



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

ACT-396792 October 1, 2025

Permit Number Issued Date

Examined and Approved for Compliance with
Act 399, P.A. 1976

PUBLIC UTILITIES

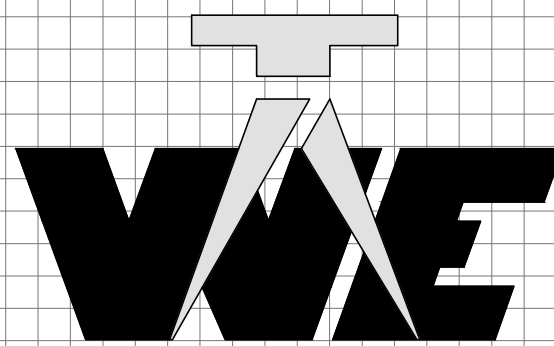
THE EXISTING UTILITIES LISTED BELOW AND SHOWN REPRESENT THE BEST INFORMATION AVAILABLE AS OBTAINED FROM SERVICE PROVIDER AND FIELD OBSERVATION. THIS INFORMATION DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO SATISFY HIMSELF AS TO THEIR ACCURACY OR OF HIS RESPONSIBILITY TO NOTIFY THE PROPER UTILITIES BEFORE COMMENCING WORK. THE FOLLOWING UTILITIES ARE LOCATED IN OR NEAR THE RIGHT OF WAY FOR THIS PROJECT.

NAME AND ADDRESS OF UTILITY	TYPE OF UTILITY
CONSUMERS ENERGY (LOCAL OFFICE) 530 WEST WILLOW STREET LANSING, MI 48909 PH: 517-374-2375 CELL: 517-930-0879 DOUG FURMAN	GAS
CONSUMERS ENERGY (LOCAL OFFICE) 530 WEST WILLOW STREET LANSING, MI 48909 PH: 517-374-2329 CELL: 517-580-2049 JACOB CHALUT	ELECTRIC
CHARTER COMMUNICATIONS 1145 SOUTH TELEGRAPH ROAD MONROE, MI 48161 PH: 734-240-4015 MARK PRICE	CABLE TELEVISION
COMLINK 1781 HOLLOWAY DRIVE HOLT, MI 48842 PH: 517-742-4109 RYAN SCHANER	FIBER
FRONTIER COMMUNICATIONS 1943 WEST M-21 OWOSSO, MI 48667 PH: 989-723-0373 MARK STEVENS	TELEPHONE
CITY OF ST. JOHNS 100 EAST STATE STREET, SUITE 1000 ST. JOHNS, MI 48979 PH: 989-224-8944 JUSTIN SMITH	SANITARY SEWER & WATER MAIN
CLINTON COUNTY DRAIN COMMISSION 100 E STATE STREET, SUITE 2300 ST. JOHNS, MI 48879 PH: 989-224-5160 JON MORRISON	STORM SEWER

OWNERS OF PUBLIC UTILITIES WILL NOT BE REQUIRED TO MOVE POLES OR STRUCTURES THAT ARE NOT WITHIN GRADING OR STRUCTURE LIMITS IN ORDER TO FACILITATE THE OPERATION OF CONSTRUCTION EQUIPMENT, UNLESS IT IS DETERMINED BY THE ENGINEER THAT SUCH LINES OR STRUCTURES CONSTITUTE A HAZARD TO THE PUBLIC OR ARE EXTRA- ORDINARILY DANGEROUS TO THE CONTRACTOR'S OPERATIONS.
(SEE SPECIAL PROVISIONS FOR UTILITY COORDINATION)

OWNER CONTACT INFORMATION

CITY OF ST. JOHNS
CONTACT: CALVIN GALECKA
100 E STATE STREET, SUITE 2900
ST. JOHNS, MICHIGAN 48820
PH: 517-224-8944 EXT. 235
FX: 517-224-2204
EMAIL: PROPERTY OWNER EMAIL ADDRESS

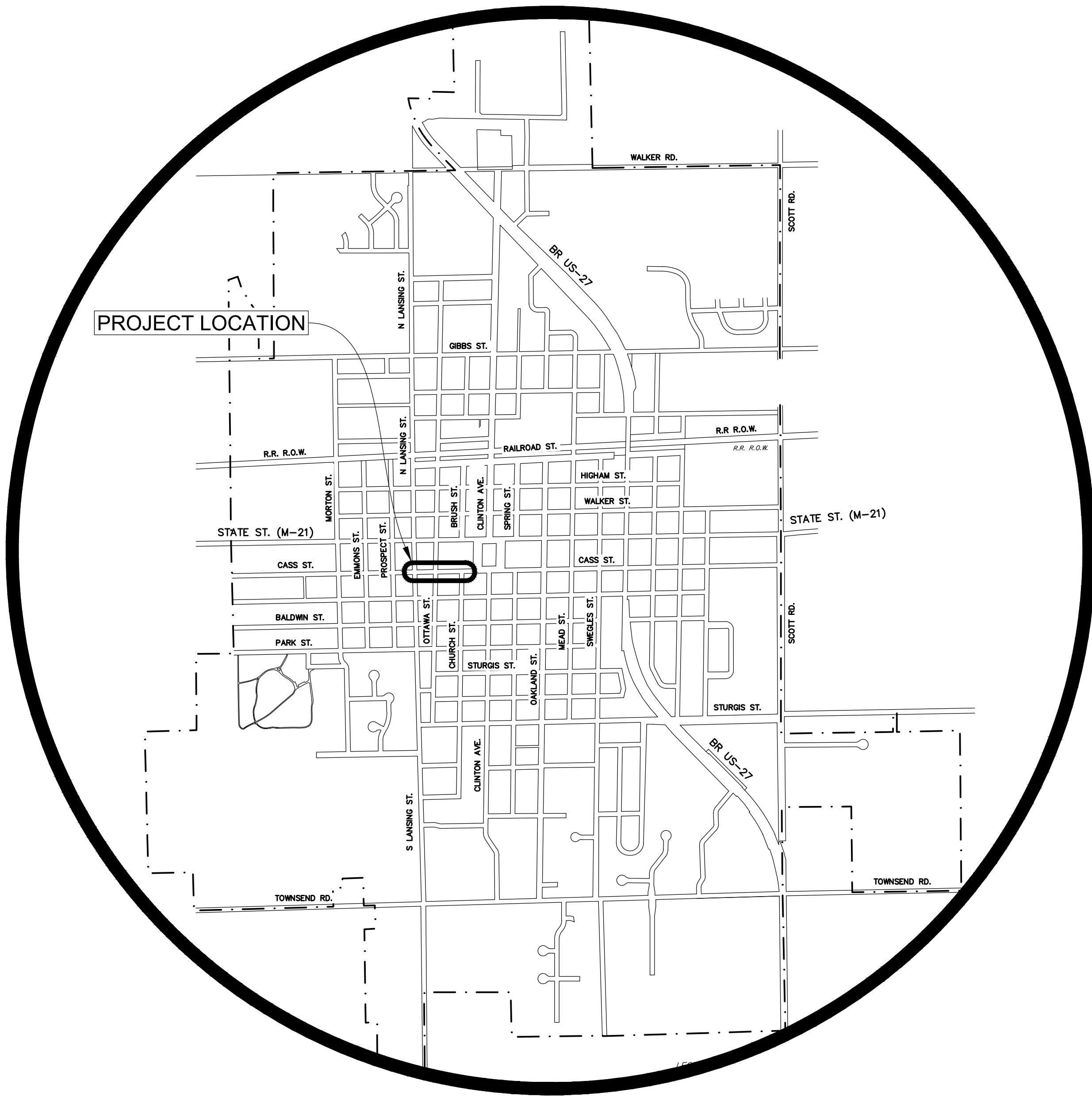


WOLVERINE
Engineers & Surveyors, Inc.

312 North Street
Mason, Michigan 48854
Ph: 517-676-9200
Fx: 517-676-9396
<http://www.wolveng.com>

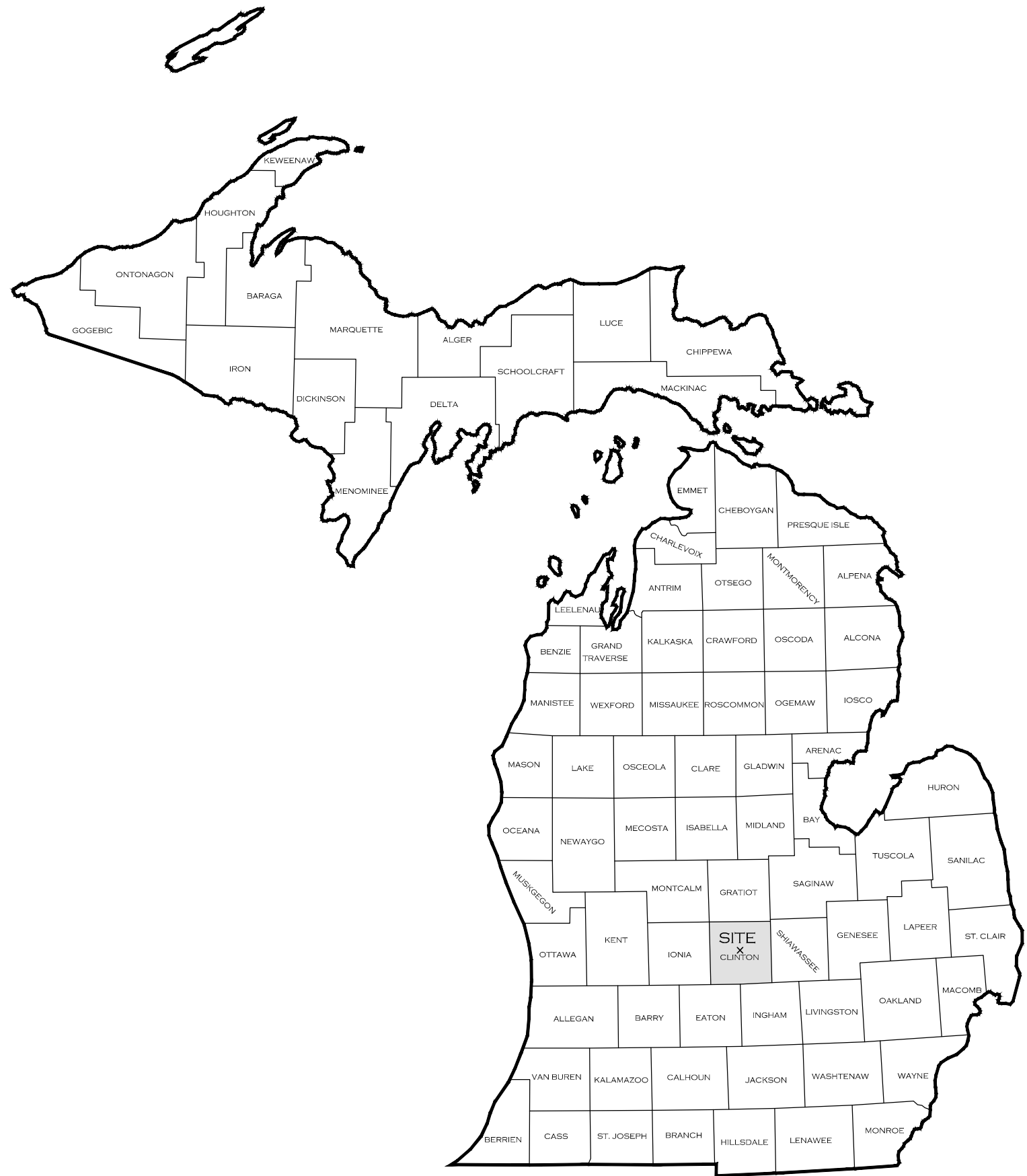
CASS STREET WATER MAIN REPLACEMENT

SECTION 16, CITY OF ST. JOHNS CLINTON COUNTY, MICHIGAN



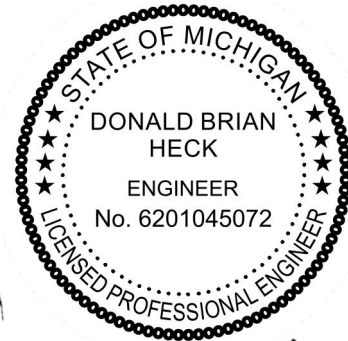
LOCATION MAP

NOT TO SCALE



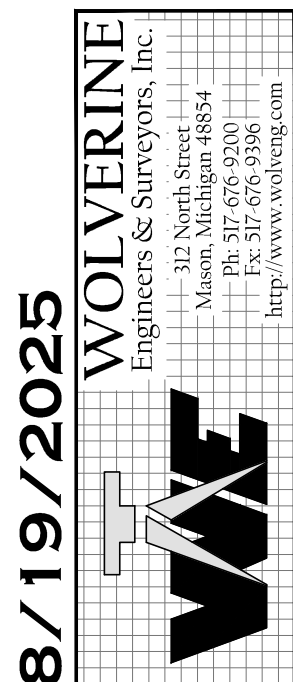
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Donald B. Heck

August 20, 2025



8/19/2025

PERMIT SET

CASS STREET WATER MAIN REPLACEMENT

25-0016














ABBREVIATIONS

ABN	ABANDON
ABND	ABANDONED
AB	AS-BUILT
BIT	BITUMINOUS
BLK	BULK HEAD
BM	BENCH MARK
BOC	BACK OF CURB
CB	CATCH BASIN
CI	CAST IRON
CIP	CAST IN PLACE
CL	CENTER LINE
CON	CONDUIT
CONC	CONCRETE
DI	DUCTILE IRON
DIA	DIAMETER
EGL	EXISTING GROUND LEVEL
EL	ELEVATION
EOP	EDGE OF PAVEMENT
EX	EXISTING
FF	FINISHED FLOOR
FOC	FACE ON CURB
HA	HYDRANT ASSEMBLY
HMA	HOT MIX ASPHALT
HYD	HYDRANT
LT	LEFT
O:	OFFSET
MH	MANHOLE
PAV	PAVEMENT
PR	PROPOSED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
FM	FORCE MAIN
REC	RECORD
REL	RELOCATE
REM	REMOVE
RT	RIGHT
S:	STATION
SAN	SANITARY
STM	STORM
TOC	TOP OF CONCRETE
TOP	TOP OF PIPE OR TOP OF PAVEMENT
TOW	TOP OF WALL OR TOP OF WALK
WTR	WATER MAIN
TOPO	TOPOGRAPHIC SURVEY

EXISTING LEGEND

	CONTOUR — MJR
	CONTOUR — MNR
	SANITARY SEWER
	STORM SEWER
	WATER MAIN
	GAS MAIN
	OVERHEAD UTILITY
	COMMUNICATION LINE
	CHAIN LINK FENCE
	WOOD FENCE
	VINYL FENCE
	CURB
	ROW
	PARCEL LINE
	GOVT
	GOVERNMENT LINE
	CENTERLINE
	TREE LINE
	STRUCTURE
	ASPHALT
	CONCRETE
	GRAVEL
	STONE
	SURFACE WATER
	WETLANDS
	DECIDUOUS TREE
	EVERGREEN TREE
	SHRUB
	STUMP
	SANITARY MANHOLE
	SANITARY CLEAN OUT
	SANITARY TRACE BOX
	STORM MANHOLE
	STORM CLEAN OUT
	STORM CATCH BASIN—CURB
	STORM CATCH BASIN—YARD
	STORM END SECTION
	STORM TRACE BOX
	HYDRANT
	WATER SERVICE VALVE
	WATER ISOLATION VALVE
	WATER MANHOLE
	WATER METER PIT
	WATER WELL
	WATER TRACE BOX
	LIGHT POLE
	UTILITY POLE
	GUY POLE
	GUY WIRE
	TELEPHONE RISER
	TELEPHONE MANHOLE
	GAS VALVE
	MAILBOX
	POST
	STREET SIGN
	SECTION CORNER
	FOUND PROPERTY IRON
	MONUMENT BOX
	SET PROPERTY IRON
	BENCHMARK
	SOIL BORING
	SATELLITE DISH

REMOVALS LEGEND

 SAW CUT, INTERMEDIATE CURB AND GUTTER, REM
 PAVT, REM ASPHALT
 PAVT, REM CONCRETE
 ABANDON
 REMOVAL
 SAVE
 SAWCUT
 RELOCATE
 RELOCATE BY OTHERS
 PROTECT
 SILT FENCE
 EROSION CONTROL ITEM NUMBER
 (SEE STANDARD PLAN R-96 SERIES)
 SLOPE STAKE LINE

PROPOSED LEGEND

	SANITARY SEWER
	STORM SEWER
	WATER MAIN
	SANITARY MANHOLE
	SANITARY TRACE BOX
	STORM MANHOLE
	STORM CATCH BASIN CURB/YARD
	STORM OUTLET STRUCTURE
	STORM TRACE BOX
	STORM SEWER END SECTION
	STORM OR SANITARY CLEANOUT
	FIRE HYDRANT
	ISOLATION VALVE
	WATER SERVICE VALVE
	METER PIT
	WATER TRACE BOX
	ASPHALT
	CONCRETE
	CURB AND GUTTER
	CONTOUR - MJR
	CONTOUR - MNR
	WORKOUT STATION
	LIGHT POLE
	ELECTRIC LINE
	OVERHEAD ELECTRIC LINE
	CABLE LINE
	OVERHEAD CABLE LINE
	FIBER OPTIC LINE
	TELEPHONE LINE
	OVERHEAD TELEPHONE LINE

SURVEY NOTES:

COORDINATE SYSTEM:	STATE PLANE GRID
ZONE:	MICHIGAN SOUTH 2113
HORIZONTAL DATUM:	NAD 83 (MSRN CORS96)
VERTICAL DATUM:	NAVD 88
UNITS:	INTERNATIONAL FEET

BENCH MARKS:

BM#	POINT#	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	783	546744.1377	13071693.32	803.6594	TOP ARROW HYDRANT
2	1312	546818.7868	13070989.32	787.9143	ESE FLANGE BOLT

GENERAL PLAN NOTES:

EXISTING WATER MAINS, SANITARY SEWERS, STORM SEWERS, COMBINED SEWERS, ETC.:

THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING UTILITIES DURING ALL CONSTRUCTION ACTIVITIES. INSPECT ALL EXISTING SEWER PIPES ENCOUNTERED DURING CONSTRUCTION AND CONNECT TO APPROPRIATE SEWER AS DIRECTED BY THE ENGINEER.

MIOSHA:

PERFORM ALL WORK UNDER THIS CONTRACT IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS, POLICIES, RULES, AND STANDARDS OF THE MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ACT (MIOSHA).

DUST CONTROL:

PROVIDE DUST CONTROL AS DIRECTED BY THE ENGINEER.

TREE PROTECTION:

DO NOT CUT ROOTS OR LIMBS OF ANY TREES WITHIN THE PROJECT LIMITS NOT BEING REMOVED UNLESS APPROVED BY THE MUNICIPALITY'S ARBORIST. PROVIDE MUNICIPALITY WITH 72 HOURS WRITTEN NOTICE TO COORDINATE WITH ARBORIST. PROCEED WITH WORK AFTER 72 HOURS IF ARBORIST IS UNRESPONSIVE.

EXISTING UTILITY CONFLICTS:

RELOCATE EXISTING BURIED UTILITY LINES THAT CONFLICT WITH NEW CONSTRUCTION. COORDINATE WITH ENGINEER AND SERVICE PROVIDER. PAYMENT FOR RELOCATING EXISTING UTILITY LINES IS INCLUDED IN RELATED ITEMS OF WORK.

UNDERGROUND UTILITY ACCURACY:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND FROM THE UTILITY COMPANY INFORMATION. THE ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

SIDEWALK REMOVAL:

EXACT LOCATIONS OF CONCRETE SIDEWALK TO BE REMOVED WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

SANITARY SEWER, STORM SEWER, AND WATER SERVICES:

THE LOCATION OF EXISTING SERVICES IS APPROXIMATE. FIELD VERIFY TO DETERMINE THE ACTUAL LOCATION DURING CONSTRUCTION. PAYMENT FOR FIELD LOCATING SERVICES IS INCLUDED IN RELATED ITEMS OF WORK.


CONTAMINATION:

THE LOCATIONS OF ACTIVE/CLOSED (PART 211) AND OPEN/CLOSED (PART 213) CONTAMINATED SITES ARE GRAPHICALLY SHOWN ON THE THE PLANS. ACTIVE OR OPEN SITES ARE LOCATED GREATER THAN 100' FROM THE PROPOSED WATER MAIN LOCATION. CONTAMINATION ENCOUNTER IS NOT EXPECTED FOR THIS PROJECT.

PART 201 AND PART 213 OF ACT 451 REQUIREMENTS MUST BE MET, AND ANY CONTAMINATED SOIL AND GROUNDWATER MUST BE APPROPRIATELY MANAGED IF ENCOUNTERED.

PERMIT SET

REVISION	DATE	DRAWN	DESCRIPTION
1	8/19/2025	TAP	EGLE COMMENT, ADD FULL STICK NOTES



WOLVERINE
Engineers & Surveyors, Inc.

312 North Street
Mason, Michigan 48854
Ph: 517-676-9200
Ex: 517-676-9396
<http://www.wolveng.com>

PROJECT		CASS STREET WATER MAIN REPLACEMENT CITY OF ST. JOHNS CLINTON COUNTY, MICHIGAN	
APPROVED	DBH		
CHECKED	DBH		
DRAWN	TAP		
JOB NO.	25-0016		
DATE	7/19/2025		
SCALE	NO SCALE		
SHEET NO.	2		

WATER MAIN SPECIFICATIONS

1. SCOPE OF THE WORK

THIS WORK INCLUDES THE FURNISHING AND INSTALLING OF ALL PIPE, FITTINGS, FIRE HYDRANTS WITH VALVES, VALVE BOXES, AND VALVES, INCLUDING ALL CONNECTIONS TO EXISTING WATERMANS AS SHOWN ON THE PLANS. PIPE IS SPECIFIED IN CLASSIFICATIONS SPECIFIED BY THE AMERICAN WATER WORKS ASSOCIATION, HEREIN DESIGNATED AS AWWA. ALL AWWA SPECIFICATIONS REFERRED TO HEREIN SHALL BE THE MOST RECENT VERSION OF THAT SPECIFICATION.

2. PIPE MATERIALS

GENERAL

ENSURE THAT ALL WATER MAIN PIPE MEETS THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) WATER BUREAU **SUGGESTED PRACTICE FOR WATER WORKS DESIGN, CONSTRUCTION AND OPERATION FOR TYPE I WATER SUPPLIES**.

USE PIPE AND FITTINGS CONFORMING TO LEAD--FREE REQUIREMENTS AND BEARING THE MARK NSF 61, NSF 61 -- ANNEX G, NSF--PW--G, NSF 14 AND/OR NSF 372 AS APPLICABLE FOR WATER SYSTEMS.

USE JOINT LUBRICANTS AS RECOMMENDED BY THE PIPE MANUFACTURER.

DUCTILE IRON PIPE AND APPURTENANCES

DI PIPE CONFORMING TO AWWA C150/A21.50, AWWA C151/A21.51, CLASS 52.

DI FITTINGS CONFORMING TO AWWA C110/A21.10 OR AWWA C153/A21.53, MATCH PIPE CLASS AND LINING, CLASS 53 MINIMUM.

FIRE HYDRANTS CONFORMING TO AWWA C502.

CEMENT--MORTAR LINING CONFORMING TO AWWA C104/A21.4.

CERAMIC--EPOXY LINING (WHEN SPECIFIED) AS MANUFACTURED BY INDURON COATINGS INC., 3333 RICHARD ARRINGTON JR. BLVD N, BIRMINGHAM, ALABAMA 35234--2303, PH. 800.324.9584, PRODUCT NAME: PROTECTO 401

JOINTS CONFORMING TO AWWA

C111/A21.11. PIPE RESTRAINT

U.S. PIPE, TWO CHASE CORPORATE DRIVE, SUITE 200, BIRMINGHAM, AL 35244, PH. 866.347.7473, PRODUCT NAME: TR FLEX

U.S. PIPE, TWO CHASE CORPORATE DRIVE, SUITE 200, BIRMINGHAM, AL 35244, PH. 866.347.7473, PRODUCT NAME: TYTON JOINT® PIPE WITH FIELD LOK 350 GASKETS

AMERICAN DUCTILE IRON PIPE, 1500 32ND AVE NORTH, BIRMINGHAM, AL 35207, PH. 500.112.2347, PRODUCT NAME: FASTJITE JOINT PIPE WITH FAST--GRIP GASKET

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 1700 MEGALUG HARNESS

GRIPPER GASKET LLC, 1660 LEESON LANE, CORONA, CA 92879, PH: 951.479.4999
PRODUCT NAME: GRIPPER GASKET OG NITRILE SERIES

MJ/RESTRAINED FITTINGS

U.S. PIPE, TWO CHASE CORPORATE DRIVE, SUITE 200, BIRMINGHAM, AL 35244, PH. 866.347.7473, PRODUCT NAME: TYTON JOINT® FITTINGS WITH FIELD LOK 350 GASKETS

AMERICAN DUCTILE IRON PIPE, 1500 32ND AVE NORTH, BIRMINGHAM, AL 35207, PH. 500.112.2347, PRODUCT NAME: FLEX--RING FITTINGS WITH FAST--GRIP GASKET

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 1100 MEGALUG

POLYETHYLENE ENCASEMENT CONFORMING TO AWWA C105/A21.5, SINGLE LAYER, LAPPED OVER PIPE JOINT 1 FOOT MINIMUM, AND SECURED WITH 10 MIL POLYETHYLENE TAPE.

PVC PIPE AND APPURTENANCES

PVC PIPE CONFORMING TO AWWA C900, DR18 (235

PSI). INJECTION--MOLDED PVC FITTINGS

CONFORMING TO AWWA C907.

FABRICATED PVC FITTINGS CONFORMING TO AWWA C900. CONFIGURATIONS REQUIRING FIBERGLASS REINFORCEMENT SHALL CONFORM TO QUALITY REQUIREMENTS OF ASTM D2563.

DI FITTINGS CONFORMING TO AWWA C110/A21.10 OR AWWA C153/A21.53, WITH CEMENT--MORTAR LINING CONFORMING TO AWWA C104/A21.4 UNLESS OTHERWISE SPECIFIED, CLASS 53 MINIMUM.

JOINTS CONFORMING TO ASTM D3139, WITH ASTM F477

GASKETS. COLOR: BLUE.

PIPE RESTRAINT

JM EAGLE, 5200 WEST CENTURY BOULEVARD, LOS ANGELES, CA 90045, PH. 800.621.4404, PRODUCT NAME: EAGLE LOC 900

NAPCO PIPE & FITTINGS, 2801 POST OAK BLVD # 600, HOUSTON, TX 77056, PH. 800.621.4404, PRODUCT NAME: C900/RJB CERTA--LOK®

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 1900

MJ FITTING RESTRAINT

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 2000PQ FOR DUCTILE IRON MJ FITTINGS AND SERIES 2600 FOR PVC MJ FITTINGS

PVCO PIPE AND APPURTENANCES

PVCO PIPE CONFORMING TO AWWA C909, PRESSURE CLASS 235 PSI,

(6"--12"). INJECTION--MOLDED PVC FITTINGS CONFORMING TO AWWA C907.

DI FITTINGS CONFORMING TO AWWA C110/A21.10 OR AWWA C153/A21.53, WITH CEMENT--MORTAR LINING CONFORMING TO AWWA C104/A21.4, CLASS 53 MINIMUM.

JOINTS CONFORMING TO ASTM D3139, WITH ASTM F477

GASKETS. COLOR: BLUE.

PIPE RESTRAINT

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 1900

MJ FITTING RESTRAINT

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 19MAG00Q FOR DUCTILE IRON MJ FITTINGS AND SERIES 2600 FOR PVC MJ FITTINGS

FUSIBLE PVC PIPE AND APPURTENANCES

FUSIBLE PVC PIPE CONFORMING TO THE **FUSIBLE POLYVINYLCHLORIDE PIPE SPECIFICATION** AS PREPARED BY UNDERGROUND SOLUTIONS, 13135 DANIELSON STREET, SUITE 201, POWAY, CA 92064, PH. 858.679.9551

COLOR: BLUE.

PIPE RESTRAINT (FUSIBLE PVC TO BELL & SPIGOT PVC)

EBAA IRON SALES, INC, PO BOX 857, EASTLAND, TX 76448, PH. 800.433.1716, PRODUCT NAME: SERIES 3800

POLYETHYLENE PIPE AND APPURTENANCES (4 INCH TO 63 INCH)

POLYETHYLENE PIPE CONFORMING TO AWWA C906, ASTM D3350, AND ASTM F714, DR11 (200 PSI), DUCTILE IRON PIPE SIZE (DIPS) OR IRON PIPE SIZE (IPS).

HDPE FITTINGS CONFORMING TO ASTM D3261, MATCH PIPE PRESSURE RATING. JOINTS CONFORMING TO ASTM F2620.

COLOR: BLACK WITH BLUE STRIPING.

3. LEAD--FREE REQUIREMENT

ALL PIPES, PIPING FITTINGS, PLUMBING FITTINGS, AND FIXTURES THAT ARE USED FOR POTABLE WATER MUST COMPLY WITH THE LEAD--FREE REQUIREMENT AND MUST BEAR THE MARK NSF/ANSI STANDARD 61, NSF/ANSI 61 -- ANNEX G, NSF/ANSI 14 AND/OR NSF 372.

4. TRACER WIRE

ALL UNDERGROUND PIPING (WATER MAIN) SHALL HAVE COPPERHEAD INDUSTRIES #12 SOLID CCS HIGH STRENGTH -- BREAK LOAD 452 LBS. (COLOR BLUE), OR AN ENGINEER APPROVED EQUAL, TRACER WIRE INSTALLED WITH AND TAPED TO THE NEW PIPE EVERY FIVE FEET. THIS WIRE SHALL EXTEND FROM THE NEW WATER MAIN CONNECTION POINT TO THE NEW WATER MAIN TERMINATION POINT. THE TRACER WIRE SHALL TERMINATE IN A SNAKEPIT MAGNETIZED TRACER BOX, PRODUCT # LD14*TP (COLOR BLUE), OR ENGINEER APPROVED EQUAL, (IN A VISIBLE LOCATION) ABOVE GROUND AT ALL NEW HYDRANT SNAKEBITE DRYCONN DIRECT BURY LUG, PRODUCT # 3WB--01 (COLOR BLUE), OR ENGINEER APPROVED EQUAL, SHALL BE INSTALLED TO CONNECT WATER TRACER WIRE. WATER MAIN WILL NOT BE ACCEPTED UNTIL THE TRACER WIRE HAS BEEN LOCATED AND TESTED.

5. VALVES & BOXES

VALVES SHALL MEET THE REQUIREMENTS OF AWWA C515 & C153 GATE VALVES WITH NON--RISEING STEM WITH "OT" RING SEAL (0--12"). ALL VALVES SHALL AMERICAN FLOW CONTROL, WITH STAINLESS STEEL STEMS AND SHALL OPEN LEFT.. CAST IRON BOXES SHALL BE PROVIDED FOR ALL VALVES. VALVE BOXES SHALL BE MUELLER H--10357 -- 3 PIECE.

6. LAYING PIPE

PIPE SHALL BE LAID TO LINE AND GRADE AND SHALL HAVE BEARING OVER ITS ENTIRE LENGTH EXCEPT AT JOINTS WHERE JOINT HOLES SHALL BE OF SUCH SIZE AS TO GIVE ADEQUATE ROOM FOR WORKING. DEPTH OF EXCAVATION SHALL BE SUCH AS TO GIVE AT LEAST FIVE FEET OF COVER OVER THE PIPE EXCEPT WHERE PIPE IS BEING LAID IN FUTURE STREETS, THE DEPTH OF EXCAVATION SHALL BE SUFFICIENT TO PROVIDE A MINIMUM OF FIVE FEET OF COVER BELOW ESTABLISHED GRADES AS INDICATED ON THE PLANS.

7. JOINTS

SLIP--ON JOINTS SHALL BE USED AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.

8. THRUST BLOCKS

THRUST BLOCKS SHALL BE OF CONCRETE HAVING A COMPRESSIVE STRENGTH OF 2,000 POUNDS AT 28 DAYS, PLACED BETWEEN THE PIPE AND UNDISTURBED EARTH OF THE TRENCH WALL. THRUST BLOCKS SHALL BE PLACED AT ALL BENDS AND FITTINGS. CONCRETE SHALL EXTEND FROM THE BOTTOM OF THE TRENCH TO THE TOP OF THE PIPE WITHIN THE LIMITS OF LAYING LENGTH OF THE FITTING.

9. JOINT RESTRAINT GASKETS OR MECHANICAL JOINT RESTRAINTS

WHERE SOIL OR INSTALLATION CONDITIONS PRECLUDE THE USE OF CONCRETE THRUST BLOCKS AS SPECIFIED AND DETAILED ON THE PLANS, THE CONTRACTOR MAY INSTALL A JOINT RESTRAINT GASKET SYSTEM IN LIEU OF THE THRUST BLOCK ON DUCTILE IRON PIPE. THE GASKET SHALL BE COMPATIBLE TO THE PIPE SUPPLIED AND FURNISHED BY THE PIPE MANUFACTURER. THE GASKET SHALL BE CAPABLE OF JOINT RESTRAINT FOR PIPE UNDER WORKING PRESSURES UP TO 250 PSI. THE GASKET SHALL BE CAPABLE OF JOINT RESTRAINT FOR PIPE UNDER WORKING PRESSURES UP TO 250 PSI. PRIOR TO INSTALLATION OF THE JOINT RESTRAINT GASKET SYSTEM, THE SUPPLIER SHALL PROVIDE ASSISTANCE TO THE CONTRACTOR AND ENGINEER IN CALCULATING THE REQUIRED LENGTH OF PIPE TO BE RESTRAINED AT THRUST LOCATIONS SUCH AS FITTINGS AND DEAD ENDS. JOINT RESTRAINT GASKETS SHALL BE SIMILAR AND/OR EQUAL TO U.S. PIPE'S FIELD LOK (TM) GASKET SYSTEM. PAYMENT SHALL BE INCIDENTAL TO THE COST OF THE PIPE.

10. FITTINGS FOR WATER MAIN CONSTRUCTION

THE COST OF ALL FITTINGS FOR WATERMAIN CONSTRUCTION, INCLUDING ADAPTERS, TEES, ELBOWS AND TURNS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CAST IRON PIPE AND NO PAYMENT WILL BE ALLOWED THEREFORE.

11. FIRE HYDRANTS

FIRE HYDRANT ASSEMBLIES SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. FIRE HYDRANT ASSEMBLY WILL BE PAID FOR AS ONE ITEM AND SHALL INCLUDE THE HYDRANT, 6" BY 12" DUCTILE (SWIVEL BY SWIVEL) OFFSET, 6" GATE VALVE AND VALVE BOX. FIRE HYDRANTS SHALL BE MANUFACTURED IN CONFORMANCE WITH THE LATEST REQUIREMENTS OF THE AMERICAN WATER WORKS ASSOCIATION STANDARDS AND SHALL BE TESTED TO 300 PSI PRESSURE FROM THE INLET SIDE, FIRST WITH THE VALVE CLOSED AND SECOND WITH THE VALVE OPEN. VALVE OPENING SHALL BE 5 1/4 INCH WITH A 6 INCH FLANGED OPENING.

HYDRANTS SHALL BE OF PROPER LENGTH FOR 5 1/2 FEET OF COVER OVER THE INLET PIPE. WHERE NECESSARY, FITTINGS SHALL BE PROVIDED BETWEEN MAIN AND HYDRANT TO INSURE PROPER BURY. EACH HYDRANT SHALL BE FURNISHED WITH 2 -- 2 1/2" HOSE CONNECTIONS AND 1-- 4" PUMPER CONNECTION. THREADS FOR HOSE CONNECTIONS AND THE PUMPER CONNECTION, AND THE CONFIGURATION OF THE CAST IRON OPERATING NUT, SHALL BE CONFIRMED BY THE OWNER. HYDRANTS SHALL OPEN LEFT (COUNTER CLOCKWISE). THE OPERATING NUT SHALL BE CAST IRON 1--1/8" PENTAGON. HYDRANTS SHALL BE DESIGNED SO THAT ONE MAN CAN REPLACE ANY OR ALL WORKING PARTS WITHOUT REMOVING THE MAIN VALVE SEAT AND IN CASE OF ACCIDENT OR BREAKING OF THE HYDRANT BARREL, THE VALVE WILL REMAIN CLOSED BY MECHANICAL DESIGN. HYDRANTS SHALL BE FURNISHED WITH AN 18--INCH SPACER PIPE BETWEEN THE HYDRANT AND AUXILIARY VALVE, AND WITH SUITABLE TWO PIECE CAST IRON VALVE BOX. VALVES SHALL CONFORM TO AMERICAN WATER WORKS ASSOCIATION STANDARD C515. HYDRANTS SHALL MEET THE LATEST REQUIREMENTS OF AWWA 502. HYDRANTS SHALL BE WATEROUS PACER.

12. WATER SERVICE LINES

ALL SERVICES SHALL BE INSTALLED UNDER THE SUPERVISION OF THE VILLAGE ENGINEER OR QUALIFIED VILLAGE AGENT. MATERIALS FOR SERVICE LEADS SHALL BE AS FOLLOWS:

A. CORPORATION STOP, CURB STOP, AND CURB BOX:

1" CORPORATION VALVE FORD CORPORATION VALVE 1"--F--1000--4--Q--NL OR ENGINEER APPROVED EQUAL.

1" CURB VALVE FORD CURB VALVE 1"--B43--4--44--M--NL OR ENGINEER APPROVED EQUAL.

1" UNION COUPLING FORD THREE PART UNION 1"--C66--44--Q--NL OR ENGINEER APPROVED EQUAL.

1" CURB VALVE BOX FORD CURB BOX EXTENSION EM2--55--66--36R--TW OR ENGINEER APPROVED EQUAL.

1--½" CORPORATION VALVE FORD CORPORATION VALVE 1--½"--F1000--6--Q--NL OR ENGINEER APPROVED EQUAL.

1--½" CURB VALVE FORD CURB VALVE 1--½"--B43--6--66--M--NL OR ENGINEER APPROVED EQUAL.

1--½" UNION COUPLING FORD THREE PART UNION 1--½"--C66--66--Q--NL OR ENGINEER APPROVED EQUAL.

1--½" CURB VALVE BOX FORD CURB BOX EXTENSION EM2--55--66--36R--TW OR ENGINEER APPROVED EQUAL.

2" CORPORATION VALVE FORD CORPORATION VALVE 2"--F1000--7--Q--NL OR ENGINEER APPROVED EQUAL.

2" CURB VALVE FORD CURB VALVE 2"--B43--7--77--M--NL OR ENGINEER APPROVED EQUAL.

2" UNION COUPLING FORD THREE PART UNION 2"--C66--77--Q--NL OR ENGINEER APPROVED EQUAL.

2" CURB VALVE BOX FORD CURB BOX EXTENSION EM2--55--66--36R--TW OR ENGINEER APPROVED EQUAL.

DEVIATION FROM THE ABOVE INCLUDING LARGE SERVICE LEADS SHALL BE AS APPROVED BY THE VILLAGE ENGINEER OR QUALIFIED VILLAGE AGENT.

B. SERVICE PIPE:

ASTM D2737 SDR--9 POLYETHYLENE (PE) TUBING. SPLICING OF TUBING IS PROHIBITED. LINERS ARE REQUIRED WHEN USING PE TUBING. SERVICE LEAD SHALL BE INSTALLED WITH TRACER WIRE.

C. FITTINGS: SHALL BE COMPRESSION TYPE OR ENGINEER APPROVED EQUAL.

D. LEAD SERVICE PIPING SHALL BE COMPLETELY REMOVED AND REPLACED WITH COPPER.

11. BACKFILLING

AFTER THE WATER LINE HAS BEEN PROPERLY POSITIONED FOR GRADE AND HORIZONTAL ALIGNMENT, THE TRENCH SHALL BE BACKFILLED FROM THE SUBGRADE TO A LEVEL AT LEAST 12 INCHES ABOVE THE TOP OF THE PIPE WITH MDOT CLASS II GRANULAR MATERIAL COMPACTED TO 95% MAXIMUM UNIT WEIGHT BY MODIFIED PROCTOR, ASTM D1557. BACKFILL FOR THE REMAINING UNFILLED PORTION OF THE TRENCH SHALL BE IN ACCORDANCE WITH ONE OF THE FOLLOWING DESCRIBED METHODS AS REQUIRED IN THE SPECIAL CONDITIONS SECTION OF THESE SPECIFICATIONS.

(a) **CLASS A BACKFILL**--BACKFILLING UNDER THIS DESIGNATION SHALL CONSIST OF FURNISHING AND PLACING MDOT CLASS II GRANULAR MATERIAL IN 12--INCH LAYERS, COMPACTED TO 95% MAXIMUM UNIT WEIGHT AS DETERMINED BY THE LATEST A.A.S.H.T.O. METHODS, FOR THE ENTIRE DEPTH OF THE TRENCH. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO PIPE DURING BACKFILLING, UNLESS OTHERWISE PROVIDED FOR IN THE BID PROPOSAL. THE COST OF FURNISHING, PLACING AND COMPACTING THE REQUIRED GRANULAR MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE FOR WATER CONSTRUCTION AND NO ADDITIONAL PAYMENT WILL BE ALLOWED. SURPLUS EXCAVATION MATERIAL SHALL BE HAULED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS FOR "DISPOSITION OF SURPLUS EXCAVATED MATERIALS" UNDER THE STANDARD PROJECT REQUIREMENTS.

(b) **CLASS B BACKFILLING**--BACKFILLING UNDER THIS DESIGNATION SHALL CONSIST OF BACKFILLING THE TRENCH FROM 12 INCHES ABOVE THE TOP OF THE PIPE TO THE TOP OF THE TRENCH, WITH SELECTED MATERIAL EXCAVATED FROM THE TRENCH, COMPACTED WITH HEAVY CONSTRUCTION EQUIPMENT IN LAYERS NOT EXCEEDING 24 INCHES IN DEPTH. BACKFILLING SHALL BE DONE BY RAMPING THE BACKFILL DOWN THE TRENCH TO PROVIDE COMPACTION BY THE HEAVY EQUIPMENT AT ALL LEVELS OF THE BACKFILL AS REQUIRED BY THE ENGINEER. WHERE TRENCHES ARE TOO NARROW IN WIDTH TO PROVIDE ACCESS BY HEAVY EQUIPMENT, OTHER METHODS AND EQUIPMENT SHALL BE USED TO ACHIEVE THE REQUIRED DEGREE OF COMPACTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO PIPE DURING BACKFILLING.

STONES EXCEEDING SIX (6) INCHES IN DIAMETER, LOGS, STUMPS, AND OTHER DEBRIS SHALL NOT BE ALLOWED IN THE BACKFILL MATERIAL. MUCK OR OTHER UNSTABLE ORGANIC SOILS WHICH MAY BE ENCOUNTERED IN EXCAVATION SHALL BE HAULED AND DISPOSED OF AND THE CONTRACTOR SHALL FURNISH SUFFICIENT APPROVED MATERIAL TO COMPLETE THE BACKFILL AS REQUIRED. SURPLUS EXCAVATED MATERIAL SHALL BE HAULED AND DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS FOR "DISPOSITION OF SURPLUS EXCAVATED MATERIALS" UNDER THE STANDARD PROJECT REQUIREMENTS.

GRANULAR MATERIAL WHICH IS ENCOUNTERED IN THE EXCAVATED MATERIAL MAY BE USED FOR THE REQUIRED MDOT CLASS II GRANULAR MATERIAL IF APPROVED BY THE ENGINEER. THE USE OF SUCH MATERIAL SHALL NOT BE ALLOWED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

REQUIREMENTS FOR RESTORATION OF THE SURFACE AREA OF TRENCHES SHALL BE AS REQUIRED UNDER THE SPECIAL CONDITIONS SECTION OF THESE SPECIFICATIONS OR AS REQUIRED ON THE PLANS.

ANY PIPE OR STRUCTURES WHICH SHALL BE DAMAGED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER.

(c) **CLASS B MODIFIED BACKFILL**-- BACKFILLING UNDER THIS DESIGNATION SHALL MEET ALL OF THE REQUIREMENTS OF "CLASS B" AS DESCRIBED ABOVE EXCEPT THAT THE BACKFILL MATERIAL SHALL BE PLACED IN MAXIMUM LAYERS OF 12 INCH DEPTH AND COMPACTED WITH SUITABLE EQUIPMENT WHICH WILL UNIFORMLY OBTAIN MINIMUM 95% MAXIMUM UNIT WEIGHT AS DETERMINED BY THE LATEST A.A.S.H.T.O. METHOD. EXCAVATED MATERIAL NOT CONSIDERED TO BE SUITABLE BY THE ENGINEER FOR BACKFILL SHALL BE DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS FOR DISPOSITION OF SURPLUS EXCAVATED MATERIALS UNDER THE STANDARD PROJECT REQUIREMENTS.

12. CONNECTIONS TO EXISTING WATER LINES

THE CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING WATER LINES AS SHOWN ON CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL INCLUDE THE COST OF SAID CONNECTIONS IN HIS UNIT PRICE BID FOR WATERMAIN CONSTRUCTION AND NO EXTRA PAYMENT WILL BE ALLOWED FOR CONNECTIONS TO EXISTING WATER LINES, UNLESS OTHERWISE PROVIDED FOR IN THE BID PROPOSAL.

ALL NEW WATER SYSTEM MAINS SHALL BE CONSTRUCTED, BACKFILLED, PRESSURE TESTED, CHLORINATED AND APPROVED BY THE ENGINEER OR OWNER, AND WATER TESTS SHALL BE TAKEN AND APPROVED FOR POTABLE USE BY THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) PRIOR TO CONNECTING THE NEW SYSTEM MAINS TO EXISTING WATER DISTRIBUTION MAINS. A TEMPORARY CONNECTION MAY BE MADE FOR FILLING, CHLORINATING, AND TESTING NEW MAINS.

WHERE WATER MAIN CONSTRUCTION UNDER THIS CONTRACT REQUIRES SHUTTING OFF WATER SUPPLY IN EXISTING MAINS SUPPLYING RESIDENTS, THE CONTRACTOR SHALL PROVIDE ADVANCE NOTICE TO THE OWNER AND TO ALL RESIDENTS WHO WILL BE AFFECTED. WATER SUPPLY SHUTOFF SHALL BE LIMITED TO A PERIOD OF NOT LONGER THAN FOUR (4) HOURS AND THIS PERIOD SHALL BE SELECTED FOR THE TIME OF DAY WHICH WILL LEAST AFFECT THE RESIDENTS. WATERMANS SHALL NOT BE SHUT--OFF UNTIL APPROVED BY THE OWNER. THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN AN ADEQUATE WATER SUPPLY AT ALL TIMES (EXCEPT AS DESCRIBED ABOVE FOR BRIEF PERIODS) TO ALL RESIDENTS ADJACENT TO THE PROJECT AND CHANGE OVER TO NEW MAINS OR SERVICES SHALL BE COORDINATED TO ELIMINATE ANY LONG PERIODS FOR RESIDENTS WITHOUT WATER. **NEW WATER MAINS SHALL NOT BE CONNECTED TO THE EXISTING WATER DISTRIBUTION SYSTEM MAINS UNTIL ALL TESTING, STERILIZATION AND WATER TESTS HAVE BEEN APPROVED BY THE ENGINEER OR OWNER AND THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY.**

13. FLUSHING AND DISINFECTION OF MAINS

BEFORE THE MAIN IS CHLORINATED, IT SHALL BE FILLED WITH POTABLE WATER TO ELIMINATE AIR POCKETS AND FLUSHED TO REMOVE PARTICULATES. THE FLUSHING VELOCITY IN THE MAIN SHALL NOT BE LESS THAN 3.0 FT/SEC (0.91 M/SEC).

FLUSHING IS NO SUBSTITUTE FOR PREVENTATIVE MEASURES DURING CONSTRUCTION. CERTAIN CONTAMINANTS, SUCH AS CAKED DEPOSITS, RESIST FLUSHING AT ANY FEASIBLE VELOCITY, AND PIGGING OF THE MAIN, OR OTHER SUITABLE METHOD ACCEPTABLE TO THE PURCHASER, MAY BE REQUIRED. WHERE SUCH FLOW RATES ARE NOT POSSIBLE, FLUSHING AT THE MAXIMUM EXPECTED FLOW RATE FOR THE LINE FOR 2--3 VOLUMES MAY BE ACCEPTABLE.

MAINS SHALL BE DISINFECTED IN CONJUNCTION WITH TESTING AND AS SPECIFIED AWWA C 651 CURRENT EDITION, THE CHLORINATED WATER SHALL REMAIN IN THE MAIN UNTIL CONSTRUCTION IS COMPLETED AND THE MAIN IS READY FOR SERVICE, AT WHICH TIME THE MAIN SHALL BE FLUSHED UNTIL THE CHLORINE RESIDUAL IS REDUCED TO 0.5 PPM. FOLLOWING FLUSHING, THE OWNER SHALL OBTAIN A MINIMUM OF TWO CONSECUTIVE SAMPLES, AT 24 HOUR INTERVALS, OF WATER FROM THE CHLORINATED MAIN FOR BACTERIAL EXAMINATION. IF SAID SAMPLES ARE NOT FREE OF COLIFORM BACTERIA, THE CONTRACTOR SHALL TAKE SUCH MEASURES AS ARE NECESSARY TO ASSURE THAT THE MAIN IS PROPERLY AND FULLY STERILIZED, AND FREE OF COLIFORM BACTERIA. THE CONTRACTOR SHALL FURNISH ALL CHLORINE FOR STERILIZATION AND PERFORM ALL LABOR AND FURNISH ALL EQUIPMENT FOR THIS WORK. THE OWNER SHALL FURNISH THE WATER.

14. TESTING

EACH SECTION OF COMPLETED MAIN SHALL BE PRESSURE TESTED AS REQUIRED BY AWWA C605 (PVC/PVCO), CURRENT EDITION.

EACH SECTION OF COMPLETED MAIN SHALL BE DISINFECTED AND BACTERIOLOGICAL TESTED AS REQUIRED BY AWWA C651 (PVC/PVCO), CURRENT EDITION.

TESTING SHALL BE BETWEEN VALVES OR IN OTHER SUCH MANNER AS TO ASSURE THAT THE CHLORINATED WATER USED FOR TESTING AND STERILIZATION SHALL NOT BE LOST. IF A HYDRANT IS WITHIN THAT SECTION OF MAIN BEING TESTED, THE TEST SHALL INCLUDE THE FIRE HYDRANT. THE CONTRACTOR SHALL FURNISH ALL PIPING, BULKHEADS, PUMPS, GAUGES AND OTHER EQUIPMENT REQUIRED TO CARRY OUT THE TESTS. UPON COMPLETION OF ALL TESTING AND ACCEPTANCE OF THE MAIN, THE CONTRACTOR SHALL VERIFY THAT ALL MAIN LINE AND HYDRANT VALVES ARE OPEN.

PROPER TECHNIQUES SHALL BE FOLLOWED DURING CONSTRUCTION TO KEEP WATER MAINS CLEAN AND DRY. NEW WATER MAINS SHALL BE FLUSHED THOROUGHLY BEFORE DISINFECTION. DISINFECTION OF NEW WATER MAINS IS REQUIRED. BEFORE PLACING A NEW WATER MAIN IN SERVICE, ALL OF THE FOLLOWING SHALL OCCUR:

BEFORE COLLECTION OF EACH BACTERIOLOGIC SAMPLE, HEAVILY CHLORINATED WATER SHALL BE FLUSHED AND NEUTRALIZED FROM THE MAIN AND APPURTENANCES UNTIL THE CHLORINE MEASUREMENTS IN THE WATER LEAVING THE MAIN IS ABSENT OR NO HIGHER THAN THAT NORMALLY MAINTAINED IN THE DISTRIBUTION SYSTEM. HEAVILY CHLORINATED WATER SHALL BE NEUTRALIZED IN ACCORDANCE WITH AWWA SPECIFICATIONS. CARE MUST BE EXERCISED WHEN DISPOSING OF WATER WITH EXCESSIVE CHLORINE RESIDUALS. DISPOSAL OF CHLORINATED WATER INTO STORM SEWERS WITHOUT PRIOR NEUTRALIZATION OF THE CHLORINE RESIDUAL MUST BE AVOIDED IF RESIDUAL CHORINE WILL STILL BE PRESENT WHEN THE WATER DIRECTLY OR INDIRECTLY REACHES A STREAM, RIVER OR LAKE.

NEUTRALIZATION OF THE CHLORINE RESIDUAL REMAINING IN THE WATER CAN BE ACCOMPLISHED BY APPLICATION OF A DE--CHLORINATION CHEMICAL IN THE HIGHLY CHLORINATED WATER IN A TEMPORARY RETENTION POND OR CONTAINER. TYPICAL DE--CHLORINATION CHEMICALS EMPLOYED ARE SULFUR DIOXIDE, SODIUM BISULFITE, SODIUM SULFITE AND SODIUM THIOSULFATE.

NOT FEWER THAN 2 CONSECUTIVE WATER SAMPLES FOR BACTERIOLOGICAL ANALYSIS SHALL BE COLLECTED 24 HOURS APART UNLESS AN ALTERNATE INTERVAL IS APPROVED BY THE EGLE.

15. CLEANUP

CLEANUP SHALL BE IN COORDINATION WITH THE LOCAL STREET, CONTAMINATION CLEANUP AND BUILDING RESTORATION PROJECTS OCCURRING AT THE SAME TIME AS THIS WATER MAIN IMPROVEMENTS PROJECT.

16. MEASUREMENT FOR PAYMENT FOR WATERMAIN CONSTRUCTION

WHEN SET FORTH IN THE BID PROPOSAL, THE FOLLOWING METHODS SHALL BE USED TO ESTABLISH PAYMENT FOR WORK COMPLETED AND ACCEPTED UNDER THIS CONTRACT. WHEN THE FOLLOWING ITEMS ARE PART OF THE PROJECT AND NOT SET FORTH IN THE BID PROPOSAL, THEY SHALL BE DEEMED INCLUDED WITHIN OTHER ITEMS OF WORK.

A. **WATERMANS**--WATERMANS WILL BE PAID FOR AT THE UNIT PRICE BID TIMES THE ACTUAL NUMBER FEET CONSTRUCTED. UNIT PRICE SHALL INCLUDE ALL FITTINGS AND THRUST BLOCKS.

B. **HYDRANTS**--PAYMENT WILL BE MADE FOR THE NUMBER OF UNITS INSTALLED TIMES THE UNIT PRICE BID FOR EACH HYDRANT. UNIT PRICE BID FOR COMPLETE VALVED HYDRANT ASSEMBLY SHALL INCLUDE HYDRANT, SPOOL (1' MINIMUM), 6" GATE VALVE WITH VALVE BOX AND CONNECTING TEE.

C. **VALVES IN BOXES**---PAYMENT WILL BE MADE AT THE UNIT PRICE BID FOR EACH SIZE VALVE TIMES THE ACTUAL NUMBER OF VALVES FURNISHED AND INSTALLED. UNIT PRICE SHALL INCLUDE CAST IRON BOX INSTALLED WITH VALVE.

D. **COPPER SERVICES**--PAYMENT FOR SERVICES SHALL BE PAID AT THE UNIT PRICE BID TIMES THE ACTUAL NUMBER OF FEET CONSTRUCTED. PAYMENT FOR TAPING, CORPORATION COOKS, CURB STOPS, CURB BOXES AND FITTINGS TO BE INCLUDED IN THE UNIT PRICE BID PER FOOT.

E. **CONNECTING NEW WATERMANS TO EXISTING WATERMANS**--PAYMENT WILL BE MADE FOR EACH NEW MAIN AS BID IN THE PROPOSAL. PRICE SHALL INCLUDE ALL FITTINGS AND LABOR REQUIRED FOR THE COMPLETE CONNECTION. COST OF CONNECTIONS WHEN NOT BID SEPARATELY IN THE PROPOSAL SHALL BE CONSIDERED INCIDENTAL TO NEW WATERMAIN CONSTRUCTION.

F. **NEW WATER SERVICE SHUTOFF VALVES (CURB STOPS)**--WHEN BID SEPARATELY IN THE PROPOSAL, SHUTOFF VALVES WILL BE PAID FOR AT UNIT PRICE EACH TIMES THE ACTUAL NUMBER OF SHUTOFF VALVES INSTALLED.

G. **RECONNECTING EXISTING WATER SERVICES TO EXISTING OR NEW MAINS**--PAYMENT WILL BE MADE AT THE UNIT PRICE BID FOR EACH RECONNECTION TIMES THE ACTUAL NUMBER OF RECONNECTIONS MADE. PRICE SHALL INCLUDE ALL FITTINGS INCLUDING CORPORATION COCK OF PROPER SIZE AND ALL LABOR FOR COMPLETE RECONNECTION.

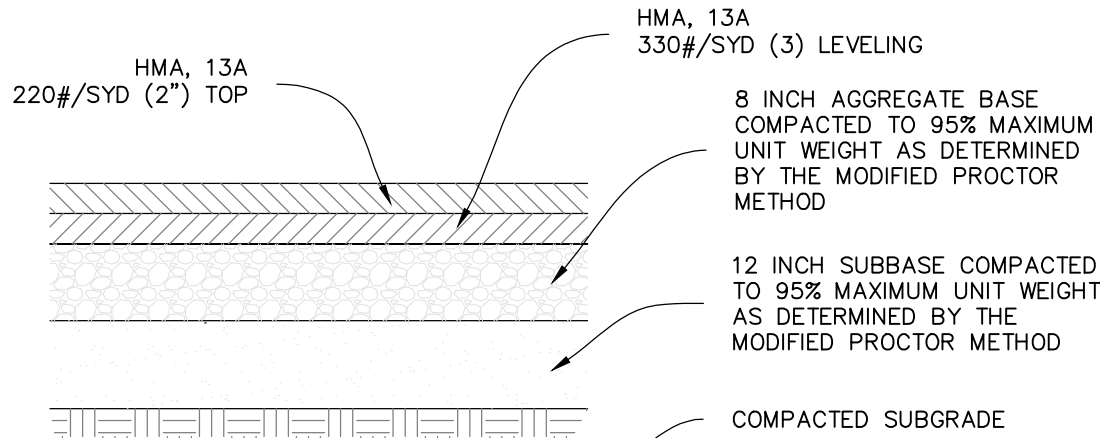
H. **NEW WATER SERVICE LINES (RESIDENTIAL OR COMMERCIAL)**--PAYMENT WILL BE MADE AT THE UNIT PRICE BID FOR EACH SIZE AND MATERIAL, TIMES THE ACTUAL NUMBER OF UNITS CONSTRUCTED.

GENERAL NOTES

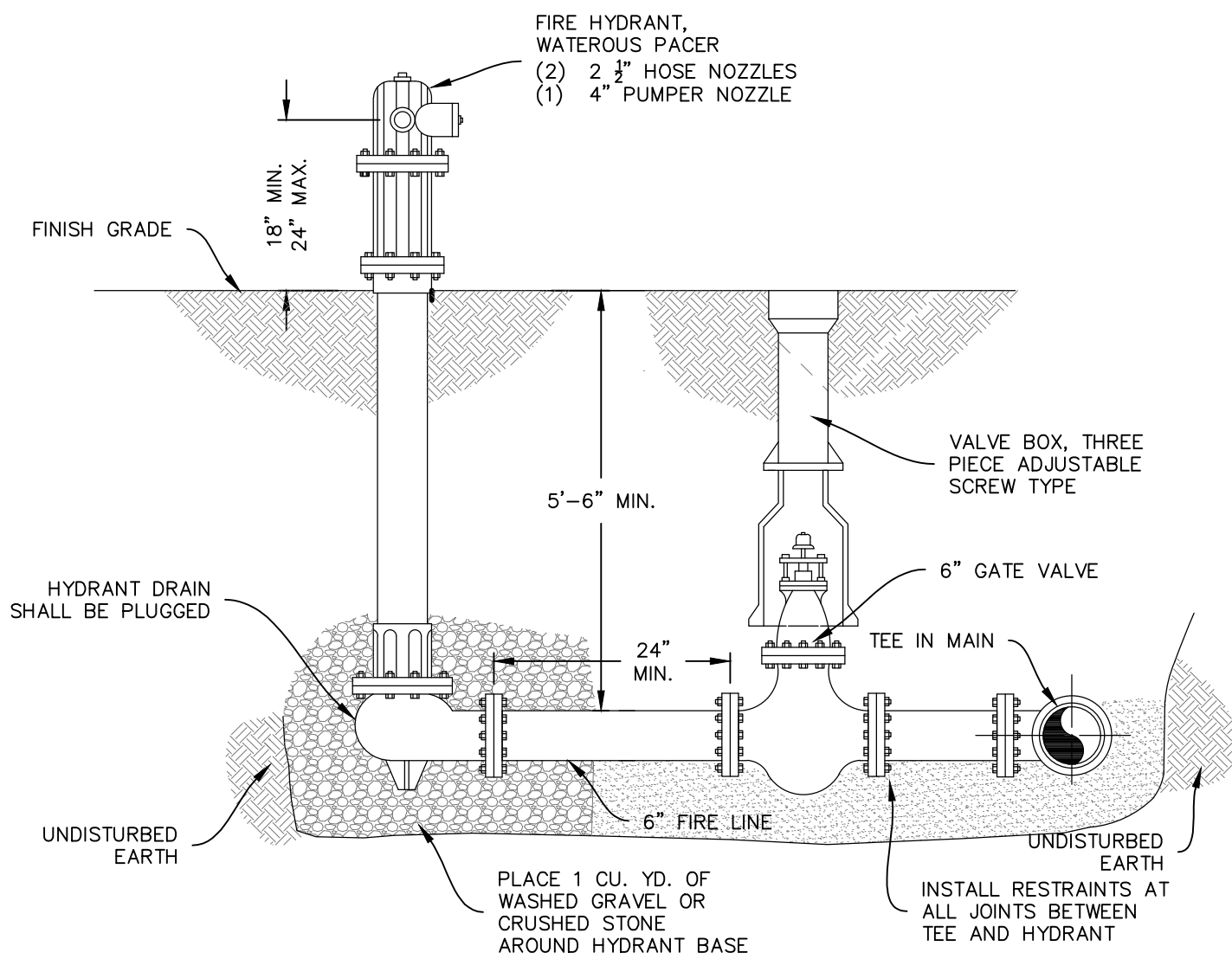
1. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ASSURING THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE REQUIREMENTS AND STANDARDS OF THE LOCAL GOVERNING AUTHORITY.

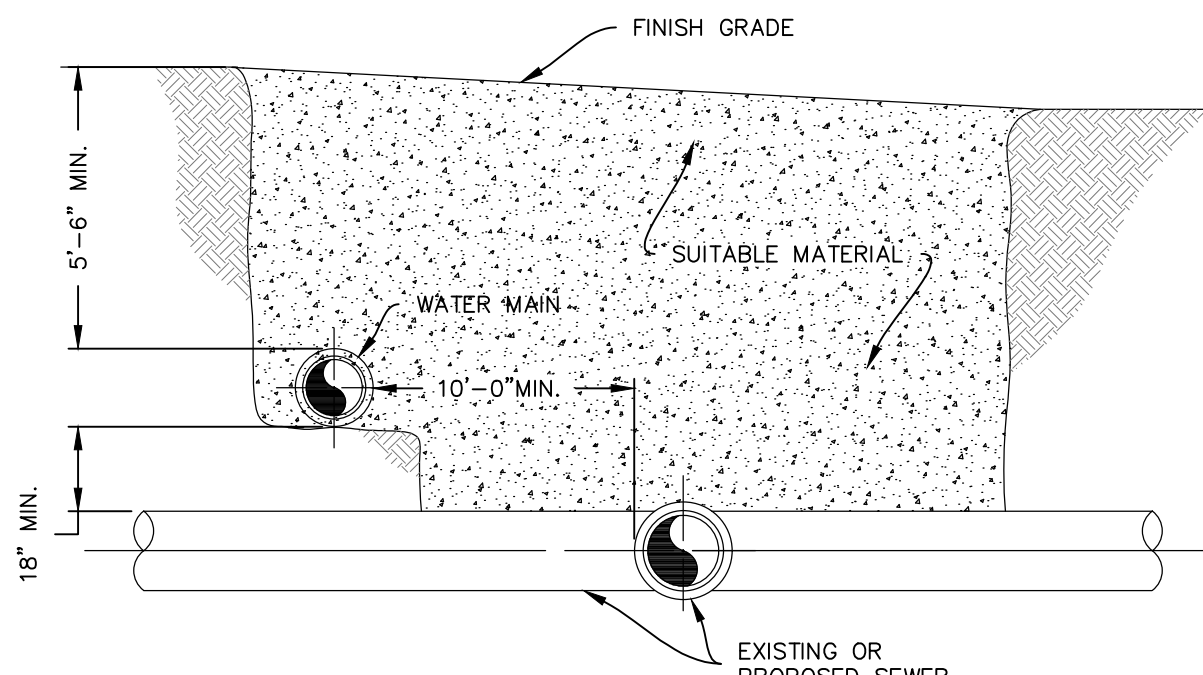
3. THE LOCATION OF THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON MISS DIG MARKINGS OR ABOVE GROUND UTILITIES LOCATED IN THE FIELD OR PLANS MADE AVAILABLE BY VARIOUS UTILITY PROVIDERS. WOLVERINE ENGINEERS AND SURVEYORS, INC. MAKES NO WARRANTIES AS TO THE ACCURACY OR COMPLETENESS OF UTILITY INFORMATION PROVIDED BY VARIOUS UTILITY COMPANIES. UTILITIES NOT VISIBLE AT THE TIME OF THE FIELD SURVEY HAVE NOT BEEN SHOWN AND WOLVERINE ENGINEERS AND SURVEYORS, INC. TAKES NO RESPONSIBILITY OF THESE UNKNOWN UTILITIES. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION AND NO ADDITIONAL COMPENSATION SHALL BE PAID TO THE CONTRACTOR FOR DAMAGE AND REPAIR TO THESE FACILITIES CAUSED BY HIS WORK FORCE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN ACCORDANCE WITH MICHIGAN P.A. NO. 53 OF 1974.



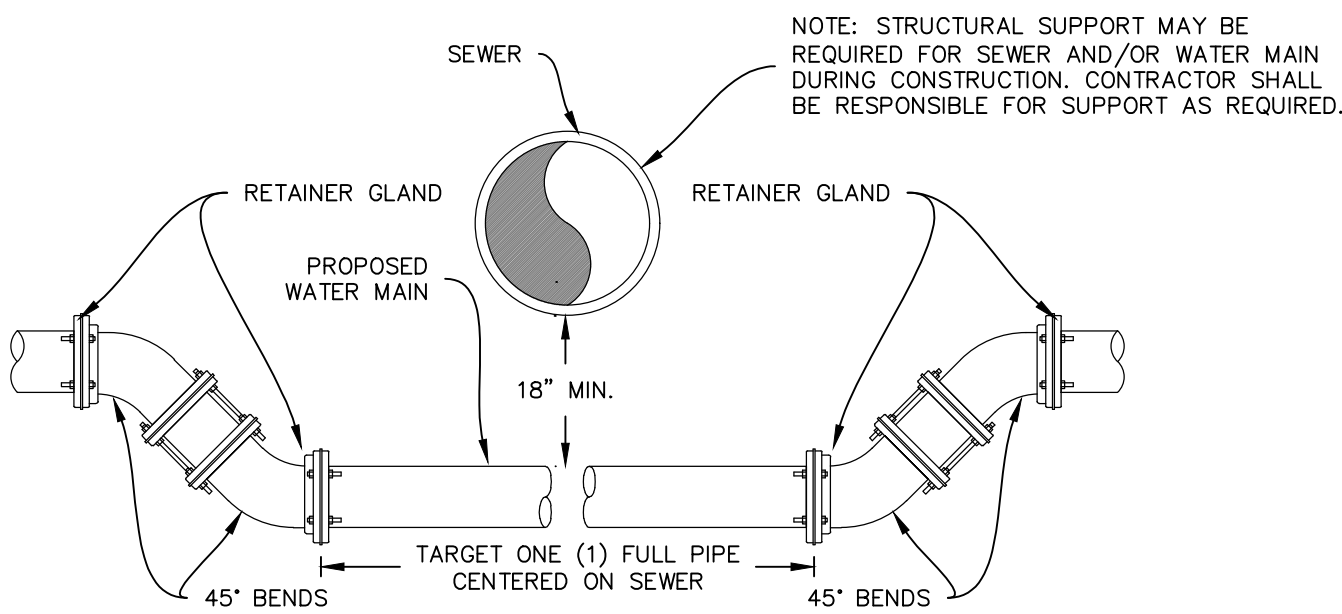
PAVEMENT REPLACEMENT SECTION
NO SCALE



HYDRANT & VALVE ASSEMBLY
NO SCALE



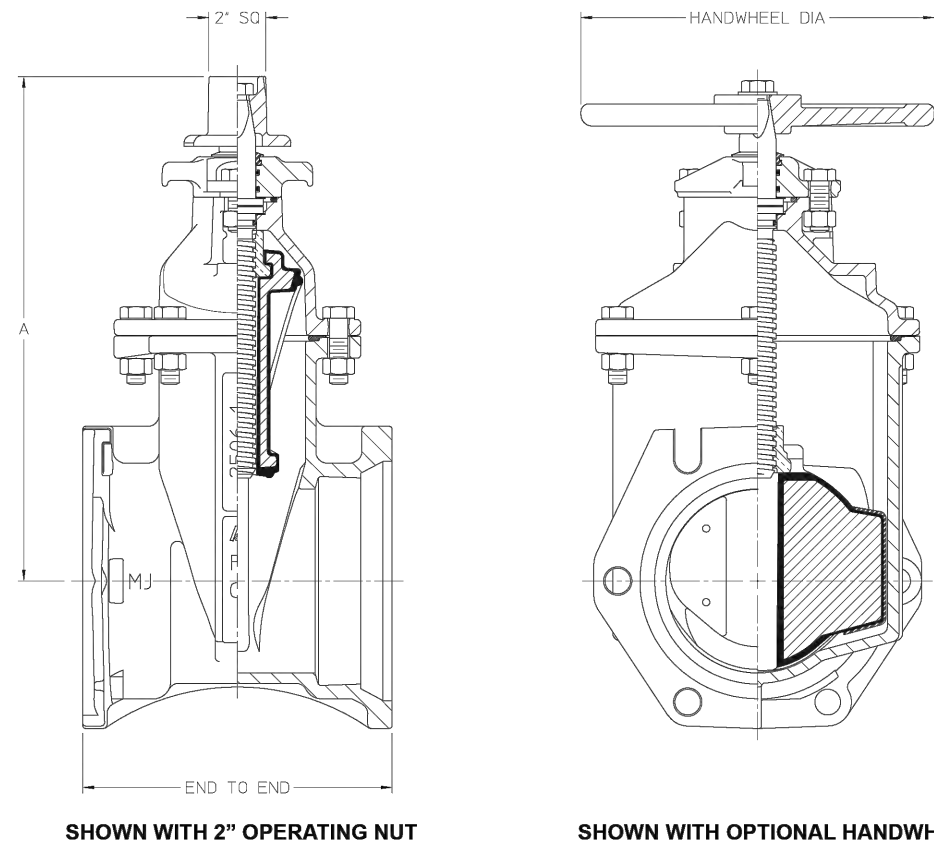
VERTICAL SEPARATION FOR WATER MAINS FROM SEWERS
NO SCALE



LOWERING WATER MAIN DETAIL
NO SCALE

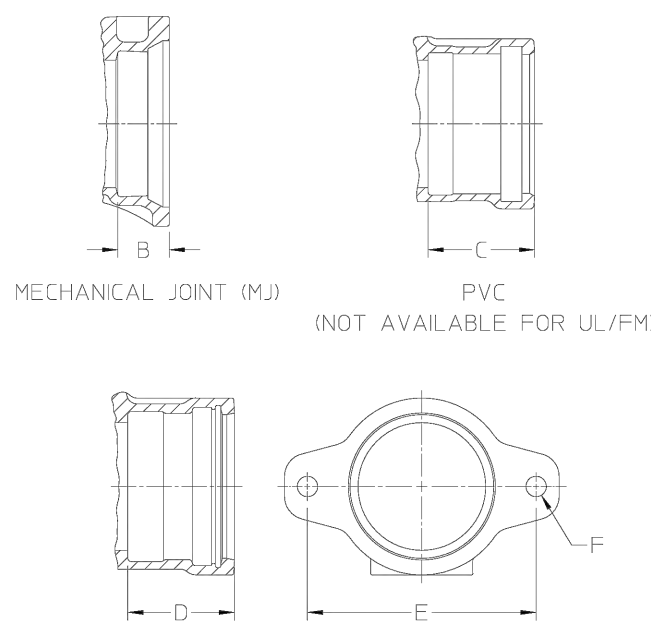
AMERICAN Flow Control Submittal Information

4" - 12" SERIES 2500-1 RESILIENT WEDGE GATE VALVE, NRS



SHOWN WITH 2" OPERATING NUT

SHOWN WITH OPTIONAL HANDWHEEL



OPTIONAL END CONNECTIONS

DIMENSION	VALVE SIZE				
	4"	6"	8"	10"	12"
End to End - M/JM	10.00	10.50	11.50	12.50	13.50
End to End - FL/FL	9.00	10.50	11.50	13.00	14.00
End to End - TY/TY	13.00	15.88	17.50	18.75	19.75
End to End - FL/MJ	9.50	10.50	12.38	13.62	14.38
End to End - FL/TY	11.00	13.19	14.50	15.88	16.88
End to End - PVC/PVC	13.00	15.88	17.50	-	-
A	13.91	17.12	20.47	24.06	27.59
B	2.50	2.50	2.50	2.50	2.50
C	4.00	5.22	5.50	-	-
D	4.00	5.22	5.50	5.62	5.62
E	9.00	11.19	13.50	15.88	18.00
F DIA	1.00	1.00	1.00	1.31	1.31
Handwheel Diameter	10.00	12.00	14.00	16.00	16.00
No. of Turns to Open	14	20	26	32	38



AMERICAN Flow Control
P.O. Box 2727
Birmingham, AL 35202-2727
Phone: 1-800-326-8051
Fax: 1-800-610-3366
E-mail: afcsales@american-usa.com

Waterous Company
125 Hardman Avenue South
South St. Paul, Mn. 55075-1191
Phone: 1-888-266-3686
Fax: 1-800-601-2809
E-mail: afcsales@american-usa.com

WWW.AMERICAN-USA.COM

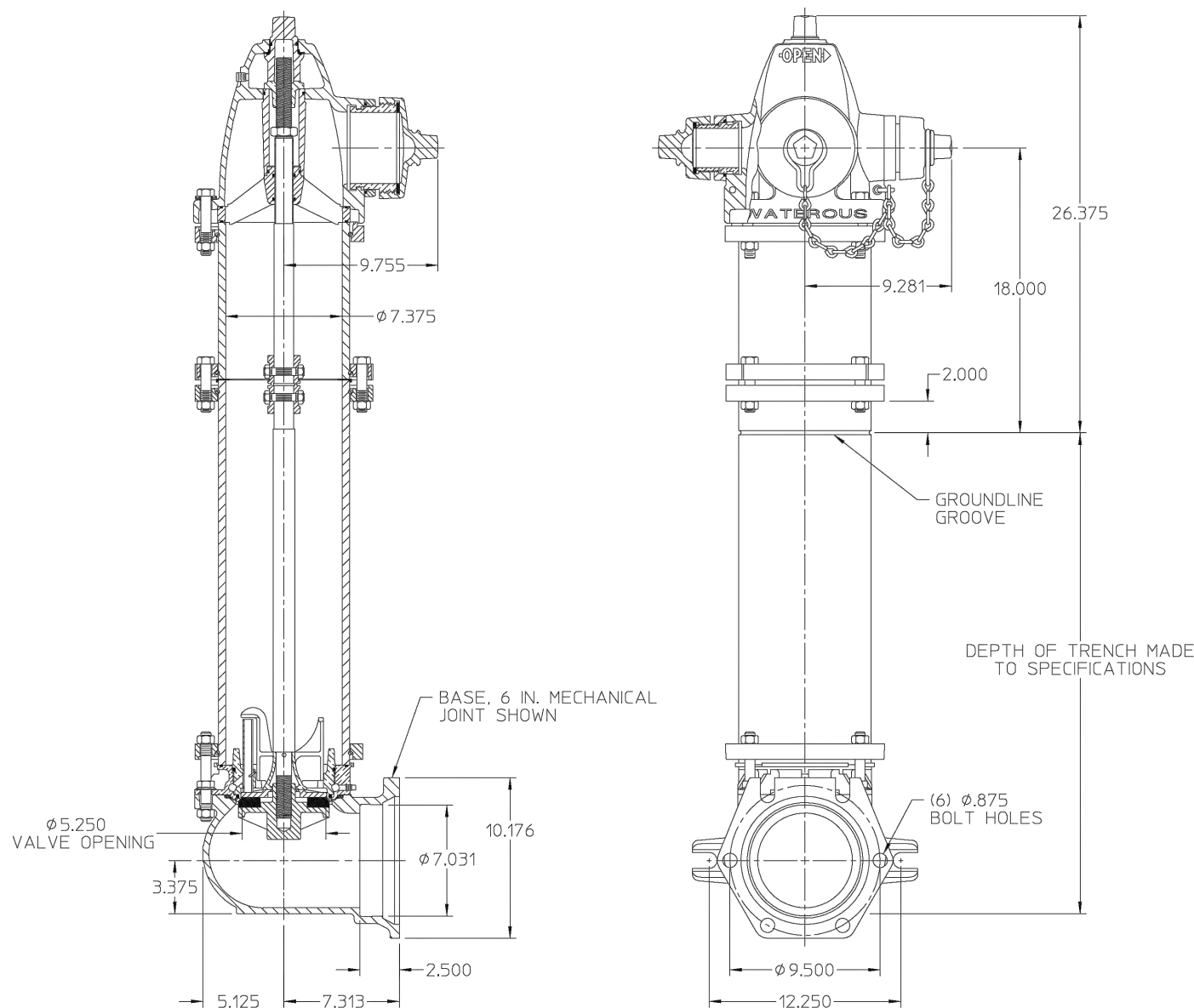
Page 1 of 2

GV11055

Issued: 2/26/2021

AMERICAN Flow Control Submittal Information

5-1/4" WATEROUS PACER® TRAFFIC MODEL WB67-250 FIRE HYDRANT



- NOTES:**
- 250 psig rated working pressure.
 - This hydrant meets or exceeds all requirements of AWWA C502.
 - 10 in. upper standpipe (traffic section) is standard. 16 in., 22 in., 28 in. and 34 in. upper standpipes are available by special order. Nozzle elevation will vary accordingly.
 - 5-1/4" valve opening.
 - Hydrants are available with counterclockwise opening direction (open-left) or clockwise opening direction (open-right).
 - Operating nut and nozzle cap wrench nuts are available in various shapes and sizes.
 - Certified to NSF/ANSI 61 & NSF/ANSI 372.



AMERICAN Flow Control
P.O. Box 2727
Birmingham, AL 35202-2727
Phone: 1-800-326-8051
Fax: 1-800-610-3366
E-mail: afcsales@american-usa.com

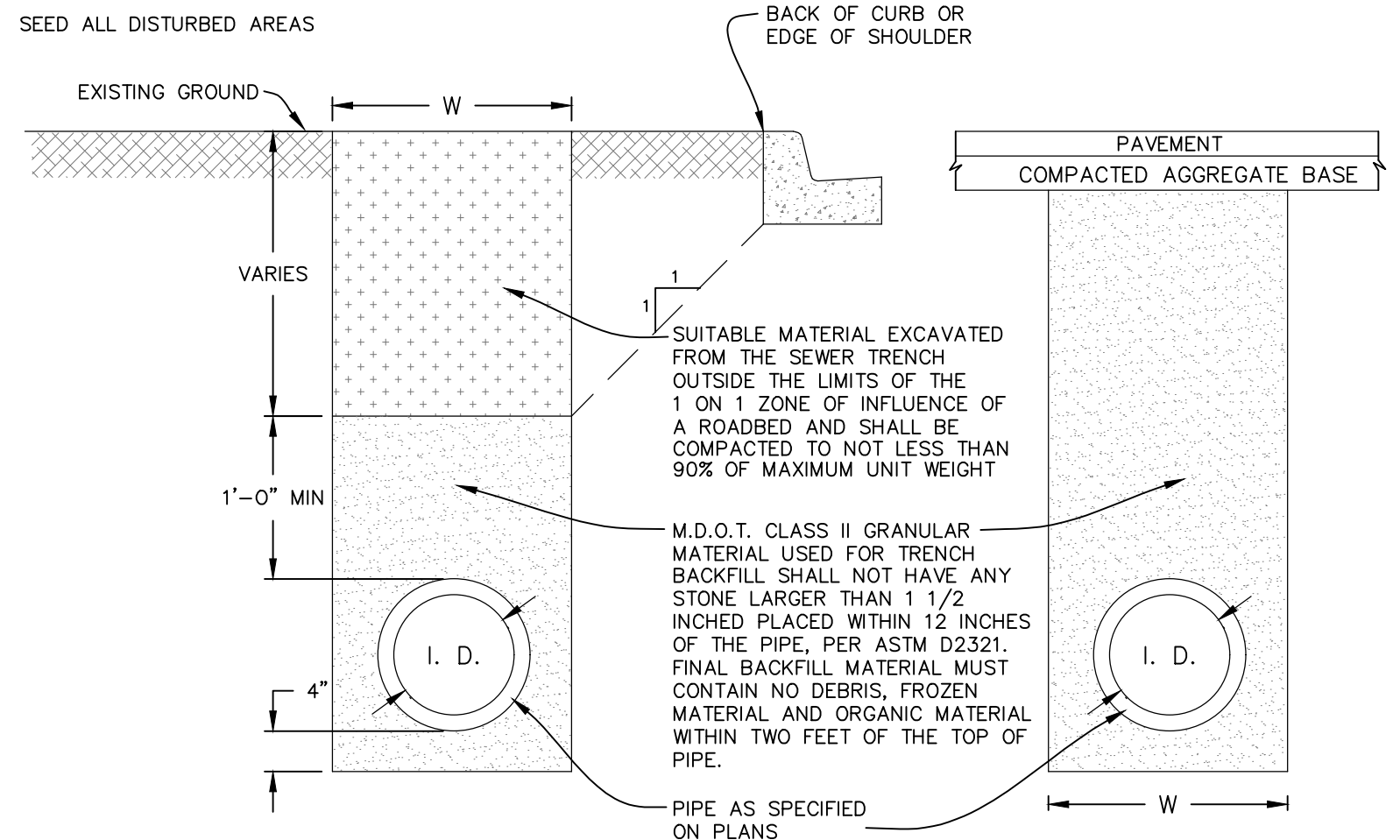
Waterous Company
125 Hardman Avenue South
South St. Paul, Mn. 55075-1191
Phone: 1-888-266-3686
Fax: 1-800-601-2809
E-mail: afcsales@american-usa.com

WWW.AMERICAN-USA.COM

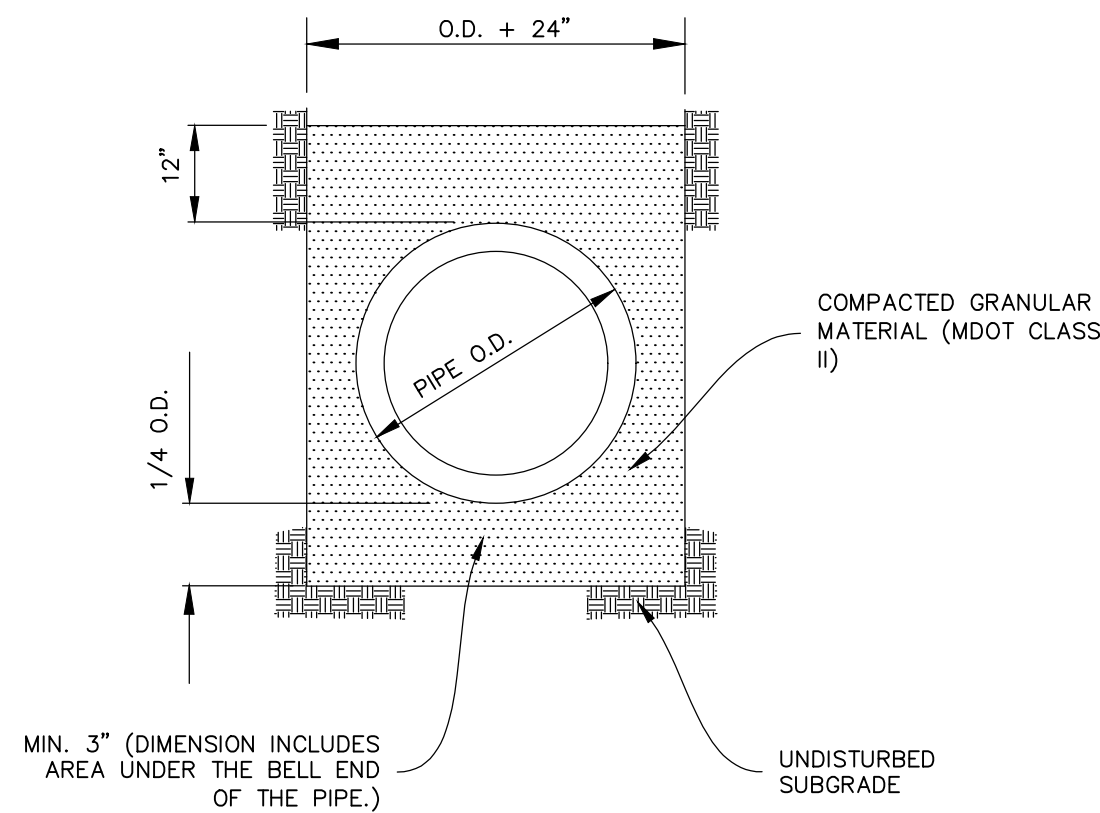
Page 1 of 4

FH11004

Issued: 3/25/2020



UTILITY TRENCH UNDER OR WITHIN INFLUENCE OF ROADWAY
NO SCALE



PIPE BEDDING DETAL
NO SCALE

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REVISION	DATE	DESCRIPTION
1	8/19/2023	ADD COMMENT, AND FILL, STICK NOTES

WOLVERINE
Engineers & Surveyors, Inc.
312 North Street
Mason, Michigan 48854
Ph: 317 676 9200
F: 317 676 9396
http://www.wolverine.com

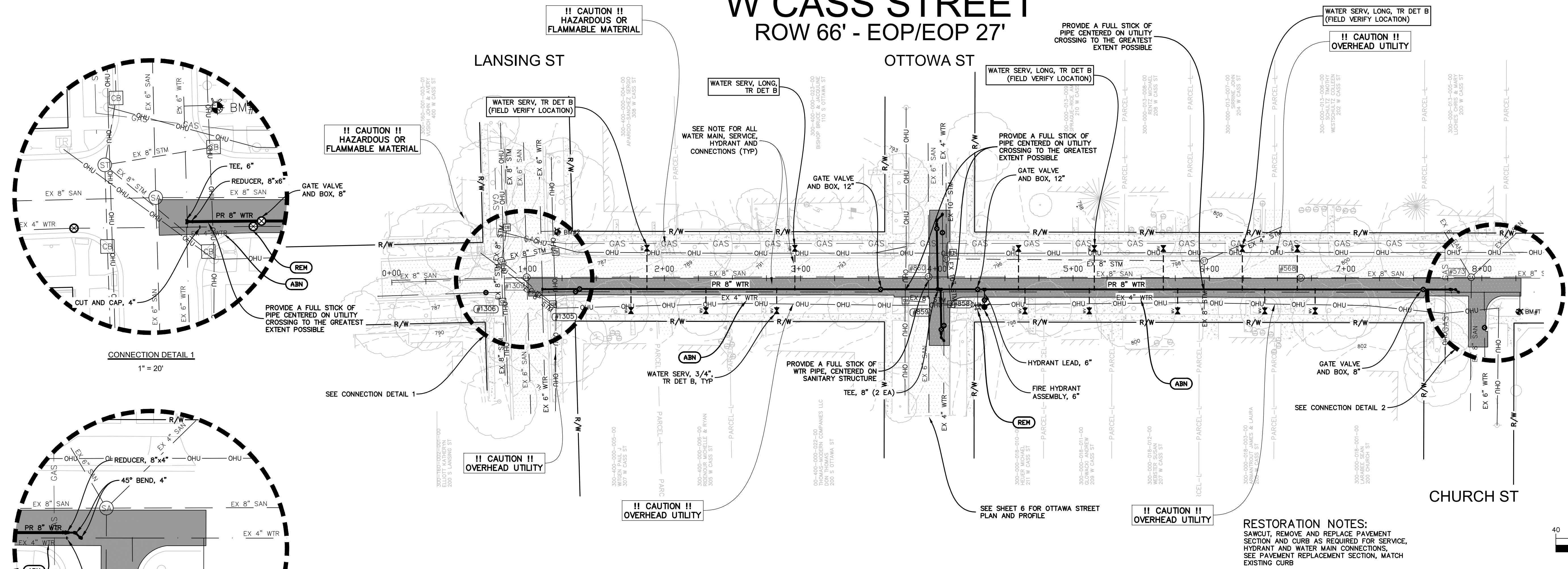
CASS STREET WATER MAIN REPLACEMENT
CITY OF ST. JOHNS
CLINTON COUNTY, MICHIGAN

DETAILS

PERMIT SET

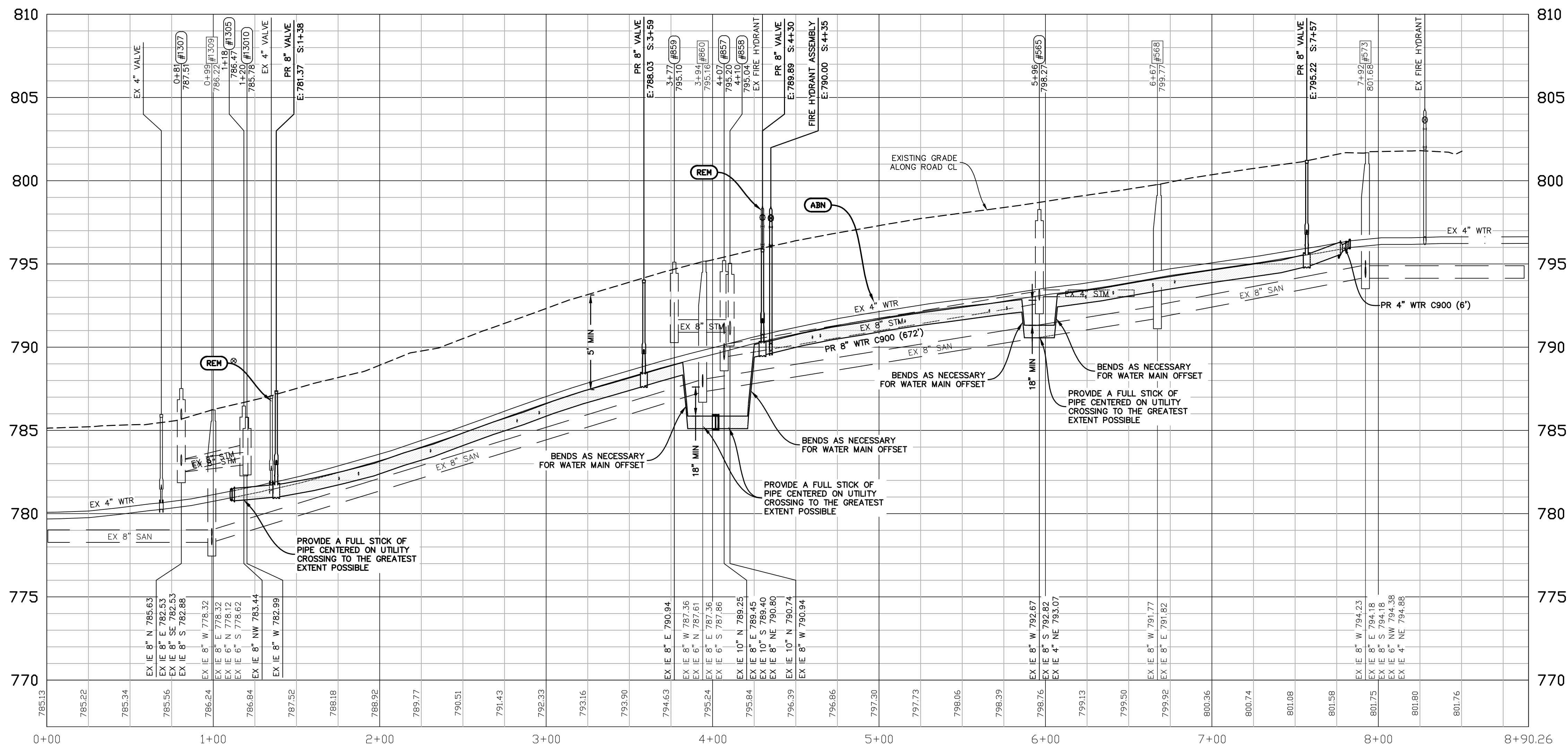
APPROVED	DBH
CHECKED	DBH
DRAWN	TAP
JOB NO.	25-0016
DATE	7/19/2025
SCALE	AS NOTED
SHEET NO.	4

W CASS STREET
ROW 66' - EOP/EOP 27'



WATER MAIN NOTES:
 PROVIDE A FULL STICK OF PIPE CENTERED ON ALL UTILITY
 CROSSINGS AND AT DRAINAGE STRUCTURES WITH LESS THAN
 10- FEET OF SEPARATION TO THE GREATEST EXTENT
 POSSIBLE

ISOLATION CONFLICTS		
STATION	STRUCTURE	DISTANCE
1+10 TO 3+94	EX 8" SAN	8.4' MIN
1+17	EX STM CB	8.1'
3+77	EX STM CB	5.4
3+94	EX SAN MH	6.6'
3+94 TO 7+81	EX 8" SAN	8.4' MIN
4+10	EX STM CB	8.0'



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REVISION	DATE	DRAWN	DESCRIPTION
1	8/19/2025	TAP	EGL COMMENT, ADD FULL STICK NOTES

WOLVERINE
Engineers & Surveyors, Inc.

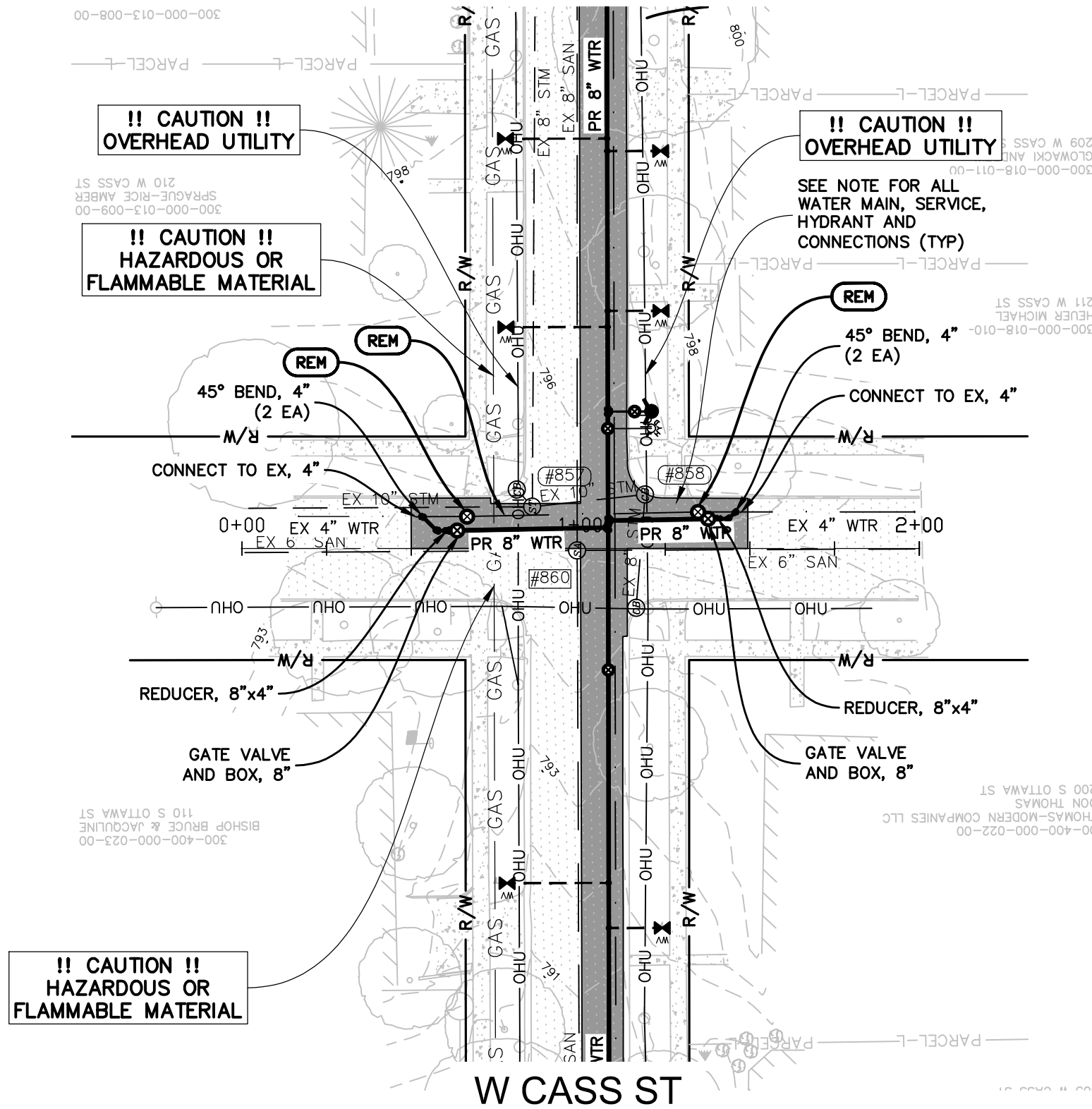
312 North Street
Mason, Michigan 48854
Ph: 517 676 9200
fx: 517 676 9396
<http://www.wolveng.com>

CASS STREET WATER MAIN REPLACEMENT
CITY OF ST. JOHNS
CLINTON COUNTY, MICHIGAN
CASS STREET PLAN AND PROFILE

PERMIT SET

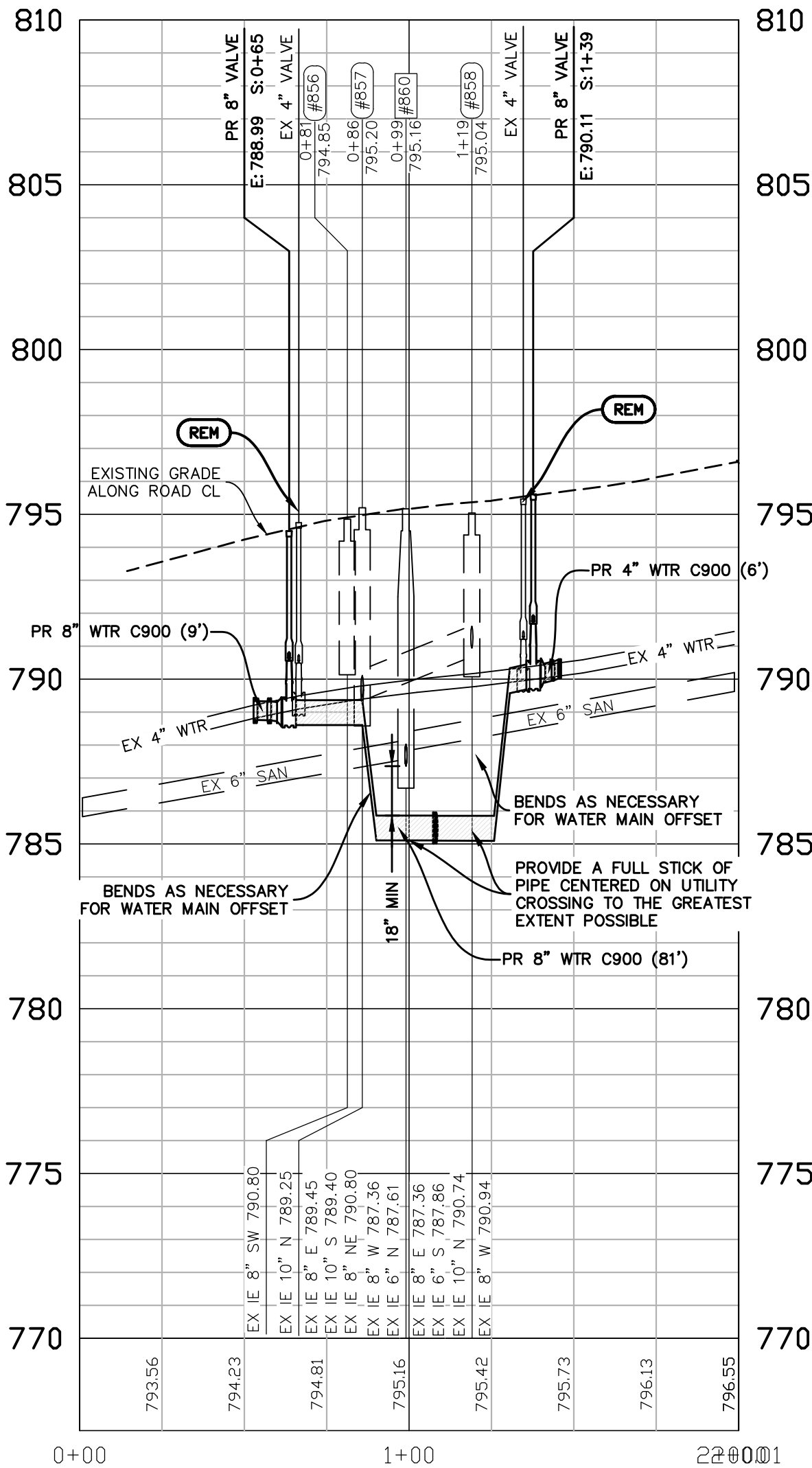
APPROVED	DBH
CHECKED	DBH
DRAWN	TAP
JOB NO.	25-0016
DATE	7/19/2025
SCALE	AS NOTED
SHEET NO.	5

S OTTAWA STREET
ROW 66' - EOP/EOP 30'

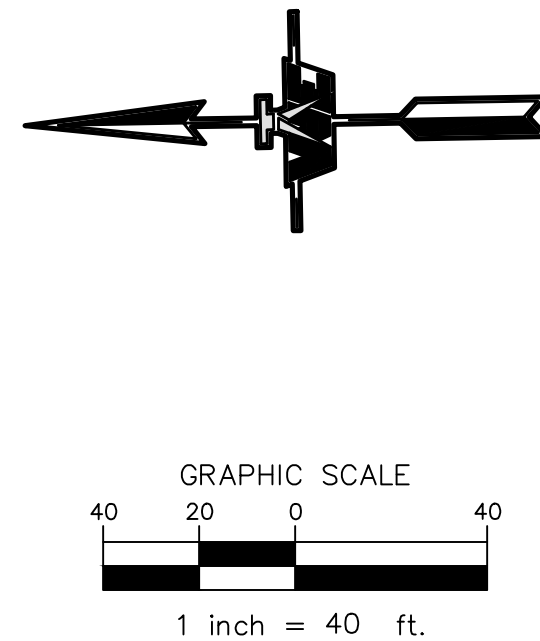


RESTORATION NOTES:
SAWCUT, REMOVE AND REPLACE PAVEMENT SECTION AND CURB AS REQUIRED FOR SERVICE, HYDRANT AND WATER MAIN CONNECTIONS, SEE PAVEMENT REPLACEMENT SECTION, MATCH EXISTING CURB

WATER MAIN NOTES:
PROVIDE A FULL STICK OF PIPE CENTERED ON ALL UTILITY CROSSINGS AND AT DRAINAGE STRUCTURES WITH LESS THAN 10-FOOT OF SEPARATION TO THE GREATEST EXTENT POSSIBLE



ISOLATION CONFLICTS (OTTAWA)		
STATION	STRUCTURE	DISTANCE
0+56 TO 0+86	EX 10" STM	7.0' MIN
0+56 TO 1+08	EX 6" SAN	6.0' MIN
0+86	EX STM CB	3.8'
0+86 TO 1+08	EX 10" STM	5.9'
0+99	EX SAN MH	3.8'
0+99 TO 1+08	EX 6" SAN	6.0' MIN
1+08 TO 1+19	EX 10" STM	6.0' MIN
1+08 TO 1+43	EX 6" SAN	7.9' MIN
1+19	EX STM CB	4.6'



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REVISION	DATE	DRAWN	DESCRIPTION
1	8/19/2023	TAP	ESSE COMMENT, ADD FULL STICK NOTES

WOLVERINE
Engineers & Surveyors, Inc.
312 North Street
Mason, Michigan 48854
Ph: 317 676 9200
Fx: 317 676 9396
http://www.wolverine.com

PERMIT SET

PROJECT: CASS STREET WATER MAIN REPLACEMENT
CITY OF ST. JOHNS
CLINTON COUNTY, MICHIGAN
SHEET TITLE: CROSS STREETS PLAN AND PROFILE

APPROVED: DBH
CHECKED: DBH
DRAWN: TAP
JOB NO.: 25-0016
DATE: 7/19/2025
SCALE: AS NOTED
SHEET NO.: 6