SEWER REVIEW CHECKLIST

Section 1. PURPOSE

This policy is an Engineering checklist of the Local Review Program for sanitary sewer improvement projects by the Bedford Regional Water Authority ("Authority").

Section 2. CHECKLIST

The checklist utilized by the Authority will be similar to that which is shown below.

Project Name:_____

Location:_____

Consulting Engineering Firm:_____

Date Plans Received:

_____

Date on Plans:

_____

Project Status (Circle One)

Initial Review

Revised Submittal (Submittal No. _____)

Low Pressure Sewer

Yes No

Pump Station

Yes No

I. Minimum Requirements to Initiate Plan Review

A. General	YES	NO	N/A	Covered by Bedford County Planning
1. One complete set of plans was submitted to the Authority for review. Four (4) copies will be required for final approval.	___	___	___	
2. Original Professional Engineer seal and signature with date are on the cover sheet/title page of the plans.	___	___	___	
3. Original or facsimile / reproduction of P.E. seal and signature with date are on subsequent plan sheets.	___	___	___	___
4. The project name and date with latest revisions are clearly noted on the cover of the plans.	___	___	___	
5. Plans are of adequate size (22" x 34" or 24" x 36"), scale and detail.	___	___	___	
6. Name and address of the Engineering/Surveying firm that prepared the documents are clearly shown on the cover sheet of the plans.	___	___	___	
7. Sewer plans and road plans have been combined and submitted to VDOT and the Authority simultaneously.	___	___	___	
8. Prints and copies are legible.	___	___	___	

9. Design calculations were submitted.	___	___	___	
10. Original Professional Engineer seal and signature with date are on the cover sheet/title page of the calculations.	___	___	___	
11. The project name and date with latest revisions are clearly noted on the cover of the calculations.	___	___	___	
12. Name and address of the Engineering/Surveying firm that prepared the documents are clearly shown on the cover sheet of the calculations.	___	___	___	
For Revised Submittals:				
13. Developer Agreement has been signed and returned.	___	___	___	
14. Project Plan Review Fees have been paid.	___	___	___	
15. Sewer lines have been sized to correspond to the Authority's Master Plan.	___	___	___	
16. Each item from review comments is specifically addressed and acknowledged in a cover letter.	___	___	___	

B. Plans	**YES**	**NO**	**N/A**	**Covered by Bedford County Planning**
1. Vicinity map on title sheet clearly shows the location of the project.	___	___	___	___
2. Site plan of the project with topography is provided, or topography is provided on the plan / profile sheets.	___	___	___	
3. Plan and profile views are provided for all sections of sewer line.	___	___	___	
4. Vertical and horizontal scales are identified.	___	___	___	
5. Sewer line stationing is shown.	___	___	___	

II. Plan Review

A. General	**YES**	**NO**	**N/A**	**Covered by Bedford County Planning**
1. Street names or route numbers are noted correctly on plans.	___	___	___	___
2. Flood plain elevations are shown where appropriate.	___	___	___	
3. Note on plans states that the project shall be constructed in accordance with the Authority's Master Specifications.	___	___	___	

SEWER REVIEW CHECKLIST

4.	If details are shown on the plans, a note is present to indicate that details are provided for convenience only and that details in the latest edition of the Authority's Master Specifications supersede any discrepancies that may be present.	___	___	___	
5.	Profile elevations reference an established elevation datum (USGS State Plane).	___	___	___	
6.	North arrow is shown in each plan view.	___	___	___	
7.	All distances, angles, offsets, and elevations are correct and drawn correctly to scale.	___	___	___	
8.	Descriptions, stations, and appurtenance locations match between the plan and profile views.	___	___	___	
9.	Direction of stub-outs is shown (i.e., angle right from downstream line, bearing, or angle offset from upstream line).	___	___	___	
10.	Existing waterlines, valve boxes, fire hydrants, sewer lines, manholes, clean-outs, and other physical appurtenances for water/sewer systems are identified.	___	___	___	
11.	Concrete encasement is shown in the plan and profile views.	___	___	___	
12.	Length of concrete encasement is noted.	___	___	___	
13.	Underground and overhead utilities that may influence construction are identified in the plan and profile views and are drawn at their correct elevations in the profile.	___	___	___	
14.	Boundaries of known marshes, bogs, and wetlands are identified.	___	___	___	

B.	**Property, Right-of-Ways, Easements, and Survey Control**	**YES**	**NO**	**N/A**	**Covered by Bedford County Planning**
1.	Property, easement, and right-of-way lines are adequately defined throughout the project.	___	___	___	___
2.	Property identification and ownership information are noted where applicable.	___	___	___	
3.	Adequate easements are provided with the greater of a minimum 20' width, or two times the depth of the pipe, with the pipe centered within the easement.	___	___	___	
4.	Rods, other right-of-way markers, and any easement information such as fences, telephone/power lines, and utilities have been identified.	___	___	___	
5.	Benchmarks are set outside of construction area.	___	___	___	
6.	Property lines match those shown on subdivision plat.	___	___	___	
7.	Sufficient number of benchmarks are located and described on the plans to provide adequate vertical control during construction (approximately one per plan / profile sheet).	___	___	___	

SEWER REVIEW CHECKLIST

C. **Manholes**	YES	NO	N/A
1. Manhole stations are shown in profile.	___	___	___
2. Match lines are only shown at manholes in profile.	___	___	___
3. Invert elevations and manhole top elevations are shown.	___	___	___
4. Manholes are drawn schematically in profile.	___	___	___
5. Basic manhole information such as angle, station, stub-outs, type of top, and appropriate notes are identified.	___	___	___
6. Manholes are spaced no more than 400 feet apart.	___	___	___
7. The fall across the manholes is at least 0.2 feet and 0.5 feet for a change of flow direction equaling approximately 90° or less.	___	___	___
8. Manholes are set high enough for slopes to be accommodated.	___	___	___
9. Drop manholes are used for invert differences equal to or greater than 2.00 feet.	___	___	___
10. Watertight frame and covers are used in areas subject to flooding or surface flow.	___	___	___
11. Stub-outs are shown at manholes suitable for future connections.	___	___	___
12. Manhole tops are buried when located in VDOT right-of-way.	___	___	___
13. Elevations of manhole tops are shown to the nearest 0.1 of a foot.	___	___	___
14. Ventilation requirements are met for line when watertight covers are used.	___	___	___
15. Sewer lines or manholes are not within 10 horizontal feet of existing waterlines, or the pipe materials and manhole types conform to VDH Waterworks Regulations and DEQ SCAT Regulations for cases with less than 10 feet of separation.	___	___	___

D. **Sanitary Sewer Line**	YES	NO	N/A
1. Pipe materials meet Authority requirements.	___	___	___
2. Gravity sewer is sized no smaller than 8 inches, with the exception of 6 inch sewer with terminal cleanout.	___	___	___
3. Existing and proposed utilities that cross sewer line are shown in the plan and profile.	___	___	___
4. Minimum cover requirements for sewer line installation are met and indicated in the profile view.	___	___	___
5. Minimum cover is indicated in the profile view when crossing utilities, streams, drainage ditches, roads, etc.	___	___	___
6. Minimum cover requirements are met when sewer line crosses existing utilities, streams, drainage ditches, etc.	___	___	___

SEWER REVIEW CHECKLIST

7. Adequate clearance between the sanitary sewer line and any water or storm sewers is provided (18 inches minimum vertical separation).	___	___	___
8. Regulatory requirements are met when crossing water lines (water lines crossing over sewer with minimum separation of 18 inches between the bottom of the water line and the top of the sewer in accordance with VDH Waterworks Regulations, DEQ SCAT Regulations, and BRWA Master Specifications).	___	___	___
9. Under unusual conditions, ductile iron pipe or AWWA specified material (i.e., SDR 18 PVC) is used when crossing water line in accordance with VDH Waterworks Regulations, DEQ SCAT Regulations, and BRWA Master Specifications.	___	___	___
10. Ductile iron pipe and concrete encasement is used when cover does not meet minimum depth requirement of 36 inches.	___	___	___
11. Ductile iron pipe and concrete encasement are used when crossing under streams.	___	___	___
12. Ductile iron pipe and vertical anchors are used if slope of pipe is greater than 20%.	___	___	___
13. Ductile iron pipe is specified with Protecto 401 or other approved epoxy lining.	___	___	___
14. Steel casing and restrained SDR 26, C900, or ductile iron pipe with Protecto 401 lining is specified under roadways.	___	___	___
15. Erosion protection is supplied in the sewer line if velocity exceeds maximum limit according to DEQ SCAT Regulations.	___	___	___
16. Pipe material is consistent between manholes.	___	___	___
17. If special circumstances exist that require change in pipe material between manholes, a Harco coupling or equal is used when PVC pipe is connected to D.I. Pipe. Location of couplings is identified in the profile view.	___	___	___
18. All sewer slopes are called out and correct.	___	___	___
19. Sewer lines are at a constant slope between manholes.	___	___	___
20. Minimum slope of 0.4% is met for gravity sewer sizes 8 inches or larger.	___	___	___
21. All terminal sewer lines with less than 5 residential connections have a slope of 1% or greater.	___	___	___
22. Stationing of the utility line is labeled every 500 feet at a minimum in the plan view with short lines drawn perpendicular to the centerline every 100 feet.	___	___	___
23. Stations are set at each structure and angle point in line.	___	___	___
24. Stations run from the lower end toward the upper end of the line.	___	___	___

SEWER REVIEW CHECKLIST

E. Laterals	**YES**	**NO**	**N/A**
1. Existing and proposed lot lines are identified for proper lateral placement.	___	___	___
2. Existing houses, septic tanks, and septic fields needed to determine proper lateral placement have been identified.	___	___	___
3. Size of laterals indicated on plans.	___	___	___
4. Minimum pipe diameter of 4 inches is used for single house service connections, and a minimum pipe diameter of 6 inches is used for double house service connections.	___	___	___
5. Minimum slope of 1% is met for lateral connections.	___	___	___
6. Sewer line is deep enough to serve adjacent properties.	___	___	___
7. If sewer line is near a stream, the line is deep enough to serve properties on the other side of stream.	___	___	___
8. Laterals are connected to manholes if possible.	___	___	___
9. Drop connections are used when depth of sewer lateral is greater than 8 feet.	___	___	___
10. Service line crossings are minimized and consolidated where possible.	___	___	___

F. Calculations	**YES**	**NO**	**N/A**
1. Sufficient data is provided to support pipe sizing for the proposed development and future flows. Calculations conform to DEQ SCAT Regulations for peak design flows and minimum line sizes.	___	___	___
2. Calculations indicate a velocity of flow in the sewer lines acceptable according to the DEQ SCAT Regulations.	___	___	___
3. Upstream needs and future connections are considered in the calculations.	___	___	___
4. Calculations indicate that the existing downstream facilities have adequate capacity to handle the additional flows (peak flows) from the proposed sewer system.	___	___	___
5. Number and types of connections (residential, commercial, industrial, etc.) and associated peak flows are noted.	___	___	___
6. Average GPD/Connection is stated for each connection type.	___	___	___
7. Flow duration in Hours/Day is stated for each connection type.	___	___	___
8. Total Peak Flow (GPD) and Peak Factor are stated.	___	___	___
9. Manning's pipe material roughness coefficient ("n") is stated.	___	___	___

10. Velocity (fps) at peak design flow is stated for each section of sewer line. ___ ___ ___
11. Velocity (fps) when flowing full is stated for each section of sewer line. ___ ___ ___

Section 3. REVISIONS

A. This policy was approved and adopted by the Authority's Executive Director on June 27, 2013, effective July 1, 2013.

B. This policy was modified as follows:
   1. Approved October 4, 2022; effective October 4, 2022
      a. Checklist items were modified and organized to correspond with Bedford County review requirements and to aide in minimizing duplication of agency reviews.
      b. Items were revised, simplified and grouped, with duplicate items removed.
      c. Section 2 I.A.14 'Review Fees' was replaced with "Plan Review Fees'
      d. Section 2.I.A: Inspection Fees removed from checklist.
      e. Section 2.II.A4: Item revised to allow details on plans with a note.
      f. Section 2.II.B: Clarification added to property ownership information required.
      g. Section 2.II.C: Regulation reference clarified for water and sewer separation requirements.
      h. Section 2.II.D, Section 2.II.E, and Section 2.II.F:: Regulation requirements and references were added or clarified. Sewer slope requirements were clarified