Standard Construction Requirements
Village of Schoolcraft

Adopted:
September 18, 2006

Prepared By:
Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Village of Schoolcraft
8/2006

The Village of Schoolcraft

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September 18, 2006

TO ALL DEVELOPERS, CONSULTING ENGINEERS AND CONTRACTORS:

The Standard Construction Requirements, August 2006 Edition, was adopted on September 18, 2006 by the Village of Schoolcraft. The purpose of adopting these Standard Construction Requirements is to ensure the use of uniform, adequate and acceptable construction methods and materials. The Village strives at all times to stay up to date regarding construction engineering developments.

This August 2006 Edition is considered the standard requirements that are to apply to work and materials bid or contracted on or after September 18, 2006.

The cost of this document is twenty-five ($25.00) dollars.

VILLAGE OF SCHOOLCRAFT

Cheri M. Lutz
Village Manager

Oak Tree: Author James Fenimore Cooper wrote *Oak Openings*, a book about Schoolcraft after visiting in the first half of the 19th Century.
House: The Dr. Nathan Thomas house was a station on the Underground Railroad. He was the first physician in West Michigan.
Arrowheads: Offer tribute to the Native Americans who settled here prior to the arrival of the European-descended newcomers.
Plow: The sale of prairie lands attracted new settlers to Schoolcraft, the site of the first settlement in Kalamazoo County.
Beehive: The first settler, Bazel Harrison was a character in *Oak Openings* known as "The Bee Keeper".

EXPLANATION OF THIS DOCUMENT:

The purpose of this document is to provide Developers, Consulting Engineers and Contractors working in the Village the general requirements and standard construction requirements required by the Village for water main, storm sewer, sidewalks and public roads, which after acceptance by the Village, will become public facilities.

THESE STANDARD CONSTRUCTION REQUIREMENTS SHALL BE INCORPORATED BY REFERENCE AS PART OF THE CONTRACT DOCUMENTS FOR THE ACQUISITION AND CONSTRUCTION OF WATER MAIN, STORM SEWER, SIDEWALK, & PUBLIC ROAD PROJECTS.

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SECTION 1

GENERAL REQUIREMENTS

1.01 DEFINITIONS

Agreement – The written contract between the Applicant and Contractor covering the work to be performed.

Village – Village of Schoolcraft, Kalamazoo County, Michigan

Village's Engineer – The person, firm or corporation used by the Village for consulting engineering purposes.

Contractor – The person, partnership, corporation or other legal entity with whom the Applicant has entered into an agreement to construct the Work.

Contract Documents – The Agreement, plus any or all of the following additional documents, if they exist: addenda (which pertain to the Contract Documents), contractor's bid (including documentation accompanying the bid and any post bid documentation submitted prior to the notice of award) when attached as an exhibit to the Agreement, the notice to proceed, bonds and insurance certificates, general conditions, supplementary conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all written amendments, change orders, work change directives, field orders, and Applicant's Engineer's written interpretation and clarifications. THESE STANDARD CONSTRUCTION REQUIREMENTS SHALL BE INCORPORATED BY REFERENCE AS PART OF THE CONTRACT DOCUMENTS.

Development Contract – A written contract between the Applicant and the Village covering various items regarding the Project.

Applicant – The person, partnership, corporation or other entity for whom the Work is being constructed and with whom the Contractor has entered into an Agreement. Also referred to as Developer in this document.

Applicant's Engineer – The Consulting Engineer employed by the Applicant for the Project.

Plans – The drawings which show the scope, extent and character of the Work to be furnished and performed by Contractor and which have been approved by the Village and are referred to in the Contract Documents.

Project – The water main, sanitary sewer, storm sewer, sidewalk or public road construction project which will become a public facility.

Specifications – Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Work – The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.02 STANDARDS/ORDINANCES

All work shall conform to these Standard Construction Requirements and all applicable Village ordinances and rules and regulations.

To the extent applicable, the Village of Schoolcraft Code, and all rules and regulations adopted there under, are considered part of these Standard Construction Requirements.

The Applicant and the Contractor shall keep themselves fully informed of and shall at all times comply with all local, state and federal laws, rules and regulations applicable to the Project.

THE PROCEDURE FOR GRANTING A VARIANCE TO THESE STANDARD CONSTRUCTION REQUIREMENTS IS:

A. A written request for a variance shall be prepared and filed by the Applicant with the Village. This written request for a variance shall be prepared and signed by the Applicant.

B. The Village will consider the variance request and consult with the Village Engineer as necessary. The Village will then give a written notice to the Applicant stating the Village's decision on the variance request. The Village decision shall be final and binding on the Applicant.

1.03 AGREEMENT

The Agreement shall incorporate by reference all of these Standard Construction Requirements and shall provide that the Village is a third party beneficiary of the Agreement and that all provisions of the Agreement in favor of the Applicant and/or Village may be enforced by the Village. The Agreement shall be submitted to the Village for approval prior to its execution.

The Village shall require a Development Contract between the Developer and the Village.

1.04 PERMITS AND APPROVALS

Prior to commencing construction of the Project, the permits / approvals shall be obtained (if applicable) by the Applicant's Engineer and may include but not limited to:

A. Site Plan Review.

B. Village Water Department Approval.

C. Michigan Department of Transportation (US 131 Jurisdiction)

D. Kalamazoo County Drain Commissioner – County Drains for storm sewer and Soil Erosion Sedimentation Control (Part 91 of PA 451). Note: Storm water detention may be required.

E. Michigan Department of Environmental Quality (former Public Health)

1) Water main construction permit (Act 399).

2) Inland Lakes and Streams (Part 301 of Act 451).

3) Soil Erosion and Sedimentation Control (Part 91 of Act 451).

4) Wetlands (Part 303 of Act 451).

5) Storm Water Discharge (Part 31 of Act 451).

6) Other.

No construction work on the Project shall commence until all of the above referenced permits/approvals which are applicable have been obtained, the Development Agreement has been signed, any necessary agreements with the Village have been signed and delivered, all required easements have been signed and delivered to the Village, appropriate evidence that all required insurance is in force has been filed with the Village, the Village has reviewed and approved the Agreement, and the preconstruction conference has been held.

1.05 INDEMNITY/INSURANCE

1.05.01 Indemnity - General

The Contractor shall agree in the Agreement that as a condition of performing the Work, the Contractor agrees to assume all liability for and protect, indemnify and save the Village, Michigan Department of Transportation, Kalamazoo County Road Commission, Kalamazoo County Drain Commissioner (including Road Commission's, Drain Commissioner's and Village's respective consulting engineers), their agents, consultants, officers, board members and employees, harmless from and against all actions, claims, demands, judgments, losses, expenses of suits or actions and attorney fees for injuries to, or death of, any person or persons and loss or damage to the property of any person, or persons, whomsoever, and the Contractor's agents, contractors, subcontractors, officer and employees, arising in connection with or as a direct or indirect result of entering into and performance of the Work, whether or not due to or arising out of the acts of the Contractor or its agents, contractor, subcontractors, officers and employees, or by or in consequence of any negligence or carelessness in connection with the same or on account of liability of obligation imposed directly or indirectly upon any of the above named indemnified parties by reason of any law of the State of Michigan or the United States, now existing or which shall hereinafter be enacted, imposing any liability or obligations, or providing for compensation to any person or persons on account of or arising from the death of, or injuries to employees. The Contractor shall pay, settle, compromise, and procure the discharge of any and all such claims and all such losses, damages, and expenses. The indemnified parties shall have the option to retain their own attorney or attorneys and the reasonable expense thereof shall be paid by the Contractor.

1.05.02 Insurance Requirements

The Agreement shall provide that prior to commencing work; the Contractor shall file with the Village, a certificate of insurance acceptable to the Village as proof that the Contractor has secured the types and amounts of insurance required by this subsection for the Project. The Village shall have the right, in its sole discretion and at any time(s), to require the Contractor to file with the Village certified copies of any policies of insurance.

Insurance requirements shall conform to Section 18 of the Village of Schoolcraft Construction Specifications, with minimum limits as outlined in sub-section 18.02.

The certificate or certified policies filed with the Village shall provide for giving the Village 30 days prior written notice of any cancellation, material change in coverage or non-renewal of the insurance.

The furnishing by the Contractor of any insurance policies and/or insurance certificates and their acceptance or approval by the Village shall not release the Contractor from the obligation to provide sufficient insurance coverage as set forth herein and shall not waive liability of the Contractor to provide indemnification as provided above.

1.06 PRE-CONSTRUCTION CONFERENCE

A pre-construction conference shall be held with the Village, the Village's Engineer, the utility companies and other agencies affected by the proposed construction. The Village's inspection procedures will be reviewed with regards to water main and sidewalks.

At the pre-construction meeting, if the Project is for water main, AutoCAD Release 2006 or prior drawing files on 3 1/2″ high density disk or CD shall be provided to the Village so that water main may be drawn by the Village's Engineer so as to conform with construction records. This will include water services, main line valves, and hydrant locations. All major field changes shall be drawn by the Applicant's Engineer. Construction records may not be completed until the other utilities have completed their work, in order to have more objects to tie witnesses to.

1.07 ASSESSMENTS/CHARGES/FEES

Water assessments/charges/fees include, but are not limited to, front footage, trunkage, stub, water services/meters and Plan review and inspection fees (development fees). These assessments/charges/fees will be established by the Village Council by ordinance and resolution. It is the responsibility of the Applicant to make inquiry as to the amount of assessments, charges and fees applicable to the Project. Payment terms, if any, shall be as agreed upon in writing with the Village.

1.08 CONNECTIONS/FINAL ACCEPTANCE

Prior to service connections or final approval of the Project by the Village, the following items shall, if applicable to the Project, be submitted to the Village:

a) Signed Engineer's Certificate for Water System (required form is included as page 1-16).

b) Executed Bill of Sale (required form is included as page 1-17).

c) AutoCAD Release 2006 or prior record drawings (see Section 1.06).

d) Copies of Michigan Department of Environmental Quality permits.

e) Final plat or drawings showing recorded dedicated easements.

f) Letter of credit for uncompleted work.

g) All easements signed, delivered and recorded.

In addition, all testing shall have been completed and all complaints shall have been resolved. Also, the date on which the guarantee period commences shall have been agreed to in writing by the Village, Applicant and Contractor.

1.09 BUILDING CONNECTIONS

Separate permits will be required for any water services into buildings.

1.10 GUARANTEE

The Agreement shall provide that the Contractor shall guarantee the completed Work for one year and shall promptly repair, replace, restore, or rebuild, as the Village may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur (or has occurred) because of such defects during the one-year period, except where other periods of maintenance and guarantee are provided. The one year period shall begin on a date agreed upon in writing by the Applicant, Contractor, and the Village.

All subcontractors, manufacturer, or supplier warranties and guarantees, expressed or implied, with respect to any material or equipment used in or incorporated as a part of the Work shall be obtained by the Contractor as agent for the Village, and all such warranties and guarantees shall inure to the benefit of the Village without the necessity of separate transfer or assignment thereof; provided that if required by the Village, the Applicant and Contractor shall cause such subcontractors, manufacturers, or suppliers to execute such warranties and guarantees in writing to the Village and, further, that the Agreement shall provide that the Contractor will assign all such warranties and guaranties to the Village on request.

1.11 CONTRACTORS AND SUBCONTRACTORS

The Work shall be performed by responsible contractors and subcontractors known to be skilled and regularly engaged in work of similar character and magnitude. The Applicant shall receive written approval from the Village of all contractors and subcontractors prior to entering into the Agreement.

1.12 CONTRACTOR RESPONSIBILITIES

1.12.01 General

All of the following Contractor responsibilities shall be incorporated as part of the Agreement.

1.12.02 Safety and Protection

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall

take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- The public and all persons on the Work site or who may be affected by the Work.
- All the Work and materials and equipment to be incorporated therein, whether in storage on or off site.
- Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, driveways, roadways, sidewalks/bike paths, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of underground facilities and utility owners when construction of the work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in this paragraph caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor, supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractors' duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and accepted.

1.12.03 Safety Representative

The Contractor shall designate a qualified and experienced safety representative at the Work site, whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

1.12.04 Emergencies

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Applicant or the Village, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Applicant and the Village prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Work have been caused thereby. If the Applicant determines that a change in the Work is required because of the action taken by the Contractor in response to such an emergency, with prior written approval of the Village, the Applicant may issue a change order or otherwise authorize a change in the Work to account for the consequences of the action taken with respect to the emergency.

1.12.05 Supervision and Superintendence

The Contractor shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall be responsible to see that the complete Work complies accurately with the Plans and Specifications.

The Contractor shall keep on the Work at all times during its progress a competent superintendent, who will cooperate fully with the Village at all times, and who shall not be replaced without written notice to the Village. The superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor.

1.12.06 Labor, Materials and Equipment

The Contractor shall provide competent, suitably qualified personnel to perform the Work. The Contractor shall at all times maintain good discipline and order at the site.

The Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the Work.

All materials and equipment shall be of good quality and new, except as otherwise provided in the Plans and Specifications. If required by the Village, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise provided in the Plans and Specifications.

1.12.07 Construction Records

The Contractor shall provide construction record information and utilize standard record forms as provided by the Village.

1.13 COST SHARING

All cost sharing agreements (if any) between the Village and Applicant shall be in writing and shall be signed and delivered prior to the start of construction.

1.14 WORK SITE

The Contractor shall confine its work to the public rights-of-way, easements and Applicant's property. Any other area required for equipment or material storage or for construction operation shall be the Contractor's responsibility.

1.15 ACCESS

The Village and its representatives shall be allowed access to all parts of the Work at all times and shall be furnished such information and assistance by the Contractor as may be required to make a complete and detailed inspection.

1.16 INSPECTORS

Authority and Duties of Village Inspectors:

Village inspectors shall not supervise, direct, or have control of the Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. Village inspectors are not authorized to revoke, alter, enlarge or relax any of the Specifications nor to change the Plans in any particular. Village inspectors are not authorized to increase or decrease any Agreement item nor to add new items to the Agreement. Village inspectors will inform the Village as to the progress of the Work and the quality of the completed Work, and the quality of the materials being used. In no instance shall any action or omission on the part of the Village inspector relieve the Contractor of the responsibility for completing the Work in accordance with the Agreement.

The Village shall make an inspection of the completed Work, or such portions thereof which are eligible for acceptance, upon notification by the Contractor that the Work is complete or substantially complete. If the completed Work is not acceptable to the Village at the time of such inspection, the Village shall inform the Applicant and the Contractor orally or in writing as to the particular defects to be remedied.

Inspection may be done by Village staff or the Village's Engineer. Inspection will consist of daily inspection of water main and sanitary sewer installation, testing of water main and sanitary sewer and gathering of construction record information of all items related to water main and sanitary sewer construction, including laterals and water services. Inspection for sidewalk will consist of daily inspection.

All construction staking, compaction testing, major field changes and pay estimates will be the responsibility of Applicant's Engineer.

The Applicant's Engineer shall periodically review the work for conformance to the Plans and Specifications and these Standard Construction Requirements. The Applicant's Engineer shall complete, sign and submit to the Village, the Engineer's Certificate contained on page 1-16.

The Village must accept the Work prior to placing water main, storm sewer, sidewalk or public road in service.

1.17 DEFECTIVE MATERIALS AND WORK

All materials, which do not meet the requirements of the Specifications at the times they are to be used, shall be rejected, unless otherwise authorized as acceptable by the Village in writing.

All completed Work that is found to be defective before the final acceptance of the completed Work, shall be corrected and replaced immediately in conformance with the Specifications.

1.18 SCHEDULING

The Contractor shall file a construction schedule with the Village and shall receive approval in writing prior to commencing construction.

Certain projects may require street closings. The Contractor shall coordinate its work with the Village and shall take all necessary precautions required by the Village to minimize traffic interference.

All detours must be approved by the Village.

1.19 MAINTENANCE OF TRAFFIC

When working within the limits of existing streets, the Contractor shall accommodate vehicular traffic in road rights-of-way as provided in the Specifications. Access to fire hydrants, water and gas valves shall be maintained at all times during construction.

Where streets are partially obstructed, the Contractor shall place and maintain temporary driveways, ramps, etc., which, in the opinion of the Village, are necessary to accommodate the public.

The Contractor shall inform the local police, schools, ambulance services and fire department in advance of its program of street obstruction and detours. Detouring and construction signage shall be in accordance with MDOT Standards for Uniform Traffic Control and in accordance with the directions of the Village.

1.20 LIMITATION ON OPERATIONS

When working within the limits of existing streets, the Contractor shall at all times conduct its work so that there is a minimum of inconvenience to the residents and traveling public within the Project area.

1.21 PROTECTION OF WORK

The Contractor shall protect the Work until it is accepted by the Village in writing. Any part of the completed Work that is damaged prior to acceptance by the Village shall be replaced at the Contractor's expense.

1.22 DUST CONTROL

All haul roads, detour roads and other public and private roads (including backfilled trenches), driveways and parking lots used by the Contractor must be maintained in a dust free condition. The control of the dust shall be accomplished by the application of dust control materials and methods of application as approved and/or sweeping shall be applied as often as is necessary to control the dust or if directed to do so by the Village (within 12 hours after notifications).

1.23 MATERIAL HAUL ROADS

Any spillage on public roadways used as haul routes shall be cleaned daily.

1.24 MAIL BOXES

The Contractor shall temporarily relocate mail boxes interfering with construction so that mail service is not interrupted. Mail boxes shall be replaced in a condition and location equal to that prior to construction or as required by the U.S. Postal Service. All mail boxes shall be replaced with a turn out of six (6") inches of MDOT 23A gravel.

1.25 DEWATERING

Where dewatering is required, the Contractor shall limit the dewatering operation to the minimum time and depth required for construction. The Contractor will be required to furnish and maintain temporary water service to property owners whose wells may be affected by the dewatering operations. The Contractor shall also be responsible for any necessary repairs to existing wells required to place them back in operation after construction is completed. If the Contractor does not provide temporary water in a timely manner, the Village will cause temporary water to be provided and the Contractor shall promptly reimburse the Village for all of its expenses.

1.26 TELEPHONE

An emergency telephone system (listing of number) shall be set up and given to the Village so that the Contractor may be immediately notified of any unsafe conditions or emergencies encountered during times that the Contractor is not working on the Project.

The Contractor shall provide a local number and a local employee so that the Contractor may be contacted at any time (including weekends and holidays) 24 hours a day.

1.27 EXISTING PRIVATE FACILITIES

Existing wells, septic tank, tile field, lawn sprinklers or other facilities which are not on the Applicant's property which are disturbed or damaged by the Contractor, shall be repaired and restored to working condition before the end of that working day. Under no circumstances will such interruptions be extended overnight. The Contractor shall take necessary precautions not to allow any discharge from the above to enter any lake, stream or canal along the line of work. Costs for repairs or temporary service caused by the Contractor shall be at the Contractor's expense.

All precautions necessary shall be taken to insure no damage occurs to homes, including basements.

1.28 CASTING ADJUSTMENTS

Casting adjustments (manholes, water main valves, gas valves, etc.) required in order to meet the new/restored grade shall be made by the Contractor.

1.29 MATERIAL TESTING

The Village reserves the right to sample and test any of the materials required for the proposed construction, either before or after delivery to the Project and to reject any material represented by any sample which fails to comply with the minimum requirements specified.

The Contractor shall furnish all materials reasonably required by the Village for sample testing and analysis necessary for the testing of materials as required by the Specifications.

If any pipe fails to meet the specified requirements, all pipe represented by the sample shall be rejected unless the Contractor can demonstrate through additional tests, at the Contractor's expense, that the remainder of the pipe is satisfactory.

As a minimum requirement, the following shall be submitted to the Village by the Contractor (at no extra cost to the Applicant).

A. Pipe: Certified test reports for strength from the manufacturer.

B. Material list: Valves, pipe, hydrants, etc. by type and manufacturer.

1.30 BONDS

The Village may require performance bonds for all of the Work or, as a minimum, for that portion of the Work within existing rights of way. (Bonds will be required when the Village is the Applicant.)

1.31 FUNDING

Prior to the Contractor starting work, the Applicant shall submit in writing to the Village documentation that the Applicant has available sufficient funds to complete the Project.

1.32 AUTHORITY OF THE VILLAGE AND THEIR AUTHORIZED REPRESENTATIVES

The Village and their authorized representatives have the authority to verify that the Project is being constructed in accordance with the Plans and Specifications, the Standard Construction Requirements, the Village's Rules and Regulations and the Development Agreement.

1.33 DISPUTES

All disputes between the Applicant and Contractor shall be reviewed and resolved in a timely manner.

1.34 SUSPENSION OF WORK AND TERMINATION

The Village reserves the right to suspend the Work until all disputes between the Applicant and Contractor are resolved.

1.35 CONTRACT AMENDMENTS/CHANGE ORDERS/NOTIFICATION/ CONCURRENCE

When necessary, the Applicant or the Applicant's Engineer will prepare for the Village's prior written approval, Agreement amendments and change orders.

1.36 SITE CLEANLINESS

The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land areas identified in and permitted by the Plans and Specifications and other land and areas permitted by law, rights-of-way, permits and easements, and shall not unreasonably encumber the Work premises with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work.

1.37 SUBSURFACE CONDITIONS

Any utilities shown on the Plans are located according to the latest available information. The Contractor shall make a conscientious effort and shall provide reasonable assistance to the Village as may be required to verify the locations and/or elevations of all existing utilities, which may be affected by the proposed construction.

At points where the Contractor's operations are near the properties of railroad, telephone and power companies, or are near existing underground utilities, damage to which might result in considerable expense, loss or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall protect, shore, brace, support and maintain all utilities affected by his operations. The Contractor shall be responsible for all damage to utility properties or facilities and shall make his own arrangements satisfactory to the Applicant, with the agency or authority having jurisdiction there over, concerning repair or replacement or payment of costs incurred with said damage.

In the event of interruption to water or other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the Village or other utility owner and shall cooperate with the Village and/or such owner in the restoration of service. If water service or other essential service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the Village's Department of Public Works.

1.38 VALVE TURNING

The Village shall be notified in writing prior to any valves being operated on the portion of water supply system operated by the Village. No such valves shall be operated by the Contractor unless authorized in writing by the Village.

1.39 FIRE PROTECTION SYSTEMS/FIRE HYDRANTS

The Village shall review/approve all fire protection systems except where an exception is authorized as is provided in the Water Rules and Regulations. All fire hydrants shall be on a public water main operated by the Village or the Village of Schoolcraft's Department of Public Works. Easements will be required when the water main and/or fire hydrants are on private property. The Applicant's Engineer shall meet with the Village Water Department prior to the design of all fire protection systems.

1.40 MASTER PLANS

The Village's water main master plans shall be followed by the Applicant's Engineer in the design of the Project. It is recommended that prior to any design being completed, that a meeting be scheduled with the Village to review these master plans.

1.41 ROOF DRAINS/FOOTING DRAINS/SUMP PUMP DISCHARGES

All buildings and other structures shall provide for positive points of discharge for roof drains, footing drains and sump pumps.

Sump pump discharges will not be permitted above ground.

1.42 EASEMENTS

All easements to be granted to the Village will be on forms as provided by the Village. All easements must be recorded and delivered to the Village prior to final approval of the project by the Village.

1.43 EXCEPTIONS

Exceptions to these Standard Construction Requirements may be granted in writing by the Village Public Works Supervisor or, on appeal, the Village Council. Exceptions shall only be granted when applied for in writing and in circumstances where compliance with the Standard Construction Requirements is impossible or would cause extreme hardship. All requests for exceptions shall be in writing and

signed by the Applicant. The exception request shall include all relevant supporting documentation and information, including information supplied by the Applicant's Engineer. The burden of proof shall be on the Applicant to provide convincing proof that the exception is necessary because it is impossible to comply with the Standard Construction requirements or compliance will cause extreme hardship. Additional cost alone is not justification for the granting of an exception. If granted, the exception shall be granted in writing by the Village. The decision of the Village shall be final.

ENGINEERS CERTIFICATE
FOR WATER, STORM SEWER AND/OR SIDEWALK

Date _____

Project Name: _____

Village of __SCHOOLCRAFT_____ Section: _____

County of ____KALAMAZOO_____ , State of Michigan

I hereby certify that the construction of the Project is complete.

Exception(s): _____

_____

and that:

(1) I have personally directed the supervision and inspection of the construction.

(2) The Work has been installed and completed in accordance with the approved Plans and Specifications and also the Village of Schoolcraft Standard Construction Requirements.*

(3) The construction materials meet the approved Specifications.

Signed: _____
Registered Professional Engineer

*A letter from the Village's Engineer, Prein&Newhof, dated_____, has been attached recommending approval based upon satisfactory testing in accordance with the Village's Standard Construction Requirements.

(Completed certificate shall be submitted to the Village prior to any service connections.)

WARRANTY

BILL OF SALE

_____ , whose address is _____ _____ , (hereinafter referred to as "Seller") for and in consideration of One ($1.00) Dollar and other good and valuable consideration, does hereby grant, dedicate, transfer, and deliver to VILLAGE OF SCHOOLCRAFT, whose address is 154 W. Eliza Street, Schoolcraft, MI 49087, (hereinafter referred to as the "Village") _____ _____ _____ (the "Improvement").

Seller hereby warrants and certifies to the Village that the Improvement has been acquired, constructed and completed in accordance with the Plans and Specifications of _____*(consulting firm / dated)*_____ for the Improvement previously approved by the Village, with only those change orders approved in writing by the Village, and that no claim, action, or liability exists with respect to the Improvement and its construction and installation.

Seller further warrants and represents to the Village that it is the lawful owner of the Improvement, and that the Improvement is free of all liens and encumbrances of any kind. Seller further represents that it has the authority to transfer the Improvement and that Seller will warrant and defend the Village against all claims asserted by any entity or person arising out of the installation, construction and completion of the Improvement. Seller also warrants that the Improvement is free from defects in materials and workmanship. All warranties and guarantees pertaining to the Improvement are hereby assigned and transferred to the Village.

Dated: _____ , 20____.

Witnessed By:

_____ By: _____

Its: _____

_____ By: _____

Its: _____

SECTION 2

SPECIFICATIONS FOR EXCAVATING, TRENCHING, & BACKFILLING FOR UTILITIES

2.01 DESCRIPTION OF WORK

The work shall consist of furnishing all materials, equipment, and labor for excavating, trenching, and backfilling for utilities. The work also shall include the necessary clearing, sheeting and shoring, boring and jacking, dewatering, pipe embedment, and other appurtenant work.

2.02 CLEARING, BRUSHING & TREE REMOVAL

2.02.01 General

The Contractor shall perform all clearing, brushing, and tree removal required for the proposed construction. Where indicated on the drawings for a specific area, that area shall be completely cleared in accordance with Sections 201 and 202 of the MDOT 2003 Standard Specifications for Construction. The Contractor shall notify the Engineer 48 hours (two working days) prior to commencement of clearing, brushing and tree removal. Clearing and brushing shall be confined to the limits of the right-of-way or easements unless otherwise directed and shall be kept to a practicable minimum.

Trees marked "Remove" on the drawings shall be taken down and removed from the right-of-way in a manner that does not endanger the adjoining property or persons or traffic using the right-of-way. Stumps of trees that are to be removed may be either removed or ground down to 12" below the ground surface. All stump removal, including those that may be buried, is incidental to the project.

Selective pruning of trees will be permitted to allow operation of the Contractor's equipment. Trees shall be pruned neatly, and the scars from pruning or other damage by the Contractor's equipment shall be covered with a preservative.

2.02.02 Preservation of Trees

Because of the special concern for preservation of trees, all trees six (6) inches in diameter and larger, measured at a point 4 1/2' above the ground line at the base of the tree, which are to be removed have been marked on the drawings. Where there is more than one tree that has grown from a common stump, each tree is measured as a separate tree. All other trees are to be preserved unless written permission for removal is obtained from the Applicant and the Engineer. Where tunneling is necessary to preserve a tree, it shall be included in the major items of work. Trees that may have to be tunneled may or may not be specified on the drawings. Where tunneling is necessary, excavation may have to be done by hand to prevent damage to the tree or to its roots. When tunneling or excavating close to a tree to be preserved, every effort shall be made to preserve the main roots.

2.02.03 Disposal of Debris

All trees, brush, and stumps from clearing and brushing operations shall be disposed of by the Contractor by burning, hauling from the site, or other suitable means approved by the Engineer. The Contractor shall obtain the necessary burning permits and shall comply with the safety regulations required.

2.02.04 Measurement & Payment

The cost of all clearing, brushing, tunneling, and protection of trees which are left standing shall be considered included in the major items of work unless specific items have been provided in the Proposal in which case the prices shall be payment in full for performing this work as specified herein. All tree preservation shall be incidental to the project. Trees will be measured at a point 4-1/2' above the ground line at the base of the tree. Where more than one tree has grown from a common stump, each tree is measured as a separate tree. Trees six (6) inches in diameter and smaller will not be considered pay items.

2.03 REMOVAL OF SURFACE IMPROVEMENTS

Surface improvements such as sidewalks, improved lawns, drives, curb and gutter, and all types of pavement shall be removed just prior to excavating or trenching operations. All improvements shall be cut at the expected trench width prior to excavating using suitable equipment which does not damage the improvement outside of the trench area.

Concrete and bituminous pavement and drives shall be cut with a pavement cutting saw. The depth of the cut shall be the full depth of the pavement. Pavement crushers or breakers of any type are prohibited unless specifically authorized by the Engineer. Pavement which is removed shall not become mixed with backfill material. Power equipment may be used for pavement removal, provided that damage is not caused to improvements which are to remain.

Removal of surface improvements shall be included in the major items of work and no specific payment will be made therefore unless specific Proposal items are provided in which case the prices bid shall be payment in full for performing this work as specified herein.

2.04 EXISTING SOIL/SUBSURFACE CONDITIONS

Where provided, soil borings are shown on the drawings only as information for use by the engineer in preparing the contract documents. The Contractor is solely responsible for confirming actual soil conditions and depth of the water table.

2.05 EXISTING UNDERGROUND UTILITIES & STRUCTURES

2.05.01 Location

No less than three (3) working days prior to excavating, the Contractor is to call "MISS DIG" at 1-800-482-7171. Existing utilities are shown only at their

approximate locations. The Contractor shall be responsbile for determining their exact elevations and location in the field. The Contractor shall notify the owners of all underground utilities before starting any work. House sewer connections, water and gas services, and other utility lines may not be indicated on the drawings. However, the Contractor shall make every effort to locate all underground utilities from information obtained from the utility owner or by prospecting in advance of trench excavation.

2.05.02 Replacement

Certain underground utilities such as sewers may require removal and subsequent replacement in lieu of supporting or bracing during the proposed construction, or the Contractor may elect this option when temporary provisions to maintain essential services have been previously approved by the Engineer.

Unless otherwise specified, any utilities removed during the proposed construction shall be replaced by the Contractor. Materials and installation shall be equal to or better than original construction in every way. Salvaged materials may be reused when they are in good condition, and a satisfactory installation can be accomplished in the judgement of the Engineer.

Replacement of existing utilities shall be considered incidental to the major items of work unless specific items have been provided in the Proposal, in which case the prices bid shall be payment in full for performing this work as specified herein.

2.05.03 Relocation

Should any pipe or other existing utility require raising or lowering or moving to another location because of interference with the pipe or structure being constructed under these specifications, such changes which in the opinion of the Engineer are necessary shall be made by the Contractor unless otherwise specified. This work will be paid for separately under the appropriate contract items or under the contract provisions for extra work.

2.05.04 Reconnection

Where lateral services, house connections, or other pipe lines require reconnection to the proposed utility, as is the case when an existing utility is being reconstructed, the Contractor shall make these connections as specified or as shown on the drawings. All costs for making these connections, including provisions for maintaining flows and providing temporary service during the proposed construction, shall be incidental to the installation of the pipe unless specific items are provided in the Proposal.

2.05.05 Utilities to be Abandoned

When pipes, conduits, sewers, or other structures are removed from the trench leaving dead ends in the ground, such ends shall be fully plugged or sealed with brick and mortar by the Contractor. Abanoned structures such as manholes or chambers shall be entirely removed unless otherwise specified or shown on the drawings.

All materials from abandoned utilities which can be readily salvaged shall be removed from the excavation by the Contractor and stored on the site or loaded on the Applicant's truck as directed by the Engineer. Applicant shall have first claim to salvageable materials. The Contractor is responsible to dispose of salvageable materials not desired to be kept by the Applicant.

All costs for abandoning utilities and for removing and salvaging materials, when required, shall be considered included in the major items of work unless specific items have been provided in the Proposal in which case the prices bid shall be payment in full for performing this work as specified herein.

2.06 EXCAVATING & TRENCHING

2.06.01 General

Excavating and trenching operations shall at all times be conducted in a safe, orderly manner using methods and equipment designed and suited to the intended use by personnel experienced in the work being performed.

None of the requirements or provisions specified herein or shown on the drawings shall nullify or restrict any safety provisions required by any regulation or law governing the protection and/or safety of persons or property.

2.06.02 Width of Trench

The width of the trench shall be ample to permit the pipe to be laid and joined properly and the pipe embedment material and backfill to be placed and compacted as specified. Trenches shall be of sufficient extra width when required as will permit the convenient placing of trench supports, sheeting, and bracing.

2.06.02.01 Width of Trench for Rigid Pipe

In order to limit excessive loads on rigid pipe, the maximum width of trench for pipe 36 inches and larger in diameter shall not be more than twice the nominal diameter; for smaller sizes of pipe, the maximum width of trench shall be not more than 3 feet greater than the nominal diameter of the pipe except as otherwise specifed or directed. The above limiting restrictions on trench width apply from outside bottom of pipe to outside top of pipe.

Where the width of trench within these limits exceeds the maximum limit specified, the Contractor shall install a heavier class of pipe or use other means to provide additional load-carrying capacity at no additional cost to the Applicant. Any changes in class of pipe or other variation shall be approved in writing by the Engineer before the work progresses.

When the trench width above the top of the pipe is appreciably greater then that which is reasonably required by project conditions in the judgment of the Engineer, any additional cost for backfill material, surface restoration, or other items that are the result of such excess width shall be borne by the Contractor.

2.06.02.02 Width of Trench for Flexible Pipe

Unless otherwise specified or approved by the Engineer, a minimum trench width of at least two (2) feet on each side of the pipe for placement of select embedment material will be required.

2.06.03 Excavating to Grade

The trench shall be excavated to a depth required for the proper installation of the pipe and placing of the pipe embedment material as specified.

Any part of the bottom of the trench excavated below the specified subgrade shall be refilled with approved materials compacted to 95% of maximum unit weight in accordance with MDOT procedures at no additional cost to the Applicant. If additional excavation is required to correct unstable foundation conditions, payment will be made as specified in Section 2.08.

2.06.04 Sheeting, Shoring, Bracing, & Shelving

2.06.04.01 General

The Contractor shall brace or slope back the sides of all excavations in accordance with current MIOSHA and OSHA regulations. The Contractor shall be responsible for compliance to such regulations and for the design, installation, and maintenance of all excavation safety measures.

2.06.04.02 Measurement & Payment

Unless otherwise specified in the Proposal, the costs incurred in the installation of bracing, sheeting, shoring, and shelving shall be included in the unit price bid for the work being performed.

Payment for sheeting left in place where directed by the Engineer shall be negotiated with the Contractor in accordance with the contract provisions for extra work unless specific items have been provided in the Proposal.

2.06.05 Rock Excavation

2.06.05.01 General

Wherever the word rock is used in these specifications, it shall mean boulders, solid ledge rock, and other minerals geologically placed and of a hardness when first exposed of 3 or greater in scales of mineral hardness, which in the opinion of the Engineer requires continuous use of drilling and blasting or special power equipment for its removal.

Soft disintegrated rock which can be removed with a power-operated excavator or with hand tools and loose, shaken, or previously blasted rock and broken stone in rock fillings shall not be classified as rock nor will it be included in measurements for payment.

2.06.05.02 Hardness

The Engineer will determine the hardness of the material or minerals in question. The following accepted hardness will be used as a guide in the field for specific situations:

Gypsum	- hardness of 2
Fingernail	- hardness of approximately 2-1/2
Calcite	- hardness of 3
Copper Coin	- hardness of approximately 3
Brass Pin	- hardness of approximately 3

A mineral with a hardness of 3 will scratch a copper coin and can be scratched with a brass pin. Determinations of hardness which cannot readily be determined in the field shall be resolved by laboratory analysis of the material in question.

2.06.05.03 Blasting

Where blasting is necessary, the Contractor shall obtain the required permits and licenses at his own expense. This work shall be done with due regard to the safety of workmen, other people, and public and private property. The method of covering blasts, amounts of charges used, and the general procedure for doing this work shall conform to the standard practice and shall meet all requirements of local ordinances and other regulations and shall be subject to the approval of the Engineer.

2.06.05.04 Clearance

Rock shall be removed to provide a clearance for all pipes, appurtenances, or structures of at least six (6) inches below, and a minimum of six (6) inches on each side of the pipe, appurtenance, or structure.

The specified minimum clearances are the minimum clear distance which will be permitted between any part of the pipe or appurtenances being laid and any part, point, or projection of the rock.

2.06.05.05 Measurement

Only boulders of 1 cubic yard or greater in volume that cannot be removed with power excavating equipment or rock as defined herein will be measured for payment. Measurements of rock will be made by the Engineer after rock is removed from the excavation by measuring the trench before the pipe is installed.

The cross sectional area will be measured at 25 foot intervals or closer if required to accurately measure the trench. The maximum depth which will be measured for payment shall be from the top of the rock formation to the specified subgrade for the pipe embedment material. The maximum width of trench to be considered for payment shall be as follows:

1. Below outside top of pipe, maximum width shall be the outside diameter of the pipe bell plus 12 inches but not less than 30 inches.

2. From outside top of pipe to top of rock formation, maximum width shall be computed based on a 5 on 1 slope vertically for the sides of the trench.

The volume will be computed by the Engineer using the method of average end areas based on measurements of rock actually removed subject to the maximum limits specified.

2.06.05.06 Basis of Payment

Rock excavation shall be paid for at the contract price per cubic yard, which price shall be payment in full for completing all work as specified herein including removal and disposal of the rock.

If a unit price has not been established in the Proposal, payment to the Contractor will be based on the contract provisions for extra work.

2.06.06 Dewatering

The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water including water or sewage from exposed sewers or water mains, from all excavations and trenches, or other parts of the work. Each excavation shall be kept dry during the preparation of the subgrade and continually thereafter until the structure to be built or the installation of the pipe line is completed to such extent that no damage from hydrostatic pressure, flotation, or other cause will result.

Where work is in soil containing an excessive amount of water, the Contractor shall provide, install, and maintain suitable well points or wells connected to manifolds or reliable pumping equipment, or other suitable dewatering methods, and shall so operate the dewatering system to insure proper construction of the work. If the Contractor elects to use a trench underdrain or similar dewatering system, he shall receive prior approval of the Engineer as to location and installation methods for this type of system. The Contractor shall make every effort to prevent sand, sediment, or debris from entering any existing pipe line or conduit which he may use for drainage purposes. The repair or cleaning of drainage structures made necessary by the Contractor's operations shall be performed by and at the expense of the Contractor. Arrangements for discharge of ground water into any public sewer shall be previously approved by the Engineer.

Dewatering including the use of stone or gravel for dewatering purposes when required will not be paid for separately but shall be included in the contract price for the major items of work.

The Contractor shall limit his dewatering operation to the minimum time and depth required for construction. The Contractor will be required to furnish temporary water service and/or provide potable water at the direction of the Engineer to property owners whose wells are affected by the dewatering operations.

2.07 BORING & JACKING

2.07.01 General

Where so specified on the drawings, railroad tracks, streets, or other obstructions to be crossed by utilities shall be bored and/or jacked as hereinafter specified. These specifications describe the general method of conducting the boring and jacking operations and set forth minimum conditions. The location and details of the proposed installation will be shown on the Drawings.

Unless otherwise specified, the Contractor shall be responsible for obtaining any permits required for the work under the right-of-way, or other facility to be crossed, and shall carry out the details of his work in a manner that will fully meet the requirements of the authority having jurisdiction over the facility affected. No interruption of traffic will be permitted, and the Contractor shall take all precautions to that effect.

2.07.02 Casing Method

When the casing method is specified, a casing pipe shall be jacked into place and a carrier pipe shall then be installed in the casing pipe. The casing pipe shall be jacked into place by approved methods that will provide accurate alignment and grade and that will allow the carrier pipe to be installed within the casing at the specified alignment and grade.

The carrier pipe shall be joined together to form a continuous run through the casing. It shall be supported on wooden shoes or blocks which shall be securely fastened to each end of each piece of pipe. The carrier pipe shall then be drawn or shoved through the casing. Junction with pipes of other materials at each end shall be made as shown on the Drawings. After the pipe has been inspected and accepted, the annular space between the pipe and the casing shall be filled with materials approved by the Applicant, such as dry sand, peastone, or flowable fill. After the casing has been filled, the ends of the casing shall be sealed as shown on the drawings or in the specifications.

2.07.03 Jacking Pipe Method

When specified or indicated on the Drawings, the pipe to be jacked shall also be utilized as the carrier pipe. The pipe shall be jacked into place by approved methods that will provide accurate alignment and grade. Excavation shall be performed ahead of the pipe by working inside the pipe or shall be performed by boring with approved equipment suitable for the intended use.

2.07.04 Measurement & Payment

The length of pipe to be measured for payment shall be the actual length of casing or jacking pipe actually jacked or pushed into place. When additional casing is specified or authorized, but is not actually jacked in place, the cost for furnishing and placing such additional casing will be paid for separately. If a unit price has not been established in the Proposal, payment will be based on the contract provisions for extra

work. No additional payment will be made where the Contractor jacks or installs additional casing not shown on the Drawing or authorized by the Engineer.

The contract price per lineal foot for furnishing and jacking the pipe, or casing, where the casing method is used shall be payment in full for completing the work as specified herein including the necessary jacking pits and connections to pipes of other materials.

The carrier pipe shall be paid at the contract price for watermain or sanitary sewer per unit prices shown on the proposal and shall be payment in full for furnishing and installing the carrier pipe inside the casing.

2.08 SUBGRADE

The subgrade for pipe and/or structures shall be firm, dense, and thoroughly compacted and consolidated, free from mud and muck, and sufficiently stable to remain firm and intact under the feet of the workmen.

2.08.01 Unstable Foundation

When the soil beneath the normal pipe embedment area is soft or unstable, even with adequate dewatering, or in the opinion of the Engineer cannot support the pipe or utility, further depth shall be excavated and refilled to the proposed grade MDOT Class II granular material (for plastic pipe the material must comply with ASTM D2321 compacted in twelve (12) inch layers as specified in Section 2.09.05, or other approved means shall be employed to assure a firm foundation for the utility. The volume of unstable foundation removed and replaced with approved materials for which payment will be allowed shall be determined in cubic yards unless otherwise specified on the drawing or in the proposal. Said volume to be computed by assuming that the cross section area of the unstable foundation takes the form of a trapezoid as shown on the Standard Detail for Unstable Soil Removal for Utility.

Payment for removal and replacement of unstable foundation will be paid under the contract provisions for extra work, unless specific Proposal items have been provided, in which case, the unit price bid shall be payment in full for performing the work as specified. If the soil in the bottom of trench is soft due to excessive amounts of ground water, and/or the Contractor's method of operation, stabilization of the trench bottom shall be at the Contractor's expense.

2.08.02 Special Foundations

Where the subgrade at the bottom of the excavation consists of soil which is unstable or yielding to such a degree that, in the opinion of the Engineer, it cannot properly support the pipe or structure, the Contractor shall construct such additonal foundation or reinforcement of the subgrade as may be specified, such as timber piling, geotextiles, or other means as approved by the Engineer to provide a proper foundation.

The construction of special foundations will be paid for separately based on the contract provisions for extra work, unless specific Proposal items have been provided,

in which case the unit price bid shall be payment in full for performing the work as specified.

2.09 PIPE EMBEDMENT

2.09.01 General

Pipe embedment shall include the furnishing and placing of approved materials as specified or as directed from 4 inches under the outside bottom of the pipe to 12 inches over the outside top of the pipe. Various classes of pipe embedment may be specified or shown on the Drawings or Standard details in which case the limits of the various types will also be specified.

2.09.02 Flexible Pipe Embedment

Flexible pipe is any pipe having a pipe stiffness of less than 60 psi. as defined under the requirements of ASTM Designation D-2412 (this includes all plastic pipe except Composite (Truss) pipe, and may include corrugated metal pipe, ductile iron pipe, and steel pipe, depending on pipe diameter and wall thickness).

Pipe embedment for flexible pipe shall be Class B. For pipes less than fifteen (15) inches in diameter, bedding material meeting the requirements of Section 902.08 of the MDOT 2003 Standard Specifications for Construction for granular materials Class II, modified to 100% passing a 1" sieve shall be used. If stone is used for bedding, it shall meet the requirements of ASTM D2321 (Table 1) for Class 1A crushed stone. An Engineer approved geotextile filter fabric shall be placed around all areas where Class 1A crushed stone pipe embedment is used as shown on the Standard details. Transition zones between crushed stone and sand embedment shall be separated by a geotextile fabric. For pipes fifteen (15) inches in diameter and larger, bedding material meeting the requirements of Section 902.08 of the MDOT 2003 Standard Specifications for Construction for granular materials Class II, modified to 100% passing a 1" sieve shall be used.

2.09.03 Class B Pipe Embedment

Unless otherwise specified or shown on the Drawings, all pipe embedment shall be Class B pipe embedment as shown on the Standard details. When the soil in the bottom of the trench at pipe subgrade meets all the requirements for Granular Material Class II as specified in the MDOT 2003 Standard Specifications for Construction, Section 902.08 and in the opinion of the Engineer will provide suitable bedding for the pipe, such soil may be utilized as bedding material and prepared to receive the pipe as specified without undercutting and subsequent replacement.

Plastic pipe embedment shall comply with ASTM D2321.

2.09.04 Special Pipe Embedment

Various types of special pipe embedment may be specified or shown on the Drawings in locations where special conditions require their use.

The Contractor shall perform all the work of constructing special pipe embedment where specified.

2.09.05 Placing Pipe Embedment Material

Pipe embedment material shall be placed in the bottom of the trench and shaped by hand to provide a firm and uniform bearing for the barrel of the pipe with additional shaping to accommodate the bells on bell and spigot pipe.

After each pipe has been graded, aligned, and placed in final position on the bedding material and jointing is complete, additional embedment material shall be carefully placed and compacted under and around each side of the pipe and over the pipe until it is completely covered by 12 inches of embedment material. Said material shall be distributed along both sides of the pipe uniformly and simultaneously to prevent lateral displacement of the pipe. All granular embedment material shall be compacted to 95% of maximum unit weight in accordance with MDOT procedures.

All the work of placing pipe embedment shall be considered an integral part of installing the pipe and shall be completed immediately after the pipe is laid to the correct alignment and grade.

2.09.06 Basis of Payment

All the work of furnishing and/or placing pipe embedment material as specified shall be included in the contract items for the proposed work as follows:

2.09.06.01 Class B Pipe Embedment

When a contract item has been provided in the proposal for special backfill, payment will be made under this item as specified in Paragraph 2.10 for approved granular material obtained off the site. When no specific item for special backfill has been provided, this work shall be incidental to the laying of the pipe.

2.09.06.02 Special Pipe Embedment

When one or more contract items have been provided in the Proposal for special pipe embedment, payment to the Contractor will be based on the prices bid for the respective items. When no specific items have been provided in the Proposal, the cost for completing this work as specified shall be incidental to the laying of the pipe except for authorized extra work in which case the contract provisions for extra work shall apply.

2.10 BACKFILLING ABOVE PIPE EMBEDMENT

2.10.01 General

All backfill material shall be free from cinders, ashes, refuse, sod, organic material, boulders, or rocks larger than 12 inches in diameter, frozen material or other material which in the opinion of the Engineer is unsuitable. The soil excavated from the trenches shall be used for backfilling when it is classified as suitable by the Engineer.

If all or a portion of the excavated material is classified as unsuitable for backfilling, the Contractor shall remove and dispose of the unsuitable material and shall furnish and place granular material meeting the requirements of Section 902.08 of the MDOT 2003 Standard Specifications for Construction for Granular Material Class II.

All backfilling and compaction shall be performed by the Contractor using methods and equipment approved by the Engineer.

2.10.02 Trenches Requiring Compacted Granular Backfill

Trenches and excavations in the following locations shall be backfilled with approved granular material meeting the requirements of Section 902.08 of the MDOT 2003 Standard Specifications for Granular Material Class II:

a. Improved areas, including drives, sidewalks, parking areas, around structures, etc.

b. Within the limits of the roadway (within a 1 on 1 slope beginning two (2) feet from the edge of pavement or back of curb towards the right-of-way line).

c. Within the limits of future improvements (shown on Drawings).

d. Within limits specified on Drawings.

e. All sanitary sewer lateral trenches within the limits of the right-of-way.

All backfill within these areas shall be placed in layers not exceeding twelve (12) inches thick, and shall be compacted to 95% of maximum unit weight in accordance with MDOT procedures. Tests for compaction will be made by the Engineer or other representative designated by the Engineer at no cost to the contractor. When tests indicate a density which is less than that required, the methods or equipment being used shall be modified to obtain the density specified, and the section in question shall be recompacted until the required density is obtained. The cost of retesting shall be borne by the Contractor.

2.10.03 Trenches Not Requiring Compacted Granular Backfill

Where not otherwise specified or directed, backfilling above the pipe embedment shall be made with material which is originally excavated, which is suitable. Backfill materials shall be consolidated by mechanical equipment working longitudinally in the trench, or by other approved methods, so as to be free of large voids with any excess material mounded over the trench or removed as directed by the Engineer. The trench shall be graded to a reasonable uniformity and left in a neat condition.

2.10.04 Basis of Payment

Payment for backfilling including compaction shall be made as follows:

a. When a contract item has been provided in the Proposal for special backfill, payment will be made under this item as specified in Paragraph 2.11 for approved granular material obtained off the site.

b. When no specific item for special backfill has been provided in the Proposal, this work shall be incidental to the major items of work.

2.11 SPECIAL BACKFILL - MEASUREMENT AND PAYMENT

2.11.01 Measurement

When an item has been provided in the Proposal for special backfill, approved granular material obtained off the site which is required by these specifications or authorized by the Engineer shall be included in this item. Special backfill shall be measured compacted in place. The Contractor shall furnish a delivery ticket for each truck load at the time the material is delivered to the project. The delivery ticket shall be prepared at least in duplicate, one copy of which shall be furnished to the Engineer or his representative, the other copy to be retained in the Contractor's file. No payment shall be made for special backfill unless the individual truck delivery tickets are furnished in this manner. The Engineer will use the delivery tickets when calculating the compacted in place quantity.

2.11.02 Payment

The Proposal unit price per cubic yard for special backfill shall be payment in full for furnishing, placing, and compacting the special backfill and for disposing of the material excavated from the trench as directed and in accordance with the Drawings and Specifications.

Stone used specifically for dewatering procedures shall not be classified as special backfill and no specific payment will be made therefore.

2.12 DISPOSAL OF EXCESS EXCAVATION

All excavated material in excess of that needed for backfill or that material classified as unsuitable by the Engineer shall be disposed of by the Contractor. However, the Engineer reserves the right to direct the Contractor to haul all or a portion of the material not required for backfilling to an area designated by the Engineer which is not more than 1,000 feet outside the project and which is reasonably accessible. This work, when directed, shall be performed at no additional cost to the Applicant.

2.13 LIMITATIONS ON OPERATIONS

The Contractor shall at all times conduct his work so that there is a minimum of inconvenience to the residents and businesses in the vicinty of this project. To this end, he shall complete his backfill and remove all debris and unsuitable backfill to a point as close to the actual pipe installation as is practical and keep the area where the pipe construction and backfill has been completed in a neat condition. Open excavations shall be protected by signs, lights, barricades, and/or fence at all times when work is not actually taking place at that excavation. The placement of

excavated earth along the line of the trench shall be controlled by the use made of the street or right-of-way by the public and shall always be confined to approved limits.

Not more than 300 consecutive feet of street shall be closed at one time, and vehicular traffic through any street shall not be stopped for a period longer than two weeks without the written permission of the Engineer. Not more than one cross street shall be closed to vehicular traffic at the same time except by permission of the Engineer. Contractor shall maintain access for emergency vehicles at all times.

2.14 SOIL EROSION AND SEDIMENTATION CONTROL

The Contractor shall comply with Section 15 under the Village of Schoolcraft Standard Constructrion Requirements, “Specifications for Soil Erosion Control” with the following additions:
The Contractor shall conduct his operations in such a manner that all soil is confined within the project limits and prevented from entering storm sewers, water courses, rivers, lakes, reservoirs, or wetlands.

The Contractor shall place a filter or barrier composed of straw, stone or other approved material around all catch basins or other inlets to the storm sewer or drainage courses to prevent sedimentation in these structures. After the construction operations are completed, the Contractor shall remove these filters and clean all the sediment and debris from the catch basins, ditches or other storm sewer structures.

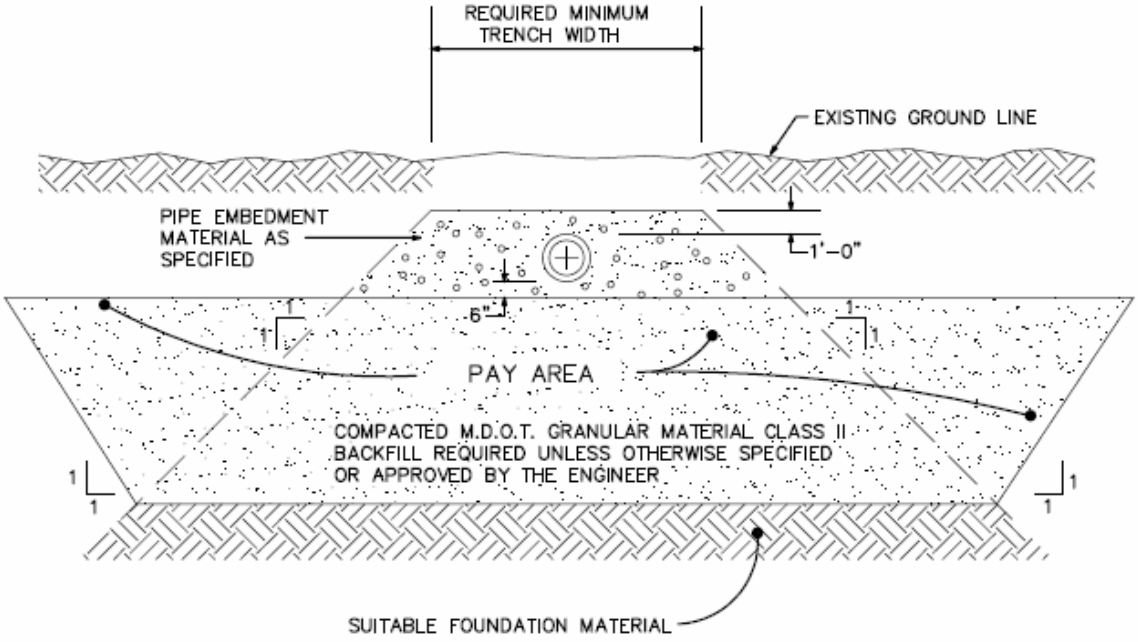
Soil erosion and sedimentation control measures if indicated on the drawings are considered as minimum requirements and are not to be considered as complete and all-inclusive. Additional control measures as may be required due to circumstances or conditions at the time of construction or as directed by the Engineer, or the designated Soil Erosion Control agency, shall be placed as required to insure conformance with the "Soil Erosion and Sedimentation Control Act of 1972" to insure conformance with the Part 91 of PA 451 of 1994. Deviations from or additions to the erosion control measures shown on the drawing shall be subject to the approval of the Engineer or enforcing agency.

The Contractor is responsbile to have a certified storm water operator and complete all such reports as required by regulatory agencies as it relates to storm water and soil erosion and sedimentation control.

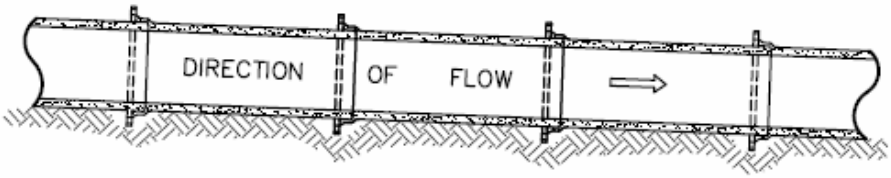
The cost of this work and other control measures which may be required or directed by the Engineer shall be incidental to the cost of the project unless specific items have been provided in the proposal.

2.15 STREAM CROSSING

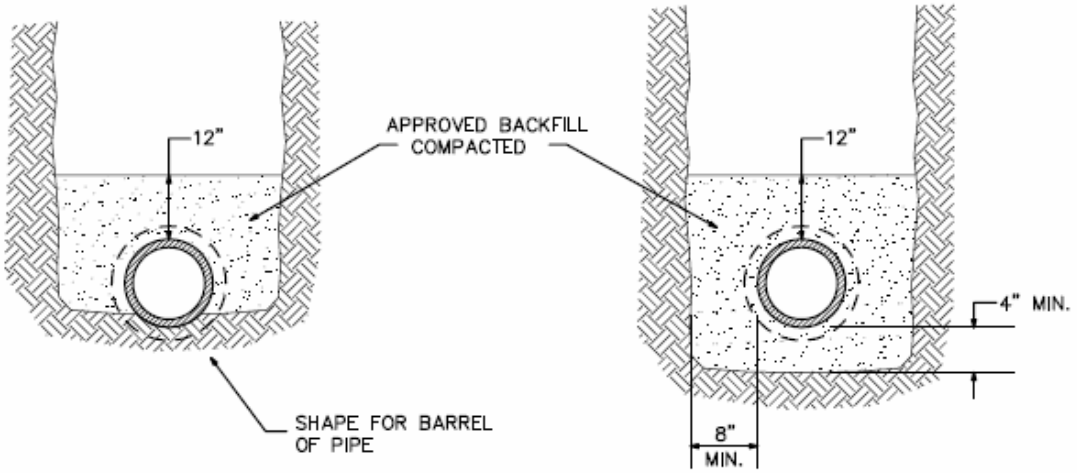
The rules and regulations of Act 451, shall govern all streams, wetland and river crossings.



UNSTABLE SOIL REMOVAL FOR UTILITY



EXCAVATION FOR BELLS



(ALL BACKFILL INDICATED SHALL BE COMPACTED TO 95% OF MAX. DENSITY IN ACCORDANCE WITH M.D.O.T. PROCEDURES)

NOTE:

1. METHOD I SHALL BE USED IN AREAS OF UNCONSOLIDATED SOILS. (SAND, GRAVEL, & ETC.)
2. METHOD II SHALL BE USED IN AREAS OF CONSOLIDATED SOILS. (CLAY, HARDPAN, ROCK, & ETC.)

CLASS B PIPE EMBEDMENT

SECTION 3

SPECIFICATIONS FOR SURFACE RESTORATION

3.01 GENERAL

All areas disturbed by construction operations shall be restored to the original condition thereof as determined by the Engineer using information from plans, surveys, and photographs or video tapes when available.

The work shall be performed in accordance with the specifications and drawings, the MDOT 2003 Standard Specifications for Construction and the following specifications.

3.02 GRADING

All streets, walks, and other improved surfaces distrubed by construction operations shall be replaced to uniform lines and grades established by the Engineer. The finish grade line will be established within three (3) inches of the existing ground profile shown on the plans unless a proposed grade is shown which indicates otherwise.

The Contractor shall perform all grading, compacting, shaping, and related work required to prepare the subgrade to the satisfaction of the Engineer. The cost for preparing the subgrade as specified herein shall be incidental to the cost of the project, and no specific payment will be made therefore.

3.03 REPLACEMENT OF BITUMINOUS STREETS

Bituminous streets shall be constructed in accordance with the typical section shown on the plans and, unless otherwise specified, shall have a cross-section that conforms to the Village of Schoolcraft's specifications Section 11, "Specification of Streets".

3.03.01 Materials

Aggregate base for bituminous streets shall meet the requirements of 22A in Section 3.06 of the 2003 MDOT Standard Specifications or current edition. Bituminous mixtures for base, leveling, and surface courses shall be as specified, and shall conform to the requirements of Section 501 of the 2003 MDOT Standard Specifications or current edition. Materials for prime coat and bond coat shall be as specified in Section 502 of the 2003 MDOT Standard Specifications or current edition.

3.03.02 Construction Methods

Aggregate base for bituminous streets shall be placed in accordance with Section 3.06 of the 2003 MDOT Standard Specifications or current edition.

Bituminous mixtures shall be placed in accordance with the applicable portions of Section 501 and 502 of the 2003 MDOT Standard Specifications or current edition.

The Contractor shall not place the aggregate base course until the subgrade has been approved by the Engineer. The Contractor shall not place the first bituminous course and each successive bituminous course until the underlying aggregate or bituminous course has been approved by the Engineer.

3.03.03 Saw Cutting

Bituminous street, driveway and spillway replacement shall include saw cutting the asphalt pavement at the edge of the trench for the full depth of the pavement. Payment for saw cutting shall be included in the pay items for street replacement and driveway replacement unless otherwise specified.

3.03.04 Measurement & Payment

Bituminous street replacement shall be measured in lineal feet along the centerline of the main line utility being constructed. The width of the street replaced will not be considered for payment, and payment will not be made for any length of street replaced beyond that which is directly above the pipe installed. Bituminous street replacement may also be measured in square yards or tons as specified in the Proposal.

Aggregate base for bituminous shall be considered incidental to the bituminous items, and no separate payment will be made therefore unless a specific Pay Item for aggregate base is listed in the Proposal.

The cost of Bituminous Prime Coat and Bituminous Bond Coat shall be incidental to the bituminous paving.

3.04 REPLACEMENT OF BITUMINOUS PAVED AREAS (PATCHING)

When the plans and specifications do not require that the Contractor replace an entire street, the surface that is disturbed shall be replaced as specified herein.

3.04.01 Materials

Aggregate base for bituminous pavement shall conform to the requirements for 22A aggregate in Section 3.06 of the 2003 MDOT Standard Specifications or current edition.

Unless otherwise specified on the plans or in the specifications, Bituminous Mixture KCRC 36A-MOD, conforming to the requirements in Section 11 of the current Village of Schoolcraft “Specifications for Streets”, shall be used for bituminous patches. When existing seal coat pavement is disturbed, a bituminous patch shall be placed.

3.04.02 Construction Methods

When an aggregate surface is distrubed by the Contractor's operations, the edges of the existing aggregate surface shall be trimmed and shall be free of all foreign material before the new aggregate is placed. The subgrade shall be graded and compacted to the proper lines and grades to match the adjacent surface. The aggregate shall be placed in layers not to exceed six (6) inches and shall be compacted to 98% of its maximum unit weight in accordance with MDOT procedures.

When a bituminous surface is disturbed by the Contractor's operations, that surface shall be replaced at a thickness equal to the thickness of the existing pavement adjacent to the trench but not less than one and one-half (1-1/2) inches thick. If existing pavement is greater than two (2) inches in thickness, the replacement pavement shall be placed in two or more layers. Aggregate base shall be replaced at a thickness equal to the adjacent aggregate base (minimum six inches) as specified for aggregate patches above. After placement of the aggregate base but prior to its final shaping and compaction, the edges of the existing pavement shall be trimmed to straight lines a minimum of one (1) foot from the edge of the trench to permit a straight and unifrom surface between the existing and new aggregate base. Trimming of the existing pavement shall be by sawing, cutting with an airspade, or other suitable means approved by the Engineer.

The Contractor shall replace all concrete curb and gutters in patching areas incidental to the item for bituminous replacement.

3.04.03 Measurement & Payment

Replacement of aggregate surface and bituminous paved areas (patching) shall be measured in lineal feet along the centerline of the main utility line being constructed. Payment shall be made according to the Proposal Item for the type of surface to be replaced and shall include all trimming, removal, shaping, compacting, aggregate base, and bituminous or aggregate surface.

3.05 REPLACEMENT OF CONCRETE IMPROVEMENTS

The Contractor shall replace all concrete sidewalk, drives, curb and gutter, and pavement removed during the installation of the utility or broken by the Contractor.

3.05.01 Materials

Concrete shall meet the requirements for Grade S2 Concrete as specified in Section 701 of the 2003 MDOT Standard Specifications or current edition. Other materials shall meet the requirements of the applicable portions of the current MDOT 2003 Standard Specifications.

3.05.02 Construction Methods

The thickness of the concrete shall be the same as the concrete adjacent to the trench but shall not be less than four (4) inches. The alignment and grade and the contour and finish of the surface shall be the same as the concrete adjacent to the trench unless otherwise directed by the Engineer.

Pavements, walks, and drives shall be sawed at the edges of the trench or removed to existing joints. The depth of the saw cut shall not be less than the full depth of the concrete.

The forms and joints and the methods of placing, curing, and protection shall be consistent with standard practice and shall meet all the requirements of the current MDOT Standard Specifications for the various items.

3.05.03 Concrete Curb & Gutter (Header Curb, 18 inch, 24 inch, and 30 inch)

Concrete curb and gutter shall match the existing curb and contain two No. 4 steel reinforcing bars. Concrete grade shall be S2. Payment shall be made in lineal feet of curb and gutter replaced. All joints shall be saw cut. Curb and gutter shall be placed in accordance with Section 803 of the MDOT 2003 Standard Specifications for Construction.

3.05.04 Measurement & Payment

Concrete walks, pavement, and drives will be measured in lineal feet along the centerline of the utility main line being constructed. Concrete curb and gutter shall be replaced incidental to the construction of the utility line unless a specific item is provided in the Proposal for its replacement. Concrete which has been broken by the Contractor outside the limits of the trench will not be considered for payment.

3.06 REPLACEMENT OF LAWN IMPROVEMENT

3.06.01 Underground Sprinkling Equipment

Underground sprinkling lines, valves & heads, and water system curb stops and boxes are specifically excluded from the pay items. The Contractor shall take the necessary precautions to preserve this equipment during construction. Any under ground sprinkling equipment disturbed by the Contractor shall be replaced at the Contractor's expense.

All underground sprinkling equipment shall be replaced in a timely fashion so as to minimize damage to lawn areas. The Contractor will be responsible for any lawn damage caused by delayed replacement of the sprinkling equipment.

3.06.02 Fences

Fences, which are removed for construction, shall be replaced with equal or better type and size. The cost of removing and replacing the fences shall be

considered part of the major items of work found in the Proposal unless otherwise specified.

3.06.03 Ornamental Shrubbery and Bushes

Ornamental shrubbery and bushes that are removed during construction shall be replaced in kind and size in a vigorous growing condition. Replacement costs shall be part of the major items of work found in the Proposal unless otherwise specified. All shrubs and bushes replaced shall be insured by a one-(1) year warranty commencing from the date of installation.

3.07 TURF RESTORATION

All areas of established turf shall be replaced as nearly as possible to their original condition.

3.07.01 Topsoil

Topsoil shall be placed four (4) inches in depth over all areas disturbed by the Contractor's operations. The subgrade shall be graded to conform to the adjacent contours prior to placement of the topsoil and shall be approved by the Engineer prior to placing topsoil. The topsoil shall then be placed in accordance with Section 816 of the 2003 MDOT Standard Specifications or current edition.

The soil shall be dark, organic natural surface soil, exclusive of muck or peat, suitable for the establishment of grass or other vegetable growth.

3.07.02 Fertilizer

After the topsoil has been placed, it shall be fertilized with a good grade of chemical fertilizer at the rate of two (2) pounds of available nitrogen per 1,000 square feet. Fertilizer shall be applied just before the placing of the seed to retain its full benefit before unfavorable weather can cause deterioration.

3.07.03 Seeding

All lawn areas to be seeded shall be seeded with Class A seed. Other areas disturbed by the Contractor's operations shall be seeded with Roadside seed. Seed mixtures, application rates, and methods shall be in accordance with Section 816 of the 2003 MDOT Standard Specifications or current edition.

Seasonal limitations on seeding in Section 816 of the 2003 MDOT Standard Specifications are waived. The Contractor shall repeat the seeding procedure as often as necessary to produce a close stand of weed-free grass.

3.07.04 Mulching

All seeded areas shall be mulched immediately following the seeding. Mulching shall be applied to all newly seeded areas at a rate of two (2) tons

per acre in accordance with the requirements of Section 816 of the 2003 MDOT Standard Specifications or current edition.

3.07.05 Hydro Application

All fertilizing, seeding and mulching shall be applied by an approved Hydro seeding and mulching process unless separate applications as heretofore described are approved by the Engineer. Separate loose straw mulch is prohibited on residential lawn areas.

3.07.06 Sod

Sod shall be placed only where directed by the Engineer or as noted on the plans or specifications.

All sod shall be nursery grown, conforming to MDOT requirements for Class A. Sod shall be approved by the Engineer prior to placing and shall be placed in accordance with the requirements of Section 816 of the 2003 MDOT Specifications or current edition. The base on which the sod is to be laid shall consist of a minimum of four (4) inches of topsoil placed and fertilized in the same manner required for seeding.

3.07.07 Measurement & Payment

Turf restoration will be measured in lineal feet along the centerline of the main utility line being constructed. Payment will be made according to the appropriate item for seeding or sod. Topsoil, fertilizer, and mulch shall be incidental to these items unless specific proposal items are provided. Any area disturbed by the Contractor's operations outside of the limits of the trench shall be restored by the Contractor to its original condition but will not be considered for payment.

3.08 SCHEDULING OF RESTORATION WORK

Initial restoration (rough grading, temporary aggregate if necessary, removal of excess excavated material and debris) shall be done each day to the extent necessary to allow the movement of local traffic and permit access to all properties for emergency vehicles. Maintenance of streets, drives, sidewalks, etc. shall be the responsibility of the Contractor (including dust control, grading, stabilization, etc.) until the restoration is complete and has been accepted by the Engineer.

Restoration of each street or section of utility line shall follow the construction in a timely fashion so as to minimize inconvenience to the adjacent property owners and the general public. The manner in which this restoration is done by the Contractor will be a determining factor in the approval by the Engineer of staking requests and partial payment requests.

3.9 LIMITS FOR MEASUREMENT & PAYMENT FOR SURFACE RESTORATION

All work necessary to return the area of construction operations to its original condition, other than the items listed in the Proposal, shall be considered incidental to the construction, and no specific payment will be made therefore.

For surface restoration items measured in lineal feet, payment will be based upon the type of surface which is directly above the pipe. Only one surface restoration item will be a pay item for each lineal foot of pipe. Anything disturbed in additon to the specific item above the pipe shall be restored by the Contractor at no additional cost to the Applicant.

Payment will be made for the proposal items only. All of the work specified above and indicated on the drawings will be considered included in the unit prices.

SECTION 4

SPECIFICATIONS FOR WATER MAIN AND WATER SERVICES

4.01 WATER MAIN

A. Pipe: Ductile Iron, Class 52 Cement Lined. Mega Lugs shall be used for joint restraint. All pipe and fittings shall be installed to carry a continuous current. Use conduction cable or strap sized to carry 400 amperes for an extended period. Permanently connect conductors to both sides of the joint. External conductor connection shall be U.S. Pipe "ELECTROBOND", Erico "CADWELD", Clow "CABLE BOND" or approved equal. Bronze wedges will not be allowed.

   Note: Ductile Iron Pipe, Class 52 Cement Lined with or without bituminous seal coat is acceptable.

B. All pipe, fittings and specials shall include the necessary "Megalug" glands, rubber gaskets, nuts, bolts, wedges and lubricant in their respective unit prices.

C. Anchorage for Plugs, Caps, Tees and Valves: Unless otherwise specified or approved by the Engineer, movement of all plugs, caps, tees, bends, and valves shall be prevented by the use of restrained joints pipe and/or joint restraining glands called "Megalugs" and/or "Field-Lok" gaskets as required.

   Plugs for abandoned water main shall be cast iron or ductile iron caps or approved equal to prevent soil migration into the abandoned pipe.

D. Resilient Wedge Gate Valves – open left (4" through 10"): All valves shall be **U.S. Pipe**, **Waterous** Series 500, **Clow,** or **EJIW** resilient wedge valve or approved equal. Mechanical Joint with "Megalugs".

   Gate valves are to be mechanical joint with plain rubber gaskets, "Megalugs" rings, and 3/4" tee head bolts.

E. Butterfly Valves - Open Left (12" and Over): Valves 12" and larger shall be butterfly valves of the rubber-seated, tight-closing type. They shall meet or exceed performance requirements for water applications of applicable recognized standards such as ANSI/AWWA C-504.

   Valve ends shall be Mechanical Joint per ANSI A21.11-85 AWWA C-111. MJ accessories, such as bolts, "Megalugs" glands and plain rubber gaskets must be supplied for each valve.

F. Fire Hydrants – Open Left: Fire hydrants shall be **"East Jordon Iron Works 5BR"** and shall be manufactured to conform with AWWA C502.94 Standard Specification or the revision there of Affidavit of compliance will be required. Hydrant length shall be supplied for a depth of bury of 5.5 feet. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double "O" ring seal in the bronze packing gland.

The hydrant stem shall be at least 1.25" diameter. Stem coupler at the breakaway shall be one piece with stainless steel pins.

Valve seat rings, where applicable shall also be brass to brass mounted. Hydrant to have 5 1/4" valve opening and a 6" Mechanical joint inlet.

Hydrant shall be a "traffic" model with breakaway near the ground design.

All nozzles shall be on removable head, not on the hydrant barrel, so that they may be rotated 360 degrees. Nozzles shall be mechanically restrained with a set screw.

Hydrant to have two 2.5" National Standard hose connection, number 4 threads, and one 5" Harrington Storz with cap connection. Caps to be furnished with chain assembly.

Hose nozzle cap nut and hydrant operating nut to be square 15/16" at the bottom of nut tapered to 13/16" at the top. Operating nut shall be brass, one piece design.

Each hydrant shall be equipped with an automatic drip valve, tapped for a plug. The draining system shall be brass. The draining system of the hydrant barrel shall be positively activated by the main operating rod. Plug shall be removed only by DPW direction.

The valve seat diameter shall be 5 1/4" and open against the pressure. The hydrant mechanism shall be on a non rising stem opening counter clockwise. (open left)

Hydrant operating threads and nut shall be contained in a sealed lubricant section and protected from moisture and foreign matter by double o-ring seals. Lubricant shall be easily replenished by the removal of the operating nut.

Rated working pressure shall be 150 p.s.i. and tested to twice the working pressure. Hydrant barrel shall be painted Red - above ground, hydrant caps and operating nut shall be painted Red.

Hydrant must be designed so that removal of all working parts shall be accomplished without excavating.

Hydrant barrel shall have an inside diameter of at least 8".

6" auxiliary valve to be AWWA 515 RW made by East Jordan Iron Works or pre-approved equal.

Fire hydrant units shall include two anchor couplings (SOLID MECHANICAL JOINT CONNECTING PIECES) for connection between the 6" gate valve, the fire hydrant and water main. **NOTE**: NO TIE RODS AND OR CONCRETE BLOCKS ARE ALLOWED.

Fire hydrant units shall include a sign placed as shown on Figure 1, Pages 4-6 thru 4-9.

G. Anchorage - For Fittings and Hydrants: All dead ends, tees, caps, hydrants and bends deflecting 22.5 degrees or more and crosses, unless otherwise indicated, shall be anchored with "Megalugs" and to prevent movement by providing suitable reaction backing between solid ground and fitting or hydrant to be anchored.

The area bearing on the pipe, fitting or hydrant and on the solid ground in each instance will be determined by the Engineer in the field, and will depend upon width or length of trench and type of soil encountered.

Stone slabs, concrete blocks in some instances, poured concrete having a compression strength of not less than 3000 psi at 28 days may be used for bracing to provide the proper backing. The Contractor may submit other methods to the Engineer for approval, however, wood and timber bracing will not be considered for permanent bracing, but may be used temporarily during pressure and leakage tests to expedite the work, however, the excavation shall not be backfilled until satisfactory permanent bracing is installed, and wood bracing shall be placed in such a manner that it will remain in place under the same condition as when the pressure test was taken until permanent bracing can be installed, all with the approval and in a manner satisfactory to the Engineer.

The backing and bracing shall be so placed that the pipe and fitting joints will be accessible for repair.

All hydrants shall be restrained to the hydrant lateral valve, and the hydrant lateral valve shall be restrained to the main using an approved joint restraint system consisting of restrained joint pipe, joint restraining glands "Megalugs", mechanical joints, mechanical joint anchoring fittings. NO RODS ARE ALLOWED.

H. The Contractor, with the authorization from the Engineer shall uncover existing mains at point of connection sufficiently in advance of making the connection and shall make any revisions in the fittings required for the connection. Existing pipe

lines shall be adequately supported during the connection operation and prior to placement of backfill.

No pipe shall be laid in water or when, in the opinion of the Engineer, trench conditions are unsuitable.

All pipe, unless otherwise specified, or permitted by the Engineer, shall have a cover over the top of pipe of not less than five (5) feet, or more than seven (7) feet.

4.02 WATER SERVICE MATERIALS

4.02.01 Copper Water Service Pipe

General: The contractor shall furnish and install copper water service pipe of the sizes listed in the proposal and at locations of existing water services connections and/or additional locations designated by the engineer.

Material: Shall be in accordance with ASTM Specifications B88 for Type K annealed, seamless cooper.

Basis of Payment: The bid item Reconnect Water Service shall include: curb box, corporation stop and reconnection to existing water service.

4.02.02 Corporation Stops

General: The contractor shall furnish and install corporation stops of the sizes listed in the proposal and at locations of existing water services connections and/or additional locations designated by the engineer.

Material: One inch (1") shall be Mueller H-15000 or approved equal. Two inch (2") shall be Ford B-81-777 (Ball Valve) or approved equal. The corporation stops must have Mueller Thread Type CC and brass in composition.

Installation: Corporation stops shall be tapped on the upper half of the water main and sealed with teflon tape or "pipe dope" on the threads.

Basis of Payment: The bid item Reconnect Water Service shall include: curb box, corporation stop and reconnection to existing water service.

4.02.03 Curb Stops

General: The contractor shall furnish and install curb stops of the sizes listed in the proposal and at locations of existing curb stop connections and/or additional located designated by the engineer.

Material: One inch (1") shall be Mueller H-15200 or approved equal. Two inch (2") shall be Ford B-44-777 or approved equal.

Basis of Payment: The bid item Reconnect Water Service shall include: curb box, corporation stop and reconnection to existing water service.

4.02.04 Curb Box

General: The contractor shall furnish and install a curb box at every location over the curb stops.

Material: Curb boxes shall be extension type with arch pattern. Curb boxes shall be Tyler 6500.

Contractor shall install new curb boxes adjacent to existing curb boxes. Upon completion of reconnecting the water service leads to the new curb box, the old curb box shall be removed and disposed of by the Contractor.

Basis of Payment: The bid item Reconnect Water Service shall include: curb box, corporation stop and reconnection to existing water service.

4.02.05 Miscellaneous

Service Saddle: 2 inch service saddle shall be double strapped, ductile iron saddle with iron pipe threads and galvanized or cadmium plated straps, Ford F202 or approved equal.

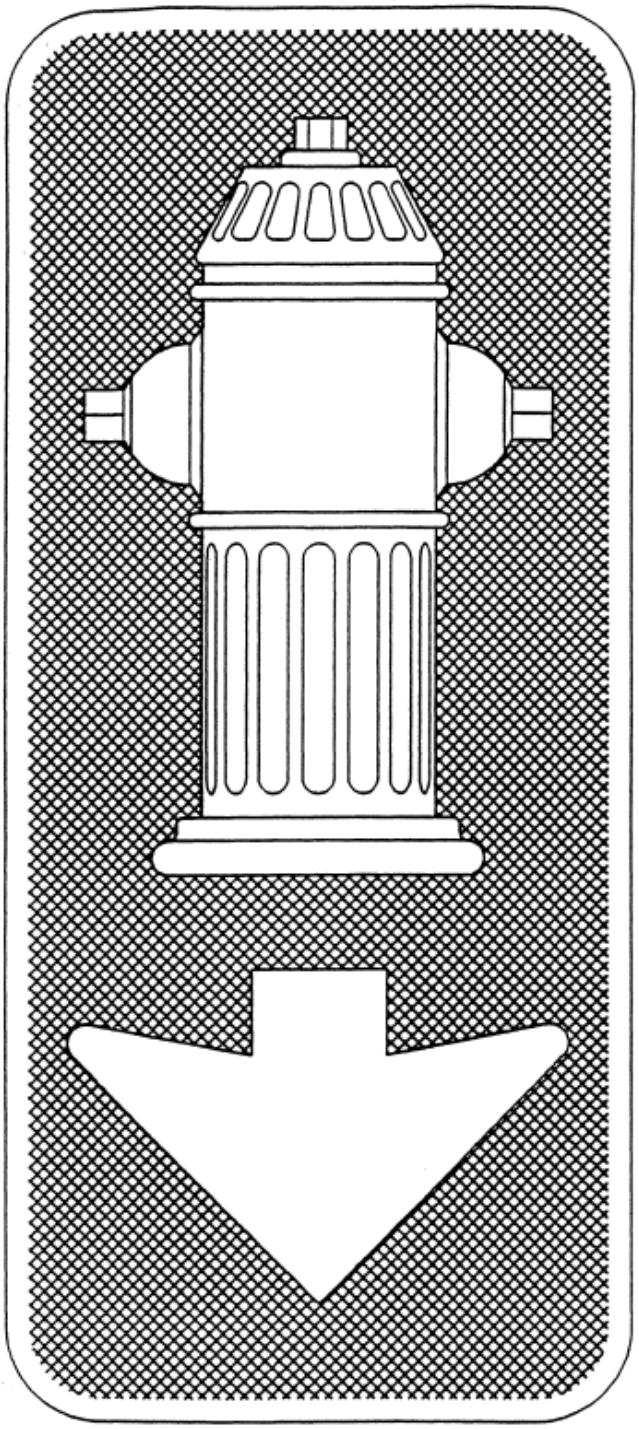
2 Inch Adapter: 2 inch adapter to connect copper pipe to ball valve shall be Ford C-84-777 or approved equal.

Copper Pipe Fittings: Fittings for copper pipe shall have compression type connection with locking device.

Basis of Payment: All miscellaneous items are considered incidental to the cost of water service installation

4.03 PAYMENT

Payment for all work related to installation of the water main, water services and appurtenances will be made in accordance with the items in the proposal.



FIRE HYDRANT
SIGN

SIZE: 18"x8"
COLOR: RED w/WHITE
SYMBOLS
SPECIFICATIONS:
M.D.O.T. TYPE 3A
BOTTOM HEIGHT OF SIGN:
5 FEET
POST: 2 lb U-CHANNEL,
9 FEET IN LENGTH

TWO REQUIRED ON
EACH POST

FIGURE 1

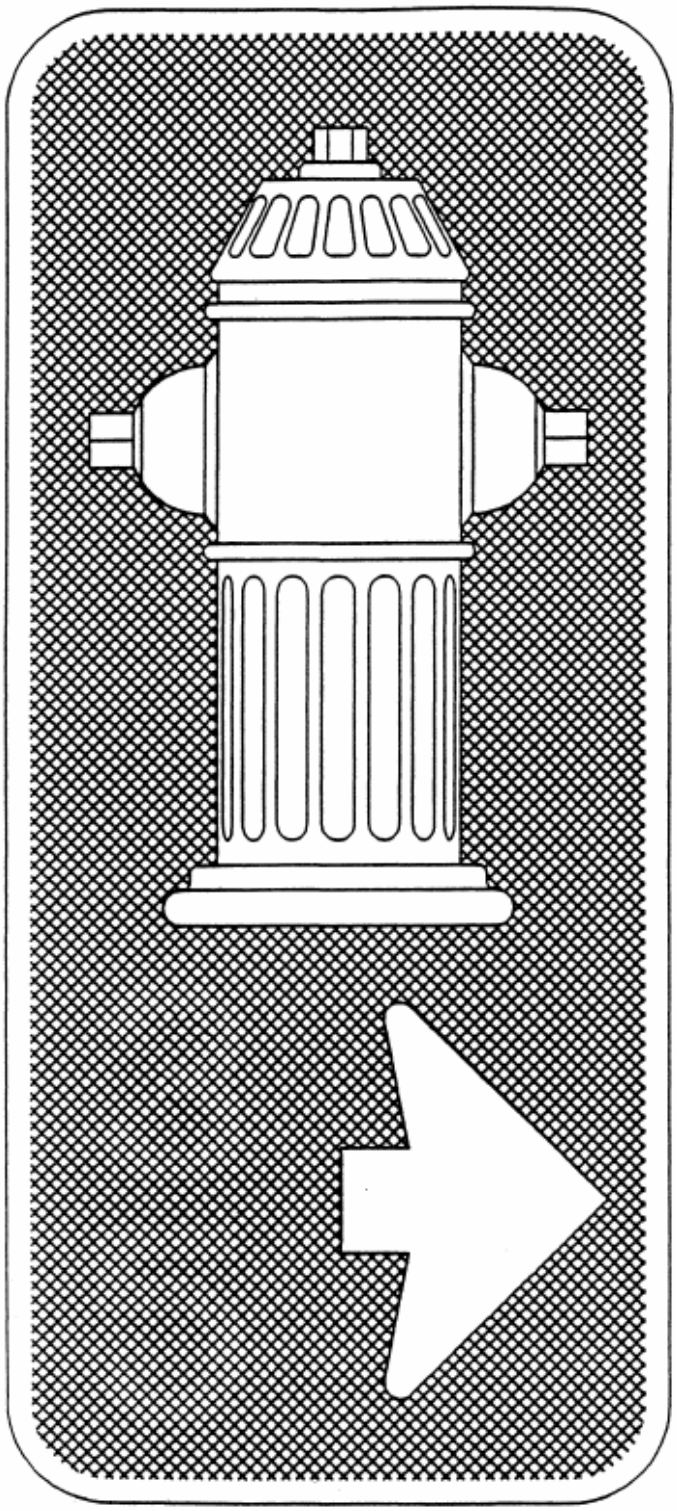


FIGURE 1

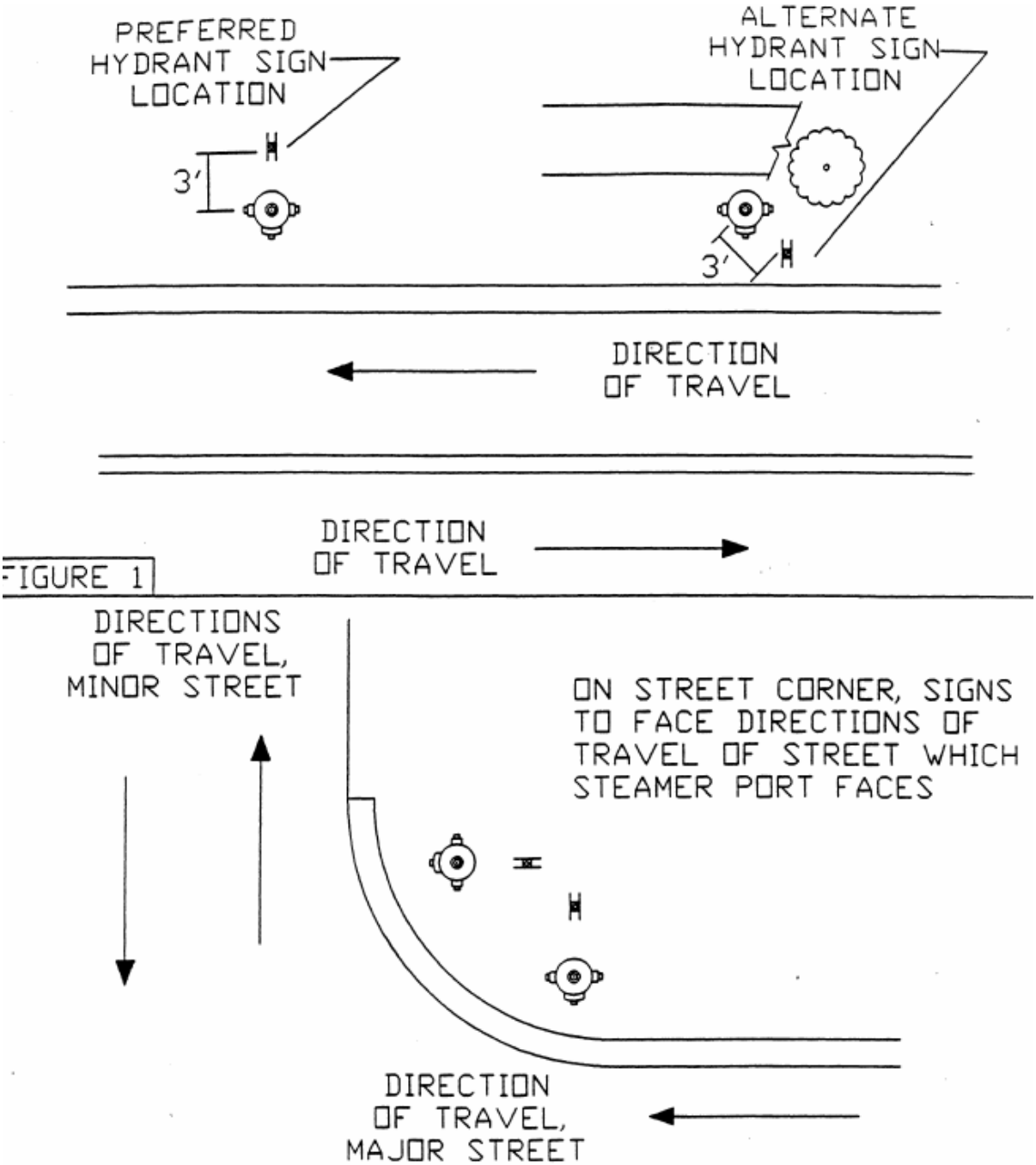

PREFERRED
HYDRANT SIGN
LOCATION
3'
ALTERNATE
HYDRANT SIGN
LOCATION
3'
DIRECTION
OF TRAVEL
DIRECTION
OF TRAVEL
FIGURE 1
DIRECTIONS
OF TRAVEL,
MINOR STREET
ON STREET CORNER, SIGNS
TO FACE DIRECTIONS OF
TRAVEL OF STREET WHICH
STEAMER PORT FACES
DIRECTION
OF TRAVEL,
MAJOR STREET

FIGURE 1

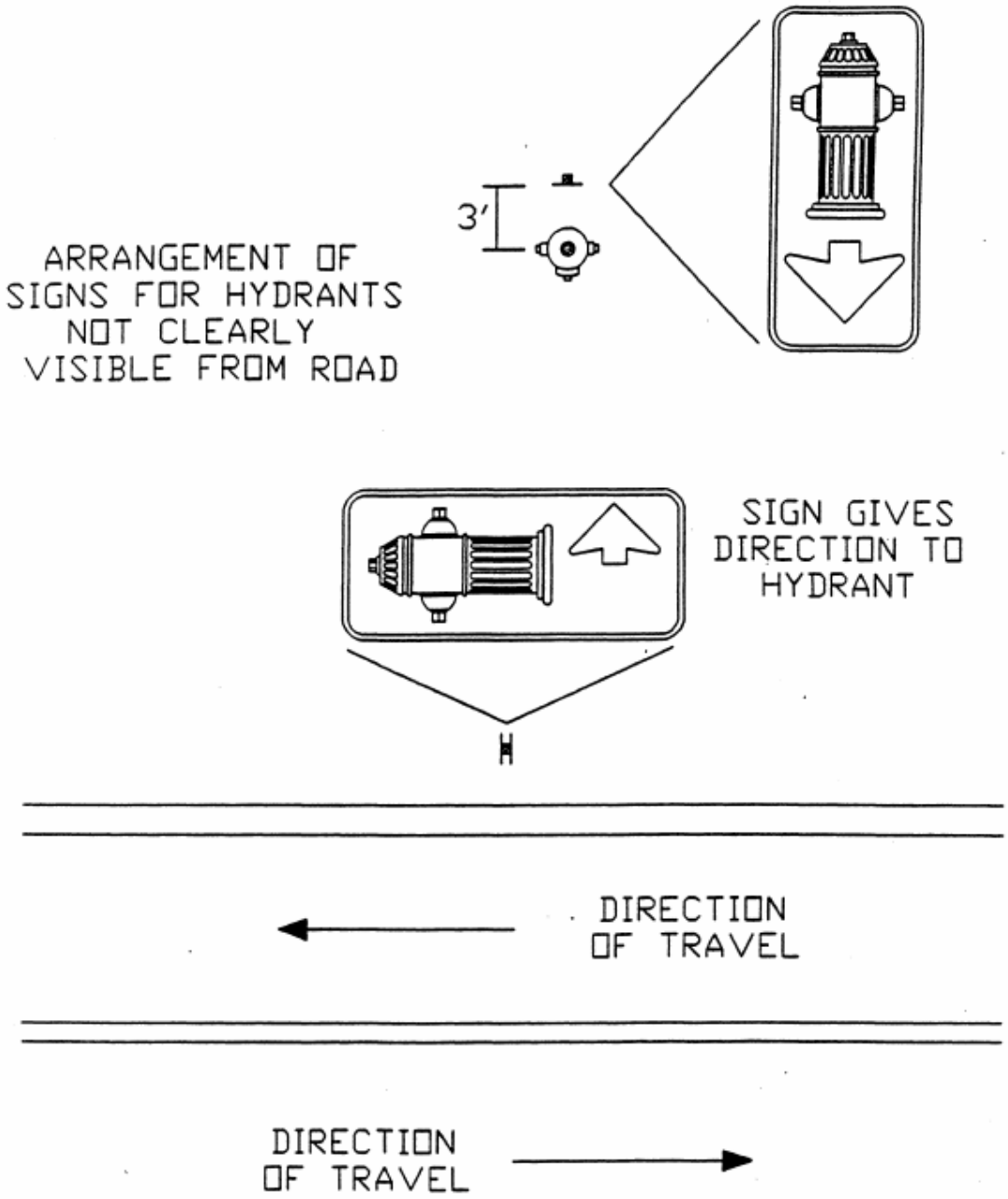

ARRANGEMENT OF
SIGNS FOR HYDRANTS
NOT CLEARLY
VISIBLE FROM ROAD
3'
SIGN GIVES
DIRECTION TO
HYDRANT
DIRECTION
OF TRAVEL
DIRECTION
OF TRAVEL

FIGURE 1

SECTION 5

SPECIFICATIONS FOR STORM SEWER

5.01 DESCRIPTION

The work shall consist of installing storm sewer pipe of the specified size or sizes in a trench and shall include the construction of manholes, catch basins, and other appurtenant work. Excavating, trenching and backfilling shall be as specified in Section 2.

5.02 MATERIALS

All materials furnished by the Contractor shall conform to the specifications which follow. Where reference specifications are used, they shall be considered as referring to the current edition or latest issue.

5.02.01 Sewer Pipe

All sewer pipe shall be of the materials and strengths shown on the Drawings or as specified.

5.02.01.01 Reinforced Concrete Sewer Pipe

Reinforced concrete sewer pipe, fittings, and accessories shall conform to the requirements of ASTM Designation C-76 for the various classes specified.

Unless otherwise specified, joints for reinforced concrete sewer pipe shall be premium rubber joints conforming to the requirements of ASTM Designation C-443.

5.02.01.02 Smooth Lined Corrugated Polyethylene Pipe

Smooth Lined Corrugated Polyethylene Pipe in sizes through forty-eight (48) inch diameter shall conform to the requirements of AASHTO M-294, Type S. The material shall have a minimum cell classification of 335420 C as determined under ASTM Designation D-3350. Pipe shall have annular corrugations, and joints shall be integral bell & spigot with gaskets. Gaskets shall be placed in annular corrugations. Gaskets shall be solid cross section rubber seals conforming to ASTM Designation F-477. A protective removable shrink wrap material shall be placed on all exposed gaskets at the factory. Gaskets and sleeves shall be lubricated prior to insertion as required by the pipe manufacturer. Pipe fittings shall conform to AASHTO M-294. Installation and testing shall be as required in Section 2, "Excavating, Trenching, and Backfilling for Utilities", except a minimum of three (3) feet of cover shall be maintained over any pipe during construction staging when construction equipment is crossing the pipe. The cost of temporary cover shall be incidental to the item of work.

5.02.02 Plugs and Stoppers

Plugs or stoppers for plugging the ends of laterals, or storm sewers, which are not extended shall make a water tight seal. Design shall be such that they can be readily removed without damage to the pipe.

5.02.03 Underdrains

Materials for underdrains shall conform to the requirements of Section 404 of the MDOT Standard Specifications.

5.02.04 Cement Mortar

Mortar shall consist of one part of Air Entraining Portland Cement, and two parts of masonry sand. These proportions shall be measured by volume.

The sand and cement shall be mixed dry in a clean tight box until a mixture of uniform color is produced, after which water shall be added until the required consistency is obtained. Mortar shall be mixed only in such quantities as needed for immediate use. The retempering of mortar will not be permitted.

5.02.04.01 Cement

Air Entraining Portland Cement shall conform to the requirements for type 1A of the current specifications for Air Entraining Portland Cement, ASTM Designation C-175.

5.02.04.02 Masonry Sand

Shall conform to the requirements of "Natural Sand, 2MS" of the current standard specification of the MDOT.

5.02.04.03 Water

For mixing mortar shall be obtained from the public water supply unless otherwise approved by the Engineer.

5.02.05 Concrete

Concrete for pipe encasement, special pipe embedment, manhole bases and similar items shall meet the requirements of the MDOT Standard Specifications for Grade X concrete. Grade X concrete shall have the strength of 2500 PSI at twenty-eight (28) days.

5.02.06 Manhole and Catch Basin Materials

5.02.06.01 Manhole Blocks

Blocks shall be 6" x 6" x 12" curved units with a curve radius of one (1) foot or two (2) feet unless otherwise specified. All blocks shall conform to the requirments of the

current specifications for concrete masonry units for construction of manholes, ASTM Designation C-139.

5.02.06.02 Brick

Concrete brick shall conform to the requirements of ASTM Designation C-55 for concrete building brick, Grade S-11.

5.02.06.03 Adjusting Rings

Precast grade adjusting rings shall conform to the requirements of ASTM Designation C-478.

5.02.06.04 Precast Units

Precast reinforced concrete manhole risers and precast reinforced concrete manhole cone sections shall conform to the requirements for reinforced concrete manhole risers and tops, ASTM Designation C-478.

Joints for precast sections shall be premium rubber, butyl rubber composition seals, "ramneck", or approved equal.

5.02.06.05 Castings

Shall meet the requirements specified in the current MDOT Standard Specifications Section 403.03B. Manhole covers and rings and similar combinations of castings shall be machined to provide an even bearing.

Unless otherwise specified, manhole castings shall be East Jordon No. 1120 with Type A solid cover or approved equal.

Unless otherwise specified, catch basin castings at curbs shall be East Jordan No. 7045, with Type M1 grate and Type 7050 T1 Back or approved equal.

5.02.06.06 Steel Reinforcement

Shall conform to the requirements for steel reinforcement of the current Michigan Department of Transportation Standard Specifications.

5.02.06.07 Manhole Steps

Unless otherwise specified, manhole steps shall be plastic coated steel steps conforming to the requirements of ASTM Designation C-478, or approved equal, spaced at 16" c-c.

5.03 INSPECTION OF MATERIALS BY CONTRACTOR

It shall be the responsibility of the Contractor to inspect all materials for cracks, flaws or other defects before they are incorporated into the work. Any materials found to be defective or damaged, shall be promptly removed from the job site.

5.04 LAYING PIPE

5.04.01 Alignment and Grade

5.04.01.01 Laser Method

The Contractor shall use the laser beam method of maintaining line and grade for sewer construction, unless otherwise approved by the Engineer. The Contractor shall submit evidence to the Engineer that a qualified operator will handle the laser beam equipment during the course of construction.

The Engineer shall place line and grade stakes at each manhole, or more often, as determined by the Engineer. The Contractor shall check the line and grade at every point at which a stake has been placed.

5.04.02 Handling

Pipe shall be protected during unloading and handling against impacts, shocks and free fall. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

Pipe shall be carefully lowered into the trench in such a way as to avoid danger to the workmen or damage to the pipe.

5.04.03 Direction of Laying

Excavation of trenches and laying of pipe shall begin at the outlet for the sewer and proceed upgrade with the individual pipe being laid with the spigot end downstream.

5.04.04 Placing

The pipe shall be placed on the prepared sub-grade and held firmly in place during susequent pipe jointing and embedment operations. Successive pipes shall be carefully positioned so that when laid they form a sewer with a uniform invert true to line and grade.

Sufficient pressure shall be applied by an approved method to each pipe as it is laid to insure that the spigot is all the way home in the bell. Care shall be exercised to prevent joints from opening up as successive lengths of pipe are placed. The Contractor shall take the necessary precautions when using a trench box to prevent joint separation when the box is pulled ahead.

5.04.05 Cleaning Sewer

The interior of the sewer shall be cleaned of all jointing material, dirt and debris as the work progresses.

In small sewers where cleaning after laying may be difficult, a swab or drag may be required in the pipe line to satisfactorily complete this work. Where possible, a plug

shall be installed on the downstream end of the sewer to prevent any sand and debris from entering the existing sewer.

5.05 PIPE JOINTS

Pipe joints shall be made in strict accordance with the pipe manufacturer's recommendations unless otherwise specified herein. All lubricants, gaskets and other materials required to make the joints shall be supplied or recommended by the pipe manufacturer, and approved by the Engineer.

Pipe layers shall be fully qualified and experienced in the work being performed and shall check each joint after it is completed to see that no part of the joint material is left on the inside of the pipe and that the joint is properly made.

5.06 MANHOLE AND CATCH BASIN CONSTRUCTION

Manholes and catch basins shall be constructed in accordance with the standard details and as specified herein.

Unless otherwise specified, or approved by the Engineer, all manholes and catch basins shall be precast.

Precast bases shall be installed on the subbase in such a way as to provide a uniform bearing under the manhole base.

Precast manholes and catch basins with integral bottom and channel may be used, however, any changes to the structure due to minor field adjustments of alignment and grade required to meet construction conditions, shall be made by the Contractor at no additional cost to the Applicant.

Stubs shall be provided in manholes for future connections as shown on the Plans or as directed by the Engineer. All such stubs shall be sealed with standard plugs or brick bulkheads in accordance with Section 403.03 of the 1996 MDOT Standard Specifications.

5.07 CUT-INS

When cutting into an existing manhole, the opening shall be no larger than is necessary to admit the new sewer. All broken or surplus materials falling inside the structure shall be removed. The opening around the pipe shall then be properly sealed with brick and mortar or by other approved means which will result in a water tight and durable repair to the structure.

Flow channels shall be constructed as specified or as directed to accommodate the sewer being cut-in.

Cut-ins shall be considered incidental to the major items of work and no specific payment will be made therefore.

5.08 ACCEPTANCE TESTS

5.08.01 Alignment and Grade

Each section of sewer may be checked by the Engineer for alignment and grade using lights and mirrors, television inspection, or other similar means. The Contractor shall assist the Engineer in the performance of these tests when necessary.

5.08.02 Pipe Deflection Tests (Flexible Pipe Only)

Flexible pipe is any pipe having a pipe stiffness of less than 115 psi. as defined under the requirements of ASTM Designation D-2412.

The completed installation of flexible pipe shall at no point have out-of-round deflections in the main sewer pipe greater than five percent (5%) of the pipe's actual original inside diameter. Go/no go gauging tests, using an approved pointed mandrel with a minimum of nine (9) points, shall be performed by the Contractor in the presence of the Engineer, or his authorized representative after the trench is backfilled, and before the surface restoration is begun. Pipe with deflections greater than five percent (5%) shall be relaid by the Contractor at no additional expense to the Applicant. Vibratory rerounding of failed sections is prohibited. A minimum of 30 days shall elapse between installation with back-filling and deflection testing.

5.09 MEASUREMENT AND PAYMENT

5.09.01 General

All proposed construction shall be measured for payment by the Engineer in accordance with the items listed in the proposal.

The unit price bid for each proposal item shall be payment in full for completing the work, ready for use as specified.

5.09.02 Storm Sewers

Measurement of the length of the sewer shall be in lineal feet along the centerline of the sewer from center to center of manhole or catch basin structures.

Where depth classifications are provided, the depth of the sewer connecting two adjacent structures shall be considered as being the average of the depth from earth grade to the sewer invert at these structures.

5.09.03 Manholes and Catch Basins

Manholes and catch basins shall be paid for in accordance with the units established in the proposal. When no proposal item is provided for castings, the work shall be considered part of the major items of work.

5.09.04 Cut-Ins

Cut-ins shall be considered part of the major items of work and no specific payment will be made therefore.

5.09.05 Stubs

Stubs shall be considered part of the major items of work and no specific payment will be made therefore.

SECTION 6

RESERVED FOR FUTURE USE (SANITARY SEWER)

SECTION 7

RESERVED FOR FUTURE USE (FORCE MAINS)

SECTION 8

RESERVED FOR FUTURE USE (PUMP STATION)

SECTION 9

SPECIFICATIONS FOR SIDEWALKS

9.01 DESCRIPTION

The work shall be performed in accordance with the specifications and drawings, the Michigan Department of Transportation Standard Specifications for Highway Construction (2003 edition) and the following specifications.

9.02 RIGHT-OF-WAY/EASEMENTS

The Contractor shall confine his work to the public right-of-way or easements as shown on the drawings. Any other area required for equipment or material storage or for construction operations shall be the Contractors responsibility.

9.03 LIMITATION ON OPERATIONS

The Contractor shall at all times conduct his work so that there is a minimum of inconvenience to the residents of the streets in this project. A traffic control plan must be submitted to the Village prior to the start of construction.

9.04 PERMITS

The Contractor shall obtain all necessary permits including but not limited to those from the Village of Schoolcraft. The Contractor shall pay for any charges or bonds for those permits and related inspection by those agencies. All costs shall be considered part of the major work items.

9.05 MAIL BOXES

The Contractor shall temporarily relocate and maintain mail boxes interfering with sidewalk location so that mail service is not interrupted, both temporarily and permanent. Mail boxes shall be replaced in a condition and location equal to that prior to construction or as required by the U.S. Postal Service. All mail boxes shall be replaced with a turn out of six (6) inches of MDOT 23A gravel, which shall be included in the cost of bituminous sidewalk grading and restoration.

9.06 CONCRETE SIDEWALK CONSTRUCTION

Concrete sidewalk shall conform to current MDOT Specifications Section 803 and Village of Schoolcraft Standards. Unless otherwise specified, sawcut and removal of existing curbs shall be considered part of the major work items.

9.06.01 Sidewalk Requirements

Sidewalks through driveways shall be a minimum of six (6) inches thick. All other sidewalks shall be a minimum of four (4) inches thick.

All sidewalks shall be at least four feet in width. Wider walks may be required by the Building Department, due to density and the development of the area.

9.06.02 Sub-base Preparation

Existing vegetation will be removed and topsoil excavated to provide a four (4) inch sand sub-base for the proposed sidewalk. The existing sand sub-base shall be compacted to ninety-five (95%) percent density. Where fill sand is required it shall be compacted to achieve ninety-five (95%) percent density. The cost to prepare the sub-base shall be included in the price bid for the sidewalk grading and restoration.

9.06.03 Concrete Requirements

Concrete shall meet the requirements for Grade P1 Concrete or Grade S2 Concrete as specified in Section 601 and 701 respectively of the 2003 MDOT Standard Specifications. Concrete to be 5.5 sack limestone mix or greater and shall be air-entrained and shall have a compressive strength of not less than 3,500 pounds per square inch, within twenty-eight (28) days of paving. Other materials shall meet the requirements of the applicable portions of the 2003 MDOT Standard Specifications.

All concrete sidewalks shall be paved with a single course of concrete. Sidewalks through driveways shall be six (6”) inches thick. All other walks shall be four (4”) inches thick. Unless otherwise specified, saw cuts and removal of existing sidewalk shall be considered incidental.

All frozen concrete shall be removed and replaced.

9.06.04 Joints

Full depth transverse expansion joints shall be constructed perpendicular to the surface of the sidewalk at intervals not to exceed fifty (50’) feet. Expansion joint material shall be one-half (1/2”) inch pre-molded expansion joints and shall be set ¼” below the surface of the sidewalk. Sealing of joints will not be required.

One (1”) inch pre-molded expansion joints must be placed between the sidewalk and back-of-curb when sidewalk is constructed between the curb and building or other rigid structures.

Transverse plane of weakness joints shall be true to line and grade, and shall be placed at four (4) foot intervals and shall be formed with a grooving tool. Planes

of weakness joints shall be constructed to a depth of at least one (1”) inch and a width of 1/8 inch to ¼ inch. Sealing of joints will not be required.

9.06.05 Surface

The surface of the concrete shall be floated to a level uniform surface and left with a slightly rounded surface. The surface shall be roughened with mechanic’s brush to prevent smooth and slippery surfaces. No surface shall be troweled to a glassy finish. Edges at the forms and joints shall be rounded with an edging tool.

9.06.06 Sidewalk Detectable Warning

Sidewalk Detectable Warning details shall conform to ADA requirements, MDOT Specifications and MDOT Detail R-28-D.

Warning details shall apply to all construction or reconstruction of streets, curbs, or sidewalks. Detectable warnings shall extend the full width of the curb/sidewalk ramp. They shall be located so that the edge nearest the curb line or street is 6" to 8" from the curb line.

9.07 GRADE

The sidewalk shall be constructed to match the existing grade, or as noted on the construction drawings. Minor fills and cuts will be made in the field during construction to provide smooth transition of the sidewalk and maintain existing drainage patterns. All cuts and fills required to construct the sidewalk shall be considered part of the major work items.

All sidewalks bordering a Village street shall have a one-fourth (1/4) inch slope in every four (4) feet towards the road.

9.08 MATERIAL TESTING

The Applicant reserves the right to sample and test any of the materials required for the proposed construction, either before or after delivery to the project and to reject any material represented by any sample which fails to comply with the minimum requirements specified.

The Contractor shall furnish all materials reasonably required for sampling testing and analysis necessary for the testing of materials as required by these specifications.

The cost of the above described testing shall be paid by the Applicant. If any material fails to meet the specified requirements, all material represented by the sample shall be rejected unless the Contractor can demonstrate through additional tests, at his own expense, that the remainder of the material is satisfactory.

As a minimum requirement, the following shall be submitted to the Engineer by the Contractor (at no additional cost to the Applicant):

A. Concrete Materials:

1. Master Mix Design
2. Material slips from the plant as to type of mix.

9.09 DRIVEWAYS/HARD SURFACE PARKING AREAS

Unless otherwise noted on the construction drawings or as directed by the Engineer, all existing driveways/hard surface parking areas shall be saved. Where driveways/hard surface parking areas are to be removed, a clean saw cut smooth joint the full depth of the material shall be made. Bond coat or joint material shall be applied if necessary. Unless otherwise specified, cost of saw cut/removal, etc. shall be considered part of the major work items.

9.10 GRAVEL DRIVEWAYS

The proposal includes a quantity for gravel driveways. This is for replacing gravel in driveways that are disturbed during construction.

9.11 DRIVEWAY AND CONCRETE CURBS

Concrete driveways and concrete curb construction shall be placed in accordance with Section 801 & 802 of the 2003 MDOT Standard Specifications and Village of Schoolcraft Standards.

Concrete shall meet the requirements for Grade S2 Concrete as specified in Section 701 of the 2003 MDOT Standard Specifications. Concrete to be six sack limestone mix and shall be air-entrained and shall have a compressive strength of not less than 3,500 pounds per square inch, within twenty-eight (28) days of paving. Other materials shall meet the requirements of the applicable portions of the 2003 MDOT Standard Specifications. Driveways shall be six (6) inches thick. Unless otherwise specified, saw cut and removal of existing curbs shall be considered part of the major work items.

9.12 DITCH/SWALE CONSTRUCTION

All ditch/swale construction, as required to maintain existing drainage patterns, shall be considered part of the major work items, unless otherwise specified.

9.13 EXCESS DIRT

Excess dirt shall be the property of the Contractor and shall be disposed of by the Contractor

9.14 EXISTING SIDEWALKS, CROSSINGS/REPLACEMENT/SAFETY

Where existing sidewalks are disturbed or removed they shall be replaced as soon as possible. The Contractor shall place barricades and warning signs to alert the sidewalk users.

Barricades (MDOT Type II, Lighted) and caution tape shall be placed and maintained at each segment of sidewalk reconstruction.

9.15 TREES

9.15.01 Tree Removal

Trees marked ″REMOVE″ on the drawings shall be taken down and removed from the right-of-way in a manner that does not endanger the adjoining property, or persons or traffic using the right-of-way. Tree limbs (less than three (3) inches in diameter) and tree stumps shall be completely removed and disposed of by the Contractor.

Firewood from the trees removed shall remain the property of the adjoining property owner. If the adjoining property owner does not want the remaining firewood, it shall be the property of the Contractor and disposed of by the Contractor.

Because of the special concern for preservation of trees in the area, only those trees that have been indicated on the construction drawings are to be removed.

Trees six (6) inches and smaller that are removed will not be considered a pay item. Trees over six (6) inches that are removed may be a pay item as indicated in the proposal. All other trees are to be preserved unless written permission for removal is obtained from the adjoining property owner and the Engineer. Selective pruning of trees will be permitted to allow operation of the Contractor's equipment. Also, this will be required for the necessary clearances along the proposed sidewalk. Tree branches and roots shall be pruned neatly and the scars shall be covered with an approved tree dressing.

9.15.02 Stump Removal

As noted on the drawings or as authorized by the Engineer, existing tree stumps as well as stumps remaining from trees which are removed shall be completely removed and disposed of by the Contractor. Grinding stumps down within the

influence of the sidewalk will not be permitted. Unless otherwise specified, the cost of stump removal shall be considered part of the major work items.

9.15.03 Tree Replacement

Replacement trees shall be the size and type specified in the proposal. Transplanting replacement trees shall be performed in accordance with the 2003 MDOT Specifications Section 815 "Landscaping". The Contractor shall replace transplanted trees that are not in a vigorous growing condition one year after transplanting. Unless otherwise specified, tree replacement shall be a pay item.

9.15.04 Tree Trimming

Adjacent trees shall be trimmed to allow for a minimum of ten (10) feet overhead clearance and one (1) foot side clearance to the edge of the sidewalk. Unless otherwise specified, cost shall be considered part of the major work items.

9.16 RELOCATIONS

9.16.01 Existing Utility Structures

Existing utility poles, guy anchors, hydrants (unless listed on the proposal), cable enclosure boxes, etc. shall be relocated by the utility company at no cost to the Contractor.

9.16.02 Fence Relocations

Existing fences shown or not shown on the construction drawings shall be relocated in accordance with 2003 MDOT Specifications Section 808 "Fencing". Unless otherwise specified, the cost of relocating fences shall be included in the cost of sidewalk grading and restoration.

9.16.03 Landscape Relocation

Existing shrubs, seedlings, bushes, landscaped mounds, decorative stone, shredded bark, etc. at the proposed walkway location shown or not shown on the drawings shall be relocated and transplanted by the Contractor, unless specified otherwise by the adjoining property owner.

The Contractor shall take care to transplant shrubs and bushes to guarantee there continued growth. If the transplanted material dies within the Contractor's warranty period, the Contract shall replace the dead material with a similar type nursery stock in vigorous growing condition. Landscaping that cannot be transplanted shall be replaced with a similar type nursery stock in a vigorous growing condition.

Unless otherwise specified, the cost of landscaping relocation and replacement shall be included in the cost for sidewalk grading and restoration.

9.16.04 Sprinkler System Relocations

Existing sprinkler systems shown or not shown on the drawings shall be relocated as directed by the Engineer or the adjoining property owner. Sprinkler systems shall be tested for leakage after relocation is complete. Unless otherwise specified the cost of relocating sprinkler systems shall be included in the cost for sidewalk grading and restoration.

9.17 ADJUSTMENTS OF EXISTING UTILITY VALVES, ETC.

All existing valves for water mains, including valves for water services, gas company valves, manhole and catch basin castings, etc. shall be adjusted to meet the sidewalk elevations. Unless otherwise specified, the cost for this work shall be considered part of the major work items.

9.18 LAWN AND YARD RESTORATION

After construction is complete all disturbed lawn areas, including adjacent cut and fill areas as required to blend into the existing yards, shall be repaired using a maximum of 1 on 4 backslope, four (4) inches of topsoil, MDOT Class A seed, fertilizer and mulch.

All disturbed areas, including adjacent cut and fill areas as required to blend into the existing yards, which are not lawns shall be repaired using a maximum of 1 on 3 backslope, two (2) inches of topsoil, MDOT Roadside Seed, fertilizer and mulch.

When approved by the Engineer, the existing topsoil may be salvaged and reused.

Areas shall be repaired and reseeded as often as necessary in order to produce a close stand of weed free grass to the edges of the sidewalk. The cost of lawn and yard restoration is to be included in the price bid for sidewalk grading and restoration.

9.19 SURFACE RESTORATION

All areas disturbed by construction operations shall be restored to the original conditions thereof as determined by the Engineer, using information from drawings and photographs, or video tapes when available.

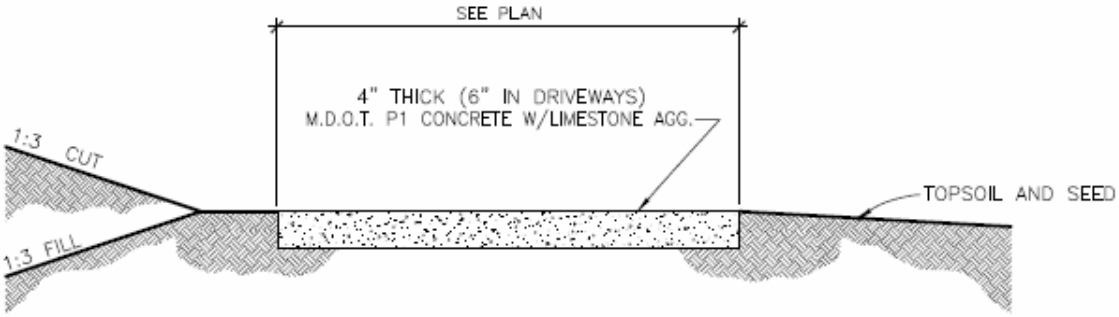
All streets, walks and other improved surfaces disturbed by construction operations shall be replaced to uniform lines and grades established by the Applicants Engineer.

Restoration shall follow the construction in a timely fashion so as to minimize inconvenience to the adjacent property owners and the general public. The manner in which this restoration is done by the Contractor will be a determining factor in the approval by the Applicants Engineer of staking requests and partial payment requests.

All work necessary to return the areas of construction operations to its original condition, other than the items listed in the proposal, shall be considered incidental to the construction, and no specific payment will be made therefore.

9.20 PROTECTION OF WORK

The Contractor shall protect the work until it is accepted by the Engineer. Any part of the completed work that is damaged prior to acceptance by the Applicant shall be replaced at the Contractor's expense.



SIDEWALK DETAIL

SECTION 10

SPECIFICATIONS FOR DRAINAGE

10.01 STORM SEWER FACILITIES

Storm sewer facilities located in the road right-of-way shall become the property of the Village of Schoolcraft. Storm sewer facilities located outside the road right-of-way may become the property of the Kalamazoo County Drain Commission (KCDC). The following storm sewer system requirements are established as minimums necessary to meet the concerns of the Village of Schoolcraft. Meeting these requirements does not in any way substitute for the necessity for obtaining any required permit from and meeting all requirements of, other regulatory agencies, including the Kalamazoo County Drain Commissioner and the Michigan Department of Environmental Quality.

10.02 STORM SEWER DESIGN CRITERIA

10.02.01 Storm sewer collector system design shall be based on a five-year frequency design rainfall event with a minimum time of concentration equal to 20 minutes, at the ultimate design imperviousness. A complete engineering analysis supporting the design concept utilized will be required for all developments and must be submitted with construction plans.

10.02.02 The storm sewer system shall have a positive outlet. If a natural outlet area is not available, a storm water disposal retention area must be constructed.

10.02.03 The maximum surface run for storm water in streets or pavement shall be no longer than 300 feet. The surface run shall not be longer than 200' for street grades exceeding 4%. For the purpose of storm sewer cleanout, structures must be placed no further than 400' apart. Drainage structures must be provided at the highest end of radii where drainage may cross an intersected roadway.

10.02.04 Drainage structures must be constructed with 2' sumps.

10.02.05 During construction and until the Village approves its removal, all drainage structures must be protected from receiving sediment bearing run-off. Inlets shall be covered with an approved filter fabric or other approved method to eliminate soils from infiltrating into the storm sewer system. Routine cleaning of the fabric while it is in place must be accomplished as needed by the Proprietor.

10.02.06 Reinforced Concrete Pipe or Smooth-Lined Corrugated Plastic Pipe conforming to Village of Schoolcraft “Section 5, Specifications for Storm Sewer”, of appropriate size and class is acceptable. Storm sewer less than 12" diameter

shall not be permitted. For plastic pipe the following additional requirements apply. When using plastic pipe, a minimum of 3' of earth cover must be maintained over top of pipe. All installed pipes may be subject to testing per MDOT specifications; documentation of testing must be submitted to the Village of Schoolcraft. Typical tests include mandrel, television inspection and backfill compaction. Tests shall be completed prior to paving.

10.02.07 Concrete pipe joints must be sealed with cold applied bituminous sealer, flexible watertight rubber gaskets or external-type rubber gaskets. Plastic pipe must have a premium joint sealing system per current MDOT specifications.

10.02.08 Only under very special circumstances, leaching basins will be allowed. A full written justification must be submitted with the plans if they are proposed for use. A suggested leaching basin detail may be obtained from the Village of Schoolcraft.

10.02.09 Edge drains may be required by the Village's Engineer as soil borings and/or field observations warrant. Required edge drains shall meet the material and installation specifications of the MDOT.

10.02.10 Prior to acceptance by the Village, all catch basin sumps and other system components shall be inspected and cleaned out of collected materials.

10.03 STORM WATER / DRAINAGE REGULATIONS

10.03.01 Regulations

The Developer shall provide adequate storm water facilities system to manage storm water run-off from the lands developed, platted, condominiumized and outlets thereto. The storm water system shall have an outlet into a natural body of water, stream or previously established County drain, if available. If none of these outlets are available, the outlet shall be into an area provided and prepared by the Proprietor to serve as a storm water retention basin.

10.03.02 Basin Area to Kalamazoo County Drain Commission (KCDC)

Size, design details and soil characteristics of the disposal basin must be approved by the Kalamazoo County Drain Commissioner and its Engineer if the area is to become the responsibility of the Kalamazoo County Drain Commission (KCDC).

The developer shall meet all the requirements as set forth by the Kalamazoo County Drain Commission (KCDC) rules, regulations, and/or policy.

10.03.03 Basin Area to legally recognized Development Association

Size, design details and soil characteristics of the disposal basin must be approved by the Village Council, Village's Engineer and Village's Attorney.

10.03.03.01 Minimum Requirements:

- In general, the basins shall be designed to fully contain four and one-half (4.5) inches of rainfall at the ultimate design imperviousness without benefit of percolation and while maintaining a minimum of two (2) foot free board.
- This capacity shall be provided at least two (2) feet above maximum groundwater table and without creating flooding of streets or adjoining properties.
- A sediment forebay shall be provided with capacity equivalent to 5% of the 25-year, 24 hour storm, plus 1 foot for captured sediments.
- The storm water disposal basin shall be designed to drain completely within 72 hours. A design infiltration rate of 0.5 times the infiltration rate determined by the geotechnical investigation or soil survey maps shall be used to estimate the maximum draining time. Infiltration in the sediment cell may be included in the calculation.
- A minimum of 25 feet around the top edge of the entire basin shall be reserved as a buffer area.
- Storm water disposal basins shall be screened from adjacent residential properties.
- Screening shall consist of vegetative (trees, shrubs, and vines) berms and other landscaping features that will provide a year-round visual barrier from the storm water pond, inlet, and outlet structures, overflow spillway and fence, and provide a minimum of 70% capacity within 3 years. Screening shall have a long-term minimum height of 6 feet measured from grade level. Trees used for screening shall have a minimum height of 4 feet upon completion of construction.
- Storm water disposal basins shall be located outside public road right-of-ways.
- The entire area shall be landscaped and appropriately seeded.
- Appropriate temporary and permanent Soil Erosion Control Measures must be taken to prevent detrimental effects to the storm water disposal basin.
- Optional: An eleven (11) gauge chain link fence or approved alternate, six (6) feet in height shall be constructed around the entire area at least ten (10) feet back from the top of the slope of the basin.
- Optional: Additional Fence Specifications (as per above): 72" (6 foot) 11 gauge 2" mesh aluminized coated fabric. Top Rail 1 5/8" SS20, Line Posts 2" SS20 concrete footings, Terminal Post 3" SS20 concrete

footings, Gates 2" SS20 with matching chain link and all posts set in concrete. All gates to the basin must be lockable with standard padlock.

- One ten (10) foot gate shall be provided at the access point.
- Access lanes ten (10) feet in width, for basins owned and operated by the Village shall be paved from the street to the access gate to facilitate maintenance.
- If the depth of the retention basin is less than eighteen (18) inches and if no slopes exceed a maximum of four (4) horizontal to one (1) vertical, requirements for fencing may be waived.
- All slopes shall be a maximum of three (3) horizontal to one (1) vertical except that the slope nearest the access point shall be a maximum of six (6) horizontal to one (1) vertical and extend to the bottom of the basin.
- A soil boring log, to a depth at least eight (8) feet below the bottom of the storm water disposal basin shall be submitted for every 1,500 square feet of bottom area. A minimum of one boring will be required for each disposal basin under 1,500 square feet of bottom area.
- Water Quality Considerations: Storm water infiltration disposal basins should only be used in series with other best management practices to pre-treat the storm water (i.e., sediment cell), before it enters the infiltration basin, to extend the life of the infiltration basin and reduce the potential risk of groundwater contamination.

10.03.04 Each Developer seeking to subdivide land, pursuant to the Land Division Act, PA 288 of 1967, as amended, shall comply with all provisions of the Land Division Act and in seeking approval of the preliminary and of final plats, shall furnish to the office of the Village of Schoolcraft a written certificate of a surveyor detailing the compliance with said Act.

Each Developer seeking to develop land, pursuant to the Condominium Act, PA 59 of 1978, as amended, shall comply with all provisions of the Act and, in seeking approval from the Village of Schoolcraft for a condominium project, shall furnish a written certificate of a surveyor detailing compliance with said Act.

10.03.05 The Developer shall pay all costs, charges and expenses incurred by the office of the Village of Schoolcraft in connection with making determination as to whether the Village can approve the proposed development, including when applicable, transfer of the Drainage system to the jurisdiction of the Drain Commissioner, or the legally recognized Development Association. This shall include any monies expended for services of engineer or for legal fees or for supervision of operations relating to the proposed development or any other expense of any nature incurred by the Village of Schoolcraft because of such application. The Developer, at time of request made for approval of a development, shall pay all applicable fees and also deposit with the Village of Schoolcraft the sum of $500 and, upon notice of need of further funds, shall supply same prior to obtaining project approval.

10.03.06 The Developer, in connection with each request for approval, shall furnish the Village of Schoolcraft sufficient copies of all drawings and documents so that one copy of same may remain permanently in the office of the office of the Village of Schoolcraft. Additionally, the Developer shall provide the Village of Schoolcraft with one complete set of details, specifications and plans concerning all improvements needed in relation to drainage facilities in the proposed development.

10.03.07 In all instances, the Developer seeking approval shall provide the maps and engineering details concerning the drainage of the area which is to be developed, platted or condominiumized and adjacent thereto which will in any manner be affected by such development. Appropriate construction and facilities shall in all instances be constructed to adequately take care of all storm water drainage indicated to result from the area shown to contribute surface water run-off.

Where the Drain facilities will become a part of a drainage system under the jurisdiction of the Kalamazoo County Drain Commissioner, releases of rights-of-way consistent with the normal releases obtained by the Drain Commissioner in similar cases shall be provided by Developer.

Where the Drain facilities will become a part of a drainage system under the jurisdiction of a legally recognized Development Association, releases of rights-of-way consistent with the normal releases obtained by the Village of Schoolcraft in similar cases shall be provided by Developer.

10.03.08 In any instance where deemed necessary by the Village in order to assure construction in accordance with the plans and proposals, the Developer shall furnish bond as required by the Village to guarantee the construction as per plans, or as per approval granted.

10.03.09 The Developer on request of the Village shall furnish title opinion or other evidence showing ownership of the property within the limits of the proposed development.