SPECIFICATIONS
AND
CONTRACT DOCUMENTS

FOR THE

CITY OF EASTPOINTE

AS NEEDED EMERGENCY WATER, SEWER AND MISCELLANEOUS UTILITY REPAIRS

AEW PROJECT NO. 0145-0627

JANUARY 2022

OWNER:
City of Eastpointe
23200 Gratiot Avenue
Eastpointe, Michigan 48021

AS NEEDED EMERGENCY WATER, SEWER AND MISCELLANEOUS UTILITY REPAIRS

CITY OF EASTPOINTE

INDEX

ADVERTISEMENT FOR BIDS

CITY OF EASTPOINTE
AS NEEDED EMERGENCY WATER, SEWER AND MISCELLANEOUS UTILITY REPAIRS
AEW PROJECT NO. 0145-0627

RECEIPT OF BIDS

Due to the COVID-19 pandemic and the closure of City Hall to the public, the City of Eastpointe will receive electronic bid submittals only until **2:00 pm, local time on Tuesday, February 1, 2022**. All bidders must submit their proposal, all attachments, and any modifications or withdrawals electronically through BidNet. The bidder should submit all documents in a modifiable (native) format (examples include but are not limited to: Microsoft Word or Excel, and Google Docs or Sheets). In addition to submitting documents in a modifiable format, the bidder must also submit copies of documents as a PDF. Bidder's failure to submit a proposal as required may result in disqualification. The proposal and attachments must be fully uploaded and submitted prior to the proposal deadline. **Do not wait until the last minute to submit a proposal**. BidNet will not allow a proposal to be submitted after the proposal deadline identified in the solicitation, even if a portion of the proposal has been updated. **E-mailed bid submissions will NOT be accepted**.

Questions on how to submit information or how to navigate the BidNet system should be referred to BidNet. The Solicitation Manager will not provide assistance related to the submittal of the proposal and all attachments. Complete submission of the bid is the responsibility of the bidder.

DESCRIPTION OF WORK

The City of Eastpointe is seeking bids from qualified contractors for **As Needed Emergency Water, Sewer and Miscellaneous Utility Repairs** to complete repairs from water main breaks, broken sanitary sewers and broken storm sewers and other miscelleaneous utility repairs as required and as directed by the City's Director of Public Works and Service.

It is the owner's intent to award an approximate three (3) year contract to expire on March 31, 2025 with the option of extending the contract on a year to year basis.

BID DOCUMENTS

Documents will only be available through the BidNet site. Bids may be rejected unless made on the forms as included with the bidding documents.

BID SECURITY

A certified check, or the included Bid Bond, executed by the Bidder and a surety company, payable to the City of Eastpointe, in an amount of $2,500 shall be submitted with each bid.

WITHDRAWAL OF BIDS

No bid may be withdrawn for a period of sixty (60) calendar days after the receipt of bids.

AWARD OF CONTRACT

The City of Eastpointe reserves the right to reject any or all bids and/or to waive any irregularities in the bidding. The successful Bidder will be required to furnish satisfactory performance, payment, maintenance, and guarantee bonds and insurance certificates.

BY: KAREN PURCELL
DEPUTY CLERK
City of Eastpointe
23200 Gratiot Avenue
Eastpointe, Michigan 48021

DATED: January 2022

AS NEEDED EMERGENCY WATER MAIN, SEWER AND MISCELLANEOUS UTILITY REPAIR CONTRACT
CITY OF EASTPOINTE
23200 GRATIOT AVENUE
EASTPOINTE, MICHIGAN 48021

GENERAL CONDITIONS

All information requested of the vendor shall be entered in the appropriate space on the bid form. Failure to do so may disqualify the bid.

In order to be considered, bid documents must be received by the City of Eastpointe Clerk's Office, located at 23200 Gratiot Avenue, **no later than 2:00pm on February 1, 2022.**

All information on the bid form shall be entered in ink or typewritten. Mistakes may be crossed out and corrections inserted before submission of your bid. Corrections shall be initialed in ink by the person signing the bid. Corrections and/or modifications received after the closing time specified will not be accepted.

This contract is for an approximate three (3) year contract and will expire on March 31, 2025.

All bids shall be signed by an authorized officer or employee of the bidder. Submit bids in a sealed envelope with "As Needed Emergency Water Main and Sewer Repair Contract" clearly written on the front of the envelope.

The City reserves the right:

1. To award bids received on the basis of individual items, or groups of items, or on the entire list of items,
2. To reject any or all bids, or any part thereof,
3. To waive any irregularities in the bids,
4. To accept the bid that is in the best interest of the City.
5. To award bids to multiple contractors.

GENERAL INFORMATION AND SPECIFICATIONS

CONTRACT:

The bidder, whose proposal is accepted, shall be required to sign and execute a Contract within ten (10) days of the date of the City's notification of acceptance. Failure to execute the Contract as specified shall result in forfeiting all rights under the bid including the bid guarantee.

The Contract shall be firm and binding for a period of approximately three (3) years. Upon mutual agreement between the parties and a contract modification, the contract may be extended for additional a period of time. The City reserves the right to award this contract to multiple contractors.

Due to the nature of the emergency repair services, contractors within a 25 mile radius of Eastpointe, Michigan will be primarily considered.

ASSIGNMENT:

The assignment of the Contract or any of the Contractor's right or interest therein, shall be prohibited without full prior knowledge and written consent of the City.

EQUIPMENT AND STORAGE:

The Contractor shall furnish all equipment required for the performance of his obligation under the Contract. The City will provide the Contractor a specified location in the Department of Public Works and Service(DPWS) yard located at 17750 East Ten Mile Road. Contractor will be required to maintain and keep clean their location of the yard and sweep clean debris as necessary that has been tracked through the DPWS yard and off site.

A visit to inspect equipment may be made by the City prior to awarding of bids. Failure to pass City inspection of equipment may be cause for disqualification of the bid.

The type of equipment proposed to be used by the Contractor shall be provided in the bid submittal and shall be approved at the time of executing the Contract documents.

The Contractor shall show evidence that he has the capability of responding to emergencies within four (4) hours.

GENERAL REQUIREMENTS:

The Contractor shall make his own determination as to soil conditions and shall complete the work under whatever conditions that may be encountered or created without extra cost to the City.

The Macomb County Department of Roads has jurisdiction of the 10 Mile Road right-of-way and the Michigan Department of Transportation has jurisdiction of the Gratiot Avenue and 8 Mile Road (west of Vernier Road) right-of-way. Permits will be required by

these agencies for work within their right-of-ways and will be secured through the Owner. The Contractor shall observe all regulations relative to work performance in these right-of-ways. Adequate safety precautions to accommodate necessary excavation work with proper ground support and shoring of pits and trenches is required. Necessary devices shall be provided in accordance with requirements of the agency having jurisdiction of the road in which installation is to be made, as well as those set forth by MIOSHA or as permitted by law. The Contractor shall assign a Supervisor to oversee the work. The Supervisor(s) shall maintain a Competent Person Certification during the life of this contract.

For planned construction, the Contractor shall be responsible to notify all utility companies and involved agencies prior to excavating. Call "MISS DIG" 72 hours prior to excavating. The Contractor is responsible for coordinating with other utilities on any necessary repairs to restore all damages to utilities caused by the Contractor.

Should the City become involved in a damage dispute with a utility company due to the Contractor's failure to handle same in a timely fashion, the Contractor will be held liable for any costs incurred by the City's representative at a rate of $60.00 per hour.

Where utilities are encountered along the line of work, the Contractor shall perform his work in such a manner that the utility service will not be interrupted and shall make all temporary provisions to maintain said service.

For backfill around all repairs, the Contractor shall utilize Class II Sand (compacted in place) to a point one foot above the top of pipe. In repair areas that are under the influence of paved surfaces or with the zone of influence (1 on 1 slope from the edge of pavement) the Contractor shall place 21AA crushed limestone backfill compacted to 95% of maximum density to 3" of final pavement grade. The Contractor shall place 3" of cold patch to pavement grade. In areas not under the influence of paved surfaces or with the zone of influence the Contractor shall place suitable fill to grade, with 3" of top soil, grass seed and mulch.

All damages caused by the Contractor that are not incidental to the work including but not limited to approaches, paving, sidewalks, and public utilities occurring during the process of making service installations or repairs are to be repaired or replaced by the Contractor as required of the damaged property at the Contractor's expense.

Incident report of all accidents and resulting damages shall be filled out, verified by City personnel and forwarded to the City the same day of occurrence.

The Contractor shall protect and preserve all trees along the line of work and shall be held responsible for any damage to trees caused by his operations. The Contractor will receive no extra compensation for preservation of trees.

Before work shall be considered ready for final inspection, the Contractor shall remove and properly dispose of all equipment, waste material, and excess excavation from the lines of work. He shall grade all trenches and do any work necessary to leave the premises in at least as good a condition as existed before work was started.

TAXES:

The City of Eastpointe is exempt from State and Federal taxes. Therefore, the price bid for contracts must be exclusive of taxes and will be so construed.

SUPERVISION AND INSPECTION:

The Director of Public Works and Service (DPWS) or an employee of DPWS designated by the Director shall have general supervision and direction of the work. The DPWS has authority to stop the work when such stoppage may be necessary to insure the proper execution of the work under this Contract. The DPWS shall also have authority to reject work and materials which do not conform to the Contract, to direct application of forces to any portion of the work, as in his judgment is required, and to resolve situations which arise in the execution of the work.

The City's inspector shall oversee the Contractor's work and shall be informed daily by the Contractor of the progress of the work assigned and shall at all times have access to the work and his requests for inspections complied with by said Contractor.

In no instance shall any action or omission on the part of the inspector release the Contractor of the responsibility of completing the work in accordance with the plans and specifications.

The City and its representative shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection.

The City shall have the right to reject workmanship which is defective. Rejected workmanship shall be satisfactorily corrected. If the Contractor does not correct such condemned work within a reasonable time, fixed by written notice, the City may remedy the condemned work and charge the expense to the Contractor.

UTILITY PROTECTION

Determining the existence and the locations of underground and overhead lines and their protection shall be the responsibility of the Contractor. Utility work referring to the removal, relocation and/or replacement of gas, telephone, and electric power lines, pipes, poles and appurtenances as required, will be done by the forces of the utility company involved. Allowances in the bid for related costs of that work shall be made by the Contractor. CALL MISS DIG. Special consideration shall be given to locating, by hand digging, the gas main, and gas services.

Before starting construction, the Contractor shall check with the Utility Companies to ascertain for himself the location of all utilities which might interfere with the work and shall give due notice to all organizations whose utilities will be affected by his operations.

It shall be the Contractors responsibility to locate all existing gas service shut-offs and adjust as necessary to meet the proposed construction. The City DPWS will assist the Contractor in locating water shut-offs. If existing water service shut-off boxes need to be replaced, the work will be done by the City DPWS.

A. This list is provided for the Contractor's use and may not be a complete listing. The Contractor shall coordinate his work and traffic control with any other agencies or Contractors as required.

Description of the Work	Agency of Contractor
Utility Pole Relocation, Service Cable and Overhead Wires, and Street Lights	Detroit Edison 586- 412-4758
Underground and/or Overhead Telephone and Communication Lines	AT&T 586-466-1056
Cable T.V. Relocation	Comcast Cable 586-883-7253 Wide Open West 248-677-9008
Gas Main Relocation, Gas Service and/or Main Crossing Lowering	Consumers Energy Company Emergency 1-800-477-5050 Damage Prevention 586 307-3223 Engineering 586-307-3276

B. Consumers Energy Gas Services and Mains

The Consumers Energy Company may have gas mains and/or gas services in the construction area. The Contractor should be aware that hand digging will be required to protect the gas lines. The Contractor shall make arrangements with the utility company to raise or lower utilities to accommodate the construction of the project.

TRAFFIC MAINTENANCE AND CONTROL:

Traffic signs and control devices shall be in conformance to the details provided in the appendices of these contract documents and the Michigan Manual of Uniform Traffic Control Devices, current issue.

This item of work shall include any and all traffic control and warning devices provided and/or rented to complete the proposed work. No consideration shall be given to any

attempt or request to include any other items of work other than traffic control and warning devices.

The Contractor shall furnish, erect, maintain and remove all traffic control devices, including lights, signs, plastic drums, lighted arrow boards (type B solar) and barricades required to protect the construction area and the public.

Maintaining traffic within the Macomb County Department of Roads (MCDR) right-of-way(s) shall conform to all requirements of the Macomb County Department of Roads (MCDR) Right-of-Way Permit.

Maintaining traffic within the MDOT right-of-way(s) shall conform to all requirements of the MDOT Right-of-Way Permit.

SITE RESTORATION:

Vegetative site restoration work will be completed by the City of Eastpointe. The Contractor will be responsible for backfilling to the ground elevation and clean up of the site. The Contractor will be responsible for placing and compacting coldpatch material where pavements, driveway approaches and sidewalks were placed.

REMOVAL AND REPLACEMENT OF STREET SIGNS

It shall be the Contractor's responsibility to remove and store the existing traffic and street signs which may be within the influence of completing repairs and to reinstall them immediately upon completion of the repair. This work shall not be paid for separately, but shall be incidental to the work completed. Any street signs that are damaged during the work or being salvaged will be the responsibility of the Contractor to replace with a new sign.

TRUCK ROUTES

All construction traffic shall comply with existing traffic patterns and regulations. All trucks shall have loads trimmed to prevent spillage. Truck traffic shall be maintained on major roads as much as possible. The Contractor shall be responsible for the repair or replacement of any property which is damaged due to truck and equipment traffic.

STREET CLEANLINESS

The Contractor shall clean and keep clean the street, the work area and public or private property occupied by him, from waste materials, refuse, mud, etc., resulting from his operations. Trucks hauling excavated materials, cement, sand, stone or other loose materials from or to the site shall be tight so that no spillage will occur on adjacent streets. Before trucks start away from the site, their loads shall be trimmed. Should the Contractor be negligent of his duties in maintaining the proper street cleanliness, the Owner will take necessary steps to perform such cleaning and shall charge the Contractor for all the costs.

EMERGENCY PHONE NUMBERS

The Contractor must submit Emergency (24 hours) phone numbers on the Company letterhead at the pre-construction meeting.

MATERIALS AND REPORTS:

The City will furnish all water main and pipe material, fittings and required backfill and coldpatch material for completion of water and sewer repairs and other as-needed repairs. Materials must meet MDOT requirements for Class II Sand and 21AA limestone aggregate.

MOBILIZATION AND DE-MOBILIZATION

Mobilization and de-mobilization for all work shall be incidental to all work effort.

WATER MAIN REPAIR (6-inch through 16-inch)

Water Main repairs are to be made to various types of existing cast iron, ductile iron, asbestos cement and plastic water mains. This item will include, but not be limited to saw cut and removal of concrete and/or asphalt pavements, removal of curb and gutter, removal of overburden, locating of the water main break, assessing the water main break and determining the length of repair clamp necessary. The Contractor will be responsible to properly backfill open excavations compacted in 12-inch lifts and will be responsible for the placement of coldpatch material where pavements and sidewalk are to be replaced under the City's Miscellaneous Street Repairs contract.

GATE VALVE AND BOX REPLACEMENT (6-inch through 16-inch)

This item will include, but not be limited to, saw cut and removal of concrete and/or asphalt pavement, removal of curb and gutter, removal of valve or removal of top section of well, including the salvaging and re-installation of frame and cover, and removal of overburden as necessary to remove old gate valve and install new gate valve in a box with necessary materials to make connection. The Contractor will be responsible to properly backfill open excavations compacted in 12-inch lifts and will be responsible for the placement of coldpatch material where pavements and sidewalk are to be replaced under the City's Miscellaneous Street Repairs contract.

FIRE HYDRANT ASSEMBLY REPLACEMENT

This item will include, but not be limited to, saw cut and removal of concrete and/or asphalt pavement as required, removal of existing fire hydrant assembly, salvaging existing fire hydrant and delivering to the Department of Public Works and Service and placement of new fire hydrant to be supplied by the City of Eastpointe. The Contractor will be responsible to properly backfill open excavations compacted in 12-inch lifts and will be responsible for the placement of coldpatch material where pavements and sidewalk are to be replaced under the City's Miscellaneous Street Repairs contract.

WATER SHUT OFFS:

The Department of Public Works and Service will operate all valves and shut off the necessary valves to complete repairs. At no time shall the contractor operate gate valves without the permission of the City.

SANITARY SEWER AND STORM SEWER REPAIR REQUIREMENTS:

Prior to beginning work at any location, the contractor shall provide the owner a detailed estimate of the labor and equipment time anticipated. No work shall begin until this estimate is approved by the owner.

It is anticipated that all Sewer Main repairs will be completed by means of open cut excavation.

When the work occurs within the street right-of-way, the Contractor shall sawcut and remove all sidewalk, driveway approach, and/or street pavement required to complete the work. All removed pavement and excess excavated material shall be hauled to the DPWS Yard to the designated storage location.

All excavations under or within 3' of a paved surface (sidewalk, driveway, or street) shall be backfilled with Class II granular material. The Class II granular material shall be placed in 12-inch lifts and compacted to 95% modified proctor.

All pavement that is removed shall be temporarily replaced with cold patch material provided by the City. Permanent replacement of the concrete pavement, sidewalks, and driveways, will be completed by others.

Contractor is responsible for coordinating work, including with property owner and all neighboring properties that will be affected by the work.

The City will provide the Contractor with all material, including pipe, fittings, adaptors, sleeves and all other material and supplies necessary to complete the repair.

Contractor is responsible for inventory, necessary parts and materials, and to then inform City personnel of the items which must be ordered.

Contractor is to follow-up on all complaints, in person.

The City shall not guarantee a minimum number of service replacements or repairs under this Contract.

DRAINAGE STRUCTURE OR MANHOLE STRUCTURE REPAIR REQUIREMENTS

Prior to beginning work at any location, the contractor shall provide the owner a detailed estimate of the labor and equipment time anticipated. No work shall begin until this estimate is approved by the owner.

When the work occurs within the street right-of-way, the Contractor shall sawcut and remove all sidewalk, driveway approach, and/or street pavement required to complete the work. All removed pavement and excess excavated material shall be hauled to the DPW Yard and dumped at a location as determined by the DPW staff.

All excavations under or within 3' of a paved surface (sidewalk, driveway, or street) shall be backfilled with Class II granular material. The Class II granular material shall be placed in 12-inch lifts and compacted to 95% modified proctor. The Class II granular material or equal shall be provided by the City.

All pavement that is removed shall be temporarily replaced with cold patch material provided by the City. Permanent replacement of the concrete pavement, sidewalks, and driveways, will be by others.

Contractor is responsible for coordinating work, including with property owner and all neighboring properties that will be affected by the work.

The City will provide the Contractor with all material, including precast sections, brick, block, mortar mix, frame and covers and all other material and supplies necessary to complete the repair.

Contractor is responsible for inventory, necessary parts and materials, and to then inform City personnel of the items which must be ordered.

Contractor is to follow-up on all complaints, in person.

The City shall not guarantee a minimum number of service replacements or repairs under this Contract.

INSTRUCTION TO BIDDERS AND GENERAL CONDITIONS

CONTRACTS:
The bidder, whose proposal is accepted, shall be required to sign and execute a Contract within ten (10) days of the date of the City's notification of acceptance. Failure to execute the Contract as specified shall result in forfeiture of all rights under the bid.

The City shall have the right to award the contract to the next qualified bidder or reject all bids and re-advertise for bids.

ASSIGNMENTS:
The assignment or delegation of the Contracts or any of the Contractor's duties, rights or interests therein, shall be prohibited. If any assignment or delegation of duties is approved by the City, the Contractor remains responsible for the performance of this Contract.

QUESTIONS:
All questions regarding this Request for Proposals shall be directed in writing to the City's engineering consultant, Ryan Kern, PE, at Anderson, Eckstein and Westrick, Inc. by e-mail at rkern@aewinc.com. Please write the name of the RFP in the subject line. A response will be provided within 24 hours. Questions must be received no later than 4:30pm on Thursday, January 27, 2022 in order to be answered.

ADDENDA:
Should any prospective bidder be in doubt as to the true meaning of any portion of the Request for Proposal, or should the bidder identify any ambiguity, inconsistency, or omission within the Request for Proposal, the bidder shall make a written request (via email) for official interpretation or correction no later than 4:30pm on Thursday, January 27, 2022 and shall be submitted to the City's engineering consultant, Ryan Kern, PE, at Anderson, Eckstein and Westrick, Inc. by e-mail at rkern@aewinc.com

Such interpretation or correction, as well as any additional RFP provisions that the City may decide to include, will be made as an addendum, which will be posted on the BidNet website at www.bidnetdirect.com. Any addendum issued by the City shall become part of the RFP and shall be taken into account by each bidder in preparing their proposal. Only written addenda are binding. It is the bidder's responsibility to be sure they have obtained all addenda. Receipt of all addenda must be acknowledged on the attached proposal form.

BONDS:
The Contractor whose proposal is accepted will furnish at his own expense, concurrently with the executed Contract, a Performance Bond in the amount of Fifty Thousand ($50,000.00) Dollars.

The Contractor shall furnish a Maintenance and Guarantee Bond in the amount of Fifty Thousand ($50,000.00) Dollars for all work performed under this Contract against defects

in workmanship for a period of two (2) years from the date of acceptance of such work by the City. The date of acceptance by the City shall be the date of the final payment.

All bonds are to be made out in favor of the City of Eastpointe, 23200 Gratiot Avenue, Eastpointe, Michigan 48021, release of which is conditioned upon the faithful performance of the Contractor's duties as set forth in this Contract document.

Should the Contractor fail, neglect, or refuse to perform his duties under the Contract, the City may declare the Contractor in default. The City shall immediately notify the bonding company of said default. All costs incurred by the City due to non-performance of the Contractor shall be paid to the City by the bonding company based on invoices submitted by the City. Should the bonding company fail to proceed within 60 days to complete the Contract requirements, the City shall have the right during this period to advertise for bids and to retain a new qualified Contractor to perform the duties and services as set forth in this Contract. Any costs incurred by the City under the new Contract which exceed the current Contract shall be paid by the bonding company.

PAYMENT TO CONTRACTOR:

The Contractor shall submit to the City a detailed invoice, indicating date(s), times, equipment used, manpower based on the prices agreed to in the contract and photographs of the repair for each location assigned. Materials used shall include backup information, such as a vendor invoice, to substantiate the material pass through cost to the City. The City shall review the invoice and recommend payment within 45 calendar days after receipt of itemized bill.

CONTRACTOR'S RESPONSIBILITY FOR HIS EMPLOYEES AND SUBCONTRACTOR'S EMPLOYEES:

The Contractor shall take reasonable precautions in the selection of his employees assigned to do work under the Contract. The Contractor shall supervise over his employees and the Subcontractor's employees at all times while working within the City.

Subject to the law, the Contractor agrees to reassign his or the Subcontractor's employee, who in the judgment of the City is violating any provisions of the Contract. All work that is not done in accordance with the provisions and specifications of the Contract shall be corrected and rectified by the Contractor.

The Contractor shall be responsible for any and all damages to any person or private property which may occur as a result of any activity or omission associated with this Contract.

INSURANCE:

The Contractor shall not commence work under this Contract until he has obtained the insurance required within this Contract. All bonds as listed above and all insurance coverage shall be with insurance carriers acceptable to the City of Eastpointe. If any

coverage is written with a deductible or self-insured retention, the Contractor shall be solely responsible for said deductible or self-insured retention. The purchase of insurance and the furnishing of a certificate of insurance shall not be a satisfaction of the Contractor's indemnification of the City of Eastpointe. The Contractor shall procure and maintain during the life of this Contract the following coverage:

Workers' Compensation Insurance in accordance with all applicable Statutes of the State of Michigan. Coverage shall include Employers Liability Coverage of no less than $1,000,000.

Commercial General Liability Insurance on an "Occurrence" basis with limits of liability not less than $3,000,000 per occurrence and/or aggregate combined single limit. Personal injury, Bodily Injury, and Property Damage. Coverage shall include the following extensions:

(A) Contractual Liability
(B) Products and Completed Operations
(C) Independent Contractors Coverage
(D) Broad Form General Liability Extensions or Equivalent
(E) Coverage for Explosion, Collapse, and Underground Hazards.

Motor Vehicle Liability Coverage, including Michigan No-Fault Coverage for all vehicles used in the performance of the Contract. Limits of Liability shall not be less than $3,000,000 per occurrence combined single limit Bodily Injury and Property Damage.

Additional Insured: Commercial General Liability Insurance as described above shall include an endorsement stating the following shall be an "Additional Insured": The City of Eastpointe, including all elected and appointed officials and employees and Anderson, Eckstein, and Westrick, Inc.

Cancellation Notice: Workers' Compensation Insurance, Commercial General Liability Insurance and Motor Vehicle Liability Insurance, as described above, shall include an endorsement stating that thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction, and/or Material Change shall be sent to:

CITY OF EASTPOINTE
23200 Gratiot Avenue, Eastpointe, Michigan 48021
(586) 445-5053

Proof of Insurance: The Contractor shall supply sample certificates of insurance with submission of their bid as verification that the Contractor can meet the insurance requirements in this invitation to bid. **FAILURE TO DO SO MAY DISQUALIFY YOUR BID.** At the time the Contract is returned for execution, original certificates are to be provided as follows:

a. Four (4) copies of Certificate of Insurance of Contractor's Workers' Compensation Insurance;

b. Four (4) copies of Certificate of Insurance of Contractor's Commercial General Liability Insurance;

c. Four (4) copies of Certificate of Insurance of Contractor's Motor Vehicle Liability Insurance.

INDEMNITY CLAUSE

To the fullest extent permitted by law, Contractor expressly agrees to indemnify and hold the City harmless against all losses and liabilities arising out of bodily injury or property damages based upon any act or omission, negligent or otherwise, of Contractor or anyone acting on Contractor's behalf in connection with or incident to this Contract or the work to be performed hereunder, except that Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence.

For the purposes of this indemnity clause, "City" shall mean the City of Eastpointe, its elected and appointed officials, employees, and volunteers working on behalf of the City; "losses and liabilities" shall mean loss, cost, expense, damage, liability or claims, whether groundless or not; "personal injury" shall mean false arrest, erroneous service of civil papers, false imprisonment, malicious prosecution, assault and battery, libel, slander, defamation of character, discrimination, mental anguish, wrongful entry or eviction, violation of property or deprivation of any rights, privileges or immunities secured by the Constitution and laws of the United States of America or the State of Michigan, for which Vendor may be held liable to the injured party in any action at law, suit in equity or other proceedings for redress; "bodily injury" shall mean bodily Injury, sickness or disease (including death resulting at any time there from), mental anguish and mental injury which may be sustained or claimed by any person or persons; and property damage " shall mean the damage or destruction of any property, including the loss of use thereof.

The Contractor's obligation to indemnify and hold the City harmless shall include, but not be limited to (1) the obligation to defend the City from any such suit, action or proceeding, and (2) the obligation to pay any and all judgments which may be recovered in any such suit, action or proceeding, and/or any and all expenses, including but not limited to costs, attorney fees and settlement expenses which may be incurred.

WORKMANSHIP:

All work shall be performed in accordance with the best modern practice and workmanship of highest quality. The Director of Public Works and Service shall determine the Contractor's compliance with these requirements. Failure to conform to standards specified by the City shall be considered a breach of the Contract.

SUPERVISION AND INSPECTION:

The Director of Public Works and Services (DPWS) or an employee of DPWS designated by the Director shall have general supervision and direction of the work. The DPWS has authority to stop the work when such stoppage may be necessary to insure the proper execution of the work under this Contract. The DPWS shall also have authority to reject work and equipment which do not conform to the Contract, to direct application of forces to any portion of the work, as in his judgment is required, and to resolve situations which arise in the execution of the work.

The City and its representatives shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such inspection.

CONTRACT TERMINATION:

The City may terminate and/or cancel this contract (or any part thereof) at any time during the term, any renewal, or any extension of this contract, upon thirty days (30) days written notice to the Contractor, for any reason, including convenience without incurring obligation or penalty of any kind. The effective date for termination or cancellation shall be clearly stated in the written notice.

NON-DISCRIMINATION:

The Contractor shall not discriminate against any employee or applicant for employment with respect to hire, tenure, terms, condition or privileges of employment on a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, or marital status pursuant to the Elliot Larsen Civil Rights Act, 1976, P.A. 453. The Agency and the Municipality shall also comply with the provisions of the Michigan Handicappers Civil Rights Act, 1976, P.A. 220 and the Federal Rehabilitation Act of 1973, P.A. 93-112, 87 Stat. 394, which require that no employee or client or otherwise qualified handicapped individual shall, solely by reason of his/her handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal Assistance. No person shall, on the grounds of race, creed, color, sex, age, national origin, height, weight, handicap, or marital status be excluded from participation in, be denied the proceeds of, or be subject to discrimination in the performance of this contract. The Consultant further covenants that it will comply with the Civil Rights Act of 1973, as amended; and the Michigan Civil Rights Act of 1976 (78. Stat. 252 and 1976 PA 453) and will require a similar covenant on the part of any consultant or sub-consultant employed in the performance of this contract.

ALL PROPOSALS ARE TO BE SUBMITTED ON THE ATTACHED FORMS

The Contractor shall complete and submit a proposal including all identified items.

Overall Ability to Perform the Required Services:

Submit the company qualifications as follows:

1. Business Name.
2. Primary Contact and/or Signatory
3. Address

4. Phone, Fax and E-Mail
5. Business Type, i.e. LLC, Inc., etc.
6. Business License and State
7. Number of Year in Business
8. Number of Year in Business performing similar work for municipal clients
9. Submit a list of Sub-Contractors/Consultants, if applicable, and when they would typically be used
10. Submit staff experience and qualifications for key individuals
11. Submit information detailing your firms historical related experience with municipal clients including the scope of work and the average number of each performed in a year: main break repairs, water taps, service line replacements, hydrant installations, valve installations, stop box replacements
12. A descriptive listing of all equipment available immediately.
13. Three names and addresses of references of similar contracts performed by the bidder during the previous one-year period.

PROPOSAL FOR AS NEEDED EMERGENCY WATER, SEWER AND MISCELLANEOUS UTILITY REPAIRS

Gentlemen:

The undersigned, as bidder, declares that he has familiarized himself with the location of the proposed water service connections and the conditions under which they must be installed; also, that he carefully examined the specifications which he understands and accepts as sufficient for the purpose of constructing said service connections and agrees that he will contract with the City of Eastpointe to furnish labor, material, tools, and equipment necessary to do all the work specified.

The undersigned hereby agrees that if this foregoing proposal shall be accepted by the City of Ecorse that he will, after being notified to proceed, furnish the required Bonds and Insurance Requirements with ten (10) calendar days.

The City of Eastpointe reserves the right to reject any or all bids, to waive any informalities in the bidding and to accept any bid it deems in the best interest of the City.

Company Name: _____

Name of Authorized Representative: _____
(Please Print)

Signature of Authorized Representative: _____

Address _____

City _____ State _____ Zip _____

Telephone No. _____ Cell Phone No. _____

E-mail Address: _____

_____
Signature of Authorized Representative

Bid Form – Time of Contract Award through March 31, 2023

Equipment Rates

1. Excavator	_____	$/Hour
2. Front End Loader	_____	$/Hour
3. Backhoe	_____	$/Hour
4. Tool Truck	_____	$/Hour
5. Dump Truck	_____	$/Hour
6. Foreman's Truck	_____	$/Hour
7. Pump	_____	$/Hour
8. Excavator	_____	$/Hour
9. _____	_____	$/Hour
10. _____	_____	$/Hour

NOTE: The Bidder should use line items 9 and 10 under equipment rates to add additional equipment that might be used to complete the work.

Labor Rates

Base Hours – List hourly rate during a normal eight (8) hour workday: 7:00 a.m. to 4:00p.m., Monday through Friday.

11. Foreman	_____	$/Hour
12. Operator	_____	$/Hour
13. Laborer	_____	$/Hour

Overtime Hours - List hourly rate for work completed other than between 7:00 a.m. to 4:00 p.m. Monday through Friday. Time will begin when crew is assembled and equipment is at job site and will end when job is complete.

14. Foreman	_____	$/Hour
15. Operator	_____	$/Hour
16. Laborer	_____	$/Hour

Bidder acknowledges that bid unit price includes an amount considered by the Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item.

Bid Form – April 1, 2023 through March 31, 2024

Equipment Rates

1.	Excavator	_____	$/Hour
2.	Front End Loader	_____	$/Hour
3.	Backhoe	_____	$/Hour
4.	Tool Truck	_____	$/Hour
5.	Dump Truck	_____	$/Hour
6.	Foreman's Truck	_____	$/Hour
7.	Pump	_____	$/Hour
8.	Excavator	_____	$/Hour
9.	_____	_____	$/Hour
10.	_____	_____	$/Hour

NOTE: The Bidder should use line items 9 and 10 under equipment rates to add additional equipment that might be used to complete the work.

Labor Rates

Base Hours – List hourly rate during a normal eight (8) hour workday: 7:00 a.m. to 4:00p.m., Monday through Friday.

11.	Foreman	_____	$/Hour
12.	Operator	_____	$/Hour
13.	Laborer	_____	$/Hour

Overtime Hours - List hourly rate for work completed other than between 7:00 a.m. to 4:00 p.m. Monday through Friday. Time will begin when crew is assembled and equipment is at job site and will end when job is complete.

14.	Foreman	_____	$/Hour
15.	Operator	_____	$/Hour
16.	Laborer	_____	$/Hour

Bidder acknowledges that bid unit price includes an amount considered by the Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item.

Bid Form – April 1, 2024 through March 31, 2025

Equipment Rates

1.	Excavator	_____	$/Hour
2.	Front End Loader	_____	$/Hour
3.	Backhoe	_____	$/Hour
4.	Tool Truck	_____	$/Hour
5.	Dump Truck	_____	$/Hour
6.	Foreman's Truck	_____	$/Hour
7.	Pump	_____	$/Hour
8.	Excavator	_____	$/Hour
9.	_____	_____	$/Hour
10.	_____	_____	$/Hour

NOTE: The Bidder should use line items 9 and 10 under equipment rates to add additional equipment that might be used to complete the work.

Labor Rates

Base Hours – List hourly rate during a normal eight (8) hour workday: 7:00 a.m. to 4:00p.m., Monday through Friday.

11.	Foreman	_____	$/Hour
12.	Operator	_____	$/Hour
13.	Laborer	_____	$/Hour

Overtime Hours - List hourly rate for work completed other than between 7:00 a.m. to 4:00 p.m. Monday through Friday. Time will begin when crew is assembled and equipment is at job site and will end when job is complete.

14.	Foreman	_____	$/Hour
15.	Operator	_____	$/Hour
16.	Laborer	_____	$/Hour

Bidder acknowledges that bid unit price includes an amount considered by the Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item.

AS NEEDED EMERGENCY WATER MAIN, SEWER AND MISCELLANEOUS UTILITY REPAIR CONTRACT
CITY OF EASTPOINTE
23200 GRATIOT AVENUE
EASTPOINTE, MICHIGAN 48021

CONTRACT

Articles of Agreement made and entered into this _____day of _____, _____ by and between _____, hereinafter called the Contractor and the City of Eastpointe, Michigan, hereinafter called the Owner, witnessed, that the Contractor and the Owner for the considerations hereinafter named agrees as follows:

That all Contract documents, as defined in "Instructions to Bidders" in the specifications, hereto attached or herein referred to shall be and are hereby made a part of the Agreement and Contract.

The Contractor shall, under penalty of Bond attached, furnish all labor and equipment necessary and perform all work as set forth in his proposal in strict accordance with the drawings, specifications, and other documents which have been made a part of this Contract in the manner, time, and place as therein set forth.

In consideration whereof, the City of Eastpointe agrees to pay the Contractor the amounts provided in the attached proposal, being the product of the hourly rates therein set forth, multiplied by the number of hours actually constructed, all in the time and manner as set forth in the "General Conditions" under the heading "payments to Contractor".

In witness whereof, said parties have hereunto set their hands and seals, the day and year first above written.

Contractor:

Name: _____

Title: _____

Signature: _____

CITY OF EASTPOINTE

Name: _____

Title: _____

Signature: _____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

City of Eastpointe
23200 Gratiot Avenue
Eastpointe, Michigan 48021

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location):* As Needed Emergency Water, Sewer, and Miscellaneous Utility Repairs
City of Eastpointe
AEW Project No. 0145-0627

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

MAINTENANCE AND GUARANTEE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
City of Eastpointe
23200 Gratiot Avenue
Eastpointe, Michigan 48021

CONTRACT
Date:
Amount:
Description (Name and Location): As Needed Emergency Water, Sewer, and Miscellaneous Utility Repairs
City of Eastpointe
AEW Project No. 0145-0627

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Maintenance and Guarantee Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that by and under said contract, the above named principal has agreed with the said Owner that for a period of **two years** from the date of payment of Final Estimate, to keep in good order and repair any defect in all the work done under said contract either by the principal or his subcontractors, or his material suppliers, that may develop during said period due to improper materials, defective equipment, workmanship or arrangements, and any other work affected in making good such imperfections, shall also be made good all without expense to the Owner, excepting only such part or parts of said work as may have been disturbed without the consent or approval of the principal after the final acceptance of the work, and that whenever directed so to do by the Owner, by notice serving in writing, either personally or by mail, on the principal at_____

OR its

legal representatives, or successors, or on the surety at

WILL PROCEED at once to make such repairs as directed by said Owner, and in case of failure to do so within one week from the date of such notice, or within reasonable time not less than one week, as shall be fixed in said notice then the said Owner shall have the right to purchase such materials and employ such labor and equipment as may be necessary for the purpose, and to undertake, do and make such repairs and charge the expense thereof to, and receive same from said principal or surety. If any repair is necessary to be made at once to protect life and property, then and in that case, the said Owner may take immediate steps to repair or barricade such defects without notice to the contractor. In such accounting the said Owner shall not be held to obtain the lowest figures for the doing of the work, or any part thereof, but all sums actually paid therefore shall be charged to the principal or surety. In this connection the judgment of said year from the date of payment of Final Estimate, shall keep said work so constructed under said contract in good order and repair, excepting only such part or parts of said work so constructed under said contract in good order and repair, excepting only such part or parts of said work which may have been disturbed without the consent or approval of said principal after the final acceptance of the same, proceed to make repair as in said notice directed, or shall reimburse said Owner for any expense incurred by making such repairs, should the principal or surety fail to do so as hereinbefore specified, and shall fully indemnify, defend and save harmless the said Owner from all suits and actions for party or parties by or from any of the acts or omissions or through the negligence of said principal, servants, agents, or employees, in the prosecution of the work included in said contract, and from any and all claims arising under Workman's Compensation Act, so-called, of the State of Michigan, then the above obligation shall be void, otherwise to remain in full force and effect.

FOR INFORMATION ONLY – NAME, ADDRESS AND TELEPHONE

Surety Agency or Broker

Owner's Representative (engineer or other party)

SECTION 823. WATER MAINS

823.01 Description These written Specifications are intended to modify and supplement Sections 823 and 923 of the MDOT Standard Specifications. A conflict between these written specifications and the MDOT Standard Specifications shall be resolved in favor of these written specifications.

The work consists of excavating, installing, backfilling, testing, and disinfecting water mains and associated appurtenances.

823.02 Materials Provide materials in accordance with the following:

A. General All water main pipe, fittings, and appurtenances shall meet the requirements the current specifications of the American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI), the American Water Works Association (AWWA), and the Safe Drinking Water Act.

B. Defective Materials All pipe, fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects prior to installation. Defective materials shall be replaced or corrected and held for review by the Owner. Rejected material shall be so marked and removed from the project site.

C. Pipe

1. Restrictions. PVC and HDPE water main shall only be used when specified on the plans or with written authorization of the engineer. The use of asbestos cement pipe and gray iron pipe will not be allowed.

2. Approved Pipe Materials. The approved types of pipe are shown on the Drawings or specified in the community Standard Detail Sheets and shall meet the following:

   a. Ductile Iron Pipe (DI)
   ANSI/AWWA C151/A21.51 Class 54, double cement lined.

   b. Polyvinyl Chloride Pipe (PVC)
   ANSI/AWWA C900, PC 235 (DR 18), 4" through 12" only.

   c. River Crossing Pipe
   ANSI/AWWA C151/A21.51 Class 54, double cement lined equal to "Usiflex Boltless Flexible Joint Pipe" by U.S. Pipe, or "Clow Ball and Socket Pipe" by Clow Corporation.

3. Manufacture's Identification
Pipe shall have the nominal pipe size, material, class, dimension ratio, and pressure class shown on each pipe along with the NSF certification, Manufacturer's mark and country where produced.

D. Pipe Joints
Joints for the various acceptable types of water main shall comply with the following:

1. Push-on Type Joint
   a. Ductile Iron Pipe
   ANSI/AWWA C111/A21.11 with serrated brass wedges. Two (2) wedges for 6-12 inch pipe, and four (4) wedges for pipe 16 inches and larger.
   b. PVC Pipe
   ANSI/AWWA C900 with elastomeric-gasket bell ends.

2. Mechanical Joint
ANSI/AWWA C-111/A21.11
   a. Bolts shall be "Cor-Blue" or "R-Blue" with T-Heads, Hex-Head nuts or approved equal.
   b. All mechanical joints shall be wrapped with polyethylene in accordance with ANSI/AWWA C105/A21.5 when required on the Standard Details for construction
   c. Split retainer glands are not allowed.

3. Flanged Joint

ANSI/AWWA C111/A21.11 with rubber, ring gaskets.

a. All flanged joints exposed to earthen materials, shall be wrapped with polyethylene in accordance with ANSI/AWWA C105/A21.5 when required on the Standard Details for construction.
b. Flanged joints shall be used only when specified on the plans.

4. Restrained Joints

If specified, restrained joints shall be a boltless restrained joint with a rubber gasket (Clow super-lock or approved equal). The restraining mechanism shall be a ductile iron retainer. The pipe shall be supplied with a factory installed lock-ring welded to the plain end of the pipe to anchor the retainer.

E. Fittings

1. Ductile Iron

ANSI/AWWA C153/A21.53 (compact fittings) with interior and exterior epoxy coating per ANSI/AWWA C116/A21.16 and with mechanical joints and retaining glands. Split retainer glands are not allowed.

2. The use of PVC and HDPE fittings are not allowed unless specifically requested or approved by the Engineer.

F. Lining, Coatings, and Polyethylene Encasement

1. Interior Lining
   a. Pipe: ANSI/AWWA C104/A21.4, Cement-Mortar, double thickness
   b. Fittings: ANSI/AWWA C104/A21.4, Cement-Mortar, single thickness, or; ANSI/AWWA C116/A21.16, Fusion-Bonded Epoxy

2. Exterior Coating
   a. Pipe: ANSI/AWWA C151/A21.51 asphaltic coating
   b. Fittings: ANSI/AWWA C151/A21.51 asphaltic coating, or ANSI/AWWA C116/A21.16, Fusion-Bonded Epoxy

3. Seal Coat: ANSI/AWWA C104/A21.4 asphaltic material (Omit for epoxy coated fittings).

4. Polyethylene Encasement: ANSI/AWWA C105/A21.5, if required on the community Standard Details Sheets.

G. Valves and Hydrants

1. Gate Valves

Gate Valves shall conform to ANSI/AWWA C509 or ANSI/AWWA C515 specifications and local community standards. The valve shall be cast with an iron body, a bronze non-rising stem, double "O"-ring replaceable seals and mechanical joints. Furnish with a two inch (2"), square operating nut and a resilient-seated wedge in accordance with the local community standards.

The opening direction shall be in accordance with the local community standards.

2. Tapping Valves

Tapping valves shall conform to the requirements of gate valves as specified herein. The valve shall be manufactured to allow a tapping machine to tap directly through the open valve.

The valve shall be supplied with a flanged joint for connection to the tapping sleeve and a mechanical joint for connection to the branch water main. The tapping sleeves shall be ductile iron or stainless steel with split sleeves and a flanged outlet.

3. Valve Boxes

Valve boxes shall be a 3-piece, screw type box (5 ¼ inch shaft) with an extension range of 51-60 inches. The box shall have a round base, sized to fit the valve, and a locking cover marked "water".

4. Hydrants

Fire hydrants shall be a dry-barrel type conforming to ANSI/AWWA C502 and all local municipal standards. The hydrants are to be supplied with a minimum valve opening of 5 ¼ inches and a six inch (6") mechanical joint inlet connection.

The hydrant shall be a "breakaway" type and shall have the drain holes plugged.

The threads for pumper and hose connections, operating nut (size and shape), direction of opening, and paint color shall be as designated by local fire department standards. The depth of bury, for hydrants, shall meet local community standards but in no case shall it be less than five feet (5').

H. Valve Wells and Concrete Products

1. Valve Well

Valve wells shall be precast reinforced concrete (manufactured with Type IIA or IP (MS) cement), flexible-joint type in accordance with ASTM C478. All lifting holes shall be filled, and joints pointed, with hydraulic cement as specified in this section.

2. Concrete

Concrete for plain or reinforced anchorages, thrust blocks, encasements, meter pits, foundations, and other structures shall be MDOT Grade P1, with a minimum compressive strength of 3500 psi at 28 days (minimum of 5 ½ sacks of air entrained cement per cubic yard) unless otherwise noted on the plans or in the specifications.

Concrete for cradles shall contain 5 sacks of air entrained cement per cubic yard and minimum compression strength of 3,000 psi. The concrete shall be mechanically mixed and have zero slump.

Reinforcing steel, when required, shall conform to ASTM A615 current specifications with minimum yield strength of 60,000 psi, unless otherwise noted on the plans or in the specifications.

Water for concrete shall be clean, fresh, and free of oil, acids, and organic matter.

3. Brick, Mortar, and Miscellaneous

Brick shall be solid (no cores) concrete brick per ASTM C55 current specifications, Grade N. The brick shall have a nominal size of 2 ¼ x 3 ⅝ x 7 ¾ inches.

Mortar for masonry work, pointing, setting, adjusting or reconstructing frames and covers shall be hydraulic cement; Octocrete manufactured by IPA Systems, Xypex Patch 'N Plug manufactured by Xypex Products, Quad-Plug manufactured by Quadex Rehabilitation Products, Hydraulic Water-Stop Cement (No. 1126) manufactured by Quikrete, Strong-Seal QSR manufactured by the Strong Company or approved equal.

Water shall be clean and fresh, free from oil, acids and organic matter.

Cement-sand backfill, when called for on the plans, shall consist of one part Portland cement, dry-mixed with 10 parts of sand (by volume). Portland cement shall be air-entrained, type 1A conforming to ASTM C150, current specifications. Sand shall meet MDOT 2NS or 2MS sand.

4. Appurtenances

Frames and covers shall meet the requirements as specified on the community Standard Detail Sheets.

Valve well steps, if required on the community Standard Detail Sheets, shall be plastic coated steel meeting the requirements in ASTM D2146-77, Type II, Grade 49108. Steps shall be M.A. Industries P.S.I. Polypropylene, MSU #360 ALU Poly or approved equal with foot recess and suitably scored to provide a non-slip surface. The maximum vertical spacing of the steps shall be sixteen inches (16") center-to-center. Bottom step shall be twenty-four inches (24") maximum above floor. Top step shall

be eighteen inches (18") maximum below rim.

Exterior gate well seals shall be CANUSA wrap or approved equal.

Tracer wires shall be 10 gauge wires having "UF" or "USE" insulation.

823.03 CONSTRUCTION

A. General

The installation of DI and PVC pipe and appurtenances shall follow ANSI/AWWA C600 and C605 specifications and AWWA manuals M41 and M23 accordingly unless otherwise specified on the local community standard details for construction. The contractor is responsible for the loading and unloading of all materials and shall use the proper techniques to prevent damage.

B. Pipe

1.Pipe Cleanliness

Foreign material shall be removed from the interior of the pipe and shall be prevented from entering the pipe while it is being placed. No debris, tools, clothing, or other materials shall be placed in the pipe at any time.

Lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe. The outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit, or any foreign materials before the pipe is laid.

2. Pipe Placement

Unless otherwise directed by the Engineer, the pipe shall be laid with the bell ends facing the direction in which the work is progressing. The assembly of several sections of pipe, prior to placement in the trench, will not be permitted.

As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade as shown on the plans or as directed by the Engineer. The pipe shall not be bumped with a backhoe or excavator bucket to obtain the correct line or grade because of the possibility of such practices causing damage to the pipe and/or lining. **The bending of PVC pipe is not allowed.** The pipe shall be secured in place with the approved backfill material.

PVC pipe shall be installed with two (2), tracer wires installed on top of the pipe prior to placement of the initial backfill.

C. Joint Assembly

1. Push-on Joints

Assemble push-on joints as follows:

a. Clean the groove and bell socket and insert the gasket, making sure that it faces the proper direction and that it is correctly seated.

b. Check that the plain end is beveled. File or grind square or sharp edges to prevent damage or dislodging of the gasket.

c. Clean foreign material from the plain end. Apply push-on joint lubricant to the gasket and plain end in accordance with the pipe manufacturer's recommendations.

d. Push the plain end into the bell of the pipe to the home position. Deflect joints after the joint is assembled.

e. The backhoe bucket and the pipe choker shall <u>not</u> be used to push or pull the pipe into the bell.

2. Mechanical Joints

Assemble mechanical joints as follows:

a. Check that the plain end is beveled. File or grind square or sharp edges to prevent damage or dislodging of the gasket.

b. Clean the socket and plain end of dirt and foreign material. Place the retainer gland then the gasket on the plain end of the pipe. Lubricate the bell end, plain end and gasket with a soap solution or push-on joint lubricant

before the joint is assembled.

c. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Deflections shall be made after the joint is assembled but before tightening the bolts.

d. Bolts shall be initially drawn up snugly and uniformly on opposite sides of the pipe before final tightening. Tighten bolts with a torque wrench to the normal range of 75 to 90 ft-lbs.

3. Joint Deflection

When it is necessary to deflect the pipe from a straight line, either vertically or horizontally, as called for on the plans or as directed by the Engineer, the deflection shall not exceed the following values:

MAXIMUM JOINT DEFLECTION

Nominal Pipe size (in)	Push-On Joint Maximum Offset (in)*	Mechanical Joint Maximum Offset (in)*
4	14	23
6	14	20
8	14	15
12	14	15
16	8	10
24	8	7

*Offsets are based upon 18 foot lengths of pipe.

4. Pipe Cutting

Cut pipe for insertion of valves, fittings, or closure pieces in conformance with all safety recommendations of the manufacturer of the cutting equipment. Perform work and cut pipe in a safe, workmanlike manner without damaging the pipe or cement-mortar lining.

Cut ductile iron pipe square to the pipe axis using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, or milling wheel saw. An oxyacetylene torch will not be allowed to cut the pipe.

Grind cut ends and rough edges smooth to the touch. Bevel the end for push-on joint connections.

D. Construction of Appurtenances

1. Hydrant Installation

a. Construct hydrants at the locations and to the grades shown on the plans or as directed by the Engineer. Do not alter the hydrant locations without approval from the Engineer.

b. Installation shall conform to the dimensions and details in accordance with the water main detail sheets and as shown on the detailed plans. Stand hydrants plumb and with their nozzles parallel with, or at right angles to the curb, with pumper nozzle facing the curb or road. Hydrants having two nozzles at 90 degrees to each other shall be set with each nozzle facing toward the curb or road at an angle of 45 degrees.

c. Connect hydrants to the main with a tee of the specified diameter and a six inch (6") valve and box. Plug drain outlets if supplied with the hydrant.

d. Paint hydrants with two (2) coats of paint of the color specified by the community.

2. Valves and Fitting Installation

Install valves shall be installed at the locations shown on the plans unless otherwise directed by the Engineer.

a. Prior to installation, valves may be examined by the Owner's Representative for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage, and cracks.

b. Valves not in conformance with the specifications may be rejected by the Owner or the Engineer. Install main

line valves in a well with vertical supports so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.

Valves shall be set in line with the main and shall not be used to re-align the pipe. Stems shall be set plumb so that the operating nut is readily accessible through the opening in the top of the well.

c. Install brass corporation stops in the top of the pipe on each side of a gate valve (except hydrant valves). The location, size and type of corporation stop shall be in accordance with the local community Standard Details sheets.

d. Level the frame with concrete brick (12" maximum adjustment). Install exterior seals in accordance with the community Standard Detail Sheets.

3. Thrust Blocks, Anchors, and Encasements

Install concrete thrust blocks on all tees, bends, caps, and plugs in accordance with the water main detail sheets.

Install concrete anchors on all vertical bends in accordance with the water main detail sheets.

Install concrete encasement to the dimensions as detailed on the plans.

In areas of unstable soils, alternate thrust restraint systems will be considered by the Engineer in place of concrete thrust blocks and anchorages. Alternate restraint systems may include restraining rods, Mega-lug restraints, restraining gaskets, pilings etc. The Engineer and Owner must approve the alternate restraint system prior to installation.

E. Hydrostatic Testing

Warning: The testing methods described in this section are specific for hydrostatic pressure testing in accordance with AWWA Manual M41. These procedures should not be applied for air-pressure testing because of the serious safety hazards involved.

Verify with the local municipality if hydrostatic pressure testing is to be performed before or after disinfecting the water main.

1. Test Restrictions

If the Contractor, for any reason, must have the existing water supply shut off, he shall contact the local DPW or Water Department to perform the shut off. The Contractor shall not shut off the water unless directly authorized by the Owner or Engineer.

The pressure test shall be conducted at 150 psi and may not vary by more than ±5 psi for the duration of the test.

The hydrostatic test shall be at least a two (2) hour duration.

The maximum length of test shall not exceed 3,000 feet in length. The Owner reserves the right to test shorter distances.

Conduct the pressure test, supplying all equipment, materials, and labor to conduct the test, including a pump, pipe connections, gauges, meters and other apparatuses.

The Owner or Owner's Representative must be present to witness the pressure test. New pipe installations may not be connected to the existing water system during the hydrostatic test.

Conduct hydrostatic pressure test against closed hydrant valves.

2. Test Pressure

After the pipe has been laid and backfilled properly, all newly laid pipe or any valved

section thereof shall be subjected to a hydrostatic pressure of 150 psi at the point of testing. Each valved section of pipe shall be slowly filled with water, and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Owner. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. It is optional to allow the system to stabilize at the test pressure before conducting the leakage test.

3. Air Removal

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks, which shall be located and recorded by the Engineer, at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Owner.

4. Examination

Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with sound material, and the test shall be repeated until it is satisfactory to the Owner.

5. Leakage Defined

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

6. Allowable Leakage

The maximum permissible leakage during the hydrostatic test shall not exceed a rate of 0.16 gallons per inch diameter of main per 1000 lineal feet in 2 hours at a pressure of 150 psi.

If any pipe installation exceeds the leakage rate, the Contractor, at his expense, shall locate and make approved repairs until the leakage is within the specified allowance. All leaks shall be repaired in the presence of the Owner or Engineer.

All visible leaks are to be repaired, regardless of the amount of leakage.

F. Disinfecting Water Mains

Disinfect water mains in accordance with AWWA C651 current specifications, Michigan Department of Public Environmental Quality and the Detroit Water and Sewerage Department requirements.

Prior to disinfection, the Contractor shall verify if the local municipality, the Contractor, or another entity is to perform the disinfection. The Contractor shall comply with any and all modifications to this specification required by the local municipality to ensure compliance with community disinfection standards.

1. Basic Disinfection Procedure
   a. Prevent contaminating materials from entering the water main during storage, construction, or repairs.
   b. Remove by flushing or other means, those materials that may have entered the water main.
   c. Add the chlorinating agent to remove any residual contamination that may remain and flush the chlorinated water from the main.

d. Determine the bacteriological quality by laboratory test after disinfection.

2. Acceptance

Contractor shall take two water samples 24 hours apart, from the newly installed main and test for bacteriological quality. The tests must be performed by a qualified laboratory and must show the absence of coliform organisms. Delivery of the supplies to the testing lab shall be coordinated with the Owner.

If test results show the presence of coliform organisms, the water main shall be rechlorinated until satisfactory results are obtained.

3. Disposal of Chlorinated Water

Exercised caution when disposing chlorinated water to avoid upsetting environmental conditions. If necessary, contact the local sewer department for conditions of disposal to a sanitary sewer.

In very critical areas, a chemical neutralizing agent may be required to remove the chlorine. Chemical neutralizing agents shall be used only as directed by the Engineer.

G. Placing Into Service

Make arrangements with the local water department for final connection to the existing water system after receiving approval of the hydrostatic and chlorination tests.

Water mains shall be placed into service within ten (10) days of the installation. Otherwise, all remaining construction on the contract may be halted.

The Owner reserves the right to place into service any completed portions of work which are ready for service although the entire contract is not complete. The Owner shall do so with written notice to the Contractor.

Placement of a portion of the main into service prior to completion of the entire contract shall not constitute final acceptance of the work.

Dewater all hydrants after placing the new main into full service and prior to leaving the site.

823.04 MEASUREMENT AND PAYMENT

The actual number of units of each unit price item of work actually performed may be more or less than the number stated in the Basis of Bid in the Bid Form, or included in the contract, but no variation in the contract unit price will be made on that account. Payment will be made only for the actual number of units incorporated in the work, or for the actual number of units of work performed, and at the contract unit prices for each such unit with measurement for payment made as defined in the following paragraphs. Items not listed in this section for payment, or further defined by project specifications but necessary for completion of the project, shall be included in the construction.

PAY ITEM	PAY UNIT
Water Main, Abandon	LS
Water Main, Remove	Ft
Water Main, Bore, ___ inch	Ft
Fire Hydrant Assembly	Ea
Hydrant Adj	Ea
Tapping Sleeve and Valve, ___ inch x ___ inch	Ea
Gate Well Cover	Ea
Gate Well Cover, Adj	Ea
Water Service, Modified	Ea
Water Main Connection, ___ inch	Ea

Water Main, Abandon

The lump sum price for **Water Main, Abandon** includes the cost to bulkhead all open ends of abandoned water main with concrete, and if

shown on the plans, fill the abandoned water mains with non-structural flowable fill in strict compliance with the State of Michigan permit or local community standards.

Water Main, Remove
The unit price for **Water Main, Remove,** where noted on the plans or directed by the Engineer, includes the cost of removal and disposal of the water main to an acceptable disposal site.

Water Main, Bore, ___ inch
The unit price for **Water Main, Bore** of the size required, shall include constructing the bore pit, sheeting, shoring bracing, and dewatering if necessary to accomplish the water main bore.

The Owner will not pay separately for a water main bore where the Contractor eliminates the need for the bore, or the water main is bored at the Contractor's discretion.

Fire Hydrant Assembly
The unit price for **Fire Hydrant Assembly** includes the cost of providing and installing the hydrant, auxiliary valve and box, pipe, and hydrant extensions necessary to achieve the required alignment and grade. The unit price shall also include all fittings, final painting, and dewatering of the hydrant.

Hydrant, Adj
The unit price for **Hydrant, Adj** includes the cost of vertically adjusting the hydrant, and the hydrant extension spool necessary to achieve the required grade, final painting, and dewatering of the hydrant.

Tapping Sleeve and Valve, ___ inch x ___ inch
The unit price for **Tapping Sleeve and Valve, ___ inch x ___ inch**, of the size required includes the cost of providing and installing the tapping sleeve, valve, all necessary restraints, complete and ready for use. This work includes the complete live tapping procedure.

Gate Well Cover
The unit price for **Gate Well Cover** includes the cost of providing and installing the gate well cover following the provisions of Drainage Structures in Section 403 of the MDOT Standard Specifications. Adjustments to achieve the required grade for gate well covers on new gate well structures is included in the pay item **Gate Well, ___ inch dia**.

Gate Well Cover, Adj, Case ___
When new gate well covers are placed on existing gate well structures, the Owner will pay for **Gate Well Cover, Adj, Case ___** in addition to the new cover, as Case 1 or Case 2 as specified in Section 403 of the MDOT Standard Specifications for Drainage Structure Cover.

Water Serv, Modified
The unit price for **Water Serv, Modified** includes all requirements for water services in Section 823.04 except the water service connection is made without installing a new shutoff.

Water Main Connection, ___ inch
The unit price for **Water Main Connection** of the size required includes the cost of all fittings, solid sleeves, thrust restraints, removal of existing pipe, and to connect the newly installed water main to the existing water main. Connections may only be made following acceptable testing and disinfection results, and Owner's approval.

N:\NSPE Master Docs\New Revised Specs March 2014\MDOT Water Main Specs February 27 2013.docx

SANITARY SEWER SPECIFICATIONS

ARTICLE 1 – GENERAL

1.01 Purpose

These Sanitary Sewer Specifications are supplemental to and form a part of the Contract herewith attached. They are intended to technically describe the materials, installation, and testing requirements needed to construct sanitary sewers and associated appurtenances.

ARTICLE 2 – MATERIALS

2.01 General

All sewer pipe used in this work shall be in accordance with these specifications, the community Standard Detail Sheets, and meet the requirements of the Standard Specifications of the American Society for Testing and Materials (ASTM), American Standards Association (ASA) and American National Standards Institute (ANSI).

2.02 Defective Materials

All pipe, fittings, structures and other appurtenances shall be examined carefully for damage and other defects prior to installation. Defective materials shall be replaced or corrected and held for review by the Owner. Rejected material shall be so marked and removed from the project site.

2.03 Pipe

The approved types of pipe are shown on the Drawings or specified in the community Standard Detail Sheets and shall meet the following:

A. Restrictions

Asbestos cement pipe and vitrified clay pipe shall not be allowed. Solid Wall PVC pipe and fittings shall only be used for sanitary services.

B. Approved Pipe Materials

The approved types of pipe are shown on the Drawings or specified in the community Standard Detail Sheets and shall meet the following:

PVC Composite (Truss) Pipe
ASTM D2680
PVC Solid Wall (Pipe & Fittings)
ASTM D3034, SDR 26 or
ASTM D1785, Sch 40
Reinforced Concrete Pipe
ASTM C76 Wall Thickness C with
Type II, IIA or IP (MS) Cement
Ductile Iron Pipe
ANSI A21.51 Class 54 with
ANSI A21.4 Double Cement Lined
Corrugated PVC Pipe
ASTM F949
PVC Closed Profile Pipe
ASTM F1803
HDPE Pipe
ASTM F714, PE3408
DR dependent upon application

C. Manufacturer's Identification

All pipe shall have class and date of manufacture conspicuously marked on each length by the manufacturer. In addition, the lot number shall similarly be marked on all reinforced concrete pipe.

Contractor shall store and protect the pipe to minimize bowing that can result from temperature fluctuations. Nominal twelve and one-half foot (12'-6") pipe lengths having deviations from straight greater than one inch (1") shall not be used.

D. Jacking Pipe

All pipe to be jacked into place shall conform with ASTM C76. The bell section shall have one (1) full circumferential line of steel reinforcing equal to, or stronger than, the circumferential reinforcement in the barrel of the pipe. This steel shall be tied to the longitudinal reinforcement.

2.04 Pipe Joints

Joints for the various acceptable types of sewer pipe (including tee branches, fittings, riser pipes and service leads) shall comply with the following:

PVC Composite (Truss) Pipe
Gasketed joints; ASTM D2680 and
ASTM D3212
PVC Solid Wall Pipe
Gasketed joints; ASTM D2680 and
ASTM D3212

Reinforced Concrete Pipe
Modified tongue & groove joints with gaskets; ASTM C361 modified as follows:
-synthetic rubber gaskets only
-reinforcing steel shall extend into bells

Ductile Iron Pipe
Push-on joints; ANSI A21.11
-Tyton or Super Belltite

Corrugated PVC Pipe
Gasketed push-on joints; ASTM D3212

PVC Closed Profile Pipe
Bell & spigot type joints with elastomeric seals; ASTM D3212

HDPE Pipe
Approved butt fusion or electrofusion technique; Manufacturer's specifications

2.05 Sanitary Service Connections

Sanitary service connections are shown on the Drawings or specified in the community Standard Detail Sheets and shall be in accordance with the following methods:

PVC Composite (Truss) Pipe
Install a factory fabricated (not extruded), six inch (6") PVC wye

Reinforced Concrete Pipe
Core drill a port in the sewer wall and install NPC Kor-N-Tee lateral connector.

Ductile Iron Pipe
Shall only be installed with written authorization from the Owner.

Corrugated PVC Pipe
Install a factory fabricated (not extruded), six inch (6") branch hub for SDR 23.5 PVC solid plastic pipe.

PVC Closed Profile Pipe
Install a factory fabricated (not extruded), six inch (6") PVC wye

HDPE Pipe
Core drill a port in the sewer wall and install an electrofusion saddle with gasketed socket outlet for SDR 23.5 PVC solid plastic pipe.

2.06 Sanitary Manholes

A. Structure

All manholes shall be precast reinforced concrete (manufactured with Type IIA or IP(MS) cement), flexible-joint type in accordance with ASTM C478. All lifting holes shall be filled, and joints pointed, with hydraulic cement as specified in this section.

B. Top Section

The top precast section shall be a modified eccentric or concentric (as specified on the community Standard Detail Sheets) cone section with stud inserts cast in place and a smooth trowel finished top surface.

C. Base Section

The bottom precast section shall consist of a base integrally cast with a riser section. The base shall contain reinforcement at least equal to, and which shall be adequately tied to, the reinforcement in the riser section.

When a separate base riser and base slab are specified or allowed, manholes shall rest on a minimum eight inch (8") thick 3,000 psi concrete base. Precast concrete bases shall be placed on a foundation of uniform bearing and the joint between a precast riser section and the base of the structure shall be set in a full bed of concrete. The base shall protrude a minimum of four inches (4") beyond the outside diameter of the structure, unless otherwise specified. All concrete bases shall be cast utilizing Type IIA or IP(MS) cement.

D. Structure Joints

Joints and gaskets between riser sections shall be the modified tongue and groove conforming to ASTM C443 Specifications.

E. Pipe Penetrations

Holes for pipe penetrations shall be cast in the riser section so as to provide a minimum clearance of two inches (2") between the inside bottom of the base section and the outside wall of the pipe. The joint between the pipe and the base section of manholes shall be a flexible watertight joint, "Kor-N-Seal" for pipes six inch (6") through thirty inch (30") in diameter and "A-Lok" for pipes thirty-six inch (36") in diameter and larger. The joint shall be capable of meeting infiltration requirements and shall permit a deflection of at least six (6) degrees in all directions as measured from centerline of the pipe.

F. Concrete/Mortar

All concrete for channelization, benches, collars and setting risers on separate bases (when specified or allowed) shall be made with Type

II, IIA or IP(MS) cement. All mortar for bulkheads, pointing, and setting, adjusting or reconstructing frames and covers shall be hydraulic cement; Octocrete manufactured by IPA Systems, Xypex Patch 'N Plug manufactured by Xypex Products, Quad-Plug manufactured by Quadex Rehabilitation Products, Hydraulic Water-Stop Cement (No. 1126) manufactured by Quikrete, or Strong-Seal QSR manufactured by The Strong Company or approved equal.

Water shall be clean and fresh, free from oil, acids and organic matter.

G. Appurtenances
All manholes shall be provided with new frames and covers as specified on the community Standard Detail Sheets.

Manhole steps, if required on the community Standard Detail Sheets, shall be plastic coated steel meeting the requirements in ASTM D2146-77, Type II, Grade 49108. Steps shall be M.A. Industries P.S.I. Polypropylene, MSU #360 ALU Poly or approved equal with foot recess and suitably scored to provide a non-slip surface. The maximum vertical spacing of the steps shall be sixteen inches (16") center-to-center. Bottom step shall be twenty-four inches (24") maximum above floor. Top step shall be eighteen inches (18") maximum below rim.

Exterior manhole seals, if required on the community Standard Detail Sheets, shall be included.

ARTICLE 3 – INSTALLATION

3.01 Pipe

All pipe shall be laid with the bell ends up grade to the line and grade as called for on the plans. Each pipe shall be laid by the Contractor with a laser level and checked with line and grade poles to insure that plan line and grade are obtained. The use of bricks, lumps of clay, wood, etc. to level the pipe will not be permitted. Any pipe found more than one-quarter inch (1/4") off grade or more than two inches (2") out of line shall be relayed properly by the Contractor.

Pipe shall be laid from the downstream end and proceed upstream. It will not be permitted for a Contractor to commence construction at any intermediate location in a sewer line other than the lowest elevation without permission from the Engineer, and the sole responsibility to assure that the sewer is installed to the correct line and grade shall remain the Contractor's.

The pipe shall be laid to provide equal clearance on both sides of the pipe in the trench. After the pipe is laid, care in backfilling and other operations shall be taken so as not to disturb its line and grade. The finished work shall be straight and shall be sighted through between manholes.

Each pipe shall be examined for defects prior to being lowered into the trench and the inside of the pipe and outside surface shall be free of earth or foreign material. Lowering of the pipe into the trench shall be accomplished in a manner which will avoid injury to the workmen and damage to the pipe.

All pipe shall be laid on an even firm bed with bell holes in the bedding for bell and spigot pipes and to a uniform line and grade with the groove or bell ends up grade. The spigot end of the pipe shall be centered, shoved tight, and secured against the bell or socket of the previously laid pipe to form a smooth and continuous invert. If the joints do not remain tightly closed, a cable and winch, or other approved means shall be used to maintain a tight joint.

Where pipe is laid in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making the joint and for holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside of the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position or other approved means.

As work progresses, the interior of the sewer shall be cleaned of all dirt, jointing material and any foreign material. On small sewers, where cleaning after laying may be difficult, a swab or drag shall be kept in the pipe and pulled forward past each joint immediately after its completion.

At the close of each day's work, or at such time when pipe is not being laid, the open end of the pipe shall be protected with a water-tight stopper.

3.02 Sanitary Service Connections

All sanitary services shall be constructed of a minimum of six inch (6") diameter pipe, in accordance with the community Standard Detail Sheets. Approved pipe materials for sanitary services shall be in accordance with Section "2.03 Pipe" and the community Standard Detail Sheets. The sanitary services shall use only the type of joint specified under Section "2.04 Pipe Joints".

Each pipe shall be examined for defects prior to being lowered into the trench and the inside of the pipe and the outside of the spigot shall be free of all foreign matter. Construction shall begin at the outlet end and proceed upgrade with spigot ends pointing in the direction of flow.

The Contractor shall install the sanitary service connections immediately following or at the same time the sewer is constructed.

All sanitary services shall be constructed to the property line or easement line in approximately the center of each lot or as shown on the plan or directed by the Engineer, thus providing a single sanitary service to each house. Existing sidewalks shall be removed and replaced. Hand tunneling of sanitary sewers shall not be permitted. All sanitary services shall be constructed to a depth as specified on the community Standard Detail Sheets. All sanitary services shall be closed with solvent welded caps, compatible with the approved pipe material used, secured in place in accordance with the manufacturer's recommendations and able to withstand air testing pressures.

All sanitary services shall be constructed in accordance with Section "3.04 Deep Burial Service Connections" when the mainline invert depth is greater than ten feet (10').

All sanitary services shall include a clean out at the right-of-way or easement line, constructed with approved materials, when required on the community Standard Detail Sheets.

All bedding and backfill shall be as specified on the community Standard Detail Sheets.

Each sanitary service shall be marked as specified on the community Standard Detail Sheets.

Replacement or relocation of all sanitary services which pass over, under, or intersect any facility being installed and which are disturbed by the Contractor's operations shall be considered included in the Work and the cost of replacement or relocation shall be included in the bid price of the facility being installed except where included as an Item of Work.

The abandoned portion of the sanitary service shall be bulkheaded and made watertight.

3.03 New Sanitary Service Connections to Existing Sewers

Unless otherwise shown or noted on the plans, the Contractor shall utilize, where possible, the existing "Tee" or "Wye" connection in the existing sewer.

When necessary to make a new tap into the existing sewer to accommodate the sanitary service, the new connections shall be made by core drilling a port in the existing sewer wall and installing the approved fitting, based upon the type of existing sewer:

PVC Composite (Truss) Pipe
Factory fabricated (not extruded), six inch (6") PVC saddle wye. Saddle wyes shall be fused to the existing sewer with type "SC" chemically welded joint;

Reinforced Concrete Pipe
Install a six inch (6") NPC Kor-N-Tee Flexible water-tight boot, installed per manufacturer's specifications.

Vitrified Clay Pipe
Omit core drilling a port in the sewer wall. Saw cut and remove a section of the VCP. Install PVC SDR 23.5, factory fabricated (not extruded), six inch (6") PVC wye. Use additional SDR 23.5 pipe as necessary and flexible couplings to connect wye to existing sewer main.

Corrugated PVC Pipe
Inserta Tee with six inch (6") PVC, SDR 23.5 hub adaptor, per manufacturer's specifications.

PVC Closed Profile Pipe
Factory fabricated (not extruded), six inch (6") saddle wye.

HDPE Pipe
Electrofusion saddle with gasketed socket outlet for six inch (6'), SDR 23.5 PVC Solid plastic pipe.

Rehabilitated (CIPP or Other) Pipe
To be reviewed and approved by the Owner prior to installation.

3.04 Deep Burial Service Connections

A service connection shall be defined as Deep Burial when the mainline invert depth is greater than ten feet (10') below grade. Deep Burial service connections shall incorporate the Deep Burial Riser System for Sewers as manufactured by Plastic Trends, Inc., or approved equal.

Deep Burial Risers for Sewers shall contain a Controlled Settlement Joint (CSJ), A Vertical Riser Adaptor, and a Deep Socket fitting. SDR 26 pipe and other SDR 26 fittings shall be used as required for directional and transitional connection. CSJ's used in Deep Burial Riser System shall provide a minimum of five and one-half inches (5-½") of axial movement. A molded, where available, SDR 26 Vertical Riser Adaptor shall be installed between the CSJ and the bottom directional transition molded fitting. A molded, where available, SDR 26 Deep Socket sewer fitting shall be used at the top of each riser assembly. SDR 26 Deep Socket fittings shall provide a minimum socket depth of six and one-half inches (6-½") below the fitting gasket race. Deep Burial Riser Systems for Sewers shall be assembled per Plastic Trends' recommended specifications, bulletin Form #1090.

3.05 Manholes

A. Structure

Pipe shall not extend into a manhole beyond the inside face of the manhole wall. Field cutting of pipe to be used at manholes shall be done in a neat, workmanlike manner, using methods approved by the Engineer. Exposed ends of reinforcing steel shall be cut flush with the pipe end.

Concrete placed inside precast Flexible-joint manholes to form the channel through the manhole shall not be placed between the pipe and the opening in the manhole base section so as to interfere in any way with the flexibility of the joint.

Grade adjustment shall be made as specified on the community Standard Detail Sheets. Adjustment materials shall not overhang beyond the top of the riser or base of the cover.

Exterior seals, if required on the community Standard Detail Sheets, shall be installed in accordance with the community Standard Detail Sheets on all new manholes.

B. Adjusting Manholes

Manhole castings shall be adjusted in accordance with the current MDOT Standard Specifications, except as modified herein. The existing castings shall be used on the adjusted manhole unless noted otherwise. New frames and covers, when required, shall be as specified on the community Standard Detail Sheet.

Replaced castings shall be offered to the community DPW for salvage. Salvaged castings refused by the DPW shall be properly disposed by the Contractor.

All manhole adjustments shall include the use, as necessary, of new brick, precast adjusting rings or composite grade rings (as specified on the community Standard Detail Sheet) to the elevation needed for the frame and cover to meet the required grade. Mortar shall be hydraulic cement, as specified in Section "2.06 Sanitary Manholes". All bricks or precast adjusting rings shall receive an exterior plaster coat of hydraulic cement, troweled smooth, and set to cure a minimum of eight (8) hours.

The Contractor shall prevent falling debris from damaging the manhole and/or entering the sewer.

Sanitary manhole adjustments shall be performed as outlined in Section 403.04D of the MDOT Standard Specifications for Dr Structure, Adj, Case ___.

If it is determined that the manhole cover does not conform to the final pavement grade after the pavement is placed. the manhole shall be readjusted and pavement replaced as required at the Contractor's expense.

Exterior seals, if required on the community Standard Detail Sheets, shall be installed in accordance with the community Standard Detail Sheets on all adjusted manholes.

C. Reconstructing Manholes

Manhole chimneys shall be reconstructed in accordance with the current MDOT Standard Specifications, except as modified herein. The existing castings shall be used on the reconstructed manhole unless noted otherwise. New frames and covers, when required, shall be

as specified on the community Standard Detail Sheet.

Replaced castings shall be offered to the community DPW for salvage. Salvaged castings refused by the DPW shall be properly disposed by the Contractor.

Reconstructing manholes shall apply where cover elevation is changed by more than six inches (6"); where a major structural alteration is needed to meet the design elevation (such as replacement of a precast cone or riser section); or where cover replacements require reshaping more than the top six inches (6") of the manhole.

Necessary excavation around the manhole shall be performed in order to determine the actual depth of the chimney repair. The damaged or deteriorated portions of the existing manhole chimney and corbel shall be removed and properly disposed as required to establish a suitable and stable foundation.

The chimney and corbel shall be reconstructed with new brick, precast adjusting rings or composite grade rings (as specified on the community Standard Detail Sheet) to the elevation needed for the frame and cover to meet the required grade. Mortar shall be hydraulic cement, as specified in Section "2.06 Sanitary Manholes". All bricks or precast adjusting rings shall receive an exterior plaster coat of hydraulic cement, troweled smooth, and set to cure a minimum of eight (8) hours.

The Contractor shall prevent falling debris from damaging the manhole and/or entering the sewer.

If it is determined that the manhole cover does not conform to the final pavement grade after the pavement is placed, the manhole shall be re-adjusted and pavement replaced as required at the Contractor's expense.

Exterior seals, if required on the community Standard Detail Sheets, shall be installed in accordance with the community Standard Detail Sheets on all reconstructed manholes.

D. Drop Connections

Drop connections shall be required when the invert of the incoming sanitary sewer is greater than eighteen inches (18") above the invert of the outgoing sanitary sewer. All drop connections shall be constructed as shown on the community Standard Detail Sheets.

E. Abandoning Manholes

When abandoning any manhole, it shall be pumped dry and all pipes entering or leaving the manhole shall be bulkheaded with an eight inch (8") brick bulkhead. Manholes shall be abandoned by completely destroying to an elevation three feet (3') below the finished grade and the destroyed portion shall be removed from the project site. After the above conditions have been completed, the excavation shall be backfilled with sand and compacted in six inch (6") layers to the subgrade elevation or finished elevation of the Project, depending upon restoration requirements.

F. Stubs, Connections, Bulkheads and Miscellaneous Items of Work

The Contractor shall furnish all material and labor and shall install and/or construct the stubs, connections, bulkheads and miscellaneous items of work called for on the Plans and/or Specifications. This work shall be included in the cost of the Project unless a pay item is provided in the Proposal.

Existing precast manholes shall be tapped with the "Kor-N-Seal" method, with a water-tight rubber boot for sewers six inch (6") through fifteen inch (15") in diameter.

Existing brick manholes, and taps for sewers eighteen inch (18") in diameter and larger, shall have holes drilled at four inches (4") center to center around the periphery of the opening to create a plane of weakness before breaking out the section. Hydraulic cement, as specified in Section "2.06 Sanitary Manholes", shall be used to seal the opening. A concrete collar shall be poured twelve inches (12") around the pipe and extend twelve inches (12") exterior to the manhole.

Unless otherwise noted on the drawings, stubs shall consist of two (2) full lengths of sewer pipe with watertight bulkheads, compatible with the pipe used and as approved by the Engineer.

When connections are made with sewers carrying sewage, special care must be taken to

insure that no part of the work is built under water. A flume or dam must be installed and pumping maintained, if necessary. The new work shall be kept dry until completed and any concrete or mortar has cured.

ARTICLE 4 – TESTING AND ACCEPTANCE

4.01 General

The Contractor shall provide all necessary materials, equipment and personnel to conduct required testing. All tests shall be witnessed by the department specified on the community Standard Detail Sheets. All sewer installations shall be complete, including sanitary services with chemically welded or glued water-tight caps, prior to performing required tests.

Following the completion of the first section of sewer, if the Engineer feels that there is some question as to the proper installation of the sewer, the Engineer may direct the Contractor to conduct a presumptive test to check his installation for defective pipe or faulty joints before it is completely covered with backfill material.

When required by the Owner, air testing shall be performed on all sewers twenty-four inches (24") in diameter and smaller in accordance with ASTM C924 or ASTM F1417. The Contractor shall air test with the dewatering system turned off and after the ground water has returned to its normal level. Infiltration testing will be performed if ground water prohibits low pressure air testing, as determined by the Engineer.

Infiltration testing shall be performed on sewers over twenty-four inches (24") in diameter and all sewers where ground water prohibits low pressure air testing, Infiltration testing shall be conducted with the dewatering system turned off and after the ground water has returned to its normal level. If there is not sufficient ground water for infiltration testing, as determined by the Engineer, infiltration testing may be waived.

The Contractor may, at his option, test any or all of the sewer lines prior to backfilling. However, such tests shall be in addition to the required test following the backfilling of the trench.

The Contractor shall make provisions for determining the ground water level prior to testing, and the level will be confirmed by the Engineer.

All tests shall be observed by the Owner or the Engineer. Testing schedule and procedures may be required by the Engineer prior to the start of the work.

Corrugated PVC and PVC Closed Profile sewer pipe shall also be tested for deflection.

The Contractor shall clean and flush all pipe prior to conducting any test. Cleaning shall be performed using hydraulically propelled, high-velocity jet, or mechanically powered equipment. Sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted.

Test sections shall generally be limited to a maximum length of one-half mile, including branches. The Owner reserves the right to test shorter pipe length segments if it is deemed necessary to assure that no segment exceeds the infiltration limit. In no case shall the length be less than between two manholes.

The Contractor shall provide for Closed Circuit Television (CCTV) inspection, in accordance with the General Requirements, of all sanitary sewers constructed.

Any defects noted during testing and/or CCTV inspection shall be satisfactorily repaired or replaced, by and at the Contractor’s expense, and witnessed by the Owner. Defects shall include, but not be limited to failing low pressure air testing, exceeding infiltration limits, exceeding deflection limits, cracked or broken pipe, defective joints, misalignment in line or grade, and visible leaks or infiltration. Additional testing and CCTV inspection shall be performed at each affected segment, from manhole to manhole, subsequent to repair and/or replacement.

All visible leakage in sewers or manholes shall be repaired regardless of previous test results.

4.02 Presumptive Tests

After the pipe section to be tested is plugged, air shall be supplied to the pipe section at a rate

sufficient to maintain an internal pressure of 4.0 psi. The exposed surface of the pipe, fittings and plugs shall then be sprayed with a foamable soap solution to detect by foam any abnormal leakage due to cracks, holes or improperly sealed joints. All sources of abnormal leakage shall be corrected. After all corrections are made, air shall again be added until an internal pressure of 4.0 psi is obtained. The pressure shall then be allowed to decrease to 3.5 psi, at which time a stop watch shall be started to determine the total time required for the internal pressure to decrease to 2.5 psi.

The test segment is considered acceptable if the measured hold time meets or exceeds the hold time required by ASTM L924 or ASTM F1417.

4.03 Air Testing

A. General

Test equipment shall include source of compressed air, air hose, plugs, hose connections, shut off valve, throttling valve, cage cock, monitoring pressure gauge, delicate 0.1 psi graduated pressure gauge and stop watch.

Test pressures noted must be adjusted for ground water level as follows:

Distance from Water Table to T/Pipe	Std Test Pressure	Add'l psi added due to Water Table	Total Test Pressure
0.5 FT	3.5 psi	0.22 psi	3.72 psi
1.0 FT	3.5 psi	0.43 psi	3.93 psi
1.5 FT	3.5 psi	0.65 psi	4.15 psi

Do not test if water table is two feet (2') or more above the top of pipe (all materials).

Safety precautions shall be carefully observed by the Contractor during air testing, recognizing the danger from plugs blowing out. No person shall be allowed in manholes during testing.

B. Add Air

Supply air to the pipe section. Monitor the air pressure so that the pressure inside the pipe does not exceed recommended limits. Air pressure in concrete pipe shall not exceed 5.0 psi (ASTM C924). Air pressure in plastic pipe shall not exceed 9.0 psi (ASTM F1417).

C. Stabilize

When pressure reaches 4.0 psi, throttle the air supply so that the internal pressure is maintained between 4.0 and 3.5 psi, plus adjustment for ground water, for at least two (2) minutes. If plugs are found to leak, bleed off the air, tighten the plugs and begin again supplying air.

D. Determine Rate of Air Loss

The control equipment consists of pressure gauges, valves and a timer. After the pressure has been allowed to stabilize for the two (2) minute period, the air supply is disconnected and the pressure is allowed to decrease to 3.5 psi. At 3.5 psi the stop watch is started to determine the time required for the pressure to drop to 2.5 psi (NOTE: make proper pressure adjustment for ground water, where applicable, in determining the beginning and end of the period for the 1.0 psi pressure drop). The pipeline shall be considered acceptable if the time interval for the 1.0 psi pressure drop meets or exceeds the hold time calculated in accordance with ASTM C924 or ASTM F1417.

4.04 Infiltration Tests

In sanitary sewers, weirs shall be placed temporarily for testing purposes in such manholes as necessary to measure the amount of infiltration. Such tests will be at the option of the Engineer and may be any length of sewer between two (2) manholes, the entire length of sewer under Contract or any combination of sewer reaches.

The allowable amount of infiltration shall not be more than fifty (50) gallons per inch diameter of the sewer per mile of sewer per twenty-four (24) hours. The allowable amount of infiltration shall include the infiltration into manholes.

If, in the Engineer's opinion, there is not sufficient ground water for infiltration testing of various sections of sewer, then infiltration testing shall be waived.

4.05 Deflection Tests

Completed installations of corrugated PVC sewer pipe or PVC closed profile sewer pipe shall be tested by the Contractor for deflection upon completion of the air test. The maximum allowable deflection at the time of initial testing is five percent (5%). The Contractor shall be required to replace, at no

additional cost to the Owner, any pipe line where the out of round, horizontal or vertical deflection exceeds five percent (5%). The testing and replacement costs will be at no expense to the Owner.

All pipe shall be tested using a nine (9) sided mandrel for horizontal and vertical deflection, no earlier than thirty (30) days following initial construction and any reconstruction. A proving ring, provided by the contractor, shall be available for all deflection tests.

The Owner reserves the right to re-test for deformation within the period of the maintenance bond. If any pipe is found to exceed a maximum allowable deflection of seven percent (7%), it shall be replaced by the Contractor at no cost to the Owner.

ARTICLE 5 – BASIS OF PAYMENT

The completed work as measured for sanitary sewers will be paid for at the contract unit prices for the following contract items (pay items):

Pay Item	Pay Unit
Sanitary Sewer, (*material type*), __ inch, Tr Det __	Ft
Sanitary Manhole, __ inch dia	Ea
Sanitary Manhole, Add Depth	Ft
Exterior Seal, Manhole	Ea
San Manhole Cover	Ea
San Manhole Cover, Adj, Case __	Ea
San Manhole, Reconstruct	Ea
San Service Connection, PVC, 6 inch	Ea
San Service Connection, Deep Burial, PVC, 6 inch	Ea
San Service, PVC, 6 inch, Tr Det __	Ft
Steel Casing Pipe, __ inch, Jacked in Place	Ft
San Manhole, Tap, __ inch	Ea
San Sewer Drop Connection	Ea
San Sewer Bulkhead, __ inch	Ea

Payment for items of work shall include, unless otherwise specified in the contract documents, all labor, material, equipment, excavation, dewatering, sheeting, tree removal, backfill, restoration, clean-up and all other work required for a complete and working system.

The actual number of units of each unit price item of work actually performed may be more or less than the number stated in the Basis of Bid in the Bid Form, or included in the contract, but no variation in the contract unit price will be made on that account. Payment will be made only for the actual number of units incorporated in the work, or for the actual number of units of work performed, and at the contract unit prices for each such unit with measurement for payment made as defined in the following paragraphs. Items not listed in this section for payment, or further defined by project specifications shall be included in the construction.

San Sewer, (material type), __ inch, Tr Det __
Measurement of **San Sewer, (material type), __ inch, Tr Det __** shall be made along the centerline of the pipe as actually laid for the size sewer, pipe material and trench detail constructed. Measurements for length of sanitary sewers shall be horizontally along the centerline through manholes, with no deductions for the manhole; and measured to the inside face of walls of all wet wells, existing manholes, or junction chambers. Sanitary sewer encased in a bore pipe shall be paid for as sanitary sewer. Bore and case is not included in this item. Where sand or gravel backfill is required for driveway, sidewalk, and other paved areas where Trench Detail B is specified, the extra materials and workmanship shall not be paid for separately but shall be incidental to the pay item for Trench Detail B of the size and pipe type specified.

San Manhole, __ inch dia
Measurement of **San Manhole, __ inch dia** shall include the total number of manholes constructed of the diameter specified. Bid price shall include the base, risers, cone section, frames, covers, steps (if required in the community Standard Detail Sheet), fillets, benches, channels, and all other items required for construction of a manhole in accordance with the plans, specifications and community Standard Detail Sheet. Payment for future connections or for extra work involved in construction and remodeling infiltration test manholes shall be included in the unit price per manhole.

Measurement of manhole depth shall be from the top of cover to the invert of the sewer. When the additional pay item **San Manhole, Add Depth** is not provided, this pay item shall include the total structure, regardless of depth.

When the additional pay item **Sanitary Manhole, Add Depth** is provided, manholes that measure less than or equal to fifteen feet (15') from the top of cover to the invert of the sewer shall be considered a unit and depths in excess of fifteen feet (15') will be paid for separately.

Sanitary Manhole, Add Depth
When the pay item **Sanitary Manhole, Add Depth** is provided, depths in excess of 15 feet shall be paid to the nearest 0.1 vertical foot. Measurement shall be from the top of cover to the invert of the sewer.

San Manhole, Exterior Seal, __ inch Width
Payment for **San Manhole, Exterior Seal, __ inch Width** shall be on a unit price each for the total number installed, regardless of manhole diameter. Exterior seal shall be an external manhole wrap as specified in the community Standard Detail Sheets.

San Manhole Cover
The unit price for **San Manhole Cover** includes the cost of providing and installing the cover following the provisions of Drainage Structures in Section 403 of the MDOT Standard Specifications. Adjustments to achieve the required grade for new manholes is included in the pay item **San Manhole, _ inch dia.**

San Manhole Cover, Adj, Case _
When new sanitary manhole covers are placed on existing manholes, the Owner will pay for **San Manhole Cover, Adj, Case _** in addition to the new cover, as Case 1 or Case 2, in Section 403 Drainage Structures of the MDOT Standard Specifications.

San Manhole, Reconstruct
The unit price for **San Manhole Reconstruct** includes the removal of damaged or unsound portions of the manhole, replacement of the damage sections and adjusting the structure cover to meet the design elevation. A new cover and the exterior seal are paid for separately.

San Service Connection, PVC, 6 inch
Payment for **San Service Connection, PVC, 6 inch** shall be at the contract unit price for each connection to a sanitary sewer. "Sanitary Service Connection, (material type), __ inch" shall include all pipe (up to six (6) feet horizontally measured), bends, fittings, connections, caps, and markers required to construct a service connection in accordance with the plans, specifications and community Standard Detail Sheets.

Measurement of service connection depth shall be from grade to the mainline invert. When the additional pay item **San Service Connection, Deep Burial, PVC, 6 inch** is not provided, this pay item shall include all service connections, regardless of depth.

When the additional pay item **San Service Connection, Deep Burial, PVC, 6 inch** is provided, service connections to sewers measuring ten feet (10') or greater from grade to mainline invert shall be paid for separately.

San Service Connection, Deep Burial, PVC 6 inch
When the pay item **San Service Connection, Deep Burial, PVC, 6 inch** is provided, payment shall be at the contract unit price for each connection to a sanitary sewer measuring ten feet (10') or greater from grade to mainline invert. Deep burial service connection shall include all pipe (up to six (6) feet horizontally measured), bends, fittings, connections, caps, and markers required to construct the service connection in accordance with Section "3.04 Deep Burial Service Connections".

San Service, PVC, 6 inch, Tr Det __
Measurement of **San Service, PVC, 6 inch, Tr Det __** shall be made along the centerline of the sanitary service as actually constructed. Payment shall be on the basis of a unit price per linear foot, measured horizontally, with deduction of the six (6) feet included in the sanitary service connection.

Steel Casing Pipe, __ inch, Jacked in Place
Payment for **Steel Casing Pipe, __ inch, Jacked in Place** shall be at the contract unit price per linear foot of bore and case installed per plan or as directed by the Engineer. The length of casing shall not exceed plan length without prior written approval of the Engineer. The measurement for **Steel Casing Pipe, __ inch, Jacked in Place** shall be measured horizontally in feet along the centerline of the sewer of the size specified. The measurement shall be made from end of casing to end of casing as installed. Sanitary sewer pipe in the casing pipe shall be paid for separately as **San Sewer, (material**

type), __ inch, Tr Det __ of the size and material type installed and the Trench Detail utilized adjacent to the bore.

Bore and case for sanitary sewer shall include the casing and all work and materials necessary for a complete installation according to the plans and contract documents. In no case will a quantity be paid for in excess of that detailed on the plans unless previously authorized by the Engineer prior to installation.

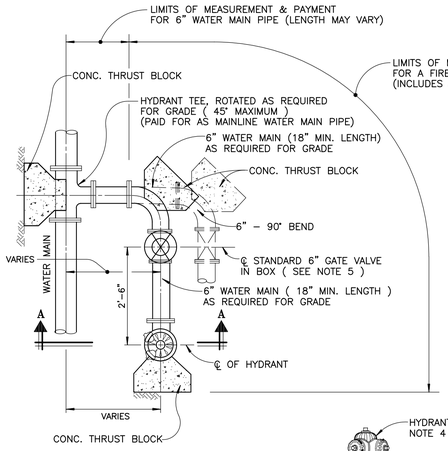
San Manhole, Tap, __ inch
Payment for **San Manhole, Tap, __ inch** shall be at the contract unit price for each new tap into an existing manhole with sanitary sewer of the size and material type specified. **San Manhole, Tap, __ inch** shall be in accordance with the plans, specifications and community Standard Detail Sheets.

San Manhole, Tap, __ inch shall not be paid for new manholes. Taps for new manholes shall be included in **San Manhole, __ inch dia**.

San Sewer Drop Connection, __ inch
Payment for **San Sewer Drop Connection, __ inch** shall be made on the basis of a unit price each based on the size of the upstream sewer pipe for the total number installed. Each drop connection shall be complete with tee, bends, drop pipe, and all miscellaneous fittings and appurtenances required for construction. Payment for the drop connection will be in addition to payment for **San Manhole, Tap, __ inch** when specified for construction in an existing manhole. When specified for construction in a new manhole, no separate payment for **San Manhole, Tap, __ inch** shall be made.

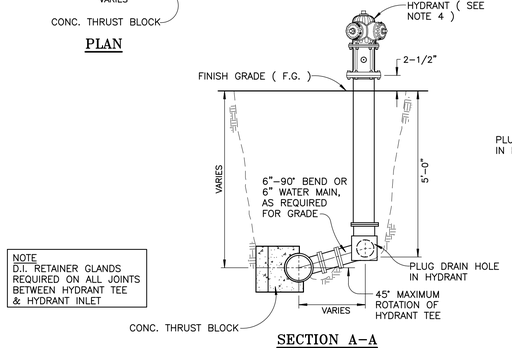
San Sewer Bulkhead, __ inch
San Sewer Bulkhead, __ inch will be paid for each based upon the nominal diameter of the pipe or opening bulkheaded. The bulkhead shall be constructed in conformance with the details specified.

Pipe Testing
Other than sanitary services, all sewers installed between manholes throughout this Project shall be televised and recorded as part of the final testing procedure, as provided in the General Requirement and community Standard Detail Sheets for the Contract. Recordings shall be furnished to the Owner prior to payment for the item of work. Payment for **Pipe Testing** shall be per linear foot of sanitary sewer televised as measured in the field. Payment for **Pipe Testing** shall also include total compensation for testing all constructed sanitary sewers in accordance with these specifications including; presumptive, air, infiltration, and deflection testing as required.



PLAN

LIMITS OF MEASUREMENT & PAYMENT FOR A FIRE HYDRANT ASSEMBLY (INCLUDES ALL LABOR, MATERIAL & EQUIPMENT)

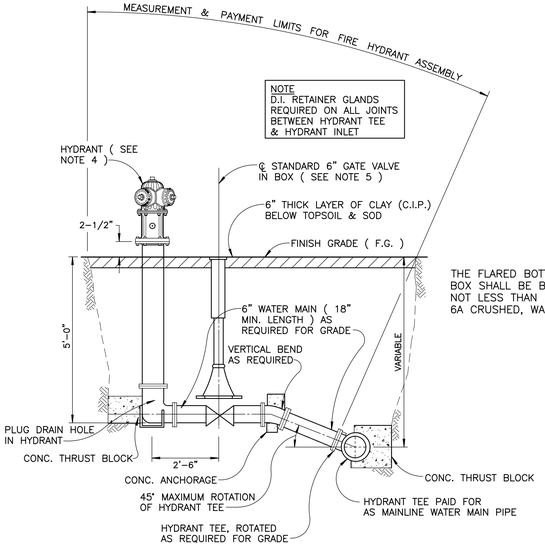


SECTION A-A

NOTE
D.I. RETAINER GLANDS REQUIRED ON ALL JOINTS BETWEEN HYDRANT TEE & HYDRANT INLET

"L" HYDRANT CONNECTION

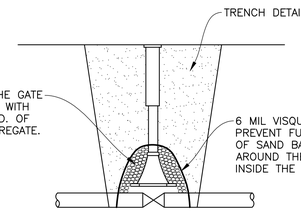
NOT TO SCALE



"T" HYDRANT CONNECTION

(TO BE INSTALLED ONLY WITH WRITTEN APPROVAL OF THE COMMUNITY)
NOT TO SCALE

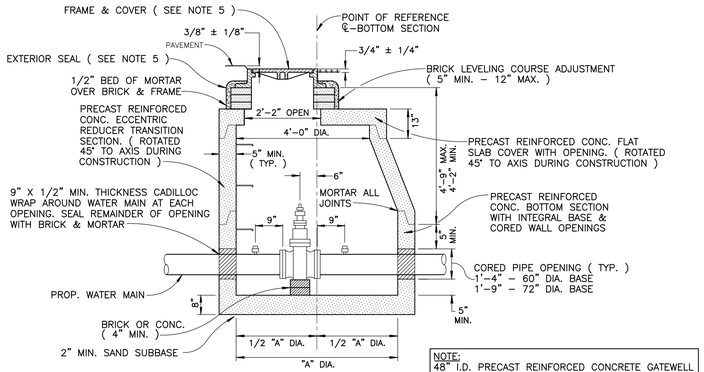
THE FLARED BOTTOM OF THE GATE BOX SHALL BE BACKFILLED WITH NOT LESS THAN 1.0 CU. YD. OF 6A CRUSHED, WASHED AGGREGATE.



GATE VALVE AND BOX BACKFILL

NOT TO SCALE

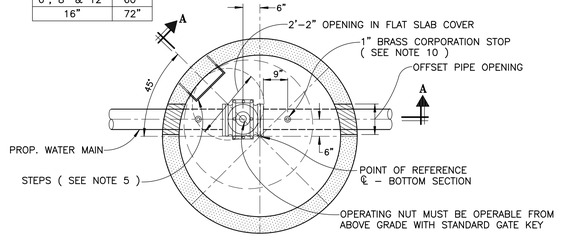
NOTE:
48" I.D. PRECAST REINFORCED CONCRETE GATEWELL RISER SECTIONS SHALL BE USED WHERE REQUIRED FOR ADDITIONAL DEPTH OF GATE WELL



SECTION A-A

VALVE SIZE	"A" DIA.
6", 8" & 12"	60"
16"	72"

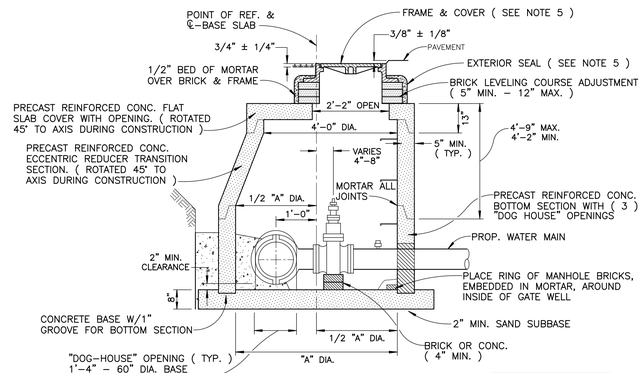
NOTE:
48" I.D. PRECAST REINFORCED CONCRETE GATEWELL RISER SECTIONS SHALL BE USED WHERE REQUIRED FOR ADDITIONAL DEPTH OF GATE WELL



GATE VALVE IN WELL

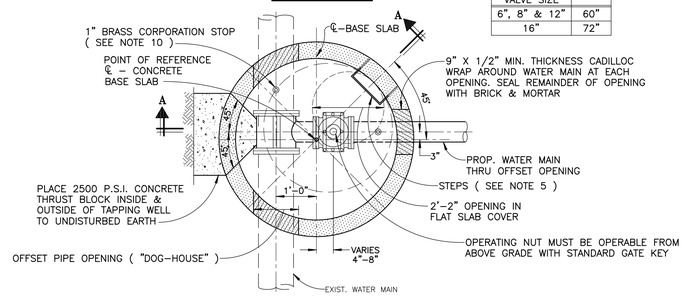
NOT TO SCALE

NOTE:
48" I.D. PRECAST REINFORCED CONCRETE GATEWELL RISER SECTIONS SHALL BE USED WHERE REQUIRED FOR ADDITIONAL DEPTH OF GATE WELL



SECTION A-A

TAPPING VALVE SIZE	"A" DIA.
6", 8" & 12"	60"
16"	72"



TAPPING SLEEVE & VALVE IN WELL

NOT TO SCALE

GENERAL NOTES

1. STANDARDS AND SPECIFICATIONS

A. ALL WATER MAIN AND WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT.

B. ANY MATERIALS OTHER THAN THOSE LISTED ON THE STANDARD DETAIL SHEETS MUST BE APPROVED IN WRITING BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. CONTRACTOR MUST SUBMIT THREE (3) COPIES OF SHOP DRAWINGS AND SPECIFICATIONS FOR PROPOSED ALTERNATE MATERIAL TO THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT FOR REVIEW AS AN APPROVED EQUAL. DETERMINATION OF ACCEPTANCE BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT SHALL BE CONSIDERED FINAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REVIEW OF THE PROPOSED ALTERNATE MATERIAL AS AN APPROVED EQUAL.

2. PRECONSTRUCTION REQUIREMENTS

A. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL ATTEND A PRECONSTRUCTION MEETING AT A TIME AND PLACE AS ARRANGED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT SHALL NOTIFY AFFECTED UTILITY COMPANIES AND GOVERNMENTAL AGENCIES A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE PRECONSTRUCTION MEETING. THE OWNER'S ENGINEER SHALL SUBMIT APPROVED PLANS TO ALL UTILITY COMPANIES AND GOVERNMENTAL AGENCIES A MINIMUM OF TEN (10) DAYS PRIOR TO PRECONSTRUCTION MEETING.

B. THE CONTRACTOR SHALL NOTIFY MISS DIG AT (800) 482-7171, THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT AT (586) 445-5040 AND ANDERSON, ECKSTEIN AND WESTRICK, INC. AT (586) 726-1234 THREE (3) WORKING DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ALSO NOTIFY REPRESENTATIVES OF ANY OTHER FACILITIES, LOCATED IN THE VICINITY OF THE WORK, WHICH ARE NOT PARTICIPANTS OF THE MISS DIG SYSTEM.

3. PIPE MATERIAL

A. DUCTILE IRON PIPE WITH EXTERIOR ASPHALTIC MATERIAL COATING SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C151/A21.51 CURRENT SPECIFICATIONS FOR DUCTILE-IRON PIPE, CENTRIFUGALLY CAST, FOR WATER. DUCTILE IRON PIPE SHALL BE SPECIAL THICKNESS CLASS 54 FOR PUSH-ON-JOINT DUCTILE-IRON PIPE. DUCTILE IRON PIPE SHALL BE DOUBLE CEMENT LINED WITH ASPHALTIC MATERIAL SEAL COATING MEETING THE REQUIREMENTS OF ANSI/AWWA C104/A21.4 CURRENT SPECIFICATIONS FOR CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS FOR WATER. PUSH-ON JOINTS SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C111/A21.11 CURRENT SPECIFICATIONS FOR RUBBER-GASKET JOINTS FOR DUCTILE-IRON PRESSURE PIPE AND FITTINGS. PUSH ON JOINTS SHALL BE TYTON OR SUPER BELLTITE WITH SERRATED BRASS WEDGES. 6" THROUGH 12" PIPE REQUIRES TWO (2) WEDGES PER JOINT, 16" AND LARGER REQUIRES FOUR (4) WEDGES PER JOINT.

4. HYDRANTS

A. HYDRANTS SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C502 CURRENT SPECIFICATIONS FOR DRY-BARREL FIRE HYDRANTS. HYDRANTS SHALL BE EAST JORDON IRON WORKS 5-BR 250 WATERMASTER WITH PENTAGON OPERATING NUT MEASURING 1-1/8" POINT TO FLAT AND BREAKAWAY FLANGE. THE CONTRACTOR SHALL PLUG ANY HYDRANT DRAIN HOLES.

B. HYDRANTS SHALL OPEN COUNTER CLOCKWISE. HYDRANTS SHALL BE SUPPLIED WITH ONE (1) THREE AND THREE-QUARTER INCH (3-3/4") PUMPER NOZZLE HAVING DETROIT STANDARD THREAD AND ONE (1) FIVE INCH (5") STORZ NOZZLE.

C. HYDRANTS SHALL HAVE A MINIMUM BURY OF FIVE FEET (5.0') FROM FINISH GRADE TO BOTTOM INLET INVERT WITH A GROUND CLEARANCE FROM CENTER OF PUMPER NOZZLE TO FINISH GRADE OF TWENTY ONE INCHES (21") AND FROM CENTER OF BASE FLANGE TO FINISH GRADE OF APPROX. TWO AND ONE-HALF INCHES (2-½").

D. PRIOR TO FINAL ACCEPTANCE BY THE MUNICIPALITY, ALL HYDRANTS MUST BE DEWATERED AND PAINTED. PAINT SHALL BE RUST-O-LEUM OR OUTDOOR LATEX WITH TWO APPLICATIONS. HYDRANT BARREL, BONNET AND CAPS SHALL BE FIRE ENGINE RED.

E. HYDRANTS SHALL BE OF THE "L" TYPE CONNECTION UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. HYDRANT PUMPER NOZZLES SHALL FACE THE ROAD CENTERLINE IN PUBLIC RIGHT-OF-WAYS OR FACE THE DIRECTION OF FIRE EQUIPMENT ACCESS ON PRIVATE DEVELOPMENTS. HYDRANTS SHALL BE SET TO THE PROPOSED PLAN GRADE ELEVATION UNLESS OTHERWISE AUTHORIZED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. ALL VERTICAL EXTENSIONS REQUIRED TO OBTAIN THE DESIRED GRADE SHALL BE INCLUDED IN THE COST OF THE HYDRANT.

F. MEASUREMENT & PAYMENT FOR FIRE HYDRANT ASSEMBLIES INCLUDES ALL 6" PIPE, 6" BENDS, THE 6" VALVE & BOX, THE HYDRANT, THRUST BLOCKS & THE EARTH EXCAVATION & BACKFILL

5. GATE VALVES

A. GATE VALVES SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C509 CURRENT SPECIFICATIONS FOR RESILIENT-SEATED GATE VALVES FOR WATER SUPPLY SERVICE OR C515 CURRENT SPECIFICATIONS FOR REDUCED-WALL, RESILIENT-SEATED GATE VALVES FOR WATER SUPPLY SERVICE. THE VALVE SHALL BE CAST WITH AN IRON BODY AND BRONZE MOUNTED WITH A BRONZE NON-RISING STEM, DOUBLE "O"-RING REPLACEABLE SEALS AND MECHANICAL JOINTS. IT SHALL BE FURNISHED WITH A TWO INCH (2") SQUARE OPERATING NUT AND SHALL TURN CLOCKWISE TO OPEN. GATE VALVES SHALL BE MUELLER 2360 SERIES RESILIENT WEDGE GATE VALVES OR EAST JORDAN IRON WORKS FLOWMASTER RESILIENT SEATED GATE VALVES.

5. GATE VALVES (CONTINUED)

B. ALL GATE VALVES GREATER THAN SIXTEEN INCH (16") IN DIAMETER SHALL BE SUPPLIED WITH A BYPASS IN ACCORDANCE WITH ANSI/AWWA C500 UNLESS OTHERWISE SPECIFIED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. THE BYPASS VALVE SHALL BE A GATE VALVE CONFORMING TO THE REQUIREMENTS OF THESE STANDARDS. THE BYPASS VALVE SHALL BE INDEPENDENTLY SUPPORTED WITHIN THE VALVE CHAMBER AND THE OPERATING NUT MUST BE OPERABLE FROM ABOVE GRADE WITH A STANDARD GATE KEY.

C. TAPPING VALVES SHALL CONFORM TO THE REQUIREMENTS OF GATE VALVES AS SPECIFIED IN THESE STANDARDS. THE VALVE SHALL BE CONSTRUCTED TO ALLOW A TAPPING MACHINE TO TAP DIRECTLY THROUGH THE OPEN VALVE. THE VALVE SHALL BE SUPPLIED WITH A FLANGED JOINT FOR CONNECTION TO THE TAPPING SLEEVE AND A MECHANICAL JOINT FOR CONNECTION TO THE BRANCH WATER MAIN. THE TAPPING SLEEVES SHALL BE STAINLESS STEEL, SPLIT SLEEVES WITH MECHANICAL JOINTS AND A DUCTILE IRON FLANGED OUTLET.

D. GATE VALVES AND TAPPING VALVES SHALL BE HOUSED WITHIN A PRECAST CONCRETE GATEWELL UNLESS NOTED OTHERWISE ON THE PLANS. PRECAST BOTTOM SECTIONS, RISER SECTIONS, ECCENTRIC TRANSITION SECTIONS AND FLAT SLAB COVERS SHALL CONFORM TO ASTM SPECIFICATION C478. HYDRANT VALVES SHALL BE HOUSED IN A CAST IRON VALVE BOX. VALVE BOX SHALL BE A THREE (3) PIECE SCREW TYPE BOX (5-¼" SHAFT) WITH AN ENLARGED BASE.

E. GATEWELL FRAMES AND COVERS SHALL BE EAST JORDON IRON WORKS 1040 FRAME & COVER WITH THE WORDS "DEPARTMENT OF WATER SUPPLY" IN TWO INCH (2") RECESSED FLUSH LETTERS.

F. ALL END-OF-THE-LINE GATEWELLS SHALL HAVE A CAPPED STUB EXTENDING ONE FULL LENGTH OF PIPE BEYOND THE GATEWELL. THE VALVE, PIPE AND CAP SHALL BE INSTALLED WITH RETAINER GLANDS AND A CONCRETE THRUST BLOCK AT THE CAP

G. STEPS SHALL BE M.A. INDUSTRIES P.S.I. POLYPROPYLENE OR MSU #360 ALU POLY MANHOLE STEPS WITH FOOT RECESS AND INSTALLED BY THE GATEWELL MANUFACTURER AT SIXTEEN INCHES (16") CENTER TO CENTER SPACING. BOTTOM STEP SHALL BE TWENTY FOUR INCHES (24") MAXIMUM ABOVE FLOOR. TOP STEP SHALL BE EIGHTEEN INCHES (18") MAXIMUM BELOW RIM. ALL STEPS SHALL BE SUITABLY SCORED TO PROVIDE A NON-SLIP SURFACE.

H. ALL GATEWELLS SHALL BE REQUIRED TO HAVE EXTERIOR SEAL. EXTERIOR SEAL SHALL BE CANUSA WRAPID SEAL ENCAPSULATION SYSTEM INSTALLED PER MANUFACTURERS SPECIFICATIONS.

6. FITTINGS

A. ALL FITTINGS SHALL BE DUCTILE IRON AND MEET THE REQUIREMENTS OF ANSI/AWWA C153/A21.53 CURRENT SPECIFICATIONS FOR DUCTILE-IRON COMPACT FITTINGS FOR WATER SERVICE. FITTINGS SHALL BE CEMENT LINED WITH ASPHALTIC MATERIAL SEAL COATING MEETING THE REQUIREMENTS OF ANSI/AWWA C104/A21.4 CURRENT SPECIFICATIONS FOR CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS FOR WATER OR EPOXY COATED MEETING THE REQUIREMENTS OF ANSI/AWWA C116/A21.16 FOR PROTECTIVE FUSION-BONDED EPOXY COATINGS FOR THE INTERIOR AND EXTERIOR SURFACES OF DUCTILE-IRON AND GRAY-IRON FITTINGS FOR WATER SUPPLY SERVICE. FITTINGS SHALL BE 350 PSI PRESSURE RATED WITH MECHANICAL JOINTS AND RETAINING GLANDS. SPLIT RETAINERS ARE NOT ALLOWED.

B. CONCRETE THRUST BLOCKS ARE REQUIRED AT ALL BENDS, TEES, CAPS OR PLUGS. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 2500 PSI (MINIMUM) AT 28 DAYS.

C. MECHANICAL JOINTS AND BOLTS FOR ALL FITTINGS SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C111/A21.11 CURRENT SPECIFICATIONS FOR RUBBER-GASKET JOINTS FOR DUCTILE-IRON PRESSURE PIPE AND FITTINGS. RETAINER GLANDS SHALL BE EBAA IRON MEGALUG 1100 SERIES WITH MANUFACTURER SUPPLIED BOLTS AND TORQUE LIMITING TWIST OFF NUTS. ALL BOLTS, OTHER THAN MANUFACTURER PROVIDED BOLTS AND TORQUE LIMITING TWIST OFF NUTS FOR EBAA IRON MEGALUG 1100 SERIES RETAINING GLANDS, SHALL BE COR BLUE WITH T-HEADS AND HEX NUTS.

7. CONSTRUCTION

A. THE WATER MAIN SHALL BE CONSTRUCTED WITH A MINIMUM COVER OF FIVE FEET (5'), MEASURED FROM THE PAVEMENT CENTERLINE ELEVATION OR THE EXISTING GROUND, WHICHEVER IS LOWER, TO THE TOP OF PIPE. GENERALLY, THE MAXIMUM DEPTH OF COVER SHALL NOT EXCEED SEVEN FEET (7') FROM FINAL FINISH GRADE.

B. A MINIMUM VERTICAL CLEARANCE OF ONE AND ONE-HALF FEET (1-½') MUST BE MAINTAINED BETWEEN THE WATER MAIN AND ANY UTILITIES. ADJUSTMENTS TO THE WATER MAIN DEPTH IN ORDER TO OBTAIN THE DESIRED CLEARANCES MUST BE ACCOMPLISHED WITH VERTICAL BENDS, THRUST BLOCKS AND ANCHORAGES.

C. DEFLECTION OF PIPE JOINTS TO OBTAIN THE DESIRED CLEARANCES OR ALIGNMENT SHALL ONLY BE ACCOMPLISHED WITH THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT APPROVAL. THE MAXIMUM ALLOWABLE DEFLECTION (FOR 1 FULL LENGTH OF PIPE) IS FOURTEEN INCHES (14") FOR 4" THROUGH 12" PIPE AND EIGHT INCHES (8") FOR 16" AND 24" PIPE.

© COPYRIGHT, 2013, ANDERSON, ECKSTEIN AND WESTRICK, INC.

REVISIONS	DATE	REMARKS
	01/09/08 PRP	REVISED HYDRANT TO INCLUDE 5" STORZ NOZZLE
	03/18/13 PRP	REVISED DPW DIRECTOR
	11/16/20 KJP	REVISED GATE VALVE AND BOX BACKFILL

CITY OF EASTPOINTE

STANDARD WATER MAIN DETAILS (1 OF 2)

WATER AND SEWER DEPARTMENT

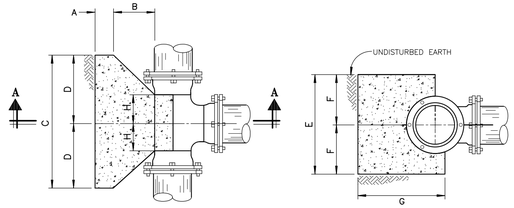
APPROVED BY : _____ DATE : _____

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586•726•1234 Fax 586•726•8780

PROJECT NO.	SHEET NO.
DATE: JANUARY, 2006	W1
DRAWN BY: SMH	CHECKED BY: CRF

STATE OF MICHIGAN
STEPHEN V. PANGORI
ENGINEER
No. 37769
LICENSED PROFESSIONAL ENGINEER

STEPHEN V. PANGORI, P.E. #37769



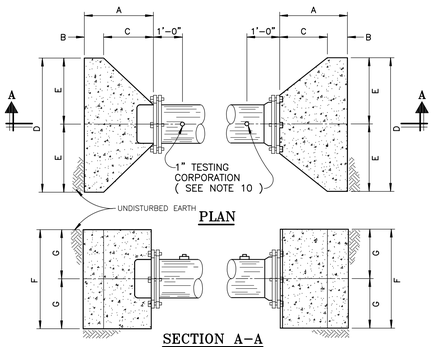
PLAN SECTION A–A

TEE SIZE	A	B	C	D	E	F	G	H
8" X 8"	0'–9"	0'–9"	2'–8"	1'–4"	2'–0"	1'–0"	2'–2"	0'–7"
12" X 8"	0'–9"	0'–9"	2'–8"	1'–4"	2'–0"	1'–0"	2'–6"	0'–8"
16" X 8"	0'–9"	0'–9"	2'–8"	1'–4"	2'–0"	1'–0"	2'–10"	0'–8"
12" X 12"	0'–9"	1'–3"	4'–0"	2'–0"	3'–0"	1'–6"	2'–10"	0'–10"
16" X 12"	0'–9"	1'–3"	4'–0"	2'–0"	3'–0"	1'–6"	3'–4"	0'–10"
16" X 16"	1'–0"	1'–4"	4'–8"	2'–4"	4'–8"	2'–4"	3'–6"	1'–0"

NOTE: THRUST BLOCKS FOR 6" TEES SHALL MATCH THE REQUIREMENTS FOR 8" TEES

CONCRETE THRUST BLOCKS FOR TEES

NOT TO SCALE

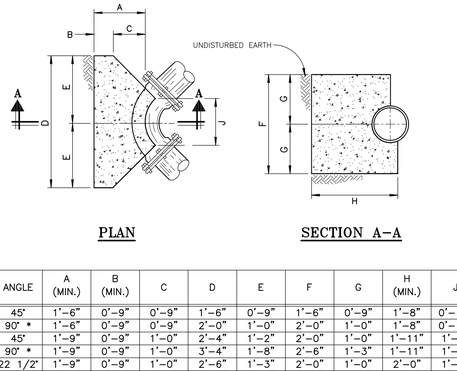


PLAN SECTION A–A

SIZE	A MIN.	B MIN.	C	D	E	F	G
8"	1'–11"	0'–9"	1'–2"	3'–0"	1'–6"	2'–0"	1'–0"
12"	2'–1"	0'–9"	1'–4"	4'–0"	2'–0"	3'–0"	1'–6"
16"	2'–8"	1'–0"	1'–8"	5'–0"	2'–6"	4'–0"	2'–0"
24"	4'–2"	1'–6"	2'–8"	6'–0"	3'–0"	4'–0"	2'–0"

CONCRETE THRUST BLOCKS FOR CAPS

NOT TO SCALE



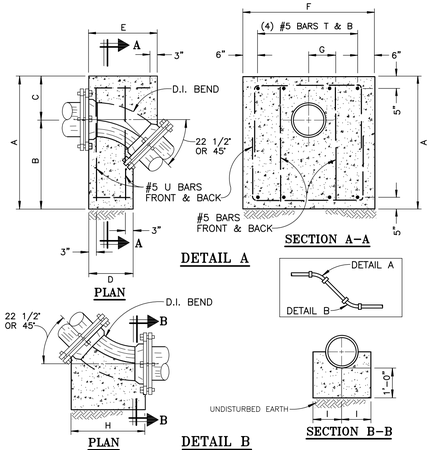
PLAN SECTION A–A

SIZE	ANGLE	A (MIN.)	B (MIN.)	C	D	E	F	G	H (MIN.)	J
6"	45°	1'–6"	0'–9"	0'–9"	1'–6"	0'–9"	1'–6"	0'–9"	1'–8"	0'–10"
6"	90° *	1'–6"	0'–9"	0'–9"	2'–0"	1'–0"	2'–0"	1'–0"	1'–8"	0'–10"
8"	45°	1'–9"	0'–9"	1'–0"	2'–4"	1'–2"	2'–0"	1'–0"	1'–11"	1'–4"
8"	90° *	1'–9"	0'–9"	1'–0"	3'–4"	1'–8"	2'–6"	1'–3"	1'–11"	1'–2"
12"	22 1/2°	1'–9"	0'–9"	1'–0"	2'–6"	1'–3"	2'–0"	1'–0"	2'–0"	1'–4"
12"	45°	2'–1"	0'–9"	1'–4"	3'–6"	1'–9"	2'–6"	1'–3"	2'–4"	1'–4"
12"	90° *	2'–1"	0'–9"	1'–4"	5'–6"	2'–9"	3'–0"	1'–6"	2'–4"	1'–8"
16"	22 1/2°	2'–8"	1'–0"	1'–8"	3'–4"	1'–8"	2'–6"	1'–3"	3'–0"	1'–2"
16"	45°	2'–8"	1'–0"	1'–8"	5'–4"	2'–8"	3'–0"	1'–6"	3'–0"	2'–6"
16"	90° *	2'–8"	1'–0"	1'–8"	6'–0"	3'–0"	5'–0"	2'–6"	3'–0"	2'–8"
24"	90° *	4'–7"	1'–0"	3'–7"	10'–0"	5'–0"	7'–0"	3'–6"	5'–4"	2'–4"

* 90° BENDS TO BE INSTALLED ONLY WITH WRITTEN APPROVAL OF THE COMMUNITY

CONCRETE THRUST BLOCKS FOR HORIZONTAL BENDS

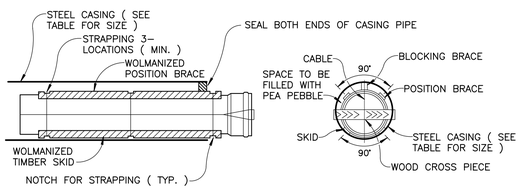
NOT TO SCALE



SIZE	ANGLE	A	B	C	D	E	F	G	H	I
8"	22 1/2°	3'–0"	1'–8"	1'–4"	1'–4"	1'–7"	2'–8"	0'–8"	1'–9"	1'–0"
8"	45°	4'–0"	2'–6"	1'–6"	1'–6"	1'–8"	3'–2"	0'–10"	2'–0"	1'–0"
12"	22 1/2°	4'–0"	2'–6"	1'–6"	1'–7"	2'–0"	4'–0"	0'–10"	2'–6"	1'–0"
12"	45°	4'–6"	3'–0"	1'–6"	1'–6"	2'–4"	5'–0"	0'–11"	2'–6"	1'–0"
16"	22 1/2°	4'–6"	2'–10"	1'–8"	1'–7"	2'–2"	5'–0"	0'–11"	2'–4"	1'–6"

ANCHORAGE FOR VERTICAL BENDS

NOT TO SCALE

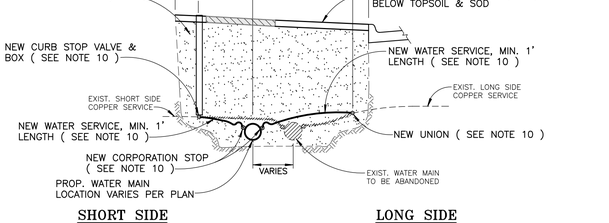


NOTE:
THE ENDS OF THE CASING SHALL BE SEALED AFTER THE WATER MAIN IS INSTALLED THROUGH THE CASING

PIPE SIZE	RECOMMENDED MINIMUM CASING DIAMETER (O.D.)	MINIMUM CASING WALL THICKNESS
4"	12.75"	0.375"
6"	14"	0.375"
8"	16"	0.375"
12"	20"	0.375"
16"	24"	0.406"
24"	36"	0.532"

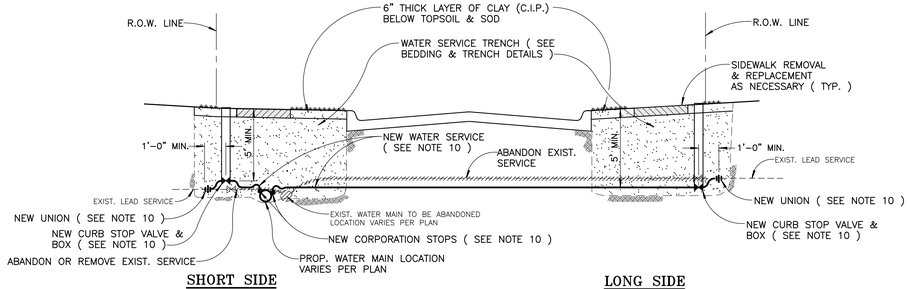
STEEL CASING REQUIREMENTS

NOT TO SCALE



TYPICAL WATER SERVICE TRANSFER

NOT TO SCALE



TYPICAL WATER SERVICE REPLACEMENT

NOT TO SCALE

GENERAL NOTES

7. CONSTRUCTION (CONTINUED)

D. THE CONTRACTOR SHALL SUPPLY AND PLACE A PLUG OR CAP OVER THE END OF THE PIPE AT THE END OF EACH WORK DAY.

E. VERTICAL TOLERANCES FOR HYDRANTS AND VALVES SHALL BE:
HYDRANTS (ANY LOCATION): −0.00 TO +0.25 FEET
GATE WELL NOT IN R.O.W.: −0.25 TO +0.25 FEET
GATE WELL IN R.O.W.: −0.00 TO +0.30 FEET

8. CONNECTION TO EXISTING SYSTEM

A. A ONE INCH (1") CORPORATION SHALL BE INSTALLED, FOR TESTING PURPOSES, IN ALL STUBS AND POINTS OF CONNECTION TO EXISTING MAINS. SEE NOTE 10 FOR CORPORATION STOP SPECIFICATION. UPON SUCCESSFUL COMPLETION OF THE TESTS AND WITH THE APPROVAL OF THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT, THE CONTRACTOR SHALL REMOVE THE TESTING CORPORATION AND INSTALL PLUGS.

B. THE MAXIMUM PERMISSABLE LEAKAGE, DURING HYDROSTATIC TESTING, SHALL NOT EXCEED 0.16 GALLONS PER INCH DIAMETER OF MAIN PER 1000 FEET OF PIPE IN 2 HOURS AT A TEST PRESSURE OF 150 PSI. THE MAXIMUM TEST LENGTH IS 3000 FEET. THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT RESERVES THE RIGHT TO TEST SHORTER LENGTHS. THE CONTRACTOR IS TO SUPPLY ALL TESTING EQUIPMENT AND PERFORM THE TEST. THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT WILL WITNESS THE TEST.

C. A DOUBLE CHECK VALVE ASSEMBLY, FOR BACKFLOW PREVENTION, SHALL BE UTILIZED ON ALL TEMPORARY LINES USED TO FILL AND FLUSH THE NEWLY INSTALLED MAIN. THE DOUBLE CHECK VALVE ASSEMBLY SHALL MEET THE REQUIREMENTS OF ANSI/AWWA C510 CURRENT SPECIFICATIONS FOR DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY.

D. ALL WATER MAINS SHALL BE DISINFECTED ACCORDING TO THE REQUIREMENTS OF ANSI/AWWA C651 CURRENT SPECIFICATIONS FOR DISINFECTING WATER MAINS.

E. ALL WATER USED FOR FLUSHING NEW WATER MAINS MAY BE OBTAINED FROM THE LOCAL WATER SUPPLY. THE CONTRACTOR SHALL SECURE WRITTEN PERMISSION AND/OR PERMIT FROM THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT FOR WATER USED. WHERE CONNECTIONS ARE MADE TO HYDRANTS, THE CONTRACTOR SHALL ALSO OBTAIN PERMISSION FOR SUCH CONNECTIONS FROM THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. STANDARD HYDRANT WRENCHES SHALL BE USED FOR OPENING AND CLOSING THE HYDRANT. PIPE WRENCHES SHALL NOT BE USED TO OPEN OR CLOSE HYDRANTS. USE OF ANY HYDRANT SHALL INCLUDE THE REQUIREMENT THAT EACH HYDRANT SO USED BE COMPLETELY PUMPED DRY AFTER EACH USE.

F. CONNECTIONS TO THE EXISTING WATER SYSTEM SHALL NOT BE MADE UNTIL THE NEW MAIN HAS BEEN SUCCESSFULLY PRESSURE TESTED AND HAS PASSED BACTERIOLOGICAL TESTING IN ACCORDANCE WITH CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT STANDARDS AND A COPY OF BOTH RESULTS ARE SUBMITTED TO THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. FINAL CONNECTIONS SHALL BE COORDINATED WITH THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT.

G. BEFORE ACCEPTANCE A FINAL REVIEW MUST BE MADE BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT AND AS–BUILT SEPIA MYLARS, AUTOCAD DIGITAL FILE AND THREE (3) SETS OF BLUE LINE PRINTS SHALL BE SUBMITTED TO THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT.

9. MAINTENANCE AND GUARANTEE BOND

A. THE CONTRACTOR SHALL PROVIDE A TWO (2) YEAR MAINTENANCE AND GUARANTEE BOND TO THE CITY OF EASTPOINTE FROM A SURETY LICENSED IN THE STATE OF MICHIGAN, DATED FROM THE TIME OF FINAL ACCEPTANCE BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT, FOR 100% OF THE CONSTRUCTION COSTS.

10. WATER SERVICES

A. ALL SHORT SIDE WATER SERVICE TRANSFERS SHALL INCLUDE NEW COPPER TUBING, CORPORATION STOPS, CURB STOP VALVES, SERVICE BOXES, AND COUPLINGS AS REQUIRED. SEE TYPICAL WATER SERVICE TRANSFER DETAIL.

B. ALL WATER SERVICE REPLACEMENTS SHALL INCLUDE NEW COPPER TUBING, CORPORATION STOPS, CURB STOP VALVES, SERVICE BOXES AND COUPLINGS AS REQUIRED. SERVICE REPLACEMENTS SHALL BE FROM THE WATER MAIN TO A CONNECTION POINT ONE FOOT (1') BEYOND THE EXISTING CURB STOP VALVE. SEE TYPICAL WATER SERVICE REPLACEMENT DETAIL.

C. COUPLINGS FOR WATER SERVICE TRANSFERS SHALL BE FORD QUICK JOINT COUPLING OR MUELLER H–15403 STRAIGHT THREE PART COUPLING WITH MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION (BOTH ENDS). COUPLINGS FOR WATER SERVICE REPLACEMENT SHALL BE MUELLER H–15509 STRAIGHT UNION EXTRA STRONG (XS) WITH LEAD FLANGE THREAD AND MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION OR AN APPROVED EQUAL FORD COUPLING.

D. WATER SERVICES SHALL BE NEW TYPE "K" SEAMLESS COPPER TUBING. CONTRACTOR SHALL MATCH EXISTING WATER SERVICE SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS.

E. CORPORATION STOPS SHALL BE FORD F1000–3–Q–NL FOR THREE–QUARTER INCH (3/4") WATER SERVICES, F1000–4–Q–NL FOR ONE INCH (1") WATER SERVICES, FB1000–6–Q–NL FOR ONE AND ONE–HALF INCH (1–½") WATER SERVICES AND FB1000–7–Q–NL FOR TWO INCH (2") WATER SERVICES OR MUELLER H–15008–N GROUND KEY CORPORATION VALVE WITH AWWA TAPER (MUELLER "CC") THREAD AND MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION OUTLET FOR THREE–QUARTER INCH (3/4") AND ONE INCH (1") WATER SERVICES OR MUELLER B–25008–N 300™ BALL CORPORATION VALVE WITH AWWA TAPER (MUELLER "CC") THREAD AND MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION OUTLET FOR ONE AND ONE–HALF INCH (1–½") AND TWO INCH (2") WATER SERVICES. A BRONZE DOUBLE STRAP SADDLE IS REQUIRED FOR TWO INCH (2") WATER SERVICES.

F. CURB STOP VALVES SHALL BE FORD B44–333M–Q–NL FOR THREE–QUARTER INCH (3/4") WATER SERVICES, B44–444M–Q–NL FOR ONE INCH (1") WATER SERVICES, B44–666M–Q–NL FOR ONE AND ONE–HALF INCH (1–½") WATER SERVICES AND B44–777M–Q–NL FOR TWO INCH (2") WATER SERVICES OR MUELLER H–15155–N MARK II ORISEAL CURB VALVE WITH MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION OUTLET (BOTH ENDS) FOR THREE–QUARTER INCH (3/4") AND ONE INCH (1") WATER SERVICES OR MUELLER B–25155–N 300™ BALL VALVE WITH MUELLER 110® CONDUCTIVE COMPRESSION CONNECTION OUTLET (BOTH ENDS) FOR ONE AND ONE–HALF INCH (1–½") AND TWO INCH (2") WATER SERVICES. ALL CURB STOP VALVES SHALL BE QUARTER TURN CHECK AND MINNEAPOLIS THREAD TOP. CURB BOXES SHALL BE FORD OR MUELLER, EXTENSION TYPE, WITH MINNEAPOLIS PATTERN BASE.

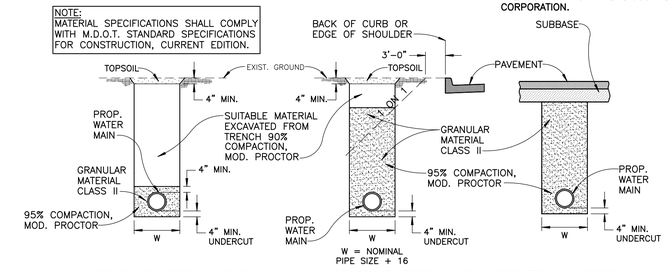
FORD METER BOX CO.
PL–LID – 1¼" UPPER, BASE TAPPED 1½" W/O ROD
PL–LID – 1¼" UPPER, BASE TAPPED 2" W/O ROD
PXL–LID – 1½" UPPER, BASE TAPPED 2" W/O ROD

MUELLER
VALVES – H–15155–N
BOXES VARY IN I.D. FROM 1" – 2"
BASE TAP VARIES 1½" – 3½"

G. CURB STOPS SHALL ONLY BE INSTALLED IN SIDEWALKS, DRIVES, OR PAVEMENT WITH THE WRITTEN AUTHORIZATION OF THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. ADDITIONAL COPPER TUBING AND FITTINGS SHALL BE USED AS REQUIRED TO INSTALL CURB STOPS BEHIND THE SIDEWALK.

H. ALL ABANDONED SERVICES MUST BE ABANDONED AT THE MAIN BY CLOSING THE CORPORATION AND DISCONNECTING THE COPPER FROM THE CORPORATION.

NOTE:
MATERIAL SPECIFICATIONS SHALL COMPLY WITH M.D.O.T. STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION.



PROP. WATER MAINS NOT UNDER ROADBED

PROP. WATER MAINS UNDER ROADBED OR WITHIN INFLUENCE OF ROADBED

BEDDING & TRENCH DETAILS

NOT TO SCALE

© COPYRIGHT, 2013, ANDERSON, ECKSTEIN AND WESTRICK, INC.

DATE	REVISIONS	REMARKS
01/09/08	PRP	REVISED HYDRANT TO INCLUDE 5" STORZ NOZZLE
03/18/13	PRP	REVISED DPW DIR./ LOW–LEAD COMPONENTS

CITY OF EASTPOINTE

STANDARD WATER MAIN DETAILS (2 OF 2)

WATER AND SEWER DEPARTMENT

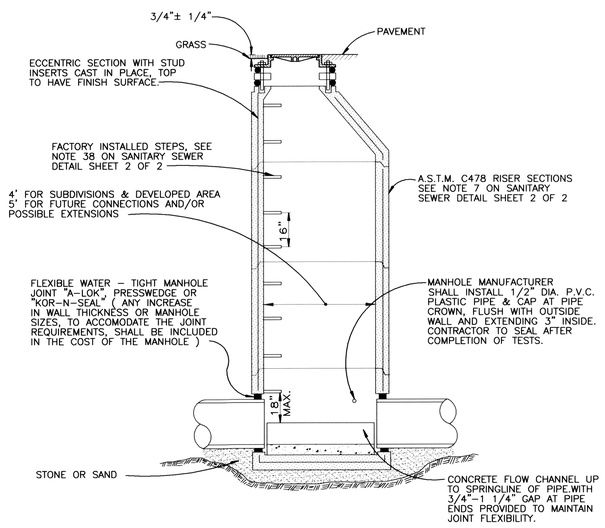
APPROVED BY : _____ DATE : _____

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586•726•1234 Fax 586•726•8780

PROJECT NO.	SHEET NO.
DATE: JANUARY, 2006	W2
DRAWN BY: SMH	CHECKED BY: CRF

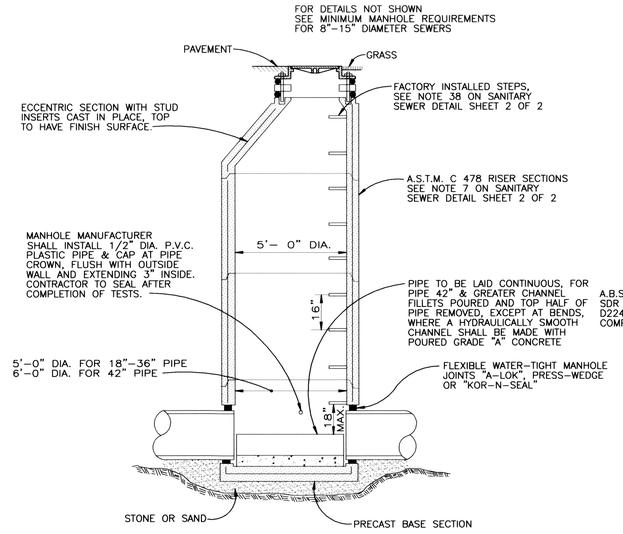
STATE OF MICHIGAN — STEPHEN V. PANGORI — ENGINEER — No. 37769 — LICENSED PROFESSIONAL ENGINEER

STEPHEN V. PANGORI, P.E. #37769



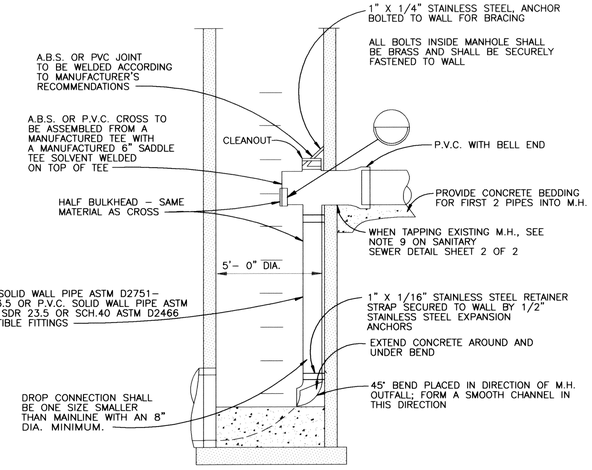
SANITARY SEWER MANHOLE

(8" THRU 15" DIA. SEWERS)



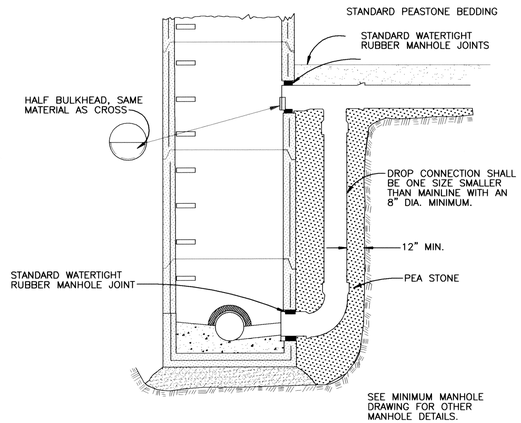
SANITARY SEWER MANHOLE

(18" THRU 42" DIA. SEWERS)



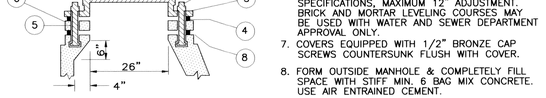
INTERIOR DROP ASSEMBLY

FOR ALL DROP CONNECTIONS



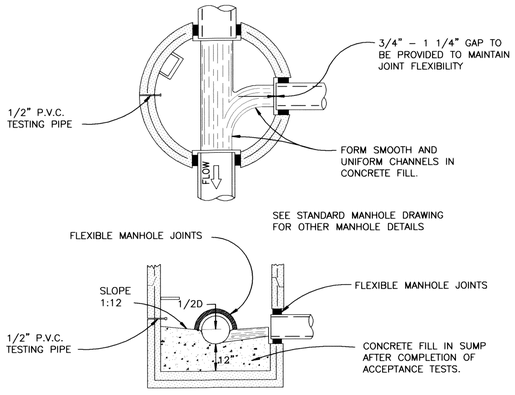
EXTERIOR DROP CONNECTION

(ONLY WITH WATER AND SEWER DEPARTMENT APPROVAL)



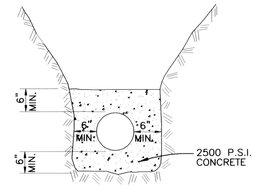
1. BOLTED WATERPROOF COVER EQUAL TO EAST JORDAN 1040 ZPT WITH PRESSURE TIGHT COVER WITH 1" ANCHOR BASE FLANGE HOLES, FOUR (4) AS SHOWN. WEIGHT = 400 LBS. WHEN & WHERE SPECIFIED
2. FOUR (4) CADMIUM COATED 5/8" THREADED STUDS, 3/4" X 2" X 1/8" FLAT WASHERS & NUTS
3. FOUR (4) 3/4" X 2" X 1/16" NEOPRENE SEALING WASHERS
4. 1" DIA. RUBBER O-RING GASKETS I.D.-36" MIN. DUROMETER 20, MAX. 40
5. FOUR (4) 5/8" THREADED INSERTS CAST AS SHOWN
6. 4" OR 6" GRADE RINGS WITH FINISH TOP AND BOTTOM SURFACES PER A.S.T.M. C 478 SPECIFICATIONS, MAXIMUM 12" ADJUSTMENT. BRICK AND MORTAR LEVELING COURSES MAY BE USED WITH WATER AND SEWER DEPARTMENT APPROVAL ONLY
7. COVERS EQUIPPED WITH 1/2" BRONZE CAP SCREWS COUNTERSUNK FLUSH WITH COVER.
8. FORM OUTSIDE MANHOLE & COMPLETELY FILL SPACE WITH STIFF MIN. 6 BAG MIX CONCRETE. USE AIR ENTRAINED CEMENT.

WATERPROOF MANHOLE FRAME & COVER



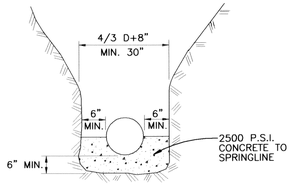
SUMP MANHOLE

FOR TESTING, CLEANING & DEWATERING



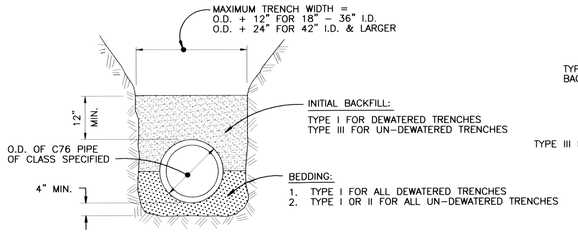
CONCRETE ENCASEMENT DETAIL

1. PLACE 2,500 PSI CONCRETE AGAINST UNDISTURBED EARTH FOR ENTIRE WIDTH OF TRENCH.
2. CONCRETE ENCASEMENT SHALL BE USED UNDER ALL RIVERS OR COUNTY DRAINS WHERE THE WIDTH FROM TOP OF BANK TO TOP OF BANK IS IN EXCESS OF 10 FEET & CROWN OF SEWER IS NOT COVERED BY 5 FEET.
3. CONCRETE ENCASEMENT SHALL EXTEND A DISTANCE OF 10 FEET BEYOND THE TOP OF BANK ON EACH SIDE OF THE STREAM. (MINIMUM ENCASEMENT 30 FEET).
4. FOR SANITARY SEWER IN EXCESS OF 15 INCHES IN DIAMETER CLASS V REINFORCED PIPE MAY BE SUBSTITUTED FOR CONCRETE ENCASEMENT, WITH OWNER'S APPROVAL.



CONCRETE CRADLE DETAIL

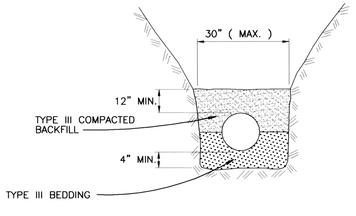
1. CONCRETE CRADLE MAY BE SPECIFIED AT OWNER'S DISCRETION WHERE THE TRENCH WIDTH IS EXCESSIVE, OR WHERE THE TRENCH IS NOT SUITABLE FOR PIPE LAYING.



BEDDING & TRENCH DETAIL, 18" & LARGER SEWER

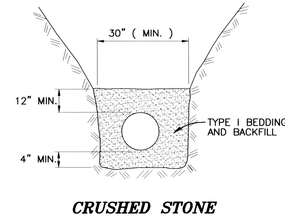
CLASS C

NOTE: APPROVAL MAY BE GIVEN TO ALTERNATE MATERIALS AND METHODS TO ACHIEVE CLASS C BEDDING.



CLASS "C" BEDDING

FOR ALL UN-DEWATERED TRENCHES LESS THAN 20" IN DEPTH



CRUSHED STONE ENCASEMENT

FOR ALL TRENCHES 30" AND GREATER IN WIDTH, DEWATERED TRENCHES AND ALL TRENCHES GREATER THAN 20' IN DEPTH.

BEDDING & TRENCH DETAIL, 6"-15" SEWERS

GENERAL PIPE BEDDING & TRENCH NOTES

1. THE CONTRACTOR SHALL INSTALL THE PIPE IN ACCORDANCE WITH THE CLASS BEDDING DETAIL REQUIRED FOR THE TYPE OF PIPE, PIPE DEPTH (MEASURED THE TOP OF THE PIPE), AND TRENCH WIDTH (MEASURED ACROSS THE TRENCH AT THE TOP OF THE PIPE) CONSTRUCTED. A CONTRACTOR MAY ALWAYS USE A HIGHER QUALITY BEDDING CLASS THAN REQUIRED. ANY OTHER VARIATIONS MUST BE APPROVED IN WRITING BY THE ENGINEER.
2. CRUSHED STONE ENCASEMENT SHALL BE UTILIZED FOR ALL DEWATERED GROUND TRENCHES AND SHALL UTILIZE A TRENCH WIDTH OF 30" (MINIMUM).
3. BACKFILL MATERIAL SHALL BE AS FOLLOWS:

TYPE I: SHALL CONSIST OF WELL GRADED CRUSHED STONE. THE STONE SHALL CONFORM TO ASTM D 448 #5, 56, 57, 6, 67 & 68, ASTM D 2321 CLASS I, OR ALTERNATIVE APPROVED BY THE ENGINEER. ANY MATERIAL INCORPORATED SHALL PROVIDE A MINIMUM OF 90% CRUSHED MATERIAL. MDOT COURSE AGGREGATES 6A, 6AA, 9A, 17A & 25 SERIES ARE ALSO APPROVED FOR USE IF THEY ARE MANUFACTURED WITH SUFFICIENT CRUSHED MATERIAL AND NO STONE IS LARGER THAN 1 INCH IN DIAMETER. SPANDING THE HAUNCH AREA IS THE ONLY DENSITY EFFORT REQUIRED.

TYPE II: SHALL CONSIST OF WELL GRADED COURSE SANDS AND GRAVEL (1 INCH MAXIMUM DIAMETER) CONTAINING A SMALL PERCENTAGE OF FINES. THE MATERIAL SHALL CONFORM TO ASTM D 2321 CLASS II AND SHALL INCLUDE PEA PEBBLE AND MDOT AGGREGATES 20 SERIES, 21 SERIES, 22 SERIES, 23A, 26A, 28 SERIES & 31 SERIES. 90% MINIMUM DENSITY REQUIRED. TYPE II MAY BE SUBSTITUTED FOR TYPE III BACKFILL.

TYPE III: SHALL CONSIST OF FINE SAND AND CLAYEY GRAVELS CONFORMING TO ASTM 2321 CLASS III AND SHALL INCLUDE PEA PEBBLE. IT SHALL NOT CONTAIN ANY STONE LARGER THAN 1 INCH IN DIAMETER AND SHALL REQUIRE 90% MINIMUM DENSITY.

CITY OF EASTPOINTE

STANDARD SANITARY SEWER DETAILS (1 OF 2)

SUPERINTENDENT OF WATER AND SEWER DEPARTMENT

APPROVED BY : GREG BROWN DATE : 2/14/2006

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586•726•1234 Fax 586•726•8780

PROJECT NO.	SHEET NO.
DATE: JULY 2004	B
DRAWN BY: KJP/KAO	CHECKED BY: SVP

STATE OF MICHIGAN STEPHEN V. PANGORI ENGINEER No. 37769 LICENSED PROFESSIONAL ENGINEER

STEPHEN V. PANGORI, P.E. NO. 37769

REMARKS | DATE | REVISIONS

REMARKS | DATE | REVISIONS

REMARKS | DATE | REVISIONS

G:\COMMUNITIES\STPOINTE\STD_DET\SEP_SDET1.DWG, Model, 8/18/2004 11:29:54 AM, HP DesignJet 1050C by HP, px3, 1:1

SANITARY SEWER CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. ALL SANITARY SEWER CONSTRUCTION SHALL HAVE COMPETENT FULL TIME INSPECTION PROVIDED BY OR CAUSED TO BE PROVIDED BY THE CITY OF EASTPOINTE.

2. AT ALL CONNECTIONS TO CITY OF EASTPOINT SANITARY SEWERS OR TO EXTENSIONS THERETO, AND BEFORE START OF CONSTRUCTION, THE CONTRACTOR MUST REQUEST AND HAVE IN HIS POSSESSION AN APPROVED CONNECTIONS PERMIT ISSUED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. THE CONTRACTOR SHALL NOTIFY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT 48 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION.

3. NO SEWER INSTALLATION SHALL HAVE AN INFILTRATION EXCEEDING 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOUR PERIOD. EXFILTRATION TESTING SHALL BE CONDUCTED WHERE GROUND WATER IS INSUFFICIENT. ALL INSTALLATIONS SHALL ALSO PASS LOW PRESSURE AIR TEST AS SPECIFIED IN THE CITY OF EASTPOINTE STANDARD SPECIFICATIONS.

   ANY APPROVED USE OF ABS COMPOSITE PIPE AND PLASTIC PIPE SHALL BE SUBJECT TO DEFLECTION TEST 30 DAYS AFTER CONSTRUCTION WITH A NINE SIDED MANDREL. THE CONTRACTOR MUST SUPPLY THE MANDREL AND PERFORM THE TEST. THE OWNER WILL WITNESS THE TEST. DEFLECTION SHALL NOT EXCEED 5%. THE OWNER OR THEIR REPRESENTATIVE RESERVES THE RIGHT TO TEST THE SEWER FOR DEFLECTION NOT TO EXCEED 7% DURING THE PERIOD OF THE MAINTENANCE BOND. ANY SEWER FOUND EXCEEDING THESE LIMITS SHALL BE REPLACED BY AND AT THE CONTRACTOR'S EXPENSE.

   AS PART OF THE FINAL INSPECTION, THE CONTRACTOR SHALL PROVIDE FOR TELEVISION INSPECTION OF THE SANITARY SEWER LINES INSTALLED UNDER THIS CONTRACT. THE CONTRACTOR SHALL ARRANGE FOR, ENGAGE AND PAY ALL EXPENSES INVOLVED FOR THE SERVICES OF A COMPETENT COMPANY TO PERFORM THIS TELEVISION INSPECTION. THE INSPECTION SHALL BE CARRIED OUT UNDER THE DIRECT SUPERVISION OF THE ENGINEER WITH ALL TELEVISION INSPECTION BEING OBSERVED BY REPRESENTATIVES OF THE OWNER OR ENGINEER AND THE CONTRACTOR. ANY TELEVISION VIEWING PERFORMED IN THE ABSENCE OF THE ENGINEER OR A REPRESENTATIVE OF THE OWNER SHALL NOT BE CONSIDERED A PART OF THE FINAL INSPECTION. ALL TELEVISION INSPECTION SHALL BE RECORDED ON VIDEO TAPE AND TURNED OVER TO THE OWNER FOR READY REFERENCE AT A LATER DATE. THE VIDEO RECORDING SHALL DISPLAY CONTINUOUSLY THE DATE, TIME AND ENGINEERING STATIONS AND SHALL PERIODICALLY DISPLAY THE NAME OF THE PROJECT, NAME OF THE AREA COVERED AND DIRECTION OF TRAVEL. THE TAPE MUST BE COMPATIBLE WITH RCA MODEL VKT-275 VIDEO CASSETTE PLAYER 1/2 INCH VHS FORMAT.

4. INFILTRATION SHALL BE TESTED BY THE OWNER UTILIZING CALIBRATED WEIRS OR FLUMES INSERTED IN THE PIPE FLOWLINE AT A MANHOLE. TEST SECTIONS SHALL GENERALLY BE LIMITED TO A MAXIMUM LENGTH OF ONE HALF MILE. THE OWNER RESERVES THE RIGHT TO TEST SHORTER PIPE LENGTH SEGMENTS IF HE DEEMS IT NECESSARY TO ASSURE THAT NO SEGMENT EXCEEDS THE INFILTRATION LIMITS.

5. HOUSE OR BUILDING LEAD PIPE, WYES AND CAPS SHALL BE SOLID WALL PLASTIC PIPE, ABS (A.S.T.M. D-2751, SDR 23.5) OR PVC (A.S.T.M. D-2241, SDR 23.5 OR A.S.T.M. D-2466, SCH. 40) WITH JOINTS AS SPECIFIED IN NOTE #15. THE JOINT BETWEEN TWO DISSIMILAR SIZES OR TYPES OF BUILDING LEAD PIPE SHALL BE MADE WITH A PROPER SIZE FERNCO DONUT, OR APPROVED EQUAL, WITH POLYVINYL JOINT SEALER. A RUBBER BOOT WITH CLAMPS IS NOT ACCEPTABLE.

6. ALL SEWER PIPE SHALL BE INSTALLED IN CLASS "C" BEDDING OR BETTER, IN CONFORMANCE WITH THE DETAILS PROVIDED.

7. ALL NEW MANHOLES SHALL HAVE WATER AND SEWER DEPARTMENT APPROVED FLEXIBLE, WATER-TIGHT SEALS WHERE PIPES PASS THROUGH WALLS. MANHOLES SHALL BE PRECAST REINFORCED CONCRETE IN ACCORDANCE WITH ASTM C478 CURRENT SPECIFICATIONS. PRECAST MANHOLE JOINTS AND GASKETS SHALL BE MODIFIED TONGUE AND GROOVE IN ACCORDANCE WITH ASTM C361 CURRENT SPECIFICATIONS. PRECAST MANHOLE CONE SECTIONS SHALL BE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT APPROVED MODIFIED ECCENTRIC CONE TYPE. ALL MANHOLES SHALL BE PROVIDED WITH BOLTED, WATER-TIGHT COVERS. MANHOLE STEPS SHALL NORMALLY BE PROVIDED ON A BACK WALL OF THE MANHOLE FURTHEST FROM TRAFFIC.

8. AT THE CONNECTIONS TO MANHOLES, SEWERS OR EXTENSIONS THERETO, DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 18 INCHES. THE DROP CONNECTIONS WILL BE INTERIOR TYPE AS APPROVED BY THE WATER AND SEWER DEPARTMENT. THE USE OF EXTERIOR TYPE DROP CONNECTIONS WILL BE BASED UPON MANHOLE SIZE, GROUND WATER AND SOIL CONDITIONS AT THE LOCATION WHERE THE TAP WILL BE PERFORMED.

9. EXISTING PRE-CAST CONCRETE MANHOLES SHALL BE TAPPED WITH THE "KOR-N-SEAL" METHOD FOR SEWERS 6" THRU 15" IN DIAMETER. EXISTING BRICK AND MANHOLE TAPS FOR 18" DIAMETER SEWERS AND LARGER WILL HAVE HOLES DRILLED AT 4 INCHES CENTER TO CENTER AROUND THE PERIPHERY OF THE OPENING TO CREATE A PLANE OF WEAKNESS BEFORE BREAKING OUT THE SECTION. NON-SHRINK GROUT SHALL BE USED TO SEAL THE OPENING AND A CONCRETE COLLAR SHALL BE POURED 12 INCHES AROUND THE PIPE AND EXTEND 12 INCHES BEYOND THE OPENING.

10. NEW MANHOLES CONSTRUCTED DIRECTLY ON CITY OF EASTPOINT SANITARY SEWER SHALL BE PROVIDED WITH COVERS READING "CITY OF EASTPOINTE SANITARY SEWER" IN RAISED LETTERS. NEW MANHOLES BUILT OVER ANY EXISTING SANITARY SEWERS SHALL HAVE MONOLITHIC POURED BOTTOMS.

11. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.

12. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (1-800-482-7171) FOR THE LOCATION OF UNDERGROUND GAS AND CABLE FACILITIES AND SHALL ALSO NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK.

    THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR THE PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL COSTS FOR LOCATING, REMOVING AND REPLACING OR RELOCATING THESE UTILITIES SHALL BE INCLUDED IN THE COST OF CONSTRUCTING THE SANITARY SEWER. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL. THE CONTRACTOR SHALL VERIFY THE DEPTH AND HORIZONTAL LOCATION OF ALL EXISTING UTILITIES BEFORE ANY WORK IS STARTED. THE EXACT LOCATION OF EXISTING UTILITIES SHALL BE DETERMINED BY HAND DIGGING.

13. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING SANITARY SEWER, WATER OR STORM SEWER SERVICE CONNECTIONS DURING CONSTRUCTION. ANY ADJUSTMENTS OR REPAIRS TO THESE SERVICES SHALL BE MADE BY THE CONTRACTOR AND THE COST SHALL BE INCLUDED IN THE COST FOR CONSTRUCTING THE SANITARY SEWER, UNLESS OTHERWISE PROVIDED IN THE CONTRACT.

14. THE CONTRACTOR IS REQUIRED TO CONTACT THE INSPECTION SECTION OF DETROIT WATER AND SEWERAGE DEPARTMENT AT 833-4682, THREE WORKING DAYS PRIOR TO START OF ANY SANITARY SEWER CONSTRUCTION.

15. SEWER PIPE MATERIAL:

    1. 8" THROUGH 15" PIPE SHALL BE SOLID WALL PRESSURE RATED P.V.C., S.D.R. 21 MIN. CONFORMING TO ASTM SPECIFICATION D-2241 CONCRETE PIPE SHALL BE REINFORCED CIRCULAR PIPE CONFORMING TO SPECIFICATION C-76 -WALL C WITH SIZE AND CLASS INDICATED ON THE PLANS.
       JOINTS IN P.V.C. SHALL BE GASKETED OR SOLVENT CEMENT JOINTS (A.S.T.M. SPEC. D-2680)
       JOINTS IN CONCRETE PIPE SHALL BE MODIFIED TONGUE AND GROOVE, CONFORMING TO A.S.T.M. C-361

    2. 18" AND LARGER PIPE SHALL BE REINFORCED CONCRETE CIRCULAR SEWER PIPE CONFORMING TO THE CURRENT ASTM SPECIFICATION C-76 (WALL C) WITH SIZE AND CLASS AS INDICATED ON THE PLANS. ALL REINFORCED CONCRETE SEWER PIPE SHALL BE CAST WITH REINFORCING STEEL EXTENDING INTO THE SPIGOTS. ALL JOINTS AND GASKETS SHALL BE MODIFIED TONGUE AND GROOVE, CONFORMING WITH THE REQUIREMENTS OF ASTM (C 361).

    3. DUCTILE IRON PIPE-DOUBLE CEMENT LINED CLASS 54 PER ANSI A21.51 AND A21.4. JOINTS AND GASKETS SHALL BE PUSH-ON TYPE PER ANSI A21.11 (TYTON, BELL, TITE, FAST TITE OR APPROVED EQUAL).

16. IN INDUSTRIAL AREAS, PRIVATE SERVICE CONNECTIONS MADE TO THE SERVICE LEAD MUST HAVE AN ACCESSIBLE SAMPLING AND MONITORING MANHOLE. THE MANHOLE SHALL BE LOCATED ON PRIVATE PROPERTY AT A LOCATION APPROVED BY THE CITY OF EASTPOINTE WATER AND SEWER DEPARTMENT. VITRIFIED PIPE MAY NOT BE USED.

17. BUILDING LEAD CONNECTIONS SHALL BE MADE WITH 6" WYES FOR A.B.S. AND P.V.C. PIPE AND 6" TEES FOR CONCRETE PIPE. WYES FOR ABS AND P.V.C. PIPE SHALL BE FACTORY FABRICATED (NOT EXTRUDED) AND SHALL BE CHECKED FOR IRREGULARITIES WHICH COULD AFFECT THE DEFLECTION TEST PRIOR TO INSTALLATION.

18. A CITY, MACOMB COUNTY ROAD COMMISSION, AND/OR MICHIGAN DEPARTMENT OF TRANSPORTATION PERMIT IS REQUIRED FOR ALL CONSTRUCTION WITHIN THEIR ROAD RIGHT-OF-WAYS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SECURE ALL PERMITS AND BONDS PRIOR TO CONSTRUCTION, OR INSURE THAT ALL REQUIRED PERMITS AND BONDS HAVE BEEN OBTAINED PRIOR TO CONSTRUCTION.

19. THE CONTRACTOR SHALL ABIDE BY ALL THE REQUIREMENTS OF THE ROAD RIGHT-OF-WAY OWNER REGARDING CONSTRUCTION OF WATER AND SEWER MAINS, MAINTAINING TRAFFIC, BARRICADING, BORING, BACKFILL AND RESTORATION.

20. NO WASTE EXCAVATION MATERIAL SHALL BE DISPOSED OF BY PLACING IT IN ANY FLOODPLAIN OR WET LAND OF THE STATE UNLESS APPROPRIATE PERMITS HAVE BEEN ISSUED. THE CONTRACTOR OR PROPERTY OWNER MUST OBTAIN LOCAL FILL PERMITS FOR ANY MATERIALS DEPOSITED UPON LANDS WITHIN ANY CITY, VILLAGE OR TOWNSHIP.

21. THE CONTRACTOR SHALL FURNISH A DETAILED PLAN TO THE MACOMB COUNTY DEPARTMENT OF PUBLIC WORKS AND OBTAIN A SOIL EROSION CONTROL PERMIT UNDER THE ACT 347 PRIOR TO MAKING ANY EARTH CHANGES.

22. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL FURNISH MATERIAL CERTIFICATES TO THE OWNER VERIFYING THAT ALL THE MATERIALS USED ON THE PROJECT ARE IN ACCORDANCE WITH THE SPECIFICATIONS.

23. IF AN EXISTING GRAVEL ROAD IS DISTURBED BY CONSTRUCTION EQUIPMENT OR BY STOCKPILING OF MATERIALS OUTSIDE THE EXCAVATION AREA, A MINIMUM OF 8" OF 23A GRAVEL SHALL BE USED TO REPLACE THE DISTURBED AREAS.

24. ALL CONSTRUCTION CHANGES MUST HAVE WRITTEN APPROVAL OF THE PROJECT ENGINEER.

25. THE CONTRACTOR SHALL BE REQUIRED TO COMPLETE ALL WORK IN AN EXPEDITIOUS MANNER AND SHALL NOT STOP CONSTRUCTION EXCEPT FOR REASONS BEYOND HIS CONTROL SUCH AS, BUT NOT LIMITED TO STRIKES, WEATHER AND UNAVAILABILITY OF MATERIALS.

26. THE CONTRACTOR SHALL PROVIDE A .001 YEAR MAINTENANCE AND GUARANTEE BOND TO THE CITY, DATED FROM THE TIME OF FINAL ACCEPTANCE BY THE CITY.

27. THE CONTRACTOR SHALL HAVE THE OPTION OF STARTING CONSTRUCTION AT THE FIRST MANHOLE UPSTREAM OF THE POINT OF CONNECTION TO THE EXISTING SYSTEM. A TEMPORARY TEST MANHOLE MAY BE USED NEAR THE POINT OF CONNECTION RATHER THAN A PERMANENT ONE, AND THE CONTRACTOR MAY LEAVE THE BASE OF THE TEMPORARY MANHOLE IN PLACE. LINES UP TO 400 FEET IN LENGTH (TOTAL LENGTH OF EXTENSION) MAY BE TESTED WITHOUT PLACEMENT OF THE MANHOLE BASE PROVIDED THE LINES ARE TESTED AND PUT IN SERVICE IMMEDIATELY FOLLOWING CONSTRUCTION.

28. THE ENTIRE PROJECT AREA OF PUBLICLY FUNDED PROJECTS, AND ALL AREAS NOT UNDER THE OWNERSHIP OF ANY PRIVATE DEVELOPER FOR PRIVATELY FUNDED PROJECTS, SHALL BE VIDEO TAPED IN COLOR PRIOR TO THE START OF CONSTRUCTION. THE TAPE SHALL BE UTILIZED BY THE TOWNSHIP TO DETERMINE CONSTRUCTION RELATED DAMAGE AND TO ASSURE ADEQUATE RESTORATION. THE TAPE SHALL BE STANDARD 1/2" VHS FORMAT.

29. ALL PRECAST MANHOLES, SLAB BASES AND CONCRETE PIPE SHALL BE MANUFACTURED WITH TYPE II, IP OR IIA CEMENT. ALL CONCRETE FOR CHANNELIZATION SHALL BE MADE WITH TYPE II, IP OR IIA CEMENT.

30. ALL TERMINAL MANHOLES AND ANY INTERMEDIATE MANHOLES WHERE FUTURE DROP CONNECTIONS ARE A POTENTIAL SHALL BE 1 FOOT LARGER IN DIAMETER THAN WOULD OTHERWISE BE REQUIRED, AND SHALL BE NO SMALLER THAN 5 FEET IN DIAMETER.

31. DUCTILE IRON PIPE SHALL BE USED FOR THE SANITARY SEWER AT ALL WATER MAIN AND SANITARY SEWER CROSSINGS WITH LESS THAN 2 (TWO) FEET OF VERTICAL CLEARANCE AND WHERE THE WATER MAIN CROSSES BELOW THE SEWER, REGARDLESS OF VERTICAL CLEARANCE DISTANCE. THE DUCTILE IRON PIPE SHALL BE OF EQUAL SIZE (OR LARGER) AS THE PROPOSED SEWER AND SHALL EXTEND FROM MANHOLE TO MANHOLE.

32. TRENCH DETAIL "A" (T.D.-A) - BACKFILL TO A POINT 12" ABOVE THE PIPE SHALL BE AS SPECIFIED ON THE PLANS. THE REMAINDER OF THE BACKFILL SHALL BE MADE WITH SUITABLE EXCAVATED MATERIAL (EXCLUDING BLUE CLAY) PLACED IN ONE-FOOT LAYERS WITH EACH LAYER BEING THOROUGHLY COMPACTED BY APPROVED MECHANICAL METHODS, OR OTHER EFFECTIVE MEANS HAVING THE APPROVAL OF THE ENGINEER, TO A DENSITY EQUIVALENT TO THE UNDISTURBED ADJACENT SOIL, OR 90% OF MAX. UNIT WEIGHT, WHICHEVER IS GREATER.
    WHEN TRENCH DETAIL "A" IS SPECIFIED, THERE WILL BE NO ADDITIONAL COMPENSATION FOR SAND BACKFILL. ALL AREAS OF SUCH TRENCH DETAIL "A" SHALL BE SURFACED WITH GRAVEL, STONE, PAVEMENT OR TOPSOIL IN ACCORDANCE WITH THE REQUIREMENTS OF RESTORATION (SEE NOTE 23).

33. TRENCH DETAIL "B" (T.D.-B) - BACKFILL TO A POINT 12" ABOVE THE PIPE SHALL BE AS SPECIFIED ON THE PLANS. THE REMAINDER OF ALL TRENCHES UNDER PUBLIC ROADWAYS AND WITHIN THAT AREA BELOW A LINE PROJECTED AT A 1 ON 1 SLOPE DOWN AND AWAY FROM A POINT 3 FEET OUTSIDE OF THE BACK OF CURB, EDGE OF PAVEMENT OR EDGE OF SHOULDER AREA, OR AS SPECIFIED ON THE PLANS, SHALL BE BACKFILLED WITH BANKRUN SAND MEETING THE REQUIREMENTS OF POROUS MATERIAL, MDOT SEC. 8.02.05, CLASS II, AND IS TO BE COMPACTED TO 95% MAX. UNIT WEIGHT. WHEN TRENCH DETAIL B IS IN A DITCH OR TURF AREA, IT SHALL BE SURFACED WITH 2" TO 12" OF ORGANIC CLAY MATERIAL AND WITH 3" OF TOPSOIL. ALL OTHER AREAS OF TRENCH DETAIL B SHALL BE SURFACED WITH GRAVEL, STONE OR PAVEMENT IN ACCORDANCE WITH THE REQUIREMENTS OF RESTORATION (SEE NOTE 23).

34. THE END OF A SANITARY LEAD SHALL BE CONSTRUCTED TO A MINIMUM DEPTH OF 8 1/2 FEET OR 9 1/2 FEET MAXIMUM BELOW THE PROPOSED GRADE AS SHOWN ON THE BUILDING LEAD DETAIL. THE LEAD LOCATION SHALL BE MARKED AS SHOWN IN THE DETAIL.

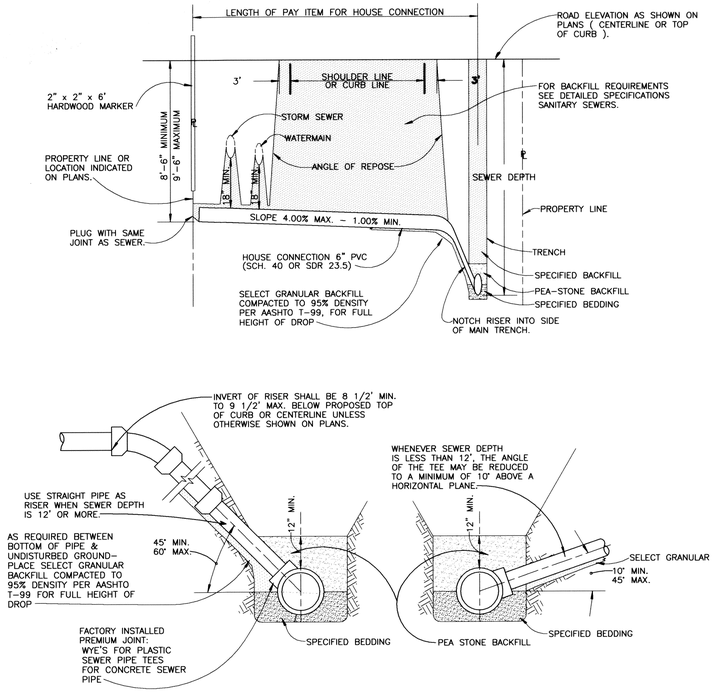
35. THE VERTICAL TOLERANCE FOR SANITARY MANHOLE RIM GRADES ARE AS FOLLOWS:

    A) IN RIGHT OF WAY 0.00 FEET TO +0.25 FEET

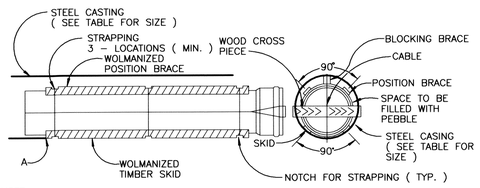
    B) NOT IN RIGHT OF WAY +0.25 FEET

36. MANHOLE STEPS SHALL BE FACTORY INSTALLED AT 16 INCHES CENTER TO CENTER SPACING. STEPS SHALL BE M.A. INDUSTRIES P.S.I. POLYPROPYLENE MSU #360 ALU POLY (OR APPROVED EQUAL).

37. THE CONTRACTOR IS REQUIRED TO CONTACT THE OFFICE OF THE MACOMB COUNTY PUBLIC WORKS COMMISSIONER AT 469-5325 , 48 HRS. BEFORE CONSTRUCTION.



SANITARY SEWER HOUSE/ BUILDING CONNECTION



NOTE:
THE ENDS OF THE CASTING SHALL BE SEALED AFTER THE SEWER IS INSTALLED THROUGH THE CASTING

PIPE SIZE	RECOMMENDED MINIMUM CASTING DIAMETER	MINIMUM WALL THICKNESS
6"	12"	.375
8"	16"	.375
10"	18"	.375
12"	20"	.375
15"	24"	.406
18" & 21"	36"	.532
24"	42"	.563
27" & 30"	48"	.625
36"	54"	.688
42"	60"	.750
48"	66"	.813

STEEL CASING REQUIREMENTS

CITY OF EASTPOINTE

STANDARD SANITARY SEWER DETAILS (2 OF 2)

SUPERINTENDENT OF WATER AND SEWER DEPARTMENT

APPROVED BY : Greg Brown GREG BROWN DATE : 2/14/2006

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586•726•1234 Fax 586•726•8780

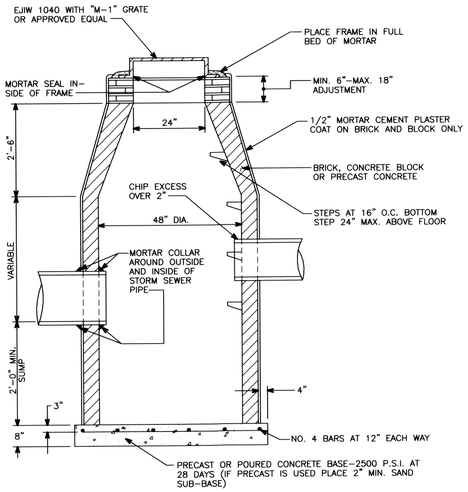
PROJECT NO.		SHEET NO.
DATE	JULY 2004	C
DRAWN BY KJP/KAO	CHECKED BY SVP	

STATE OF MICHIGAN STEPHEN V. PANGORI ENGINEER No. 37769 LICENSED PROFESSIONAL ENGINEER

STEPHEN V. PANGORI, P.E. NO. 37769

REVISIONS	DATE	REMARKS
	7-13-93	ADD NOTE NO. 39

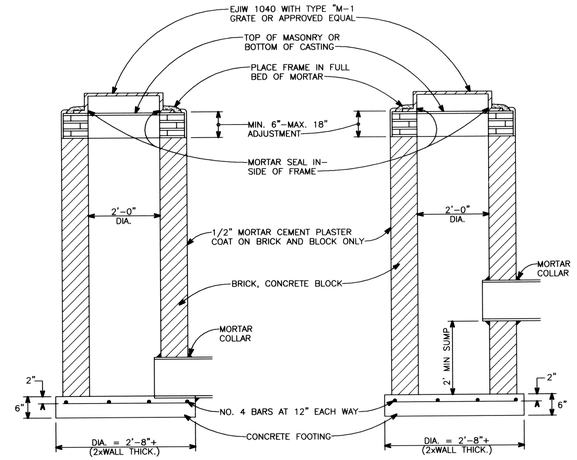
G:\COMMUNITIES\EASTPOINTE\STD_DETS\EP_SDET2.DWG, Model, 8/19/2004 11:28:41 AM, HP DesignJet 1050C by HP pc3, 1:1



SPECIAL CATCH BASIN NOTES:

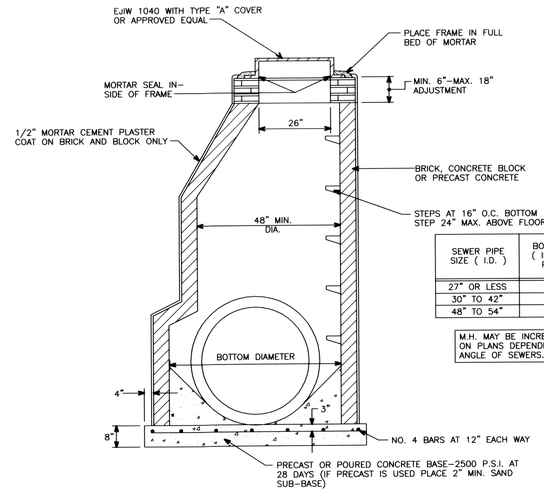
1. DIAMETER OF "YARD" CATCH BASIN MAY BE REDUCED TO 36" PROVIDED THERE IS ONE (1) PIPE IN THE STRUCTURE AND THE DISTANCE TO THE OUTLET MANHOLE IS LESS THAN 150'.
2. CATCH BASINS MUST DISCHARGE INTO MANHOLES AND NOT INTO OTHER CATCH BASINS, EXCEPT:
   A. WHERE CATCH BASIN IS A "YARD" TYPE WITH NOT MORE THAN THREE (3) CATCH BASINS DISCHARGING INTO IT.
   B. WHERE CATCH BASIN IS A "PAVEMENT TYPE" DISCHARGING INTO ANOTHER CATCH BASIN LOCATED WITHIN 75 FEET.

4 FT. DIAMETER CATCH BASIN



2 FT. DIAMETER INLET

2 FT. DIAMETER CATCH BASIN



SEWER PIPE SIZE (I.D.)	BOTTOM DIA. (IF NOT ON PLANS)
27" OR LESS	48"
30" TO 42"	60"
48" TO 54"	72"

M.H. MAY BE INCREASED ON PLANS DEPENDING ON ANGLE OF SEWERS.

STORM SEWER MANHOLE "A"

STORM SEWER NOTES

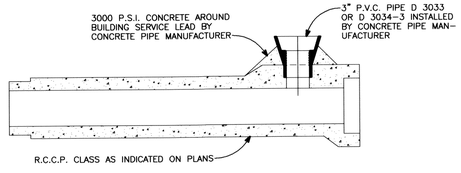
1. AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL GIVE NOTIFICATION OF HIS INTENTION TO BEGIN CONSTRUCTION TO THE CITY OF EASTPOINTE ENGINEERING DEPARTMENT, THE MACOMB COUNTY PUBLIC WORKS COMMISSION OR THE ROAD COMMISSION OF MACOMB COUNTY WHEN INSPECTIONS ARE NEEDED BY THAT AGENCY.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST HAVE IN HIS POSSESSION A COPY OF A VALID PERMIT TO CONSTRUCT A CONNECTION TO, OR AN EXTENSION OF, THE STORM WATER DRAINAGE SYSTEM, FROM REQUIRED AGENCY ON THE JOB AT ALL TIMES OF CONSTRUCTION.
3. THE CONTRACTOR SHALL SECURE PERMITS FROM THE MACOMB COUNTY PUBLIC WORKS COMMISSION FOR ALL TAPS AND CROSSINGS OF COUNTY DRAINS AND SHALL PAY THE COSTS OF SAID PERMITS AND THE COST OF ANY INSPECTION CHARGES BY THAT AGENCY FOR WORK DONE UNDER THE PERMITS.
4. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (1-800-482-7171) FOR LOCATION OF UNDERGROUND FACILITIES, AND SHALL ALSO NOTIFY REPRESENTATIVES OF ANY OTHER FACILITIES, LOCATED IN THE VICINITY OF THE WORK, WHICH MAY NOT BE HANDLED BY MISS DIG.
5. ALL STORM WATER DRAINAGE SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, COUNTY ROAD COMMISSION AND/OR COUNTY PUBLIC WORKS COMMISSION AS APPLICABLE.
6. ALL REINFORCED CONCRETE SEWER PIPE SHALL CONFORM TO ASTM SPECIFICATION C76 WITH CLASS DESIGNATION ON PLANS.
7. UNLESS OTHERWISE INDICATED ON THE PLANS, ALL STORM SEWER JOINTS SHALL BE TONGUE AND GROOVE WITH BITUMINOUS COMPOUND JOINT FILLER MATERIAL.
8. UNLESS OTHERWISE INDICATED ON THE PLANS, ALL STORM SEWER BEDDING SHALL BE STANDARD BEDDING.
9. ALL WYES AND BUILDING SERVICE CONNECTIONS SHALL BE 3" POLY VINYL CHLORIDE (PVC) SEWER PIPE D3033 OR D3034-3.
10. ALL STORM SEWER WYE OPENINGS SHALL BE FACTORY INSTALLED EXCEPT WHEN USING ABS TRUSS PIPE FOR SUMP PUMP DISCHARGE OUTLET.
11. UNLESS OTHERWISE NOTED ON THE PLANS, STRUCTURE FRAME AND COVERS SHALL BE AS FOLLOWS:

    MANHOLE
    E.J.I.W. 1010 FRAME, TYPE B, PERFORATED COVER WITH SEWER INSCRIBED IN RAISED LETTERS.

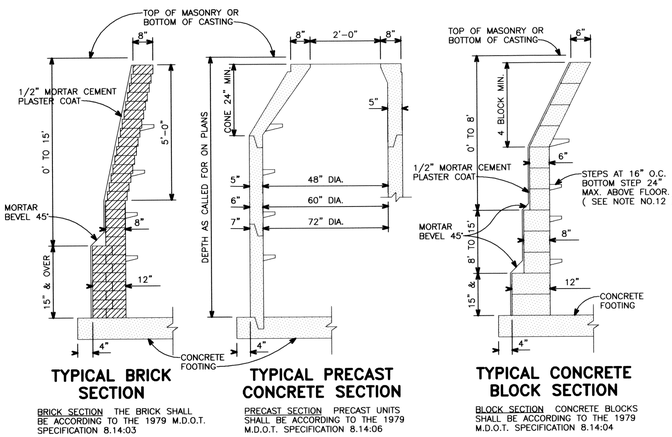
    CATCH BASIN OR INLET (PAVEMENT TYPE)
    E.J.I.W. 5105 OR NEENAH R-3036 WITH SINUSOIDAL GRATE (MDSH COVER D4) E.J.I.W. 7045M WITH SINUSOIDAL GRATE FOR ROADWAY.

    CATCH BASIN (YARD TYPE)
    E.J.I.W. 1045 OR NEENAH R-2579 WITH OVAL GRATE HAVING A RISE ABOVE THE FRAME OF 2 1/2".

12. STEPS TO BE INSTALLED DURING MANHOLE SECTION MANUFACTURE. STEPS MUST BE E.J.I.W. NO. 8503 M.A. INDUSTRIES P.S.I. POLYPROPYLENE OR APPROVED EQUAL.



STANDARD WYE DETAIL IN CONCRETE PIPE FOR SUMP PUMP CONNECTION



TYPICAL BRICK SECTION

BRICK SECTION THE BRICK SHALL BE ACCORDING TO THE 1979 M.D.O.T. SPECIFICATION 8.14:03

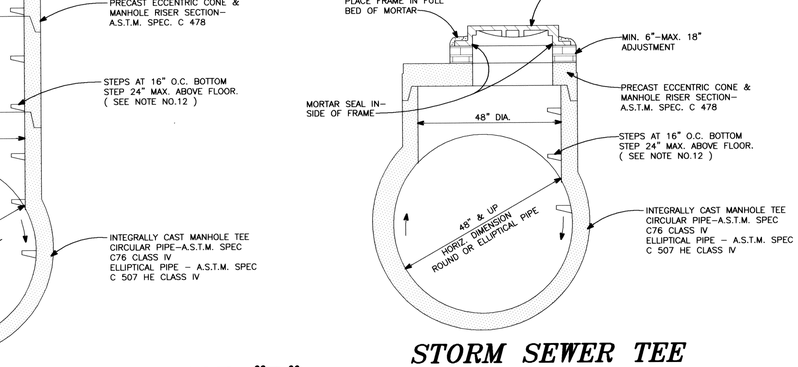
TYPICAL PRECAST CONCRETE SECTION

PRECAST SECTION PRECAST UNITS SHALL BE ACCORDING TO THE 1979 M.D.O.T. SPECIFICATION 8.14:06

TYPICAL CONCRETE BLOCK SECTION

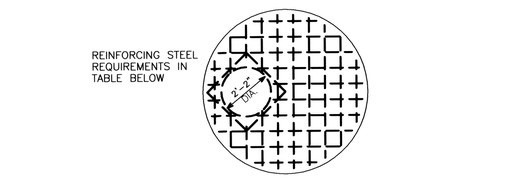
BLOCK SECTION CONCRETE BLOCKS SHALL BE ACCORDING TO THE 1979 M.D.O.T. SPECIFICATION 8.14:04

TYPICAL WALL SECTIONS FOR ALL DRAINAGE STRUCTURES

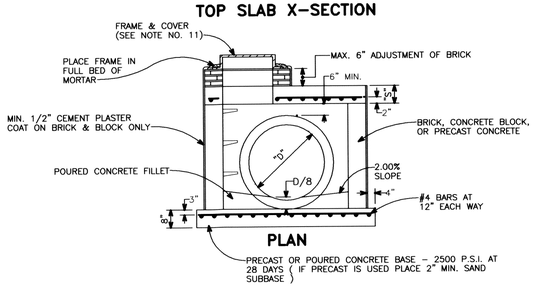


STORM SEWER TEE MANHOLE "B"

STORM SEWER TEE MANHOLE "B" WITH FLAT SLAB



TOP SLAB X-SECTION



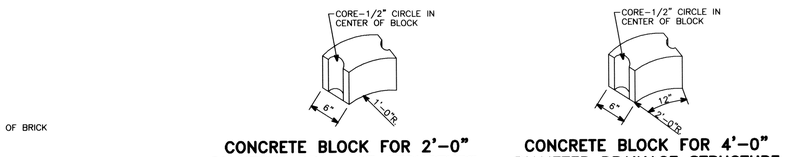
PLAN

OUTLET "D"	M.H. I.D. #	TOP SLAB "S"	REINFORCING STEEL (T.S.)
27" OR LESS	4	9"	3/4" @ 9" EA. WAY
42"	5	10"	3/4" @ 9" EA. WAY
48"-54"	6	11"	7/8" @ 9" EA. WAY
	7	12"	1" @ 9" EA. WAY
	8	12"	1" @ 9" EA. WAY

* DIAMETER OF MANHOLE SHALL BE INCRESED AS SHOWN ON THE PLANS DEPENDING ON THE ANGLE OF SEWERS

STORM SEWER MANHOLE "A"

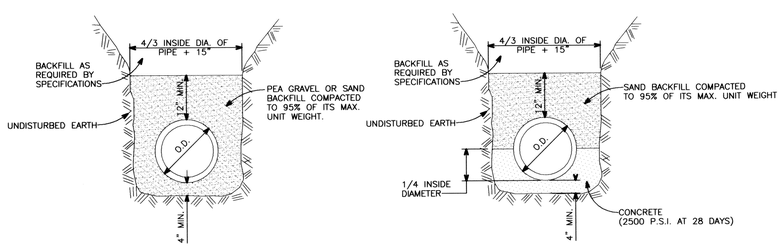
WITH FLAT SLAB TOP



CONCRETE BLOCK FOR 2'-0" DIAMETER DRAINAGE STRUCTURE

CONCRETE BLOCK FOR 4'-0" DIAMETER DRAINAGE STRUCTURE

CONCRETE BLOCKS



STANDARD BEDDING

CONCRETE BEDDING

CITY OF EASTPOINTE STORM SEWER DETAILS

SUPERINTENDENT OF WATER AND SEWER DEPARTMENT

APPROVED BY : GREG BROWN DATE : 2/14/2006

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586•726•1234 Fax 586•726•8780

PROJECT NO.		SHEET NO.
DATE	JULY 2004	D
DRAWN BY	CHECKED BY	
K.J.P.	SVP	

STATE OF MICHIGAN STEPHEN V. PANGORI ENGINEER No. 37769 REGISTERED PROFESSIONAL ENGINEER

STEPHEN V. PANGORI, P.E. NO. 37769

REVISIONS DATE REMARKS

REVISIONS DATE REMARKS

REVISIONS DATE REMARKS

G:\COMMUNITIES\EASTPOINTE\STD_DETS\Ep_stdet.dwg, Model, 8/18/2004 11:27:35 AM, HP Designjet 1050C by HP pc3.1:1