THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

DEPARTMENT OF
PUBLIC UTILITIES

Division of Sewerage
and Drainage

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Administrator

Design Guidelines for Storm Sewer Improvements

Effective February 1, 2017

Table of Contents

PREFACE

The Division of Sewerage and Drainage derived these guidelines from the City of Columbus Stormwater Drainage Manual (SWDM). This document is an outline of the design standards to consider and follow for public and private storm sewer projects within the City of Columbus. These guidelines **DO NOT** replace the SWDM! The design professional shall use the SWDM to ensure a thorough understanding of design requirements during project development. The Division of Sewerage and Drainage must approve any variance from the SWDM. All technical details shall remain the responsibility of the Engineer preparing the plans. In addition to the SWDM, the design professional shall use the Green Infrastructure Design Guidelines to assist with the design of green infrastructure throughout the City of Columbus.

The Division of Sewerage and Drainage reserves the right to review and modify any or all of the following guidelines during design of any storm sewer project.

Project #_____
Date: _____ 30%___ 75%___ 90%___ Mylar___

TYPICAL PLAN SET – MINIMUM REQUIREMENTS

- ☐ Title Sheet
- ☐ General Notes
- ☐ Quantities
- ☐ Plan View
- ☐ Profile View
- ☐ Details
- ☐ Cross Sections
- ☐ Landscape Plan
- ☐ Stormwater Pollution Prevention Plan (SWP3)
- ☐ Maintenance of Traffic (MOT)

STORMWATER DRAINAGE REPORT

- ☐ The stormwater drainage report shall follow requirements of the current SWDM

ADDITIONAL PLAN SET REQUIREMENTS

- ☐ Green Infrastructure Details
- ☐ Waterline Plan View
- ☐ Waterline Profile View
- ☐ Waterline Relocation and Lowering Plan
  - Waterline Survey Coordinates Table
- ☐ Street Improvement Plan*
- ☐ Resurfacing Plan
- ☐ Curb Ramp Details
- ☐ Sidewalk Improvement Plan

* *Follow Department of Public Service Guidelines*

Project #_____
Date: _____ 30%___ 75%___ 90%___ Mylar___

TITLE SHEET – MINIMUM REQUIREMENTS

- ☐ PROJECT TITLE
- ☐ PROJECT NUMBER (CIP, CC, DR.E)
- ☐ SHEET INDEX
- ☐ VICINITY MAP
- ☐ INDEX MAP (TO AN APPROVED SCALE)
- ☐ BENCHMARKS
- ☐ POST CONSTRUCTION CONTROL FACILITIES AND GREEN INFRASTRUCTURE AREA TABLES**
- ☐ A COMPLIANCE NOTE IF NO BMP's ARE REQUIRED FOR WQv OR FLOOD CONTROL
- ☐ OWNER CONTACT INFORMATION FOR EACH BMP (DEPARTMENT, DIVISION OR PRIVATE)
- ☐ STORMWATER DETENTION TABLE (100 YR POST DOWN TO THE 10 YR PRE AT MINIMUM)
- ☐ SITE DATA TABLE
  - Total Disturbed Area
  - Existing Impervious Area
  - Proposed Pervious Area
  - Proposed Impervious Area
- ☐ ESTIMATE OF QUANTITIES (IF NOT OWN SHEET)
- ☐ CITY OF COLUMBUS STANDARD DRAWINGS WITH DATE
- ☐ CITY OF COLUMBUS SUPPLEMENTAL SPECIFICATIONS WITH DATE
- ☐ GENERAL NOTES (IF NOT OWN SHEET)
- ☐ SPECIAL NOTES***
- ☐ ENGINEER'S SEAL AND SIGNATURE
- ☐ OUPS INFORMATION
- ☐ SIGNATURE BLOCK APPLICABLE TO THE TYPE OF PLAN (CIP, CC, DR.E)
- ☐ ENGINEER'S CONTACT INFORMATION (ADDRESS, PHONE AND E-MAIL)

** *It is desired that this table be placed on the title sheet, however, if there is no room or a justified reason to put it on another sheet, the sheet number where the table will be found must be referenced in the sheet index. Show GI area in Sq. Ft.*

*** *See Special Notes on pages 13 through 17*

Project #_____
Date: _____ 30%___ 75%___ 90%___ Mylar___

PLAN VIEW – MINIMUM REQUIREMENTS

- ☐ SCALE 1" = 30'
- ☐ NORTH ARROW
- ☐ STRUCTURE NUMBERING
- ☐ STATIONING
- ☐ LEGEND
- ☐ SPECIAL NOTES
- ☐ CODED NOTES
- ☐ PROPOSED STORM SEWER (LINE TYPE SHALL BE BOLD)
- ☐ MEET 10 STATE STANDARD FOR SEWER SEPARATION FROM OTHER UTILITIES (OUTSIDE OF PIPE TO OUTSIDE OF PIPE)
- ☐ APPROPRIATE SEWER SEPARATION FROM R/W FOR MAINTENANCE
- ☐ GREEN INFRASTRUCTURE LOCATIONS AND LIMITS
- ☐ POST CONSTRUCTION BMP's
- ☐ POINT OF REFERENCE
- ☐ PROPERTY LINES
- ☐ PROPERTY OWNER
- ☐ PROPERTY ADDRESS
- ☐ PROPERTY IDENTIFICATION NUMBER
- ☐ STREAMS
- ☐ STREAM CORRIDOR PROTECTION ZONES (SCPZ)
- ☐ FEMA FLOOD PROTECTION ZONES
- ☐ EXISTING TOPOGRAPHY
- ☐ EXISTING RIGHT OF WAYS
- ☐ EDGE OF PAVEMENT OR BACK OF CURB
- ☐ EXISTING SIDEWALK
- ☐ PROPOSED SIDEWALK
- ☐ EXISTING PUBLIC UTILITIES (WATER, SANITARY, STORM AND POWER)

PLAN VIEW – MINIMUM REQUIREMENTS (CONT.)

- ☐ SHOW ALL PUBLIC UTILITIES BASED ON RECORD PLAN INFORMATION
- ☐ EXISTING SEWER MATERIAL (I.E. 2 RING BRICK, 3 RING BRICK)
- ☐ EXISTING SEWER DIAMETER AND RECORD PLAN NUMBER
- ☐ EXISTING PRIVATE UTILITIES (ELECTRIC, CABLE, PHONE, ETC…)
- ☐ EXISTING UTILITY LABELS (PUBLIC AND PRIVATE)
- ☐ EXISTING TREES
- ☐ EXISTING TREES TO BE REMOVED (DESIGNATED WITH AN X THROUGH THE TREE)
- ☐ PROPOSED TREES – FOLLOW THE CITY OF COLUMBUS TREE POLICY

Project #_____
Date: _____ 30%___ 75%___ 90%___ Mylar___

PROFILE VIEW – MINIMUM REQUIREMENTS

- ☐ SCALE 1" = 5'
- ☐ STATIONING AT EVERY 100 FEET
- ☐ 0+00 SHALL BEGIN AT DOWNSTREAM END OF LONGEST SEWER RUN
- ☐ STATIONING SHALL START WITH LONGEST RUN OF SEWER AND REPEAT PROCESS FOR EACH SUCCEEDING SECTION OF SHORTER SEWER LENGTH
- ☐ SHOW ACCURATE SURFACE ELEVATIONS ABOVE CENTERLINE OF SEWER
- ☐ SHOW TOP OF CASTING ELVATIONS
- ☐ SHOW INVERT ELEVATIONS AND DIRECTION OF FLOW AT THE BEGINNING AND END OF ALL PROFILES
- ☐ MATCH LINES AND BREAK LINES IN PROFILES SHALL BE MADE AT 100 FOOT STATIONS
- ☐ DESIGNER NEEDS WRITTEN APPROVAL FOR STATION EQUATIONS OR NEGATIVE STATIONING
- ☐ CENTERLINE STATION OF ALL R/W CROSSED BY STORM SEWER SHALL BE INDICATED
- ☐ ALL PUBLIC AND PRIVATE UTILITY CROSSINGS SHALL BE SHOWN RECORD PLAN OR BEST AVAILABLE RECORDS
- ☐ SHOW STREET, ALLEY AND DRIVEWAY CROSSINGS
- ☐ SHOW STREAMS, DITCHES AND ALL OTHER WATER COURSE CROSSINGS
- ☐ SHOW DIFFERENCE IN ELEVATION BETWEEN THE BOTTOM OF STREAM CROSSING AND THE TOP OF SEWER
- ☐ STRUCTURE NUMBERS
- ☐ STRUCTURE STATIONING SHALL BE BASED ON CENTERLINE STATION LOCATION
- ☐ SHOW ALL RESPECTIVE SEWER DIAMETERS
- ☐ SHOW RESPECTIVE SEWER LENGTH
- ☐ SHOW RESPECTIVE SEWER SLOPES
- ☐ SHOW ALL EXISTING STRUCTURES IN DASHED LINE TYPE
- ☐ SHOW ALL EXISTING TOP OF CASTINGS
- ☐ SHOW ALL EXISTING SEWER DIAMETERS

PROFILE VIEW – MINIMUM REQUIREMENTS (CONT.)

- ☐ SHOW ALL EXISTING SEWER INVERT ELEVATIONS WHERE IT CROSSES THE PROPOSED SEWER
- ☐ ALL UTILITY CROSSINGS SHALL MEET 10 STATE STANDARDS FOR VERTICALCROSSINGS (OUTSIDE OF PIPE TO OUTSIDE OF PIPE)
- ☐ SHOW ALL EXISTING SEWER LENGTHS
- ☐ SHOW ALL EXISTING SLOPES BASED ON RECORD PLAN INFORMATION
- ☐ SHOW THE LIMITS OF PROPOSED BACKFILL
- ☐ SHOW TYPE OF PROPOSED BACKFILL BASED ON CITY OF COLUMBUS CMSC
- ☐ EXISTING GROUND SURFACE SHALL BE SHOWN WITH A DASHED LINE TYPE
- ☐ PROPOSED GROUND SURFACE SHALL BE SHOWN WITH A SOLID LINE TYPE
- ☐ BOTH EXISITNG AND PROPOSED GROUND SHALL BE CLEARLY MARKED

DETAILS AND CROSS SECTIONS – MINIMUM REQUIREMENTS
OPEN CHANNELS

- ☐ SHOW TYPICAL CROSS SECTIONS FOR ALL PROPOSED CHANNEL SYSTEMS
  - FLOOD ROUTING SWALES
  - ROADSIDE DITCHES
  - MINOR STORM CONVEYANCE CHANNELS
  - ANY OTHER APPLICABLE CHANNEL SYSTEM
- ☐ SHOW ALL TYPCIAL CROSS SECTION DIMENSIONS
  - DEPTH
  - SIDE SLOPES
  - BOTTOM WIDTH
  - TOP WIDTH

DETAILS AND CROSS SECTIONS – MINIMUM REQUIREMENTS (CONT.)

CULVERTS

- ☐ SHOW ALL CULVERT PROFILES ALONG EACH ROADWAY
- ☐ PROVIDE UPSTREAM AND DOWNSTREAM INVERTS
- ☐ SHOW ROADWAY EDGE OF PAVEMENT AND/OR TOP OF CURB
- ☐ SHOW ROADWAY CENTERLINE BASED ON R/W
- ☐ SHOW DESIGN STORM HEADWATER SURFACE ELEVATION
- ☐ SHOW 100 YEAR HEADWATER SURFACE ELEVATION
- ☐ A TABLE SHALL BE PROVIDED WITH THE 100 YEAR STORM DISCHARGE VALUES AND RESPECTIVE OUTLET VELOCITIES

STORMWATER QUALITY BMPs

- ☐ PROVIDE PLAN VIEW
- ☐ PROVIDE ELEVATION/PROFILE VIEW
- ☐ DIMENSION BMP CROSS SECTIONS
- ☐ A TABLE SHALL BE PROVIDED SHOWING
    - REQUIRED WQv
    - PROVIDED WQv
    - REQUIRED DRAWDOWN TIME
    - PROVIDED DRAWDOWN TIME
    - SEDIMENT STORAGE VOLUME

DETAILS AND CROSS SECTIONS – MINIMUM REQUIREMENTS (CONT.)

- ☐ A DETAILED PLANTING PLAN SHALL BE PROVIDED
  - TYPE OF VEGETATION
  - NUMBER OF VEGETATION
- ☐ SHOW TYPE OF BACKFILL; SPECIFY ENGINEERED FILL, STONE, MULCH ETC…
- ☐ SHOW OUTLET STRUCTURE
  - LOCATION
  - SIZE
  - ELEVATIONS

DETENTION BASINS

- ☐ SHOW CROSS SECTION OF THE BASIN (WET OR DRY)
- ☐ SHOW DIMENSIONS
- ☐ SHOW SIDE SLOPES
- ☐ SHOW BASIN BOTTOM SLOPE (IF DRY)
- ☐ SHOW INLET STRUCTURE AND ELEVATIONS
- ☐ SHOW OUTLET STRUCTURE AND ELEVATIONS
- ☐ SHOW WQv STORAGE ELVEATION
- ☐ SHOW CRITICAL STORM ELEVATION
- ☐ SHOW 100 YEAR STORM ELEVATION
- ☐ SHOW AN ELEVATION VIEW AND PLAN VIEW OF EACH OUTLET RISER STRUCTURE
- ☐ ANNOTATE OUTLET RISER STRUCTURE
- ☐ SHOW PRIMARY, SECONDARY AND EMERGENCY OVERFLOW WEIR ELEVATIONS
- ☐ SHOW ENERGY DISSIPATION FOR OVERFLOW WEIRS

STORMWATER POLLUTION PREVENTION PLAN – MINIMUM REQUIREMENTS

- ☐ CONSULTANT SHALL FOLLOW APPENDIX A IN THE CITY OF COLUMBUS STORMWATER DRAINAGE MANUAL TO DEVELOP THE SWP3
- ☐ SCALE IS NOT TO EXCEED 1”=100’
- ☐ SWP3 SHALL SHOW LOCATION(S) OF THE AREA OF LAND DISTURBANCE
- ☐ VICINITY MAP
- ☐ NORTH ARROW
- ☐ PERTINENT INFORMATION NECESSARY TO EASILY LOCATE SITE
- ☐ SHOW OFF-SITE AREAS SUSCEPTIBLE TO SEDIMENT DEPOSITS OR EROSION DUE TO ACCELERATED RUNOFF (BASINS, STREAMS, RIVERS)
- ☐ SHOW OFF-SITE AREAS AFFECTING POTENTIAL ACCELERATED RUNOFF AND EROSION CONTROL
- ☐ SHOW EXISTING TOPOGRAPHY OF THE LAND DISTURBANCE AREA AND ADJACENT LAND WITHIN 50 FEET OF THE BOUNDARIES
- ☐ SHOW TOPOGRAPHY WITH APPROPRIATE CONTOUR INTERVALS TO EASILY SHOW DRAINAGE PATTERNS
- ☐ SHOW EXISTING STRUCTURES, BUILDINGS, UTILITIES, WATER BODIES, DRAINAGE FACILITIES, VEGETATIVE COVER, IMPERVIOUS AREAS
    - SHOW ALL FEATURES SIGNIFICANT TO THE LAND DISTURBANCE WITHIN 50 FEET OF THE BOUNDARY LINES
- ☐ PROVIDE A GENERAL DESCRIPTION OF THE PREDOMINANT SOIL TYPES, LOCATION AND THEIR LIMITATIONS FOR THE PROPOSED USE
- ☐ PROVIDE THE PROPOSED LAND USE
- ☐ SHOW ALL AREAS OF EXCAVATION, GRADING AND FILLING
- ☐ SHOW THE PROPOSED FINAL GRADE ELEVATIONS AND SLOPES
- ☐ SHOW THE TYPE OF UTILITIES AND PROPOSED AREAS OF INSTALLATION
- ☐ SHOW PROPOSED IMPERVIOUS AREAS IN SQUARE FEET
- ☐ SHOW ALL PERVIOUS AREAS WITH DESCRIPTIONS (LAWN, TURFGRASS, SHRUBBERY, TREES, RIP-RAP, MULCH, ETC…)
- ☐ SHOW ALL DEVICES AND PROVISIONS FOR TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONROL

Project #_____
Date: _____ 30%___ 75%___ 90%___ Mylar___

STORMWATER POLLUTION PREVENTION PLAN – MINIMUM REQUIREMENTS (CONT.)

- ☐ PROVISIONS SHALL BE MADE FOR BOTH ON-SITE AND OFF-SITE TRIBUTARY AREAS
  - CONTROL OF ACCELERATED ON-SITE RUNOFF TO A STABLE RECEIVING OUTLET
  - SITE CONDITIONS AROUND POINTS OF ALL SURFACE WATER DISCHARGE FROM THE SITE
  - VELOCITIES OF THE 10 YEAR FLOW AT OUTFALLS
- ☐ DESCRIBE THE MEASURES THAT WILL BE UNDERTAKEN TO PREVENT POLLUTION OF EXISTING STREAMS DURING CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE
  - PROVIDE DESCRIPTION OF MITIGATION MEASURES TO REPAIR DAMAGE TO THE STREAM CHANNELS IF THE STREAM CHANNEL MUST BE DISTURBED
  - PROVIDED JUSTIFICATION FOR EARTH DISTURBANCE WITHIN THE STREAM CHANNEL
- ☐ PROVIDE PROVISIONS FOR MAINTENANCE OF CONTROL FACILITIES INCLUDING EASEMENTS TO ENSURE SHORT TERM EROSION AND SEDIMENT POLLUTION CONTROL
- ☐ A CONSTRUCTION SEQUENCE SHALL BE PROVIDED AND AT MINIMUM INCLUDE A SCHEDULE AND TIME FRAME FOR THE FOLLOWING ACTIVITIES
  - CLEARING AND GRUBBING FOR THOSE AREAS NECESSARY FOR INSTALLATION OF PERIMETER CONTROLS
  - CONSTRUCTION OF PERIMETER CONTROLS
  - REMAINING CLEARING AND GRUBBING
  - ROAD GRADING
  - GRADING FOR THE REMAINDER OF THE SITE
  - UTILITY INSTALLATION AND WHETHER STORM DRAINS WILL BE USED, PROTECTED OR ABANDONED AFTER CONSTRUCTION
  - FINAL GRADING, LANDSCAPING OR STABILIZATION
  - REMOVAL OF CONTROLS
- ☐ SEEDING MIXTURES AND RATES, LIME AND FERTILIZER APPLICATION RATES, AND KIND AND QUANTITY OF MULCHING FOR BOTH TEMPORARY AND PERMANENT VEGETATIVE CONTROL MEASURES. DETAILS ON PROPOSED METHODS AND SCHEDULES OF PROVIDING TEMPORARY AND PERMANENT STABILIZATION, PERTAINING TO SEEDING AND/OR MULCHING SHALL BE INCLUDED
- ☐ MAP REFERENCE DATA INCLUDING TITLE, SCALE, DIRECTION, LEGEND, AND DATE ON ALL PLAN MAPS; ADDITIONALLY, THE PLAN, AS PART OF THE OVERALL STORMWATER DRAINAGE PLAN, SHALL PROVIDE SPACE FOR SIGNATURES OF CITY OF COLUMBUS OFFICIALS
- ☐ STATEMENT IDENTIFYING THE NAME, ADDRESS, AND TELEPHONE NUMBER OF THE PERSON(S) PREPARING THE PLAN, THE OWNER OF THE PROPERTY WHERE THE GRADING IS PROPOSED AND THE DEVELOPER AND/OR PERSON RESPONSIBLE FOR THE DEVELOPMENT AREA

STORMWATER POLLUTION PREVENTION PLAN – MINIMUM REQUIREMENTS (CONT.)

- ☐ A STATEMENT INDICATING THAT THE OWNER WILL NOTIFY THE CITY FORTY-EIGHT (48) HOURS BEFORE COMMENDING ANY LAND DISTURBING ACTIVITY. AT THE TIME THIS NOTICE IS GIVEN, THE OWNER SHALL IDENTIFY THE SITE MANAGER
- ☐ APPEARING ON THE EROSION AND SEDIMENT CONTROL PLAN, AS PART OF THE OVERALL STORMWATER DRAINAGE PLAN, SHALL BE A CERTIFICATION (SIGNATURE AND SEAL) BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF OHIO, THAT THE PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THIS REGULATION, AND IN ACCORDANCE WITH GOOD ENGINEERING PRACTICES AND PRINCIPLES
- ☐ ANY PERSON SEEKING APPROVAL OF AN EROSION AND SEDIMENT CONTROL PLAN SHALL SUBMIT DESIGN COMPUTATIONS AND APPLICABLE ASSUMPTIONS FOR ALL STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL. VOLUME AND VELOCITY OF FLOW SHALL BE PROVIDED FOR ALL SURFACE WATER CONVEYANCE. THIS INFORMATION SHALL BE PROVIDED FOR SURFACE WATER OUTLETS

APPENDIX A

Special Notes

Ensure the following notes are included on all plans:

☐ Division of Sewerage and Drainage Utilities
City of Columbus locators will only locate and mark main line sewers. The contractor is responsible for locating all service laterals and field verifying the location of main sewer lines. Any damage and/or repairs to the main sewer lines or service laterals are the responsibility of the sewer contractor. Repairs must be completed by a licensed sewer contractor under a separate sewer permit.

☐ Clean Water Connections to Sanitary Sewers:
Roof drains, foundation drains, drain tiles, and other clean water connections to the sanitary system are prohibited.

☐ Stormwater Facilities:
Before any work is started on the project and again before final acceptance by the Owner, the Engineer and the Contractor shall make an inspection of all existing sewers which are to remain in service and which may be affected by the work. The condition of the existing conduits and their appurtenances shall be determined from field observations. The Engineer shall keep records of the inspection in writing.
All new conduits, inlets, catch basins, and manholes constructed or reconstructed as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the Owner. All existing manholes, catch basins, drains, sewers, and appurtenances inspected initially by the above mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. The Contractor shall correct any change in the condition resulting from the Contractor's operations to the satisfaction of the Engineer. The above is not applicable for structures to be abandoned. The Contractor shall remove debris, silt, etc. from the existing manholes and catch basins that have been affected by construction operations. The Contractor shall maintain service in existing sewers during construction.

☐ Existing Drainage Systems:
Existing drainage systems (field tiles, roof drain outlets, sump pumps, etc.) encountered during construction of the new storm sewer or removal of existing storm sewers shall be extended as necessary and blind tapped to the new storm sewer per Division of Sewerage and Drainage Standard Drawing AA-S159 or connected to the catch basin as directed by the Engineer. All costs associated with this work shall be included in the unit price bid for CMSC Item 901.

If the Contractor encounters a pipe or connection to the storm sewer that in the estimate of the Engineer may be an illicit connection from an on-site sewage disposal system, Columbus Public Health shall be contacted at 645-6448 to determine whether the pipe may be reconnected to the City's storm sewer system.

☐ Licensed Sewer Tapper Requirement
It shall be unlawful for any person to engage in the business of sewer tapping and sewer building, or to open or tap any sewer in any street, alley or any public or private place or rehabilitation of any sewer or appurtenances (including manholes, inlets and service laterals) in the City of Columbus without first securing license to engage in such business, as indicated in Columbus City

Code Section 1131.01. Utilization of subcontractor must meet the licensing requirements of City of Columbus Building Code, in particular Section 4114.119 and 4114.529.

Ensure that any of the following notes that may apply to the proposed improvements are included:

☐ Certification of Pipe and Structures:
All concrete pipe, storm and sanitary structures will be stamped or have such identification noting that said pipe, storm and sanitary structures have been inspected by the designated representative of the City of Columbus and meets their specifications. Pipe and structures without proper identification will not be permitted for installation.

☐ Grade Changes:
If it is determined that the elevation of the existing sewer, or existing appurtenance to be connected, differs from the plan elevation or results in a change in the plan sewer slope, the Engineer shall be notified before starting construction of any portion of the proposed sewer which will be affected by the variance in the existing elevations. If it is determined that the proposed sewer will intersect an existing sewer or underground utility if constructed as shown on the plan, the Engineer shall be notified before starting construction of any portion of the proposed sewer which would be affected by the interference with an existing facility.
Grades and elevations shown on the plans shall not be revised under any circumstances without first obtaining written approval from the Engineer. Invert elevations shall not deviate from plan elevation by more than 0.05 foot. Failing to meet the above requirements is cause for rejection of the affected section of sewer.

☐ End Treatment:
Immediately after placement of any conduits, the Contractor shall construct the end treatments required by the plans at both the outlet and inlet ends. This shall include headwalls, concrete, riprap, rock channel protection, sodding, etc.

☐ Support of Existing Brick Sewers:
The Contractor shall support the existing sewers during construction of manholes, as necessary, to keep sewers in operation and to assure a sound watertight connection to the base of the manhole upon completion. Any changes to the manhole from the standard type shall be submitted by the contractor to the engineer for approval, with supporting calculations sealed by a registered professional engineer. In any locations where new sewer pipe is to be connected to an existing manhole or to the main trunk, the existing brick sewer shall be kept sound to the extent possible for a distance of 3 feet outside of the manhole or main trunk and a collar of reinforced concrete placed to connect the new concrete sewer to the brick. Shop drawings for the connection shall be submitted for review prior to construction.

☐ Brick Sewers
The contractor shall maintain a minimum clearance of 10’ horizontal and 5’ vertical from the outside diameter of all brick sewers. The sewers must be labeled “Brick” and the outside diameter pipe size indicated on the plans. Brick sewers Shall Not be exposed as it may cause the collapse of the sewer due to removal of the backfill material.
Designer Note: This note is only applicable to non-City of Columbus CMS projects that are conducting work within our R/W or on our infrastructure.

☐ Sanitary Lateral Deflection and Leakage Testing:

All sanitary lateral lines constructed as part of the main line construction shall be leakage and deflection tested in conformance with the requirements of CMSC Items 901.20 and 901.21.

☐ Sanitary Sewer Lateral Connections:
Any lateral reconnections made in an area of pipe replacement shall be paid as Item 915 - Lateral Reconnection. This pay item shall include all labor and materials necessary to make this service connection complete and ready for service. Contractor shall be responsible for field verifying the size and number of existing open laterals and supplying the proper materials.

☐ Manholes to be Rebuilt
All sewer manholes being rebuilt to accommodate grade changes will need to be built by a licensed sewer contractor, for the City of Columbus, under a separate sewer permit. Contact the sewer permit counter at 614 645-7490 for additional information.
Designer Note: This note is only applicable to non-City of Columbus CMS projects that are conducting work on our infrastructure.

☐ Post Construction Storm Water Treatment:
This plan utilizes best management practices (BMP's) for post construction storm water treatment. The Contractor must complete a Stormwater Control Facility Disclosure form for each outlet control facility.
Designer Note: This plan note shall be used on all projects that have post construction storm water management BMP's.

☐ MANUFACTURED WATER QUALITY STRUCTURE:
This plan utilizes manufactured water quality structures for water quality treatment. Areas have been shown in the plans for placement of an off-line system. Payment for these devices shall be made at the contract unit price for manufactured water quality structure. The Contractor must complete Stormwater Control Facility Disclosure form for each outlet control facility.
Designer Note: This plan note shall be used on all projects that have manufactured water quality structures identified in the plan. If more than one manufactured water quality structure is provided in the plans, a table shall be provided to indicate the location and type of each structure used. Manufactured systems may not be used without approval of the DOSD through a feasibility study.

APPENDIX B

CONSTRUCTION PLAN GENERAL NOTES

□1. Specifications: The latest edition of the City of Columbus Construction and Material Specifications (CMSC), including all supplements thereto, shall govern all construction items that are a part of this plan unless otherwise noted.

Any modification to the specifications or changes to the work as shown on the drawings must have prior written approval by the Administrator of the Division of Sewerage and Drainage.

□2. Additional Compensation: The contractor shall furnish all labor, materials, tools, equipment, services, and related accessories for a complete project as shown and described in the plans and specifications. The price for items of work or materials shown on the plans or provided for in the specifications or special provisions for which no separate unit price is given shall be bid as per plans and the costs distributed among the various bid items. Submission of a bid shall be considered evidence that the bidder is satisfied with the plans and conditions as shown. No additional compensation will be paid to the contractor for compliance with the plans, specifications, or special provisions.

□3. Notification: The Contractor shall notify the following Divisions at least 48 hours in advance of the anticipated start of construction, holidays and weekends excluded. Work shall not commence until a pre-construction conference is held.

Division of Sewerage and Drainage	(614) 645-7490
Division of Water	(614) 645-7788
Division of Fire	(614) 221-3132
Division of Police	(614) 645-6676
Division of Design and Construction	(614) 645-3182

The Contractor shall notify, in writing, all adjacent landowners a minimum of one week in advance of work near their property. The Contractor shall contact the Division of Sewerage and Drainage for a suggested format for the notice.

□4. Permits: The Contractor shall obtain all necessary permits and licenses needed for construction of this project as required under CMSC 107.02. When excavating within the public right-of-way limits inside the City of Columbus, the Contractor shall obtain an excavation permit from the Transportation Permit Office by calling 645-5660 during the hours of 7:30 a.m. to 5:00 p.m., Monday – Friday.

□4a. Manholes to be Rebuilt: All sewer manholes being rebuilt to accommodate grade changes will need to be built by a licensed sewer contractor, for the City of Columbus, under a separate sewer permit. Contact the sewer permit counter at 614 645-7490 for additional information.

□5. Non-Rubber Tired Vehicles: No non-rubber tired vehicles shall be moved on public streets or roads. The Transportation Division may grant exceptions where short distances and special circumstances are involved. Granting of exceptions must be in writing and any resulting damage must be repaired to the satisfaction of the appropriate jurisdiction.

□6. Safety: The Contractor shall be solely responsible for complying with all Federal, State, and Local safety requirements. Together with exercising precautions at all times for the protection of persons (including employees) and property, it is also the sole responsibility of the Contractor to initiate, maintain, and supervise all safety requirements, precautions, and programs in connection with the work.

The Contractor shall follow the OSHA requirements for "confined space entry," Title 29 of the Code of Federal Regulations, Part 1910.146 while performing work inside any manhole or other permit required for confined space.

□7. Elevation Datum: Elevations shown on these plans are based on (*list datum here*) Datum.

□8. Benchmarks: The Contractor shall carefully preserve benchmarks, property corners, reference points, and stakes. Any benchmark, property corner, or survey marker damaged or disturbed by the Contractor shall be reset by an Ohio Registered Surveyor at the Contractor's expense.

□9. Right-of-Way: In addition to the direct requirements of the contract specifications, the Contractor shall observe and conform to the specific requirements of all Rights-of-Way including easements, court entries, and rights of entry or action filed in court in accordance with the code of the applicable governing agency. The cost of the operations necessary to fulfill such requirements shall be included in the price bid for the various items of the contract per CMSC 105.05 unless specific provision is made in the contract specifications for such cost under specific items of the contract.

□10. Utilities: The locations of underground utilities shown on the plan are obtained from the Owners of the utility as required by Section 153.64 ORC. The utility locations indicated are not necessarily complete or correct. The Contractor is responsible for the investigation, location, support, protection and restoration of all existing utilities and appurtenances shown. The Contractor is also responsible for coordination of any necessary utility relocation with the utility owner. The utility company shall relocate private utilities within the ROW at their own expense. Public utilities (waterlines, sewers, etc.) shall be relocated as shown in the contract documents. The Contractor shall expose utilities and structures prior to the construction to verify the vertical and horizontal effect on the proposed construction. The Contractor shall call, toll free, the Ohio Utilities Protection Service (1-800-362-2764) 72 HOURS PRIOR to construction and shall notify all utility companies at least 48 HOURS PRIOR to work in the vicinity of their underground lines. The cost of utility related work shall be included in the unit price bid for CMSC Item 901, unless otherwise specified.

Where plans provide for a proposed sewer to be connected to, or cross over or under an existing sewer or underground utility, the Contractor shall locate the existing pipes or utilities, both as to line and grade before starting to lay the proposed sewer. These locations are noted thus: EXPOSE. The cost of this work shall be included in the unit price bid for CMSC Item 901.

□10a. Division of Sewerage and Drainage Utilities: City of Columbus locators will only locate and mark main line sewers. The contractor is responsible for locating all service laterals and field verifying the location of main sewer lines. Any damage and/or repairs to the main sewer lines or service laterals are the responsibility of the sewer contractor. Repairs must be completed by a licensed sewer contractor under a separate sewer permit.

The contractor shall maintain a minimum clearance of 3' horizontal and 1' vertical from the outside diameter of all sewer lines.

□10b. Brick Sewers: The contractor shall maintain a minimum clearance of 10' horizontal and 5' vertical from the outside diameter of all brick sewers. The sewers must be labeled "Brick" and the outside diameter pipe size indicated on the plans. Brick sewers Shall Not be exposed as it may cause the collapse of the sewer due to removal of the backfill material.

□11. Grade Changes: If it is determined that the elevation of the existing sewer, or existing appurtenance to be connected, differs from the plan elevation or results in a change in the plan sewer slope, the Engineer shall be notified before starting construction of any portion of the proposed sewer which will be affected by the variance in the existing elevations.

If it is determined that the proposed sewer will intersect an existing sewer or underground utility if constructed as shown on the plan, the Engineer shall be notified before starting construction of any portion of the proposed sewer which would be affected by the interference with an existing facility.

Grades and elevations shown on the plans shall not be revised under any circumstances without first obtaining written approval from the Engineer. Invert elevations shall not deviate from plan elevation by more than 0.05 foot. Failing to meet the above requirements is cause for rejection of the affected section of sewer.

□12. Water, Sanitary, Storm, and Private Utility Service Lines: The existing water, sanitary, storm, and private utility service lines that are shown on the plans have been located as accurately as possible using available information (Field marked, tap card records, plan location, use of valve boxes, etc.).

Relocation of an existing sanitary or water service line that is in physical conflict with the new storm sewer and its appurtenances shall be paid for under the applicable "Item Special – Sanitary Service Relocated/Repair" or "Item 816 – ___-Inch Water Service Tap Relocated", respectively.

Any damage to an existing sanitary or water service line not in physical conflict with the new storm sewer and its appurtenances and found to be beyond 5 feet of its location shown on the plans shall be repaired and paid for under the applicable "Item Special – Sanitary Relocated/Repair" or " Item 816 – ___-Inch Water Service Tap Relocated", respectively. Any damage to an existing sanitary or water service line not in physical conflict with the new storm sewer and its appurtenances and is within 5 feet of its location shown on the plans shall be restored by the Contractor at their own expense.

The following estimated quantities are to be used as directed by the Engineer for relocating water service taps. Relocated water service taps are to be inspected by the Division of Power and Water. Please contact the Distribution Engineering office at 645-7677, 24 hours in advance, to schedule an appointment.

816 ¾ Inch Water Service Tap Relocated 1 Each

It is the Contractor's responsibility to verify the location of all other utility lines and include the cost of crossing these lines under the various pay items of this contract. Requests for extra compensation for the delay or loss of productivity caused by these crossings will be denied. The Contractor shall restore any damage to the service lines at his expense.

□13. Water Line Lowering: Existing water line lowering, as noted on the plans, may or may not be performed depending on field conditions or as directed by the Engineer. Water line lowering shall be per Division of Power and Water Std. Detail Drawing L-7401.

□14. Interruption of Water Service: The Contractor shall give written notice to all affected property owners at least 24 hours, but not more than 72 hours prior to any temporary interruption of water service. Interruption of water service shall be held to a minimum and shall be approved by the City.

□15. Service Box Adjustment: The Contractor shall adjust existing Utility Valve Boxes and Service Boxes to grade within the construction area. The Contractor shall replace any damaged Curb Box encountered while relocating Water Service Taps as directed by the Engineer. Any damage to Curb, Utility, and Service Boxes caused by the Contractor shall be replaced by the Contractor at his own expense as required by CMSC 105.08.

The following estimated quantity has been included in the quantity summary for the work noted above:

805 Curb Box 2 Each

□16. Fire Hydrant Permit: The Contractor must obtain from the Division of Water a fire hydrant permit prior to connection of his water supply lines to any fire hydrant. Permits may be obtained through the Division of Water Permit Office (645-7330). The Contractor shall provide the necessary gate valves, backflow preventers, and flow meter for each hydrant location. All equipment, fittings and valves shall be in accordance with Division of Power and Water standards. The Contractor shall pay for water at the current City rates.

□17. Trenching: Any excavation performed beyond the minimum trench width, as defined on Division of Sewerage and Drainage Standard Construction Drawings AA-S149, AA-S151, and AA-S152 due to site conditions or the contractor's methods are done so solely at the contractor's expense. No extra payment will be made for unauthorized excavation. Blasting is not permitted.

If unsuitable subgrade material is found, the following contingency quantity may be used as directed by the Engineer per CMSC Item 901.06.

CMSC Item 906 Stone Foundation _____ cubic yards

□18. Dewatering: Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity to adequately dewater the trench per CMSC Item 901.06. The trench shall be sufficiently dewatered so that the placement of bedding and laying and joining of the pipe or structures is made on firm, dry ground. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any damage to the property by utilizing proper erosion and sediment controls. Direct discharge of sediment laden water to the City's sewer system or a receiving stream is a violation of Ohio EPA and City of Columbus regulations; the Contractor will be held liable for the violation and subsequent fines. The cost of all dewatering work shall be included in the unit price bid for CMSC Item 901.

□19. Trench Backfill: Trench backfill shall be per CMSC Item 901.17. No additional compensation shall be made for trenches requiring CMSC Item 911, Compacted Backfill. The cost for backfilling trenches with CMSC Item 912, Compacted Granular Material shall be paid for under the applicable "Item 901 - ____Pipe,

with Type _____ Bedding, including Item 912 Backfill", no separate payment shall be made for Item 912, Compacted Granular Material.

At all points of crossing water mains or other sewers, the backfill shall be of granular material between the deeper and shallower pipes.

All trenches within the road right-of-way shall be backfilled or securely plated during non-working hours.

The Contractor shall be responsible for the condition of the trenches for a period of one (1) year from the date of final inspection. The cost of this work shall be included in the unit price bid for CMSC Item 901.

□20. Stormwater Facilities: Before any work is started on the project and again before final acceptance by the Owner, the Engineer and the Contractor shall make an inspection of all existing sewers which are to remain in service and which may be affected by the work. The condition of the existing conduits and their appurtenances shall be determined from field observations. The Engineer shall keep records of the inspection in writing.

All new conduits, inlets, catch basins, and manholes constructed or reconstructed as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the Owner.

All existing manholes, catch basins, drains, sewers, and appurtenances inspected initially by the above mentioned parties shall be maintained and left in a condition reasonable comparable to that determined by the original inspection. The Contractor shall correct any change in the condition resulting from the Contractor's operations to the satisfaction of the Engineer. The above is not applicable for structures to be abandoned. The Contractor shall remove debris, silt, etc. from the existing manholes and catch basins that have been affected by construction operations. The Contractor shall maintain service in existing sewers during construction.

□21. Existing Drainage Systems: Existing drainage systems (field tiles, roof drain outlets, sump pumps, etc.) encountered during construction of the new storm sewer or removal of existing storm sewers shall be extended as necessary and blind tapped to the new storm sewer per Division of Sewerage and Drainage Standard Drawing AA-S159 or connected to the catch basin as directed by the Engineer. All costs associated with this work shall be included in the unit price bid for CMSC Item 901.

If the Contractor encounters a pipe or connection to the storm sewer that in the estimate of the Engineer may be an illicit connection from an on-site sewage disposal system, Columbus Public Health shall be contacted at 645-6448 to determine whether the pipe may be reconnected to the City's storm sewer system.

□22. Clean Water Connections to Sanitary Sewers: Roof drains, foundation drains, drain tiles, and other clean water connections to the sanitary system are prohibited.

□23. Certification of Pipe and Structures: All concrete pipe, storm and sanitary structures will be stamped or have such identification noting that said pipe, storm and sanitary structures have been inspected by

the designated representative of the City of Columbus and meets their specifications. Pipe and structures without proper identification will not be permitted for installation.

□24. Manhole Steps: Manhole steps shall be reinforced polypropylene plastic per DOSD Std. Construction Drawing AA-S119. Payment for manhole steps shall be included in the unit price bid for CMSC Item 604, Manhole.

□25. Storm Structure Adjustment: The Contractor shall field verify the top of casting elevation of all new stormwater structures. If precast structures are utilized, the top 6 inches minimum shall be field placed either with grade rings or brick and mortar to allow for field adjustment. The cost for this work shall be included in the unit price bid for the applicable CMSC Item 604.

If the Engineer determines that an inlet is too low/high after it has been placed and rough grading performed, the Contractor shall adjust the inlet as directed by the Engineer and regrade the area accordingly. For adjustments of +/- 6 inches, the cost to adjust the inlet shall be included in the unit price bid for the applicable CMSC Item 604. For adjustments greater than +/- 6 inches, the cost to adjust the inlet shall be paid for in the unit price bid for CMSC Item Special – Inlet Adjusted, As Directed by Engineer, and shall constitute full payment for adjusting the inlet including grade rings, concrete sawing, mortar, excavation, backfill, regrading, etc.
The following estimated quantity has been included in the quantity summary for the work noted above:

Item Special - Inlet Adjusted, As Directed by the Engineer	2 Ea

□26. Manhole Frames and Covers: The top of new or modified manhole castings shall be set flush with the existing surface. The contractor shall field verifying the top of casting elevation prior to ordering materials.

□27. Sanitary Lateral Deflection and Leakage Testing: All sanitary lateral lines constructed as part of the main line construction shall be leakage and deflection tested in conformance with the requirements of CMSC Items 901.20 and 901.21.

□28. End Treatment: Immediately after placement of any conduits, the Contractor shall construct the end treatments required by the plans at both the outlet and inlet ends. This shall include headwalls, concrete, riprap, rock channel protection, sodding, etc.

Notes 29-40 Specific to CIPP Project

□29. Sewer Maintenance Notification: The Contractor shall notify the Division of Sewerage and Drainage Sewer Maintenance Operation Center at least 24 hours in advance of the anticipated start of construction by calling (614) 645-7102 during the hours of 7:30 a.m. to 5:00 p.m., Mon.-Fri.

□30. Protruding Taps: All lateral taps protruding greater than 1-inch shall be removed flush with the wall of the main line sewer prior to installation of the CIPP liner. Care shall be taken to ensure that the lateral sewer is not damaged beyond the connection point to the main. Cost to be included in the various items of the contract.

□31. Liner Thickness: Prior to lining, the contractor shall submit liner thickness calculations to the engineer for review and approval in accordance with Supplemental Specification SS-12. The approved liner thickness shall govern the work, subject to the minimum thickness requirement.

□32. Bypassing of Sewage Flows: The contractor shall be responsible for all bypassing of sewage flows as required to complete the work in accordance with the drawings and specifications. The contractor shall submit in writing, for city approval, the construction sequence and flow maintenance by-pass pumping procedure. Refer to Supplemental Specifications SS-1 and SS-3 for additional requirements.

□33. Residual Grout: The Contractor shall not allow residual grout in the grouting hoses to be blown out into the sewer. All residual grout shall be removed and disposed of.

□34. Rebound Clean-up: The Contractor shall insure that all rebound of sprayed cementitious material shall be cleaned up and removed from the sewer.

□35. Fire Hydrant Permits: Fire hydrant permits may not be available in project limits. Contractor shall contact the Division of Power and Water to locate hydrants available for use prior to bidding. All costs associated with trucking water to the project site shall be included in the lining costs.

□36. CIPP Joints: All CIPP to CIPP joints shall be made in a neat, workmanlike manner and shall be watertight.

□37. Lateral Status Determination: Sewer service laterals not associated with a structure and other sewer lines tying into the existing sewers (to be lined with cured-in-place pipe) shall be tested to determine if they are active. It is the intent of this contract to reestablish only those lateral sewers that are active, or for which inactivity can not be confirmed.

□38. Open Excavations: All excavations shall be maintained as safe as possible by the Contractor at all times and backfilled as soon as practical. Open excavations after work hours require traffic plates, and/or lighted barricades and construction fence.

□39. Support of Existing Brick Sewers: The Contractor shall support the existing sewers during construction of manholes, as necessary, to keep sewers in operation and to assure a sound watertight connection to the base of the manhole upon completion. Any changes to the manhole from the standard type shall be submitted by the contractor to the engineer for approval, with supporting calculations sealed by a registered professional engineer. In any locations where new sewer pipe is to be connected to an existing manhole or to the main trunk, the existing brick sewer shall be kept sound to the extent possible for a distance of 3 feet outside of the manhole or main trunk and a collar of reinforced concrete placed to connect the new concrete sewer to the brick. Shop drawings for the connection shall be submitted for review prior to construction.

□40. Sanitary Sewer Lateral Connections: Any lateral reconnections made in an area of pipe replacement shall be paid as Item 915 - Lateral Reconnection. This pay item shall include all labor and materials necessary to make this service connection complete and ready for service. Contractor shall be responsible for field verifying the size and number of existing open laterals and supplying the proper materials.

□41. Permanent Pavement Replacement: Pavement replacement shall be per Transportation Division Standard Drawing 1441 Dr. A, unless otherwise noted. Payment shall be based on the minimum trench width as shown on Standard Construction Drawings AA-S149, AA-S151, and AA-S153. Any excavation performed or pavement removed beyond the minimum trench width, and the subsequent pavement replacement, due to site conditions or the Contractor's methods are done solely at the Contractor's expense, no additional payment shall be made for permanent pavement replacement.

□42. Driveway Replacement: Asphalt drives shall be replaced from the farthest edge of trench to the edge of road pavement or to the concrete drive apron, if one exists. Concrete drives shall be replaced between nearest adjacent joints if joints are within 4 feet of trench edge. Concrete aprons that are disturbed and are located within the limits of the trench shall be replaced between nearest joints; monolithic aprons shall be replaced in their entirety. *(Note to Consultant preparing plans: locate joints of concrete driveways, show limits of concrete and asphalt driveway replacement on plans and quantities, same for concrete aprons.)*

□43. City of Columbus Park Property: The Contractor shall contact the City Forester of the Recreation and Parks Department (phone: (614) 645-3350) 24 hours prior to any construction in or near City of Columbus park property.

□44. Tree Preservation: All trees, whether shown or not shown on the plans, are to be preserved unless approval to remove is given in writing by the Engineer or their removal has been designated on the plan. Trees removed by either of the two preceding authorities shall be paid for under CMSC Item 201, Clearing and Grubbing, unless otherwise provided for by unit price bid under Item 201, Tree Removed, ___" Size. The Contractor shall use special precautions to avoid damage to all other trees. All trees removed shall include stump removal to 6 inches below grade. All wood over 4-inch diameter shall, at the property owner's discretion, be cut into lengths not exceeding 16 inches and stacked on the owner's property adjacent to the permanent easement. The cost for tree, brush, and stump removal shall be included in the price bid for CMSC Item 201, Clearing and Grubbing. The Contractor is to work with staff from the Division of Parks and Recreation (645-6648) on all tree removals.

Pruning: Branches or growth that interferes with the free construction of the project may be removed from trees/bushes that are to be saved by the use of pruning tools with prior approval from the Engineer. All pruning tools used and methods employed shall meet the approval of the Engineer. The branches shall be removed with a good clean cut made flush with the parent trunk or if having a good healthy lateral branch, the cut shall be a good clean slanting cut close to and beyond the healthy branch. The cost of all work and expenses connected with tree pruning shall be included in the price bid for CMSC Item 201, Clearing and Grubbing. No extra payment shall be made.

Trees damaged or destroyed that were not designated for removal or approved by the Engineer for removal shall be replaced at the contractor's expense. If suitable replacement cannot be determined, compensation by the Contractor for unauthorized tree removal shall include sufficient additional landscaping as determined by Recreation and Parks and the City Forester.

□45. Topsoil: The requirements of CMSC Item 653 shall govern the construction of this work. Four inches of topsoil shall be placed over all disturbed areas that are to be seeded and mulched. Final grades shall conform to those shown on the plans. Topsoil found suitable by the Project Engineer during clearing and

grubbing shall be segregated from the other excavated material and stockpiled for reuse. Payment for segregating, stockpiling and reuse of stockpiled topsoil shall be included in the amount bid for CMSC Item 901. If stockpiled topsoil is insufficient, the Engineer may direct the Contractor to import additional topsoil. Imported topsoil shall be paid for under the unit price bid for CMSC Item 653, Topsoil Furnished and Placed, as Directed by the Engineer.

□46. Seeding & Mulching: The Contractor shall seed and mulch all disturbed areas in conformance with CMSC Item 659 – Seeding & Mulching. Any disturbed areas outside the project limits shall be restored at the Contractor's expense.

The Contractor shall water seeded areas at a rate of 120 gallons per 1,000 square feet as soon as the seed is covered. The Contractor shall water all seeded areas at a rate of 120 gallons per 1,000 square feet every other day for four weeks. Watering shall be performed in the morning between 6:00am and 10:00am and shall be applied by means of a hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the mulching material. The cost for water shall be included in the unit price bid for Item 659 Seeding and Mulching.

Maintenance shall begin immediately after any area is seeded and shall continue for a minimum four-week active growing period following the completion of all seeding work, and until final acceptance of the project. In the event that seeding operations are completed too late in the fall for adequate germination and growth of grass, then maintenance shall continue into the following spring.

Maintenance shall include reseeding, mowing to maintain a height of 3 inches, watering, weeding, fertilizing and resetting and straightening of protective barriers. Maintenance shall also include chemical treatments as required for fungus and/or pest control.

It shall be the Contractor's responsibility to protect and maintain the seeded areas. After the grass in seeded areas has appeared, all areas and parts of areas that, in the opinion of the City, fail to show a uniform stand of grass for any reason whatsoever shall be reseeded and such areas and parts of areas shall be reseeded repeatedly until all areas are covered with a satisfactory growth of grass. Reseeding together with necessary grading, fertilizing, watering, and trimming shall be done at the expense of the Contractor.

□47. Dust Control: The following estimated quantities are to be used as directed by the Engineer for dust control:

616 Water _____ M Gallons
616 Calcium Chloride _____ Tons

□48. Temporary Soil and Sediment Control: The following estimated quantities are to be used as directed by the Engineer for erosion and sedimentation control measures:

207 Perimeter Filter Fabric Fence _____ LF
207 Construction Seeding and Mulching _____ SY

All erosion and sediment practices are subject to field modifications at the discretion of the City of Columbus and/or the Ohio EPA.

All disturbed areas, which will remain unworked for 45 days or more, shall be seeded. The Contractor shall be responsible for the removal of all temporary sediment control devices at the conclusion of the construction but not before growth of permanent ground cover is established. The Contractor shall provide adequate drainage (consistent with sediment/erosion control practices) of the work area at all times.

(Include following if plan includes SWP3) Complete information for erosion and sediment control measures are detailed in the Stormwater Pollution Prevention Plan (SWP3) included in the plan.

□49. Soil Stockpiles: All soil stockpiles, including trench excavation stockpiles shall be protected from erosion by perimeter control devices such as straw bale dikes or silt fences. These perimeter control devices shall be maintained throughout the life of the project. Excavated materials shall not be stored on existing public roadway pavements. This includes excess or unusable excavated soil.

□50. Storm Sewer Inlet Protection: All storm sewer inlets shall be protected from excessive amounts of sediments using adequate filtering devices as approved by the Division of Sewerage and Drainage. These devices shall be maintained until the denuded area has been stabilized, or as directed by the Engineer. The cost of this work shall be included in the unit price bid for CMSC Item 207 – Inlet Protection. Straw or hay bales are not approved for inlet protection.

□51. Disposal of Excess Excavation: The Contractor shall dispose of all excess excavation. If materials are disposed on property within City limits, the contractor shall provide a copy of the signed agreement and a copy of the Grade and Fill Permit obtained from the Development Department.

□52. Street Cleaning: The Contractor shall keep streets free of dirt, sediment or mud on or off the project site. The Engineer may direct the Contractor to perform street cleaning periodically or on a regular interval if excessive amounts of dirt and mud are left along the street. This may include removal by sweeping, power cleaning, or manual methods. The cost of this work shall be included in the unit price bid for CMSC Item 901, unless otherwise specified.

□53. Non-Performance: In the event that it becomes necessary for the City to perform work of an immediate nature (such as the placement of barricades or replacement of signs or other warning or protective devices) required of the Contractor by this contract because of failure or refusal of the Contractor to perform such work, the Contractor shall reimburse the City at the rate of 2.5 times the actual cost of labor, materials, and equipment necessary to perform such work. If the Contractor refuses or fails within a reasonable time to perform or cause the performance of such work, the City shall be reimbursed by the Contractor in the amount provided herein by way of a deduction from the Contractor's net payment under the contract. Reasonable time for all streets involved on this contract is 1 hour from the time of notification by the City.

ADDITIONAL NOTES THAT HAVE BEEN USED ON PREVIOUS PROJECTS.

□54. Maintenance of Traffic: The Contractor shall furnish, erect, maintain, and remove all temporary traffic control devices in accordance with the 'Ohio Manual of Uniform Traffic Control Devices for Construction and Maintenance Operations' (current edition). Copies are available from the Ohio Department of Transportation, Bureau of Traffic, 1980 West Broad Street, Columbus, Ohio 43223.

Construction operations shall not begin until all temporary traffic controls are in place. All lanes shall be open to traffic during nonworking hours. The Contractor shall supply all signing, barricades, etc., for street closures.
A Maintenance of Traffic Control Plan (MTCP) shall be submitted to the Traffic Engineering and Parking Division Construction Coordinator (645-6269) at the preconstruction meeting or a minimum of ten (10) working days prior to beginning work. Copies of the approved MTCP shall be given to the Project Engineer and the Contractor shall keep the MTCP along with the City Street Closure Permit at the project site.

The Traffic Engineering and Parking Division Construction Manager (645-6269) and The Columbus Paving the Way Program (645-3970) shall be notified a minimum of five (5) working days prior to starting work and prior to each phase or major change in traffic patterns within the right-of-way.

All lanes shall be open from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. weekdays.

Two-way, one-lane traffic shall be maintained on all affected streets during working hours (9:00 a.m. to 4:00 p.m.). A flagger shall be used and proper signing provided as shown on page C-18 of the Ohio Manual.

Police officers are not needed unless a hazard develops. If a hazard develops an off-duty officer may be assigned by the Safety Director or Service Director to the project at the Contractor's expense.

Notification shall be given to adjoining properties a minimum of one (1) week in advance of closures. Access to all adjoining properties as well as access for mail, sanitation service, emergency vehicles, etc. shall be maintained throughout the duration of the project.

Steady burning, Type "C" lights shall be required on all barricades, drums, and similar traffic control devices in use at night. Cones are not approved for use at night.

A flashing arrow panel (48"x96" – Type "C") shall be used in lane closures in accordance with the Ohio Manual.

The Contractor shall maintain all permanent traffic controls not in conflict with the temporary traffic controls throughout this project. Permanent traffic controls may be temporarily relocated, as approved by the Engineer. The Contractor shall assume all liability for missing, damaged and improperly placed signs. The Contractor shall provide all facilities and personnel required for maintaining local traffic and detouring through traffic during construction in accordance with CMSC Item 614.

Any work done by the Traffic Engineering and Parking Division, including installation, relocation, removal and/or replacement of temporary traffic control devices as a result of work done by the Contractor or as a result of NEGLIGENCE of the Contractor shall be at the expense of the Contractor.

□55. Graveled Parking Area(s): The following estimated quantity is to be used as directed by the Engineer to provide 6" depth graveled parking area(s) within the right-of-way adjacent to the roadway. Final grade of the parking area shall match the surrounding area. The cost for this work shall be paid for under the unit price bid for CMSC Item 304 – Aggregate Base, As Per Plan, and shall constitute full payment for providing all labor, equipment, and materials to construct the parking area(s) complete in place including excavation and disposal, aggregate, grading, etc.

The following estimated quantity has been included in the quantity summary for the work noted above:

CMSC Item 304 - Aggregate Base, As Per Plan _____ CY

□56. Curbs: All curbs damaged or removed as a result of Contractor's operations shall be replaced using the same type material and the same dimension as that removed. Class "C" concrete, as specified under the City of Columbus (CMSC) Item 499, shall be used for all concrete work. The following estimated quantity has been carried to the general summary:

Item 609 Combination Curb and Gutter XX L.F.

□57. Clearing and Grubbing: All trees and stumps specifically marked for removal within the construction limits shall be removed under the lump sum bid for Item 201, Clearing and Grubbing. The following is an approximate estimate of the number of trees and stumps to be removed.

Sizes	No. Trees	No. Stumps	Total
15 In.	36	12	48
30 In.	27		27
48 In.	5		5

□58. Fence Rebuilt, Type ( ): This item shall include the careful reconditioning and re-erection of fence and component parts as detailed on the plans and as directed by the Engineer. Fence or component parts which are damaged or are otherwise unsatisfactory for reuse shall be replaced in kind by the Contractor. Any new parts, which are needed, as determined by the Engineer, shall be supplied by the Contractor at no additional cost to the City. The amount of rebuilt fence to be paid for will be the number of feet rebuilt, complete in place and measured as provided for in 607.10. Payment for the above will be paid for at the contract price per foot for item 607, Fence Rebuilt, Type ( ). The lengths of fence shown in the plans are horizontal dimensions. Measurements of the final quantities shall be made in accordance with Item 607.

□59. Tree Planting: The Contractor shall include associated items for tree planting called out in the supplemental specifications in the bid item for tree replacement. These associated items include, but are not limited to, water and tree guards. Replacement trees shall be American Sycamore (Plantanus Occidentalis), Skyline White Ash (Fraxiuns Americana "Skyline"), and Sawtooth Oak (Quercus Acutissima) as shown. The following estimated quantities have been included in the General Summary for the work noted above.

Item	Replacement Type	Total
Special	Skyline White Ash	17
Special	American Sycamore	5
Special	Sawtooth Oak	5

□60. Increased or Decreased Earth Excavation: If the engineer states in writing that the proposed sewer elevation must be changed from that shown on the plan, a payment adjustment will be made based on the CMSC Item 902 description.

The following estimated quantities have been included in the quantity summary for the work noted above:
902 Increased or Decreased Earth Excavation 10 CY

□61. Abandon or Remove Existing Storm Pipe and Structures: The Contractor shall abandon (fill in place) all existing storm sewer pipes outside the proposed trench labeled (Ab) per Item 202. At the Contractor's option, existing storm sewer pipe outside the proposed sewer trench may be removed and disposed of at an approved disposal site. Any existing sewer pipe labeled (R) shall be removed per Item 202. Bulkhead all sewers abandoned per 901.08. Cost of abandoning and/or removing and disposing of existing sewer pipe outside trench to be included in Item 202 - Abandon Sewer Pipe. The cost of removal and disposal of any existing storm pipe within normal trench excavation width shall be included under Item 901.

The Contractor at his option shall abandon or remove all existing storm sewer structures (manholes, catch basins, headwalls, etc.) outside proposed sewer trench labeled with an "X" per Item 202. Cost of removal and disposal of any existing storm structure within normal trench excavation width shall be included under Item 901.

□62. Removal and Reinstallation of Fence: For existing fencing installed inside existing right-of-way the Contractor shall follow Item 202 – Fence Removed for fence removal and storage for reuse. For existing fencing installed outside of existing right-of-way the Contractor may reuse and reinstall existing fence material or provide new material per Item 607 as requested and directed by the Engineer. Cost to be included under Item Special – Remove and Reinstall Chainlink Fence.

□63. Construction within Franklin County: All work within Franklin County road Right-of-Way is subject to the inspection and approval of the Franklin County Engineer per 105.14. The Contractor shall secure a written permit from the Franklin County Engineer, 970 Dublin Road, Columbus, Ohio, Two (2) working days in advance of starting any work within road Right-of-Way.

Steel plate Installation: The Contractor shall notify the Franklin County Engineer Road Supervisor (462-3072) 24 hours in advance of the Contractor installing any steel plates.

□64. Encountering Hazardous or Toxic Materials: If the Contractor encounters any abnormal material such as, but not limited to, drums, tanks, or stained earth or any unusual odor during construction operations,

the work in this area shall be temporarily discontinued, equipment left in place, the area cordoned off and the Engineer notified. If the area is considered to contain hazardous or toxic material it must be handled correctly in accordance with all local, state and federal laws.

□65. Archeological/Historical Resources: If the excavation operations encounter remains or prehistoric people's dwelling sites or artifacts of historical or archeological significance, the operations shall be temporally discontinued in this area and the Contractor shall notify the City's representative. The City's representative will contact the Ohio historic preservation office to determine the disposition of the find. After consultation with the Ohio historic preservation office, the City's representative may elect to discontinue the work in the area indefinitely, resume normal excavation, or excavate for artifacts. When directed by the City's representative to excavate for artifacts, the Contractor shall excavate the site n such a manner as to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper authorities. The Contractor shall not disturb any historical or cultural buildings, foundation, structure, or materials above or below the ground surface.

□66. Sanitary Convenience Facilities: The Contractor shall furnish and maintain sanitary convenience facilities for the workers and inspectors for the duration of the work.

□67. Air/Noise Control: Construction equipment shall be provided with intake silencers and mufflers. All construction vehicles shall be equipped with proper emission control equipment. Periodically check equipment and machinery for proper tuning to minimize exhaust emissions and noise. Baffles shall be installed on boiler tucks to minimize noise.

APPENDIX C

The following links are the GI Design Guidelines and the design guidelines for the Division of Water and the Department of Public Service to assist the design professional when it is necessary to develop detailed design plans for water improvements and/or pavement improvements in addition to the sewer improvement.

Green Infrastructure Design Guidelines

https://www.columbus.gov/utilities/projects/blueprint/Green-Infrastructure-Design-Guidelines/

Department of Public Utilities Document Library

https://www.columbus.gov/utilities/document-library/

Department of Public Service Document Library

https://www.columbus.gov/publicservice/Design-and-Construction/Document-Library/