



ORDINANCE NO. 07-09

NORTHERN MORAIN WASTEWATER RECLAMATION DISTRICT REVIEW/ CONSTRUCTION/ ACCEPTANCE/MAINTENANCE PROCEDURES, AND STANDARD SPECIFICATIONS AND DESIGN REQUIREMENTS

PART 1 CONSTRUCTION/ACCEPTANCE/MAINTENANCE PERIOD PROCEDURES

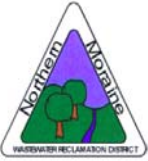
Section 1 – General

- 1.1 The basic design standards for connections and improvements to the public sanitary sewer system hereby incorporated by reference are:
 - A. “Standard Specifications for Water and Sewer Main Construction In Illinois”, latest edition, Illinois Society of Professional Engineers, etal, (Referenced as SSWSMC),
 - B. Title 35 Illinois Administrative Code, Subtitle C: Water Pollution, Chapter II: Environmental Protection Agency, Part 370: Illinois Recommended Standards for Sewage Works (IRSSW),
 - C. “Standard Specifications for Road and Bridge Construction”, latest edition, Illinois Department of Transportation (SSRBC).
- 1.2 The abovementioned documents are modified by specific requirements of the District as set forth below. In case of conflict, the more conservative of the two shall govern.
- 1.3 The requirements of the District set forth below are not intended to be all-inclusive, but rather to highlight more significant items.
- 1.4 The District reserves the right to establish or modify requirements, that are deemed appropriate, in the opinion of the District, or its authorized agent, as needed, on a case by case basis.
- 1.5 Other requirements of the District may be found in various ordinances relating to Sewer User Charges/Connection Fees, Installation, Operation and Enforcement of Regulations.
- 1.6 All sanitary sewers shall be extended to the furthest point of the property, or to a location specified by the District, or its authorized agent.
- 1.7 Applicant shall not propose developments with street names that duplicate existing names within the District Facility Planning Area.

Section 2 – General Procedure

Pre-Construction

- 2.1 Prior to the start of construction Applicant shall be responsible for providing a financial guarantee to the Northern Moraine Wastewater Reclamation District (the District). The guarantee shall be a Letter of Credit, Cashier’s Check or cash in an amount not less than 125% of the Engineer’s Opinion of Probable Construction Cost and in a format acceptable to the District. The guarantee shall be accompanied by the Engineer’s Opinion of Probable



Construction Cost including a breakdown of each individual sanitary sewer item and identified by the proposed quantity and the corresponding unit price.

2.2 Applicant shall provide the District with three copies of approved Final Engineering Plans and Specifications, which shall be signed and sealed by an Illinois Registered Professional Engineer.

2.3 The Applicant shall provide the NMWRD with an approved plat prior to execution of the IEPA permits applications.

2.4 Applicant shall provide the District with one copy of a signed and executed copy of the recorded final plat or dedicated easement or documentation indicating that a prior recording of an easement or dedicated right of way prior to the start of construction.

2.5 A preconstruction meeting shall be held prior to the approval to start construction. At this meeting Applicant and Contractor shall be responsible for providing the District with the following information:

- A. A valid IEPA Construction Permit. At no time will Applicant be permitted to start the construction of sanitary sewer or related improvements without a valid IEPA Permit. Verbal confirmations or "Construction at Risk" will not be permitted.
- B. Three (3) copies of the approved Engineering Plans and Specifications.
- C. Contact Information for the General Contractor including 24-hour emergency phone numbers.
- D. Projected Construction Schedule, including contingencies.
- E. An approved Letter of Credit, or other form of performance security, as approved by the District.
- F. Original Certificate of Insurance naming the District, its authorized agent(s) and representative(s) as primary and non-contributory insured. Insurance shall be in accordance with the following requirements:
 - 1. Liability Insurance: The limits of liability for the liability insurance required shall provide coverages for not less than the following amounts or greater where required by law and coverages shall be as follows:
 - a. Workers Compensation and Occupational Diseases Insurance
 - i. Statutory amount for the State of Illinois.
 - b. General Liability Insurance
 - i. Bodily injury, with limits of not less than \$1,000,000 each occurrence/\$2,000,000 aggregate.
 - ii. Property damage, with limits of not less than \$1,000,000 each occurrence/\$2,000,000 aggregate.
 - iii. Contractual insurance - broad form, with limits of not less than \$1,000,000 each occurrence/\$2,000,000 aggregate.
 - c. Automotive Liability Insurance
 - i. Bodily injury, with limits of not less than \$1,000,000 each occurrence/\$2,000,000 aggregate.
 - ii. Property damage, with limits of not less than \$1,000,000 each occurrence/\$2,000,000 aggregate.



- iii. Umbrella or excess liability coverage of \$5,000,000 or \$3,000,000 per occurrence and in the aggregate.
- iv. To the extent of Contractor's indemnification liability herein, the Contractor shall include the District and its authorized agent(s), their partners, officers, agents and employees as insured to the extent of Contractor's indemnification herein on General Liability, Automotive Liability and Excess Liability insurance policies. The insurance coverage shall be written with insurance companies acceptable to the District. All insurance premiums shall be paid without cost to the District. The Contractor shall furnish the District with a Certificate of Insurance attesting to the respective insurance coverage for the full contract term. The Contractor shall submit satisfactory proof of insurance simultaneously with the execution of this supplement
- v. The District shall receive written notice of cancellation or reduction in coverage of any insurance policy thirty (30) days prior to the effective date of cancellation or education.
- vi. Provided that the Contractor maintains a financial rating of 5A2, as issued by Dunn and Bradstreet, Inc., at all times during the term of the Supplement, the Contractor may utilize a plan of self-insurance certified by the Department of Insurance, State of Illinois and the Illinois Industrial Commission for the minimum coverages required above, provided that the Contractor maintains said limits at all times during the supplement period and retains a current and viable certificate of self insurance from the State of Illinois and immediately provides a copy of said Certificate to the District.
- vii. All insurance provided to the District shall be primary and non-contributory with any insurance or self-insurance program maintained by the District.

2. Property Insurance

- a. Property insurance to the full insurable value of the work will be provided by the Contractor.
- b. Such coverage shall be written on an "All Risk" Completed Value form.
- c. The deductible under this policy shall be the responsibility of the Contractor.
- d. The Named Insured shall include the District and its authorized agent(s). They should be named as additionally and non-contributory.

Section 3 – General Procedure Construction

- 3.1 Applicant shall be responsible for bearing the cost of having a full time representative from the District, or its authorized agent at the jobsite as required by the District.
- 3.2 Applicant shall be responsible for providing the District, or its authorized agent, with a minimum of 48 hours notice prior to the start of construction.
- 3.3 The District, or its authorized agent, shall be present during all sanitary sewer construction. In the event that work is completed without proper notification, the District has the right to fail, or not accept, the aforementioned improvements.



3.4 Any changes or modifications to the approved final engineering plans shall be issued through the design engineer in writing.

Section 4 –Testing Procedures

- 4.1 Any deficiencies noted by the District, or its authorized agent shall be corrected.
- 4.2 Applicant shall be responsible for the completion of air testing all sanitary sewer lines. This shall be done in accordance with the procedure outlined in Section 31-1.11C (3) of Standard Specifications for Water and Sewer Main Construction in Illinois, latest edition.
- 4.3 All sanitary force mains shall be pressure tested in accordance with Section 41-2.13 of Standard Specifications for Water and Sewer Main Construction in Illinois, latest edition. The pressure shall be 150% of the maximum expected operating pressure. A seal on the discharge end shall be completed through the use of a mechanical plug at the receiving manhole.
- 4.4 After a period of thirty days following the completion of the sanitary sewer installation, Applicant shall be responsible for cleaning, televising and mandrel testing all sanitary sewer mains. Applicant shall notify the District a minimum of 48 hours prior to testing. A representative from the District shall be present at all times during testing.
- 4.5 All sanitary manholes shall be vacuum tested in accordance with ASTM C1244 prior to placing into service.
- 4.6 Applicant shall furnish the District with one copy of the videotape for review. In the event that a deficiency is noted, Applicant shall be responsible for correcting this deficiency and retesting the failed section.

Section 5 –Acceptance Procedure

- 5.1 At no time will lateral or service connections to the sanitary sewer be permitted prior to a letter of “Approval for Use” issued by the District, or its authorized agent. Approval of use consists of the applicant completing the following tasks within this section.
- 5.2 Any manholes or sanitary sewer structures lying outside of pavement or areas that have been restored including seed and or sod shall be protected with the use of construction fence. Each manhole or structure shall have a 5' by 5' barrier of construction fence centered around the structure. This shall maintained by the applicant until the adjacent area has been restored to its final condition.
- 5.3 Applicant shall provide the District with a financial guarantee in an amount not less than 20% of the Original Letter of Credit amount. Please refer to the financial guarantee ordinance for allowable reduction procedures. In addition, the Applicant shall provide the District with retained personnel fees of not less than \$1,000 plus \$100 for every manhole and low pressure sanitary sewer grinder pump and \$2,000 for any lift station. In the event that existing retained personnel fees exceed the calculated amount, the District will return these fees, with the exception of the remaining calculated amount that will be used for costs associated with completing the final closeout procedures occurring at the expiration of the maintenance period.



SUMMARY OF SANITARY SEWER SERVICES

House No	Street	Street Direction	Lot No.	Subdivision	Community	Downstream MH ID	Upstream MH ID	Service (Y) Location ¹	Easement Data	Stub Length	Stub Depth at End	Pipe Size	Pipe Material	Tax ID (PIN)
1010	Elm Street	N	14	Big House Estates	Island Lake	C8NE94	C8NE95	125'	Front	55'	7'	6"	PVC	09-21-318-020
<h1>Sample</h1>														

¹ Distance (in LF) from downstream manhole.



5.4 The District reserves the right to increase the amount of the financial guarantee and retained personnel fee in the event that the District deems the improvements are considered “high risk” areas. The District will quantify the required additional amount, in a correspondence distributed to Applicant, identifying the locations of the “high risk” improvements.

5.5 In the event that a deficiency is impeding the operation of the sanitary sewer improvements or negatively impacting the existing sanitary sewer, the District reserves the right to utilize the funds within the financial guarantee to remedy the situation. Funds may be spent on the following items (including but not limited to) the purchase of material, labor costs directly associated with the repair and replacement of the deficiency, construction inspection and observation costs, and material and labor costs resulting from the hiring of third parties to complete the necessary work.

5.6 Applicant shall provide the District with Record (As-Built) Drawings, signed and sealed by a professional engineer. Drawings and electronic files shall include, at a minimum, the following information:

Hard Copies (2 Copies)

- Horizontal and Vertical locations of all sanitary sewer improvements.
- Horizontal Control shall be provided on State Plane Coordinates (Illinois East).
- Vertical Control in accordance with USGS NAD 83.
- Both Proposed and As-Built lengths and slopes of all sewer main.
- Locations of all tees and wyes identified by their distance to an adjacent downstream manhole.
- Modification of easements, right of ways or property limits.
- Material Substitutions.
- Each individual plan sheet shall show a “Summary of Sanitary Sewer Services” in tabular form, showing (at a minimum) in order, the following information (see example on next page):
 - House Number and Lot Number and Tax ID (PIN) for Property Served
 - Name of Subdivision and Local Community
 - Upstream and Downstream Manhole Number (ID Number)
 - Distance from Downstream Manhole to Service Y (in LF)
 - Summary of easement data (if applicable)
 - Sanitary Service Sewer Stub Length (in LF)
 - Stub Depth at End of Sanitary Service Sewer (in FT)
 - Sanitary Service Sewer Size (in IN-DIA) and Material (ASTM/AWWA)

Electronic Files (1 copy)

- Electronic files shall be in one of the following formats:
 - Microstation DGN file
 - AutoCad 2000 DWG
 - DXF File



Section 6 –Maintenance Period Closure Procedures

- 6.1 After a minimum period of three years all sanitary sewer improvements located within the right of way, dedicated easements or District owned land shall be turned over to the District. Prior to the expiration of the Maintenance Period, the following steps must be completed with all costs associated with the tasks borne by the Applicant. These improvements shall be completed a minimum of thirty (30) days but no more than ninety (90) days prior to expiration of the maintenance period.
- a. A punchlist inspection completed by the District, or its authorized agent.
 - b. All items within the punchlist shall be completed by Applicant and reinspected and approved by the District, or its authorized agent.
 - c. Sanitary sewer manholes and lines shall be cleaned and televised.
 - d. Applicant shall be responsible for providing the District with a televised inspection of all sanitary sewer lines.
- 6.2 Notice from District:
- a. In the event that Applicant does not initiate maintenance period closure procedures within sixty (60) days of the expiration of the three year maintenance period, the District shall notify the Applicant via registered mail.
 - b. The Applicant shall then be required to complete these procedures within thirty (30) days, unless additional time is granted by the District.
- 6.3 In the event that all necessary items are not completed within (30) days prior to the time of expiration the District may draw upon the Letter of Credit to complete the remaining items stated previously.



PART 2 STANDARD SPECIFICATIONS AND DESIGN REQUIREMENTS

Unless superseded by the following design standards, all sanitary infrastructure improvements are to be constructed and installed in full accordance with "Recommended Standards for Water and Sewer Main Construction in Illinois (RSWSMC)", Current Edition as published by the Illinois Society of Professional Engineers. All contractors working on sanitary sewer components within the NMWRD jurisdiction are required to maintain a copy of RSWSMC on site at all times.

Section 1 –Sewer Mains

1.1 Materials

A. Ductile-Iron Pipe and Fittings:

1. Pipe: DIP pipe shall conform to ANSI/AWWA C150/A21.50. Pressure rating shall be based on the diameter and depth of bury and, using a "Type 5" Laying Condition, must conform with the requirements of Table 4 (Rated Working Pressure and Maximum Depth of Cover) of "Design of Ductile Iron Pipe" as published by the Ductile Iron Pipe Research Association (latest version).
 - a. Ductile Iron Pipe shall be manufactured in accordance with the latest revision of ANSI/AWWA C151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.
 - b. Pipe shall have a standard asphaltic coating on the exterior and, unless otherwise approved by the District, shall be lined with a ceramic quartz filled, amine cured, novalac epoxy (Protecto 401 or equal), 40 mil thickness (nominal).
 - c. The class or nominal thickness, net weight without lining and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, country where cast, year produced and the letters "DI" or "DUCTILE" shall be cast or stamped on the pipe.
2. Joints: All pipe shall be furnished with push-on type joints in accordance with ANSI/AWWA C111/A21.11 complete with all necessary accessories.
3. Fittings: Ductile iron fittings shall conform to the latest revision of either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Fittings and accessories shall be furnished with mechanical type joints in accordance with ANSI/AWWA C111/A21.11, latest revision.

B. Polyvinyl Chloride (PVC) Pipe and Fittings:

1. Pipe:
 - a. Up to 20' of Bury: PVC pipe shall conform to ASTM D2241, Type PSM for sizes 4" to 15" and ASTM F679 for sizes 18" to 36". Standard Dimension Ratio (SDR = Average OD ÷ Min. Wall Thickness) shall be indicated on the plans and shall be no greater than 26.
 - b. 20' to 30' of Bury: PVC pipe shall conform to AWWA C900/C905, depending on diameter. Dimension Ratio (DR = Average OD ÷ Min. Wall Thickness) shall be indicated on the plans and shall be no greater than 21.
 - c. All piping shall bear the National Sanitation Foundation (NSF) seal of approval and shall be visibly marked with the appropriate design standard and specific SDR (DR) number.
2. Joints: All pipe shall be furnished with elastomeric push-on type joints in accordance with ASTM F477 and shall be pressure rated in accordance with ASTM D3139.
3. Fittings: PVC fittings shall be of the same material as the pipe and shall be rated



- C. High Density Polyethylene Sewer Pipe (HDPE):
1. HDPE shall be SDR 11 or as approved by the District
 2. Cell classification of PE345464C or greater Per ASTM D3350
 3. The use of HDPE and all fittings will be approved by the District on a case-by-case basis.
 4. All HDPE welds shall be certified through the use of a datalogger.
 5. Install two (2) 12 gauge stranded copper wires, suitable for direct bury, directly over the installed line. Bury depth shall be between 18" and 24" deep, with both ends terminated as directed by the District, or its authorized agent.
- D. Fiberglass (FRP) Pipe and Fittings
1. Pipe: Up to 30' of Bury: FRP pipe shall be in complete conformance with ASTM D3262 and shall have a stiffness number of no less than SN 72.
 - a. The Pipe shall be manufactured using a continuous advancing mandrel process utilizing continuous glass fiber reinforcements in the circumferential direction. Both continuous glass fiber rovings and chopped roving will be incorporated for high hoop strength and axial reinforcement. A sand fortifier shall be used to provide increased stiffness with placement near the neutral axis in the core.
 - b. The pipe shall meet the following cell limits: Type 1, Glass-fiber-reinforced thermosetting polyester resin mortar (RPMP polyester), Liner 1, Grade 1; pipe stiffness as specified on plans.
 - c. Diameters: The outside diameter of pipe shall be per the ASTM D3262-Table 3.
 - d. Lengths: Pipe shall be supplied in nominal lengths of 10, 20 or 40 feet. Actual lay length shall be nominal ± 1 inch. Special short lengths may be used where surface geography or installation conditions require shorter lengths.
 - e. Wall Thickness: The average wall thickness of the pipe shall not be less than the nominal wall thickness published in the manufacturer's literature, and the minimum wall thickness at any point shall not be less than 87.5% of the nominal wall thickness.
 - f. End Squareness: All points around each end of a pipe unit shall fall within $\pm 1/4$ inch or $\pm 0.5\%$ of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.
 2. Standard Joints/Couplings: Unless being installed in a casing pipe, all pipe shall be field connected with glass reinforced plastic sleeve couplings that utilize elastomeric sealing gaskets as the sole means to maintain joint water tightness. The couplings shall be manufactured using the same process as the pipe. The joints shall utilize elastomeric sealing gaskets meeting the performance requirements of ASTM D4161.
 3. Restrained Joints/Couplings: All pipe installed within casing pipe shall be connected with a fiber glass reinforced sleeve/coupling utilizing a double bell with elastomeric sealing gaskets as the sole means to maintain joint water-tightness and locking rods to transfer axial thrust from one pipe section to another. On each side, the coupling bell shall have a standard rubber gasket and a rod-groove system, through which the load is transferred via compressive and shear action. The pipe spigot shall have a matching rod-groove. The joint shall meet the performance requirements of ASTM D4161.
 4. Fittings: All fittings shall be fabricated from pipe meeting the requirements of these standards.
 5. Testing
 - a. Pipes: Pipe shall be manufactured in accordance with ASTM D3262.
 - b. Joints: Joints shall meet the requirements of ASTM D4161.
 - c. Stiffness: Stiffness shall be tested in accordance with the test method of ASTM D2412. One pipe shall be tested every 100 lengths of each type, grade, and size pipe produced.
 - d. Chemical Resistance: Pipe shall meet or exceed the requirements of ASTM D3262 when tested in accordance with ASTM D3681.



E. Couplings:

1. Provide non-shear flexible rubber couplings with adjustable stainless steel bands for connecting new pipe to existing sewer pipe and for repairing sewer pipe.
 - a. Acceptable products: Non-shear couplings by DFW Plastics/Hefco Plastics, Inc.

1.2 Construction Standards

- A. Sanitary sewer installations shall not commence until mass grading has been completed.
- B. All pipe shall be inspected and approved by the District, or its authorized agent, prior to installation.
- C. All sanitary sewers shall be visually inspected and approved by the District, or its authorized agent, prior to backfill.
- D. A minimum cover of 5 feet above top of pipe shall be provided where the pipe crosses beneath paved areas (such as streets and driveways) and a minimum cover of 3.5 feet in unpaved areas.
- E. Pipe shall be laid at a constant slope on a straight line from manhole to manhole. Curvilinear sanitary sewers and sanitary sewer mains with deflected pipes or joints are prohibited.
- F. All changes in pipe material, class, size, slope, and direction shall be made at a manhole unless approved by the District, or its authorized agent.
- G. All sanitary sewers shall be constructed with the use of a pipe laser.

Section 2 – Sanitary Sewer Services

2.1 Materials

- A. All sanitary sewer services shall be Schedule 40 PVC in accordance with ASTM D1785 and D2665 with a minimum inside diameter of four-inches (4") with glued joints
- B. Provide non-shear flexible rubber couplings with adjustable stainless steel bands for connecting new pipe to existing sewer pipe and for repairing sewer pipe.
 1. Acceptable products: Non-shear couplings by DFW Plastics/Hefco Plastics.

2.2 Construction Standards

- A. Sanitary sewer services shall be installed at a minimum slope of 1% (1/8" per foot) for 6" diameter services or 2% (1/4" per foot) for 4" diameter services. Sanitary services not meeting the minimum slope, if approved, may be required to include additional cleanouts at locations designated by the District, or its authorized agent,
- B. Place the building sewer pipe/service on a layer of sand conforming to IDOT gradation FA 6. Crushed stone and pea gravel are prohibited. Provide a minimum thickness of four (4) inches under the pipe barrel and two (2) inches under bells. Carefully place and compact around the pipe to provide uniform support to the bottom quadrant. Backfill PVC plastic pipe with bedding material to one (1) foot above top of pipe and compact it per the direction of the District, or its authorized agent,



- C. Mark the location of the building service with an “S” stamped on the curb face.
- D. Utilize wye fittings for connecting to PVC interceptors less than 20 feet deep. Utilize wye saddles, in the direction of flow, for connecting to PVC interceptors that are more than 20 feet deep. Use tee fittings when connecting to ductile iron interceptors.
- E. A cleanout shall be provided at the exterior of each building at grade and be placed between five and ten feet from the exterior wall of the structure.
 - 1. Cleanouts shall be placed every 50’ on sanitary sewer services or as required by the District, or its authorized agent,

Section 3 – Force Mains

3.1 Ductile-Iron Pipe and Fittings

- A. Pipe: DIP pipe shall only be used with approval from the NMWRD and conform to ANSI/AWWA C150/A21.50 for a minimum 150 psi (or project requirements, whichever is greater) rated working pressure plus a 100 psi surge allowance (or project surge requirements, whichever is greater) and shall include a 2:1 safety factor based on the sum of these two pressures; Type 4 laying condition and the applicable depth of bury.
 - 1. Ductile Iron Pipe shall be manufactured in accordance with the latest revision of ANSI/AWWA C151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.
 - 2. Pipe shall have a standard asphaltic coating on the exterior and a cement-mortar lining on the interior in accordance with ANSI/AWWA C104/A21.4, latest revision.
 - 3. The class or nominal thickness, net weight without lining and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer’s mark, country where cast, year produced and the letters “DI” of “DUCTILE” shall be cast or stamped on the pipe.
- B. Restrained Joints: Restrained joints for pipe sections shall be provided by the use of boltless, push-on restrained devices. When restrained joints require factory welding, the manufacturer shall qualify all welding procedures and welders used to produce the product per the requirements of a documented quality assurance system based on ANSI/AWS D11.2.
 - 1. Unless otherwise specified, gasket material shall be standard styrene butadiene copolymer (SBR). Restrained joints and restrained joint pipe shall be rated for the specified pressure rating of the pipe. Torque-activated restrained joint devices shall not be used.
 - 2. The required length of restrained pipe at all fittings, valves, plugs, etc... shall be per plan or in accordance with “Thrust Restraint Design for Ductile Iron Pipe”, Current Edition, by the Ductile Iron Pipe Research Association (DIPRA).
 - a. Variables for calculating restrained length of pipe shall be calculated using the following variables:
 - i. Laying Condition: Type 5.
 - ii. Soil Designation: Cohesive-Granular.
 - iii. Depth of Cover: As indicated on plans.
 - iv. Design Pressure: As indicated on plans.
 - v. Safety Factor: 1.50.
- C. Push-On Joints: Except where restrained joints are required, all pipes shall be furnished with push-on type joints in accordance with ANSI/AWWA C111/A21.11, complete with all necessary accessories.



- D. Fittings: Ductile iron fittings shall conform to the latest revision of either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Fittings and accessories shall be furnished with mechanical type joints in accordance with ANSI/AWWA C111/A21.11, latest revision. Fittings shall have a cement-mortar lining on the interior in accordance with ANSI/AWWA C104/A21.4, latest revision.
1. Mechanical joint restraint for all fittings shall be made by installing a MEGALUG Series 1100 Restraint System as manufactured by EBBA Iron Sales, Inc., or equal.
 - a. Use A-304 stainless steel fasteners.
 2. Restraint devices for nominal pipe sizes 3" through 24" shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
 - a. The devices shall have a working pressure rating of 350 psi for 3" through 16" and 250 psi for 18" to 24".
 - b. Ratings are for forcemain pressure and must include a minimum safety factor of 2:1 in all sizes.
- E. Polyethylene Encasement: Where soil conditions require corrosion control, or when required by the District, or its authorized agent, polyethylene encasement shall be provided in accordance with ANSI/AWWA C105/A21.5, latest revision and installed per manufacturer's specifications.
1. Thickness: Not less than 8 mils.

3.2 Poly-Vinyl Chloride (PVC) Pipe and Fittings

- A. Pipe: PVC pipe shall conform to AWWA C900 or AWWA C905, depending on diameter. DR selection shall be in accordance with "PVC Force Main Design" as published by Uni-Bell PVC Pipe Association, UNI-TR-6-97, latest revision. At no time will a DR with a long term pressure rating = 160 psi (DR 21) be approved.
1. Calculations justifying the selected DR based on the proposed system design pressure shall be submitted to the District, or its authorized agent, for approval.
- B. Restrained Joints
1. Gasketed Couplings
 - a. Gasketed restrained coupling connections shall join two sections of factory grooved PVC (C900/C905) pipe. The restrainer coupling or must not be directionally sensitive.
 - b. Couplings shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F-477 and shall be DR-14 Class 200 C-900 PVC in all applications, meeting or exceeding the performance requirements of AWWA C-900, latest revision.
 - i. The inside face or contact surface of the coupling connection shall be of sufficient width to incorporate a factory machined non-directionally sensitive groove in both pipe and coupling to grip the outside circumference of the pipe.
 - ii. Couplings shall provide full (360 degrees) contact and maintain pipe roundness and avoid and localized points of stress.
 - iii. Couplings shall be designed with an internal stop to align the precision-machined grooves in the coupling and pipe prior to installation of a non-metallic thermoplastic restraint spleen, and will provide full non-directionally sensitive restraint at the rated pressures.
 - c. High-strength flexible thermoplastic spleens shall be inserted into mating precision – machined grooves in the pipe and coupling to provide full non-directional restraint with evenly distributed loading.



- d. The non-metallic restrained joint pipe and couplings for PVC C-900 type non-directionally sensitive restrainer system shall be capable of a test pressure twice the maximum sustained working pressure listed in Section D and be for PVC (C900) pipe sizes four through twelve inch.
 - e. Non-metallic restrained joint pipe and couplings for PVC C-900 restrained systems sizes four through twelve inches shall be capable of use for both Class 150 (DR 18) and four through eight inches for Class 200 (DR 14) PVC C900 pipe.
 - f. The non-metallic restrained joint pipe and couplings for PVC C-900 restraint system shall consist of a pipe and couplings system produced by the same manufacturer meeting the performance qualifications of Factory Mutual (FM) and Underwriters Lab (UL).
2. Bell Restraint Harnesses
- a. Mechanical joint restraint shall be made by installing either a MEGALUG Series 1500 Bell Restraint Harness (for all C-900 pipe) or a MEGALUG Series 2800 Bell Restraint Harness (for all C-905 pipe) as manufactured by EBBA Iron Sales, Inc., or equal.
 - i. Use A-304 stainless steel fasteners.
- C. Push-On Joints: Except where restrained joints are required, all pipe shall be furnished with push-on type joints in accordance with ASTM D3139, complete with all necessary accessories.
- D. Fittings: Fittings shall be fabricated from PVC in accordance with AWWA C900 or C905, depending on diameter, or shall be molded PVC in accordance with AWWA C907.
1. Mechanical joint restraint for all PVC fittings shall be made by installing a MEGALUG Series 2500 Restraint Harness as manufactured by EBBA Iron Sales, Inc., or equal.
 - a. Use A-304 stainless steel fasteners.
 2. The required length of restrained pipe at all fittings, valves, plugs, etc... shall be per plan or in accordance with "Thrust Restraint Design for Ductile Iron Pipe", Current Edition, by the Ductile Iron Pipe Research Association (DIPRA).
 - a. Variables for calculating restrained length of pipe shall be calculated using the following variables:
 - i. Laying Condition: Type 5.
 - ii. Soil Designation: Cohesive-Granular.
 - iii. Depth of Cover: As indicated on plans.
 - iv. Design Pressure: As indicated on plans.
 - v. Safety Factor: 1.50.

3.3 High Density Polyethylene Pipe and Fittings

- A. Pipe: Polyethylene compounds utilized in the manufacture of products furnished under this section shall be listed in PPI TR-4, have a grade of PE34 with a minimum cell classification of PE 345464 (C, D, or E) for PE3408 materials, as defined in ASTM D3350. In conformance with AWWA C901, AWWA C906, or CSA B137.1, they shall have a PPI recommended Hydrostatic Design Basis (HDB) of 1600 psi (PE3408) at a temperature of 73.4° F.
1. All materials which come in contact with water, including lubricants, shall be evaluated, tested and certified for conformance with NSF/ANSI Standard 61, if required by the production standard or requested by the end user.
 2. Clean re-work material of the same type grade, and cell classification generated from the manufacturer's own pipe and fitting production may be used by the same manufacturer as long as the pipe, tubing and fittings produced meet all the requirements of AWWA C901, AWWA C906, or CSA B137.1.
 3. Pipe and tubing furnished under this specification shall be manufactured using compounds complying with the requirements above. Dimensional and performance



characteristics shall conform to the requirements of AWWA C901, AWWA C906, or CSA B137.1.

4. Pipe, tubing and fittings shall be homogeneous throughout, and free of visible cracks, holes, foreign inclusions, blisters, dents, or other injurious defects. The pipe, tubing, and fittings shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.
5. The Pressure Class of the PE pipe and PE fittings shall be specified on the basis of the Working Pressure Rating of the water system as defined in AWWA C906. Recurring positive pressure surges of up to one half of the pipe's nominal pressure class and occasional pressure surges of up to 100% of the pipe's nominal pressure class may be ignored due to the fatigue endurance of the polyethylene materials.
6. The pipe's dimension ratio and working pressure rating (WPR) shall be as specified by the project design engineer. Design calculations justifying both shall be submitted to the District, or its authorized agent, for approval.

B. Fused Joints

1. Polyethylene pipe shall be joined together by the method of thermal butt fusion in complete conformance with ASTM D2657 – Heat Joining Polyolefin Pipe and Fittings.
2. Butt fusion joining of pipe and fittings shall be performed in accordance with the procedures recommended by the manufacturer.
 - a. Unless otherwise indicated by the manufacturer, the temperature of the heater plate shall be between 400° F and 450° F.
3. Polyethylene pipe may be adapted to fittings or other systems by means of an assembly consisting of a polyethylene stub end, butt fused to the pipe, a backup flange of ductile iron, made to Class 150, ANSI B16.1/B16.5 dimensional standards with exceptions, bolts of compatible material and a gasket of suitable neoprene, red rubber or non-asbestos rubber compound cut to fit the joint. In all cases the bolts shall be drawn up evenly and in line.
4. Polyethylene pipes of same outside diameter but different wall thicknesses shall be joined by means of a flange assembly as designated above, or by thermal butt fusion.
5. Pipe supplier shall be consulted to obtain machinery and expertise for the joining by butt fusion of polyethylene pipe and fittings.
 - a. No pipe or fittings shall be joined by fusion by any contractor unless they are adequately trained and qualified in the techniques involved.

C. Fittings

1. Polyethylene fittings furnished under this specification shall be manufactured using compounds complying with the requirements of Section II above, and all appropriate requirements of AWWA C901, AWWA C906, or CSA B137.1.
2. Butt fusion fittings shall comply with ASTM D3261.
3. Fabricated fittings shall be designed to have a pressure rating equal to, or in excess of that of the pipe to which they will be joined.
4. Fittings shall be marked on the body or hub. Marking shall be in accordance with either ASTM D2683, ASTM D3261, AWWA C906 or ASTM F1055, depending on fitting type and the standard that applies.
5. Mechanical fittings shall be marked with size, body material designation code, pressure rating and manufacturer's name or trademark.

3.4 Tracing Wire: Install two (2) 12 gauge stranded copper wires, suitable for direct bury, directly over the installed line. Bury depth shall be between 18" and 24" deep with both ends terminated as directed by the District, or its authorized agent.



3.5 Construction Standards

- A. All pipe shall be inspected and approved by the District, or its authorized agent, prior to installation
- B. Depth and routing of the forcemain shall be verified at no greater than 50' intervals.
- C. Provide minimum cover of 5 feet above top of pipe where pipe crosses beneath paved areas such as streets and driveways and a minimum cover of 3.5 feet in unpaved areas.
- D. Where required, installation of polyethylene encasement shall be in accordance with "Polyethylene Encasement: Effective, Economical Protection for Ductile Iron Pipe in Corrosive Environments" as published by the Ductile Iron Pipe Research Association, latest revision.

Section 4 – Bedding and Backfill

4.1 Sewer Mains and Force Mains

- A. Following placement of pipe and inspection of joints, bedding and backfill shall be placed in complete conformance with Division II of "Standard Specifications for Water and Sewer Main Construction in Illinois, with the following exceptions.
 - 1. Granular pipe bedding and covering material shall be of a well graded mixture of washed gravel or stone aggregate, free of clay, loam, dirt, calcareous or other foreign matter, conforming to SSRBC, Gradation No. CA 7. Fine aggregates or coarse aggregates of any other gradation will not be allowed.
 - 2. Where a firm foundation is not encountered at the grade established due to soft, spongy or other unsuitable soil (as determined by the District or its authorized agent), all such unsuitable soil under the pipe and for the width of the trench shall be removed and replaced with well-compacted foundation. The gradation required for placement of the foundation shall be as determined in the field by the District, or its authorized agent.
 - 3. SSRBC, Gradation No. CA-7 bedding material at least four-inches (4") in depth below the pipe, shall be placed the entire width of the trench and for the length of pipe. Bedding is required for all pipe materials, be they rigid or flexible. Bedding for flexible pipe shall be placed and installed in complete conformance with ASTM D-2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications, a copy of which shall be on site at all times during construction.
 - 4. As soon as the condition of the pipe will permit, the entire width of the trench shall be backfilled with SSRBC, Gradation No. CA-7 to a height of at least the center of the pipe. The aggregate shall be placed longitudinally along the pipe and shall be at the same elevation on both sides of the pipe. Special care shall be taken to completely fill the space under the pipe haunches. The aggregate shall be placed in maximum eight-inch (8") lifts, loose measurement, and compacted by ramming or tamping.
 - 5. Initial backfill, conforming to SSRBC, Gradation No. CA-7, shall consist of backfill from the center of the pipe to twelve-inches (12") above the top of pipe. The filling of the trench shall be carried on simultaneously on both sides of the pipe in such a manner to not damage the pipe. The material in each layer shall be firmly compacted by ramming or tamping. The use of mechanical compaction equipment shall not be permitted until initial backfill has been placed to a minimum depth of 6" above the top of the pipe.
 - 6. Final backfill shall in conformance with local municipal requirements for the community in which the pipe is being installed. Where the installation of the pipe is under or within two-feet (2'-0") of pavement, final backfill shall conform to SSRBC. The filling of the trench



shall be carried on simultaneously on both sides of the pipe in such a manner to not damage the pipe. The material in each layer shall be firmly compacted by ramming or tamping.

Section 5 – Casing Pipes

5.1 Size

- A. Casing pipes shall be a minimum of 24” in diameter unless approved by the District, or its authorized agent.

5.2 Steel Casing Pipe

- A. Casing pipe shall have a minimum wall thickness of 1/2” and shall be steel, conforming to ASTM A-53, Type S, Grade B and shall have a 16 mil bituminous coating inside of and out. Thickness shall be as required to resist all loads including, but not limited to soil, structures, vehicle dead loads, as well as vehicle live loads and live load surcharges.

5.3 Carrier Pipe

A. Ductile-Iron Pipe

- 1. Pipe Material: ANSI/AWWA C150/A21.50.
- 2. Joint Material: Restrained per the performance requirements of ANSI/AWWA C111/A21.11.

B. Poly Vinyl Chloride (PVC) Pipe:

- 1. Pipe Material: Products delivered under this section shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900. The restrained joint pipe system shall also meet all short and long term pressure test requirements of AWWA C900.
 - a. Pipe and couplings shall be made from unplasticized PVC compounds having a minimum cell classification of 12454-B, as defined in ASTM D1784. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4°F, in accordance with the requirements of ASTM D2837.
 - b. Pipe shall be legibly and permanently marked in ink with the following minimum information:
 - i. Nominal size (for example, 4 In.)
 - ii. PVC Dimension ratio (for example, DR18)
 - iii. AWWA pressure class (for example, Class 150)
 - iv. AWWA designation number for this standard which is ANSI/AWWA C900-97 (or latest edition)
 - v. Manufacturer’s name or trademark and production record code
 - vi. Seal (mark) of the testing agency verifying the suitability of the pipe material for potable water service
- 2. Joints/Couplings: Pipe shall be joined using non-metallic couplings to form an integral system for maximum reliability and interchangeability. High-strength, flexible thermoplastic splines shall be inserted into mating, precision-machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading.
 - a. Couplings shall be designed for use at or above the rated pressures of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the leakage test requirements of ASTM D3139.



- b. Couplings shall be legibly and permanently marked in ink with the following minimum information:
 - i. Nominal size (for example, 4 In.)
 - ii. PVC
 - iii. AWWA pressure class (for example, Class 200)
 - iv. AWWA designation number for this standard which is ANSI/AWWA C900-97 (or latest edition)
 - v. Manufacturer's name or trademark
 - vi. Seal (mark) of the testing agency verifying the suitability of the pipe material for potable water service

C. Alternate carrier pipe/joint materials may be allowed by the District on a case-by-case basis.

5.4 Stainless Steel Casing Spacers

- A. Carrier pipe shall be centered within a casing by use of stainless steel casing spacers as shown on the plans. Center to center dimensions are to be per the detail provided.
 1. Acceptable Manufacturer: Cascade Waterworks Manufacturing. Co - Yorkville, Illinois – Model CCS, or acceptable alternative.
 2. Casing spacer shall be a two piece shell made from T-304 stainless steel of a minimum 14-gauge thickness, with a minimum of two spacers per section of pipe.
 3. Each shell section shall have one bolt flange formed with ribs for added strength and one hook and eye section for added shear strength.
 4. Pipe shall not be moved by inserting the forks of an end loader into the pipe. (One Bolt, Inc. fittings.)
 5. Each connecting flange shall have a minimum of three 5/16" T-304 stainless steel bolts.
 6. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edges of the shell and prevents slippage.
 7. Bearing surfaces (runners) shall be ultra high molecular weight polymer for abrasion resistance and a low coefficient of friction. The runners shall be attached to support structures (risers) at appropriate positions to properly support the carrier within the casing and to ease installations. The runners shall be attached mechanically by punched riser section and bolt heads TIG welded for strength.
 8. Riser shall be made of T-304 stainless steel of a minimum 10 gauge. All risers over 6" in height shall be reinforced and MIG welded to the shell.
 9. Centered positioning within the casing will require the risers and runners to be dimensioned to center the carrier pipe in the casing with a top clearance of one half-inch minimum.
 10. All welds and metal surfaces shall be chemically passivated.

5.5 Casing End Seals

- A. Ends of all casing pipes shall be sealed with a prefabricated end seal constructed from virgin SBR with T-305 stainless steel bands, Cascade Model CCESS with stainless steel bands or approved equal.
 1. The sealing of casing ends with brick and mortar will not be permitted.

5.6 Directional Drilling

- A. Prior to the start of work, Applicant shall prepare and submit for District's approval a detailed description of the Horizontal Drilling Plan, including materials and equipment, lateral reconnection and manhole restoration procedure and equipment, materials, bypass pumping system, plan of operation, schedule of work, etc...



- B. The alignment and elevation of the forward end of the pipe shall be checked at regular intervals as Work proceeds and appropriate measures immediately taken to correct any observed deviation. When the Contractor elects to jack a metal liner prior to installing the sanitary sewer, all earth and other foreign material shall be removed from inside the liner. The carried pipe sections shall be installed by jacking the sections through the liner.
- C. No more than 3" lateral and 1" vertical deviation from the proposed alignment shall be permitted in the position of the completed sewer pipe or at any point along the installation.

Section 6 – Sanitary Sewer Structures

6.1 Manholes

- A. Manholes shall be leak tight and may be constructed of precast or cast-in-place concrete and shall be constructed in complete conformance with Section 32 of SSWSMCI.
- B. All sanitary manholes shall be vacuum tested in accordance with ASTM C1244 prior to placing into service
- C. Precast Manholes:
 - 1. All components shall conform to the requirements of ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - 2. Provide precast reinforced concrete manhole sections, bottoms, and flat top slabs complying with ASTM C478 unless otherwise indicated on Drawings.
 - a. Exterior of all manhole sections, bottoms and flat top slabs shall be waterproof coated with coal tar epoxy bitumastic prior to shipment to the site.
 - 3. Unless otherwise approved by the District, or its authorized agent, all manhole structures shall be provided with an eccentric cone section.
 - a. When approved by the District, or its authorized agent, all flat top structures shall be designed for HS20 loadings.
 - 4. Precast reinforced concrete monolithic bases shall be provided for all new sanitary sewer installations. Provide separate base for existing sewer lines.
 - 5. Unless written permission has been granted by the District, or its authorized agent, provide precast invert and benches.
 - 6. Manhole sections shall be sealed with the use of Canusa wrap or approved bituminous sealing system.
 - 7. The NMWRD reserves the right to reject any structures deemed as defective or damaged.
 - 8. All structures shall be placed vertically. No deviations or leaning structures will be accepted.
- D. Steps
 - 1. Steps shall be provided on 16" centers, with a minimum width of 12" and a minimum projection of 5"
 - 2. Provide steps consisting of copolymer, polypropylene plastic with a continuous ½" steel reinforcement as manufactured by M.A. Industries, Inc., or approved equal.



E. Frames and Covers

1. Provide cast iron frames and covers with heavy duty, non-rocking type, indented top with solid self-sealing lids and machined bearing surfaces, stamped with the word "SANITARY".
 - a. Acceptable products: Neenah R-1713, East Jordan 1050 Extra Heavy Duty or equal.
2. Provide bolted and gasketed covers where directed by the District, or its authorized agent.
 - a. Acceptable products: Neenah R-1916-C, East Jordan 1058 WT or equal.

F. Adjustment of Frames and Covers

1. In paved areas: Adjust frame so that the top of the cover will be flush with the finished pavement using precast concrete adjusting rings. The total adjustment height shall not exceed 8" and shall be accomplished through a maximum of 2 rings. Use preformed bituminous plastic gaskets between frame, adjusting rings and manhole.

G. External/Internal Frame Seals

1. Provide frame seals consisting of a flexible rubber sleeve and stainless steel compression bands.
2. Use internal frame seal in paved areas.
3. Use an external frame seal in unpaved areas.
4. Acceptable manufacturer: Cretex Specialty Products, or approved equal.

H. Flexible Pipe Connectors

1. Boot design, installation and materials shall meet the requirements of ASTM C923. Flexible material shall consist of natural or synthetic rubber.
2. Base sections shall be cast with integral flexible rubber pipe gasket for connecting pipe to the manhole.
3. Mechanical fastening systems shall be corrosion resistant and meet the requirements of ASTM A48 or A536.
4. Acceptable Manufacturers:
 - a. For pipe 24" and smaller in diameter, use PSX Manhole Connector by Press-Seal Gasket Corporation, or equal.
 - b. For pipe 27" and larger in diameter, use Z-LOK gasket by A-LOK Products, Inc., or equal.

I. Manhole Drop Connection

1. Use ASTM D2241 (SDR 26) PVC pipe for 8" to 12" diameter drops.
 - a. Drops shall be cast with the precast manhole sections and cast vertically and parallel to the outside of the manhole.
 - b. Encase entire drop pipe and elbow from base of manhole to 6" above top of incoming sewer with 4000 psi concrete at a minimum thickness of 6".
2. Use ANSI/AWWA C150/A21.50 DIP for drops larger than 12" in diameter.
 - a. Drops shall be constructed vertically and parallel to the outside of the manhole.
 - b. Encase drop elbow and DIP drop pipe entering elbow to a height of 24" above the upper flange of the elbow in concrete.
 - c. Utilize ductile iron restrained joint pipe and fittings for drop elbow, pipe, and ductile iron tee at incoming sewer.
 - d. Support drop pipe to manhole wall with stainless steel brackets and strapping where drops are over 10 feet long.
3. PVC drops 12-inch diameter and greater, with totally encased in concrete, may be utilized if approved by the Engineer.



J. Connections to Existing Sewers

- a. At locations where a sanitary sewer is proposed on an existing line, the manhole shall be placed by utilizing the following procedure.
 - i. Existing pipes shall be cut smooth approximately 5' from the outside of the proposed manhole.
 - ii. Lengths of identical pipe shall be fitted with non-shear couplings and then attached to the manhole using booted connections.
- b. Dog housing or placing structures directly over the existing lines is not permitted unless specifically approved by the NMWRD for mainline connections.

Section 7 – Force Main Valves

7.1 Valves

- A. Provide valves furnished by a manufacturer considered standard by the District, or its authorized agent.
- B. Eccentric Plug Valves
 1. Acceptable Manufacturers:
 - a. Clow Valve Company – Oskaloosa, Iowa.
 - b. DeZurik Water Controls – Sartell, Minnesota.
 - c. Val Matic – Elmhurst, Illinois.
 - d. Requests for substitutions shall be considered by the District on a case-by-case basis.
 2. Fabrication:
 - a. Valves shall be on the tight closing, resilient faced, non-lubricating variety and shall be of eccentric design such that the valves pressure member (plug) rises off the body seat contact area immediately upon shaft rotation during movement.
 - b. Valves shall be drop-tight rated pressure (175 psi through 12", 150 psi 14" and above) and shall be satisfactory for applications involving throttling service as well as frequent or infrequent on-off service. The valve-closing member should rotate approximately 90 degrees from the full open to full-close position and vice-versa.
 - c. The valve body shall be constructed of cast iron (semi-steel) conforming to ASTM A126, Class B. Body ends shall be as indicated in the Valve Schedule and shall conform to the following standards:
 - d. Flanged with dimensions, facing, and drilling in full conformance with A-ANSI B16.1, Class 125. This includes flange thickness.
 - e. Mechanical Joint to meet the requirements of AWWA C111/ANSI A21.11.
 - f. Grooved ends to meet the requirements of AWWA C606.
 - g. Eccentric Plug Valves shall have a rectangular or round shaped port. Port areas for 3"-20" valves shall be a minimum 80% of full pipe area.
 - h. Valve seat surface shall be welded-in overlay, cylindrically shaped of not less than 90% pure nickel. Seat area shall be a minimum of 0.125" thick and 0.500" wide.
 - i. The valve plug shall be constructed of cast iron (semi-steel) conforming to ASTM A126, Class B. The plug shall have a cylindrical seating surface that is offset from the center of the plug shafts. The plug shafts shall be integral. The plug shall be coated with Buna-N, Chloroprene elastomer in all valve sizes. The Rubber to metal bond must withstand 75 lbs. Pull under test procedure ASTM D429-73 Method B.
 - j. Shaft bearings, upper and lower, shall be sleeve type metal bearings, sintered, oil impregnated, and permanently lubricated type 316 stainless steel conforming to ASTM A743 Grade CF-8M. Thrust bearings shall be Nylatron or PTFE.



- k. Plug valve shaft seals shall be on the multiple V-ring type (Chevron) and shall be adjustable. All packing shall be replaceable without removing the bonnet or actuator and while the valve is in service. Shaft seals shall be made of Buna N.
- l. Each valve shall be given a test against the seat at full rated working pressure and a hydrostatic test at twice the rated working pressure. Certified copies of individual tests shall be submitted when requested. Certified copies of proof-of-design tests shall be submitted upon request.
- m. Manual valves shall have lever or worm gear type actuators with handwheels, 2" square nuts, or chainwheels attached. Lever actuators shall be furnished on valves 6" and smaller where the maximum unseating pressure is less than 25 psig. Worm gear type actuators shall be furnished on all 4" or larger valves where the maximum unseating pressure is 25 psig or more. Extended bonnets and worm gears shall be provided on all buried valves. Bonnets shall be extended so that the associated handwheel is at an elevation of 42" above finished grade.

C. C. Swing Check Valves

- 1. Acceptable Manufacturers:
 - a. G. A. Industries – Cranberry Township, Pennsylvania – Model Figure 220DS.
 - b. Mueller – Decatur, Illinois.
 - c. Waterous – South St. Paul, Minnesota.
 - d. Requests for substitutions shall be considered by the District on a case-by-case basis.
- 2. Fabrication
 - a. The valve shall exceed the minimum requirements of AWWA C508 with a heavy duty body of high-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 250, suitable for horizontal or vertical installation.
 - b. The valve body shall be the full waterway type, designed to provide a net flow area not less than the nominal inlet pipe size when swung open no more than 25 degrees. The valve shall have a replaceable stainless steel body seat, a cast iron disc faced with a renewable resilient seat ring of rubber or other suitable material and held in place by stainless steel screws.
 - c. The disc arm shall be ductile iron or steel, suspended from and keyed to an austenitic stainless steel shaft which is completely above the waterway and supported at each end by heavy bronze bushings. The shaft shall rotate freely without the need for external lubrication. The shaft shall be sealed where it passes through the body by means of a stuffing box and adjustable packing. Simple O-ring shaft seals are not acceptable.

D. Sewage Air Release Valves

- 1. Acceptable Manufacturers
 - a. Valve & Primer Corporation – Schaumburg, Illinois – APCO Model S-400.
 - b. Requests for substitutions shall be considered by the District on a case-by-case basis.
- 2. Provide 2-inch NPT inlet size, cast iron body and cover, stainless steel internal linkage, stem, and float, and Buna-N needle.
- 3. Provide shut-off, quarter-turn ball valves for inlet, back flushing and blow off lines.

7.2 Valve Vaults

A. Precast Structures



1. Provide precast reinforced concrete manhole sections, bottoms, and flat top slabs complying with ASTM C478 unless otherwise indicated on Drawings.
 2. Provide precast reinforced concrete monolithic base.
 3. Provide eccentric cone section for drain valve vaults and flat top for air release manhole unless otherwise indicated on the Drawings.
 - a. Design flat top structures for HS20 loading in accordance with ASTM C478.
 4. All structures shall be placed vertically. No deviations or leaning structures will be accepted.
 5. The NMWRD reserves the right to reject any structures deemed as defective or damaged.
- B. Concrete/Mortar
1. Provide 4000 psi concrete using Type I Portland Cement complying with ASTM C150.
 2. Mortar: Mix one part Portland Cement to three parts fine aggregate.
- C. Steps
1. Steps shall be provided on 16" centers, with a minimum width of 12" and a minimum projection of 5"
 2. Provide steps consisting of copolymer, polypropylene plastic with a continuous ½" steel reinforcement as manufactured by M.A. Industries, Inc., or approved equal.
- D. Frames and covers
1. Provide cast iron frames and covers with standard duty, indented top with solid self-sealing lids and machined bearing surfaces, stamped with the word "SANITARY".
 - a. Acceptable products: Neenah R-1713, East Jordan 1050 EXHD, or equal.
 2. Openings shall be placed directly above operating parts of interior equipment.
 3. Provide bolted and watertight frame and cover where indicated on the Drawings.
 - a. Acceptable products: Neenah R-1916-C, East Jordan 1058 WT, or equal.

Section 8 – Lift Stations

- 8.1 All lift stations shall be equipped with a brick and block, or similar type structure, capable of housing all controls and a natural gas generator, and providing sufficient space for future improvements as deemed necessary by the District, or its authorized agent. Any request for exception to this requirement shall be submitted to the District, in writing, with a narrative describing the difficulties and hardships associated with meeting this requirement.
- 8.2 At a minimum, provide a duplex submersible pump lift station, with a separate precast concrete wet well and valve vault. All lift stations with a total motor sizing in excess of 5 HP shall be designed with a permanently mounted standby natural gas generator within a protective enclosure. Lift stations where total motor sizing is less than 5 HP can be equipped with a portable, diesel powered generator of adequate size.
- A. Prefabricated steel lift stations are prohibited.
- 8.3 Three phase electric power is required at all lift stations unless otherwise approved by the NMWRD.
- 8.4 Lift Stations shall be constructed to permit the removal, replacement and maintenance of all equipment. The District will determine if adequate space has been provided within structures including but not limited to buildings, wet wells and valve vaults.
- 8.5 Submersible Sewage Pumps



- A. Provide submersible centrifugal sewage pumps having a maximum speed of 1750 rpm and capable of passing a 3½” diameter spherical solid.
 - 1. Acceptable manufacturers:
 - a. Flygt.
 - b. KJI Hydro.
 - B. Provide each pump with the following features:
 - 1. Cast iron case.
 - 2. Cast iron, non-clog impeller with replaceable brass or bronze wear ring.
 - 3. Stainless steel shaft and fasteners.
 - 4. Oil lubricated mechanical seals tandem mounted and seal failure sensor.
 - 5. Two rows of heavy-duty, permanently lubricated ball bearings to support the shaft and motor rotor and absorb thrust and radial loads.
 - 6. Discharge connection elbow.
 - 7. Auto flush valve
 - C. Provide explosion-proof, air or oil-filled motors suitable for continuous operation on 240/480 volts, 3-phase, 60 Hertz A.C.
 - 1. Provide all motors with overheat sensor(s) installed in the motor windings.
 - 2. Design motor to be non-overloading throughout the pump capacity-head curve.
 - D. Provide suitable length of extra hard usage, water resistant, 600 volt, UL listed and/or FM approved power cord and sensor cable(s) for each pump with leak-proof, torque free seal at cable entry to motor.
 - 1. Seal the motor power cord and sensor cable(s) to prevent moisture entry into the motor due to wicking or capillary action through the cable.
 - 2. Provide corrosion-resistant cable supporting devices.
- 8.6 For each lift station, furnish one spare pump of identical size and capacity to the ones used in that lift station ready for installation complete with lifting chain, power cable, rail guides and quick disconnect fitting.
- 8.7 Guide Rails
- A. Provide a two-rail guide system so that the entire pump and motor assembly can be easily removed from the pumping chamber without requiring removal of nuts, bolts or other mechanical fasteners. The guide rail system shall consist of the following:
 - 1. Stainless steel guide rails.
 - 2. Intermediate guide bar bracket if required.
 - 3. One full length 304 stainless steel lift chain.
 - 4. One forged “grip eye” of wrought alloy steel for use with a mechanical lifting device.
- 8.8 Construct all steel components within the wet well from type 304 stainless steel.
- 8.9 Provide a three valve system including riser pipe matching force main diameter and material.
- A. Terminate the riser inside the valve vault with a blind flange.
- 8.10 Provide access hatches with the following features:
- A. Prefabricated ¼” aluminum channel frame with anchor flange with a 1-1/2 inch pipe coupling for channel frame drainage.



- B. ¼” inch aluminum diamond pattern plate door leaf reinforced for a live load of 300 pounds per square foot.
 - C. Heavy forged brass hinges.
 - D. Stainless steel pins.
 - E. Tubular compression spring or heavy duty adjustable torsion spring operators.
 - F. Automatic hold-open arm with release handle.
 - G. Hatches shall be located directly above the mechanical improvements within the structure or at a location approved by the District.
 - H. Positive spring loaded snap lock with fixed inside turn handle.
 - I. Flush lifting handles.
 - J. Padlock hasp.
 - K. Upper rail guide pipe holders.
 - L. Lift chain hook.
 - M. Provide mill finish for frame and door leaf surfaces.
 - N. Apply a protective alkali-resistant bituminous paint to the exterior frame surfaces contacting dissimilar metals, mortar, or concrete.
 - O. Acceptable manufacturers
 - 1. The Bilco Company.
 - 2. Haliday
 - 3. Dur-Red Products.
- 8.11 Provide a submersible sump pump in the valve vault capable of discharging 20 gpm at determined feet of head (TDH), cast iron body complete with close-coupled oil-filled motor with thermal overload protection, pressure switch with piggyback plug-in arrangement for operation on 120 volt, three phase, 60 Hertz A.C. power source.
- 8.12 Provide a pump control system from the same manufacturer of the pumps consisting of wet well level sensing float switches and an electrical control panel to be mounted inside a pumping station electrical enclosure with the following features:
- A. Wet well level sensing float switches:
 - 1. Unless otherwise directed by the District, or its authorized agent, at a minimum, provide float switches for “Pumps Off”, “Lead Pump On”, “Lag Pump On”, “High Water Alarm”, “Power Failure”, “Seal Failure” and “Low Level”.
 - 2. Acceptable manufacturers: Flygt ENH-10, or equal.
 - B. Provide a stainless steel chain with 10-pound cast iron weight for float switch support.



- C. Provide all electrical devices in the wet well conforming to the NEC requirements for Class I, Div. I, Group D Hazardous Area.

8.13 Electrical Control Panel

- A. Provide the following controls for each pump:
 - 1. Hand-off-automatic selector switch: Oil-tight, NEMA 4 rated.
 - 2. Indicating pilot lights: Oil-tight, NEMA 4 rated, green "run", red "seal failure", and red "overheat" of 120 volt, push-to-test type.
 - 3. Manual reset button for pump failure (overheat).
 - 4. Seal failure sensor unit.
 - 5. Running time meter: Six-digit, non-resettable, registered in hours and tenths of hour.
 - 6. Wiring terminal board.
- B. Provide the following additional control functions and components:
 - 1. Automatically switch primary power for control transformer from deactivated pump circuit breaker to active circuit breaker.
 - 2. Provide for manual alternation of pumps.
 - 3. Intrinsically safe barriers for float switches and intrusion limit switches.
 - 4. Dry contacts to activate remote alarm circuits when in the "high water level", "pump failure (overheat)", and "intrusion" conditions.
 - 5. A thermostatically controlled strip heater with thermal magnetic circuit breaker.
 - 6. A 20 amp, single pole thermal magnetic circuit breaker for a remote duplex receptacle.
 - 7. A 15 amp, single pole thermal magnetic circuit breaker for valve vault sump pump.
 - 8. Phase motor protector connected to incoming line with fuse protected leads to open pump control circuit when phase loss, under voltage, or phase reversal occur.
- C. Provide an autodialer with the following features:
 - 1. Capable of dialing a least 10 telephone numbers sequentially.
 - 2. Provides audio instructions in the alarm message on how to acknowledge the alarm.
 - 3. Approved manufacturer/model: Sensaphone 1108
 - 4. The autodialer shall provide notification for "Pumps Off", "Lead Pump On", "Lag Pump On" and "High Water Alarm, "Power Failure", "Seal Failure" and "Low Level".
- D. Acceptable electrical components manufacturers:
 - 1. Furnas.
 - 2. Square D.

8.14 Engine Generator

- A. For duplex lift stations with combined connected horsepower less than 5 HP, provide one portable diesel engine-generator capable of powering the pumping station.
 - 1. Provide generator male plug Appleton ACP1034CDRS, 100 amp, 4-wire, 3 phase.
 - 2. Provide panel female receptacle Appleton ACR1034, 100 amp, 4-wire, 3 phase.
- B. For all remaining lift stations or as deemed necessary by the District the applicant shall provide an on-site engine-generator enclosed in a brick and block or pre-cast concrete building for each lift station.
 - 1. Size the engine-generator to operate all pumps simultaneously with other station electrical loads.
 - 2. Design engine-generator to operate on natural gas.
 - 3. Provide an automatic transfer switch.
 - 4. Acceptable engine-generator manufacturers using domestic engine.



- a. Kohler.- Domestic Engine
- b. Onan.

8.15 Paint and Protective Coatings

- A. Interior Piping, fittings, vents, structural steel, ferrous metal tanking, steel lintels, or any surfaces exposed to a corrosive or highly corrosive environment as specified below, and any other item as noted by the District shall be painted or treated with a protective coating per the direction of the District, or its authorized agent,.

Section 9 – Low Pressure Sanitary Sewer Systems

9.1 Low pressure sanitary sewer systems shall be used only where approved by the District.

- A. When approved by the District, all low pressure sanitary sewers shall be constructed of PVC or HDPE and are to be located entirely within the right of way or dedicated easement(s).
- B. The NMWRD reserves the right to inspect any appurtenances to the system including but not limited to the control panel.
- C. The NMWRD has the right to access the control panel or any other pump related appurtenance regardless of ownership and at any time for access to perform maintenance, repair, replacement or interruption of service.

9.2 Grinder Pump Systems:

- A. Pumps shall be manufactured by E-One, or approved equal.
- B. All Grinder Pump Systems shall include:
 - 1. A self contained grinder pump, check valve and tank.
 - 2. 1 HP, 1725 rpm high torque, capacitor start, thermal protected 240/120 volt 60 hertz single phase electric motor.
 - 3. Tanks shall be constructed of high-density polyethylene or other corrosion resistant material.
 - 4. Concrete ballast shall be installed according to engineer's specifications.
 - 5. Discharge lines shall be a minimum of 1-1/4" in diameter.
 - 6. Lids within the floodplain shall be properly vented.
 - 7. Vents shall be routed to an adjacent permanent structure. If no adjacent structure exists the NMWRD reserves the right to require that a permanent structure such as a bollard or wood post no less than 4" by 4" be set adjacent to the vent.
- C. Control Panels shall be mounted in a location acceptable to the District and shall include a visual warning indicator located as directed by the District, or its authorized agent. Wiring for the Panels shall be in conformance with local codes and ordinances.
- D. Wiring outside grinder pumps and control panels shall be placed within conduit at a depth of not less than 24" measured to top of conduit.
- E. For plans or developments including multiple pumps, all grinder pump systems shall be uniform with additional cores provided to the District. The District will determine the adequate number of replacement pumps or cores.



Section 10 – General Testing and Inspection

10.1 Test sewers and service connections for water-tightness by the low pressure air testing, or exfiltration, or infiltration method as selected by the District. All tests shall be completed in the presence of a member of the District staff, or its authorized agent,

10.2 Tests:

A. Low pressure air test

1. Prior to testing for leakage, flush and clean the sewers by passing a snug-fitting inflated rubber ball through the sewer by upstream water pressure.
2. Seal pipe openings with airtight plugs and braces.
3. Whenever the sewer to be tested is submerged under groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the sewer to determine the groundwater hydrostatic pressure by forcing air to flow slowly through the probe pipe.
4. Add air to the plugged sewer sections under test until internal air pressure reaches 4.0 psig greater than any groundwater hydrostatic pressure.
5. Allow at least two minutes for air temperature to stabilize and adding air to maintain the initial test pressure.
6. Shut off the air supply after stabilizing the air temperature and record the time in seconds using an approved stopwatch for the internal sewer pressure to drop from 3.5 psig to 2.5 psig greater than any groundwater hydrostatic pressure.
7. Allowable limits: Total rate of air loss not to exceed 0.0030 cubic feet of air per minute per square foot of internal pipe area and shall not be greater than the minimum time limits in the following table:

MINIMUM ALLOWABLE TIME (min:sec) FOR PRESSURE DROP FROM 3.5 PSIG TO 2.5 PSIG WHEN TESTING ONE PIPE DIAMETER ONLY

Length of Sewer Pipe In Feet	-----Pipe diameter in inches									
	4	6	8	10	12	15	18	21	24	
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38	
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17	
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55	
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34	
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20	
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30	10:02	11:35	
175	0:31	1:09	2:03	3:13	4:37	7:05	8:30	10:09	11:50	
200	0:35	1:19	2:21	3:40	5:17	7:17	8:30	10:17	12:06	
225	0:40	1:29	2:38	4:08	5:40	7:29	8:30	10:25	13:36	
250	0:44	1:39	2:56	4:35	5:43	7:41	8:31	11:35	15:07	
275	0:48	1:49	3:14	4:43	5:46	7:53	9:21	12:44	16:38	
300	0:53	1:59	3:31	5:00	5:50	8:05	10:12	13:53	18:09	
350	1:02	2:19	3:47	5:15	5:57	8:16	11:54	16:12	21:10	
400	1:10	2:38	4:48	6:00	6:03	9:27	13:36	18:31	24:12	
450	1:19	2:50	5:24	6:45	6:48	10:38	15:19	20:50	27:13	
500	1:28	3:30	6:00	7:30	7:34	11:49	17:01	23:09	30:14	



8. If the air test fails to meet these requirements, locate and repair, or remove and replace the faulty sections of sewer in a manner approved by the District, or its authorized agent, as necessary to meet the allowable limits upon retesting.
 9. Do not use acrylamide gel sealant to correct leakage.
- B. Vacuum Testing
1. All sanitary manholes shall be vacuum tested in accordance with ASTM C1244 prior to placing into service.
- C. Deflection test for flexible thermoplastic pipe
1. Test the deflection in the initial 1,200 feet of installed, PVC, and other flexible thermoplastic pipe and not less than 10 percent of the remainder of the sewer project at random locations selected by the District, or its authorized agent.
 2. Perform the test no sooner than 30 days after backfilling has been completed.
 3. Perform the test by pulling a mandrel or rigid ball having a diameter equal to 95 percent of the inside diameter of the pipe through the pipe from manhole to manhole without using mechanical pulling devices.
 4. Allowable deflection limits: 5.0 percent of the base inside diameter of the PVC pipe.
 5. Wherever the deflection limitation is exceeded, uncover the pipe, carefully replace compacted embedment and backfill material, and retest for deflection.
- D. Pressure Testing
1. All pressurized systems shall be required to perform a hydrostatic test for no less than one-hour at a minimum pressure of 50% over the maximum operating pressure or 150 psi whichever is greater.
 2. Lines shall be tested in lengths no greater than 2000 linear feet unless otherwise approved by the NMWRD.
 3. Recovery tests are only applicable to jointed pipe such as DIP and shall not be used to test sealed systems such as fused HDPE.
- E. Televising
1. All sanitary sewers shall be televised prior to usage or acceptance.
 2. Lines shall be jetted and the Contractor shall televise all new sanitary sewers.
 3. Prior to televising the contractor must completely fill all line segments with water from a hydrant. Filling the sanitary sewer with upstream effluent is not acceptable.
 4. The contractor shall furnish one copy of the videotape and corresponding log to the Engineer for review. The District shall return a written record of all deficiencies noted within the corresponding videotapes.
- F. Equipment
1. Equipment including but not limited to pumps, generators, auto transfer switches, grinder pump units, control panels, autodialers, and metering devices shall be tested according to the manufacturer's specifications. Documentation from the manufacturer, contractor, or their agent shall be forwarded to the NMWRD for review.
 2. Where manufacturer's specifications do not exist the NMWRD or its agent shall reserve the right to witness the successful operation of the equipment prior to acceptance.
- G. Punchlist
1. The District or their representative shall complete a comprehensive inspection of all sanitary sewer improvements and related documentation.
 2. The Applicant shall provide the District, or its authorized agent, with access to all areas of the site.



3. The District shall return a written record of all deficiencies noted within the corresponding punchlist inspection.

SECTION 11 – Ordinance in Force

11.1 This ordinance shall be in full force and effect from and after its passage, approval, and publication as provided by law.

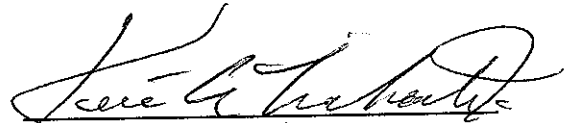
11.2 Passed and adopted by the Board of Trustees of the Northern Moraine Wastewater Reclamation District, Counties of Lake and McHenry, State of Illinois on this 11th day of December 2007, by the following votes:

Ayes: 5

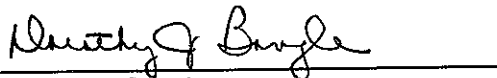
Nays: 0

Absent: 0

Approved this 11th day of December 2007.


Kenneth A. Michaels Jr.
President

ATTEST:


Dorothy J. Bangle
Clerk





Reference Standards

ANSI/AWWA C104/A21.4 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

ANSI/AWWA C110/A21.10 – Ductile-Iron and Gray-Iron Fittings, 3" through 48", for Water and Other Liquids

ANSI/AWWA C111/A21.11 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

ANSI/AWWA C151/A21.51 – Ductile-Iron Pipe, Centrifugally Cast, for Water

ANSI/AWWA C153/A21.53 – Ductile-Iron Compact Fittings, 3" through 24" and 54" through 64" for Water Service

ASTM A194/A194M – Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

ASTM D1784 – Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D2564 – Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems

ASTM D2855 – Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings

ASTM D3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

ASTM D3262 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe

ASTM D3681 – Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition

ASTM D4161 – Standard Specification for Fiberglass Pipe Joints Using Flexible Elastomeric Seals

ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F679 – Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings



Northern Moraine Wastewater Reclamation District

420 Timber Trail P.O. Box 240

Island Lake, IL 60042

Phone: 847-526-3300

Fax: 847-526-3349

Date

Applicant

Attn: _____

Address

City, State, Zip

Re: Acceptance of _____ Development, Municipality

To Whom It May Concern:

The Northern Moraine Wastewater Reclamation District has completed all necessary testing for the sanitary sewer and related improvements within the _____ Development as indicated within the Final Engineering Plans Dated _____ produced by _____.

Completed Inspections:

- Onsite Inspection of Sanitary Sewer Improvements
- Sanitary Sewer Cleaning Televising Dated _____
- Punchlist Inspection Dated _____
- Air/ Mandrel/ Exfiltration/ Infiltration Testing Dated _____

The following information has been reviewed and approved by the Northern Moraine Wastewater Reclamation District:

- Maintenance Letter of Credit
 - Number _____
 - Date of Issuance _____
 - Date of Expiration _____
- As-Built Drawings Dated _____
- As-Built Drawings (Electronic) Dated _____
- Retained Personnel Fee Refund (if applicable) _____

As of _____ the development is under the Maintenance Period, which will expire _____. Upon receipt of this letter, the applicant is responsible for adhering to all requirements for the Maintenance Period Closure Requirements and in no way relieves the applicant of his obligation for maintenance of the improvements prior to the expiration of the maintenance period.

Sincerely,

District Administrator
Northern Moraine Wastewater Reclamation District

CC:
Diamond and LeSueur, P.C.
Trotter and Associates, Inc.



Northern Moraine Wastewater Reclamation District

420 Timber Trail P.O. Box 240

Island Lake, IL 60042

Phone: 847-526-3300

Fax: 847-526-3349

Date

Developer

Attn: _____

Address

City, State, Zip

Re: Expiration of Maintenance Period of _____ Development, Municipality

To Whom It May Concern:

The Northern Moraine Wastewater Reclamation District has received the following items and completed all necessary testing for the sanitary sewer and related improvements within the _____ Development as found indicated within the Final Engineering Plans Dated _____ produced by _____.

Inspections Completed:

Sanitary Sewer Televising Dated _____

Punchlist Inspection Dated _____

Therefore, as of _____ the sanitary sewer improvements within the _____ development will be owned and maintained by the Northern Moraine Wastewater Reclamation District. Please find the attached maintenance letter of credit and reimbursement for remaining retained personnel fees.

Sincerely,

District Administrator
Northern Moraine Wastewater Reclamation District

CC:

Diamond and LeSueur, P.C.
Trotter and Associates, Inc.



Northern Moraine Wastewater Reclamation District

420 Timber Trail P.O. Box 240

Island Lake, IL 60042

Phone: 847-526-3300

Fax: 847-526-3349

Date

Developer

Attn: _____

Address

City, State, Zip

Re: INVOICE FOR NMWRD TIME AND MATERIAL - Subdivision Name

To Whom It May Concern:

In order insure the uninterrupted operation of the sanitary sewer it was necessary for the Northern Moraine Wastewater Reclamation District to complete the following work relative to the sanitary sewer system within the _____ Development. This work is above and beyond normal maintenance associated with sanitary sewer operation.

Description of Work Completed:

Description	Hours	Rate	Extended Cost
Foreman			
Operator			
Laborer			
Equipment			
Crew Truck			
Vactor			
Backhoe			
Truck			
Sub Contractor #1			
Sub Contractor #2			
Trotter and Associates	Refer to Attached Invoice		
Total			

Sincerely,

District Administrator
Northern Moraine Wastewater Reclamation District

CC:

Diamond and LeSueur, P.C.
Trotter and Associates, Inc.