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**
1. Sewer plans and road plans have been combined and submitted to VDOT and the Authority simultaneously.	_____	_____	_____
2. One complete set of plans was submitted for review, or four complete sets of plans for final approval, stamped, dated, and signed by a registered professional engineer or qualified registered land surveyor.	_____	_____	_____
3. Design calculations were submitted and are stamped, dated, and signed by a registered professional engineer.	_____	_____	_____
4. Original professional engineer seal and signature with date are on the cover sheet/title page of the plans and calculations.	_____	_____	_____
5. Facsimile / reproduction of P.E. seal and signature with date are on subsequent plan sheets.	_____	_____	_____
6. Plans are of adequate size (22" x 34" or 24" x 36"), scale and detail.	_____	_____	_____
7. Prints and copies are legible.	_____	_____	_____
8. The project name and date with latest revisions are clearly noted on the cover of the plans and calculations.	_____	_____	_____

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9.	Name and address of the engineering/surveying firm that prepared the documents are clearly shown on the cover sheet of the plans and calculations.	_____	_____	_____
10.	Developer Agreement package has been mailed to owner.	_____	_____	_____
11.	Developer Agreement has been signed and returned.	_____	_____	_____
12.	Review and inspection fees have been paid.	_____	_____	_____
13.	Sewer lines have been sized to correspond to the Authority's Master Plan.	_____	_____	_____
14.	For revised submittals, each item from review comments is specifically addressed and acknowledged in a cover letter.	_____	_____	_____
B.	**Plans**	**YES**	**NO**	**N/A**
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.	Manhole stationing and sewer slopes are shown.	_____	_____	_____

II. Plan Review

A.	**General**	**YES**	**NO**	**N/A**
1.	Note on plans states that the project shall be constructed in accordance with the Authority's Master Specifications.	_____	_____	_____
2.	Only special details (those not covered in Master Specifications) are shown on plans.	_____	_____	_____
3.	Profile elevations reference an established elevation datum (USGS State Plane).	_____	_____	_____
4.	North arrow is shown in each plan view.	_____	_____	_____
5.	Street names or route numbers are noted correctly on plans.	_____	_____	_____
6.	All distances, angles, offsets, and elevations are correct and drawn correctly to scale.	_____	_____	_____
7.	Descriptions, stations, and appurtenance locations match between the plan and profile views.	_____	_____	_____
8.	Direction of stub-outs is shown (i.e., angle right from downstream line, bearing, or angle offset from upstream line).	_____	_____	_____
9.	Utility crossings, sewer lines, manholes, manhole tops, etc. are drawn at their correct elevations and stations in the profile.	_____	_____	_____

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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 marshes, bogs, and wetlands are identified.	_____	_____	_____
15.	Flood plain elevations are shown where appropriate.	_____	_____	_____
B.	**Property, Right-of-Ways, Easements, and Survey Control**	**YES**	**NO**	**N/A**
1.	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.	_____	_____	_____
2.	Property, easement, and right-of-way lines are adequately defined throughout the project.	_____	_____	_____
3.	Property ownership information is noted.	_____	_____	_____
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).	_____	_____	_____
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 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 Sewer 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.	Ductile iron pipe and concrete encasement is used when cover does not meet VDH and Authority minimum depth requirement of 36 inches.	_____	_____	_____
4.	Ductile iron pipe or AWWA specified material (i.e., SDR 18 PVC) is used when crossing water line.	_____	_____	_____
5.	Ductile iron pipe is specified with Protecto 401 or other approved epoxy lining.	_____	_____	_____
6.	Ductile iron pipe and concrete encasement are used when crossing under streams.	_____	_____	_____
7.	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.	_____	_____	_____
8.	Ductile iron pipe and vertical anchors are used if slope of pipe is greater than 20%.	_____	_____	_____
9.	Erosion protection is supplied in the sewer line if velocity exceeds maximum limit according to VDH Sewer Regulations.	_____	_____	_____
10.	Adequate clearance between the sanitary sewer line and any water or storm sewers is provided (18 inches minimum separation).	_____	_____	_____

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11.	Existing and proposed utilities that cross sewer line are shown in the plan and profile.	_____	_____	_____
12.	Minimum cover requirements for sewer line installation are met and indicated in the profile view.	_____	_____	_____
13.	Minimum cover requirements are met when sewer line crosses existing utilities, streams, drainage ditches, etc.			
14.	Steel casing and SDR 26, C900, or ductile iron pipe with Protecto 401 lining is specified under roadways and restrained.	_____	_____	_____
15.	Minimum cover is indicated in the profile view when crossing utilities, streams, drainage ditches, roads, etc.	_____	_____	_____
16.	Pipe material is consistent between manholes.	_____	_____	_____
17.	All grades are correct.	_____	_____	_____
18.	Minimum grade requirements are met for all lines.	_____	_____	_____
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.	Minimum slope of 0.5% is met for gravity sewer cleanout lines.	_____	_____	_____
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.	_____	_____	_____
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.	Sewer line is deep enough to serve adjacent properties.	_____	_____	_____
6.	If sewer line is near a stream, the line is deep enough to serve properties on the other side of stream.	_____	_____	_____
7.	Laterals are connected to manholes if possible.	_____	_____	_____

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8. Drop connections are used when depth of sewer lateral is greater than 8 feet.	_____	_____	_____
9. 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 VDH Sewer Regulations for peak design flows and minimum line sizes.	_____	_____	_____
2. Calculations indicate a velocity of flow in the sewer lines acceptable according to the VDH 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.	_____	_____	_____

Section 1. REVISIONS

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