

**SANITARY SEWER GENERAL NOTES**

- ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CHARTER TOWNSHIP OF LYON. ALL SANITARY SEWER CONSTRUCTION SHALL HAVE FULL TIME INSPECTION SUPERVISED BY THE CHARTER TOWNSHIP OF LYON.
- THE CONTRACTOR SHALL NOTIFY THE CHARTER TOWNSHIP OF LYON AND THE TOWNSHIP ENGINEER 72 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- AT ALL CONNECTIONS TO EXISTING SANITARY SEWERS, A WATER-TIGHT BULKHEAD WITH A CAPPED 1-INCH DIAMETER PIPE TO PERMIT MEASURING INFILTRATION SHALL BE PROVIDED. A TEMPORARY 12-INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE ABOVE THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL. SEE SUMP MANHOLE FOR TESTING DETAIL.
- ALL NEW MANHOLES SHALL HAVE APPROVED FLEXIBLE, WATER-TIGHT SEALS WHERE PIPES PASS THROUGH THE WALLS. MANHOLES SHALL BE OF PRECAST SECTIONS WITH MODIFIED GROOVE TONGUE AND RUBBER GASKET TYPE JOINTS. PRECAST MANHOLE CONE SECTIONS SHALL BE APPROVED MODIFIED ECCENTRIC CONE TYPE. ALL MANHOLES SHALL BE PROVIDED WITH BOLTED, WATER-TIGHT COVERS. ALL JOINTS ARE REQUIRED TO HAVE AN OUTSIDE BUTYL WRAP.
- NEW MANHOLES BUILT OVER AN EXISTING SANITARY SEWER SHALL HAVE MONOLITHIC POURED BOTTOMS.
- ALL LEAD CONNECTIONS SHALL BE MADE TO WYE FITTINGS. SEWER PIPE WYE OPENINGS SHALL CONTAIN FACTORY INSTALLED PREMIUM JOINT MATERIAL OF AN APPROVED TYPE COMPATIBLE WITH THAT OF THE BUILDING LEAD PIPE USED, AND BE FURNISHED WITH REMOVABLE, AIR-TIGHT AND WATER-TIGHT STOPPERS. THE BUILDING LEAD SHALL BE COMPATIBLE WITH THE MAIN SEWER PIPE.
- ALL LEADS SHALL BE EXTENDED A MINIMUM OF TEN (10) FEET BEYOND THE PROPERTY OR EASEMENT LINE IN NEW SUBDIVISIONS, HOUSE LEADS IN EXISTING SUBDIVISIONS SHALL BE EXTENDED TO THE PROPERTY LINE.
- DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 1 FOOT. CONCRETE ENCASEMENT OF DROP CONNECTIONS SHALL NOT BE ALLOWED. IN GENERAL, DROP CONNECTIONS SHOULD BE AVOIDED AND WILL BE ALLOWED ONLY WHEN APPROVED BY THE TOWNSHIP ENGINEER.
- TAPS TO EXISTING MANHOLES SHALL BE MADE BY CORING. THE CONTRACTOR SHALL PLACE A KOR-N-SEAL BOOT AFTER CORING IS COMPLETED. BLIND DRILLING WILL NOT BE PERMITTED IN LIEU OF CORING.
- 18" MINIMUM VERTICAL SEPARATION AND 10" MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN SANITARY SEWER AND NEARBY UTILITIES. REQUIRED SEPARATION BETWEEN LARGER PIPE DIAMETERS WILL BE DETERMINED ON A CASE BY CASE BASIS BY THE TOWNSHIP ENGINEER.
- NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY AND OBTAIN ANY INFORMATION REGARDING THE PRESENCE OF UNDERGROUND UTILITIES WHICH MIGHT AFFECT THE PROJECT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL TELEPHONE MISS DIG (800-482-7171) FOR THE LOCATION OF UNDERGROUND PIPELINE AND CABLE FACILITIES AND NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK. (72 HOURS PRIOR TO CONSTRUCTION)
- ALL TRENCHES UNDER OR WITHIN A 1-ON-1 SLOPE FROM EXISTING AND/OR PROPOSED PAVEMENT AND DRIVEWAYS SHALL BE OF COMPACTED CLASS II SAND (95% MAXIMUM WEIGHT DENSITY) BACK FILLED TO THE ELEVATION SHOWN ON THE PLANS.
- IF CONSTRUCTION IS TO OCCUR DURING THE MONTHS OF NOVEMBER THROUGH MARCH, TEMPORARY SOIL STABILIZATION WILL BE REQUIRED.

**GENERAL:**

- ALL PIPE SHALL BE CERTIFIED BY THE MANUFACTURER TO MEET THE APPLICABLE ASTM SPECIFICATION REQUIREMENTS, CERTIFICATION FORMS, TOGETHER WITH A REPORT OF THE TEST RESULTS, SHALL BE PROVIDED TO THE CONSTRUCTION INSPECTOR WITH PIPE DELIVERIES. CERTIFICATION FORMS SHALL INCLUDE: PROJECT NAME, LOCATION, CONTRACTOR AND TEST LOT NUMBER.

- ALL PIPE AND FITTINGS SHALL BE SUITABLY MARKED TO PROVIDE MANUFACTURER'S NAME OR TRADEMARK, LOT OR PRODUCTION NUMBER, ASTM DESIGNATION, PVC CELL CLASSIFICATION, SDR NUMBER AND NOMINAL DIAMETER. FITTINGS ARE NOT REQUIRED TO BE MARKED WITH LOT NUMBERS, CELL CLASS OR SDR NUMBER. PIPE SHALL HAVE A "HOME" MARK.

**GRAVITY SEWERS:**

- PVC SOLID WALL PIPE AND FITTINGS SHALL BE DESCRIBED AS UNDER ASTM D3034-00 (A-2000), "STANDARD SPECIFICATION FOR POLYVINYL CHLORIDE SEWER PIPE AND FITTINGS". MINIMUM WALL THICKNESS SHALL BE SDR 26 FOR MAIN LINE SEWER (NOT TO BE ALLOWED BELOW 15 FEET DEEP).

- ABS AND PVC TRUSS PIPE AND THEIR FITTINGS SHALL BE DESCRIBED AS UNDER ASTM D2680-01 "STANDARD SPECIFICATION FOR ABS AND PVC COMPOSITE SEWER PIPING". APPENDIX A1 OF SAID SPECIFICATION SHALL BE AS MODIFIED BY THE BEDDING REQUIREMENTS.

- HOUSE CONNECTIONS AND RISERS SHALL BE EXTRA STRENGTH, SOLID WALL ABS PIPE, EXTRUDED FROM ABS MEETING THE MINIMUM CELL CLASSIFICATION 2-2-3. THE PIPE SHALL HAVE A MINIMUM DEFLECTION AT FAILURE OF 15% AND SHALL HAVE A MINIMUM PIPE STIFFNESS OF 150 PSI. HOUSE LEADS WITHIN THE PUBLIC RIGHT OF WAY AND SEWER EASEMENT SHALL BE 6" SDR 23.5.

- TRUSS PIPE WITH AN ABSENCE OF FILLER MATERIAL AT ENDS GREATER THAN 1/4" DEEP SHALL BE SUBJECT TO REJECTION OR ACCEPTABLE REPAIR.

**PRESSURE SEWERS:**

- HIGH DENSITY POLYETHYLENE PIPE (HDPE) SHALL BE PE 3408, SDR 11, AND CONFORM TO ASTM D 3350-01, "STANDARD SPECIFICATION FOR POLYETHYLENE PLASTIC PIPE AND FITTINGS MATERIAL."

- ALL FIXTURES (VALVES, TEES, ETC.) ARE TO HAVE ADJUSTABLE STEEL SUPPORTS.

**AIR RELEASE VALVES:**

- AIR RELEASE VALVES SHALL BE SEWAGE COMBINATION AIR VALVES DESIGNED TO EXHAUST LARGE AMOUNTS OF AIR DURING FILLING, RELEASE SMALL AMOUNTS OF ACCUMULATED AIR DURING OPERATION, AND OPEN TO ADMIT LARGE AMOUNTS OF AIR TO PREVENT A VACUUM WHILE DRAINING.

- THE VALVE SHALL BE FLOAT OPERATED AND BOTH THE AIR & VACUUM, AND AIR RELEASE FUNCTIONS SHALL BE HOUSED IN A SINGLE BODY. BODY AND COVER SHALL BE CAST IRON, CONFORMING TO ASTM A126, "STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS FOR VALVES, FLANGES AND PIPE FITTINGS". CLASS B. ALL LEVERAGE MECHANISM PARTS AND THE FLOAT SHALL BE STAINLESS STEEL. LARGE AND SMALL ORIFICE SEATS SHALL BE RENEWABLE.

- THE COMBINATION AIR VALVE SHALL BE SUPPLIED WITH "FLUSHING ATTACHMENTS" TO ALLOW PERIODIC FLUSHING OF SEDIMENT, GREASE, AND SOLIDS.

- DISCONNECTS TO ALLOW CONNECTION TO A CLEAN WATER SOURCE.

- THE SEWAGE COMBINATION AIR VALVE SHALL BE AS MANUFACTURED BY: APCO VALVE & PRIMER CORP. OR APPROVED EQUAL.

- AIR RELEASE STRUCTURES SHALL HAVE VENTED "C" TYPE COVERS WITH CALGON ODOR CONTROL UNITS.

**GATE VALVES:**

- GATE VALVES SHALL BE DESIGNED FOR 200 PSI (MINIMUM) WORKING PRESSURE AND MEET THE REQUIREMENTS OF THE AWWA. GATE VALVES SHALL BE CAST IRON BODY, FULLY BRONZE MOUNTED, WITH A BRONZE STEM, O-RING STEM SEAL, NON-RISING STEM AND DOUBLE PARALLEL SEAT. GATE VALVES SHALL HAVE A CLEAR WATERWAY EQUIVALENT IN AREA WHEN FULLY OPEN, TO THAT OF THE CONNECTING PIPE. VALVES SHALL BE MADE TO OPEN WHEN TURNED LEFT, OR COUNTERCLOCKWISE. GATE VALVES SHALL HAVE SQUARE WRENCH NUTS.

- GATE VALVES SHALL BE FURNISHED WITH CAST IRON BOXES AS CALLED FOR ON THE CONSTRUCTION DRAWINGS. VALVE BOXES SHALL BE OF THE 3 - PIECE ADJUSTABLE HEIGHT TYPE WITH CAST IRON COVER.

- GATE VALVES 4" AND LARGER SHALL BE RESILIENT SEATED AS MANUFACTURED BY U.S. PIPE AND FOUNDRY CO., OR AMERICAN FLOW CONTROL.

- GATE VALVES SMALLER THAN 4" SHALL BE AS MANUFACTURED BY U.S. PIPE AND FOUNDRY CO., CHAPMAN VALVE AND MANUFACTURING CO., CLOW CORP., KENNEDY VALVE MANUFACTURING CO., OR TRAVERSE CITY IRON WORKS.

- CURB STOPS SHALL BE QUARTER TURN BALL VALVE BRONZE CONSTRUCTION THE END CONNECTIONS SHALL BE SUITABLE FOR THE PIPE MATERIAL. VALVE BOX MAY BE CAST IRON OR PLASTIC. CURB STOP SHALL BE LOCATED ON SITE WITHIN FIVE FEET OF THE FRONT PROPERTY LINE. VALVE BOX COVER SHALL BE IDENTIFIED AS "SEWER".

- CHECK VALVES SHALL BE SWING TYPE WITH PORT SIZE EQUAL TO OR LARGER THAN THE NOMINAL PIPE SIZE. MATERIALS SHALL BE PVC OR BRONZE. CHECK VALVE SHALL BE LOCATED AT THE CURB STOP ON THE BUILDING SIDE.

**SANITARY SEWER MATERIALS NOTES**

**GRAVITY SEWER JOINTS:**

- PVC PIPE AND FITTINGS SHALL HAVE ELASTOMERIC GASKET PUSH-ON TYPE SUCH THAT JOINTS CONFORM TO THE ASTM D3212-96a, "STANDARD SPECIFICATION FOR JOINTS FOR DRAIN AND SEWER PLASTIC PIPES USING FLEXIBLE ELASTOMERIC SEALS." GASKET JOINTS SHALL BE INSTALLED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED BY THE PIPE MANUFACTURER AND CARE SHALL BE TAKEN TO INSURE ALL JOINTS HAVE BEEN PUSHED TO THE "HOME" POSITION AND HELD TIGHTLY IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS.

- ABS PIPE JOINTS SHALL BE SOLVENT WELDED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

- ALL ENDS OF TRUSS PIPE SHALL BE FULLY AND THOROUGHLY COATED WITH PLASTIC JOINTING CEMENT PRIOR TO JOINTING TO ELIMINATE THE POSSIBILITY OF FALSE LOW PRESSURE TESTS. PIPE SHALL BE ROTATED DURING JOINT INSERTION TO INSURE A COMPLETE SPREAD OF JOINTING CEMENT.

- ABS PLASTIC CEMENT PRIMER AND ABS PLASTIC PIPE CEMENT SHALL ARRIVE AT THE JOB SITE IN SEALED AND LABELED CONTAINERS. "JOHNNY MOPS" OR SIMILAR SWAB TYPE APPLICATORS SHALL BE PROTECTED FROM DIRT, WATER, AND OTHER CONTAMINANTS.

**PRESSURE SEWER JOINTS:**

- HDPE PIPE SHALL BE BUTT FUSED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

- TAPS TO HDPE PIPE SHALL BE DONE WITH BRANCH SADDLES FUSED TO THE MAIN LINE PIPE.

- UNDERGROUND CONNECTIONS BETWEEN HDPE PIPE AND OTHER TYPES OF PIPE SHALL BE DONE WITH APPROVED TRANSITION SLEEVES. TRANSITION SLEEVES SHALL HAVE GRIPPER TEETH ON THE HDPE SIDE OF THE SLEEVE.

- CONNECTIONS BETWEEN HDPE PIPE AND DUCTILE IRON PIPE SHALL BE WITH MECHANICAL JOINT ADAPTERS.

- MECHANICAL JOINTS MUST BE USED WITHIN VALVE WELLS AND FUSED JOINTS MUST BE USED OUTSIDE OF VALVE WELLS.

**BEDDING:**

- IT IS ESSENTIAL TO RECOGNIZE THAT THE SUCCESSFUL USE OF FLEXIBLE PIPE REQUIRES BEDDING THAT PROVIDES UNYIELDING SIDE SUPPORT AND COMPLETE BEDDING CONTACT UNDER PIPE HAUNCHES.

- BEDDING MATERIAL SHALL BE PROPERLY PLACED AND COMPACTED TO PROVIDE LATERAL RESTRAINT AGAINST DEFLECTION IN THE PIPE DIAMETER. PIPE SHALL BE BEDDED TO TRUE LINE AND GRADE THROUGHOUT ITS LENGTH, BELL HOLES SHALL BE PROVIDED WHERE REQUIRED.

- WHERE UNSTABLE BOTTOMS ARE ENCOUNTERED, THE CONTRACTOR SHALL PROVIDE A FOUNDATION CONSISTING OF AN APPROVED GRADED PROCESSED ANGULAR STONE OR GRAVEL TO ACT AS AN IMPERVIOUS MAT TO PREVENT MIGRATION OR VERTICAL MOVEMENT OF UNSTABLE SOILS OR BEDDING MATERIALS. WHERE TRENCH SHEETING PLATES OR TRENCH BOX ARE USED DUE TO SEVERE GROUND CONDITIONS, ALL VOIDS TO THE SIDE AND BELOW THE TOP OF PIPE CAUSED BY THE SHEETING PLATES OR BOX REMOVAL SHALL BE COMPLETELY FILLED, OR SUPPORTS SHALL BE LEFT IN PLACE BELOW THE TOP OF PIPE.

- CONCRETE CRADLE BEDDING SHALL NOT BE USED. WHERE ALLOWABLE TRENCH WIDTHS ARE EXCEEDED, STANDARD PIPE BEDDING SHALL BE PROVIDED TO THE FULL WIDTH BETWEEN UNDISTURBED TRENCH WALLS OR A MINIMUM OF 2 1/2" PIPE DIAMETERS ON EACH SIDE OF PIPE.

- THE CONTRACTOR SHALL CAREFULLY AVOID DUMPING ANY MATERIALS OTHER THAN THE APPROVED BEDDING SAND OR STONE ON THE PIPE UNTIL 12" OF COVER HAS BEEN PLACED ON THE PIPE.

- CARE SHALL BE TAKEN DURING BEDDING COMPACTION TO AVOID DISTORTING THE SHAPE OF THE PIPE OR DAMAGING ITS WALL. MOBILE EQUIPMENT SHALL NOT BE USED OVER THE PIPE TRENCH UNTIL 48" OF COVER HAD BEEN PLACED.

- BEDDING FOR HOUSE CONNECTIONS SHALL BE EQUAL TO THAT OF THE MAIN LINE SEWER BEDDING. RISERS IN DEEP AND UNSTABLE TRENCHES SHALL BE BEDDED IN CLASS I ANGULAR STONE TO AVOID SETTLEMENT. CONCRETE SHALL NOT BE USED FOR BEDDING.

**CUTTING AND HANDLING:**

- CUTTING OF PIPE LENGTHS SHALL BE PERFORMED BY THE USE OF TOOLS OR EQUIPMENT THAT WILL PROVIDE A NEAT, PERPENDICULAR CUT WITHOUT DAMAGE TO THE PIPE OR FILLER MATERIAL. ALL BURRS SHALL BE REMOVED, SPIGOT ENDS ON CUT PVC PIPE SHALL BE BEVELED SIMILAR TO FACTORY BEVELING TO PREVENT GASKET DAMAGE.

- PIPE WALLS AND JOINTS SHALL BE PROTECTED FROM ABRASION AND DAMAGE DURING HANDLING AND SHALL BE FULLY INSPECTED JUST PRIOR TO PLACING IN TRENCH.

- BOWING OR WARPING OF PIPE CAN OCCUR WITH TEMPERATURE FLUCTUATIONS. THE CONTRACTOR SHALL STORE AND PROTECT THE PIPE TO MINIMIZE BOWING. NOMINAL PIPE LENGTHS OF 10', 12'-6", OR 20' HAVING DEVIATIONS FROM STRAIGHT GREATER THAN 1" SHALL NOT BE USED.

**TRACER WIRE NOTES:**

- FOUR (4) TRACER WIRES SHALL BE ATTACHED TO ALL PRESSURE SEWER PIPE AT APPROXIMATELY 5 FT. INTERVALS OR AS SHOWN ON PLANS.

- TRACER WIRE SHALL BE 6 GAUGE SOLID COPPER WITH PLASTIC INSULATION AND SUITABLE FOR DIRECT BURIAL.

- ATTACHMENT TO PIPE SHALL BE MADE WITH PLASTIC CABLE TIES OR EQUIVALENT.

- SPLICES SHALL BE SOLDERED. COPPER TO COPPER. SPLICE SHALL THEN BE ATTACHED TO PIPE WITH TIES AND SHRINK-WRAPPED IN PLACE TO RE-ESTABLISH INSULATION ACROSS SPLICED LENGTH.

- A MINIMUM LENGTH OF 6 FT. OF WIRE SHALL BE LEFT ACCESSIBLE AT CLEAN-OUTS AND OTHER STRUCTURES, AS SHOWN ON DETAILS.

- CONTRACTOR IS RESPONSIBLE FOR TESTING CONTINUITY OF WIRE FROM STRUCTURE TO STRUCTURE. THE TOWNSHIP ENGINEER TO BE ON SITE DURING CONTINUITY TEST.

**ACCEPTANCE OF NEW SANITARY SEWERS**

**GENERAL:**

- A PRELIMINARY TEST WITNESSED BY THE TOWNSHIP ENGINEER SHALL BE PERFORMED PRIOR TO THE FINAL TEST TO DETERMINE THE NEED FOR ANY REPAIRS, INCLUDING ALL VISIBLE LEAKS AND CRACKS. THESE REPAIRS SHALL BE COMPLETED BEFORE THE FINAL ACCEPTANCE TEST.

- NO CONNECTIONS SHALL BE MADE TO THE NEW MAIN PRIOR TO THE ACCEPTANCE TEST, EXCEPT AS SPECIFIED HEREIN.

- ALL AIR SHALL BE EXPULSED FROM THE PIPE BEFORE APPLYING TEST PRESSURE.

- FINAL TESTS SHALL BE WITNESSED BY TOWNSHIP CONSULTANT(S), AND MUST BE SCHEDULED IN ADVANCE BY ENGINEER. MAXIMUM ALLOWABLE INFILTRATION SHALL NOT EXCEED 100 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER TWENTY-FOUR (24) HOURS IN ANY INDIVIDUAL RUN BETWEEN MANHOLES. AIR TESTS IN LIEU OF INFILTRATION TESTS SHALL BE AS SPECIFIED BY TOWNSHIP ENGINEER.

**GRAVITY SEWERS:**

- THE CONTRACTOR SHALL PLACE PLUGS IN UPSTREAM AND DOWNSTREAM SEWER MANHOLES, AND THEN PRESSURIZE TO 4 PSI. TEMPORARY BLOW-OFFS, CAPS, OR PLUGS SHALL BE PROVIDED AT THE ENDS OF THE NEW MAIN.

- THE ACCEPTANCE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH THE TOWNSHIP OF LYON STANDARDS.

- THE SANITARY SEWER SHALL REMAIN PRESSURIZED FOR THE SPECIFIED AMOUNT OF TIME BASED ON THE LENGTH OF SEWER AND DIAMETER, PROVIDED BY THE TOWNSHIP ENGINEER. THE TEST FAILS IF THE LOSS IS GREATER THAN 1 LB IN THE ALLOWABLE TIME PERIOD.

- DEFLECTION IN THE PIPE SHALL BE MEASURED BY A MANOREL TEST CONFORMING TO ASTM D2122-98, "STANDARD TEST METHODS FOR DETERMINING DIMENSIONS OF THERMOPLASTIC PIPE AND FITTINGS."

- A VIDEOAPE (WITH LOG AND LEAD LOCATIONS) SHALL BE SUBMITTED AND APPROVED BY THE TOWNSHIP OF LYON PRIOR TO FINAL ACCEPTANCE.

**PRESSURE SEWERS:**

- TEST PRESSURE SHALL BE MAINTAINED AT TWO HUNDRED (200) POUNDS PER SQUARE INCH AT THE POINT OF HIGHEST ELEVATION IN THE TEST SECTION. THIS SHALL BE ACCOMPLISHED BY PUMPING WATER INTO THE PIPE FROM AN APPROVED SOURCE FOR A PERIOD OF AT LEAST TWO (2) HOURS. PRESSURE SHALL BE MAINTAINED LONG ENOUGH IN ALL CASES TO PERMIT ASSURANCE OF A SATISFACTORY TEST. ALLOWABLE LEAKAGE SHALL NOT EXCEED FIFTY (50) GALLONS PER INCH OF MAIN DIAMETER, PER MILE OF PIPE, PER 24 HOUR PERIOD.

**SANITARY SEWER RECORD DRAWING SPECIFICATIONS**

- THE DESIGN ENGINEER SHALL FURNISH SANITARY SEWER "RECORD DRAWINGS" UPON JOB COMPLETION. "RECORD DRAWINGS" SHALL BE FORWARDED TO THE TOWNSHIP ENGINEER FOR THEIR REVIEW AND APPROVAL.
- RECORD DRAWINGS SHALL BE PROVIDED ON THREE (3) ML MYLAR. XEROX OR ANY HEAT PROCESS REPRODUCTIONS WILL NOT BE ACCEPTED.
- ALONG WITH THE MYLAR PLAN SET, PROVIDE TWO (2) SETS OF BLUEPRINTS PRODUCED FROM THE MYLARS AND THE PLANS ON ELECTRONIC MEDIA IN AUTOCAD FORMAT (LATEST VERSION).
- THE COVER SHEET SHALL BE SEALED BY THE PROJECT DESIGN ENGINEER, ALONG WITH THE FOLLOWING CERTIFICATION:

I HEREBY CERTIFY THAT OUR FIRM HAS PREPARED THESE RECORD DRAWINGS OF THE IMPROVEMENTS AS CONSTRUCTED, AND THAT TO THE BEST OF MY KNOWLEDGE THOSE IMPROVEMENTS NOTED AS "RECORD DRAWINGS" WERE CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS; AND ALSO THAT THE SANITARY SEWER AND STRUCTURES, AS CONSTRUCTED, LIE WITHIN THE EASEMENTS AS SHOWN ON DRAWINGS.

\_\_\_\_\_  
(COMPANY NAME)

\_\_\_\_\_  
(ENGINEERS SIGNATURE)

PROFESSIONAL ENGINEER No. \_\_\_\_\_

\_\_\_\_\_  
ENGINEER SEAL

**TABLE OF CONTENTS:**

SHEET NAME	SHEET NUMBER
SANITARY SEWER STANDARD NOTES	SA-1
GRAVITY SEWER DETAILS	SA-2
LOW PRESSURE SEWER DETAILS	SA-3

REVISIONS:	DATE:
DETAILS FINALIZED	2/7/03
DETAILS REVISED	10/01/03
DETAILS REVISED PER:	4/06/05
"TEN STATES" STANDARDS"	



**PRINCIPAL: LDC**  
**PROJ. MNGR: TAB**  
**DESIGN: GWE**  
**DRAWN: GWE**  
**IND. REVIEW: GWE**

**CHARTER TOWNSHIP OF LYON**  
 LYON MUNICIPAL CENTER  
 58000 GRAND RIVER AVENUE  
 NEW HUDSON, MI 48165  
 (248) 437-2240

**GWE**  
**Giffels-Webster Engineers, Inc.**  
 ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS  
 2871 BOND STREET ROCHESTER HILLS, MI 48309  
 (248) 852-3100

**Terms and Conditions for Electronic Data:**  
 The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees that the electronic record files are for informational purposes only. The user agrees to indemnify and hold GWE harmless for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence of GWE. The user agrees to indemnify and hold GWE harmless from all liability, including reasonable attorneys' fees, for any and all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of or from the use or reuse of electronic record files with the exception of those claims, damages, losses, and expenses caused by the negligence