

Section 3: Sewer Contract Drawings

Version 4.0

A. Drawing Size

1. Sheet – 30" x 42"
 2. Outer Border – 29" x 41" (1/2" from left, 1/2" from top, bottom, right)
 3. Inside Border – 27" x 39" (1" from left, 1" from top, bottom, right) (see Appendix IIb [40])
 4. Title Block – 5" x 9" in lower right corner (See Appendix IIc [41]).
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B. Materials

1. Drawing shall be on Mylar type material.
2. Mylar shall be .004 inch thick polyester base and matted on both sides.

C. Drafting

1. Scales

- a. Plan – 1" = 20' except as otherwise specifically approved.
- b. On new construction, where 1" = 30' scale can reduce the number of sheets, it may be used, as approved by the Water/Sewer Engineering Supervisor.
- c. Sections – 1/4" = 1'-0" or as otherwise appropriate
- d. Profile
 - i. Horizontal: 1" = 20' (or match plan)
 - ii. Vertical: 1" = 5'

2. Lettering

- a. All text size, style and orientation shall conform to the examples shown in Appendix II f [42] except the size of the call out for the proposed sewer in the profile only shall be 0.24" and the style and orientation shall be as shown in the sample plans for sewers in Appendix IX [43].
- b. Existing utilities shall be indicated using upper and lower case lettering and shall be italicized. The word existing shall not be used.
- c. Proposed work shall be indicated using nonitalic lettering in bold upper case letters.
- d. The word proposed shall be used in the plan and cross sections to only to call out the proposed water main and proposed sewer. It should not be used with any appurtenances (like manholes, collars or inlets) but the letters calling out the appurtenances should still be bold upper case. See the Sample Plans shown in Appendix IX [44].
- e. Ordinance Date (where applicable [45]) shall be 0.175".
- f. Preliminary Assessment (where applicable [46]) shall be 0.14".
- g. Name of sewer system (where applicable [47]) shall be 0.24" Arial.
- h. Title block information shall be as shown in Appendix II d [48].
 - i. All streets shall be kept clear of notes as much as possible. The name of the street shall be placed along the top of the sheet. No abbreviations shall be used on the street.
 - j. The words street, road, avenue, etc., should be spelled out on streets and abbreviated on intersecting streets.
- k. For Private Cost Contracts, the words "PRIVATE COST" in a 0.24" Arial shall be placed above the title block.

3. Line weights and styles shall be as shown in Appendix II e [49]

4. Symbols and Abbreviations

- a. Symbols and abbreviations shown in Appendix II [50] shall be used
- b. Any other symbols and abbreviations shall be defined on the Contract Drawings.
- c. The Legend shown in Appendix II j [80] shall be shown on all sewer sheets.

5. Drawing Orientation

- a. The drawing should be generally oriented with the street on the sheet being oriented horizontally across the sheet, and north being oriented towards the top of the sheet (the north arrow should point towards the top of the page). In the rare instance that a street is exactly north – south the north arrow should point towards the right.

6. Profiles

- a. All sewer Contract Drawings shall contain a Profile.
- b. Elevations of existing vent pipes are typically not given on return plans. See the picture of a vent pipe in Appendix Vi [51] for the typical elevation relative to the sewer.

7. Cross Sections

- a. All sewer Contract Drawings shall contain a cross section. Drawings shall contain more than one cross section if the underground structures or utilities change substantially such as under a bridge.
- b. Cross sections, on sewer sheets shall be taken looking up stream, except where there is a summit manhole, in which case all sections shall be taken in the same direction.

D. Sewer Base Plan Information

1. City Plan Information

- a. Houseline distance, street and Right-of-way widths, name of street and legislative route number if it is a state highway (see Appendix Vi [52] for a list of state highway route numbers).
- b. City plan elevations shall be shown on all sewer drawings.
 - i. If the survey elevations are within 6" of the City Plan data, then it shall be assumed to be at City Plan.
 - ii. If the survey elevations are different than City Plan data by more than 6", then the existing street elevation shall be shown with a solid line and the City Plan elevations shall be shown with a dashed line.
- c. Survey Benchmark (place in upper left hand corner) – The survey benchmark shall be attained from Eric.LaCrosse@phila.gov, 215-685-6275. There is no charge to attain benchmarks because this is a City project. The Surveyor must give the PWD work number for that particular street to the Streets Department District Surveyor when applying for the benchmarks. The closest benchmark to each block should be used.
- d. Street Status - Legally open or not legally open; at grade or not at grade. Only label when not legally open or not at grade (greater than 6" difference from City Plan)
- e. Cartway and footway widths shall be dimensioned. Note: The curb is part of the footway and the curblineline is at the face of the curb between the footway and cartway.
- f. City Plan information shall be shown for at least 30' past the houseline on all streets adjacent to proposed work, including beginning and end locations and intersecting streets.
- g. City Plan information, where it deviates from actual existing physical curblines, the City Plan curblines shall be shown dashed and the actual existing physical curblines shall be shown solid.

2. Pertinent Information

- a. The Consultant's name or in-house unit shall be shown on the base plan to the left of the title block stipulating who prepared the base plan or design. The base plan and/or design completion date shall be shown directly beneath the Consultant's name. For consultant's projects the drawing shall be stamped by a registered Professional Engineer in the state of Pennsylvania. If only the base plan or design was prepared by the consultant, the wording should reflect such.
- b. Base plan legend shall be shown in the upper right hand corner (or lower left hand corner if space is needed) of the first sheet of the base plan whenever possible.
- c. {45} {56} The words "AUTHORIZED BY ORDINANCE OF COUNCIL" shall be placed above the title block on base plans when the street has no City sewer and one is being proposed and the existing homes (if any) are not tied into a private sewer which is connected to a City sewer.
- d. {46} {57} {104} Except on private cost projects, the words "PRELIMINARY ASSESSMENT" shall be placed at the bottom center of each sheet, on base plans when the street has no sewer and one is being proposed and the existing homes (if any) are not tied into a private sewer which is connected to a City sewer. For assessable projects, drawings shall be sent to the District Surveyor to obtain the preliminary assessment. See Section 6 D.12. [54] and Appendix VIb [55]

- i. {3} {4} An Assessable sewer project is one where there is no existing sewer and the project is being funded by the City. A Private Cost sewer project is one where there is no existing sewer and the project is being funded by a developer. For Private Cost Contracts, Developers should refer to the Private Cost Contract Requirements.
 - ii. An Assessment is a charge to the property owner for the installation of a sewer and/or water main. It is based on the length of frontage with deductions for corner properties.
 - e. {47} Name of the sewer system shall be placed above the title block on all sewer sheets, when appropriate. Note: These are large sewers. If the consultant is designing a large sewer, the consultant should ask Design for the name if it is not on the old plans. Examples include the following:
 - i. Dobson's Run
 - ii. Wingohocking System
 - iii. Main Relief, etc.
 - f. Miscellaneous information that shall be provided on each plan drawing
 - i. Ward Number
 - ii. Sewer Plat Number
 - iii. Highway District Number
 - iv. Streets District Survey Number
 - v. One Call Serial Number
 - vi. Ordinance Date (if applicable [56])
 - vii. Preliminary Assessment (if applicable [57])
 - viii. Outfall Number
 - ix. GPIS Number
 - g. Title block should always contain the date on which the most recent changes were completed.
 - h. The title block of each sheet shall indicate the limits of work represented on that particular sheet (in many cases this will not be the entire length of the project) from the street with the lower sewer elevation to the street with the higher sewer elevation.
3. Plan View Information
- a. Property owners shall be shown on base plans where there is no existing sewer.
 - b. District Standard measurement shall be used for all distances.
 - c. All block distances shall be indicated on the base plan.
 - d. All street grades along the gutters shall be indicated. The direction of stormwater flow shall be indicated by placing arrow heads on the curbs pointing in the downgrade direction.
 - e. All existing sewer manholes including the first manhole on each connecting sewer, shall be identified with field invert and rim elevations. Inside top of crown elevations are required on the base plan for design purposes, to be removed from final plans. Field invert elevations of the main sewer manholes are required in the profile

- f. All elevations shall be identified at the summits and sumps of street. Elevations shall be noted for both the top and bottom of curb.
- g. All elevations shall be identified at the street intersections at the P.C., P.I., and P.T. of the curb.
- h. Overhead bridges shall be shown and the elevation of the underside of the bridge shall be indicated on the base plan.
- i. Match lines shall be shown on base plans when required. See Sample S-3 in Appendix IXc [58].
- j. Where there is no existing sewer, the locations and invert elevations of sanitary laterals at the points where the house laterals connect to the septic systems shall be identified on the base plan.
- k. All existing laterals over 6 inches in diameter shall be shown dashed on the base plan and indicated with the lateral size and material, where information is available. It is not necessary to show existing inlet pipes since they will be replaced or reconnected with 15" VCP.
- l. Existing sewers with a width of 24" or over shall be shown as double line and include a center line for dimensioning. Existing sewers with a width of less than 24" shall be shown as single line, unless the sewer is brick or is part of a separate system. All existing brick sewers shall be shown as a double line. In a separate system where the stormwater conduit is located directly over the sanitary sewer, the sanitary sewer shall be shown as a single dashed line and the stormwater conduit shall always be shown as a double line.
- m. Paving information
 - i. Existing footway, curb and roadway material shall be fully identified.
 - ii. Driveway, tree wells and wheelchair ramps shall be indicated.
 - iii. Footways, if special pattern (particularly brick), shall be carefully identified.
 - iv. Deteriorated footway shall be noted.
- n. Traffic Information
 - i. Direction of traffic along with parking information shall be shown on all streets including intersecting streets. Symbols used shall be as shown on the sample drawings in Appendix IX [59] and in Appendix IIg [60].
- o. Above Ground Features
 - i. Steps, cellar doors, fire hydrants, parking meters, trees (including diameter), manhole covers, traffic signs and signals, utility poles, and all street furniture (phone booths, mailboxes, benches, etc.) shall be identified as shown in Appendix IIj [61].
 - ii. All existing water curb stops, sewer vent boxes, and gas curb boxes shall be identified as shown in Appendix IIj [62].
 - iii. Property lines shall be indicated, along with sufficient street addresses to identify all properties. The address label shall be parallel to the street it is related to. The street name should be added to the address if it is not obvious (like on a parallel street or similar addresses on intersecting streets).
 - iv. All lots not containing structures shall be so labeled (open lot, parking lot, etc.)

4. Misc. Field Information

- a. The final design and specifications are very dependent on the field investigation, and the information obtained from the field visit. The engineers and/or designers which visit the field location should pay special attention to the visible details of the block which may be useful in later making design decisions. Examples of such items are:
 - i. Condition of paving, signs of paving disruptions due to Water Department infrastructure failures, etc. This information will assist in establishing appropriate paving limits.
 - ii. Evidence of hydrant relocations or damaged or knocked over hydrants. This information will assist in locating new hydrants.
 - iii. Potential construction interferences such as low bridges, tree interference, overhead wires or structures, etc.
 - iv. Condition of homes, are any vacant or collapsing, etc.
 - v. These are a few examples of the type of information required to properly design a contract.

5. Utility information shall be given as follows:

- a. Each utility shall be identified in the following order: (Water, H.P.F.S., PECO, Sewer, Verizon, Gas, Streets Traffic, SEPTA, Public Property-Communication, Public Property-Transit, Western Union, Cable TV, etc.) See Section 6 [63] [64] and/or Appendix VI [65] for contact information, if required.
- b. Each former utility (i.e. Keystone, City Transit, PTC) if so identified on manholes or the highway supervisor's drawing shall be indicated and identified by its current owner (i.e. Verizon, SEPTA). Each time a former utility is encountered it must be investigated individually. For example do not assume that PTC is SEPTA without confirmation from SEPTA.
- c. Indicate duct bank or pipe size as width x height except sewer which shall be height x width.
 - i. Brick sewers shall be labeled in feet and inches (e.g. 2'-6" x 1'-8")
 - ii. Manufactured pipe shall be labeled in inches (e.g. 36" RCP or 10"TC)
 - iii. Box sewers, arch sewers and tunnels not constructed with manufactured pipe, whether brick or poured in place concrete shall be labeled in feet and inches. The above nomenclature, if used consistently, assists in quick identification and approximate dating of the sewer.
- d. The distance from the center line of the utility to the curb line.
- e. Cover for all utilities shall be indicated to the outside top of the conduit. The cover to the top of the sewer is calculated by determining the depth to the invert bottom and subtracting the height and then subtracting the thickness of the crown. Unless the thickness of the crown of a brick sewer is shown on record plans, it shall be assumed to be 9". This should be done at each manhole. If the cover varies by less than 6", use the shallower cover. If the cover varies by more than 6" state the cover varies from min. to max.
- f. High voltage electrical conduits shall be separately labeled with voltage, and boxed in.
- g. SEPTA and railroad tracks shall be shown as accurately as possible, but not dimensioned. Their status (active, inactive, paved over) shall be stated. Ties for railroad tracks shall be shown and ties for trolley tracks shall not be shown.
- h. Utility lines shall be drawn using the types of lines shown in Appendix IIe [66].

- i. Sewer inlets shall be accurately shown and indicated as to size and type as shown in Appendix Vb [67].
- j. Utilities other than existing water, sewer, and gas shall be shown as double line when their width is 42" or greater.
- k. Existing sewers with a width of 24" or over shall be shown as double line and include a center line for dimensioning. Existing sewers with a width of less than 24" shall be shown as single line, unless the sewer is brick or is part of a separate system. All existing brick sewers shall be shown as a double line. In a separate system where the stormwater conduit is located directly over the sanitary sewer, the sanitary sewer shall be shown as a single dashed line and the stormwater conduit shall always be shown as double line.
- l. All water mains and gas lines 24" or greater in diameter shall be shown as double line.
- m. Abandoned utilities, except water mains, shall be labeled abandoned. Abandoned water mains shall not be shown.

6. Profile (Base Plan)

- a. Show confirmed curb regulation of the curb closest to existing sewer. Profile shall show both actual and City Plan curb lines if there is a greater than 6" difference between the two. If the difference is 6" or less then show the confirmed City Plan curb lines only.
- b. All existing sewers and manholes shall be shown and identified with field invert elevations.
- c. Match lines shall be shown where applicable. Match lines are shown in the profile when the matching sheet shows a profile to that point. If the matching sheet does not show a profile to the match line, the profile should be extended past the match line in the plan view to complete the profile of sewer on the matching sheet. No match line is needed in the profile when the profile is extended past the match line in the plan view (See sample sheet S-3 of contract S – 40599 – RD in Appendix IXc [68]).
- d. The elevations of bridge footings and the underside of bridges shall be indicated on the profile.
- e. SEPTA or railroad track and track status at intersecting street shall be shown (active, inactive, or paved over).
- f. Show all utilities which fall within the projected trench line (outside dimensions) or cross the proposed sewer, assuming construction in place.

7. Cross Section (Base Plan)

- a. All cross sections shall be shown beneath the profile or on the side of the profile, if possible. Sufficient space shall be left on the sheet to place standard notes.
- b. All utilities shall be shown in the entire cartway and both footways to the house lines. Abandoned utilities, except water mains, shall be labeled (abandoned). Abandoned water mains shall not be shown.
- c. The cross section shall be taken from the plan looking toward the high end of the existing sewer, except where you have a summit manhole, where all sections shall be taken in the same direction. If no sewer exists, the cross section shall be taken upgrade, based on gutter grades.

- d. Where there is a railroad bridge shown on the base plan, a cross section at the railroad bridge with underside elevations shall be shown on the base plan. (This is in addition to the standard cross section for the base plan.)
- e. cross section shall be taken at a point where there is the most utility congestion and where there is considerable change that may affect the construction.
- f. City Plan information shall be indicated and also physical dimensions where they deviate from City Plan information by more than 6”.

E. Proposed Sewer

1. Plan View (Contract Plans)

- a. The proposed sewer shall be located and dimensioned from the center line of the proposed sewer to the nearest curb line.
- b. All new manholes shall be identified. Invert elevations at new manholes shall be included at changes in direction, size or grade and at terminating manholes (except when the sewer terminates at a concrete collar).
- c. All new inlets and inlet pipe shall be shown and identified. See Appendix Va [69] for Preferred Inlet Locations.
- d. All new concrete collars, brick bulkheads, vent pipes and inlet pipes shall be shown and identified.
- e. Match lines shall be shown on Contract Plans, where applicable. See Appendix IX [70]
- f. Applicable standard notes shall be placed on all sheets of the proposed sewer Contract. (See Appendix II m [71] to obtain proper notes).
- g. All junction chambers, separating chambers and utility manholes shall be identified. All additional information or instructions concerning these structures shall be written in the specifications.

2. Profile (Contract Plans)

- a. In the profile the sewer shall be shown at the correct size and grade and identified. The manholes and their elevations, when applicable, shall also be shown and identified.
- b. The new sewers that are shown in the profile that are connected into the main sewer shall be identified. The size of the new sewer and the invert elevation at the connection shall be shown at the correct location in the profile.
- c. All new concrete collars, concrete cut-off walls and vent pipes along with their invert elevations shall be shown and identified in the profile.
- d. All chambers shall be shown in profile. All additional information or instructions concerning these chambers shall be written in the specifications.
- e. Match lines shall be shown where applicable. Match lines are shown in the profile when the matching sheet shows a profile to that point. If the matching sheet does not show a profile to the match line, the profile should be extended past the match line in the plan view to complete the profile of sewer on the matching sheet. No match line is needed in the profile when the profile is extended past the match line in the plan view (See sample sheet S-3 of contract S – 40599 – RD in Appendix IXc [72]).

3. Cross Section (Contract Plans)

- a. The new sewer shall be shown in the correct location in the cross section looking up-stream. The new sewer shall be dimensioned from the center line to the curb and identified.
- b. Where there is a railroad bridge shown on the base plan, a cross section at the railroad bridge with underside elevations showing the new sewer looking up-stream shall be shown. Bridge foundations shall also be shown.

F. Sample Drawings

1. Appendix IX [74] shows sample sewer drawings which demonstrate the final look of the drawings for various types of sewer systems. Take note of the general look and character of the drawings. Also notice the lettering style, line widths and scales. Additionally, see Appendix II [75] for “Drawing Size and Borders (Sewer)”, “Title Block (Sewer Drawing)”, “Symbols and Abbreviations”, “Lettering”, “Line Styles” and “Standard Notes for Sewer Sheets”.
 - a. Appendix IX [74] includes the following:
 - b. Combined Sewer Drawing (Plan, Profile & Section)
 - c. Sewer Match Line Drawing
 - d. Separate System Sewer Drawing (Plan, Profile & Section)
 - e. Sewer Green Drawing
 - f. Roadway Grading Plan

Change Log

Version	Type	Change
4.0	Spelling	In 3.D.2.b., corrected spelling from “he” to “be”.
4.0	Content	Changed text in section B. Lettering subsection 2.c. from “slanted” to “italicized”.
4.0	Content	Revised text from section B. Lettering subsection 2.d. to remove reference to slanted text.
4.0	Contact Update	Changed contact for survey benchmark in Section D Sewer Base Plan Information subsection 1.c. from Matt Fulmer to Eric LaCrosse.
4.0	Format	Manual converted from PDF to web content.