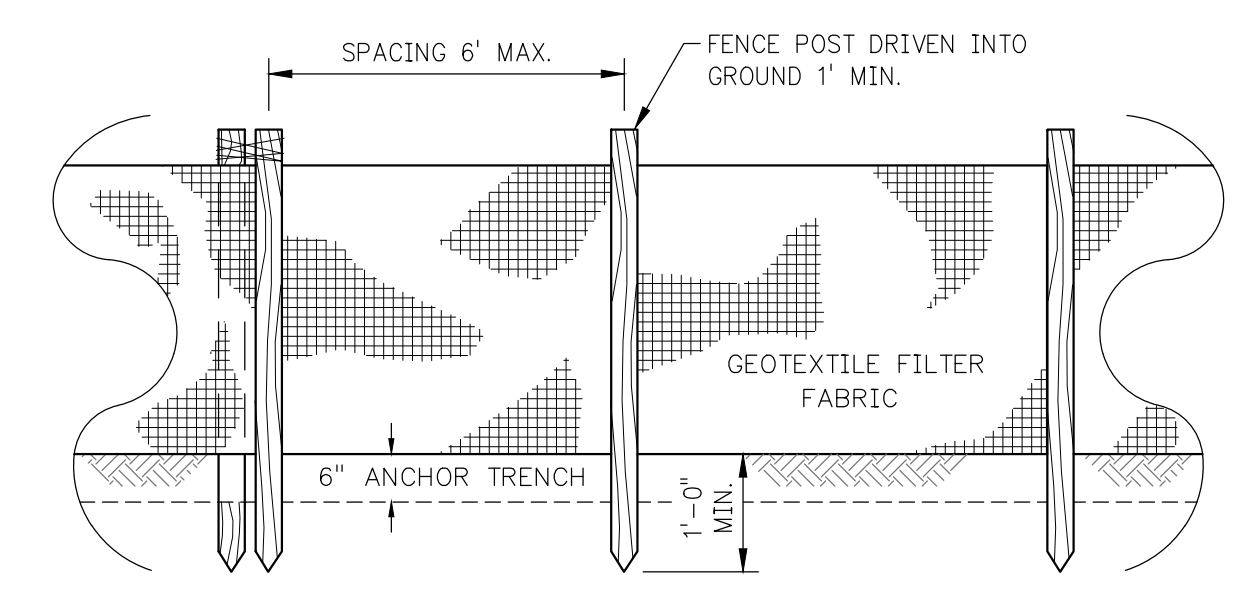
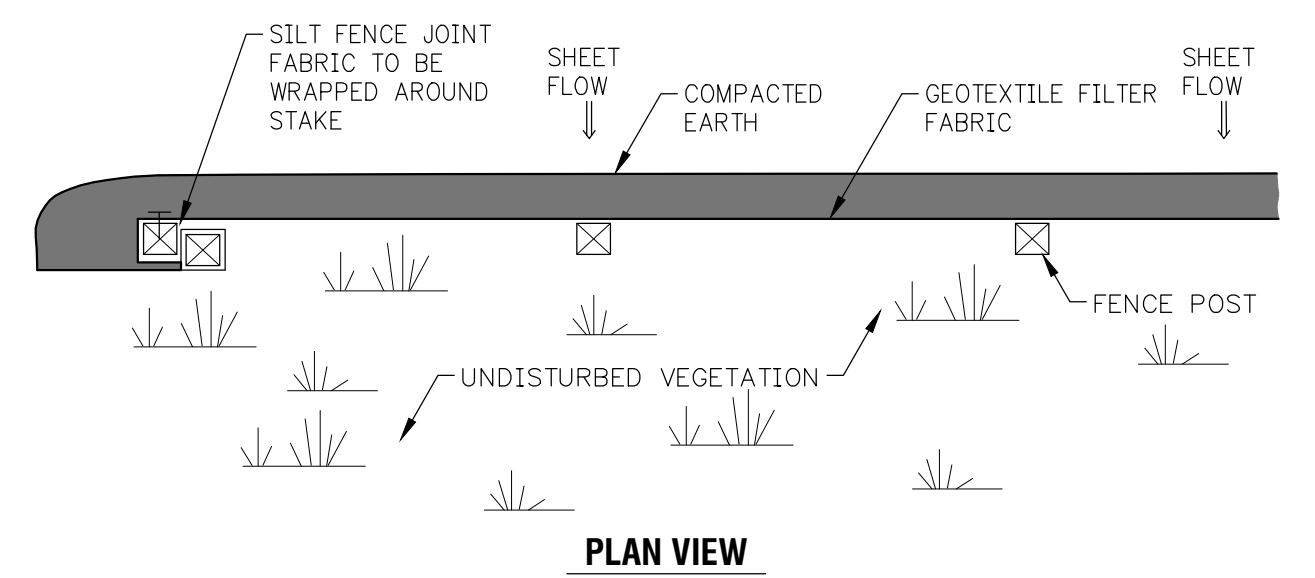
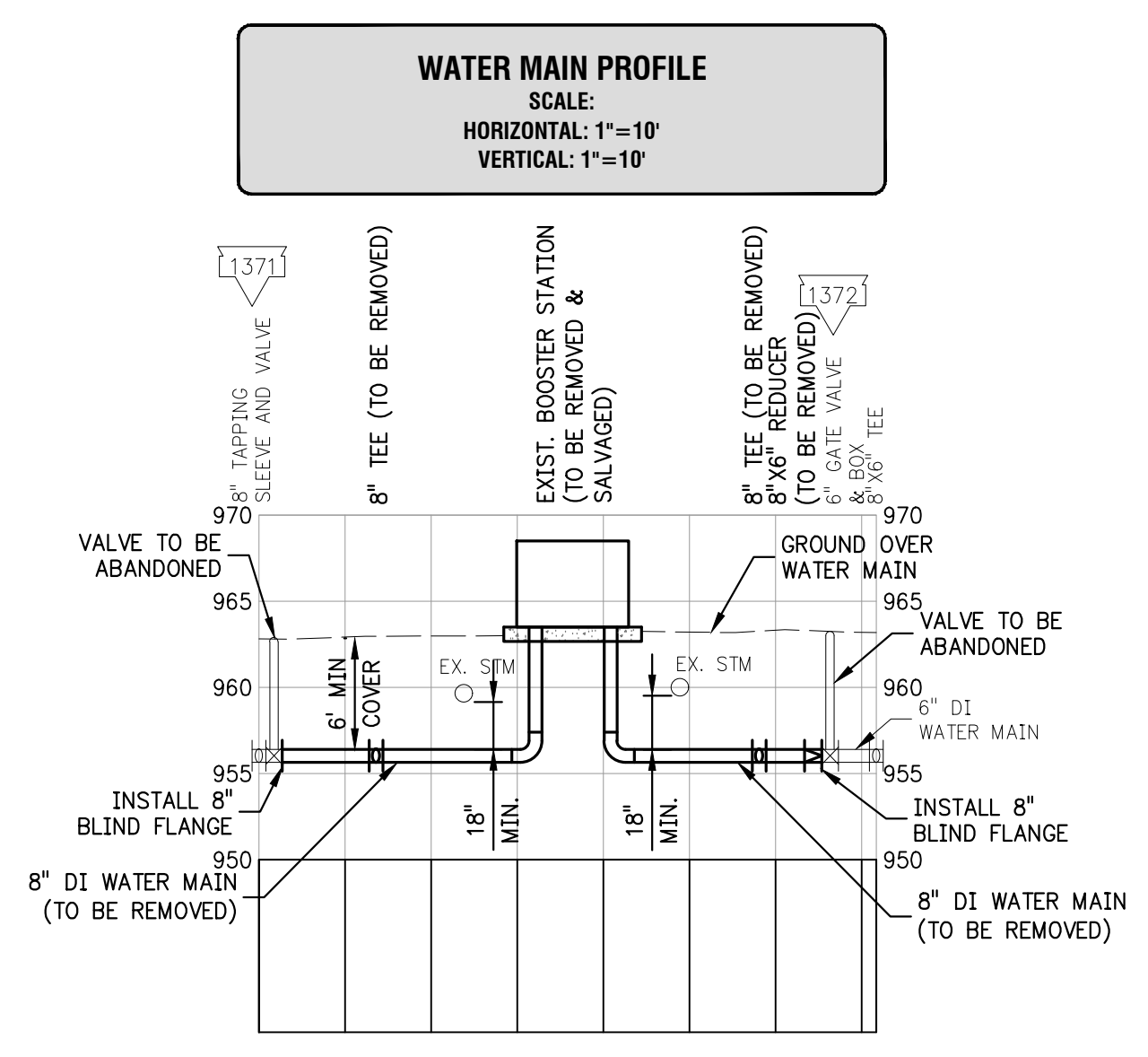
ENGINEERING SURVEYING TESTING & OPERATIONS	
231.946.8874 (p) 231.946.9703 (f)	
123 West Front Street Traverse City, MI 49684	
GRAND TRAVERSE COUNTY DEPT. OF PUBLIC WORKS THE CROWN BOOSTER STATION ABANDONMENT GENERAL NOTES SECTION 19, T.27 N., R.11 W. GARFIELD TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN	These documents are prepared in accordance with the contractual terms and conditions for this project.
PROJ: JENNIFER GRAHAM, P.E. DRN: C. BALLANCE DES: A. BELANGER	23029 C1.2



BENCHMARK 'M':
 SET MAG NAIL IN WEST FACE 6" ASH
 ELEV. = 994.66 (N.G.V. DATUM)
 (LOCATED IN LOT 14 PER EXHIBIT B TO
 MASTER DEED OF CROWN COMMONS NO. 2)

NOTES

1. DRAWINGS ARE BASED ON 2014 RECORD DRAWINGS (14416) AND ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY.
2. THE DPW TO PERFORM ANY VALVE OPERATION TO ISOLATE AREA TO FACILITATE BOOSTER STATION ABANDONMENT.
3. EQUIPMENT TO BE SALVAGED SHALL BE COORDINATED WITH THE DPW. CONTRACTOR TO TAKE CARE PROTECTING SALVAGED EQUIPMENT UNTIL TURNED OVER TO THE DPW. ANY DAMAGE DONE TO BE REPAIRED/REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. ALL ELECTRICAL WORK COMPLETED TO DECOMMISSION THE BOOSTER STATION SHALL BE COORDINATED WITH CONSUMERS ENERGY. ALL SCADA INCLUDING PANEL, ANTENNA, ETC. TO BE DECOMMISSIONED AS COORDINATED WITH TOPLINE ELECTRIC.
5. CONTRACTOR TO BE RESPONSIBLE FOR PROVIDING ALL NECESSARY MATERIALS AND LABOR TO COMPLETE ABANDONMENT INCLUDING POWER SUPPLY, WATER, FUEL, ETC. AT NO ADDITIONAL COST TO THE PROJECT.
6. CONTRACTOR TO PROPERLY DISCONNECT BOOSTER STATION STATION FROM ELECTRICAL SOURCE IN ACCORDANCE WITH LOCAL ELECTRICAL CODE.
7. UPON COMPLETION OF WORK, CONTRACTOR TO REMOVE FROM THE SITE ALL MATERIALS, DEBRIS, TOOLS, MACHINERY, OR ANY OTHER ITEMS THAT HAVE ACCUMULATED AROUND THE SITE DURING THE ABANDONMENT PROCESS. THE SITE TO BE RESTORED TO PRE-CONSTRUCTION CONDITION, INCLUDING BACKFILLING, GRADING, AND REPAIRING ANY DAMAGE THAT MAY OCCUR DURING ABANDONMENT.
8. CONTRACTOR TO SALVAGE AND DELIVER ANY ITEMS AS REQUESTED BY THE DPW.



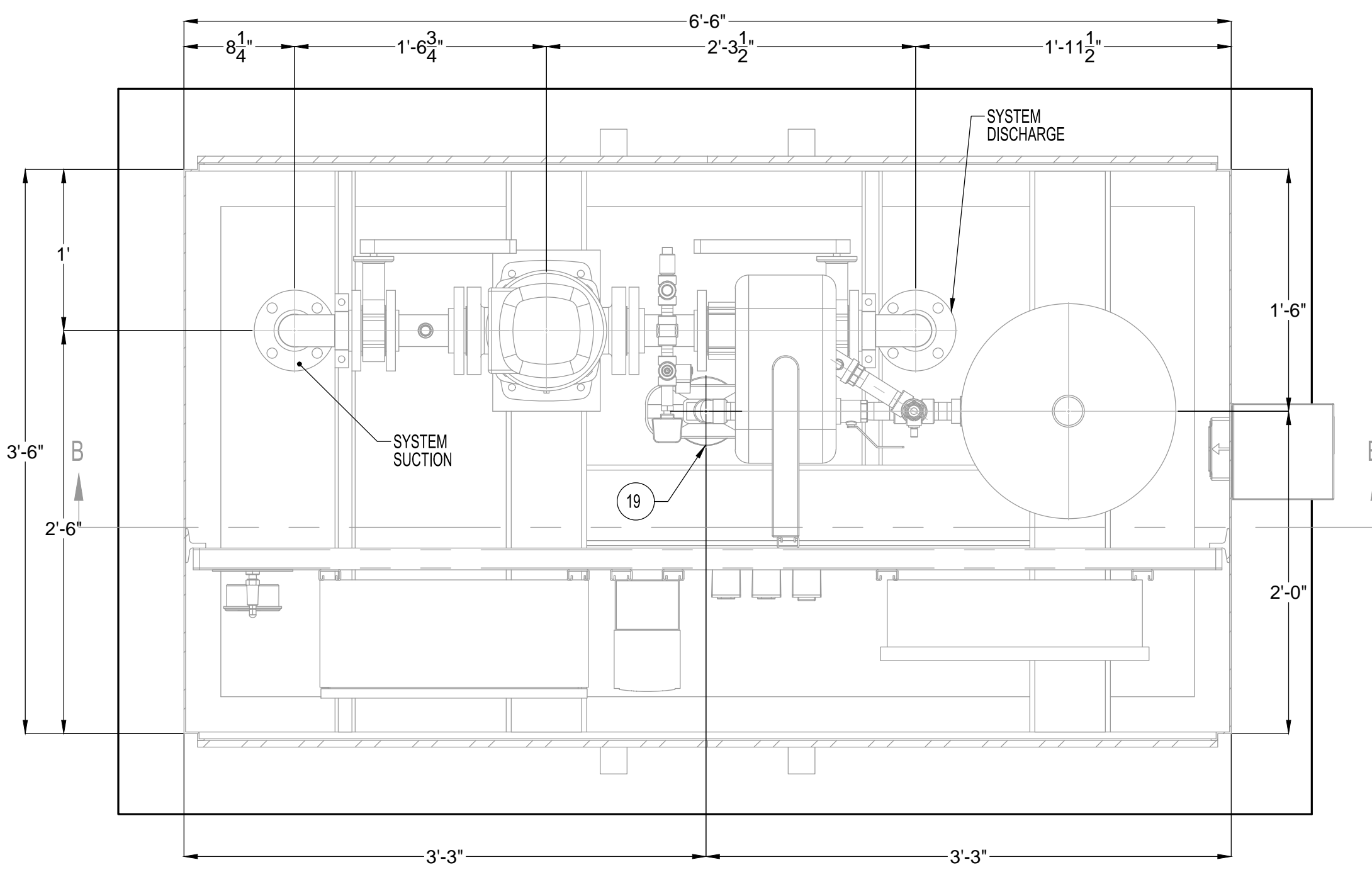
SILT FENCE DETAILS
 NO SCALE

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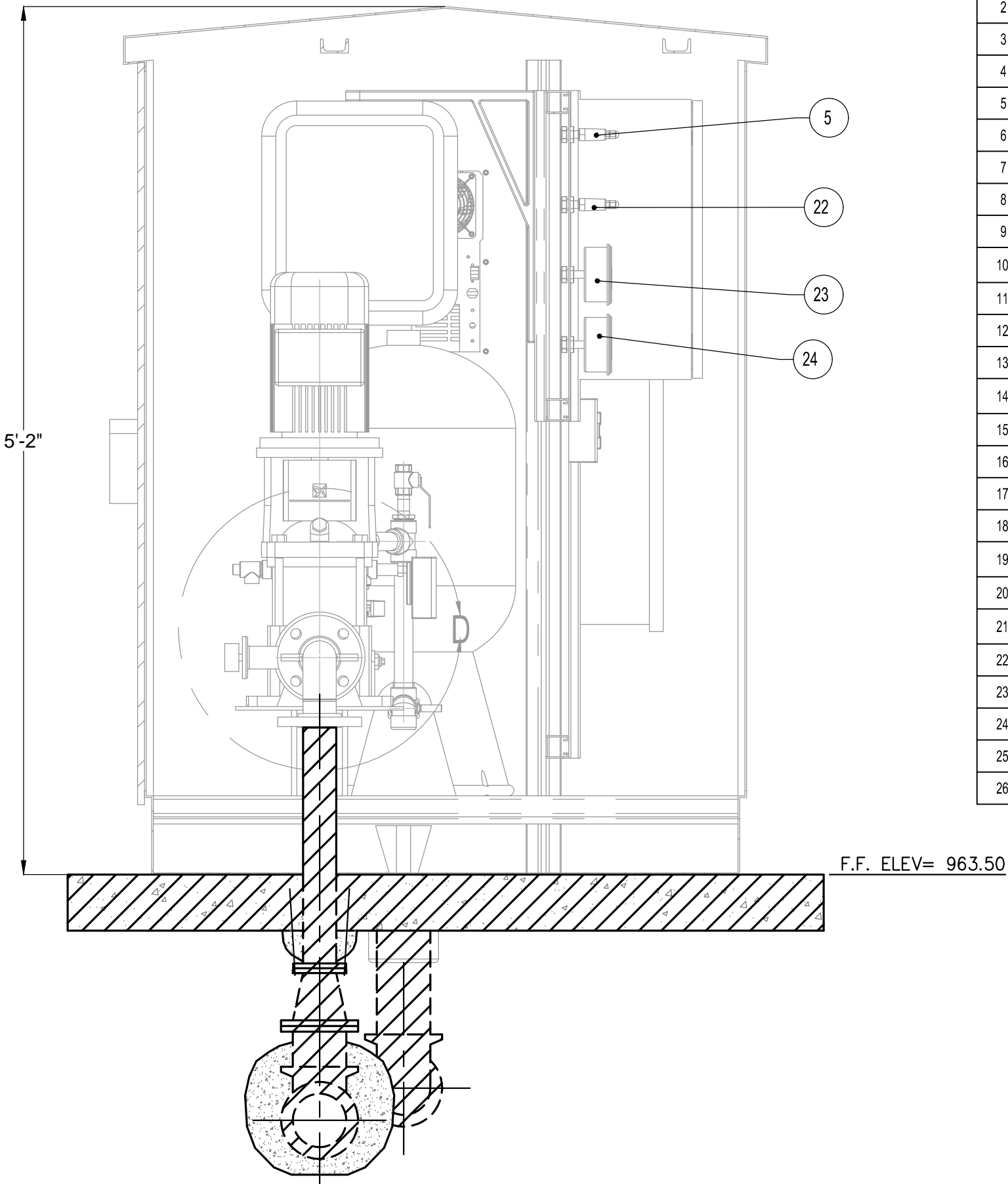
http://gfa.io 	
ENGINEERING SURVEYING TESTING & OPERATIONS 123 West Front Street Traverse City, MI 49684	
PROJECT: 250808_05_BOOSTER ABANDONMENT	DATE: 10/14/2025
DRAWN BY: GJALANKE	CHECKED BY: GJALANKE
ISSUED FOR PERMITS	DATE: 10/14/2025
PROJECT NO: 23029	SHEET NO: C2.1

GRAND TRAVERSE COUNTY DEPT. OF PUBLIC WORKS
THE CROWN BOOSTER STATION ABANDONMENT
 SITE DEMOLITION PLAN
 SECTION 19, T.27 N., R.11 W.
 GARFIELD TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

These documents are prepared in accordance with the contractual terms and conditions for this project.



SECTION A-A

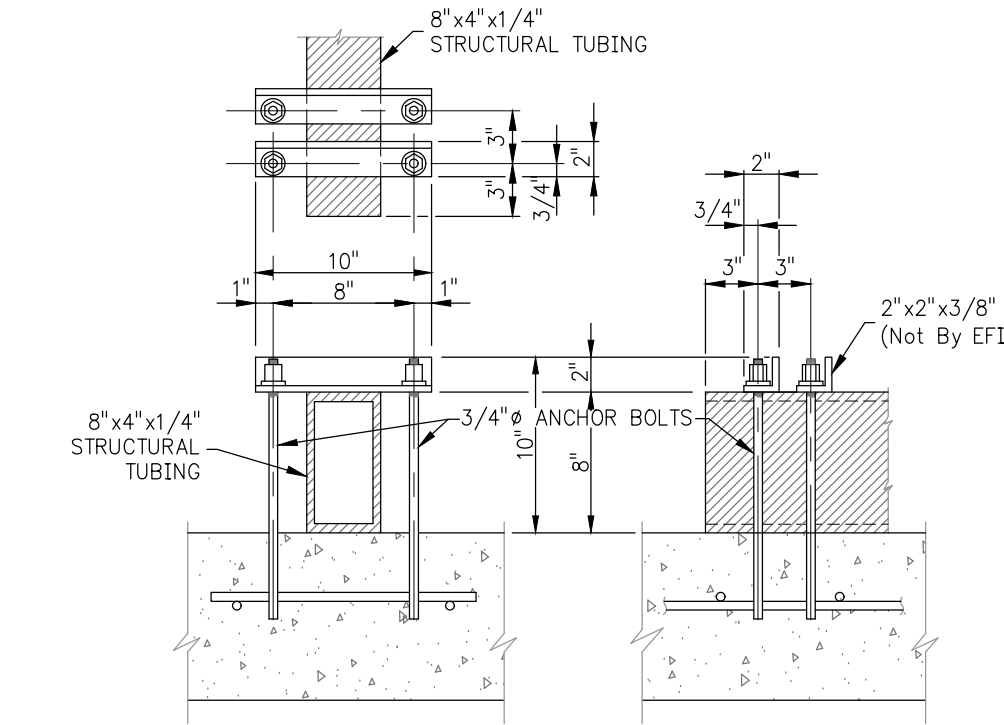


SECTION C-C

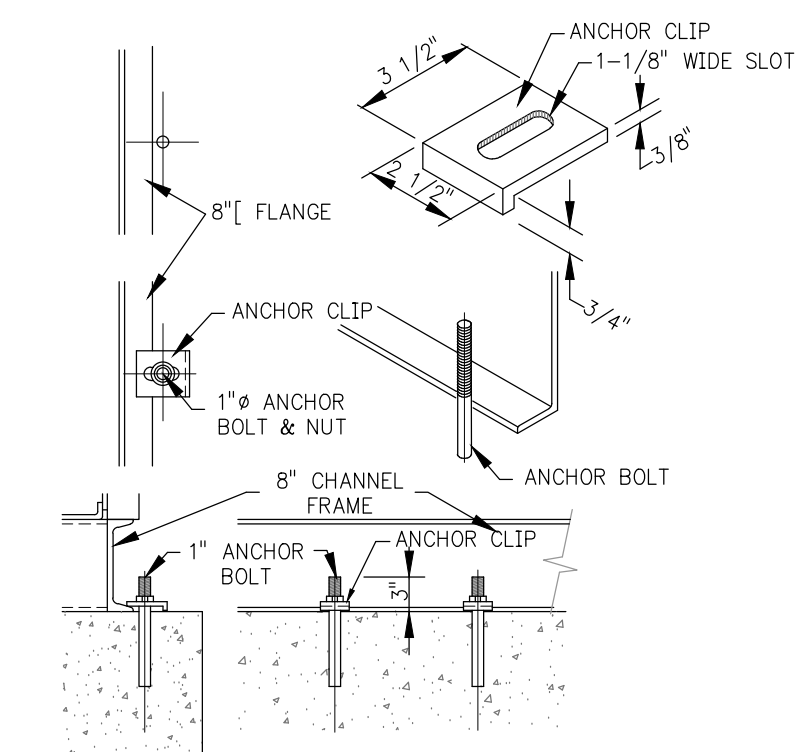
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TRAFFIC BOX STYLE ENCLOSURE	INSULATED	1
2	CR 104 3HP, 1 PHASE	3 HP, TEFC, VERTICAL MULTISTAGE PUMP	1
3	AQUA-STAT	PUMP CASING WATER TEMP MONITOR	1
4	PANEL BOARD	AS PROVIDED BY OWNER	1
5	PRESSURE TRANSDUCER 300 PSI	300 PSI	1
6	CONCRETE PAD	BY CONTRACTOR	1
7	AIR CONDITIONER		1
8	WALL MOUNT HEATER	3 KW	1
9	2" BUTTERFLY VALVE - 31H	ANSI CLASS 125/150 BUTTERFLY VALVE - 250 PSI MAX	2
10	2" FABRICATED SPOOL (A)	ANSI CLASS 300 x 150 FLANGES, SCHED. 10 STAINLESS STEEL PIPE	2
11	2" WAFER SILENT CHECK VALVE	SILENT CHECK VALVE, WAFER STYLE, ANSI CLASS 125/250	1
12	2" FABRICATED SPOOL (B)	ANSI CLASS 150 FLANGES, SCHED. 10 STAINLESS STEEL PIPE	1
13	1/4" SOLENOID VALVE	VALVE, SOLENOID (COMPLETE) 120 VAC, MINI 1/4" SST	1
14	0.5 IN - 530	PUMP PROTECTION VALVE (50 TO 175 PSI - CONTRACTOR TO PIPE TO DRAIN)	1
15	2" FABRICATED ELBOW	ANSI CLASS 150 FLANGES, SCHED. 10 STAINLESS STEEL PIPE	2
16	15GAL. HYDRO-PNEUMATIC TANK	TANK, HYDRO-PNEUMATIC, 150 PSI	1
17	1" BALL VALVE		2
18	1/2" BALL VALVE		1
19	FLOOR DRAIN WITH FUNNEL - 4" PIPE	SHIPPED LOOSE - CONTRACTOR TO INSTALL PER LOCAL CODES	1
20	CONTROL PANEL	C-SD02028	1
21	ABB R1 VFD	1 THRU 5 HP (208/230 VOLT, 3PH)	1
22	SUCTION PRESSURE TRANSDUCER	100 PSI	1
23	DISCHARGE PRESSURE GAUGE	0-200 PSI	1
24	SUCTION PRESSURE GAUGE	0-100 PSI	1
25	DUPLEX OUTLET	115 VAC	1
26	SIMPLEX OUTLET	115 VAC	2

NOTES:

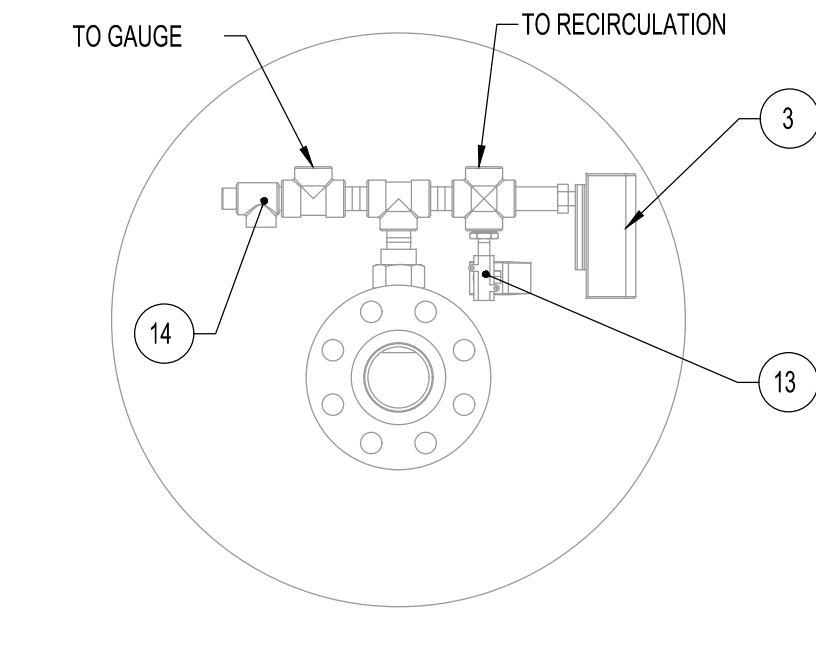
- ALL COMPONENTS IN GRAY SCALE AND IN TABLE TO THE LEFT SHALL BE SALVAGED AND RETURNED TO OWNER UNLESS OTHERWISE INDICATED. CONTRACTOR SHALL BE RESPONSIBLE FOR STORAGE, OFFLOADING, AND TRANSPORTING IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS, MDOT, ROAD COMMISSION & NEC CODE. REFER TO SPECIFICATIONS.
- CONTRACTOR IS RESPONSIBLE FOR REMOVING AND DISCONNECTING (110/240 VOLT) UTILITY METER AND MAIN DISCONNECT TO SERVICE THE STATION, INCLUDING ALL COORDINATION, PERMITS, AND ASSOCIATED FEES. METER AND DISCONNECT TO BE REMOVED FROM STATION AS COORDINATED WITH DPW. ALL BELOW GROUND CONDUIT SHALL BE REMOVED. ALL CONDUIT IN STATION SHALL BE REMOVED.
- CONTRACTOR IS RESPONSIBLE FOR ALL LOCAL REGULATORY PERMITS, FEE, AND INSPECTIONS.
- LOCATIONS OF ALL EQUIPMENT TO BE COORDINATED WITH OWNER.
- SCADA, RADIO, ANTENNA, COAX, PROGRAMMING, CONTROLS, ETC. TO BE SALVAGED & RETURNED TO OWNER. CONTRACTOR TO COORDINATE ACCORDINGLY. CONTRACTOR TO BE RESPONSIBLE FOR REMOVAL AND SALVAGING OF DISCONNECTED EQUIPMENT.
- CONTRACTOR TO REMOVE AND PROPERLY DISPOSE OF ANY PIPING, FITTINGS, VALVES, ELECTRICAL EQUIPMENT, PUMPS, FOUNDATION, AND ANY OTHER APPURTENANCES ASSOCIATED WITH THE BOOSTER STATION. CONTRACTOR TO SALVAGE AND DELIVER ANY ITEMS AS REQUESTED BY THE DPW.



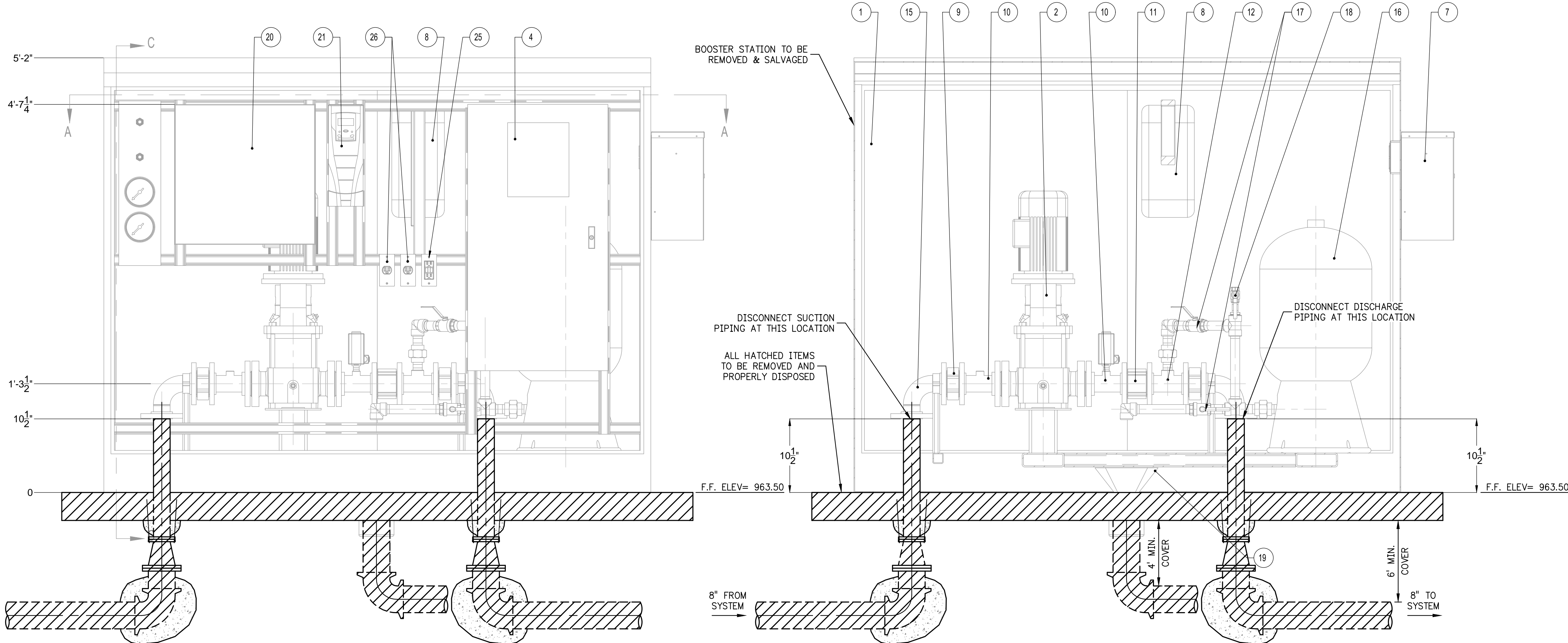
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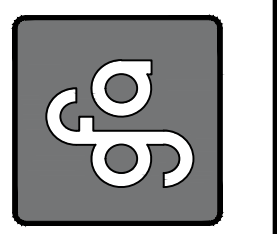
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SCALE: NOT TO SCALE



DETAIL D



SECTION B-B



REV#	DATE	BY	DESCRIPTION
A	07/02/2024	CP	ISSUED FOR PERMITS

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These documents are prepared in accordance with the contractual terms and conditions for this project.