Department of Design and Construction	SPECIFICATION BULLETIN	SB 24-006

Title: **REINFORCED CONCRETE SEWERS**

Prepared:	Approved:
Digitally signed by Mohammad Mahmud, P.E. Date: 2024.08.21 14:24:43 -04'00' 8/21/2024	How Sheen Pau, P.E. Digitally signed by How Sheen Pau, P.E. Date: 2024.08.22 11:33:12 -04'00' 8/21/2024
Mohammad Mahmud, P.E. Date	How Sheen Pau, P.E. Date
Director, Specifications	Associate Commissioner – Infrastructure Design

APPLICABILITY:

- This Specification Bulletin (SB) is effective for projects advertised on or after 8/28/2024.

SUPERSEDENCE:

- This SB supersedes the following SBs: **None.**

ATTACHMENTS:

1. *Section 50.11 (7 pages)*

REVISIONS TO THE NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARD SEWER AND WATER SPECIFICATIONS, DATED 8/8/2022:

All references contained below are to the New York City Department of Environmental Protection Standard Sewer and Water Specifications, Dated August 8, 2022. Said Standard Specifications are hereby revised as follows:

a) **Refer** to Section 50.11-REINFORCED CONCRETE SEWERS

Delete in its entirety Section;

Substitute the revised Section in Attachment 1 (7 pages)

While the text of the specifications governs, changes include:

1) *Gasket requirements in 50.11.4 (D)*
2) *Hydrostatic test requirements in 50.11.4 (E)*

For questions regarding this bulletin, please contact Richard Jones, jonesri@ddc.nyc.gov.

SECTION 50.11 – REINFORCED CONCRETE SEWERS

50.11.1 DESCRIPTION

Reinforced concrete sewers must be constructed of the sizes and shapes shown.

50.11.2 MATERIALS

(A) Concrete must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01**.

(B) Reinforcement must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01**.

(C) Pipe for spurs and risers must comply with the requirements of **Section 21.02** for vitrified clay pipe, or **Section 21.04** for cast iron soil pipe, or **Section 21.06** for ductile iron pipe.

(D) Cement mortar must comply with the requirements of **Section 23.03**.

50.11.3 CONSTRUCTION METHODS

(A) GENERAL - Reinforced concrete sewers must be constructed to the sizes and dimensions shown by the normal sections and special sections and to the lines and grades shown on the plans or ordered. Transverse and longitudinal construction joints must be located where approved by the Engineer.

(B) GENERAL CONSTRUCTION PROVISIONS - The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** must apply to the work to be done hereunder.

(C) INVERTS - Inverts of reinforced concrete sewers must be formed between transverse templates and must be screeded. Where the radii of inverts are too small to permit screeding between templates, the inverts must be shaped by means of interior forms. The concrete for inverts must be deposited continuously for the entire cross section and for such longitudinal distances as approved. Inverts must be carefully protected from all injury during the progress of the work. The inverts of reinforced concrete sewers must be troweled smooth. Unless otherwise permitted or ordered, not less than twelve (12) feet of invert for reinforced concrete sewer must be built at one operation.

(D) SIDE WALLS - Concrete in the sidewalls of sewers must be deposited continuously to the height, to the thickness and for such longitudinal distances as approved.

(E) ROOFS - Concrete in the roofs of sewers must be deposited continuously for the full depths and for the entire widths of the roofs and for such longitudinal distances as approved. The outer surfaces of roofs must be finished true and smooth.

(F) BULKHEADS - Approved construction joint bulkheads with provisions for keying and doweling adjoining sections must be provided, where required.

(G) REINFORCEMENT AND STRUCTURAL STEEL - The steel reinforcement must be of the dimensions and shapes shown and installed in the manner specified in **General Specification 11 - Concrete, as modified in Section 23.01**. Structural steel must be of the shapes and sizes shown and installed as directed.

(H) CONNECTIONS - Connections and branches must be built where shown on the plans or where directed. All unconnected branches must be closed with bulkheads of brick masonry eight (8) inches thick unless otherwise shown on the plans or specified.

(I) SPURS AND RISERS - Spurs and Risers must be built to the details shown on the plans or as directed. Locations of spurs and risers and height of risers are not shown on the plans. Need for and location of spurs and risers and height of risers will be determined by the Engineer at time of construction. Unconnected dead ends of spurs and risers must be closed with approved tile or precast concrete

plugs or with hand tightening (wing nut type) expandable plugs to provide a watertight seal. The threads are to be greased prior to tightening to ensure a proper seal without stripping.

(J) REMOVAL OF FORMS - Forms must be removed in accordance with **General Specification 11 - Concrete, as modified in Section 23.01**.

(K) WATERSTOPS - Waterstops must be provided between each successive pour in accordance with **Section 25.04**. Details must be submitted for waterstops as part of the shop drawings.

50.11.4 PRECAST REINFORCED CONCRETE SEWER

(A) DESCRIPTION - When specifically stated in the contract documents the Contractor will be permitted to use precast sections in lieu of pouring the proposed reinforced concrete sewer in place.

The precast section must be a four (4) sided box section with open ends to be monolithically cast of reinforced concrete. All inside surfaces must be smooth so as not to restrict flow. All curves and bends must be poured in place.

(B) MATERIALS

(1) Concrete must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01** except that the concrete must have a concrete design mix of five thousand (5,000) pounds per square inch (minimum twenty-eight (28) day compressive strength of four thousand (4,000) pounds per square inch). The maximum allowable chloride content in the concrete must not exceed one-tenth (1/10) of one percent by weight of cement. The maximum water/cement ratio must not exceed forty-seven (47) percent by weight.

(2) Portland Cement must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01** and must be Type II unless otherwise specified. Coarse and Fine Aggregate for concrete must be well graded in accordance with **Subsection 2.6.1.1 of General Specification 11 - Concrete, as modified in Section 23.01**. Size of Coarse Aggregate must be three-quarter (3/4) inch unless smaller size aggregate is required due to nature of work.

(3) Reinforcement must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01**.

(4) Welded Steel Wire Fabric must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01** and must have a minimum specified yield strength of sixty-five thousand (65,000) pounds per square inch.

(5) High range water reducing admixtures meeting the requirements of ASTM C494 Type F and having been previously approved by the New York State Department of Transportation may be used.

(C) DETAILS - The minimum dimensions and minimum reinforcement utilized for the construction of box sewers must be those shown on the contract documents. However, the Contractor will be required to submit computer printouts for the design of precast box sections that may result in additional concrete thickness and/or additional steel.

The design submitted must be in general conformance with ASTM C1433 and ACI 318-05. The following design parameters must be used:

(1) Unit Weight of Soil - 120-lbs./cu. ft. (minimum)

(2) Minimum Live Load - AASHTO HS20

(3) Impact Loading (Dependent upon depth)

(4) Exterior Groundwater Elevation

A design must be submitted for loadings based upon depth of water in the section equal to interior height and for no water in the section.

(D) JOINTS AND GASKETS - Each section of box sewer must have an approved lap and spigot joint that will permit watertight smooth and permanent joints. The minimum lap must be four (4) inches. Sections with butt or square ends will only be permitted where connections are made to poured-in-place sections.

Each spigot end must be manufactured with a groove or step to accept a gasket. The gasket must be a one (1) inch diameter neoprene ring gasket meeting the requirements of ASTM C1619, Class C or Class D, and must be cemented to the spigot groove of each section. In lieu of a one (1) inch diameter neoprene ring gasket, the Contractor will be permitted to request alternate neoprene gaskets provided that the alternate neoprene gasket is a one (1) piece continuous ring meeting the requirements of ASTM C1619, Class C or Class D, and passes the hydrostatic test.

(E) TESTING - Concrete utilized in the construction of precast box sewers must be tested in conformance with **General Specification 11 - Concrete, as modified in Section 23.01**, with the exception that the concrete, steel reinforcement, fabrication, and manufacture must be tested and certified as to compliance by an independent Testing Laboratory licensed in the State of New York and approved by the Department of Design and Construction.

Hydrostatic tests must meet or exceed the requirements of ASTM C1677 and must be performed for approval of the joint design, for each size and configuration of joint, prior to acceptance of the represented lot. Gaskets must be tested for a joint deflection of half (0.5) inch. Failure to meet the requirements of the ASTM C1677 hydrostatic tests necessitate a confirmative hydrostatic test. The confirmative hydrostatic test must be conducted with a pressure of 13 PSI for 10 minutes. The gaskets must be tested for joint deflection of 1 inch. The precast box sewer shall be deemed acceptable if it successfully withstands the confirmative hydrostatic test without experiencing failure beyond the specified parameters.

Testing must also conform to all applicable sections of **DIVISION III - INSPECTION OF MATERIALS, SAMPLING, AND METHODS OF TEST** of these specifications.

In addition, all manufacture of sections must be witnessed by an approved licensed independent Testing Laboratory and Certified as to Compliance with the standard drawings and specifications.

The costs of all testing as described above must be deemed included in the price(s) bid per linear foot of item(s) labeled "REINFORCED CONCRETE SEWER".

(F) LATERAL CONNECTIONS TO PRECAST SECTIONS - Connections to the walls of precast sections for which the opening is greater than ten (10) inches must be provided integral with the precast sections at the time of manufacture and must have a minimum additional steel reinforcement of two (2) number five (5) reinforcement bars on each face around the opening.

Connections to the walls of precast sections for which the opening size is ten (10) inches or less may be made by core drilling holes in the field.

Openings in walls for connections must be placed so that a minimum distance of one (1) foot is provided between the inner top of the precast section and the inner top of the opening. In addition, a minimum distance of one (1) foot must be maintained between the edge of the opening and the end of the section.

Openings in roofs required for risers must be provided at time of manufacture and must be shown on the shop drawings.

Locations of openings are not shown on the plans. The Engineer will determine the need for and location of openings at the time of construction. The Contractor must provide openings as required by the field conditions and as directed by the Engineer.

Lateral pipes (i.e., spurs, risers, drains) must be installed flush with the inside face of the box section and all annular spaces must be filled with non-shrink grout that must comply with the requirements of **General Specification 11 - Concrete, as modified in Section 23.01**.

(G) CONNECTIONS TO POURED-IN-PLACE SECTIONS, ETC. - At locations where precast sections are to be connected to poured-in-place sections, manholes, and/or chambers the precast section must be provided with a keyway and a four (4) inch waterstop. In general, the location of this connection must be at least eighteen (18) inches from the poured-in-place structure. Threaded inserts must be provided in the precast section at twelve (12) inches on center located in the center of the walls, roof, and invert. These inserts must be nine (9) inches in depth and provided with eighteen (18) inch long No. 6 reinforcement bars which must extend into the monolithically poured-in-place section. Details of all connections to poured-in-place structures, including modifications to these poured-in-place structures, must be included in the shop drawings.

(H) INSTALLATION - All precast box sections must be laid on a well-compacted six (6) inch thick layer of crushed stone, the material must be in conformance with **Section 40.12** of these specifications. In addition, two (2) rows of 2" x 8" pressure treated wood planks must be laid parallel and continuous along the entire length of the trench. The planks must be laid so that their outer edges align with the inside walls of the precast section. The planks must be laid within the stone bedding to line and grade in order that when the sections are placed on the planks the required line and grade will be met.

After the bedding has been prepared, the initial box section must be placed on the prepared base. Coil inserts and lifting slings, or their equivalent, must be used in the placing of all sections. After the initial section is in place, successive precast sections must be lowered into position and slid upon the planks as close as possible to the previous section. Pipe pullers or their equivalent must then be utilized to bring the pipe to within one-half (1/2) inch of the previous section. All internal annular spaces and external roof annular spaces must then be filled with a non-shrink grout.

(I) SHOP DRAWINGS - The Contractor will be required to submit five (5) sets of shop drawings depicting all details regarding the manufacture and installation of precast boxes. The shop drawings must show dimensions, reinforcement details, connection details, design parameters, and construction procedures.

All shop drawings and calculations must bear the seal and signature of a New York State Licensed Professional Engineer. Shop drawings must show the Contractor's name, the manufacturer's name, the project number, the project title, the drawing description, the drawing number, and the date.

(J) MARKINGS - The manufacturer must mark each individual piece with permanent markings on the inside of the box section. The following minimum information must be listed:

(1) Date of Manufacture

(2) Manufacturer's Logo

(3) Individual Piece Identification

(4) ASTM Designation

(K) DELIVERY OF SECTIONS – Sections cannot be delivered to the job site until they have attained the specified twenty-eight (28) day compressive strength as evidenced by cylinder testing. In addition, five (5) copies of all test results, steel supplier certifications, independent Testing Laboratory certifications, and fabrication and manufacture certifications must be submitted to the Engineer prior to delivery or at the time of delivery.

(L) MANUFACTURE - Precast box sewers must be built in conformance with approved drawings and must be cast in steel forms.

Devices used to position reinforcement must be made of, or coated with, material so that corrosion of the device will not occur. Sufficient devices to position the reinforcement for required concrete cover must be provided. Tack welding or any other welding of specified steel reinforcement will not be permitted. Redundant steel reinforcement may be tied or fastened.

Concrete must be thoroughly consolidated by internal or external vibration or a combination of both.

(M) CURING - All precast sections must be subjected to curing by one of the following methods:

(1) STEAM CURING - Sections may be placed in a curing chamber, free from outside drafts, and cured in a moist atmosphere maintained at a temperature between one hundred (100) degrees Fahrenheit and one hundred sixty (160) degrees Fahrenheit, by the injection of steam for a period of not less than twelve (12) hours or, when necessary, for such additional time as may be needed to enable the pipe to meet the strength requirements. Steam curing must not commence until at least two (2) hours have elapsed since completion of placement of concrete in the forms. When a curing chamber is not available, sections may be placed in an enclosure of canvas and subjected to steam around the entire section at the temperature and for the time specified above. The enclosure must be so erected as to allow full circulation of steam around the entire section. The interior surfaces of the curing room or canvas jackets and the surfaces of the section must be entirely moist at all times.

(2) WATER SPRAY CURING - Under the conditions of enclosure described in the above paragraph on "Steam Curing", sections may be cured by subjecting it to a continuous fine spray of water in an enclosure maintained at a temperature of not less than seventy (70) degrees Fahrenheit for a period of not less than seventy-two (72) hours or such additional time as may be necessary to meet the strength requirements.

(3) SATURATED COVER CURING - The sides and top of each section must be covered with heavy burlap or other suitable material saturated with water before applying and kept saturated at a temperature of not less than seventy (70) degrees Fahrenheit for seventy-two (72) hours or such additional time as may be necessary to meet the strength requirements.

Precast Sections must not be subjected to freezing temperatures until the required twenty-eight (28) day compressive strength is achieved.

(N) TELEVISION INSPECTION AND RECORDING - Upon completion of all work, the Contractor must perform a television inspection and digital audio-visual recording of all sewers reconstructed in accordance with **Section 53.11** of the specifications. Payment for television inspection and digital audio-visual recording must be made under Item No. 53.11DR - TELEVISION INSPECTION AND DIGITAL AUDIO-VISUAL RECORDING OF SEWERS.

50.11.5 MEASUREMENT

The quantities of reinforced concrete sewers to be measured for payment must be the number of linear feet of each size and type of sewer, incorporated in the work, complete, as shown, specified or required, measured horizontally along the center lines of sewers.

Payment must be based on the measurement from inside face of manhole or chamber to inside face of manhole or chamber, unless otherwise shown or specified in the contract documents.

50.11.6 PRICE TO COVER

The contract price for “REINFORCED CONCRETE SEWERS” must be the unit price bid per linear foot for each size and type of sewer and must cover the cost of all labor, materials, plant, equipment, samples, tests, and insurance required and necessary to construct the reinforced concrete sewers of the sizes and dimensions shown by the normal sections and special sections and to the lines and grades shown, including the earth excavation of all materials of whatever nature encountered (See **Section 40.03 - Earth Excavation**); all sheeting and bracing; pumping; fluming; bridging; breaking down and filling in of abandoned sewer appurtenances; connections; spurs as required (except when there is a contract price for Spurs); maintaining flow in sewers, backfilling, cleaning up, and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

Unless otherwise shown, reducers or conformers will be paid for at the contract price for the sewer at the larger ends thereof.

Where precast reinforced concrete sewers are specifically permitted on the contract documents, the cost for furnishing, delivery and installation of precast reinforced concrete sewers, complete as shown, specified, or ordered together with additional excavation and sheeting associated with the widening and deepening

of a trench due to increased width of precast reinforced concrete sewer and due to the placement of a continuous crushed stone and plank grade pad, crushed stone, planks, connections and all work incidental thereto all in accordance with the plans, specifications and standards must be included in the contract price(s) bid for item(s) labeled “REINFORCED CONCRETE SEWERS". No additional or separate payments will be made for any work associated with the installation of precast reinforced concrete sewers.

Included in the price hereunder must be the cost for all labor and materials required to provide all the openings in the precast reinforced concrete sewer for spurs, risers and drains, where shown on the plans or as directed by the Engineer, all in accordance with the specifications.

In addition, included in the price hereunder must be the cost of all labor and materials necessary to remove all specified or ordered existing sewers, manholes, structures, and appurtenances that may be in the line of the work and do all work incidental thereto, all in accordance with **Subsections 10.13 and 10.28** of the specifications and as directed by the Engineer.

Payment for Reinforced Concrete Sewers will be made under the Item Number as calculated below:

The Item Numbers for Reinforced Concrete Sewers have thirteen characters. (The decimal point is considered a character, the third character.)

(1) The first five characters must define Flat Top Reinforced Concrete Sewers:

50.11

(2) The sixth character must define the Type of Sewer Effluent:

S - Sanitary Sewer
M - Storm Sewer
C - Combined Sewer

(3) The seventh character must define the Number Of Barrels of the Sewer:

S - Single Barrel
D - Double Barrel
T - Triple Barrel

(4) The eighth, ninth, and tenth characters must define the Width of the Sewer. (The eighth and ninth characters representing the unit of feet and the tenth character representing the unit of inches (in three (3) inch increments) for the Width of the Sewer.) See examples below:

040 - 4’-0”W
093 - 9’-3”W
146 - 14’-6”W

(5) The eleventh, twelfth, and thirteenth characters must define the Height of the Sewer. (The eleventh and twelfth characters representing the unit of feet and the thirteenth character representing the unit of inches (in three (3) inch increments) for the Height of the Sewer.) See examples below:

050 - 5’-0”H
089 - 8’-9”H
126 - 12’-6”H

(6) Examples of Item Numbers together with Description and Pay Unit as provided in the Bid Schedule are provided below:

Item No.	Description	Pay Unit
50.11SS040040	4’-0”W X 4’-0”H SINGLE BARREL FLAT TOP REINFORCED CONCRETE SANITARY SEWER	L.F.
50.11SS053043	5’-3”W X 4’-3”H SINGLE BARREL FLAT TOP REINFORCED CONCRETE SANITARY SEWER	L.F.

50.11MS079046	7’-9”W X 4’-6”H SINGLE BARREL FLAT TOP REINFORCED CONCRETE STORM SEWER	L.F.
50.11MD100073	10’-0”W X 7’-3”H DOUBLE BARREL FLAT TOP REINFORCED CONCRETE STORM SEWER	L.F.
50.11MT126079	12’-6”W X 7’-9”H TRIPLE BARREL FLAT TOP REINFORCED CONCRETE STORM SEWER	L.F.
50.11CS080053	8’-0”W X 5’-3”H SINGLE BARREL FLAT TOP REINFORCED CONCRETE COMBINED SEWER	L.F.
50.11CD110066	11’-0”W X 6’-6”H DOUBLE BARREL FLAT TOP REINFORCED CONCRETE COMBINED SEWER	L.F.
50.11CT070049	7’-0”W X 4’-9”H TRIPLE BARREL FLAT TOP REINFORCED CONCRETE COMBINED SEWER	L.F.