Land Development Projects:
Plan Notes (Date of Issuance/Revised 12/31/2018)

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All plan notes are to be included in their entirety on all engineering land development plans, with the exception of Traffic Signal General Notes. Plan notes are provided in both PDF and Word format for the convenience of the design engineer; however these plan notes shall not be edited or altered except by the City of Delaware.

Plan Notes within the Engineering Plan Set shall contain the Date of Issuance.

General Plan Notes

GEN-1 The City of Delaware "City" detailed specifications, standard drawings, and Infrastructure Design Manual, together with the City of Columbus (COC) Construction and Material Specification (CMS), including all supplements thereto, shall govern all material and workmanship involved in the improvements shown in these plans unless otherwise noted. All pertinent standard construction drawings are available upon request of the Public Works Department.

GEN-2 All work shall be completely acceptable to City officials. No work shall commence until arrangements have been coordinated with the City for required inspections. Prior to beginning construction, the contractor shall make all arrangements necessary to coordinate the provision of inspection service by the City for the proposed work. Cost of inspection shall be paid for by the Developer through engineering inspection fees calculated by the Public Works Department.

GEN-3 The contractor shall provide written notification to the P Public Works Department at least 7 days prior to the initial start of any construction project and after a preconstruction meeting has been held.

GEN-4 Twenty-four hour advance notification is required for all work requiring inspection, testing, or approval by the Public Works Department or the Building Department.

GEN-5 The contractor is responsible to notify the Public Works Department and request a final punch-out inspection of the project site once all items on the approved development plans have been completed.

GEN-6 Necessary line and grade staking will be provided by the Developer. Cut sheets shall be submitted to the Public Works Department two (2) full working days prior to the commencement of construction activities and must be approved by the City prior to the beginning of construction.

GEN-7 The Developer is responsible for having "As-Built" construction drawings delivered to the Public Works Department within 30 days following the completion of the project construction. Plans shall be submitted in both paper and digital format. The plans must include top-of-casting and flow-line elevations for all sanitary and storm structures, flood routing swale verification, and identify all field modifications to the approved plan set. The "As-Built" drawings must also include THE state plane coordinate locations for all newly constructed public utility structures including sanitary/storm structures, mainline water valves, fire hydrants, street lights, pull boxes, etc.

GEN-8 For modifications to the work as shown on the approved construction drawings, a request must be submitted in writing from the Engineer of Record to the Public Works Department for review and approval. Modifications must follow the plan revision process set forth by Public Works Department and are subject to plan revision fees.

GEN-9 The Contractor or Developer shall secure and pay for all permits, fees, licenses, and inspections required for the proper execution and completion of the improvements as shown on the approved construction plans.

GEN-10 It is the responsibility of the Contractor to visit the site and verify the extent of the work to be performed, to identify the necessary construction means and methods to accomplish all work items, and to notify the Public Works Department of any identified conflicts, errors, or omission from the construction plans.

GEN-11 The Contractor or Subcontractor shall be solely responsible for complying with all federal, state, and local safety requirements, together with exercising precautions at all times for protection of persons (including employees) and property. It is also the sole responsibility of the Contractor or Subcontractor to initiate, maintain, and supervise all safety requirements, precautions, and programs in connection with the work.

GEN-12 The Contractor is responsible for the investigation, location, support, protection, and restoration of all existing utilities and appurtenances whether shown on these plans or not. The Contractor shall expose all utilities or structures prior to construction to verify the vertical and horizontal effect on the proposed construction. The Contractor shall call, toll free, the Ohio Utilities Protection Service (OUPS) at 1-800-362-2764 seventy-two hours prior to construction and shall notify all utility companies at least forty-eight hours prior to work in the vicinity of their underground lines.

GEN-13 The Contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on the approved construction plans is based on the most current available records, and at the times from measurements taken in the field. The information provided is not to be relied on as being exact or complete. The City assumes no responsibility as to the accuracy or depths of the underground facilities as shown on the plans. The Contractor must call the appropriate utility company at least seven days in advance of any excavation to request exact field location of utilities.

GEN-14 The Contractor is responsible for coordinating the relocation of any utilities as required by the approved construction plan, or that may be determined by additional field investigation to be in conflict with the construction of new infrastructure as shown on the plans, and to coordinate these efforts with the Owner of the affected utility.

GEN-15 Where potential grade conflicts might occur with existing utilities, the Contractor will be required to uncover such utilities in advance of installing new utilities in order for the Engineer of Record to determine the exact elevations, and to make any necessary plan adjustments.

GEN-16 All materials including but not limited to piping, appurtenances, manholes, gravel, etc. utilized for the construction of new public infrastructure must be approved by the Public Works Department. In addition, all concrete pipe, storm, and sanitary sewer structures will be inspected by the City of Columbus at the manufacturing plant location for conformance to specifications. Pipe or structures without proper approval as identified by bearing the COC approval stamp, shall not be permitted for installation in the City of Delaware.

GEN-17 All field tiles broken during excavation shall be replaced by the Contractor at his expense, to original condition or shall be connected to the storm sewer collection system as directed by the city.

GEN-18 The Contractor shall repair or replace any property, utility, structure, or other infrastructure at his expense, damaged during the execution of his work to an equal or better condition than existed prior to the damage. All work IS to be repaired or replaced to the satisfaction of the Engineer of Record and the City. Any damage to private utilities caused by the Contractor shall be repaired by the appropriate utility company at the Contractor's expense.

GEN-19 Care shall be exercised when working in the area around existing trees and shrubs. Any trees or shrubs not marked for removal that are damaged by the contractor will have to be replaced by the Contractor to the satisfaction of the Owner.

GEN-20 The Contractor/Developer is responsible for providing and scheduling of qualified personnel for concrete, asphalt, and soils testing services as required by the Public Works Department. Testing is to be performed under the direct supervision of a registered testing agency approved by the Public Works Department.

GEN-21 Property corner pins or permanent survey markers disturbed during construction shall be reset by a Registered Surveyor at Contractor's expense.

GEN-22 Existing structures to be removed or demolished require a "Demolition Permit" issued by the City Building Department.

GEN-23 The open burning of site cleaning debris, trash, etc. is prohibited in the City.

GEN-24 The Contractor is responsible for the provision and maintenance of a portable toilet on the site during all phases of construction.

GEN-25 All earthwork operations, especially pavement sub-grade construction, shall be inspected by a Registered Soils Engineer employed and paid for by the Owner. Additionally, all final grades shall be field checked by the Developer's Contractor and/or Surveyor for conformance to construction plan grades.

GEN-26 Utility trenches within the influence of the roadway are to be filled and compacted per Item 912 of the COC CMS. Utility trenches within the right of way but outside the roadway influence shall be filled and compacted with suitable native material per Item 911 of COC CMS. All other trenches are to be filled and compacted with native material to within 95% of the maximum dry density. The backfill material for any utility trench shall be free of large boulders, tree branches, stumps, and construction debris. Utility trenches that are under existing or proposed pavement shall be required to have backfill tested for compaction by an approved testing firm.

GEN-27 Storm sewers, sanitary sewers, and water mains constructed in fill areas shall not be constructed until after compacted fill has been installed to proposed grade. The storm sewers, sanitary sewers, and water mains shall be installed per specified trench installation details.

GEN-28 Clearing and Grubbing is to be performed from right of way line to right of way line, within all easements, or as otherwise noted in the approved construction plans. Tree chipping equipment may be used however chip piles shall be stored in separate locations away from any area subject to further construction activities, and shall not be spread or dispersed over existing ground

GEN-29 Topsoil shall be stripped and stockpiled separately from all work areas, and respread during final grading operations. For residential developments, the topsoil shall not be respread until such time as all building construction activities have been completed on individual project phases.

GEN-30 Seeding: All areas within the right of way disturbed during construction shall be seeded and mulched within 7 days from the date work in the areas is completed. Seed shall be spread at the rate of 14 pounds per 1,000 SF and meet the requirements of COC CMS Item 659.09 Class 1 lawn mixture. A 10-20-10 commercial fertilizer shall be applied at a rate of 20 pounds per 1,000 SF to newly seeded areas. Seeding performed between October 30th and March 1st shall be applied as temporary seeding per COC CMS Item 207.

GEN-31 The following turf seed blend is required for all park areas. Seed shall be certified, fresh, clean, poa and bent grass free, with 98% purity and 85% minimum germination rate. Seed shall be applied at a rate of 8 pounds per 1,000 SF (350 pounds per acre).

Turf type mixture shall be tall fescue (a mixture of no less than three cultivars by weight) and perennial ryegrass (a mixture of no less than two cultivars by weight).

Seed cultivars shall be the following or an approved equal:

- 30% Gooden turf type tall fescue
- 20% Wolverine turf type tall fescue
- 20% Cochise III turf type tall fescue
- 15% Nobility perennial ryegrass
- 15% Amazing GS perennial ryegrass
- Fertilizer shall be 10-20-10, applied at a rate of 20 pounds per 1,000 SF. Straw mulch shall be clean oat or wheat straw, well-seasoned before bailing, and free from mature seed bearing stalks or roots or prohibitive or noxious weeds. The straw mulch shall be applied at a rate of 2 Tons per acre for all permanent seeding.

The top six (6) inches of soil must conform to CMS Item 659.09 for lawn areas. All rock and other foreign material 1 inch or greater in any dimension shall be removed.

All work within park areas, including construction of fills, shall be completed with track equipment only. All other equipment used must be approved by the City.

All seeding and mulching must be completed by October 1st.

GEN-32 All mulch under play equipment shall be certified playground mulch and spread to a minimum thickness of 12 inches. Playground mulch shall be certified to the latest standards, including:

- ASTM F1292-04. Playground mulch shall meet head impact criteria (HIC) and GMAX requirements of 12" of coverage.
- ASTM F2075-04. Playground mulch shall meet tramp metal test and sieve analysis.
- ASTM F1951. Playground mulch shall be wheelchair accessible.

GEN-33 Plastic caution tape shall be placed over all fiber optic conduits at a depth of 18-inches.

Roadway Notes

RDW-1 All pavement sub-grade shall be constructed in accordance with COC CMS Item 204, the soils report, and as directed by the Registered Soils Engineer present on the site. The City will strictly adhere to the compaction requirements set forth in Section 203.07. Density testing must be performed on each lift of fill, and the soils engineer performing the testing must have detailed laboratory test data on site to support the values being utilized in the density calculations. The moisture content of the new fill shall be in the range of ± 2% of the optimum moisture content determined by ASTM D698. The City reserves the right to require density testing of sub-grade in newly cut areas where topsoil has been stripped in preparation for sub-base installation or filling operations, in order to evaluate the necessity for additional compaction effort.

RDW-2 All pavement joints, particularly where a proposed pavement abuts an existing pavement, and all pavement joints abutting the curbline or utility structures such as manholes, catch basins, valve boxes, etc. shall be sealed in accordance with COC CMS Item 413 Type (1).

RDW-3 At the option of the Developer and approved by the City, the placement of the final wearing course of Item 448 asphalt concrete may be delayed until such time that the majority of the residential housing construction in the area is complete, or in the case of winter construction when weather permits.

RDW-4 All asphalt concrete paving operations shall be regulated as specified in COC CMS Item 400 Flexible Pavement.

RDW-5 Pavement cuts for utility line installations are subject to the backfill requirements of Item 912. In lieu of compacted granular material, Flowable Controlled Density Fill, Item 636 Type-11 may be used. Pavement shall be constructed to match the existing section or nine inches of asphalt concrete, whichever is greater. As an alternative, the Contractor may choose to repair the pavement with a 7" class "C" concrete base extending 1'-0 beyond all edges of the excavation, and finished with A 2-inch Item 448 asphalt wearing course.

RDW-6 Steel plates shall be positioned and secured in place with steel spikes and cold patch asphalt mix over all trenches that are left open on a temporary basis and subject to traffic. The Contractor is responsible for reporting the location of all steel plates directly to the Public Works Department.

RDW-7 Proactive measures shall be taken by the Contractor to keep public streets clean and free from mud, stone, dirt, etc. at all times. A stabilized construction entrance, as specified in the plans, is to be diligently maintained at the construction site entrance(s) throughout the project. If the entrance is rendered ineffective in the judgement of the City, work on the project may be suspended until the entrance is made effective.

RDW-8 Concrete curbs are to be branded during placement utilizing the standard brand set provided by the Public Works Department. Brands that are missed must be mechanically ground into the curb after concrete is set.

Brand curbs are as follows:

"S" On top of curb for sanitary lateral locations.
"W" On face of curb for water service box locations.

"WV" On face of curb for hydrant watch valve locations.
"WM" On face of curb for water main valve locations.
"SM" On face of curb for sanitary/storm manhole locations.

RDW-9 The combination curb and gutter shall be placed continuously. The curb shall have control joint mechanically cut at 10'-0" spacing within 24 hours from being poured. Driveway curb cuts shall be saw-cut at the time each individual residence is constructed.

RDW-10 Monument boxes shall be installed at intersections designated on the plan by a Registered Surveyor. Boxes shall be Neenah R-1968, Type 36-8 or East Jordan Iron Works No. 8371. Monuments are to be set in a concrete filled 24" diameter cored hole, flush with the top of the pavement per City Standard. A letter of Certification must be submitted for each monument. The letter shall identify the coordinates and elevations of the monument.

RDW-11 All traffic control (i.e., maintenance of traffic (MOT)) devices shall be furnished, erected, maintained, and removed by the Contractor in accordance with the most recent edition of the "Ohio Manual of Traffic Control Devices for Construction and Maintenance Operations" (OMUTCD). The contractor must provide the City with 24-Hour contact information in the event the MOT items require adjustment, repair, or replacement.

RDW-12 Traffic lanes shall be fully open to traffic at all times and ingress and egress shall be maintained to public and private property. Lane restrictions or closures required during construction must be approved by the Public Works Department a minimum of two-weeks in advance of any work being performed. A Maintenance of Traffic (MOT) plan must be submitted and approved prior to starting any work that effects traffic flows. Work requiring partial or complete closure of any public street required 48-Hours advance notification to all affected residents and businesses. Notification shall be prepared and distributed by the contractor prior to scheduled work. City approval of all notifications is required in advance of distribution.

RDW-13 COC Item 407 Tack Coat is required between all lifts of flexible pavement, between concrete base and asphalt surface course, and along the face of the curb. The tack coat application may be waived at the discretion of the Public Works Department if the lifts of asphalt are installed within seven (7) days of each other, there has been no water or vehicle traffic on the pavement, and the pavement is clean and free of dust and debris.

RDW-14 All construction and permanent roadway signage must meet the minimum required of OMUTCD Table 2A-3 regarding retroreflectivity levels.

RDW-15 Proof rolling: The following specifications are put in place by the City of Delaware in addition to COC CMS Item 204 Subgrade Compaction and Proof Rolling/Test Rolling:

For areas where subgrade appears to be stable without undercutting, proof roll after the top 12 inches of the subgrade meets the compaction requirements and after the subgrade has been brought to approximate shape within 0.1 to 0.2 Feet required by plan grade.

For areas that are unstable and require undercutting, it is not necessary to commence a formal proof roll to demonstrate that subgrade correction is required. Correction must be authorized by the City at the time of rough grading and must be based on recommendations from the Soils Engineer. Proof rolling must be treated as the final verification that all repairs have been performed. Failed proof rolls following corrective action will be at the Contractor's expense.

Proof rolling must be done immediately after the subgrade compaction operation, when the moisture content of the subgrade soil is near optimum or at the moisture content that achieved compaction. Unstable or hard pan conditions encountered during proof rolling operations, which results from the failure of the contractor to maintain the specified density and moisture requirements, must be corrected by the Contractor at the Contractor's expense.

If it becomes necessary to take corrective action, such as but not limited to, underdrain installation, undercut and backfill of an unsuitable material, aeration of excessively we material in areas that have been proof rolled, or (if hard pan exists) reconditioning the upper portion of the subgrade, these areas shall be proof rolled again following the completion of the necessary corrections. If the corrections are necessary due to the negligence of the Contractor and/or weather, the corrective work and additional proof rolling must be performed by the Contract at the Contractor's expense.

The contractor shall be required to perform a proof roll along the curb line to confirm there is no unsuitable material in advance of installing curb rain, stone, or concrete curbing.

Proof rolling for the pavement area may occur either before or after pipe underdrains are installed. If following the installation of underdrains, rolling should not occur directly over the underdrains. In 204.06, proof rolling must be performed at least 1-1/2 Feet away from the underdrains because of the potential damage to the underdrains.

Storm Sewer Notes

STM-1 All storm sewer shall be installed in accordance with the specifications contained within the most recent edition of the COC CMS, except as modified within the City of Delaware General Notes, Standard Drawings and Infrastructure Design Manual. The minimum requirements for storm sewer pipe within the City right of way or easements shall be reinforced concrete pipe (RCP) per ASTM C655 or ASTM C76, non-reinforced concrete pipe per ASTM C14, high-density polyethylene (HDPE) pipe per AASHTO M294 (ADS N-12 WT or approved equal), or high-performance polypropylene (PP) pipe per ASTM F2881 or AASHTO M330 (ADS HP Storm or approved equal). HDPE pipe shall only be used in rear yard storm applications. All storm sewers within pavement and rights-of-way shall be either RCP or PP pipe. All pipe manufacturers' materials must appear on the COC list of approved storm sewer materials to be used in the City of Delaware.

STM-2 Flexible storm sewers within the right of way will be deflection tested and/or video inspected at the Contractor's expense. Testing shall be performed no sooner than thirty days after the pipe trench has been backfilled. Maximum deflection shall not exceed 5% of the base inside diameter. The Contractor is responsible for arranging all required testing and for notifying the Public Works Department in advance to witness the testing.

STM-3 All flexible pipe installations that are subject to construction loading shall maintain a minimum cover of 2'-0 at all times during the construction process. Testing shall not occur until all construction loading above the sewer is complete.

STM-4 Leakage testing shall be performed for all storm sewers and storm sewer structures located in front or side yards in accordance with COC CMS Section 901.20, except that for storm sewers the allowable leakage shall be as specified therein for sanitary sewers.

STM-5 All HDPE and PP pipe joints shall be watertight per ASTM D3212 with gaskets per ASTM F477. RCP pipe joints shall include preformed flexible joint sealant per ASTM C990, unless required otherwise by STM-6.

STM-6 Storm sewers located along a side yard shall be RCP with no aggregate bedding and no aggregate backfill and shall include watertight rubber gaskets per ASTM C443 at the joints, unless approved otherwise by the City. This may also be a requirement for front yard areas when required by the City.

STM-7 Storm sewer structures located in front or side yards shall include a flexible watertight connection for all pipe penetrations that meets the requirements of COC CMS 706.16 (Z-LOK STM manufactured by A-LOK Products, or approved equal). Pipe penetrations at all curb inlets and rear yard catch basins shall be neatly grouted in place.

STM-8 Storm sewer structures located in front or side yards shall be tested with an exfiltration test or vacuum test in accordance with COC Section 901.

STM-9 All storm manholes shall be marked with a 4" x 4" x 10'-0" pressure treated wood wye-pole projecting 4'-0" above the finish grade and with the top 1'-0" painted green on four sides.

STM-10 Storm sewer pipe shall not be installed in any trench holding water. The contractor is responsible for dewatering operations required for the construction of the storm sewer.

STM-11 If rock must be excavated within a proposed trench area, the Contractor shall remove enough rock below the bell and flowline of the pipe in order to install the appropriate amount of bedding material. Excavated rock shall not be used as backfill material.

STM-12 The flow in all sewers, drains and watercourses encountered shall be maintained by the Contractor at his own expense, and whenever such watercourses and drains are disturbed or destroyed during construction, they shall be restored by the Contractor to a condition satisfactory to the City.

STM-13 All major flood routes and storm water basins are to be surveyed by a Registered Surveyor at the Contractor's expense to verify conformance to the approved grading plans. Survey results are to be included on the as-built construction plans.

STM-14 The Contractor is responsible for the proper installation (prior to the start of construction), maintenance, and replacement of sediment and erosion control measures per the approved storm water pollution prevention plan (SWPPP). The Contractor will be responsible for paying any fine levied by the OEPA resulting from failure to adhere to the SWPPP and/or the requirements of the OEPA applicable permits.

STM-15 All drainage flood routes, swales, and ditches are to be designed and graded with a minimum flow line grade of 2%, and a maximum side slope of 4:1.

STM-16 All catch basins, manholes, and curb inlets shall have concrete channels poured in place to assure positive drainage through these structures.

STM-17 Public storm sewer manhole lids are to be East Jordan Iron Works No. 1661-A1, Neenah Foundry or equivalent, and embossed "City of Delaware Storm Sewer".

STM-18 Storm sewer curb inlets are to be adjusted within ¼" of plan elevation using steel shims. Curb inlet hoods shall be embossed with the wording "Drains to the River" per the City Standard Drawing.

STM-19 Pre-cast concrete or HDPE performed manhole adjusting rings are to be used for all final adjustments of manhole castings.

STM-20 Openings shall be provided in curb inlet drainage structures to accommodate underdrain outlets. Underdrains are to be constructed in accordance with details given in the plans.

STM-21 Shop Drawings are required for be submitted for review and approval per the City of Columbus CMS prior to the commencement of ordering materials/construction, this includes but is not limited to, all storm structures, pipe, frames, grates, covers, etc. Additional shop drawings shall be provided as requested by the City of Delaware.

Water Line Notes

WTR-1 All water lines, fittings, and appurtenances shall be installed in accordance with the specifications contained within the most recent edition of the COC CMS, except as modified within the City of Delaware General Notes, Standard Drawings and Infrastructure Design Manual.

WTR-2 Any activity related to the modifying, upgrading, or expanding the public water system must have pre-approval of the Public Works Department and Utility Department. Work requiring the shutdown of existing water mains is to be coordinated with these two departments forty-eight hours prior to the scheduled work being performed. All effected customers shall be notified, in writing, by the contractor at least twenty-four hours prior to shut down. City approval of all customer notification is required in advance of distribution.

WTR-3 Water mains shall be ductile iron pipe (DIP), Class 53 for sizes 3" to 10" and Class 54 for sizes 12" to 48" (AWWA C151) with cement mortar lining and seal coating (AWWA C104) in accordance with city specifications, unless called out otherwise by these plans. For pipe 12" and smaller, AWWA C909 polyvinyl chloride (PVC) pipe with cast iron outside diameter (CIOD) dimensions and Pressure Class 235 is permitted as an alternate to ductile iron pipe. DIP joints must be rubber gasket push-on or mechanical (AWWA C111). PVC pipe joints must be integral bell push on joints (ASTM D3139). Water main fittings must be ductile iron with cement mortar lining and seal coating with mechanical joints and must conform to AWWA C153, unless specified otherwise by these plans. Joint restraints must be per the approved plans.

WTR-4 All piping 2" or less in diameter between the water main and the control valve or meter pit shall be Type K, soft tempered copper tubing conforming in all respects to ASTM B88. Fittings shall be Ford or Mueller high quality copper brass with AWWA approved compression type joints. There will be no fittings permitted between the water main connection and the control valve.

WTR-5 Dead-end water lines shall terminate with a fire hydrant and watch valve followed by a main line valve and an additional section of water line plugged and blocked per the standard drawings.

WTR-6 Water lines shall be installed with a minimum of 4'-0 of cover measured from the finished grade to the top of the water main, or as indicated on the approved construction plans.

WTR-7 All main line valves, hydrant watch valves, curb boxes, and dead end lines are to be marked with a 4" x 4" x 10'-0 pressure treated wood wye-pole projecting 4'-0 above the finished grade and with the top 1'-0" painted blue on four sides. Posts are to be maintained until the area has undergone final grading and seeding.

WTR-8 If there are any conflicts in grade between water line and sewers, the water lines shall be lowered during construction.

WTR-9 The Contractor shall be responsible for the horizontal and vertical deflections or bend in the water line in accordance with the manufacturer's specifications. Water lines are to maintain 1'-6" vertical, and 10'-0 horizontal clearance from sanitary sewers and storm sewers.

WTR-10 A permit for each new water service must be obtained from the city prior to making a connection to the public water system as part of this project. Permit applications can be obtained from City Hall at 1 South Sandusky Street.

WTR-11 The water service taps shall consist of all pipe, valves, fittings, and appurtenances necessary to connect to the public water main and complete the installation according to the standards set forth in the approved construction plans.

WTR-12 The valve covers and inside of all mainline water valve boxes shall be painted blue, and the valve covers and inside of all fire hydrant watch valve boxes shall be painted red with 2 coats of rust inhibitive paint. Public fire hydrants are to be painted with two coats of Federal Safety yellow. Private fire hydrants are to be painted Federal Safety Red, with White bonnets and nozzle covers.

WTR-13 All mechanical fasteners, bolts, are to be provided with a factory-coated carbon steel bolts (Blue Flouropolymer/flourocarbon tee head bolts and nuts) for mechanical joint fittings; Sigma, Tyler, or approved equal. All thread rod, etc., shall receive one coat of rust inhibitive paint or coating.

WTR-14 If the top of the valve operating nut is more than 36" inches below finished grade, an extension stem shall be furnished to bring the top of the operating nut to within 24" of finished grade elevation. All valve stem extensions are to be installed with the extension secured directly to the valve operating nut with galvanized bolts.

WTR-15 Water line shall not be installed in any trench filled with water. The contractor is responsible for dewatering operations required for the construction of the water line.

WTR-16 All fittings shall be adequately restrained with solid or poured in place concrete blocking per the City standard drawings. All fittings to be backed must be thoroughly wrapped in plastic sheeting prior to placing concrete.

WTR-17 Fire hydrants shall meet AWWA standards and are to be Mueller "Super Centurion 250" A-423 or "Clow medallion" on Type "A" setting with National standard threads for the 2-1/2" hose NOZZLEs and watch valve directly mounted to anchor tee. Type "B" settings shall not be used unless approved by the City. All piping between the watch valve and hydrant shall be mechanical joint fittings. The connection to the hydrant shall be a 5" Stortz fitting with a Quick release locking coupling. All safety chains are to be removed from hydrants.

WTR-18 All fire department connections (standpipes) shall have a 45° downturn fitting to reduce kinking in the fire hose. The connection to the standpipe shall be a 5" Stortz fitting with a locking coupling.

WTR-19 All new main line and hydrant watch valves are to be directly bolted to the anchor tee with anchor type fittings.

WTR-20 The installation of 3/4" and 1" water taps shall be made by direct tap only. Direct taps are not permitted to any asbestos mains. 1½" and 2" water taps shall be made with a Ford style FC-202. 3" and 4" water taps shall be made with a Ford style FS-202. 6" water taps and larger shall be made with a Ford FTSS tapping sleeve. A JCM 432 is an approved equal.

WTR-21 All gate valves must be ductile iron resilient wedge 250 PSI as manufactured by American Flow Control or approval equivalent which meets or exceeds the requirements of ANSI/AWWA C515. Clow Valve Company, model number 2638 approved for16". 6" and 8" must be ductile iron and epoxy coated.

WTR-22 Valve boxes are to be Tyler 6850 Series cast iron 2-piece screw type for main and water valves and Tyler 6500 Series cast iron 2-piece screw type service boxes for curb valves. Star Pipe products 2-piece screw type valve box item code approved.

WTR-23 For water service taps: The water main connection shall be made using a Mueller 300 Ball Type B-25008 or Ford FB1000-Q BALLCORP corporation stop. Control valves shall be Mueller 300 Ball Curb Valve B-25209 or Ford B44-Q Ball valve curb stops (quarter turn only).

WTR-24 Water service boxes are to be installed in pairs along property lines, set 8'-0" apart and 1'-0" outside of the right of way line. A minimum bury depth of 48" below top of curb must be maintained for all water services in the right of way.

WTR-25 All water lines shall be tested (AWWA C600 for ductile iron pipe or AWWA C605 for polyvinyl chloride pipe) and sterilized (AWWA C651) by the Contractor at the Contractor's expense in accordance with the City and AWWA specifications. Testing shall be done under the supervision of the Public Works Department.

WTR-26 All meters (other than standard 5/8" x 3/4" residential meter) and all backflow devices specified for this project must be delivered to the City Public Utilities Department for inspections and approval prior to installation.

WTR-27 Meter pits, including all piping, fittings, equipment, and appurtenances, must be approved by the City through a scheduled field inspection during the installation. The City Public Utilities Department is responsible for inspecting the domestic water meter pit, domestic water line, and associated appurtenances. The Planning and Community Development Department is responsible for the inspection of: the fire line, thrust blocks for the fire line, meter pit-fire line connection, fire department connection, and valve monitoring. Prior to burying the water service, the appropriate department representative shall be contacted by the Contractor to arrange for the required inspection of each portion of the service. Failure to having the inspection performed will result in having to uncover the service for inspections.

WTR-28 The pressure required to perform hydrostatic testing on water lines is 150 psi for domestic lines and 200 psi for fire suppression lines (per NFPA 13).

WTR-29 The Contractor at the Contractor's expense shall clean all water mains 12" and larger by passing a properly sized poly pig through the pipe per COC 801.11.

WTR-30 All mechanical joints within the meter vault shall include factor manufactured flanges. No uni-flanges are permitted. All joints and fittings located on the supply side within 20-Feet of the meter vault shall be restrained using approved mechanical joint restraints.

WTR-31 All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution

system under all conditions of flow. The normal working pressure in the distribution system shall be at least 35 psi.

WTR-32 Booster pumps are not permitted on individual water services.

WTR-33 Shop Drawings are required for be submitted for review and approval per the City of Columbus CMS prior to the commencement of ordering materials/construction, this includes but is not limited to, all water pipe, tracer wire, connections, valves boxes, meter box covers, curb stops, corporation stops, hydrants, fittings, accessories (glands, gaskets, bolts, nuts) couplings, clamps, restraints, service saddles, etc. Additional shop drawings shall be provided as requested by the City of Delaware.

Sanitary Sewer Notes

SAS-1 All sanitary sewer shall be installed in accordance with the specifications contained within the most recent edition of the COC CMS, except as modified within the City of Delaware General Notes, Standard Drawings and Infrastructure Design Manual. The Contractor's specific attention is directed to the requirements of either the infiltration or exfiltration as specified by the COC CMS Section 900. All sanitary sewers, manholes and services shall be tested by the Contractor at the Contractor's expense. All sanitary sewers shall be subject to, and pass the infiltration or exfiltration test prior to acceptance, including vacuum testing of manholes. An air test is acceptable to the City. This air test shall be performed according to the current regulations.

SAS-2 Clean water connections including roof drains, foundation drains, sumps, etc. are prohibited from being connected to the sanitary sewer SYSTEM.

SAS-3 The minimum requirement for sanitary sewer pipe shall be ASTM D3034 polyvinyl chloride (PVC) sewer pipe, 46 psi pipe stiffness (SDR35), ASTM C1784 cell classification of 12454 or 12364, with ASTM D3212 pipe joints; ASTM F679 PVC sewer pipe, 46 psi pipe stiffness, ASTM cell classification 12454 or 12364, with ASTM D3212 pipe joints; or centrifugally cast fiberglass reinforced polymer cement (CCFRPM) pipe, ASTM D3262-Type 1, Liner 2, Grade 3, Stiffness 72 psi, unless otherwise shown on the plans. PVC pipe for installations with a depth of cover of greater than 20-feet shall be the same as specified above except with a pipe stiffness of 115 psi (SDR26) for ASTM D3034 and a pipe stiffness of 115 psi for ASTM F679. Pipe manufacturers must be on the current COC approved list, and require the additional approval of the City Public Utilities Department Director.

SAS-4 Sanitary sewer services shall be PVC pipe with the same specification as the sewer main and shall be 6-inch diameter, unless approved otherwise. The services are subject to either the infiltration or exfiltration testing requirements. All service extensions shall be installed at a minimum grade of ¼" per foot and shall be constructed at the time of construction of the main sewer, unless otherwise directed by the City.

SAS-5 All PVC pipe shall be deflection tested thirty days or more after the trench has been backfilled to finished grade. A rigid mandrel shall be used for the testing. No mechanical pulling devices shall be used. Pipe deflection shall not exceed five 5%.

SAS-6 Clay dams are to be installed along main line sewers at half the distance between each pair of manholes, but no closer than 10'-0" from a lateral service. Dams shall be a minimum of 6'-0 long.

SAS-7 Public sanitary manhole covers are to be East Jordan Iron Works No. 1661-A2, Neenah Foundry or equivalent, with enclosed pick holes and embossed "City of Delaware Sanitary Sewer". Private manhole covers shall be embossed "PRIVATE SEWER".

SAS-8 6'-0" long clay (trench) dams are to be installed on all sanitary laterals (both long and short laterals). Dams are to be installed by the contractor initially installing the laterals. No part of the clay dam shall be installed within the trench backfill for the sewer main or under the roadway pavement.

SAS-9 All sanitary manholes and lateral services are to be marked with a 4"x4"x10'-0" pressure treated wood wye-pole projecting 4'-0 above the finished grade and with the top 1'-0 painted green on FOUR sides. Additionally a 2"x2" hardwood wye pole is to be wired to the base of each 4"x4" pole and extended down to the end of each lateral service. Cost to be included in the various items. Individual lateral service wye-poles are to be installed as each lateral is constructed.

SAS-10 Where the cover to finished grade over a sanitary wye is in excess of 12'-0, a length of riser pipe and a 45° bend shall be installed along with a minimum of one whole length of 6" pipe such that the end of the service will be 10'-0 below grade.

SAS-11 Where the sanitary sewer crosses under a proposed storm sewer or waterline the trench shall be backfilled to the bottom of the proposed storm sewer or waterline with compacted granular material Item 912, for a length of 10 LF centered on the storm sewer or waterline.

SAS-12 Prior to construction, the Contractor shall verify existing tie-in manhole flowline and top-of-casting elevations. Manholes shall be built or adjusted so the tops conform to the elevations shown on these plans. All manhole casting adjustments shall be accomplished with pre-cast concrete or HDPE preformed adjustment rings.

SAS-13 All sanitary lines shall be installed with stone or gravel bedding as shown in the standard drawings.

SAS-14 Sanitary trench details shall be in accordance with City standard drawings.

SAS-15 Temporary bulkheads shall be placed where indicated on the plans and shall remain in place until removal is directed by the City.

SAS-16 Sanitary laterals to adjacent lots shall be installed in a 4'-0 wide common trench, spaced with 2'-0 center to center separation, and with 1'-0 minimum bedding around pipes. The ends of the services are to be flared apart to a minimum 10'-0 center to center separation at 5'-0" outside the right of way line.

SAS-17 All sanitary sewer manholes joints shall conform to the requirements of ASTM C443. All manholes shall have Wrapidseal Manhole Encapsulation System or an approved equal installed. The encapsulation shall include the frame and the top of the cone only.

SAS-18 All sanitary sewers are to be video inspected 3 months before the expiration of the maintenance bond. All mud and debris shall be removed prior to the maintenance bond being returned.

SAS-19 Shop Drawings are required for be submitted for review and approval per the City of Columbus CMS prior to the commencement of ordering materials/construction, this includes but is not limited to, all sanitary structures, pipe, fittings, manhole encapsulation system, frams, grates, and covers. Additional shop drawings shall be provided as requested by the City of Delaware.

Residential and Collector Street Lighting Notes

LHT-1 The contractor shall install street light at the locations per plan, including all disconnects, pull boxes, routing circuit cable, controller cabinet, meter, photo sensor, etc. Provide a complete, operating lighting system that complies with the City of Delaware Specifications and Standard Details.

LHT-2 The street lighting shall be constructed in accordance with the Current City of Columbus (COC) Construction and Materials Specifications (CMS), Section 1000 Street Lighting, including all supplements thereto, in force on the date of the approved plans and/or contract. The COC CMS shall govern all materials and workmanship involved in the improvements shown on these plans, except as such specification are modified by the City of Delaware Design manual or Standard Details. Testing referred in Section 1000.18 shall be required.

LHT-3 Plan details shall be considered supplemental to the City of Columbus division of electricity material and installation specifications (MIS)

LHT-4 All Street lighting shall be installed per the electrical installation requirements specified on City of Delaware's Standard Detail RDWD-34.2.

LHT-5 All street lighting poles shall be installed 2'-6" (two feet-six inches) to the center of the foundation from the back of curb and placed where noted on the approved lighting plan. Street lights shall be installed on the same side of the road as the water main; gas main and sanitary sewer main shall be installed on the opposite side of the road. In general the fixture shall not be installed above sanitary sewers, storm sewers, water mains or other utilities.

LHT-6 Conduits within the influence of pavement shall be concrete encased.

LHT-7 Plastic caution tape shall be placed over all lighting conduits at a depth of 18-inches.

LHT-8 Required Inspections: The following inspections shall be required for street lighting installation:

- Pole Foundation
- Underground conduit prior to backfill
- Electrical service inspection
- Final installation of fixtures

LHT-9 Permits and/or Easements: A permit must be obtained from the City of Delaware after final approval of the submitted plans.
Recorded easements must be provided to the City of Delaware for the branch circuit conductors on the property lines. A fee of $150.00 shall be required.

LHT-10 All set screws on light poles shall be lubricated with a compound to prevent seizing.

LHT-11 HPS Light bulb base shall be lubricated with Ideal Noalox compound or approved equal, before screwing light bulb into ballast.

LHT-12 Shop Drawings are required for be submitted for review and approval per the City of Columbus CMS prior to the commencement of ordering materials/construction, this includes but is not limited to, pull boxes, disconnects, controller, main power source, circuit cable, conduit, etc. Additional shop drawings shall be provided as requested by the City of Delaware.

LGT-13 Maintenance: After the complete installation of the required number of light fixtures in a development and the installation is approved by the City, the Developer shall be responsible for the first two years of maintenance. Streetlights installed in accordance with these standards shall become a Public Improvement in accordance to Section 1111.06 of the Subdivision Regulations. This includes the repair of all of the components of the lighting system, including but not limited to the replacement of faulty or defective equipment, poles or luminaires and lamps, pullboxes, conduit and associated wiring, or any items damage by contractors or any other means. This includes painting of married poles. Repairs shall be made in a timely manner.

Traffic Signal General Notes

The Traffic Signal General Notes shall be included in any plan set in which a new or existing traffic signal shall be installed or improved, or as directed by the City of Delaware. These sheets are provided in both CADD and PDF format for the design engineer's convenience.