1. REFERENCE STANDARDS
THE WORK SHALL CONFORM TO APPLICABLE PROVISIONS OF THESE CONTRACT DOCUMENTS AND THE FOLLOWING REFERENCE STANDARDS, LATEST EDITION, EXCEPT AS MODIFIED HEREIN. ANY CONFLICT BETWEEN THE REFERENCE STANDARDS AND THESE SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR REVIEW.

ASTM A536	STANDARD SPECIFICATIONS FOR DUCTILE IRON CASTINGS
AWWA C111	RUBBER-GASKET JOINTS FOR DUCTILE-IRON PRESSURE PIPE AND FITTINGS
AWWA C151	DUCTILE IRON CENTRIFUGALLY CAST
AWWA C153	DUCTILE IRON COMPACT FITTINGS FOR WATER SERVICE
AWWA C104	CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS
AWWA C502	DRY-BARREL FIRE HYDRANTS
AWWA C509	RESILIENT-SEALED GATE VALVES FOR WATER SUPPLY SERVICE
AWWA C600	INSTALLATION OF DUCTILE-IRON WATER MAINS AND THEIR APPURTENANCES
AWWA C605	UNDERGROUND INSTALLATION OF POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS FOR WATER
AWWA C651	DISINFECTING WATER MAINS
AWWA C800	UNDERGROUND SERVICE LINE VALVE AND FITTINGS
AWWA C901	POLYETHYLENE (PE) PRESSURE PIPE AND TUBING, ½ INCH THROUGH 3 INCH FOR WATER SERVICE
AWWA C900	POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FABRICATED FITTINGS, 4 INCH THROUGH 12 INCH FOR WATER TRANSMISSION AND DISTRIBUTION
AWWA C905	POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FABRICATED FITTINGS, 14 INCH THROUGH 48 INCH
AWWA C909	MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PRESSURE PIPE 4 INCH THROUGH 24 INCH FOR WATER, WASTEWATER AND RECLAIMED WATER SERVICE
ODOT CMS	OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION MATERIALS SPECIFICATIONS
TEN STATE STANDARDS - RECOMMENDED STANDARDS FOR WATER WORKS	

2. PIPE MATERIALS GENERAL
THE PIPE SHALL BE APPROPRIATELY MARKED TO ALLOW THE ENGINEER TO VERIFY THE PROVIDED PIPE MATERIAL MEETS THE REQUIREMENTS OF THESE SPECIFICATIONS.

MATERIALS NOT SPECIFICALLY MEETING THE REQUIREMENTS OF THESE SPECIFICATIONS MAY BE SUBMITTED FOR REVIEW AND APPROVAL BY THE ENGINEER. THE CONTRACTOR SHALL SUBMIT A BID UNIT PRICE FOR MATERIALS TO BE PROVIDED UNDER THIS SPECIFICATION UPON MATERIALS THAT MEET THE REQUIREMENTS OF THESE SPECIFICATIONS. IF ALTERNATE MATERIALS ARE APPROVED, THE ENGINEER MAY REQUEST A UNIT PRICE DEDUCT FROM THE CONTRACTOR.

THE ENGINEER RESERVES THE RIGHT TO SPECIFY MATERIALS WITH MORE STRINGENT OR CONSERVATIVE PERFORMANCE CHARACTERISTICS FOR PARTICULAR APPLICATIONS.

THE ENGINEER RESERVES THE RIGHT TO REQUIRE MANUFACTURER OR SUPPLIER CERTIFICATIONS OR TEST REPORTS THAT THE SUPPLIED MATERIAL MEETS THE REQUIREMENTS OF THESE SPECIFICATIONS.

3. DUCTILE IRON PIPE
DUCTILE IRON PIPE TO BE USED FOR WATER MAINS SHALL BE PROVIDED IN ACCORDANCE WITH AWWA C151. DUCTILE IRON PIPE SHALL BE USED FOR ALL WATER MAINS 16 INCHES AND LARGER.

DUCTILE IRON PIPE SHALL BE THICKNESS CLASS 50. DUCTILE IRON PIPE SHALL BE PROVIDED WITH A RUBBER-GASKET JOINT IN ACCORDANCE WITH AWWA C111. BRONZE WEDGES SHALL BE USED AT ALL PUSH-ON JOINTS (2 PER JOINT). THE WEDGE SHALL BE DRIVEN INTO THE PUSH-ON JOINT TO PROVIDE ELECTRICAL CONDUCTIVITY BETWEEN PIPES.

DUCTILE IRON PIPE SHALL BE COATED WITH A BITUMINOUS MATERIAL ON THE EXTERIOR OF THE PIPE IN ACCORDANCE WITH AWWA C151 AND THE INTERIOR OF THE PIPE SHALL BE CEMENT MORTAR LINED IN ACCORDANCE WITH AWWA C104.

DUCTILE IRON PIPE AND FITTINGS SHALL BE WRAPPED IN A MINIMUM 8 MIL THICK POLYETHYLENE FILM PER AWWA C-105, UNLESS THE REQUIREMENT IS WAIVED BY THE CITY. FITTINGS SHALL BE WRAPPED FOR A DISTANCE OF 5 FEET ON EACH SIDE OF THE FITTING. RIPS, TEARS, PUNCTURES OR OTHER DAMAGE TO THE POLYETHYLENE FILM SHALL BE REPAIRED PRIOR TO PLACEMENT OF BACKFILL.

4. POLYVINYL CHLORIDE (PVC) PIPE
PVC PIPE TO BE USED FOR WATER MAINS SHALL BE PROVIDED IN ACCORDANCE WITH AWWA C900, DR18, PC 235 FOR PIPE SIZES 4-INCH THROUGH 12-INCH DIAMETER.

PVC PIPE SHALL BE DUCTILE IRON EQUIVALENT OUTSIDE DIAMETER. PIPE SHALL BE OF THE INTEGRAL ALL-THICKENED BELL END TYPE INCORPORATING ELASTOMERIC GASKETS TO AFFECT THE PRESSURE SEAL. PIPE SHALL HAVE A NOMINAL LAYING LENGTH OF 20 FEET. PIPE SHALL BE DESIGNED FOR DIRECT CONNECTION INTO DUCTILE IRON FITTINGS USING MECHANICAL JOINTS.

PIPE SHALL BE BLUE IN COLOR.

5. MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPE
PVCO PIPE TO BE USED FOR WATER MAINS SHALL BE PROVIDED IN ACCORDANCE WITH AWWA C909, PC235 FOR PIPE SIZES 4-INCH THROUGH 12-INCH.

PVCO PIPE SHALL BE DUCTILE IRON EQUIVALENT OUTSIDE DIAMETER. PIPE SHALL BE OF THE INTEGRAL WALL-THICKENED BELL END TYPE INCORPORATING ELASTOMERIC GASKETS TO AFFECT THE PRESSURE SEAL. PIPE SHALL HAVE A NOMINAL LAYING LENGTH OF 20 FEET. PIPE SHALL BE DESIGNED FOR DIRECT CONNECTION INTO DUCTILE IRON FITTINGS USING MECHANICAL JOINTS.

PIPE SHALL BE BLUE IN COLOR.

6. DUCTILE IRON FITTINGS
ALL FITTINGS SHALL BE DOMESTIC DUCTILE IRON CONFORMING TO AWWA C153 AND AWWA C111 AND SHALL BE LINED AND COATED AS SPECIFIED ABOVE.

FITTINGS SHALL BE OF THE MECHANICAL JOINT OR PUSH-ON TYPE INCORPORATING RUBBER GASKETS. CAPS AND PLUG FITTINGS REQUIRED FOR TESTING OF THE WATER MAINS SHALL BE PROVIDED WITH STANDARD TAPPED CONNECTIONS. PIPE COUPLINGS SHALL REQUIRE THE PIPE TO BE FURNISHED WITH GROOVED OR SHOULDERED ENDS PROPERLY MACHINED TO RECEIVE THE COUPLING.

ALL FITTINGS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR WATERMAIN INSTALLED.

7. MECHANICAL JOINT RESTRAINTS
MECHANICAL JOINT RESTRAINTS SHALL BE DOMESTIC AND PROVIDED IN ACCORDANCE WITH ASTM A536, AWWA C111 AND AWWA C153.

MECHANICAL JOINT RESTRAINTS SHALL INCLUDE A RESTRAINING MECHANISM THAT WHEN ACTUATED, IMPACTS MULTIPLE WEDGING ACTIONS AGAINST THE PIPE, INCREASING ITS RESISTANCE TO MOVEMENT AS INTERNAL PIPE PRESSURE INCREASES. THE JOINT SHALL MAINTAIN SOME FLEXIBILITY FOLLOWING PLACEMENT OF FINAL BEDDING AND BACKFILL. THE RESTRAINING DEVICE SHALL BE CONSTRUCTED OF DUCTILE IRON HEAT TREATED TO A HARDNESS OF 370 BHN WITH A MINIMUM WORKING PRESSURE OF 250 PSI AND A SAFETY FACTOR OF 2:1.

DIMENSIONS OF THE JOINT RESTRAINT SHALL BE SUCH THAT IT CAN BE USED WITH STANDARD MECHANICAL JOINT BELL AND T-HEAD BOLTS CONFORMING TO AWWA C111. TWIST-OFF NUTS SHALL BE USED TO INSURE PROPER ACTUATION OF THE RESTRAINING DEVICES.

THE CONTRACTOR SHALL PROVIDE THRUST BLOCKING AS SHOWN ON THE PLAN DETAIL SHEET. THRUST BLOCKS MAY BE USED IN LIEU OF MECHANICAL JOINT RESTRAINTS WITH THE APPROVAL OF THE ENGINEER.

WATERMAIN PIPES SHALL BE ANCHORED USING MECHANICAL JOINT RESTRAINTS AT ALL DEAD ENDS, BENDS, TEES, VALVES AND CHANGES IN DIRECTION OF THE PIPE IN ACCORDANCE WITH THE APPLICABLE TABLE AS SHOWN ON THE PLAN DETAIL SHEET.

THE COST OF ALL MECHANICAL JOINT RESTRAINTS/THRUST BLOCKING SHALL BE INCLUDED IN THE UNIT BID PRICE FOR WATERMAIN INSTALLED.

8. CATHODIC PROTECTION
ALL T-HEAD BOLTS AND NUTS FOR MECHANICAL JOINTS SHALL BE STAINLESS STEEL WITH POLYTETRAFLUOROETHYLENE (PTFE) OR A COR-BLUE BOLT WITH A ZINC END CAP.

ALL TEES, FITTINGS, HYDRANT LEADS AND MECHANICAL JOINTS SHALL BE INSTALLED WITH SACRIFICIAL ANODE BAGS AS SHOWN ON THE DETAIL SHEET. ANODE BAGS AND COPPER ANODE LEADS SHALL BE PROVIDED BY CORRPRO COMPANIES INC. OR APPROVED EQUAL.

ANODE BAGS SHALL BE 32 POUND HIGH POTENTIAL PREPACKAGED MAGNESIUM ANODES.

ANODE LEADS SHALL BE #12 TW SOLID COPPER.

ANODES SHALL BE SET A MINIMUM OF 5-FEET HORIZONTALLY OFFSET FROM WATER MAIN.

ANODES AND LEAD WIRES SHALL BE BACKFILLED WITH STONE FREE NATIVE SOIL COMPACTED IN 6-INCH LAYERS.

ANODES SHALL BE CONNECTED TO THE ANODE LEAD WIRE USING A COPPER CRIMP. CONNECTIONS BETWEEN LEAD WIRES SHALL BE WRAPPED WITH RUBBER TAPE FOLLOWED BY ONE WRAP OF VINYL TAPE. THE ANODE LEAD CONNECTION WIRES SHALL BE INSTALL A MINIMUM OF 24 INCHES BELOW GRADE.

THE WATER MAIN PIPE COATING MATERIALS SHALL BE REMOVED TO WHITE METAL OVER AREAS SUFFICIENT TO MAKE THE CONNECTION. USE OF RESIN IMPREGNATED WHEELS OR DISCS WILL NOT BE PERMITTED. THE LEAD WIRE SHALL BE WELDED TO THE PIPELINE USING AN EXOTHERMIC PROCESS AS APPROVED BY THE ENGINEER. ALL SLAG MATERIAL SHALL BE REMOVED, AND THE WELD SHALL BE TESTED WITH A SHARP HAMMER BLOW TO ENSURE A PROPER METALLURGICAL BOND. ALL DEFECTIVE WELDS SHALL BE REMOVED AND REPLACED AT NO ADDITIONAL COST TO THE OWNER. ALL EXPOSED SURFACES OF COPPER AND STEEL SHALL BE COVERED WITH A BITUMASTIC FILLED SHIELD ENCAPSULATING THE CONNECTION.

FOR ANODE BEDS CONSISTING OF MORE THAN ONE ANODE INSTALLED IN SERIES; INSTALL A 3-INCH WIDE NON-DETECTABLE WARNING TAPE AS MANUFACTURED BY PRO-LINE SAFETY PRODUCTS OR APPROVED EQUAL. WARNING TAPE SHALL BE BURIED 12-INCHES BELOW FINAL GRADE AND ABOVE THE ANODE LEAD WIRE. WARNING TAPE FOR ANODE LEADS SHALL BE PRINTED "CAUTION CATHODIC PROTECTION LINE BURIED BELOW."

THE COST OF ALL ANODES, INCLUDING INSTALLATION, PARTS AND ACCESSORIES, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PERTINENT WATER SYSTEM ITEMS.

9. SERVICE CONNECTIONS
THE CONTRACTOR SHALL CONSTRUCT NEW OR REINSTATE ALL WATER SERVICE LINES SHOWN ON THE PLANS OR DISCOVERED TO THE NEW WATER MAIN. ALL NEW WATER SERVICES SHALL BE MINIMUM 1-INCH DIAMETER. WATER SERVICE REINSTATEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DETAILS SHOWN IN THE CONTRACT DOCUMENTS. WATER SERVICES SHALL BE REINSTATED USING THE FOLLOWING PARTS DEPENDING ON THE EXISTING WATER SERVICE MATERIAL.

SADDLE - FORD BRASS SADDLE STYLE 202BS WITH DOUBLE STAINLESS BAND OR MUELLER BR2W. ALL SADDLES SHALL BE FOR A MINIMUM 1-INCH DIAMETER SERVICE.

CORPORATION STOP - FORD FB1000 WITH PACK JOINT, GRIP JOINT, OR QUICK JOINT OUTLET OR MUELLER B-25008N. ALL CORPORATION STOPS SHALL BE MINIMUM 1-INCH.

TUBING - AWWA C800 TYPE "K" SOFT COPPER OR AWWA C901 SDR9 POLYETHYLENE TUBING (BLUE). THE MINIMUM DIAMETER OF THE NEW TUBING SHALL BE 1-INCH NOMINAL DIAMETER.

CURB STOP - FORD B44 QUICK JOINT ENDS WITH COMPRESSION ENDS OR MUELLER B-25209N QUICK JOINT WITH COMPRESSION ENDS.

CURB BOX - AMERICAN MADE TYLER UNION 6500 SCREW TYPE CURB BOX WITH "CITY OF BOWLING GREEN WATER" STAMPED ON THE LID.

THE PRICE BID FOR WATER SERVICES SHALL INCLUDE ALL PARTS, MATERIALS AND LABOR REQUIRED TO CONSTRUCT A COMPLETE CONNECTION TO THE WATER MAIN. OTHER PARTS OF ITEMS NOT SPECIFICALLY LISTED BUT REQUIRED TO PROVIDE A COMPLETE CONNECTION SHALL ALSO BE INCLUDED. TUBING SHALL BE PAID UNDER THE BID ITEM FOR WATER SERVICE TUBING.

WHEN A BUILDING IS SERVED BY A FIRE LINE, ALL DOMESTIC WATER SERVICES SHALL BE SEPARATED FROM THE FIRE LINE BEFORE ENTERING THE BUILDING AND SHALL HAVE A CURB VALVE AND CURB BOX A MINIMUM OF 8 FEET OUTSIDE THE BUILDING FOOTPRINT.

10. WATER MAIN INSTALLATION
WATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPE MANUFACTURER AND AWWA C600 AND AWWA C605.

ALL WATERLINES SHALL BE INSTALLED WITH A MINIMUM OF 5 FEET AND A MAXIMUM OF 6 FEET OF GROUND COVER, AS MEASURED FROM THE TOP OF THE PIPE TO FINISH GRADE OR AS MODIFIED ON THE PLANS. WATERLINE SERVICE CONNECTIONS SHALL BE INSTALLED WITH A MINIMUM OF 4 FEET OF COVER. WATERLINES SHALL BE INSTALLED IN AN OPEN TRENCH TRUE TO THE LINE AND GRADE WITH THE AID OF A ROTATING LASER WITH GRADE AND SLOPE CONTROL OR AN INTERNAL PIPE LASER WITH TARGET.

LASER BEAM EQUIPMENT SHALL BE CHECKED TWICE DAILY, ONCE IN THE AM AND ONCE IN THE PM, IN THE PRESENCE OF THE ENGINEER OR ENGINEER'S REPRESENTATIVE TO VERIFY THAT THE PIPE IS BEING LAID TRUE TO DESIGN LINE AND GRADE. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DEVIATION IN THE DESIGN LINE AND GRADE.

PIPE SECTIONS LESS THAN 10 FEET IN LENGTH SHALL NOT BE USED WHERE A FULL PIPE SECTION CAN BE USED.

NO WATER MAINS OR ANY APPURTENANCES TO THE POTABLE WATER SYSTEM SHALL BE ALLOWED TO DIRECTLY ENTER OR CONTACT WITH A SANITARY OR STORM SEWER OR MANHOLE. A SUITABLE AIR-GAP SHALL BE PROVIDED WHERE SUCH ITEMS AS TANK DRAINS, ETC. MUST BE INSTALLED.

ALL PIPES SHALL BE THOROUGHLY CLEANED INSIDE AND OUTSIDE BEFORE BEING LOWERED INTO THE TRENCH AND SHALL BE KEPT CLEAN DURING THE INSTALLATION. THE END OF THE PIPE SHALL BE PLUGGED TO EXCLUDE WATER, ANIMALS OR OTHER DEBRIS FROM ENTERING THE PIPE.

SURFACES TO BE IN CONTACT WITH THE RUBBER GASKET SHALL BE BRUSHED CLEAN WITH SOAPY WATER AND DRIED JUST PRIOR TO MAKING THE JOINT. A LUBRICANT SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION WHEN MAKING THE JOINT.

11. TRENCH EXCAVATIONS
EXCEPT WHERE OTHERWISE SPECIFIED BY THE ENGINEER, WATER MAINS SHALL BE INSTALLED IN OPEN TRENCHES.

THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL EQUALTHE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES OR AS SPECIFIED IN THE CONTRACT DOCUMENTS. IF THE MAXIMUM TRENCH WIDTH IS EXCEEDED FOR ANY REASON, THE ENGINEER RESERVES THE RIGHT TO DIRECT THE CONTRACTOR TO UTILIZE PIPE OF GREATER STRENGTH, TO MODIFY THE TYPE OF BACKFILL OR BEDDING OR A COMBINATION OF THESE OPTIONS AT THE EXPENSE OF THE CONTRACTOR.

TRENCH EXCAVATION SHALL INCLUDE IN THE UNIT PRICE FOR PIPE INSTALLED, THE REMOVAL OF EXISTING PAVEMENT, CURB, SIDEWALKS AND OTHER FEATURES AS SHOWN IN THE CONTRACT DOCUMENTS.

TRENCHES SHALL BE KEPT SUFFICIENTLY FREE OF WATER DURING PIPE LAYING AND JOINTING TO PREVENT DAMAGE TO THE PIPE JOINTS OR OVERALL INSTALLATION. DEWATERING SHALL BE PERFORMED IN A MANNER AS APPROVED BY THE ENGINEER.

WHERE NECESSARY TO PREVENT CAVING OF THE TRENCH AND OTHER EXCAVATIONS, AND FOR PROTECTION OF WORKMEN AND NEARBY STRUCTURES, ADEQUATE SHEETING AND BRACING SHALL BE PROVIDED AT THE EXPENSE OF THE CONTRACTOR.

TRENCH EXCAVATION SHALL BE TO 6 INCHES BELOW THE OUTSIDE BOTTOM OF THE PIPE BARREL AND BELL.

WHERE ROCK IS ENCOUNTERED WHICH CANNOT BE REMOVED BY ORDINARY EXCAVATING METHODS, ROCK EXCAVATION, UNLESS SUBSEQUENTLY SPECIFIED TO BE BY HAND, MAY BE ACCOMPLISHED BY THE USE OF ROCK SAWS, HOE RAMS, OR OTHER METHODS APPROVED BY THE ENGINEER. ROCK REMOVAL BY BLASTING IS NOT PERMITTED. THE COST FOR ROCK REMOVAL SHALL BE INCLUDED IN THE UNIT BID PRICE FOR THE APPROPRIATE ITEM REQUIRING THE EXCAVATION, UNLESS OTHERWISE INDICATED IN THE BIDDING DOCUMENTS.

12. BEDDING
THE WATER MAIN SHALL BE PROPERLY EMBEDDED IN ACCORDANCE WITH THE PIPE MANUFACTURER, THESE SPECIFICATIONS AND DETAILS SHOWN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL USE SPECIAL CARE TO PLACE BEDDING MATERIAL UNDER AND ALONG THE ENTIRE LENGTH OF PIPE TO PROVIDE ADEQUATE SUPPORT FOR THE PIPE. BEDDING MATERIAL SHALL BE CAREFULLY PLACED TO AVOID DAMAGE TO THE PIPE MATERIAL. THE BEDDING MATERIAL SHALL BE PLACED AND TAMPED TO PROPERLY CLOSE ALL VOIDS AND PROVIDE PROPER SUPPORT OF THE PIPE.

THE BEDDING MATERIAL SHALL BE COARSE AGGREGATE MEETING THE REQUIREMENTS OF ODOT CMS AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER. ALL BEDDING MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE FOR WATER MAIN INSTALLED.

IF MATERIAL IS FOUND AT THE SPECIFIED DEPTHS OF EXCAVATION BELOW THE PROPOSED BEDDING THAT IS UNSUITABLE TO PROVIDE ADEQUATE SUPPORT OF THE PIPE AND BEDDING MATERIAL, THE CONTRACTOR SHALL EXCAVATE ADDITIONAL DEPTH UNTIL ADEQUATE FOUNDATION CAN BE ACHIEVED. THIS ADDITIONAL EXCAVATION SHALL BE FILLED WITH GRANULAR BEDDING MATERIAL APPROVED BY THE ENGINEER. SUCH ADDITIONAL GRANULAR BEDDING MATERIAL AND ADDITIONAL EXCAVATION SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER AND SHALL BE INCLUDED IN THE PRICE FOR WATER MAIN INSTALLED.

ANY UNAUTHORIZED OVER-EXCAVATION SHALL BE FILLED WITH GRANULAR BEDDING MATERIAL AT NO ADDITIONAL COST TO THE OWNER AND SHALL BE INCLUDED IN THE UNIT PRICE FOR WATER MAIN INSTALLED.

13. BACKFILL
ONCE THE WATER MAIN HAS BEEN PROPERLY BEDDED, THE REMAINDER OF THE OPEN TRENCH SHALL BE BACKFILLED TO MATCH THE SURROUNDING GRADE. THE BACKFILL MATERIAL SHALL BE INSTALLED IN 6-INCH LOOSE LIFTS AND COMPACTED BY HAND OR MECHANICAL METHODS TO 95% PROCTOR DENSITY (AASHTO T99).

IN TRENCH AREAS UNDER OR WITHIN 5-FEET OF THE PAVED SURFACE (INCLUDING SIDEWALK) OR BACK OF CURB, THE BACKFILL MATERIAL SHALL BE A GRANULAR AGGREGATE MATERIAL IN ACCORDANCE WITH ODOT ITEM 304 OR AS SHOWN IN THE CONTRACT DOCUMENTS. IN TRENCH AREAS OUTSIDE OF 5 FEET OF THE PAVEMENT, SPOIL MATERIAL MAY BE REUSED SO LONG AS IT IS CLEAN AND FREE FROM DEBRIS OR OTHER MATERIAL THAT MAY AFFECT THE LONG TERM PERFORMANCE OF THE BACKFILLED AREA. THE CONTRACTOR SHALL USE SPECIAL CARE TO AVOID SETTLEMENT OF THE BACKFILL MATERIAL.

TESTING FOR COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D698, WITH ONE TEST PERFORMED PER LIFT FOR EACH 2,000 SQUARE FEET OF AREA OR FRACTION THEREOF INVOLVED IN THE LIFT. TESTS SHALL CONTINUE FOR EACH LIFT UNTIL SATISFACTORY RESULTS ARE OBTAINED AS DETERMINED BY THE ENGINEER. THE OWNER WILL EMPLOY A TESTING LABORATORY TO MAKE TESTS ON THE SITE AND WILL PAY ALL COSTS FOR THE FIRST SET OF TESTS PERFORMED PER LIFT. IF COMPACTION FAILS TO MEET THAT WHICH IS SPECIFIED, ALL SUCCEEDING TESTS FOR THAT LIFT SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

ALL UTILITIES ENCOUNTERED SHALL BE PROPERLY SUPPORTED, SHORED OR OTHERWISE PROTECTED WHENEVER EXPOSED IN THE EXCAVATION AS APPROVED BY THE ENGINEER. SUCH SUPPORTS, SHORING OR OTHER MEASURES SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. THE ENGINEER RESERVES THE RIGHT TO REQUIRE SIGNED AND SEALED ENGINEERING DESIGN CALCULATIONS FOR THE SUPPORTS, SHORING OR OTHER MEASURES PROVIDED BY THE CONTRACTOR. PIPE SHALL BE LOCATED WITH RESPECT TO OTHER UTILITIES SO AS TO ALLOW FOR TAPS TO BE INSERTED. THE ENGINEER SHALL ESTABLISH A MINIMUM CLEARANCE BASED UPON FIELD CONDITIONS.

14. TRACER TAPE
TRACER WARNING TAPE AND TRACER WIRE SHALL BE INSTALLED WITH ALL NEW WATER MAINS.

TRACER WARNING TAPE SHALL BE A MINIMUM 3 INCHES WIDE WITH THE WORDS "BURIED WATERLINE BELOW" IN 1.5-INCH HIGH BOLD BLACK LETTERS REPEATED EVERY 21 INCHES PRINTED WITH BLUE WARNING COLORS. TRACER WARNING TAPE SHALL BE INSTALLED 30 INCHES BELOW FINAL GRADE DIRECTLY ABOVE THE WATER MAIN.

CALCULATED XXX | CHECKED XXX

WATER NOTES (SHEET 1 OF 2)

CITY OF BOWLING GREEN:
ENGINEERING DIVISION
304 N. CHURCH ST.
BOWLING GREEN, OHIO 43402

15. TRACER WIRE

TRACER WIRE SHALL BE INSTALLED CONTINUOUSLY OVER WATERMAINS AND SERVICE LINES AND SHALL BE CONNECTED TO THE WATERMAIN OR SERVICE LINE WITH TAPE AT 15-FOOT MAXIMUM INTERVALS. THE WIRE SHALL NOT BE WRAPPED AROUND THE WATERMAIN.

TRACER WIRE

1. OPEN TRENCH INSTALLATION - TRACER WIRE SHALL BE MINIMUM 12 AWG WITH A 30-MIL POLYETHYLENE JACKET, SPECIFICALLY DESIGNED FOR BURIED USE.

2. DIRECTIONAL BORE INSTALLATION - TRACER WIRE SHALL BE REINFORCED TRACER WIRE, COPPERHEAD EXTRA HIGH STRENGTH (EHS) OR CITY APPROVED EQUAL, 12 AWG SOLID (.0808" CONDUCTOR DIAMETER), 21% CONDUCTIVITY ANNEALED COPPER-CLAD HIGH CARBON STEEL HIGH STRENGTH TRACER WIRE, 1,150# AVERAGE TENSILE BREAK LOAD, 30 MIL. HIGH MOLECULAR WEIGHT-HIGH DENSITY YELLOW POLYETHYLENE JACKET COMPLYING WITH ASTM-D-1248, 30 VOLT RATING.

THE TRACER WIRE SHALL BE BROUGHT TO THE SURFACE EVERY 300 FEET OR AT ANY CHANGES IN DIRECTION AS APPROVED BY THE ENGINEER. ACCESS POINTS MAY BE VALVE BOXES, VAULTS, TRACER WIRE ACCESS BOX OR OTHER COVERED ACCESS DEVICES CLEARLY MARKED "WATER." THE CONTRACTOR SHALL PROVIDE AN EXTRA 24" OF WIRE AT ALL ACCESS POINTS. THE CONTRACTOR SHALL INCLUDE NECESSARY APPURTENANCES FOR ACCESS IN THE BID UNIT PRICE FOR WATER MAIN INSTALLED.

SERVICE LINE TRACER WIRE SHALL BE SPLICED TO WATER MAIN TRACER WIRES. SPLICES IN THE TRACER WIRE SHALL BE CONNECTED BY MEANS OF A SPLIT BOLT OR COMPRESSION TYPE CONNECTOR TO ENSURE CONTINUITY. WIRE NUTS SHALL NOT BE USED. A WATERPROOF OR CORROSION-PROOF CONNECTOR FOR DIRECT BURY APPLICATIONS SHALL BE USED. AFTER INSTALLATION, THE TRACER WIRE SHALL BE TESTED BY THE CONTRACTOR WITH A REPRESENTATIVE OF THE CITY OF BOWLING GREEN PRESENT TO VERIFY CONTINUITY OF THE TRACER WIRE SYSTEM.

16. EXISTING WATER MAINS

NEW WATER MAINS SHALL BE CONNECTED TO EXISTING WATER MAINS IN ACCORDANCE WITH THE REQUIREMENTS OF THESE SPECIFICATIONS AND IN A MANNER ACCEPTABLE TO THE OWNER AND ENGINEER. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 24-HOURS NOTICE TO THE SUPERINTENDENT OF THE WATER DEPARTMENT, (419-354-6278) AND TO THE ENGINEER PRIOR TO MAKING ANY CONNECTIONS TO EXISTING WATER MAINS. EXTREME CARE SHALL BE TAKEN IN MAKING SUCH CONNECTIONS TO PREVENT CONTAMINATION OF THE EXISTING MAINS. BEFORE MAKING CUT-INS OR CONNECTIONS TO EXISTING MAINS, ALL FITTINGS, VALVES AND PIPE SHALL BE WASHED WITH CLEAN WATER AND THE STERILIZED BY WASHING WITH A CHLORINE SOLUTION HAVING RESIDUAL CHLORINE STRENGTH OF NOT LESS THAN 50 PPM.

17. TEMPORARY WATER SERVICE

THE CONTRACTOR SHALL PROVIDE TEMPORARY WATER SERVICE WHEN WATER SERVICE AND FIRE PROTECTION WILL BE TEMPORARILY DISRUPTED DUE TO CONSTRUCTION. THE PROPOSED TEMPORARY WATER SERVICE SHALL BE AS APPROVED BY THE OWNER AND ENGINEER.

18. DISINFECTION

ALL NEW WATER MAINS SHALL BE DISINFECTED IN ACCORDANCE WITH PROCEDURES OUTLINED IN AWWA C651. DISINFECTION MAY BE ACCOMPLISHED BY THE TABLET METHOD, THE CONTINUOUS FEED METHOD OR THE SLUG METHOD. IN ALL CASES, TESTS FOR CHLORINE CONTENT SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER. ALL FILLING OPERATIONS MUST BE CONDUCTED UNDER THE SUPERVISION OF THE ENGINEER. THE CONTRACTOR SHALL USE SPECIAL CARE TO ENSURE THE PRESSURE IN THE NEW MAIN DOES NOT RISE ABOVE 20-PSI DURING FILLING APPLICATIONS.

CHLORINATED WATER SHALL BE DECHLORINATED PRIOR TO DISCHARGE.

THE CONTRACTOR SHALL FURNISH ALL MATERIALS, CORPORATION STOPS, LABOR AND EQUIPMENT REQUIRED TO PROPERLY DISINFECT THE MAIN.

19. HYDROSTATIC TESTING

ALL NEW WATER MAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH PROCEDURES OUTLINED IN AWWA C600 AND AWWA C605.

WATER MAINS SHALL BE SUBJECTED TO HYDROSTATIC TESTING FOLLOWING DISINFECTION AND FLUSHING OF DISINFECTION SOLUTION OUT OF THE WATER MAIN. THE CONTRACTOR SHALL REMOVE ALL AIR FROM THE SECTION OF WATER MAIN TO BE TESTED. THE NEW WATER MAIN SHALL REMAIN ISOLATED FROM ADJACENT MAINS DURING THE HYDROSTATIC TESTING. THE FOLLOWING IS A SUMMARY OF THE PROCEDURE TO BE USED FOR HYDROSTATIC TESTING.

19. HYDROSTATIC TESTING (CONT)

a. AN INITIAL PRESSURE OF AT LEAST 150 PSI SHALL BE APPLIED TO THE WATER MAIN BY PUMPING CLEAN WATER CONTAINING 10 PPM CHLORINE FROM A CLEANED AND STERILIZED CONTAINER THROUGH A 1-INCH CORPORATION STOP INSTALLED ON THE WATER MAIN.

b. AFTER 18 HOURS, THE WATER MAIN SHALL BE MAINTAINED AT 150 PSI FOR 6-HOURS. AT THE END OF THE 6-HOUR PERIOD, THE WATER SHALL BE MEASURED AND THE LOSS BY LEAKAGE SHALL NOT EXCEED THAT AS DETERMINED BY THE FOLLOWING FORMULA:

$$Q = \frac{LD\sqrt{P}}{148{,}000}$$

WHERE:

Q = QUANTITY OF MAKEUP WATER, IN GALLONS PER HOUR

L = LENGTH OF PIPE SECTION BEING TESTED, IN FEET

D = DIAMETER OF PIPE, IN INCHES

P = AVERAGE TEST PRESSURE DURING HYDROSTATIC TEST, IN POUNDS PER SQUARE INCH (GAUGE)

c. HYDRANTS - WHEN HYDRANTS ARE IN THE TEST SECTION, THE TEST SHALL BE MADE AGAINST THE CLOSED HYDRANT.

d. VALVES - PRESSURE TESTING OF EACH SIDE OF THE INTERMEDIATE VALVES SHALL BE DONE AT THIS TIME BY SHUTTING EACH VALVE AND EXHAUSTING THE PRESSURE ON ONE SIDE AND THE APPLYING A MINIMUM TEST PRESSURE OF 150 PSI ON THE OPPOSITE SIDE OF THE VALVE. THIS PROCEDURE SHALL BE REPEATED FOR EACH INTERMEDIATE VALVE. IF THE MAIN VALVES DO NOT PASS THE LEAKAGE TEST, THE LEAK OR LEAKS SHALL BE LOCATED AND REPAIRED AND THE TESTING PROCEDURE REPEATED.

e. FLUSHING - UPON COMPLETION OF THE LEAKAGE TESTS, THE MAIN SHALL BE THOROUGHLY FLUSHED WITH POTABLE WATER FROM THE PUBLIC SUPPLY UNTIL THE WATER IN THE MAIN HAS APPROXIMATELY THE SAME CHLORINE CONTENT AS WATER IN THE EXISTING MAIN.

f. VISIBLE LEAKS - ALL VISIBLE LEAKS SHALL BE REPAIRED, REGARDLESS OF THE AMOUNT OF LEAKAGE.

g. THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT REQUIRED FOR HYDROSTATIC TESTING.

*PRIVATE FIRE SERVICE MAINS ARE REQUIRED TO BE TESTED AT A MINIMUM PRESSURE OF 200 PSI.

20. BACTERIOLOGICAL TESTING

FOLLOWING THE SUCCESSFUL HYDROSTATIC TESTING, BACTERIOLOGICAL SAMPLES SHALL BE COLLECTED FROM THE WATER MAIN BY AN EMPLOYEE OF THE CITY OF BOWLING GREEN. BACTERIOLOGICAL SAMPLES SHALL NOT BE TAKEN BY THE CONTRACTOR. COLLECTION AND TESTING OF THE SAMPLES SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD METHODS FOR EXAMINATION FOR WATER AND WASTEWATER.

IF RESULTS OF TWO CONSECUTIVE SETS OF BACTERIOLOGICAL TESTS ARE DEEMED ACCEPTABLE BY THE CITY OF BOWLING GREEN WATER DEPARTMENT, THE MAIN MAY BE PLACED IN SERVICE. IF BACTERIOLOGICAL RESULTS ARE NOT ACCEPTABLE, THE MAIN SHALL BE DISINFECTED AND TESTED AGAIN. THE CITY OF BOWLING GREEN WILL PERFORM TWO SETS OF BACTERIOLOGICAL TEST AT NO CHARGE TO THE CONTRACTOR. ADDITIONAL TESTS WILL BE AT THE EXPENSE OF THE CONTRACTOR.

21. COST OF WATER PURCHASED

UNLESS OTHERWISE SPECIFIED, COST OF WATER NECESSARY FOR INITIAL FLUSHING, TESTING, ETC. SHALL BE AT THE OWNER'S EXPENSE. SUBSEQUENT WATER NECESSARY FOR FLUSHING, TESTING, ETC. DUE TO FAILED TESTS SHALL BE AT THE CONTRACTOR'S EXPENSE.

22. COMPLETION OF TEST

WHEN ALL TESTS ON THE WATER MAIN HAVE BEEN SUCCESSFULLY COMPLETED AND THE MAIN IS PLACED IN SERVICE BY THE OWNER, NO FURTHER WORK ON THE MAIN OR VALVES WILL BE PERMITTED WITHOUT FULL KNOWLEDGE OF THE WORK BY THE BOWLING GREEN WATER DEPARTMENT AND THE ENGINEER.

23. FIRE HYDRANTS

HYDRANTS SHALL BE SET PLUMB AND TO MATCH THE SURROUNDING FINAL GRADE. PUMPER NOZZLE SHALL BE FACED TOWARD THE CENTER LINE OF THE PAVEMENT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

HYDRANTS SHALL FIRST BE BACKFILLED WITH ODOT NO. 67 STONE TO A MINIMUM DEPTH OF TWO FEET. A 10 CUBIC FOOT GRAVEL POCKET SHALL BE PROVIDED AROUND THE HYDRANT DRAIN IN ACCORDANCE WITH TEN STATES STANDARDS, SECTION 8.4.4. THE REMAINDER OF EXCAVATION SHALL THEN BE BACKFILLED AS SPECIFIED FOR WATER MAINS. THE HYDRANT SHALL BE PROTECTED DURING BACKFILLING TO ENSURE THE COATING IS NOT DAMAGED.

THE HYDRANT BASE AND WATCH VALVE SHALL BE PLACED ON AN 8-INCH THICK BY 8-INCH BY 16-INCH SOLID CONCRETE BLOCK.

THE FIRE HYDRANT SHALL BE OF THE COMPRESSION TYPE, OPENING AGAINST AND CLOSING WITH THE WATER PRESSURE IN THE MAIN IN ACCORDANCE WITH AWWA C502. HYDRANTS SHALL BE SUITABLE FOR SETTING IN TRENCHES WITH 5 FEET OF GROUND COVER ABOVE THE HYDRANT LATERAL. THE HYDRANT ASSEMBLY SHALL HAVE A 6-INCH MECHANICAL JOINT BASE.

23. FIRE HYDRANTS (CONT)

FIRE HYDRANTS SHALL BE PROVIDED TO OPEN TO THE LEFT (COUNTERCLOCKWISE).

THE FIRE HYDRANT SHALL BE FITTED WITH A 5 ¼ INCH DIAMETER PUMPER NOZZLE AND TWO 2 ½ INCH DIAMETER HOSE NOZZLES. THE CONTRACTOR SHALL VERIFY THAT THE PUMPER NOZZLE, HOSE NOZZLES, STORZ FITTING, CAP NUT SIZE AND HOSE THREADS CONFORM TO THE CITY OF BOWLING GREEN FIRE DEPARTMENT'S STANDARD SIZING PRIOR TO ORDERING MATERIALS. THE CHAINS SHALL BE CUT OFF THE 2 ½ INCH DIAMETER HYDRANT CAPS.

THE PUMPER NOZZLE SHALL BE FITTED WITH A 5-INCH DIAMETER STORZ FITTING COMPATIBLE WITH 5-INCH DIAMETER COUPLED FIRE HOSES.

a. THE STORZ FITTING SHALL BE CONSTRUCTED OF AIRCRAFT QUALITY ALUMINUM WITH BRASS CONNECTION, BRASS SEALING FACE AND UNINTERRUPTED BRASS WATERWAY. THE ALUMINUM TO BE HARD COAT ANODIZED IN ACCORDANCE WITH SAE-AMS-A-8625F, TYPE 3, DARK GRAY, FOR CORROSION PROTECTION. THE STORZ FITTING SHALL NOT BE PAINTED. THE STORZ FITTING SHALL BE INTEGRAL AND FACTORY MOUNTED TO THE FIRE HYDRANT ASSEMBLY AND RESISTANT TO TAMPERING OR REMOVAL BY UNAUTHORIZED PERSONNEL. ADD-ON STORZ COMPATIBLE ADAPTERS ARE NOT ACCEPTABLE.

b. THE STORZ FITTING SHALL BE AS MANUFACTURED HARRINGTON, INC. OR EQUAL APPROVED BY THE FIRE CHIEF.

HYDRANTS SHALL BE PROVIDED WITH A POSITIVE OPERATING DRAIN VALVE AND SHALL BE INSTALLED WITH THE DRAIN VALVE OPEN.

HYDRANT NUTS AND BOLTS SHALL BE 316 STAINLESS STEEL AND LUBRICATED WITH POLYTETRAFLOUROETHYLENE (PTFE) TO PREVENT GALLING.

FIRE HYDRANTS SHALL BE MUELLER SUPER CENTURION A-423 OR KENNEDY K-81D BOWLING GREEN SPECIFICATION.

THE HYDRANT SHALL BE COATED AT THE FACTORY, PRIOR TO SHIPPING WITH EITHER A POLYESTER POWDER COAT OR A TWO PART POLYURETHANE COATING. THE BELOW GRADE PORTION OF THE HYDRANT SHALL BE COATED WITH RAL 9005 JET BLACK. THE ABOVE GRADE PORTION OF THE HYDRANT SHALL BE YELLOW, WITH THE EXCEPTION OF THE BONNET AND BOTH 2½ INCH CAPS, WHICH SHALL BE GREEN. THE YELLOW AND GREEN COLORS, PER MANUFACTURER, SHALL CONFORM TO THE FOLLOWING:

MUELLER: TRAFFIC YELLOW (RAL 1023), FIR GREEN (RAL 6009)

KENNEDY: SAFETY YELLOW (RAL 1018), FOREST GREEN (RAL 6009)

PRIVATE HYDRANTS SHALL BE RED (RAL 3001)

24. WATCH VALVES AND VALVE BOXES

ALL FIRE HYDRANT ASSEMBLIES SHALL BE PROVIDED WITH A 6-INCH GATE VALVE AND VALVE BOX AS SHOWN IN THE STANDARD DRAWINGS. THE VALVE BOX COVER SHALL BE CAST WITH THE WORDS "CITY OF BOWLING GREEN WATER".

25. ANCHORING PIPE, OFFSET ANCHORING PIPE AND FITTINGS

HYDRANT ASSEMBLIES SHALL BE SECURED TO THE WATERMAIN WITH AN ANCHORING PIPE TO CONNECT THE WATCH VALVE TO THE 6-INCH OUTLET TEE ON THE WATERMAIN. THE ANCHORING PIPE SHALL BE A ONE PIECE DOMESTIC CASTING WITH PLAIN END MECHANICAL JOINT TYPE INCORPORATING AN INTEGRAL FOLLOWER GLAND AS MANUFACTURED BY CLOW CORPORATION, US PIPE AND FOUNDRY COMPANY OR APPROVED EQUAL.

HYDRANT ASSEMBLIES SHALL BE SECURED TO THE WATCH VALVE WITH AN OFFSET ANCHORING PIPE. THE OFFSET ANCHORING PIPE SHALL BE A GRADELOK OFFSET ANCHOR PIPE WITH LIPLESS SPLIT FLANGES AS MANUFACTURED BY ASSURED FLOW SALES OR APPROVED EQUAL.

26. EXISTING HYDRANT ASSEMBLIES REMOVED

ALL EXISTING HYDRANT ASSEMBLIES REMOVED AS PART OF THIS WORK SHALL BECOME PROPERTY OF THE OWNER. THE CONTRACTOR SHALL STORE REMOVED HYDRANT ASSEMBLIES ON SITE AND THE OWNER SHALL PROVIDE TRANSPORTATION OF THE REMOVED HYDRANT ASSEMBLIES OFF SITE.

27. RESILIENT SEATED GATE VALVES

ALL GATE VALVES SHALL BE PROVIDED WITH RESILIENT SEATS WITH NO EXPOSED BARE METAL. VALVES SHALL BE EQUIPPED WITH MECHANICAL JOINT CONNECTIONS AND NON-RISING STEM OPERATORS. ALL INTERIOR AND EXTERIOR SURFACES OF THE VALVE BODY SHALL BE COATED WITH EPOXY PAINT MEETING THE REQUIREMENTS OF AWWA C550 AND NSF 61. RESILIENT SEATED GATE VALVES SHALL BE PROVIDED IN ACCORDANCE WITH AWWA C509.

BONNET BOLTS AND NUTS SHALL BE 316 STAINLESS STEEL AND LUBRICATED WITH POLYTETRAFLOUROETHYLENE (PTFE) TO PREVENT GALLING.

RESILIENT SEATED GATE VALVES SHALL BE DESIGNED FOR A MAXIMUM WORKING PRESSURE OF 250 PSI. RESILIENT SEATED GATE VALVES SHALL BE USED ON WATER MAINS UP TO AND INCLUDING 12-INCH DIAMETER.

27. RESILIENT SEATED GATE VALVES (CONT)

VALVES SHALL BE EQUIPPED WITH A 2-INCH OPERATING NUT AND SHALL OPEN TO THE LEFT (COUNTERCLOCKWISE).

RESILIENT SEATED GATE VALVES SHALL BE MUELLER A-2362 OR APPROVED EQUAL.

28. BUTTERFLY VALVES

ALL BUTTERFLY VALVES SHALL BE PROVIDED WITH AN ELASTOMERIC SEAT WITH A 316 STAINLESS STEEL DISC. BUTTERFLY VALVES SHALL BE EQUIPPED WITH MECHANICAL JOINT CONNECTIONS. ALL INTERIOR AND EXTERIOR SURFACES OF THE VALVE BODY SHALL BE COATED WITH EPOXY PAINT MEETING THE REQUIREMENTS OF AWWA C550 AND NSF 61. BUTTERFLY VALVES SHALL BE PROVIDED IN ACCORDANCE WITH AWWA C504. ALL EXPOSED BOLTS AND NUTS ON THE VALVE BODY SHALL BE 316 STAINLESS STEEL AND LUBRICATED WITH POLYTETRAFLOUROETHYLENE (PTFE) TO PREVENT GALLING.

BUTTERFLY VALVES SHALL BE DESIGNED FOR A MAXIMUM WORKING PRESSURE OF 150 PSI. BUTTERFLY VALVES SHALL BE USED ON WATER MAINS LARGER THAN 12 INCHES IN DIAMETER.

BUTTERFLY VALVES SHALL BE MUELLER LINESEAL III OR APPROVED EQUAL.

BUTTERFLY VALVES SHALL BE PLACED IN MANHOLES IN ACCORDANCE WITH THE DETAILS SHOWN IN THE CONTRACT DOCUMENTS.

29. TAPPING SLEEVE AND VALVE

TAPPING SLEEVES SHALL BE MECHANICAL JOINT TYPE IN ACCORDANCE WITH AWWA C223. ALL TAPPING SLEEVE HARDWARE SHALL BE CONSTRUCTED USING 316 STAINLESS STEEL. NO SIZE ON SIZE TAPS SHALL BE PERMITTED. THE TAPPING SLEEVE SHALL BE PROVIDED WITH A TEST PLUG AND SHALL BE COMPATIBLE WITH THE PROVIDED TAPPING VALVE.

THE CONTRACTOR SHALL HYDROSTATICALLY TEST ALL TAPPING SLEEVES PRIOR TO PERFORMING THE NEW TAP CONNECTION TO AN EXISTING WATER MAIN. TAPPING SLEEVES SHALL BE HYDROSTATICALLY TESTED FOR 15 MINUTES USING TEST PRESSURES IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR THE SIZE OF TAP AND WORKING PRESSURE OF THE NEW WATERLINE. COMPRESSED AIR TESTING OF THE NEW TAPPING SLEEVE SHALL NOT BE PERMITTED.

FOLLOWING THE PRESSURE TESTING, THE CONTRACTOR SHALL RE-TIGHTEN THE SLEEVE AND MECHANICAL JOINT CONNECTION TO ACCOUNT FOR ANY STRETCHING IN THE RESTRAINT BOLTS OR SLEEVES.

TAPPING VALVES SHALL MEET THE REQUIREMENTS FOR RESILIENT SEATED VALVES LISTED ABOVE. VALVE SHALL BE CLOW F-6114, MUELLER T2360, AMERICAN FLOW CONTROL RW-500 OR APPROVED EQUAL.

PRE-STRESSED CONCRETE CYLINDER PIPE (PCCP) SHALL ONLY BE TAPPED BY A LICENSED CONTRACTOR.

30. VALVE BOXES

VALVE BOXES AND COVERS SHALL BE TYLER UNION AND SHALL BE CONSTRUCTED OF CLASS 30 B DOMESTIC CAST IRON IN ACCORDANCE WITH ASTM A48. VALVE BOXES SHALL BE OF THE THREE PIECE SCREW TYPE WITH 5 ¼ INCH DIAMETER SHAFT. THE VALVE BOX COVER SHALL BE CAST WITH THE WORDS "CITY OF BOWLING GREEN WATER" ON THE TOP. VALVE BOXES SHALL BE FIRMLY SUPPORTED AND SHALL BE KEPT CENTERED AND PLUMB OVER THE WRENCH NUT OF THE GATE VALVE. THE VALVE BOX BASE SHALL COVER THE VALVE BONNET AND BE SET FLUSH WITH THE FINAL GRADE.

VALVE EXTENSIONS SHALL BE REQUIRED FOR ALL OPERATING NUTS LOCATED MORE THAN 5 FEET BELOW GRADE.

31. VALVE INSTALLATION

VALVES SHALL BE SET PLUMB WITH THE VALVE BOX CENTERED OVER THE VALVE OPERATING NUT. ALL VALVES SHALL BE IN THE ON POSITION AT THE TIME OF SUBSTANTIAL COMPLETION.

WHERE VALVE BOXES ARE LOCATED IN PAVED AREAS, THE SURFACE OF THE COVER SHALL BE SET ¼-INCH BELOW THE PAVEMENT SURFACE. IN UNPAVED AREAS, THE COVER SHALL BE SET NOT TO EXCEED 1-INCH ABOVE THE GROUND SURFACE, OR AS DIRECTED BY THE ENGINEER.

VALVES SHALL BE BACKFILLED IN ACCORDANCE WITH THE REQUIREMENTS FOR WATER MAINS.

GATE VALVES SHALL BE PLACED ON AN 8-INCH THICK BY 8-INCH BY 16-INCH SOLID CONCRETE BLOCK.

32. EXISTING VALVES ABANDONED

VALVES SHALL BE ABANDONED IN THE OFF POSITION IN PLACE AS SHOWN ON THE PLANS. THE VALVE BOX CASTING SHALL BE REMOVED AND THE CASTING SHALL BE FILLED WITH STONE. THE PRICE BID FOR THE VALVES ABANDONED SHALL INCLUDE ALL LABOR AND MATERIAL TO ABANDON VALVES AS SHOWN ON THE PLANS.

33. LARGE WATER SERVICE APPROVAL

ALL WATER METER SETTINGS LARGER THAN 1-INCH, AND ALL FIRE PROTECTION SERVICES SHALL BE PRE-APPROVED BY THE CITY WATER DIVISION BEFORE ORDERING OR INSTALLING ANY METER OR BACKFLOW EQUIPMENT TO ENSURE CONFORMANCE WITH THE CITY STANDARDS AND POLICIES. CONTACT THE CITY WATER DIVISION AT 419-354-6277.

WHEN A BUILDING IS SERVED BY A FIRE LINE, ALL DOMESTIC WATER SERVICES SHALL BE SEPARATED FROM THE FIRE LINE BEFORE ENTERING THE BUILDING AND SHALL HAVE A CURB VALVE AND CURB BOX OUTSIDE THE BUILDING FOOTPRINT.

ALL WATER SERVICES 4 INCHES AND LARGER (INCLUDING FIRE SERVICE LINES) EXTENDING 150 FEET OR MORE FROM THE WATER MAIN SHALL HAVE A MASTER METER AND BACKFLOW PREVENTER INSTALLED AT THE RIGHT-OF-WAY LINE.

CALCULATED XXX | CHECKED XXX

WATER NOTES (SHEET 2 OF 2)

CITY OF BOWLING GREEN:
ENGINEERING DIVISION
304 N. CHURCH ST.
BOWLING GREEN, OHIO 43402