MD NOTES_CIVIL 06.16.2025

*Note to designer: Edit for project specific notes.*

**GENERAL NOTES**

1. THE CONTRACTORS SHALL VERIFY LOCATIONS OF ALL U/G UTILITY LINES AND NOTIFY "MISS DIG" 811 PRIOR TO EXCAVATING. THE CONTRACTOR WILL BE RESPONSIBLE TO REPAIR ANY UTILITY LINE DAMAGED BY CONSTRUCTION ACTIVITIES.

2. IF PLAN INFORMATION INDICATES AN EXISTING UNDERGROUND UTILITY IS OR WILL BE OUT OF SERVICE WITHIN THE LIMITS OF THIS CONTRACT, THE CONTRACTOR IS CAUTIONED TO TREAT SUCH A LINE AS IF IT WERE STILL IN SERVICE AND NOTIFY “MISS DIG” WHEN WORKING IN THE AREA OF THE OUT OF SERVICE FACILITY.

3. ALL WORK SHALL BE COMPLETED IN CONFORMANCE WITH CURRENT ADA STANDARDS.

4. ALL MATERIALS, EQUIPMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT UNIVERSITY OF MICHIGAN STANDARD SPECIFICATIONS FOR CONSTRUCTION AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION.

5. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTORS OF THEIR OBLIGATION TO CONSTRUCT ITEMS IN COMPLETE ACCORDANCE WITH U-M AND CITY OF ANN ARBOR STANDARD SPECIFICATIONS, AS WELL AS FOLLOW CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

6. ALL WORK WITHIN CITY OF ANN ARBOR RIGHT-OF-WAY (ROW) SHALL MEET OR EXCEED THE CURRENT CITY OF ANN ARBOR STANDARD SPECIFICATIONS FOR CONSTRUCTION.

7. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS & FEES – ALLOW ADEQUATE TIME FOR OBTAINING PERMITS. CITY OF ANN ARBOR BARRICADE PERMIT IS REQUIRED IF CONTRACTOR IS INSTALLING BARRICADES IN THE ROW TO ACCESS WORK THAT IS NOT IN THE ROW. A CITY OF ANN ARBOR ROW PERMIT IS REQUIRED TO PERFORM WORK IN THE CITY OF ANN ARBOR ROW, INCLUDING SIDEWALK RESTORATION. A CITY OF ANN ARBOR TRAFFIC CONTROL PERMIT IS REQUIRED TO IMPACT A LANE OF TRAFFIC IN THE CITY OF ANN ARBOR ROW, INCLUDING VEHICULAR DETOURS OR LANE CLOSURES.

8. WALKS WITHIN THE CITY ROW SHALL BE INSPECTED BY THE CITY OF ANN ARBOR ACCORDING TO THE CITY STANDARDS.

9. ALL BARRICADES AND TRAFFIC CONTROL REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR AND MEET MMUTCD REQUIREMENTS. ALL PEDESTRIAN BARRICADES SHALL MEET MDOT ADA PEDESTRIAN RAIL REQUIREMENTS.

10. CONTRACTOR SHALL PROVIDE A PEDESTRIAN DETOUR IN ALL INSTANCES WHERE A SIDEWALK WIDTH IS CLOSED OR REDUCED TO LESS THAN 5 FEET IN WIDTH. THIS INCLUDES BUT IS NOT LIMITED TO BARRICADES, SIDEWALK CLOSED SIGNS, & DETOUR ARROWS AS OUTLINED IN THE MMUTCD.

11. CONTRACTOR SHALL CONTACT REPUBLIC PARKING (734-761-7235) TO COORDINATE ANY NECESSARY CLOSURE OF CITY OF ANN ARBOR ON-STREET PARKING AND SHALL PAY ANY ASSOCIATED FEES. TEMPORARY RESTRICTION OF ON-STREET PARKING (NON-METERED) IS ARRANGED THROUGH CITY OF ANN ARBOR ENGINEERING AFTER PAYMENT OF FEES.

12. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR INSTALLATION OF SESC CONTROL MATERIALS. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN INLET FILTER BAGS ON ALL STORM WATER INLETS IN THE VICINITY OF THE PROJECT SITE WHICH MAY RECEIVE STORM WATER RUNOFF FROM THE SITE. THE CONTRACTOR SHALL REMOVE THE INLET FILTER BAGS AT THE CONCLUSION OF THE PROJECT WORK.

13. CONTRACTORS SHALL AVOID NOISE GENERATING WORK AROUND CAMPUS BUILDINGS DURING UNIVERSITY SEMESTER EXAM PERIODS. *(NOTE TO DESIGNER – EDIT AS JOB APPROPRIATE)*

14. MATERIAL TESTING WILL BE PROVIDED BY A 3RD PARTY HIRED BY OWNER. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL MATERIAL TESTING.

15. NO EQUIPMENT OR VEHICLES MAY BE PARKED IN LAWN OR LANDSCAPED AREAS WITHOUT PRIOR APPROVAL BY U-M PROJECT MANAGER.

16. NO STORAGE OF MATERIALS, PARKING, OR DRIVING IS ALLOWED WITHIN THE LIMITS OF TREE CANOPIES.

17. EGRESS TO BUILDINGS SHALL BE MAINTAINED AT ALL TIMES. WORK WITH U-M PROJECT MANAGER TO COORDINATE ANY LOCATIONS WHERE WORK WILL CUT OFF BUILDING ACCESS.

18. ALL DISTURBED U-M LANDSCAPE GRASS AREAS SHALL BE RESTORED BY THE CONTRACTOR BY INSTALLING A MINIMUM OF 6" OF TOPSOIL, SEED AND MULCH OR HYDROSEED UNLESS NOTED OTHERWISE.

19. MAINTAIN VISIBILITY AND ACCESSIBILITY TO FIRE HYDRANTS AND BUILDING FIRE DEPARTMENT CONNECTION LOCATIONS.

20. GOOD HOUSEKEEPING PRACTICES MUST BE EMPLOYED AT THE JOB SITE. MINIMIZE DUST.

21. ALL BROKEN ASPHALT, CONCRETE, & DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY REMOVED FROM THE SITE PRIOR TO THE COMPLETION OF THE CONTRACT. NO STOCKPILING WILL BE ALLOWED ON SITE.

22. SEQUENCING OF WORK IS TO BE APPROVED BY PROJECT MANAGER PRIOR TO STARTING CONSTRUCTION.

23. PARKING LOT LIGHTING WORK WILL BE CARRIED OUT BY U-M POWER AND LIGHTING SHOP. CONTRACTOR SHALL COORDINATE GRADING & U/G WORK WITH U-M POWER AND LIGHTING SHOP BY CALLING THE FACILITIES & OPERATIONS SERVICE CENTER AT 734-647-2059.
    *(NOTE TO DESIGNER – EDIT AS JOB APPROPRIATE. DELETE FIRST PARAGRAPH IF U-M IS NOT CARRYING OUT ELECTRICAL WORK.)*

COORDINATE SITE LIGHTING WORK AND PANEL ACCESS FOR SHUTDOWNS WITH U-M POWER AND LIGHTING BY CALLING THE FACILITIES & OPERATIONS SERVICE CENTER AT 734-647-2059.

24. ALL PIPE FURNISHED SHALL BE ACCOMPANIED BY THE MANUFACTURER'S CERTIFICATE OF TEST SHOWING CONFORMITY WITH THE SPECIFIED PIPE. EACH CERTIFICATE SHALL IDENTIFY A SPECIFIC LOT NUMBER, QUANTITY OF PIPE, AND SHOW ACTUAL TEST RESULTS FOR THE LOT FURNISHED. ALL PIPE FURNISHED SHALL BE SUBJECT TO INSPECTION ON ARRIVAL AT THE JOB SITE BY THE OWNER'S DESIGNATED REPRESENTATIVE. THE PURPOSE OF THE INSPECTION SHALL BE TO CULL AND REJECT PIPE OR FITTINGS THAT, INDEPENDENT OF PHYSICAL TESTS SPECIFIED UNDER THE STANDARD SPECIFICATIONS DESIGNATED HEREIN, FAIL TO CONFORM TO THE REQUIREMENTS OF THE SPECIFIED PIPE STANDARDS. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE SUFFICIENTLY IN ADVANCE SO THAT AN INSPECTOR CAN BE ON THE JOB SITE DURING THE UNLOADING OF MATERIALS. A MINIMUM NOTICE OF 24 HOURS IS REQUIRED FOR SUCH UNLOADING AND INSPECTION.

**CITY OF ANN ARBOR GENERAL NOTES**

1. ALL SIDEWALKS WITHIN THE CITY SHALL BE KEPT AND MAINTAINED IN GOOD REPAIR BY THE OWNER OF THE LAND, ADJACENT TO AND ABUTTING UPON THE SAME; AND IF ANY OWNER SHALL NEGLECT TO KEEP AND MAINTAIN THE SIDEWALK OR ANY WALKS AND RAMPS LEADING TO A CROSSWALK ALONG THE FRONT, REAR, SIDE OF THE LAND IN GOOD REPAIR AND SAFE FOR THE USE OF THE PUBLIC, THE SAID OWNER SHALL BE LIABLE TO THE CITY FOR ANY DAMAGES RECOVERED AGAINST THE CITY SUSTAINED BY ANY PERSON OF SAID SIDEWALK BEING UNSAFE AND OUT OF REPAIR. CONTRACTOR SHALL REPLACE ANY DAMAGED SIDEWALK (FULL FLAGS) AS A RESULT OF CONTRACTOR OPERATIONS.

2. THE CONSTRUCTION OF ANY PUBLIC UTILITY AND WORK WITHIN THE CITY OF ANN ARBOR RIGHT OF WAY COVERED BY THESE PLANS SHALL CONFORM TO THE CURRENT CITY OF ANN ARBOR PUBLIC SERVICES STANDARD SPECIFICATIONS AND DETAILS. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT. THE WORK SHALL BE PERFORMED IN COMPLETE CONFORMANCE WITH THE CURRENT DETAILS. IF DETAILS INCLUDED IN THESE PLANS DIFFER FROM CITY'S CURRENT DETAILS, THE CITY'S CURRENT DETAILS SUPERSEDE. NOTE THAT U-M SIDEWALK STANDARD DETAIL EXCEEDING CITY STANDARDS IS ACCEPTED AND REQUIRED IN THE CITY ROW. REFER TO CITY OF ANN ARBOR RESOURCES TO ACCESS CURRENT SPECIFICATIONS AND DETAILS:
https://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

3. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING PUBLIC ROAD PAVEMENT SURFACES TO REMAIN. DAMAGE TO THE ROAD PAVEMENT DURING THE COURSE OF CONSTRUCTION MAY NECESSITATE MILLING AND RESURFACING OF THE DAMAGED AREAS AT THE COST OF THE CONTRACTOR AND PRIOR TO PROJECT ACCEPTANCE.

4. PAVEMENT MARKINGS DISTURBED DUE TO PAVEMENT CUTS OR CONSTRUCTION RELATED ACTIVITIES SHALL BE REPLACED AS DIRECTED BY ENGINEERING. REPLACEMENT DURING

CONSTRUCTION OF THE PROJECT MAY BE CONSIDERED TEMPORARY, WITH FINAL PAVEMENT MARKING RESTORATION TO OCCUR AT THE END OF THE PROJECT.

**CONCRETE NOTES**

1. UNLESS OTHERWISE NOTED ON THE DETAIL, ALL EXTERIOR CONCRETE SHALL BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AND CONSIST OF AIR ENTRAINED PORTLAND LIMESTONE CEMENT (ASTM C595/AASHTO M240 TYPE IL CEMENT) WITH A TOTAL AIR CONTENT OF NOT LESS THAN 5% AND NOT MORE THAN 8%. CEMENT CONTENT SHALL BE MINIMUM OF SIX BAGS PER CUBIC YARD. THE SLUMP SHALL NOT BE MORE THAN 4 INCHES NOR LESS THAN 1- ½ INCHES AS DETERMINED BY THE SLUMP CONE TEST ASTM-143. SLUMP GREATER THAN 5 INCHES WITH USE OF AN ADMIXTURE REQUIRES ENGINEER AND U-M PROJECT MANAGER APPROVAL. CONC. WALKS AND PAVEMENT SHALL INCLUDE MONOFILAMENT POLYPROPYLENE MICRO FIBER WITH A VOLUME OF 1.0 LBS/CY THAT COMPLIES WITH ASTM C-1116, STANDARD SPECIFICATION FOR FIBER REINFORCED CONCRETE AND SHOTCRETE. ALL MATERIALS, EQUIPMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR CONSTRUCTION.

2. CONCRETE CURING COMPOUND SHALL BE CLEAR MEMBRANE CONFORMING TO ASTM C-309, TYPE I OR ID, CLASS A AND B AND APPLIED AT A RATE OF NOT LESS THAN ONE GALLON PER 200 SQ. FT. OF CONCRETE SURFACE IMMEDIATELY AFTER FINISHING OPERATIONS ARE COMPLETE. CURING COMPOUND USED WITHIN CLOSE PROXIMITY OF BUILDING DOORS, WINDOWS OR AIR INTAKES SHALL BE WATER BASED.

3. GRANULAR MATERIAL SHALL BE A MINIMUM OF MDOT CLASS II COMPACTED TO 98% ASTM 1557 VALUE. GRANULAR MATERIAL WITHIN THE ROW SHALL MEET CITY OF ANN ARBOR CLASS II REQUIREMENTS. COMPACTED GRANULAR MATERIAL SHALL EXTEND HORIZONTALLY FOR MINIMUM DISTANCE OF 6” BEYOND THE EDGES OF NEW CONCRETE.

4. ALL PREPARED GRANULAR FILL BASE SHALL MEET COMPACTION REQUIREMENTS PRIOR TO THE SCHEDULING OF CONCRETE/PAVING MATERIAL DELIVERY. CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF REQUIRED MATERIAL TESTING.

5. PLACE CONCRETE ON A MOIST COMPACT BASE.

6. NOTE - TYPE 1L PORTLAND LIMESTONE CEMENT REQUIRES MORE TIME TO FINISH THAN TYPE 1 PORTLAND CEMENT. IT HAS MORE BLEED WATER, SETS SLOWER AND MAY LOOK READY BEFORE IT IS. RUSHING THE FINISHING PROCESS IS A TOP CAUSE FOR SURFACE PROBLEMS. FINISHERS SHOULD BE TRAINED IN TYPE IL PORTLAND LIMESTONE CEMENT. CONTACT THE MICHIGAN CONCRETE ASSOCIATION FOR TRAINING.

7. PROVIDE 1/2" THICK SEALED EXPANSION JOINTS AT ALL POINTS OF CONTACT WITH FIXED OBJECTS SUCH AS BUILDING, CURBS, PAVING, POLES, SIGNS, MANHOLES, AND HYDRANTS. EXPANSION JOINTS SHALL BE INCIDENTAL TO CONCRETE INSTALLATION.

8. PROVIDE HAND TOOLED CONTROL JOINTS IN CONCRETE WALKS TO FORM PANELS OF SIZES INDICATED OR MATCH EXISTING PATTERN. HAND TOOL ½” WIDE CONTROL JOINTS TO A MINIMUM

DEPTH OF ONE (1) INCH. TOTAL DEPTH OF CONTROL JOINT SHALL BE ¼ OF SLAB THICKNESS. FOR SLAB THICKNESS GREATER THAN 8", SAWCUTTING, IN ADDITION TO AND AFTER HAND TOOLING JOINTS, IS REQUIRED TO MEET A FINAL DEPTH OF ¼ THICKNESS OF THE SLAB. SAWCUTTING SHALL OCCUR AS SOON AS POSSIBLE AND WITHIN 24 HOURS OF CONCRETE INSTALLATION. INITIAL SURFACE SAWCUT CONTROL JOINTS (SAWCUT ONLY) ARE PROHIBITED UNLESS APPROVED BY OWNER.

9. SAWCUT & GRINDING TOOLS MUST BE ATTACHED TO A WATER SOURCE OR A VACUUM DEVICE TO MINIMIZE DUST EXPOSURE.

10. SAWCUTTING FOR REMOVALS SHALL BE INCIDENTAL TO REMOVAL.

11. PROTECT CONCRETE PAVEMENT FROM DAMAGE BY PRECIPITATION. AS DIRECTED BY THE U-M PROJECT MANAGER AND AT NO COST TO U-M, REPLACE CONCRETE SHOWING DAMAGE OR AESTHETICALLY IMPACTED DUE TO INADEQUATE PRECIPITATION PROTECTION.

**UTILITY NOTES**

**TRACER WIRE**

1. A DETECTABLE TRACER WIRE FOR FUTURE LOCATION EFFORTS SHALL BE INSTALLED THE ENTIRE LENGTH OF WATER MAINS OR AS DIRECTED BY THE AUTHORITY HAVING JURISDICTION (AHJ). FOR SANITARY OR STORM SEWERS, TRACER WIRE SHALL BE INSTALLED THE LENGTH OF THE PIPE WHEN JUNCTIONS ARE NOT VISIBLE AT GROUND LEVEL, SUCH AS SERVICE LEADS. TRACER WIRE TERMINATIONS WITH GROUND LEVEL ACCESS POINTS SHALL BE LOCATED AT A MAXIMUM SPACING OF 600 FEET, OR AS DIRECTED BY AHJ. IF ADDITIONAL TERMINATION IS REQUIRED, A GROUND LEVEL TRACER WIRE ACCESS POINT SHALL BE INSTALLED. FOLLOW APWA UNIFORM COLOR CODE STANDARD FOR ACCESS POINTS.

2. AN 18-INCH LONG MAGNESIUM GROUNDING ROD WITH AWG 12 CONNECTING WIRE SHALL BE INSTALLED AT ALL HYDRANTS AND GROUND LEVEL ACCESS POINTS ALONG THE PROPOSED TRACER WIRE. GROUNDING ROD CONNECTION SHALL BE MADE AT THE IDENTIFIED (OR BOTTOM) TERMINAL AT ALL ACCESS POINTS.

3. TRACER WIRE GROUND LEVEL ACCESS POINTS SHALL BE DESIGNED TO BE INSTALLED AT GRADE AND CONSISTING OF AN ABS RIGID PLASTIC BASE WITH CAST IRON TOP SECTION FOR PAVEMENT INSTALLATION AND A TOTAL DEPTH OF AT LEAST 14-INCHES. ACCESS POINT SHALL INCLUDE A LOCKING COVER LABELED WITH THE UTILITY TYPE (E.G. WATER, SAN, STORM) WITH PENTAGON HEAD BOLT, INTEGRAL TWO-TERMINAL CONNECTION WITH GROUNDING SWITCH AND AN ENCAPSULATED MAGNET FOR DETECTION BY A FERROUS METAL DETECTOR. ACCESS POINTS SHALL BE INSTALLED BY THE NEAREST ABOVE GROUND FIXTURE (E.G. HYDRANT, GATE WELL, MANHOLE, ETC.) FOR EASE OF LOCATING.

4. TRACER WIRE FOR OPEN TRENCH SHALL BE #12 AWG SOLID COPPER CLAD STEEL, HIGH STRENGTH WITH A MINIMUM AVERAGE BREAK LOAD OF 450 LBS AND MINIMUM CONDUCTIVITY OF 21%. INSULATION THICKNESS SHALL BE MINIMUM 30 MIL HDPE AND BE RATED FOR DIRECT BURY. TRACER WIRE SHALL BE ATTACHED TO THE TOP OF THE PIPE AT EVERY FITTING, VALVE, AND AT

INTEGRALS NOT EXCEEDING 5 FEET BY THE USE OF A NON-ADHESIVE, WATERPROOF SILICONE TAPE OR APPROVED EQUAL. TRACER WIRE SHALL BE PLACED AT THE 3 O'CLOCK POSITION OF THE PIPE AND SHALL BE CONSISTENTLY PLACED IN THAT POSITION. FOLLOW APWA UNIFORM COLOR CODE STANDARD FOR WIRE INSULATION. CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS AND MATERIAL REQUIREMENTS SHALL SUPERSEDE. https://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

5. TRACER WIRE FOR DIRECTIONAL DRILLING/BORING SHALL BE #10 AWG EXTRA HIGH STRENGTH COPPER CLAD STEEL WITH MINIMUM AVERAGE BREAK LOAD OF 2,000 LBS AND MINIMUM CONDUCTIVITY OF 21%. INSULATION THICKNESS SHALL BE MINIMUM 45 MIL HDPE AND BE RATED FOR DIRECT BURY. COLOR CODE INSULATION PER APWA STANDARD. CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS AND MATERIAL REQUIREMENTS SHALL SUPERSEDE. https://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

6. TRACER WIRE TO BE USED WITH PIPE BURSTING SHALL BE 7 X 7 STRANDED COPPER CLAD STEEL TRACER WIRE WITH 50 MIL HDPE INSULATION SUITABLE FOR DIRECT BURIAL INSTALLATION. TRACER WIRE SHALL HAVE A MINIMUM AVERAGE BREAK LOAD OF 4,700 LBS AND MINIMUM CONDUCTIVITY OF 21%. COLOR CODE INSULATION PER APWA STANDARD. CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS AND MATERIAL REQUIREMENTS SHALL SUPERSEDE. https://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

7. THE CONTRACTOR SHALL PERFORM A CONTINUITY TEST ON ALL TRACER WIRE IN THE PRESENCE OF THE AHJ. IF THE TRACER WIRE IS FOUND TO NOT BE CONTINUOUS AFTER TESTING, THE CONTRACTOR SHALL REPAIR OR REPLACE THE FAILED SEGMENT AT THEIR OWN EXPENSE.

**SANITARY SEWER**

1. ALL SANITARY SEWER SPECIFIED AS POLYVINYL CHLORIDE (PVC) SHALL BE SDR26 PVC CONFORMING TO CURRENT ASTM DESIGNATION D3034, (STANDARD SPECIFICATION FOR TYPE PSM POLY(VINYL CHLORIDE) (PVC) SEWER PIPE AND FITTINGS), LATEST EDITION. PIPE SHALL HAVE AN INTEGRAL WALL, SDR26 BELL & SPIGOT RUBBER O-RING GASKET JOINTS.

2. THE REPAIR OF SDR-26 PVC PIPE IS TO BE DONE WITH SDR-26 REPAIR COUPLINGS. FLEXIBLE BOOT CONNECTORS ARE NOT ALLOWED IN LIEU OF COUPLINGS.

3. COUPLINGS E USED FOR JOINING DISSIMILAR PIPE MATERIALS SHALL CONFORM TO ASTM DESIGNATION C1173, LATEST EDITION (STANDARD SPECIFICATION FOR FLEXIBLE TRANSITION COUPLINGS FOR UNDERGROUND PIPING SYSTEMS). COUPLINGS SHALL HAVE A STAINLESS-STEEL SHIELD DESIGNED FOR RESISTANCE TO SHEAR FORCES.

4. CONNECTIONS OF SEWER PIPE TO PRECAST MANHOLES: A FLEXIBLE NEOPRENE RUBBER BOOT CONFORMING TO ASTM C923 (STANDARD SPECIFICATION FOR RESILIENT CONNECTORS BETWEEN REINFORCED CONCRETE MANHOLE STRUCTURES, PIPES, AND LATERALS), LATEST EDITION,

SECURELY CLAMPED INTO A CORE DRILLED OR CAST PIPE PORT SHALL BE UTILIZED. PIPE CLAMP BANDS SHALL BE OF CORROSION-RESISTANT STEEL.

5. CONTRACTOR TO FOLLOW MDOT REQUIREMENTS FOR VIDEO INSPECTION OF SEWER PIPE. ALL PVC SANITARY SEWER MAINS SHALL BE MANDREL TESTED FOR DEFLECTION BY THE CONTRACTOR. NO PIPE SHALL EXCEED A DEFLECTION OF 5 PERCENT. IF DEFLECTION EXCEEDS 5 PERCENT, THE PIPE SHALL BE EXCAVATED AND REPLACED IN ACCORDANCE WITH REQUIREMENTS OF APPROVED SPECIFICATIONS. THE RIGID BALL OR MANDREL USED FOR THE DEFLECTION TEST SHALL HAVE A DIAMETER NOT LESS THAN 95 PERCENT OF THE BASE INSIDE DIAMETER OR AVERAGE INSIDE DIAMETER OF THE PIPE PER ASTM SPECIFICATION. THE TEST SHALL BE PERFORMED WITHOUT MANUAL PULLING DEVICES. SANITARY SEWER AIR TESTING SHALL BE BASED ON THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY FOR TESTING AS INCIDENTAL TO THE SANITARY SEWER INSTALLATION.

**STORM**

1. REINFORCED CONCRETE PIPE (RCP) SHALL CONFORM TO THE LATEST REQUIREMENTS OF REINFORCED CONCRETE PIPE OF ASTM DESIGNATION C76 (STANDARD SPECIFICATION FOR REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE), CLASS IV, UNLESS OTHERWISE DESIGNATED ON THE PLANS. JOINTS FOR REINFORCED CONCRETE PIPE SHALL MEET ASTM C443 AND SHALL BE RUBBER GASKET FOR TONGUE AND GROOVE, FULL BELL AND SPIGOT RUBBER O-RING GASKET, OR MODIFIED GROOVED TONGUE WITH RUBBER GASKET.

2. STORM SEWER SPECIFIED AS HIGH DENSITY POLYETHYLENE (HDPE) SHALL MEET OR EXCEED THE LATEST REQUIREMENTS OF ASTM D3350 (STANDARD SPECIFICATION FOR POLYETHYLENE PLASTICS PIPE AND FITTINGS MATERIALS), AASHTO M252 (STANDARD SPECIFICATION FOR CORRUGATED POLYETHYLENE DRAINAGE PIPE 3”-10”), AND AASHTO M294 (STANDARD SPECIFICATION FOR CORRUGATED POLYETHYLENE DRAINAGE PIPE 12”-60”). THE PIPE SHALL BE DUAL WALL CORRUGATED WITH AN INTEGRALLY FORMED SMOOTH INTERIOR. JOINTS SHALL BE GASKETED WATERTIGHT JOINTS USING FACTORY-INSTALLED BELL AND SPIGOT ENDS TESTED TO ASTM D3212 (STANDARD SPECIFICATION FOR JOINTS FOR DRAIN AND SEWER PLASTIC PIPES USING FLEXIBLE ELASTOMERIC SEALS). GASKETS SHALL CONFORM TO ASTM F477 (STANDARD SPECIFICATION FOR ELASTOMERIC SEALS (GASKETS) FOR JOINING PLASTIC PIPE). CONNECTIONS OF STORM PIPE TO PRECAST MANHOLES: A FLEXIBLE NEOPRENE RUBBER BOOT CONFORMING TO ASTM C923 (STANDARD SPECIFICATION FOR RESILIENT CONNECTORS BETWEEN REINFORCED CONCRETE MANHOLE STRUCTURES, PIPES, AND LATERALS), LATEST EDITION, SECURELY CLAMPED INTO A CORE DRILLED OR CAST PIPE PORT SHALL BE UTILIZED. PIPE CLAMP BANDS SHALL BE OF CORROSION-RESISTANT STEEL.

3. AFTER TRENCH BACKFILL AND COMPACTION IS COMPLETE, ENGINEER WILL SELECT AT LEAST 50% OF THE INSTALLED LENGTH OF EACH SIZE OF STORM SEWER HDPE PIPE FOR THE CONTRACTOR TO MANDREL TEST FOR DEFORMATION. UNLESS APPROVED OTHERWISE, CONTRACTOR TO PERFORM THE MANDREL TESTING FROM 5 TO 10 DAYS BEFORE PAVEMENT SURFACING OR COMPLETION OF FINAL GRADE. ALLOW TIME FOR CORRECTIVE ACTION. FOLLOW MDOT TESTING REQUIREMENTS FOR MANDREL TESTING OF HDPE STORM SEWERS. MANDREL TESTING IS INCIDENTAL TO HDPE STORM SEWER INSTALLATION.

4. CONTRACTOR TO FOLLOW MDOT AND CITY OF ANN ARBOR REQUIREMENTS FOR VIDEO INSPECTION OF SEWER PIPE. VIDEO INSPECTION IS NOT REQUIRED FOR EXTENSIONS OF EXISTING CATCH BASIN LEADS LESS THAN 20 FEET. ALLOW TIME FOR CORRECTIVE ACTION. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY FOR ALL TESTING AND IS INCIDENTAL TO THE STORM SEWER INSTALLATION.

5. ALL U-M STORM SEWER LIDS (SOLID AND OPEN GRATED) SHALL HAVE THE ENVIRONMENTAL NOTICE AND THE WORD "STORM" CAST INTO THE LID. CITY STORM LIDS SHALL MEET CURRENT CITY STANDARDS. ALL CATCH BASIN GRATES/BACKS SHALL HAVE THE ENVIRONMENTAL NOTICE CAST. CONTRACT U-M EHS TO PROVIDE AN ALUMINUM STORM DRAIN MARKER TO BE CAST ADJACENT TO TRENCH DRAINS.

**WATER MAIN**

1. CITY CAPITAL COST RECOVERY CHARGES, PERMANENT METER FEES AND CITY CONSTRUCTION INSPECTION ESCROW FEE WILL BE PAID BY THE UNIVERSITY OF MICHIGAN. ANY INSPECTION FOR REWORK INCLUDING REPEAT BACTERIA TESTING WILL BE PAID BY THE UNIVERSITY AND BACK-CHARGED TO THE CONTRACTOR BY THE UNIVERSITY. TEMPORARY HYDRANT METER/WATER FEES AND/OR TESTING CORPORATIONS ARE TO BE PAID BY THE CONTRACTOR.

2. ALL MATERIALS, EQUIPMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT CITY OF ANN ARBOR STANDARD SPECIFICATIONS AND DETAILS. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT. SEE CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS FOR WATER MAIN AND APPENDIX A: MATERIAL REQUIREMENTS. https://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

3. THE CONTRACTOR SHALL NOTIFY THE CITY A MINIMUM OF 24 HRS IN ADVANCE OF PIPE DELIVERY SO THAT AN INSPECTOR CAN BE ON THE JOB SITE FOR THE UNLOADING OF THE MATERIALS. CONTRACTOR SHALL COORDINATE WITH THE CITY OF ANN ARBOR A MINIMUM OF 72 HOURS PRIOR TO IMPACTING WATER MAINS.

4. LINE STOPS SHALL BE INSTALLED WHERE EXISTING WATER MAINS CANNOT BE SUFFICIENTLY ISOLATED TO COMPLETE THE WORK. THE CITY OF ANN ARBOR IS NOT RESPONSIBLE FOR THE COST OF INSTALLING LINE STOPS.

5. DUCTILE IRON PIPE SHALL BE A MINIMUM THICKNESS OF CLASS 52 WITH POLYETHYLENE WRAP AND PUSH-ON JOINTS, UNLESS OTHERWISE NOTED. DUCTILE IRON PIPE SHALL BE CEMENT-MORTAR LINED CONFORMING TO ANSI/AWWA C104/A21.4 AND COATED OUTSIDE CONFORMING TO ANSI/AWWA C104/A21.4.

6. GATE VALVES SHALL BE RESILIENT SEAT NON-RISING STEM PUSH-ON GATE VALVE WITH 2" SQUARE OPERATING NUT, OPENING RIGHT, COMPLETE WITH ACCESSORIES. GATE VALVE SHALL MEET AWWA SPECIFICATION C509 OR C515 AND CURRENT CITY OF ANN ARBOR STANDARDS.

7. ALL HORIZONTAL BENDS, TEES AND FITTINGS SHALL INCLUDE THRUST BLOCKS. RESTRAINED JOINT GASKETS RATED FOR 350 PSI ARE REQUIRED FOR ALL JOINTS (U-M STANDARD REQUIREMENT).

8. ALL WATER MAIN SHALL HAVE A TYPICAL 5.5 FT COVER. MAINTAIN A MINIMUM OF 18 INCHES VERTICAL CLEARANCE FOR STORM AND SANITARY CROSSINGS AND A MINIMUM OF 12 INCHES VERTICAL CLEARANCE WITH ALL OTHER UTILITIES.

9. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL UTILIZE STANDARD ALLOWABLE PIPE DEFLECTIONS FOR THE PROPOSED ALIGNMENT.

10. FIRE HYDRANT ASSEMBLIES SHALL INCLUDE ALL NECESSARY THRUST BLOCKS, BENDS, PIPE AND FITTINGS, INCLUDING ADJUSTMENT OF THE STOP BOX. FIRE HYDRANT ASSEMBLY INCLUDES 6 INCH STOP BOX LOCATED 3 FEET FROM HYDRANT.

11. FIRE HYDRANTS SHALL CONFORM WITH ANSI/AWWA C502 AND THE CITY OF ANN ARBOR'S CURRENT FIRE HYDRANT STANDARDS AND SHALL BE EJ 5BR 250 FURNISHED WITH ONE 5" STORZ CONNECTION, ONE 3-3/8" ANN ARBOR PUMPER NOZZLE, A 1-3/8" PENTAGON OPERATING NUT, PUSH ON JOINT AND NO BARREL DRAIN. CITY OF ANN ARBOR FIRE HYDRANT PRODUCT NUMBER IS 55931D.

12. WATER MAIN FITTINGS SUCH AS BLOW-OFF ASSEMBLIES, CONCRETE THRUST BLOCKS, SOLID SLEEVES AND MECHANICAL PLUGS WHICH ARE REQUIRED TO COMPLETE THE WORK, OTHER THAN THOSE SPECIFICALLY LISTED AS SEPARATE PAY ITEMS, SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED AND INCIDENTAL TO THE COST OF DOING THE WORK.

13. THE CONTRACTOR SHALL CONSTRUCT, FLUSH, AND BACTERIOLOGICALLY TEST THE WATER MAIN PER CITY OF ANN ARBOR SPECIFICATIONS. ALL CHLORINATED WATER SHALL BE DISCHARGED DIRECTLY INTO AN APPROVED SANITARY SEWER. THE CONTRACTOR SHALL SUPPLY ALL NECESSARY PERSONNEL, HOSES, FITTINGS, AND THE LIKE TO ACCOMPLISH THIS WORK AND IS INCIDENTAL TO THE INSTALLATION OF WATER MAIN.

14. HYDROSTATIC TESTING MUST BE PERFORMED IN ACCORDANCE WITH ANSI/AWWA C600. DISINFECTION AND BACTERIOLOGICAL TESTING MUST BE PERFORMED IN ACCORDANCE WITH ANSI/AWWA C651. ALL TESTING MUST BE COORDINATED WITH THE AUTHORITY HAVING JURISDICTION/CITY OF ANN ARBOR AND BE PER CITY OF ANN ARBOR SPECIFICATIONS.

15. CONNECTIONS TO EXISTING WATER MAIN SHALL NOT BE MADE UNTIL THE NEW WATER MAIN HAS BEEN SUCCESSFULLY PRESSURE TESTED AND HAS PASSED BACTERIOLOGICAL TESTING. FINAL CONNECTIONS SHALL BE COORDINATED WITH THE ENGINEER. THE CONTRACTOR SHALL COORDINATE ALL WATER SYSTEM SHUTDOWNS WITH THE UNIVERSITY OF MICHIGAN AND THE CITY OF ANN ARBOR AFTER APPROPRIATE NOTIFICATIONS HAVE BEEN PROVIDED TO THOSE AFFECTED. CONTRACTOR SHALL NOT OPERATE VALVES OWNED BY THE CITY OF ANN ARBOR OR U-M WITHOUT PRIOR WRITTEN APPROVAL.

16. GATE WELL STRUCTURE FRAME AND COVERS SHALL BE EJCO 1040 WITH TYPE "A" LIDS WITH THE WORD "WATER" CAST ON THE LID. CITY WATER MAIN LIDS SHALL INCLUDE CITY ART WORK - CONFIRM WITH OWNER WHERE APPROPRIATE.

17. TRACER WIRE SHALL EXTEND TO ALL HYDRANTS, BLOWOFFS, DEAD ENDS, AND POST INDICATOR VALVES, OR AS DIRECTED BY THE AHJ. CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS AND MATERIAL REQUIREMENTS SHALL SUPERSEDE.

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18. SACRIFICIAL ANODES SHALL BE PLACED AT THE DIRECTION OF THE AHJ WHEN ANY EXISTING WATER MAIN IS EXPOSED DURING CONSTRUCTION. ANODES SHALL BE HIGH POTENTIAL MAGNESIUM ANODE INGOTS WITH PACKAGED BACKFILL. ANODE INGOT SHALL MEET OR EXCEED ASTM B843, GRADE M1C FOR HIGH-POTENTIAL MAGNESIUM ANODES. FOR 12" AND LARGER WATER MAIN, 32-LB ANODES SHALL BE USED. FOR UNDER 12" WATER MAINS, 17-LB ANODES SHALL BE USED. SEE CITY OF ANN ARBOR CURRENT STANDARD SPECIFICATIONS AND MATERIAL REQUIREMENTS FOR ADDITIONAL MATERIAL AND INSTALLATION REQUIREMENTS.
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