

Fauquier County Water and Sanitation Authority

7172 Kennedy Road

Warrenton, Virginia 20187

APPROVED MATERIALS LIST



October 2016

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GENERAL NOTES

1. Questions or comments regarding the Approved Materials List should be directed to Fauquier County Water and Sanitation Authority (FCWSA) Engineering Department at (540) 349-2092.
2. All standards referenced in the Approved Materials List shall be the latest version of that standard.
3. All pipes, fittings, and fixtures used in public water systems shall comply with NSF 372 *Drinking Water System Components – Lead Content* and conform to the lead content requirements for “lead-free” plumbing as defined in the U.S. Safe Drinking Water Act in effect as of January 4, 2014.
4. All materials considered for use in water and/or sanitary sewer systems must be reviewed and approved by FCWSA prior to being included in the Approved Materials List. In order for FCWSA to review and possibly accept materials, samples must be submitted as well as test results and certification documents from ASTM, AWWA, etc. Further information may be requested to evaluate materials such as shop drawings, design information, terms of warranty, documented history of material performance, and manufacturer/distributor locations and availability.
5. After an item is approved, the manufacturer or representative shall inform FCWSA, in writing, of any modification in design or material. Changes in design or material may require further evaluation and approval of the product.
6. FCWSA may withdraw any approval as a result of design change, field observation, testing, product failure, or other factors which, in FCWSA’s opinion, warrant such withdrawal.
7. Any materials delivered to the project site which are deemed to be inferior quality by the FCWSA Inspector shall be removed from the site and replaced with acceptable materials.

1A - DUCTILE IRON PIPE

Ductile Iron Mechanical Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast

DESIGN AND PERFORMANCE REQUIREMENTS

- Double-lined with cement mortar, seal coated and have a protective exterior coating.
- Thickness class for water and sewer construction shall be minimum Class 52.
- A greater thickness may be required when conditions so dictate.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	
Atlantic States Cast Iron Pipe Company (McWane, Inc.)	02/2015	
U.S. Pipe	04/2012	

Ductile Iron “Push-On” Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast

DESIGN AND PERFORMANCE REQUIREMENTS

- Double-lined with cement mortar, seal coated and have a protective exterior coating.
- Thickness class for water and sewer construction shall be minimum Class 52.
- A greater thickness may be required when conditions so dictate.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Atlantic States Cast Iron Pipe Company (McWane, Inc.)	02/2015	Tyton
U.S. Pipe	04/2012	Tyton

Ductile Iron Flanged Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper

DESIGN AND PERFORMANCE REQUIREMENTS

- Double-lined with cement mortar, seal coated and have a protective exterior coating.
- Thickness class shall be a minimum Class 53.
- A greater thickness may be required when conditions so dictate.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Atlantic States Cast Iron Pipe Company (McWane, Inc.)	02/2015	
U.S. Pipe	04/2012	

Ductile Iron Polyurethane-Lined Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast

DESIGN AND PERFORMANCE REQUIREMENTS

- Double-lined with cement mortar, seal coated and have a protective exterior coating.
- Thickness class for water and sewer construction shall be minimum Class 52.
- A greater thickness may be required when conditions so dictate.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
U.S. Pipe	04/2012	

Ductile Iron Restrained Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast

DESIGN AND PERFORMANCE REQUIREMENTS

- Double-lined with cement mortar, seal coated and have a protective exterior coating.
- Thickness class for water and sewer construction shall be minimum Class 52.
- A greater thickness may be required when conditions so dictate.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- Polyethylene encasement is required for Ductile Iron pipe and fittings installed in aggressive soils for corrosion protection.
- Restrained joint pipe is required for water lines constructed in fill.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	
Atlantic States Cast Iron Pipe Company (McWane, Inc.)	02/2015	TR Flex
U.S. Pipe	04/2012	TR Flex

1B - DUCTILE IRON PIPE FITTINGS

Ductile Iron Pipe Fittings

STANDARDS

- ANSI/AWWA C110/A21.10 Ductile Iron and Gray Iron Fittings (standard fittings)
- ANSI/AWWA C153/A21.53 Ductile Iron Compact Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Cement-mortar lined with seal coating, mechanical joint ductile iron
- Minimum pressure rating of 250 psi
- All sanitary sewer and force main fittings shall be lined with Protecto 401 ceramic epoxy.
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	
Sigma Corporation	02/2015	
Tyler Union (McWane, Inc.)	02/2015	
U.S. Pipe	04/2012	

Field Installed Joint Restraints

STANDARDS

- Bolts and nuts shall be in accordance with ANSI/AWWA C111/A21.11 Ductile-Iron and Gray-Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Minimum working pressure of 350 psi for sizes 3 inch through 16 inch.
- Minimum working pressure of 250 psi for sizes 18 inch through 48 inch.
- Minimum safety factor of 2:1.
- Use of restraining glands on PVC pipe is prohibited.
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
EBA Iron, Inc.	04/2012	Megalug Series 1100
Ford Meter Box Company (Domestic Only)	02/2015	Uni-Flange Series 1400

Field Installed Restrained Flange Adapters

STANDARDS

- Flange bolt circles compatible with ANSI/AWWA C115/A21.15 Flanged Ductile Iron Pipe with Threaded Flanges
- Bolts and nuts shall be in accordance with ANSI/AWWA C111/A21.11 Ductile-Iron and Gray-Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Body shall be ductile iron per ASTM A536 Grade 65-45-12.
- Minimum pressure rating of 250 psi
- Polyethylene encasement is required for ductile iron pipe and fittings installed in aggressive soils for corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
EBA Iron, Inc.	04/2012	Megaflange Series 2100
Ford Meter Box Company (Domestic Only)	02/2015	

1C – CASING PIPE

Casing Pipe

STANDARDS

- FCWSA Utility Standards Manual 4.10, 7.10, and Detail G-05 for water and sewer mains
- VDOT Road and Bridge Standards, Section 1400 Utilities (Concrete/Steel Encasement Pipe)
- For casing pipe of service laterals, see **Service Line Tubing and Casings** under *Part 2, Water Construction*.

DESIGN AND PERFORMANCE REQUIREMENTS

- Casing pipe required for road crossings shall be uncoated steel with 36,000 psi yield strength.
- See Detail G-05 for sizing of casing pipe.
- All carrier pipe shall be restrained joint ductile iron and shall be pushed through the casing. Protecto 401 ceramic epoxy shall be used to line all sanitary sewer and force main carrier pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Empire Pipe and Supply Company	02/2015	

Casing Spacer and End Seals

STANDARDS

- FCWSA Utility Standards Manual 4.10, 7.10, and Detail G-05
- VDOT Road and Bridge Standards, Section 1400 Utilities (Concrete/Steel Encasement Pipe)

DESIGN AND PERFORMANCE REQUIREMENTS

- Stainless steel casing isolator with glass reinforced polymer runners.
- Minimum of three casing insulators required per pipe length, or more as required by the manufacturer, with a maximum separation of 5-ft.
- Casing spacers shall be sized to center the carrier pipe within the casing and shall be a minimum of 12 inches in length. Bolts and nuts shall be type 304 stainless steel.
- The gap between any casing spacer and the inside of the casing pipe shall be minimum ¼ inch and maximum ¾ inch.
- Casing end seals shall be standard pull-on type.

APPROVED MANUFACTURERS AND MODELS

Casing Spacer

Company	Approval Date	Model Name/Number
Pipe Seal & Insulator Company	04/2012	S12-G2
The BWM Company	02/2015	BWM-SS

Casing End Seals

Company	Approval Date	Model Name/Number
Pipe Seal & Insulator Company	04/2012	"S"
The BWM Company	02/2015	BWM-PO

1D – LINE LOCATORS

Line Location Markers

STANDARDS

- FCWSA Utility Standards Manual 4.04 and 7.04
- FCWSA Utility Standards Manual Details SC-08 and SC-09

DESIGN AND PERFORMANCE REQUIREMENTS

- Full-range disc type line markers
- The maximum spacing between markers shall be 40 feet.
- All markers shall be color-coded to APWA standards (i.e. blue for water and green for sanitary sewer) and tuned to a specific frequency for each utility.
- For water construction, the markers are to be placed on top of the pipe, along the pipe route, at each change in direction, tee, corporation stop, and all other fittings.
- On sanitary sewer lines, markers shall be installed on top of the pipe at the tee of each individual service connection, 5 feet from the stub-out end of each service connection, and at each change in direction along the route of the individual service connection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
3M	04/2012	EMS Full-Range Markers
Telemark Solutions	02/2015	DiskMark

Marker Tape

STANDARDS

- FCWSA Utility Standards Manual 4.04 and 8.04

DESIGN AND PERFORMANCE REQUIREMENTS

- Detectable marker tape shall be buried 18 inches above the pipe for the entire length.
- The width of tape used is determined by the size of and depth at which the water/sewer line is buried. Follow manufacturer's recommendation.
- Tape installed with water piping shall have APWA blue background with "CAUTION BURIED WATER LINE" in black letters.
- Tape installed with sanitary sewer shall have APWA green background with "CAUTION BURIED SEWER LINE" in black letters.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Harris Industries, Inc.	02/2015	
Pro-Line Safety Products Co.	02/2015	

Tracer Wire

STANDARDS

- FCWSA Utility Standards Manual Details 'WM', WS-01, and SC-11

DESIGN AND PERFORMANCE REQUIREMENTS

- Tracer wire required only with nonmetallic (PVC or PE) pipeline.
- Wire to be #12 AWG solid copper with low density polyethylene insulation of minimum thickness of 45 mils.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kris-Tech Wire	02/2015	HMWPE
Pro-Line Safety Products Co.	04/2012	Copper PE30

1E – PIPE LINING & TUBING FOR DUCTILE IRON PIPE

Polyethylene Encasement Tubing

STANDARDS

- ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Pipe Systems

DESIGN AND PERFORMANCE REQUIREMENTS

- Material may be 4 mil thick cross-laminated high density polyethylene or 8 mil linear low density polyethylene. Seamless flat tube form must comply with the minimum widths based on nominal pipe diameter in accordance with above standard.
- Where polyethylene encasement of pipe is specified, fittings and valve bodies are to be included within the encasement.
- Must be installed in accordance to manufacturer's recommendations.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Sigma Corporation	03/2016	
Trumbull	02/2015	

Ductile Iron Pipe Lining (SEWER ONLY)

DESIGN AND PERFORMANCE REQUIREMENTS

- All ductile iron pipe and fittings shall be lined with Protecto 401 ceramic epoxy for all sanitary sewer and force main applications.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Induron Coatings, Inc.	04/2012	Protecto 401
U.S. Pipe	04/2012	Protecto 401

2A - PIPE

Polyvinyl Chloride (PVC) Pipe

STANDARDS

- AWWA Standard C909 Molecularly Oriented Polyvinyl Chloride (PVCO), 4" through 12"

DESIGN AND PERFORMANCE REQUIREMENTS

- All PVCO pipe shall be minimum Pressure Class 235.
- Fittings for PVC pipe shall be mechanical joint ductile iron pipe.
- PVC pipe shall be stored in accordance with manufacturer's recommendations on flat, even surfaces and shall remain racked on the pallets as delivered to the job site until such time as the trench is ready for the placement of the pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
IPEX, Inc.	02/2015	

Brass Pipe Nipples and Fittings

STANDARDS

- FCWSA Utility Standards Manual Details WD-01 & WD-03
- ASTM B43 Standard Specification for Seamless Red Brass Pipe, Standard Sizes
- ASTM B687 Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Pipe sizes shall be 2 inch for blow-offs and air release valves with schedule 40 wall thickness.
- Product must be marked with a lead-free identifier (such as “NL” or “LF”) and with the verifying agency’s mark.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald (Fittings)	10/2016	
BMI	10/2016	
Merit Brass	10/2016	
Trenton Pipe Nipple Company	10/2016	

Service Line Tubing and Casings

STANDARDS

- FCWSA Utility Standards Manual 4.14 B and Detail WS-01
- AWWA C904-16 Cross-linked Polyethylene (PEX) Pressure Tubing
- ANSI/AWWA C800 Underground Service Line Valves and Fittings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Applies to standard water service connections up to 2 inch in diameter
- Cross-linked polyethylene tubing shall be CTS O.D., class 200, and SDR-9. Tubing shall be “indent” marked with class, size and NSF-PW rating.
 - All joints require stainless steel inserts.
 - Pipe shall have a co-extruded UV shield made from UV-resistant high-density polyethylene, color blue. Pipe shall have a minimum UV exposure time of one (1) year when tested in accordance with ASTM F2657.
- Copper tubing shall be type “K” soft copper, sizes ¾ inch to 2 inch.
- Service line casing pipe to be HDPE or SCH 40 PVC (see *Part 3 – Sewer Construction* **High-density polyethylene (HDPE) Pipe** and **Service Line Tubing** for approved manufacturers)

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
REHAU (PEX Tubing)	08/2016	MUNICIPEX
Cambridge Lee Industries (Copper Tubing)	08/2016	
Cerro Flow Products, Inc. (Copper Tubing)	08/2016	
CMC Howell Metal (Copper Tubing)	08/2016	
Kessler Industries (Copper Tubing)	08/2016	

2B – VALVES

Angle Stop and Angled Dual Check Valve

STANDARDS

- FCWSA Utility Standards Manual Details 'WM'

DESIGN AND PERFORMANCE REQUIREMENTS

- Use angle stop valve with padlock wings.
- Use cartridge style angled dual check valve.
- CTS pack joints required for the water line connections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	10/2012	
Ford Meter Box Company	04/2012	See 'WM' Details
Mueller	10/2012	

Automatic Air Release Valve

STANDARDS

- FCWSA Utility Standards Manual 3.07 and Detail WD-03
- AWWA C512 Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service

DESIGN AND PERFORMANCE REQUIREMENTS

- Universal type with the orifice the same diameter as the inlet
- Working pressure from 0 to 300 psi
- Stainless steel float and resilient seat
- Valves shall have a 2 inch diameter screwed NPT connection.
- All air release piping shall be brass.
- All working parts shall be constructed of non-corroding material.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Cla-Val	02/2015	Series 36
Crispin Multiplex Manufacturing Company	04/2012	UL Series
GA Industries, LLC	02/2015	
Val-Matic	03/2016	

Ball Valve*STANDARDS*

- FCWSA Utility Standards Manual Details WD-01 and WD-02
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Bronze Ball Valve, Size 'B' with 100% full port configuration
- Valve shall be one-quarter turn operation with handle.
- Ball valve shall be lead-free in accordance with NSF/ANSI 372.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Valve	02/2015	
Apollo Valves	02/2015	

Butterfly Valve

STANDARDS

- AWWA C504 Rubber-Seated Butterfly Valve

DESIGN AND PERFORMANCE REQUIREMENTS

- For valves greater than 12”
- Iron bodied with rubber-seated, self-adjusted disc seal
- Valve ends shall be mechanical joint or flanged.
- Underground valves shall be provided with operators with non-corrosive type of construction for input shaft, seals, bushings and bolting. Operators shall be totally enclosed and permanently lubricated for direct burial of the valves and frequent submergence in water up to 20 feet of head. The operator shall open the valve on a counterclockwise rotation of the operator wrench.
- Valve extensions shall have a 2-inch square wrench nut on top end and socket to fit 2-inch square nut on bottom.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	04/2012	
Mueller	04/2012	

Corporation Stop/Valve

STANDARDS

- AWWA C800-84 Underground Service Line Valves and Fittings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Ball type with CTS pack joint outlet and rating of 300 psi
- Brass construction
- Inlet threads shall be AWWA taper thread for all corporation stops used on direct taps.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	02/2015	
Ford Meter Box Company	04/2012	
Mueller	04/2012	

Gate Valve

STANDARDS

- FCWSA Utility Standards Manual Detail G-03
- AWWA C509 Resilient Seated Gate Valves for Water Supply Service

DESIGN AND PERFORMANCE REQUIREMENTS

- For valves 3 inch to 12 inch
- Shall be resilient wedge gate valves with ductile iron bodied. Valve ends shall be restrained mechanical joint.
- Non-rising stem with 2-inch operating nut, counter-clockwise opening, and mechanical joint or flanged ends designed for bubble tight closure at 250 psi working pressure.
- Stems seals shall be double O-ring stem seals.
- Valve extensions shall have a 2-inch square wrench nut on top end and socket to fit 2-inch square nut on bottom.
- All valves shall be wrapped with polyethylene encasement tubing.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	04/2012	
Clow Valve Company (McWane, Inc.)	06/2015	
Kennedy Valve Company (McWane, Inc.)	04/2012	
Mueller	04/2012	A-2360 Series

Curb Stop Box*DESIGN AND PERFORMANCE REQUIREMENTS*

- Curb boxes, extensions, foot pieces, and lids shall be cast iron and heavily coated with asphalt-based paint.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Mueller	04/2012	

Valve Box

STANDARDS

- ANSI/AWWA C110/A21.10-82 Ductile Iron and Gray Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Valve boxes, base extensions, head and cover shall be cast iron and heavily coated with asphalt-based paint.
- Valve box shall be two piece Buffalo Style, 5-1/4" shaft, with a slip type extension with flange at top of upper section (2-3 inches from top).
- Valve boxes shall be of sufficient length to provide for adjustment above and below grade of not less than 6 inches when the pipe is laid to the specified depth.
- Slip type valve extensions will be required on any gate valve where the distance from the finished grade to the top of the operating nut exceeds 4 foot. Extension shall be of a locking type to prevent it from coming off the valve. Top of extension will be no deeper than 1 foot from finished grade.
- Valve boxes shall include a stationary valve rod extension whenever a valve has 10 feet or more of cover.
- The cover and head shall be round and shall have the word "WATER" cast upon it.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bingham & Taylor	04/2012	
East Jordan Iron Works	04/2012	
Tyler Union (McWane, Inc.)	04/2012	

2C – METERS

Water Meter

STANDARDS

- FCWSA Utility Standards Manual ‘WM’ Details
- AWWA C700 Cold Water Meters – Displacement Type, Bronze Main Case
- AWWA C701 Cold Water Meters – Turbine Type
- AWWA C702 Cold Water Meters – Compound Type

DESIGN AND PERFORMANCE REQUIREMENTS

- The size and type of all water meters shall be determined by the General Manager based on fixture count and proposed use(s).
- All water meters shall be equipped with a Radio Frequency Meter Interface Unit appropriate to the type of meter specified and compatible with the FCWSA’s radio read system.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Neptune	04/2012	T-10 (Positive displacement)
		HP (Turbine)
		Tru/Flo (Compound)

Meter Box

STANDARDS

- FCWSA Utility Standards Manual 'WM' Details

DESIGN AND PERFORMANCE REQUIREMENTS

- Material for meter box shall be concrete, PVC Pit-Setter or rigid FRP. See 'WM' Details for specific size and material.
- Minimum wall thickness of ½ inch
- Cut-outs are not permitted.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
DFW Plastics, Inc.	02/2015	
Ford Meter Box Company	04/2012	
Oldcastle Enclosure Solutions	02/2015	

Meter Box Cover*STANDARDS*

- FCWSA Utility Standards Manual 'WM' Details
- ASTM A48 Standard Specification for Gray Iron Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Top to be set between ½ inch and 2 inch above finished grade.
- Meter box lid shall include 1-3/4" hole for mounting a touch read pad.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	02/2015	
Bingham & Taylor	02/2015	
Ford Meter Box Company	04/2012	Type A32-T or C32-T

Meter Yoke*STANDARDS*

- FCWSA Utility Standards Manual 'WM' Details

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	02/2015	
Ford Meter Box Company	04/2012	See 'WM' Details
Mueller	02/2015	

2D – FIRE METERS

Fire Service Meter

STANDARDS

- FCWSA Utility Standards Manual Detail WM-05
- AWWA C703 Cold Water Meters, Fire Service Type
- Underwriters Laboratory (UL) Listed and Factory Manual (FM) approved for fire service use.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Neptune	04/2012	Protectus III

Precast Vault

STANDARDS

- FCWSA Utility Standards Manual Detail WM-05
- ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
- ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures

DESIGN AND PERFORMANCE REQUIREMENTS

- Absolute minimum vault dimensions shall be 10' L x 7' W x 6' D.
- All vaults shall be installed with top slabs flush to grade.
- Concrete to be 4,000 psi minimum compressive strength.
- Provide link seal with stainless steel hardware for all pipe penetrations.
- Floor shall have a minimum slope of ¼ inch per foot directed to a sump pit. Sump pit shall be piped by gravity to daylight or a sump pump provided.
- Vaults shall include factory applied exterior bitumastic waterproofing.
- Design shall meet AASHTO H-20 loading criteria.
- Vaults shall be non-buoyant when installed. Manufacturer to provide buoyancy calculations with assumed water table elevation at the ground surface. Calculations shall not include the weights of the piping or equipment installed and shall be sealed by a Professional Engineer licensed in the Commonwealth of Virginia.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	
Smith-Midland Corporation	02/2015	

Vault Access Door

STANDARDS

- FCWSA Utility Standards Manual Detail WM-05
- ASTM B26 Standard Specification for Aluminum-Alloy Sand Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Access door shall be 30 inch x 30 inch hatch cover with locking hasp.
- Mill finish with bituminous coating applied to exterior of the frame.
- A ladder extension shall be installed on fixed ladders below hatch cover to assist personnel in getting on and off of a ladder. The extension shall retract after use so that the access cover can be closed. Device shall be T304 stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bilco Company	04/2012	J-AL – Access Door LU-3 – LadderUP Safety Post
Halliday Products	02/2015	Series F1R – Access Door Series L1E - Ladder Extension

Vault Ladder

STANDARDS

- 29 CFR 1910.27 Fixed Ladders (OSHA)

DESIGN AND PERFORMANCE REQUIREMENTS

- Ladder shall be manufactured of 6000-series aluminum with fully-welded construction, including vault connection clips.
- Rungs shall be square or rectangular with a nonslip top surface.
- Ladder shall include continuous side rails from vault floor to top of ladder. Rungs shall be fastened on both ends to side rails.
- Clearance between side rails shall be at least 16 inches.
- Distance between ladder rungs shall not exceed 12 inches. Rungs shall not be higher than 12 inches above the vault floor or lower than 12 inches below top of vault structure.
- Clear distance from vault wall to ladder shall not be less than 7 inches.
- Ladder shall be securely fastened to wall with stainless steel bolts. Stainless steel washers shall be installed between connection clip and vault wall.
- Unit shall be completely fabricated and ready for installation before shipment to the site.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Pennsylvania Insert Corporation	02/2015	
Precision Ladders, LLC	02/2015	FLH

2E – MISCELLANEOUS WATER APPURTENANCES

Fire Hydrant

STANDARDS

- FCWSA Utility Standards Manual Detail WD-04
- AWWA C502 Dry Barrel Fire Hydrants

DESIGN AND PERFORMANCE REQUIREMENTS

- Hydrants shall be of the compression type with main valve openings not less than 5- $\frac{1}{4}$ " in diameter, double O-ring seals and safety flange.
- Hydrants shall have a cast iron body with full bronze trim.
- Hydrants shall have a minimum 6" connection base for setting with a minimum of 42" cover on connection pipe. Pipe sections shall be mortar lined Class 52 ductile iron.
- Hydrants shall be equipped with two each 2- $\frac{1}{2}$ " NST hose connections and one each 4- $\frac{1}{2}$ " NST pumper connection.
- Shall be operated by a National Standard 1- $\frac{1}{2}$ " pentagon shaped operating nut, opening counterclockwise. The direction of opening shall be clearly marked by an arrow cast on the outside of the hydrant.
- Hydrants shall be furnished with a breakaway feature that will break cleanly on the underside of the flange upon impact. This shall consist of a break flange with a breakable stem coupling. Breakable bolts will not be accepted.
- Install a red fire hydrant marker ring with the text, "FOR FIRE DEPARTMENT USE ONLY UNAUTHORIZED USE IS THEFT, VIOLATORS WILL BE PROSECUTED" in white lettering.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kennedy Valve Company (McWane, Inc.)	04/2012	K-81D Guardian
Mueller	04/2012	Super Centurion 250

Sampling Station

STANDARDS

- FCWSA Utility Standards Manual 3.06

DESIGN AND PERFORMANCE REQUIREMENTS

- Connect to main with ¾-inch tap, service line, and curb stop.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kupferle Foundry Company	06/2013	Eclipse #88

Tapping Sleeve

STANDARDS

- FCWSA Utility Standards Manual 4.11
- ANSI/AWWA C110/A21.10 Ductile Iron and Gray Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Ductile iron mechanical joint sleeve with epoxy coating.
- Bolts and nuts shall be stainless steel, ASTM 304 Standard Specification stainless steel bolts and studs, 60,000 psi tensile strength, Grade B.
- Minimum pressure rating of 200 psi
- Diameter of tap may be as large as the pipe being tapped for ductile iron pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Flow Control	02/2015	
Kennedy Valve Company (McWane, Inc.)	02/2015	
Mueller	04/2012	
Tyler Union	02/2015	

Service Saddle

STANDARDS

- FCWSA Utility Standards Manual 4.14 C and Detail WS-01
- AWWA C800 Underground Service Line Valves and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Shall be made of non-corrosive material (e.g. bronze, stainless steel, or epoxy-coated ductile iron). Tapping saddles permitted to be used within public right-of-way shall be of stainless steel construction.
- Shall have a rubber gasket or O-ring type seal.
- Service saddles with a single strap shall have a minimum strap width of 1-½". Double-strap saddles shall have minimum ¾" flat-faced straps.
- Straps and fasteners shall be constructed of stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Ford Meter Box Company	04/2012	FTSS or FAST
Mueller	04/2012	
Romac Industries, Inc.	02/2015	
Smith Blair	02/2015	

3A – PIPE

Polyvinyl Chloride (PVC) Pipe

STANDARDS

- ANSI/AWWA Standard C900 PVC Pressure Pipe and Fabricated Fittings, 4” through 12”
- ANSI/AWWA Standard C905 PVC Pressure Pipe and Fabricated Fittings, 14” through 48”

DESIGN AND PERFORMANCE REQUIREMENTS

- See approved construction plans for required dimension ratio (DR).
- Fittings for PVC pipe shall be mechanical joint ductile iron pipe.
- PVC pipe shall be stored in accordance with manufacturer’s recommendations on flat, even surfaces and shall remain racked on the pallets as delivered to the job site until such time as the trench is ready for the placement of the pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Diamond Plastics Corporation	02/2015	
IPEX, Inc.	02/2015	
National Pipe & Plastics	02/2015	
North American Pipe Corporation	02/2015	

High-density polyethylene (HDPE) Pipe*STANDARDS*

- FCWSA Utility Standards Manual Detail SC-12

DESIGN AND PERFORMANCE REQUIREMENTS

- Used for sewage force mains 2 inch and smaller.
- Stainless steel inserts shall be used on HDPE pipe at all fittings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Flying W Plastics, Inc	02/2015	
Lee Supply Co. Inc.	02/2015	
National Pipe & Plastics	02/2015	

Stainless Steel Pipe Nipples and Fittings

STANDARDS

- FCWSA Utility Standards Manual Detail SC-01
- ASTM A733 Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
- ASTM A312 Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
- ASTM A351 Castings, Austenitic, for Pressure-Containing Parts
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper

DESIGN AND PERFORMANCE REQUIREMENTS

- Threaded pipe nipples and fittings for air release valves shall be 2 inch in size.
- Pipes nipples and fittings shall be type 316 stainless steel material.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
BMI	10/2016	
Merit Brass	10/2016	
Trenton Pipe Nipple Company	10/2016	

Service Line Tubing

STANDARDS

- FCWSA Utility Standards Manual Details SC-08 & SC-09

DESIGN AND PERFORMANCE REQUIREMENTS

- All service line tubing shall be PVC Schedule 40 pipe material.
- All new construction of the sanitary sewer main will require the installation of a prefabricated solid wye fitting for service lateral connections. The wye fitting shall be made of the same pipe material as the sanitary sewer main.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Charlotte Pipe and Foundry Company	02/2015	
HARCO (Fittings)	02/2015	
Multifittings (Fittings)	02/2015	
National Pipe & Plastics	02/2015	
North American Pipe Corporation	02/2015	

3B – FORCE MAIN APPURTENANCES

Automatic Air Release Valve

STANDARDS

- ANSI/AWWA C110/A21.10-82 Ductile Iron and Gray Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Combination air-vacuum type with a working pressure from 0 to 300 psi.
- T316 stainless steel float and internal trim
- Resilient seating for positive shutoff
- Valves shall include a minimum 1-inch diameter screwed NPT or flanged connection.
- Air release valves shall be attached to the force main by means of a 2-inch stainless steel pipe nipple threaded to a ductile iron mechanical joint tap tee fitting. Air release valves on force mains smaller than 6 inches will require additional support.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Crispin Multiplex Manufacturing Company	04/2012	S/SL
Val-Matic	03/2016	

Check Valve

DESIGN AND PERFORMANCE REQUIREMENTS

- For use in service branch of low pressure wastewater collection systems.
- Minimum pressure rating of 150 psi
- Cast iron body with epoxy coating and clean-out port

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Flomatic	10/2016	208B

Curb Stop

STANDARDS

- FCWSA Utility Standards Manual Detail SC-12

DESIGN AND PERFORMANCE REQUIREMENTS

- Curb stop shall be ball type, compression fittings with padlock wings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Ford Meter Box Company	04/2012	B61-555

Plug Valves

DESIGN AND PERFORMANCE REQUIREMENTS

- Eccentric plug valves shall be suitable for raw sewage, with full port configuration and straight through flow pattern.
- Unless otherwise specified on construction plans, ends shall be mechanical joint for buried applications. Flanged ends shall be used in buildings and vaults.
- Ductile iron valve body with nickel seat permanently welded to the body. The seat thickness shall be a minimum of 1/8" thick. Design working pressure shall be a minimum of 150 psi.
- Plug valve shall include resilient Neoprene covered eccentric plug, replaceable T316 stainless steel permanently lubricated upper and lower journal bearings and externally accessible & replaceable V-ring or U-cup valve shaft seals.
- Underground valves shall be provided with operators with non-corrosive type of construction for input shaft, seals, bushings, and bolting. Fasteners exposed to backfill must be T304 stainless steel.
- The operator shall open the valve on a counterclockwise rotation of the operator wrench.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Clow Valve Company (McWane, Inc.)	03/2016	
DeZurik	04/2012	
Henry Pratt Company	03/2016	
Val-Matic	03/2016	

Resilient Wedge Gate Valve

STANDARDS

- ANSI/AWWA C509 Resilient Seated Gate Valves

DESIGN AND PERFORMANCE REQUIREMENTS

- Plug valves may be necessary for buried applications where cover on pipeline cannot accommodate a gate valve's bonnet.
- All gate valves shall be lined and coated in accordance with ANSI/AWWA C550 Protective Epoxy Interior Coatings for Valves and Hydrants.
- Unless otherwise specified on construction plans, ends shall be mechanical joint for buried applications. Flanged ends shall be used in buildings and vaults.
- Valve shall have non-rising stem with O-ring seals.
- Gate valve shall be ductile iron bodied and designed for bubble tight closure at 200 psi working pressure.
- Fasteners exposed to backfill must be T304 stainless steel.
- Counter-clockwise rotation of operating nut to open. Operator to be a 2-inch square nut for underground installations and a hand wheel in all buildings and vaults.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Flow Control	04/2012	
Kennedy Valve Company (McWane, Inc.)	04/2012	
Mueller	04/2012	

Tapping Saddles

STANDARDS

- FCWSA Utility Standards Manual 8.12 B and Detail SC-11

DESIGN AND PERFORMANCE REQUIREMENTS

- Saddle tap shall be sized to match force main.
- Male thread adapter with compression fitting and gripper
- Saddle tap shall use stainless steel inserts.
- Where permitted for use, tapping saddles constructed within public right-of-way shall be epoxy-coated cast iron with stainless steel bands.
- For ductile iron pipe sanitary mains, use standard FP Saddle Tap.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
The General Engineering Company (For PVC Mains)	04/2012	

Valve Box

STANDARDS

- ANSI/AWWA C110/A21.10-82 Ductile Iron and Gray Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Valve boxes, base extensions, head and cover shall be cast iron and heavily coated with asphalt-base paint.
- The cover and head shall be round and shall have the word “SEWER” cast upon it.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bingham & Taylor	04/2012	
East Jordan Iron Works	04/2012	
Tyler Union (McWane, Inc.)	04/2012	

3C – MANHOLE

Manhole - Precast

STANDARDS

- FCWSA Utility Standards Manual 8.07 and Details SC-05 & SC-06
- ASTM C478 Precast Reinforced Concrete Manhole Sections
- ASTM A615 Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

DESIGN AND PERFORMANCE REQUIREMENTS

- Sanitary sewer manholes shall consist of precast reinforced concrete sections, an eccentric conical section, and an expanded base section extending a minimum 4” and a maximum of 8” beyond the outside vertical wall (riser section) of the manhole.
- Concrete to be 4,000 psi minimum compressive strength at 28 days. Each component must be monolithic.
- Each section shall have no more than two holes for the purpose of handling and setting.
- Manholes shall be carefully made and shall have no honeycombs or other deteriorated surfaces. All surfaces shall be smooth.
- Insert holes for the required sewer connections shall conform to the actual minimum diameters required to properly seal the connection and include approved boot connectors.
- Base section to be 3 feet high minimum, unless overall height of structure requires use of shorter base. Minimize number of riser sections.
- Precast manholes shall have holes for pipe penetrations separated far enough apart to ensure the structural integrity of the manhole wall and shall be a minimum of 12 inches. Provide a minimum 6 inches between pipe penetrations and manhole joints.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	

Boot Connector

STANDARDS

- ASTM C-923 Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals

DESIGN AND PERFORMANCE REQUIREMENTS

- On pipes sized less than 18 inches, sealing shall be accomplished by flexible connectors comprised of rubber boots and dual stainless steel straps.
- On pipes sized 18 inches and larger, sealing shall be accomplished by using an integrally cast rubber gasket.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A-LOK Products, Inc. (≥ 18" pipe)	04/2012	
Press-Seal Gasket Corporation	02/2015	PSX Direct Drive
TrelleBorg	04/2012	NPC Kor-N-Seal

Chimney Seal

STANDARDS

- FCWSA Utility Standards Manual Details SC-03 & SC-04

DESIGN AND PERFORMANCE REQUIREMENTS

- Seal shall be constructed of corrosion resistant materials and installed per manufacturer's recommendations.
- Chimney seals may not be used to compensate for deficient or damaged masonry or grade rings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Cretex Specialty Products	04/2012	

Coating

DESIGN AND PERFORMANCE REQUIREMENTS

- The exterior of all precast manhole sections shall be coated with a minimum of 16 mils dft in accordance with the manufacturer's recommendations.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Carboline	04/2012	Bitumastic 300M

Concrete Protective Lining

STANDARDS

- FCWSA Utility Standards Manual 7.06

DESIGN AND PERFORMANCE REQUIREMENTS

- System shall be resistant to deterioration due to hydrogen sulfide (H₂S) and its by-products. System shall include provisions to protect concrete at all discontinuities, including joints, pipe penetrations, seams, and entryways.
- Protective linings to be applied in accordance with manufacturer's recommendations, including surface preparation as specified.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	Argu Sure Grip
Raven Lining Systems (for use in rehabilitation of existing structures only)	10/2016	405 Trowel

Frame and Cover

STANDARDS

- ASTM A48, Class 30 Gray Iron Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- When frames and covers will be subject to traffic loading, they shall be heavy weight, 350 pounds. Where there will be no traffic loading, the frames and covers may be light weight, 290 pounds.
- Castings shall be of best quality, tough, gray iron, free from cold shunts, blow holes, and other imperfections. The castings shall be sound, true to form and thickness, cleaned by sandblasting and neatly finished. The castings on all manholes shall be anchored to the manhole.
- The bearing surfaces shall be machine ground and finished to insure satisfactory seating and anti-rocking.
- Frame and cover shall receive one coat of black asphalt base paint at the factory.
- All covers shall have “F.C.W.S.A.” and “VA” casted in 1-1/4” high letters on the perimeter and “SANITARY SEWER” casted in 1 inch high letters in the center.
- Covers for use in easements and remote locations shall be cam-locking type.
- Covers shall be furnished with two closed pick holes and one 1 inch vent hole. Solid cover required when watertight manhole specified.
- Watertight cover shall include ¼-inch O-ring gasket, bonded to frame; two 5/8-inch recessed hex head stainless steel bolts with rubber gasket and stainless steel washers; and two stainless steel lift bar slots.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
East Jordan Iron Works	04/2012	

Joint Rubber Gasket

STANDARDS

- FCWSA Utility Standards Manual Details SC-05 and SC-06
- ASTM C443 Joints for Concrete Pipe and Manholes, using Rubber Gaskets
- ASTM C-361 Reinforced Concrete Low-Head Pressure Pipe

DESIGN AND PERFORMANCE REQUIREMENTS

- Joints shall be of the O-ring rubber gasket type or other jointing system approved by the FCWSA. When assembled the joint shall be uniform and watertight.
- In addition to the O-ring gasket, 301 mastic joint sealer shall be used to assist in sealing the joint from either internal or external hydrostatic pressure. No mortar joints will be permitted.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Press-Seal Gasket Corporation	02/2015	O-ring or Type 4G

Steps

STANDARDS

- FCWSA Utility Standards Manual Details SC-05 and SC-06
- ASTM C478 Precast Reinforced Concrete Manhole Sections, Section 16 Steps and Ladders

DESIGN AND PERFORMANCE REQUIREMENTS

- Steps for manholes shall be securely placed in position in the manhole sections during the manufacturing process and shall be made of minimum 0.5-inch diameter grade 60 steel reinforcing rod encapsulated in a copolymer polypropylene.
- Steps will be set in the manholes as shown in the abovementioned FCWSA Details.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Step Company	04/2012	ML-10, ML-11, or I-11
M.A. Industries, Inc.	08/2016	PS1-PF

Waterproof Manhole Insert

STANDARDS

- FCWSA Utility Standards Manual Detail SC-02

DESIGN AND PERFORMANCE REQUIREMENTS

- The manhole insert shall be constructed of non-corrodible materials which will not be damaged by sewer gases or road oil.
- Both the gas relief and vacuum relief valves shall be self-cleaning and made of non-corrodible materials.
- The gas relief valve and vacuum relief valve shall be automatically activated at a pressure differential of approximately 2.25 psi.
- A properly fitted rubber gasket shall be installed under the lip of the insert to insure a tight seal between the insert and the manhole frame.
- The insert shall be deep enough to prevent the manhole cover from coming into contact with the valves when the manhole cover is removed or installed.
- The insert shall be designed to restrict inflow to no more than 1 gallon in 24-hrs.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Southwestern Packing & Seals, Inc.	04/2012	Rainstopper

3D – MISCELLANEOUS SEWER APPURTENANCES

Service Saddle for Gravity Collection System

DESIGN AND PERFORMANCE REQUIREMENTS

- Used to tap existing gravity sewer main only. All new construction of the sanitary sewer main will require the installation of a prefabricated wye connection.
- The branch inlets shall be configured to accept a branch line at a 90 degree angle to the main line.
- Saddle casting shall be made of non-corrosive material (e.g. bronze, stainless steel, or epoxy-coated ductile iron). Sewer saddles permitted to be used within public right-of-way shall be of stainless steel construction.
- Shall have a SBR gasket in accordance with ASTM D 2000.
- Sewer saddles shall have a single strap with a minimum strap width of 3.5 inches.
- Straps, fasteners, and hose clamps shall be constructed of T304 stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Ford Meter Box Company	06/2015	FSS
Romac Industries, Inc.	06/2015	CB

Grinder Pumps (Privately Owned)

DESIGN AND PERFORMANCE REQUIREMENTS

- Private grinder pumps are installed outdoors on lots receiving public gravity sewer service but where topography of the lot requires sewage pumping, as approved by the Authority. These pumping systems are owned and maintained by the property owner.
- Grinder pumps to be complete water-tight unit ready for connection to inlet and outlet piping as well as electric power supply.
- All components to be corrosion resistant with accessory/wet well to be fiberglass reinforced polyester or high density polyethylene, double-wall construction.
- Pump shall be removable via a quick disconnect system with head and flow characteristics suitable for the application and a grinder suitable for domestic sewage.
- Inlet shall be for connection to 4 inch or larger PVC pipe.
- Discharge force main shall include a check valve and a ball valve.
- Wet well shall be vented and sized in accordance with the application, but not less than 24 inches in diameter by 36 inches deep.
- Cover shall be fiberglass or polypropylene and shall be secured to the wet well with a locking mechanism or bolts.
- Pump control shall be via floats or pressure switch. Electric wiring between control panel and grinder pump unit shall be installed in conduit. Control panel to have audio and visual warnings activated when liquid level rises above alarm level. Control panel shall be NEMA 4 mounted on the outside of the building. Electrical conduit shall enter the bottom of the panel with a sealed connection.
- Installation shall be in accordance with manufacturer’s recommendations and shall include provisions to prevent flotation.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Environment One Corporation	04/2012	