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1. Preface

This document is a guide for public sanitary sewer system design and improvement. These guidelines are not comprehensive and do not replace sound engineering judgement. Deviations from guidelines shall be approved by the City of Westerville. All technical details are the responsibility of the Design Engineer preparing the plans.

The City of Westerville reserves the right to modify design guidelines on a project by project basis.

2. Submission, Review and Approval

A. General

a. All proposed or existing sanitary sewer system modifications as well as additions, extensions, and demolitions require a Sanitary Sewer, Site Improvement and/or Roadway Plans submission and approval as required by the City Engineer.

b. Any property owner and/or developer building/developing a lot, tract, subdivision or parcel of land is required to connect to the public sanitary sewer system. The property owner and/or developer shall bear all costs of survey, design, construction, installation, permitting, capacity fees, inspection fees, etc. as required by the City. The property owner and/or developer shall extend sanitary sewer(s) as required by the City Engineer.

c. The City does NOT guarantee sanitary sewer capacity for any property owner, development and/or any use (residential, commercial or industrial/manufacturing, etc.). The property owner and/or developer shall be responsible for determining capacity and making necessary improvement on-site and/or off-site improvements as well as providing sanitary sewer analysis/calculations as required by the City Engineer.

d. The design of sanitary sewer systems shall conform to provisions of the following publications or agencies except as such provisions are modified or amended herein. Where a conflict exists between provisions of the reference publications, the publication providing the most stringent requirement shall govern.
    i. Recommended Standards for Wastewater Facilities, A Report of the Wastewater Committee of the Great Lakes –Upper Mississippi River, commonly known as “Ten State Standards”
    ii. Ohio Environmental Protection Agency Requirements
    iii. City of Westerville Standard Drawings
    iv. City of Westerville General Notes
    v. City of Columbus Construction and Material Specifications
    vi. City of Columbus Division of Sewerage and Drainage Standard Drawings
    vii. Delaware County Regional Sewer District Rules and Regulations
    viii. Delaware County Regional Sewer District Standard Drawings
    ix. Delaware County Regional Sewer District General Notes
    x. Ohio Building Code/Plumbing Code

e. Typically, sanitary sewer mains serving more than one building are public. Each sanitary sewer extension will be reviewed by the City on a case-by-case basis to determine if the sanitary sewer main extension is public or private.

f. All senior living facilities, assisted living facilities, healthcare service facilities, daycare facilities and/or any other facility determined by City Staff shall have a private screening device located within a private manhole on the private sanitary lateral. Devices may be grinding units ("Muffin Monster" or approved equal) or screens (openings not exceeding 2 ½-in in diameter) in a private sampling sanitary sewer manhole before outletting into the public sanitary sewer main.

B. Plans

a. All plans submitted for approval to the City of Westerville shall be prepared, signed and sealed by a Professional Engineer licensed in the State of Ohio.

b. All plans shall be prepared and submitted on 22"x 34" ANSI D size PDFs. Title sheets and title blocks shall per City of Westerville standard templates. Plans shall be submitted electronically through the City of Westerville Online Plan Review Portal.

c. Plans that outlet/discharge sanitary sewer to City of Columbus sanitary sewers shall include the required City of Columbus Signature block, CC number, required notes, details, etc. The Design Engineer shall submit the plans to the City of Columbus and Ohio EPA as required.

d. Plans that outlet/discharge sanitary sewer to Delaware County Regional Sewer District shall include the required Delaware County Regional Sewer District Signature block, required notes, details, etc. The Design Engineer shall submit the plans to Delaware County Regional Sewer District and Ohio EPA as required.

e. After review comments have been addressed and necessary/required revisions completed (including but not limited to the Ohio EPA, the City of Westerville, the City of Columbus or the Delaware County Regional Sewer District), the City will route the title sheet electronically to City staff for signatures. The Design Engineer shall be responsible for obtaining the required signatures/approvals from the Ohio EPA, the City of Columbus or the Delaware County Regional Sewer District.

f. The Design Engineer should submit a cost estimate for the public improvements with each submission.

g. Sanitary sewer calculations, cost estimates, easements and exhibits shall be submitted electronically through the City of Westerville On-Line Plan Review Portal.

h. All proposed text shall be capitalized and a minimum height of L100 or 0.10 x (scale).

i. Plan approval occurs after Planning Commission approval (where applicable).

C. Easements and Recorded Documents

a. Locate public sanitary sewer mains (including manholes) within public rights of way and/or public easements. Necessary public easements must be granted prior to City signing the title sheet/approving the plans.

b. All public easements shall be a minimum width of 15-ft or 5-ft beyond minimum trench limits on either side of trenches as specified in COC SCD AA-S149, AA-S151 and AA-S153, whichever is greater. Actual easement widths depends upon utility depths and other factors. Public sanitary sewers shall be centered within easements.

c. All existing easements shall be labeled on plans as platted or deeded. All existing easements shall be identified by plat books and page numbers or official record numbers of deeds.

d. The property owner and/or developer shall provide legal descriptions and exhibits for all easements. Documents shall be signed and sealed by a Professional Surveyor licensed in the State of Ohio. Documents shall be prepared on legal size paper. Easement and legal description title shall match the official name of the easement. Easements are expected to be donated to the City at no cost to the City.

e. Easement legal descriptions and exhibits (metes and bounds) shall be submitted electronically through the City of Westerville Online Plan Review Portal.

f. The City will record public easements once the City receives original executed easements. It is the responsibility of the property owner(s)/developer to record private easements. A copy of all recorded private easements shall be provided to the City.

3. Minimum Plan Requirements

A. Title Sheet

The title shall contain the following items:

a. Project Title - Plans shall be titled "PUBLIC SANITARY SEWER IMPROVEMENTS FOR <PROJECT NAME>".

b. Location Map - This map shall show the location of the project relative to major roadways, corporate boundaries and common landmarks. The map shall be located in the upper right corner and have no scale.

c. Index Map/Tributary Area Map - This map shall be of sufficient common scale to be legible. This map shall include the sewer alignment with structures numbered. Indicate where sections of sewer line may be found in the plan set. The entire onsite and offsite tributary area shall be clearly delineated with acreage delineated. Breaklines in dimensioning a sub-area are not acceptable unless otherwise approved by the City. All roadways, 100 year flood plains (FEMA), corporation lines, adjacent land ownerships, railroads, and other significant land features shall be shown. Locate this map at the center of the title sheet.

d. Benchmarks - A minimum of two (2) suitable benchmarks shall be provided for every 1,000 lineal feet. Benchmarks shall be established through a bench circuit with elevations based on the most recent North American Vertical Datum (NAVD) determination. Where a benchmark has a determination differing from the most recent NAVD datum, show the earlier elevation in parentheses following the present elevation i.e. 730.05 (729.98-1929). Benchmark location(s) shall be shown and labeled on the Index Map.

e. Horizontal Datum - Provide horizontal control in Ohio South State Plane Coordinates. Horizontal control locations shall be shown on the Index Map.

f. Vertical Datum - Provide vertical control in North American Vertical Datum (NAVD) 1988. Vertical control locations shall be shown on the Index Map.

g. Standard Drawings - The title sheet shall include a list applicable Standard Construction Drawings which apply to the proposed work. All standard drawings shall be included on project detail sheets. The minimum height of L100 (0.10 x scale) does not apply to these standard detail sheets. Consultants are asked to populate detail sheets with as many legible details as is possible.

h. Signature Block - The signature block shall include applicable signatures for City of Westerville officials and contain the following note: "SIGNATURES BELOW SIGNIFY ONLY CONCURRENCE WITH THE GENERAL PURPOSE AND LOCATION OF THE PROJECT. ALL TECHNICAL DETAILS REMAIN THE RESPONSIBILITY OF THE ENGINEER PREPARING THE PLANS."
The Design Engineer shall be responsible for acquiring necessary signatures from officials outside the City of Westerville.

B. Plan

a. Text - All text shall be capitalized and a minimum height of L100 or 0.10 x (scale).

b. North Arrow - Orient plans so north arrows are located toward the top or left margins of each sheet with North being up or to the right.

c. General Notes - Current City of Westerville Capital Improvement or Private Development general notes shall be reviewed for applicability and included in the same order as provided. Additional construction notes shall be included after the City of Westerville general notes. “ITEM SPECIAL” quantities shall include a note explaining the requirements of that item. If a specification item is noted “AS PER PLAN”, include the necessity note and/or detail.

d. Detail Sheets - All standard drawings shall be included on project detail sheets. The minimum height of L100 (0.10 x scale) does not apply to these standard detail sheets. Consultants are asked to populate detail sheets with as many legible details as is possible.

e. Estimate of Quantities - An accurate estimate of items being constructed shall be included. The descriptions of items shall be the same as that under the item descriptions in the Construction Material Specification, current edition. If an item is “AS PER PLAN”, include any necessary note and/or detail. For private development projects, title the public improvement quantities as “ESTIMATE OF QUANTITIES FOR PUBLIC IMPROVEMENTS”and shall only include public improvement quantities that are in Right of Way and or public easement.

f. Stationing - Plans shall have continuous stationing along the centerline of pipes from the downstream 0+00 station through the longest length of sewer alignment. Manhole numbering shall conform to stationing with the lowest manhole number correlated to the lowest station. The next longest continuous length of sewer shall be restarted at 0+00 station with manhole and structure numbering continuing with increasing numbers. Apply this guideline for each succeeding section of shorter sewer lengths.

   Station equations and/or negative stationing on water main centerlines are not acceptable.

   Place match lines at 50-ft station intervals.

g. Scale - Horizontal scales of 1"=60', 1”=50’, 1”=40”, 1”=30’ and 1”=20’ are acceptable if legible as determined by the City. Details shall be of an appropriate scale.

h. Line Weights - Use appropriately differing line weights. All items shall be labeled and clearly distinguishable. Existing linework, structures and associated texts shall be faded and/or thinner while proposed linework, structures and associated texts shall be dark and/or bold. Proposed sanitary sewer with detailed design information shown on different sheets shall be labeled “PROPOSED <X>” SANITARY. SEE SHEET <Y>, where ‘X’ is the pipe diameter and ‘Y’ is the sheet number.

i. Property Crossings - Label both onsite and offsite properties through which sanitary sewer lines pass with each property owner's name, parcel acreage, parcel I.D. number. Additionally, include both deed book and page numbers of title instruments.

j. Utilities - Existing and proposed utilities within or adjacent to the project shall be clearly identified as to types, sizes, locations, and ownerships. Construction plan numbers (CC, RP, MM, etc.) of all existing sewers shall be labeled. Label all drainage swales, ditches, creeks, etc. All existing utilities greater than 24-in and utility crossings shall be shown to scale as double lines.

k. Service Laterals - Proposed service laterals shall be shown on the plans. Occasionally, both the City and Developer benefit by installing laterals and main lines simultaneously. In these cases, the developer/property owner shall pay all permit and capacity fees to the City of Westerville Building Division before construction.

   Service laterals shall be connected to a main with a wye and not into a sanitary manhole unless otherwise approved by the City.

   Service laterals and wyes are privately owned. The City is not responsible to maintain and/or replace laterals or wyes.

   Sanitary service lateral cleanouts shall be provided a minimum of every 100-ft.

   No Service lateral shall be connected within 8-ft of a sanitary manhole.

   Provide a Sanitary Service Lateral Schedule (in table format). Include wye station, length of service, size of service, length of riser, slope of service, end of service elevation and as-built elevations for each.

   The length of the riser quantities shall be the distance from the pipe invert to a point ± 9' below the existing or proposed ground surface, whichever is higher. Note: The length of riser quantities might not equal the sum of service riser lengths identified in plan view.

l. Mainline Sewer - Public mainlines shall be located in public right of way and or within a 15-ft minimum width easement. The outside edge of the sewer shall be no less than 5-ft feet from the edge of the easement. Easement widths shall depend on sewer depths and other factors.

   All sewer centerlines shall be labeled with bearings and distances in a table format. Distances shall be measured from center of manhole to center of manhole. Bearings and distances shall be based on the State Plane

Coordinate System. Coordinates of all proposed manholes as well as their as-built locations and existing manholes shall be shown in table format.

C. Profile

a. Text - All text shall be capitalized and a minimum height of L100 or 0.10 x (scale).

b. Scale - The horizontal scale shall correspond to the plan scale. The vertical scale shall be 1”=5’ or 1”=10’.

c. Slopes - High ends of sewer profile slopes shall read from left to right or right to left, but shall be consistent throughout.

d. Stationing and Cut Information - Surface elevations, proposed centerline elevations and cut-to-invert depths shall be labelled at every 100-ft station. Additionally, this information shall be shown at the beginning and end of each profile.

e. Utility and Other Crossings - All existing (based on existing records or field observations) and proposed utility crossings shall be shown accurately with their types and sizes labelled. Features such as streets, alleys, driveways, streams, ditches, etc. shall be shown and identified by names, centerlines, edges of pavement, etc.

f. Structures - All structures shall be labeled as to type, centerline station location, invert and top of casting elevation (Rim) as well as all other pertinent information such as size, slope, and distance. Existing structures and pipes shall be shown as dashed lines and proposed structures shall be shown as darker, solid lines.

g. Backfill, Backing, and Encasement - Label types and limits of backfill above proposed sanitary sewer lines. Identify concrete backing and encasement limits as needed.

h. Ground Surfaces -Clearly show and label existing and proposed ground surfaces. Existing surfaces shall be represented as lighter, dashed lines. Proposed ground surfaces shall be shown as darker, solid lines. All elevations shown on plans shall be per the most recent N.A.V.D.

4. Design Requirements and Criteria

A. Tributary Area

a. Tributary Area Map - Tributary areas for proposed sanitary sewers shall be clearly labeled and accurately identified in the Index Map on the title sheet. The design engineer shall research existing plans, original design, calculations, studies, contours maps, etc.

Changes in sanitary tributary design boundaries may be approved by the City upon written request. The request shall include a map showing the existing and proposed tributary boundaries and a copy of both original and proposed sewer design calculations. The map and calculations shall include any previously approved changes. The existing system shall be analyzed to a point downstream determined by the City. Combined changes shall be minor and not have a detrimental effect on the sewer capacity.

b. Population Design Densities - An area's rate of sanitary flow shall be determined by the proposed population density. The design engineer shall propose a density to the City for review. The design engineer may use actual density records to support proposed density chart variations.

c. Sewer Depth - Sanitary sewers as well as future extensions within a tributary boundary shall be a minimum depth of 10' from the proposed flowline to the proposed ground elevation. This requirement shall apply to commercial as well as residential development with or without basements. Certain circumstances may dictate this depth requirement is not possible or practical, and in such cases, the City may waive the requirement.

Sewers shall be designed to be no less than 10' deep when extended to the most distant point in a tributary area. A critical alignment and profile may be required to demonstrate minimum depth compliance.

d. Extending Sewer through Development - The property owner/developer shall extend sewer to surrounding properties to accommodate any upstream tributary area as required by the City. Where owners/developers are required to extend sewer to provide for upstream tributary properties, public easements shall be provided.

B. Hydraulic Requirements and Sanitary Main Design

a. All public sanitary sewer mains shall maintain a minimum separation of 20-ft from any part of the building (including foundation) and greater separation may be required for deeper sewers, unless otherwise approved by the City Engineer.

b. Separations between water lines and sewers shall conform to the requirements of the "Recommended Standards for Wastewater Facilities & Recommended Standards for Water Works". Backfill between all points of crossing shall follow City of Westerville Standard Construction Drawing "Anti Infiltration & Inflow Barrier Detail". All other utilities shall provide 1.5-ft vertical and 3-ft minimum horizontal clearances with all underground utilities. No utility facility shall be installed with less than minimum clearance without the written approval of the owner(s). The contractor shall expose all utilities and/or structures prior to construction to verify vertical and horizontal clearances.

c. Pipe Type and Roughness - All public sanitary sewer main line piping shall be PolyVinyl Chloride (PVC) sewer pipe meeting the requirements of ASTM D 3034, SDR 35. Large diameter pipe (18"-36") shall meet the requirements of ASTM F-679.

   All hydraulic calculations shall be based on a pipe roughness coefficient of N=0.013 (Mannings n) regardless of pipe material. Sanitary sewer computation/design sheets shall be submitted for all mainline sanitary sewer plans.

d. Pipe Grade - Minimum design grades for the various pipe sizes:

Size	Minimum Grade
8"	0.45%
10"	0.25%
12"	0.20%
15"	0.15%
18"	0.12%

   Excessive velocities shall be avoided. When proposed design velocities exceed 15 feet per second, OEPA design requirements shall apply.

End of Sewer Run - Sewers that will not require future extensions shall have adequate grade to provide sufficient cleansing velocity. Slope design shall exceed minimum grade requirements to compensate for reduced flow.

e. Design Capacity - System designs shall not exceed the following percentages of pipe flowing full capacities.

8" through 15" diameter:	50%
18" through 27" diameter:	75%
30" and larger diameter:	92%

f. Average Sanitary Flow - A rate of 0.0002 CFS per capita (based on 130 gpcd) multiplied by the design density for the area under consideration shall determine average sanitary flow.

g. Peak Sanitary Flow - Multiply the average sanitary flow by a factor of 3.5 to determine peak sanitary flow.

h. Infiltration - Infiltration shall be computed at a rate of 0.003 CFS per acre of total area tributary to the portion of the collection system under analysis.

i. Design Flow -Design flow is the sum of the peak sanitary flow and the total infiltration up to the point in question.

j. Pipe Size - Sanitary sewer mains shall be a minimum of eight inches (8") nominal inside diameter. Sanitary service lines shall be a minimum of six inches (6") nominal inside diameter. Reductions in pipe sizes downstream are not permitted regardless of pipe slopes.

k. Bedding/Backfill - Bedding shall be per City of Columbus Standard Drawings unless otherwise approved. Backfill under any pavement or within the pavement influence line (as shown in City of Columbus Standard Drawing 2179) shall be compacted the full width of the trench by means of approved mechanical devices meeting the requirements of COLS Item 912. All other backfill shall meet the requirements of COLS Item 911. Item 912 backfill shall extend from the bottom of the trench to the top of the pavement subgrade for trenches under pavement. Trenches not under pavement shall backfill to the influence line.

l. Direct Sewer Taps - Direct sewer taps into existing sanitary sewers is prohibited unless otherwise approved by the City.

C. Manholes

a. Required Locations - Manholes shall be constructed:

i. At changes of pipe size.
ii. At changes of pipe slope.
iii. At changes of pipe alignment.
iv. At changes of pipe material. (Example: PVC to Concrete)
v. At curves on sewers (PC or PT) 48" in diameter and larger
vi. At intermediate intervals not exceeding 300' on 8" through 27", and 500' on 30" and larger, or approved by the City.
vii. At the ends of sewer extensions where a service line is located between the manhole and the end of the sewer extension.
viii. At the ends of sewer extensions 50' or more in length, regardless of service line connections, or as approved by the City.

Manholes shall be located outside ponding areas, swales, flood routing routes, etc. or otherwise protected from the 100 year recurrence interval storm. Manhole castings must be 1-ft above the 100-year floodplain elevation.

b. Over Existing Sewers - When constructing a manhole over an existing flexible eight inch (8"), ten inch (10"), or twelve inch (12") sanitary sewer, a Type C (City of Columbus Standard Drawing AA-S102) manhole with flexible connections shall be installed. When constructing a manhole over an existing sewer other than noted above, a Type "E" (City of Columbus Standard Drawing AA-S104) cast in place base manhole or other City approved alternative shall be constructed.

c. Precast Manholes - All new manholes shall be precast and sized appropriately (See City of Columbus Standard Drawings.) Manhole bases shall provide a minimum 0.10' drop between inlet and outlet pipes unless otherwise approved by the City.

d. Manhole Casting - Sanitary Sewer manhole castings shall be blank.

e. Manhole Adjustments - Bricks are not permitted, use polypropylene or precast concrete.

f. Drop Pipes - **If approved by the City,** proposed sewers entering proposed manholes two feet (2') or more above the invert of the manhole may have an outside drop constructed per City of Columbus Standard Drawing AA-S110.

If approved by the City, proposed sewers entering existing manholes two feet (2') or more above the invert of the manhole may have an inside drop constructed per City of Columbus Standard Drawing M-S110.

No more than than one inside drop per manhole is permitted.

g. Cleanouts - Cleanouts on sanitary sewer mains will not be permitted under any circumstances.

D. Stream and Ditch Crossings; Sedimentation and Erosion Control

a. Alignment - Align sewers crossing open channels to cross as perpendicular to channels as possible. Crossings shall be minimized to mitigate construction sediment pollution. Strictly adhere to all additional OEPA requirements regarding stream crossings.

b. Depth, Backfill, Encasement, and Watercourse Erosion Protection - The depth from the channel bed to the crown of the pipe shall be a minimum of 4-ft. Trench backfill shall be in accordance with City of Columbus Item 911 of the CMSC. Watercourse erosion protection shall be placed over backfilled trenches in accordance with City of Columbus Item 919. When the 4-ft minimum cover requirement cannot be met, 6-in concrete encasement will be required for all pipe materials. PVC pipe, encasement shall extend between manholes on each side of the channel. An encasement detail shall be provided on the plan.

c. Sediment Pollution Concerns - Where the City determines a stream or other erodible surface may be impacted by construction activities:
    i. Phase construction practices may be required.
    ii. Construction stream crossings will be required.
    iii. Temporary and/or Permanent erosion protection shall be constructed within fourteen (14) days of surface disturbance.
    iv. All runoff generated off-site and on-site shall require sediment control.
    v. All stock piles shall be protected from sediment generation.
    vi. Add additional general notes as required.

E. Waterline Crossings and Parallel Installations

a. OEPA Guidelines shall be followed for sanitary sewers in relation to waterline crossings and parallel installations. The City shall have final determination as to whether proposed sewer installation is acceptable.

F. Phasing of Plans

a. A clearly defined phase line shall be shown on plans and tributary area maps where applicable.

   Quantities shall be estimated per phase.

G. Inspections

a. All installations and/or connections to the City's public sanitary sewer system shall be inspected by the City of Westerville Engineering Division and/or Third Party Consultant.

H. Sanitary Sewer Capacity Fees

a. Capacity fees may be obtained by contacting the City of Westerville Building Division, (614) 901-6650, or found on-line at Westerville.org.