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## **INTRODUCTION**

The Utilities Commission, City of New Smyrna Beach, Florida (“UCNSB”) makes every effort to provide high quality, reliable wastewater service to all Customers. Providing such service requires that these Specifications be established, administered consistently and clearly understood by all concerned. This publication has been prepared with this in mind and should be used by Customers, Developers, Engineers and Contractors relative to the installation of new wastewater facilities and the upgrade or retrofitting of existing facilities.

If these Specifications do not cover exact project components, or if questions arise as to the application of these Specifications, contact the UCNSB Engineering Department prior to design and construction.

These Specifications complement those of the Florida Administrative Code (FAC), Florida Department of Environmental Protection (FDEP), Recommended Standards for Wastewater Facilities (RSWF) by the Great Lakes – Upper Mississippi River Board (GLUMRB) a.k.a. 10 State Standards, American Water Works Association (AWWA), Trench Safety Act, Occupational Safety and Health Administration (OSHA), the Florida Department of Transportation (FDOT), Sunshine State One-Call of Florida and all other applicable City, County and State codes. In the event of a conflict, the more stringent rule shall apply.

All construction shall be performed by a Certified Underground Utility and Excavation Contractor licensed in the State of Florida. The Contractor is responsible for all tools, labor, equipment and materials to perform all work necessary to complete work per the approved Construction Drawings to the UCNSB Engineering Department’s satisfaction, as expressed herein by the Engineering Manager.

If any Engineer, Developer or Contractor has intent to construct any part of a wastewater collection system planned to be accepted by the UCNSB Engineering Department with exceptions to these Specifications, all such exceptions shall be listed on the first detail plan sheet signed and sealed by the Engineer of Record.

If the UCNSB accepts the exceptions, the Engineering Manager will sign and date a space immediately below the exceptions. No other exceptions will be accepted.

All exceptions will be warranted by the Engineer of Record signing and sealing the exceptions.

## DEFINITIONS

### ALIGNMENT

Refers to a pipe's location, direction and slope.

### APPURTENANCE

An accessory part of gravity sanitary sewer mains, force mains and laterals necessary for operation.

### AVERAGE DAILY FLOW (ADF)

The statistical average amount of wastewater produced each day by one ERU.

### BACKFILL

(1) The operation of refilling an excavation, usually after some structure has been placed therein. (2) The material placed in an excavation in the process of backfilling.

### BEDDING

The prepared base or bottom of a trench or excavation on which a pipe or other underground structure is supported.

### BELL AND SPIGOT JOINT

A form of joint used on pipes which have an enlarged diameter or bell on one end and a spigot at the other which fits into the bell. The joint is then made tight by a gasket or other jointing compounds or materials.

### COMMERCIAL

An establishment that exchanges goods or services.

### COMPACTION

Tamping or rolling of a material to achieve density that is able to support predicted loads.

### CUSTOMER

Any entity that owns and/or rents property(ies) that discharge into the wastewater collection system and pays UCNSB rates.

### DEVELOPMENT

Residential and/or commercial property(ies) with new or renovated infrastructure, e.g., building expansions, remodels requiring new meter sets or meter set upgrade, subdivision of land, new buildings or as determined by the UCNSB Engineering Department.

### DIRECTIONAL DRILLING

A steerable trenchless method of installing pipe underground in a prescribed bore path by using a surface launched drilling rig causing minimal impact on the surrounding area.

ERU - WASTEWATER

Equivalent Residential Unit producing 250 gallons per day of wastewater, or as otherwise expressed in the Developer's Agreement and Addendum.

FORCE MAIN

Pipe(s) that discharge and transmit wastewater by pressure.

GRAVITY SANITARY SEWER MAIN

Pipe(s) that discharge and transmit wastewater by gravity.

JACK AND BORE

A trenchless method of installing pipe underground using pneumatic percussive blows to drive a casing through the ground for a carrier pipe.

LATERAL (SANITARY SEWER SERVICE LATERAL)

Pipe connected to a gravity sanitary sewer main to provide service to a Customer.

LIFT STATION

A pump station that accepts wastewater and then pumps the received wastewater through a force main to another wastewater collection system or to the Wastewater Treatment Plant.

MANHOLE

A concrete structure used to connect and/or change the alignment of a gravity sanitary sewer main, in addition to allowing access for maintenance.

MANIFOLD

A pipe fitting with numerous branches to convey fluids between a large pipe and several smaller pipes or to permit choice of diverting flow from one of several sources or to one of several discharge points.

RESIDENTIAL/RESIDENCE

An establishment used for living accommodations for a single family.

SANITARY SEWER

See wastewater.

TELEMETERY EQUIPMENT

Equipment that translates physical measurements into electrical impulses that are transmitted to dials or recorders.

VALVE

A device used to isolate sections of a force main for testing, repair and maintenance.

VALVE BOX

A two part, screw type, cast iron box which is height adjustable with a cover to allow access to the operating nut.

VALVE COLLAR

Concrete set around a valve box lid at finished grade outside of paved areas.

WASTEWATER

Produced and/or used liquids and solids from a Customer that flow into a wastewater collection system, and ultimately to the Wastewater Treatment Plant.

WASTEWATER COLLECTION SYSTEM

The pipe system used to collect and carry wastewater to a Wastewater Treatment Plant.

WASTEWATER TREATMENT PLANT

A facility that accepts and treats wastewater from the wastewater collection system.

WATER TABLE

The level below which the ground is completely saturated with water.

## SECTION 1 - GENERAL

### 1.01 Developers

Owners of commercial or residential developments are required to enter into a Developer's Agreement and Addendum with the UCNSB. Contact the UCNSB Engineering Department's New Business Specialist for further details and assistance. The Developer's Agreement and Addendum is available for download on the UCNSB website under [Engineering](#).

The UCNSB reserves the right to require a Memorandum of Understanding (MOU) if a Developer's Agreement and Addendum is not required to help delineate the responsibility of each party.

### 1.02 Customers

The UCNSB will allow plumbing to be connected to a sanitary sewer lateral provided a proper account is established and all payments are made to the UCNSB Billing Department.

The UCNSB ownership terminates at the right-of-way line or easement line and/or at the clean out and is not responsible for any wastewater facilities beyond this point.

Duly authorized agents of the UCNSB shall have access to UCNSB facilities on the Customer's premises.

Customers shall reference the UCNSB's [Rates, Charges and Fees](#), current edition, for more information.



## SECTION 2 – DESIGN

Wastewater flows shall be calculated on the build-out of the proposed and any known future development.

Easements required for force mains shall be 15' wide centered on the pipe. Easements required for gravity sanitary sewer mains shall be a minimum of 20' wide centered on the pipe; whereas, the UCNSB Engineering Department shall determine actual size based on the depth of the main.

### 2.01 Gravity Sanitary Sewer Mains

Gravity sanitary sewer mains, at a minimum, shall have an 8" diameter and 36" of cover.

Gravity sanitary sewer main slopes shall be 0.40 % for an 8" main, 0.28 % for a 10" main and 0.22 % for a 12" main.

Gravity sanitary sewer mains shall be straight lines and terminate with manholes. Manholes shall be spaced at a maximum of 400' and the influent invert elevation shall be 0.10' higher than the effluent invert elevation at each manhole.

Upsizing of gravity sanitary sewer mains will not be approved without appropriate flows.

Gravity sanitary sewer mains shall be shown in plan and profile view and designed to minimize crossings with other underground systems.

### 2.02 Force Mains

Force mains, at a minimum, shall have a 6" diameter, 36" of cover and a flow velocity between 2.5 feet per second and 7 feet per second.

Plug valves shall be placed at each full compass change in direction, i.e., use of a bend, and at every 1,000-foot interval for force mains exceeding 2,000'.

A check valve and vault is required within 10' of a tap or tee if

- Tapping an existing force main 12" or larger or
- The force mains, regardless of size, have a combined total length greater than 500' between
  - The tap and the lift station site;
  - The tap and a tee or
  - A tee and the lift station site.

High points in the force main shall have an air release valve with vault enclosure.

Force main inside diameter must be maintained regardless of material used, e.g., 6" HDPE is not the equivalent of 6" PVC; therefore, it must be upsized.

Force mains shall be shown in plan view and designed to minimize crossings with other underground systems.

Force mains shall be adequately restrained against movement due to the resultant thrust at the specified test pressure per the [Ductile Iron Pipe Research Association \(DIPRA\)](#) or per the Engineer of Record's table. Thrust blocks require UCNSB Engineering Department approval.

## 2.03 Concrete Structures

Concrete structures, e.g., manholes and vaults, shall be designed per ASTM C913 and C478. Concrete structures shall be reinforced, precast and monolithically poured to include all openings, made from Type II sulfate-resistant Portland cement with a minimum compressive strength of 4,000 psi at 28 days and capable of withstanding AASHTO H-20 vertical, dynamic wheel load rating. Rings and covers shall conform to ASTM A48. Joints shall be sealed with flexible plastic joint sealer for a watertight seal manufactured by Ram-Nek or Rub'R Nek, or approved equal, per ASTM C990.

### A. Manholes

Manholes shall have:

- Round, circular shape;
- 48" inside diameter (min.);
- 8" base thickness (min.);
- 2' base section height (min.);
- 2' to 3' eccentric cone section height;
- 18" chimney height (max.);
- 13' maximum invert depth and
- US Foundry Model 170 ring and CE cover with UCNSB specific casting.

#### 1) Shallow Manholes

A shallow manhole is used for depths less than or equal to 5.5' to the lowest invert elevation and shall have US Foundry 667 ring and CR (outer) and CE (inner) cover with UCNSB specific casting.

2) Drop Manholes

A drop manhole is used when the vertical distance between inverts exceeds 2'. Drop connections shall be inside. Outside drop connections require UCNSB Engineering Department approval.

3) Doghouse Manholes

A doghouse manhole is used to accommodate retrofit construction on top of an existing pipe and will require UCNSB Engineering Department approval.

4) Conflict Manholes

A conflict manhole is used when no other reasonable alternatives exist to eliminate a conflict between two different utilities and will require UCNSB Engineering Department approval. The carrier pipe will require a casing.

B. Vaults

Vaults shall be square with a minimum 5' x 5' inside area and 6" base thickness. The maximum height shall be 5.5' from top of base slab to finished grade. The ring and cover shall be US Foundry 667 Ring and CR (outer) and CE (inner) cover, with UCNSB specific casting.

## 2.04 Sanitary Sewer Laterals [REVISED 2019]

Minimum service requirements.

All Customers/Developments ("Customer") shall provide new sanitary sewer service lateral facilities or improve existing facilities to meet or exceed the minimum requirements of:

1. The Customer's Engineer of Record is responsible for determining the adequate size of each lateral. Plumbing plans are required for site plan review of the sanitary system and lateral sizes shall match plumbing plans.
2. Each lateral shall connect to the gravity sanitary sewer main (lateral shall not be larger than the main) and terminate with a clean out at the right-of-way line or proposed and recorded easement line.
3. Customers shall be responsible for upgrading existing off-site systems to comply with proposed lateral sizes which exceed existing system size. (e.g. 10" lateral into 8" gravity system will not be permitted)

New construction shall provide minimum sanitary sewer service(s) as follows:

Residential (New Construction):

1. An individual four-inch (4") sanitary sewer service lateral shall be provided for each single-family unit.
2. Duplex and Townhomes are required to provide individual, four-inch (4") sanitary sewer service laterals for each permitted unit. (e.g. two (2) laterals for a duplex, four (4) laterals for a quad-plex, etc.)
3. Services for multi-family buildings shall be:
  - a. Six-inch (6") for up to 24 units.
  - b. Eight-inch (8") for 25 units or more. Services eight-inch (8") and larger in size are considered gravity sewer mains and will terminating with a manhole at the right-of-way or easement line and may connect to the manhole in this case with commission approval.

Mixed Use / Commercial / Industrial Construction:

1. New services for mixed use, commercial and industrial facilities shall be six-inch (6") for each unit.
  - a. Shall include grease interceptors or pre-treatment systems as required per UCNSB Resolution No. 1-92 and F.A.C. 64E-6, latest editions or resolutions.
  - b. One lateral is required for each proposed distinct leased, rental, mixed use, commercial, or industrial unit.
  - c. A lateral shall not exceed 75' in total length. Sanitary mains shall be extended so that the maximum lateral length is 75'. A clean out shall be installed every 50'.
2. Shared or double services will not be permitted. Each and any new lease space, rental space, or fee simple unit will require a separate sanitary sewer lateral for each space or unit based on above criteria.
3. Single Unit renovation (including expansions), change in use, or change in occupancy projects may utilize existing service (s) for single occupants only. When customer-side engineering or plumbing requires an increase in lateral size, the service lateral between the sanitary sewer main and the service clean out must also be increased in size and shall follow the above criteria.

## **2.05 Aerial or Subaqueous Crossings**

Aerial and subaqueous crossings require UCNSB Engineering Department approval.

## SECTION 3 - MATERIALS

All materials used in wastewater facilities, or that come into contact with wastewater, shall:

- Be adequately identified by the color green;
- Be marked with the manufacturer, batch number and strength designation;
- Conform to Ductile Iron Pipe Size (D.I.P.S.) Standards and
- Have Type 316 Stainless Steel materials, conforming to ASTM F593, where applicable.

### 3.01 Pipe

#### A. Ductile Iron

Ductile iron pipe, including fittings and restraints, shall conform to ASTM A536 and AWWA C104, C110, C111, C115, C116, C153 and C600. Ductile iron pipe shall be Pressure Class 350.

#### B. Polyvinyl Chloride (PVC)

PVC pipe shall conform to ASTM D1784.

##### 1) Gravity Sanitary Sewer Mains

PVC gravity sanitary sewer pipe and fittings shall conform to ASTM D3034 and F1336 and shall have minimum standard dimension ratio (SDR) 35.

##### 2) Force Mains

PVC force main pipe shall conform to AWWA C900, C905 and C605 and have minimum dimension ratio (DR) 25. PVC force main pipe shall be capable of connecting to standard ductile iron valves and fittings using mechanical joints.

#### C. High Density Polyethylene (HDPE)

HDPE pipe shall have minimum standard dimension ratio (SDR) 11. HDPE shall be sized to match the inside pipe diameter to which it is connected.

#### D. Fusible PVC

Fusible PVC may be used with UCNSB Engineering Department approval as shown in drawings approved by the Engineering Manager.

#### E. Steel

Black or Galvanized Steel (GS) pipe is prohibited.

### 3.02 Valves

The valve type, size, rating, flow direction arrow and manufacturer shall be clearly marked on each unit, as applicable. Valves shall open in the counterclockwise direction with an arrow cast on the operating nut in the open direction. Hand wheels require UCNSB Engineering Department approval. Valve boxes shall be cast iron and the cover labeled SEWER.

#### A. Plug Valves

Plug valves shall conform to AWWA C517 and be [DeZurik Eccentric Plug Valve](#), or approved equal.

#### B. Check Valves

Check valves shall conform to AWWA C508 and be [American Flow Control Series 2100, Flomatic 745](#) or approved equal.

#### C. Air Release Valves

Air release valves shall be [A.R.I. Flow Control Accessories D-025 2" Combination Air Valve for Wastewater \(Short Version\)](#), or approved equal.

#### D. Tapping Valves and Sleeves

Tapping sleeves shall be full length, stainless steel, mechanical type, with test port, and suitable for either wet or dry installation. Tapping valves shall be resilient seat gate valves.

### 3.03 Sanitary Sewer Laterals

Lateral pipe shall be PVC SDR 35. See [Section 3.01](#).

PVC fittings and clean outs shall be [Multi Fittings](#), [Spears Manufacturing](#), [GPK Products](#) or approved equal.

Clean outs in paved areas shall be cast iron and be [Star Pipe Product 7610 Handhole Ring & Cover "S" \(MB-0036\)](#), or approved equal.

### 3.04 Concrete Structures

See [Section 2.03](#).

### 3.05 Casings

A. Ductile Iron

See [Section 3.01](#).

B. PVC

PVC casings shall be DR 25, minimum.

C. HDPE

HDPE casings shall be DR 13.5, minimum.

D. Fusible PVC

Fusible PVC casings require UCNSB Engineering Department approval.

E. Steel

Steel shall conform to ASTM A139 Grade B and have a black protective bituminous coating, minimum of 5 mils thick, inside and out.

## SECTION 4 - CONSTRUCTION

Prior to construction:

- A preconstruction meeting shall be scheduled by the Developer or Engineer of Record. In attendance shall be the UCNSB, the licensed Contractor, including all Sub-Contractors, the Developer and the Engineer of Record.
- Shop drawings shall be submitted to and approved by the UCNSB Engineering Department. Shop drawings will not be accepted unless stamped with approval by the Engineer of Record and the Contractor.
- A minimum notice of 48 hours shall be provided to the UCNSB Engineering Department Inspector.

During construction:

- All permits, shop drawings and construction plans shall be retained by the Contractor on-site. Failure to produce such items on-site will result in work stoppage.
- The Contractor, under no circumstances, shall operate an existing UCNSB plug valve, new plug valve and/or allow flow into an existing gravity sanitary sewer main or manhole without Final Acceptance and approval from the UCNSB Engineering Department.
- The Contractor is responsible for all water used during construction and setting up an account to use a UCNSB construction meter. The Contractor will be responsible for the construction meter until returned to the UCNSB and the deposit is refunded. Use of a private meter is prohibited.
- The Contractor is responsible for all utility locates.

### 4.01 Installation

#### A. Pipe

Pipe shall remain free of dirt and foreign materials during construction. When work is stopped, for any reason, the Contractor shall securely seal the open ends of the pipe. Bell and spigot surfaces shall be wiped free of debris prior to applying lubricant sealer and jointed within 5 minutes of application. The spigot end shall be centered into the bell and properly seated by moderate force by hand or push bar with a cushion block.

Over-homed pipes will be rejected. It is recommended that human force be used to home bell and spigots for pipe sizes 12" or less. If mechanical equipment is used to home bell and spigot pipe, an insertion limiting device will be required at each joint to prevent over-homing, e.g., [EBBA Mega Stop Series 5000](#) or approved equal.

Concrete encasement at utility crossings must be approved by the UCNSB Engineering Department.



1) Gravity Sanitary Sewer Mains

The Contractor shall utilize a laser instrument with target to install pipe straight with a consistent slope per the approved construction drawings.

Connections to existing gravity sanitary sewer mains or manholes, approved by the UCNSB Engineering Department, shall be made by a power driven abrasive wheel or saw with inspection by the UCNSB Engineering Department Inspector. No hammer taps are allowed.

2) Force Mains

The Contractor shall install green coated copper 14 gauge locate wire adhered to the top of all new pipe and appurtenances. The wire shall be bundled in each valve box to extend 2' above finished grade and 6' within vaults. A duplicate wire shall be installed on all pipe directionally drilled. Upon construction completion, the Contractor will be required to test the locate wire for continuity.

The Contractor shall install detectable underground utility marking tape 18" below finished grade labeled *CAUTION FORCE MAIN BELOW*.

The Contractor shall install green valve markers, 3' above and 3' below finished grade, where required by the UCNSB Engineering Department.

Fittings and appurtenances must not bear on the pipe when installed and must be fully and independently supported on the trench bedding. The maximum deflection of pipes and fittings shall not exceed the manufacturer's recommendations. Fittings shall be installed in accordance with AWWA C600 and C605, along with the manufacturer's recommendations.

The Contractor shall install electronic markers at each:

- Main connection;
- Fitting and
- In-line plug valve.

B. Concrete Structures

Concrete structures shall be installed plumb on 6" of FDOT #57 stone. Pipe shall be connected to manholes using Kor-N-Seal rubber boots, or approved equal, with stainless steel bands.

Manhole inverts and benches shall be constructed with a minimum compressive strength of 3,000 psi concrete at 28 days. Manhole chimneys shall be grouted and have a smooth finish. Invert and flow channels shall be smooth and semicircular in shape.

Rings and covers in paved areas shall be flush with finished grade. In unpaved areas, rings and covers shall be 4" above finished grade. Only precast concrete rings may be used to adjust manhole ring and cover to finished grade.

See [Section 2.03](#) for supplemental information.

C. Sanitary Sewer Laterals

Lateral terminations shall have an air-tight clean out cap and marked with a PVC stake 3' to 4' above finished grade. Laterals shall be marked with a 'V' in curbs or at edge of pavement and painted green.

Clean outs in paved areas shall be flush with finished grade. In unpaved areas, clean outs shall be 3" above finished grade.

D. Valves

Valves shall be cleared of all foreign matter before installation and installed to prevent debris from becoming lodged in the seat. Valves shall be installed with stems vertically above the centerline of the pipe. Under each valve and at the pipe connection 6" of FDOT #57 stone shall be installed. Valves shall be inspected in the opened and closed position.

Valve boxes shall be centered over the operating nut. Valve boxes shall not transmit surface loads directly to either the pipe or valve. Valve box extensions shall be PVC SDR 35.

Valve boxes in paved areas shall be flush with finished grade. In unpaved areas, valve lids shall be 2" above finished grade and have precast concrete collars.

Valve covers shall be painted green. After Final Acceptance, terminal valves shall be permanently closed with the cover painted red.

## 4.02 Delivery and Handling of Materials

The UCNSB Engineering Department Inspector has the right to refuse any damaged or dropped materials. All materials shall be delivered and distributed at the site by the Contractor. All pipe, fittings, valves and appurtenances shall be loaded and unloaded by hoists or skidding so as to prevent shock or damage to the material. Under no circumstances shall material be dropped. Pipe that is misshaped and/or has lining/coating damage will be rejected. Concrete structures with holes or honeycombs will be rejected.

### 4.03 Excavation and Trenching

Trenches shall be a depth which will provide cover from top of pipe to finished grade as shown on approved construction drawings. Excess excavated material, unsalvageable material, and debris shall be wasted and disposed of by the Contractor.

All excavated material retained for backfill shall be piled in such a manner as not to endanger the work or obstruct sidewalks, driveways or drainage. Fire hydrants, valve covers, vault hatches and other utility controls shall not be obstructed and shall remain accessible at all times during construction.

The Contractor shall exercise sound construction practices in excavating and maintaining the pipe trench to prevent damage to any foundation, structure, pole line, pipeline or other facility. If, as a result of the excavation, a foundation, structure, pole line, pipeline or other facility is endangered, the Contractor shall immediately take remedial action at his own expense. No act of the UCNSB shall in any way affect the liability of the Contractor for damages, expenses or costs that may result from trench excavation.

Sheet piling, shoring, sheeting, bracing or other supports required for construction shall be designed, furnished, placed, maintained and removed by the Contractor. Sheet piling and timbers used in trench excavations shall be withdrawn in such a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

All existing underground utilities, whether or not they are shown on the approved Construction Drawings or their locations are made known to the Contractor prior to excavation, shall be protected from damage and, if damaged, shall be repaired to equal the prior serviceability or replaced in kind at the Contractor's expense. The UCNSB does not assume responsibility for the correctness of the approved Construction Drawings. Repairs or replacements shall be made at the earliest practicable time and in no case shall the Contractor leave the job at the end of the day without making all such repairs or satisfactory arrangements for subsequent repairs.

Wherever excavation exposes unsuitable materials such as muck, the Contractor shall remove and replace with suitable bedding and backfill material. Muck shall be removed full depth, from trench limits. Trees, stumps and roots within the limits of the trench excavation shall be removed to a depth of at least 12" below the bottom of the trench. Stump and root holes shall be refilled to existing grade and compacted. No stumps, roots, or organic matter of any description shall remain. Rock excavation shall be carried to a depth of at least 6" below the required pipe invert. Blasting is prohibited.

No pipe or structures shall be installed in a wet trench. All bedding material must be dry and firm. The free water surface shall be lowered to at least 6" below the bedding surface before installing pipe or structures. The UCNSB Engineering Department Inspector's judgement shall be used to determine if the trench is acceptable, which includes requiring rock or stopping work.

The bottom of the trench shall be shaped to give sufficient uniform circumferential support to the lower one-fourth of each pipe. In addition, bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from, and is uniformly supported by, the bottom of the trench.

The use of horizontal struts below the barrel of the pipe or the use of the pipe as support for trench bracing will not be permitted. In pipeline construction the use of the soldier pile and horizontal lagging method of support or the use of a traveling shield shall require UCNSB Engineering Department approval.

#### **4.04 Backfill**

All backfill and bedding material shall be in accordance with ASTM D422 and shall meet UCNSB Engineering Department approval. Bedding material in areas above the natural ground water table shall be fine sand or shell, or a mixture of both. Bedding material in areas where trench bottom is below natural ground water table shall be FDOT #57 stone.

Backfill material from trench bottom to 12" above top of pipe shall be select granular material free of organic matter. Backfill material from 12" above top of pipe to finished grade shall be common fill material free of organic matter. Backfill material shall not be obtained from the trench walls.

After the pipe has been properly laid and inspected, backfill material shall be compacted in 12" lifts to prevent settlement. The Contractor shall achieve the specified maximum dry density/optimum moisture content per the approved Construction Drawings. The Contractor shall submit all field density tests to the UCNSB Engineering Department prior to final acceptance. Any depression that forms adjacent to or within the trench line will be rejected.

#### **4.05 Groundwater**

The Contractor shall furnish, install and operate all necessary machinery, appliances, and equipment to keep excavations free from water during construction and shall dewater and dispose of the water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for emergencies.

The control of groundwater shall be such that softening of the bottom of the excavations or formation of quick conditions or boils shall be prevented. Dewatering systems shall be designed and operated so as to prevent the removal of the natural soils. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils and allow the placement of backfill to the required density.

The UCNSB Engineering Department will not accept pipe that floats due to lack of groundwater control and shall require the Contractor to reinstall any pipe that is rejected.

#### **4.06 Maintenance of Traffic (MOT)**

MOT must follow the Manual on Uniform Traffic Control Devices (MUTCD), the FDOT Design Standards (current edition) and all applicable Right-of-Way Use Permit requirements.

#### **4.07 Restoration**

##### **A. Pavement Restoration**

Road surfaces, curb and gutter, driveways, sidewalks, parking locations and any other type of surface materials that require removal for the purpose of installation of underground utilities shall be replaced as soon as practicable after compaction of the backfill and in accordance with City, County or Florida Department of Transportation standards or as indicated on the respective permit. These surface materials shall be separated from other excavated materials and will not be permitted to be included in the backfill but shall be satisfactorily disposed of by the Contractor. Surface material to be removed shall be cut, if necessary, vertically with a power-driven friction saw prior to removal. The surface shall be scored in sufficient depth to provide uniform straight break lines.

Under no condition shall pavement be cut with a trenching machine, power shovel or backhoe. The width of cut of the pavement or sidewalk shall be the width of the trench

plus one-half the trench width, or a minimum of 2' on either side. In the event that the trench excavation becomes wider than the initial cut, the pavement or sidewalk shall be re-cut to at least 2' back from all edges of the actual excavation by the Contractor at his own expense. Utility crossing and installations along state highways shall be made in full compliance with Florida Department of Transportation (FDOT) requirements.

B. Open Space Restoration

The Contractor shall sod or seed and mulch the disturbed work area per the approved Construction Drawings and shall protect road shoulders, ditch banks, and other natural or artificial slopes subject to rapid erosion.

C. Clean-Up

The Contractor is responsible to present a clean work area to the UCNSB Engineering Department Inspector prior to final acceptance.

#### **4.08 Boring Methods**

The Contractor shall manage and control all drilling practices to prevent damage to existing utilities. The Contractor shall make a diligent effort to locate evidence of any other potential subsurface obstructions, e.g. piles. Subsidence and heave within the construction limits of the project shall be limited to values that avoid damage. The Contractor shall be responsible for all damage and repairs as a result of drilling operations.

The Contractor shall be responsible for all underground utility locates via soft digs prior to boring so that adjustments can be made if necessary.

Bore logs shall be provided to the UCNSB Engineering Department in 10-foot segments. During construction, any deviations greater than 5' in any direction shall immediately be reported to the UCNSB Engineering Department. Pipe testing shall follow the requirements of these Specifications.

A. Jack and Bore

The casing pipe shall have the nominal diameter and wall thickness as shown on the approved Construction Drawings.

Field and shop welds of the casing pipes shall conform to the American Welding Society standard specifications. Field welds shall be complete penetration, single-vee groove or single-bevel groove type joints.

The carrier pipe shall be ductile iron pipe per these Specifications. Carrier pipes to be installed within the specified casings shall be equipped with restrained joint connectors.

The casing shall be jacked in one continuous operation at the locations specified. In no event shall jacking be discontinued for sufficient period to cause the partially jacked sleeve to freeze in place. Proper alignment and elevation of the sleeve shall be consistently maintained throughout the jacking operation.

Jacking pits shall be shored with sheeting or other such materials as required. Sheeting shall be driven to a sufficient depth below the invert of the casing to resist any pressure developed by the soil outside the jacking pit. Sheeting shall terminate not less than 3.5' above existing grade. At the completion of the jacking operations, the Contractor will be required to leave all sheeting in place; however, the top of the sheeting shall be cut off 30" below finished grade upon completion of the jack and bore.

The Contractor shall be responsible for preventing the occurrence of voids outside the casing and if they do occur, the Contractor may be directed to fill them with grout in a method approved by the UCNSB Engineering Department. The Contractor shall constantly exercise care in the removal of the earth from within the sleeve sufficiently close to the forward end to prevent voids.

The Contractor shall be responsible for removing any type of material or equipment used for backing up the jack.

A masonry bulkhead 8" wide shall be placed in the ends of the casing.

The carrier pipe shall be supported by spacers as shown on the approved construction drawings and per manufacturer's recommendations.

#### **B. Directional Drilling**

Prior to drilling, the Contractor shall utilize all verified locate information to determine the drill pathway in conjunction with the approved Construction Drawings.

The entry and exit point shall be within 5' of the location shown on the approved Construction Drawings. After successfully reaming the bore hole to the required diameter, the pipe shall be pulled with a swivel and reamer in front of the pipe to compact the bore hole walls.

The pullback section of the pipe shall be supported during pullback operations so that it moves freely and does not damage the pipe. The Contractor shall cease operations if the pipe is damaged and shall remove the pipe from the bore hole and repair the pipe using the manufacturer's recommended procedure or replace the damaged pipe before resuming installation.

## 4.09 Asbestos

Any asbestos-cement pipe identified shall be reported to the UCNSB Engineering Department Inspector immediately.

A Contractor that disturbs, maintains, repairs or demolishes shall comply with:

- Environmental Protection Agency's (EPA) 40 CFR Part 61, Subpart M and 40 CFR Part 763, Subpart E
- Florida Administrative Code (FAC) 62-257
- Occupational Safety and Health Administration (OSHA) Standard 1910.1001 and 1926.1101

The following are UCNSB guidelines for asbestos-cement pipe disposal:

- 1) Notify the UCNSB Engineering Project Manager:
  - a. Location of job site.
  - b. Pipe size.
  - c. Proposed operation.
- 2) File a FDEP [Notice of Demolition or Asbestos Renovation](#) form.
- 3) Mark area to minimize the number of persons exposed.
- 4) Post warning signs demarcating the area that reads "DANGER – ASBESTOS – CANCER AND LUNG DISEASE HAZARD".
- 5) Put on personal protective equipment such as coveralls, gloves, eye wear, etc.
- 6) Put on face mask or respirator.
- 7) Adequately wet pipe during and after removal operation.
- 8) Use equipment least likely to cause pipe to crumble and/or fray, such as snap cutters, carbide-tipped blade cutters or wheel-type cutters. See 12b.
- 9) Remove entire section of pipe:
  - a. Wet coupling.
  - b. Cover pipe with drop cloth.
  - c. Use hammer, chisel and pry bar to break coupling.
  - d. Replace pipe using compression, coupling, sleeve or repair clamp.
- 10) Contain all waste:
  - a. Wrap in 6 mil plastic bags or polyethylene sheets.
  - b. Large pieces shall be double wrapped.
  - c. Duct tape all open seams and edges.
  - d. Label waste with "DANGER ASBESTOS-CONTAINING MATERIAL".
- 11) Transport waste in approved, closed truck.
- 12) At no time shall asbestos-containing material:
  - a. Be disturbed in any way when dry.
  - b. Cut with a chain or circular saw, grinder, jack hammer, drills, etc.
  - c. Crushed in place.
- 13) UCNSB will have a continuing contract arrangement for asbestos handling, transport and disposal.



## SECTION 5 – LIFT STATIONS

Lift station design calculations shall be submitted by the Engineer of Record for UCNSB Engineering Department approval. All lift stations shall be duplex type stations.

For multiple adjacent properties owned by one person or entity, a lift station shall be built to the UCNSB's specifications and transferred to the UCNSB for ownership and maintenance; therefore, a private lift station and force main will not be allowed. Lift stations shall be located near the right-of-way line, property line or easement line and be constructed for maximum access and ease of inspection and maintenance. Easements shall be required where needed to provide access to the lift station.

Under certain circumstances, a private lift station and force main may be allowed if one individual owner owns one stand-alone parcel with one tenant, which will require UCNSB Engineering Department approval.

A permanent in-place back-up generator supplying emergency pumping capabilities shall be provided for new and existing lift stations that comply with one or more of the following:

- Receive flow from one or more lift stations through a force main;
- Discharge through a force main 12" or greater;
- Serve 500 ERU's or more;
- Or otherwise specified in [F.A.C. 62-604.400](#) and [RSWF Chapter 47](#).

See [Section 2](#), [Section 3](#), [Section 4](#) and the Submersible Pump Station Detail(s) for supplemental information.

### 5.01 Site

The lift station site shall have a finished elevation so that it is included in the drainage design and has positive drainage to adjacent stormwater system. Lift station sites shall be a 40' x 40' easement at a minimum. The lift station shall have a fenced area with FDOT #57 stone enclosing all of the equipment. Outside the fenced area shall be a vegetation buffer sodded with Bahia. No other vegetation will be permitted in the easement. A minimum 12' wide concrete driveway with a gate is required so that utility vehicles and lifting equipment have unobstructed access to the wet well and valve vault.

### 5.02 Wet Well, Vault, Pipe and Valves

The influent pipe, from the first manhole to the wet well, shall be heavy wall PVC (C900, SDR 26) or ductile iron pipe. The pump discharge piping, from the wet well to the last fitting downstream of the valve vault shall be ductile iron pipe.

The wet well shall be designed to avoid flotation during seasonal high ground water level conditions as an empty tank. The wet well, at a minimum, shall have a 6' diameter and shall have smooth concrete fillets constructed with a minimum compressive strength of 3,000 psi concrete at 28 days to provide sloping towards the pump intake.

The wet well, the first manhole to the wet well and any manhole receiving flow from a force main shall be lined with [Agru America Sure-Grip Concrete Liner](#), or approved equal.

A vault for the plug valves, check valves, pressure gauges and bypass connection shall be constructed below finished grade adjacent to the wet well. Concrete pipe stands shall be installed to support the pipe in the vault.

The wet well and valve vault shall have an access hatch. The hatch shall be rectangular, heavy-duty diamond plated aluminum capable of withstanding AASHTO H-20 vertical, dynamic wheel load rating. The frame shall have recessed hinges with stainless steel hinge pin or butt type stainless steel hinge. The hatch openings shall be sized to provide adequate space for the removal and maintenance of the pumps, valves, etc. The hatch opening shall be gasket sealed and equipped with a locking device to hold a UCNSB lock. Bolts in the locking device shall be Type 316 stainless steel.

### 5.03 Equipment

The pumping equipment shall be capable of handling raw, unscreened, sanitary sewerage containing heavy sludge and fibrous materials without injurious damage during normal operation. Pumps shall be submersible sewage type with double guiderail system to permit rising and lowering of the pump(s). Guiderails shall be Type 316 stainless steel, of adequate length, to extend from the lower guide holders on the pump discharge connection to the upper holders mounted on the access frame. The pump shall be capable of passing a three-inch sphere.

Approved pumps and guiderails shall be manufactured by [Flygt](#), [EBARA](#), [Grundfos](#) and [Hydromatic](#).

Float systems shall be used to automatically operate the pumps and shall be positioned per manufacturer specifications and the approved Construction Drawings. The rise and fall of the sewage level in the wet well shall automatically start and stop the pumps. Capability shall be provided for manual start-stop control for all pumping units, as well as the normal automatic control. An automatic alternator shall change the starting sequence on each pump cycle. Each sewage pump shall be provided with an elapsed time meter to indicate pump running time.

Each pump motor electric feed shall be suitable for submersible pump applications. The electric feed shall be sized in accordance with the National Electric Code (NEC), current edition. The electric feed shall be installed in a separate conduit through the wet well and shall have a gas tight seal. A lift station with pumps less than 25 HP shall have soft start motor controls. Lift stations with pumps greater than or equal to 25 HP shall have a variable frequency drive (VFD) motor controls. The emergency electric connection shall be located on the pump control panel for lift stations without an on-site back-up generator.

The pumps shall be easily removable with lifting equipment for inspection or service, requiring no bolts, nuts or other fasteners to be removed for this purpose, nor should personnel need to enter the wet well. The pumps shall be equipped with lifting rings and stainless steel wire rope of adequate strength to permit raising the pump for inspection and removal. The working load rating shall be not less than three times the weight of the pump. An eye shall be provided in the upper end for hooking onto the bracket. A bracket, separate from the level regulator cable bracket, shall be mounted on the wall of the station below the lid to support each pump power and lifting cable. All mounting hardware including anchors, brackets and supports shall be Type 316 Stainless Steel.

Prior to shipment, each pump shall be inspected and tested as follows:

- Pump Model;
- Pump Serial Number;
- Impeller Pattern and Size;
- Motor Ratings (HP, line volts, full load amps) and
- Motor and Cable Insulation Test.

An ultrasonic flow meter, having a display showing flow rate and totalizing dial, shall be installed in a separate vault as required by the Florida Department of Environmental Protection (FDEP) and [RSWF Chapter 42](#). Telemetry shall be provided for each lift station provided by [Data Flow Systems](#), or approved equal.

## 5.04 Start-Up

The initial start-up shall be performed by a competent factory trained representative of all equipment being supplied. The representative shall instruct UCNSB personnel in the operation, maintenance, adjustment, etc., of the equipment. A copy of the start-up test report shall be submitted to the UCNSB Engineering Department prior to Final Acceptance. One copy of the operation and maintenance manuals shall be placed in the control panel on-site along with a copy of the start-up test report. A lift station start-up on a temporary power supply is prohibited. The Contractor is responsible for all electric and water used during the lift station start-up.

## SECTION 6 - TESTING

The Contractor shall perform all tests on newly constructed pipe and appurtenances in the presence of the UCNSB Engineering Department Inspector, including a locate wire continuity test.

All required tests shall be satisfactorily completed prior to Final Acceptance. All labor, equipment and materials required to complete tests shall be furnished by the Contractor and approved by the UCNSB Engineering Department Inspector.

Testing shall not proceed until new construction is complete, including adequate cover (pipe in paved areas will require base material) and pipe is thoroughly cleaned of all foreign matter.

Cracked or defective pipes, fittings or valves, leaks, bellies, etc. will not be accepted and the repair or replacement shall be at the Contractor's expense.

All temporary connections, approved by the UCNSB Engineering Department, necessary to test pipe and appurtenances shall be installed by the Contractor.

New construction and existing facilities shall not be interconnected until Final Acceptance. The Contractor is responsible for plugging/capping pipe and appurtenances, where necessary.

### 6.01 Gravity Sanitary Sewer Mains

#### A. Lamp Test

Pipe shall be visually inspected by lamping between manholes in order to ascertain that the pipe is clear and to correct alignment. The concentricity of the lamp image received shall be such that the diameter of said image shall have no vertical or horizontal reduction from that of the pipe inside diameter.

#### B. Televised Inspection

All gravity sanitary sewer mains shall be televised and recorded. The video shall be provided to the UCNSB Engineering Department for review/approval. The UCNSB Engineering Department may also require the laterals to be televised.

C. Deflection Test

Deflection tests shall be conducted using a mandrel. Mandrels shall be rigid and nonadjustable. The mandrel shall be fabricated of metal, fitted with pulling rings at each end and stamped with the nominal pipe size and mandrel outside diameter. The length of the minimum radius portion of the mandrel shall not be less than one-third of the nominal diameter of the pipe tested. The pipe shall be flushed and cleaned by the Contractor prior to testing. The mandrel shall be hand-pulled. All pipe with deflections in excess of 5% of the base internal diameter shall be repaired or replaced.

D. Infiltration and Exfiltration Water Test

The water tightness of a sewer which has a crown lying below groundwater level shall be tested by measuring the infiltration.

The water tightness of sewer, having a crown one inch or more above groundwater level, shall be tested by filling the pipe with water to produce a hydrostatic head of two feet or more above the crown of the sewer at the upper end of the test section or the water table outside of the sewer, whichever is higher, then measuring the exfiltration.

In no case shall the infiltration or exfiltration exceed 0.10 gallons/inch of diameter/hour/1,000 feet of line when field tested by actual infiltration conditions. If exfiltration testing is required, an allowance of an additional 10% gallonage shall be permitted for each additional two feet of head over the basic two-foot minimum internal head.

Testing shall proceed for a continuous period of twenty-four (24) hours with exfiltration or infiltration amounts measured by methods approved by the UCNSB. Upon application of internal hydrostatic pressure for exfiltration testing, care shall be taken to preclude unseating of the joint gaskets for a specific type of pipe exceeding the pressure capability thereof. Should the test fail, necessary repairs shall be accomplished by the Contractor and the test repeated until within the established limits.

E. Low Pressure Air Exfiltration Test

All service laterals, stubs and fittings shall be capped or plugged properly not to allow for air loss. Where necessary, restrain and seal caps, plugs or short pipe to prevent blowouts and leaks. Groundwater shall be determined prior to testing and the pressure test shall be adjusted accordingly. Low pressure shall be slowly introduced into the sealed line until the internal pressure reaches 4.0 psi greater than the average back pressure of any groundwater above the invert of the pipe, but not greater than 9.0 psi. The monitoring pressure gauge shall be observed while the pressure is decreased to no less than 3.5 psi (greater than the average groundwater back pressure) in which timing shall commence.

If the time for the designated pipe size and length elapses before the air pressure drops 1.0 psi, it is a passing result. If the pressure drops 1.0 psi before the appropriate time has elapsed, the air loss rate shall be considered excessive and that section of the pipe shall have a failing result. Should any section of pipe fail, the sources of leakage shall be repaired and the test repeated until the section is within specified limits.

Low Pressure Air Exfiltration Tests shall conform to the requirements of UNI-B-6-98 [Recommend Practice for Low-Pressure Air Testing of Installed Sewer Pipe](#) by Uni-Bell Plastic Pipe Association.

## 6.02 Force Mains

### A. Pressure Test

Pipe shall be hydrostatically leak (pressure) tested at 100 psi for a minimum duration of two hours.

Unless otherwise specified, the allowable leakage rate shall not exceed that required by AWWA Standard C600 or C605, calculated by the following equation:

$$L = (S \times D \times P^{1/2}) \div 148,000$$

L = Allowable leakage rate in gallon per hour (gph)

S = Length of pipe tested in feet

D = Nominal diameter of the pipe in inches

P = Average test pressure in pounds per square inch (psi)

Not more than 1,000' of pipe, or as directed by the UCNSB Engineering Department Inspector, shall be pressure tested at one time.

There shall be no additional leakage allowance made for bends, fittings or valves. If a leak is visible or if the allowable leakage is exceeded, the Contractor shall make the necessary repairs and repeat the pressure test until the result is acceptable to the UCNSB Engineering Department Inspector.

## SECTION 7 – PERMITS

All applicable permits shall be obtained and submitted to the UCNSB Engineering Department prior to construction. The UCNSB is not responsible for any fees required by permitting agencies.

### 7.01 Florida Department of Environmental Protection (FDEP)

An FDEP permit is required when a gravity sanitary sewer main and/or force main is extended.

One (1) original [FDEP Form 62-604.300\(8\)\(a\)](#) and one (1) set of approved Construction Drawings, signed/sealed by a Florida registered Professional Engineer, shall be submitted to the UCNSB Engineering Department for UCNSB's approval and endorsement, and then submitted to the FDEP for issuance of a construction permit. When applicable, a permit determination may be required.

### 7.02 Florida Department of Transportation (FDOT)

An FDOT permit must be obtained for any work within the FDOT right-of-way.

One (1) original [FDOT Utility Permit Form 710-010-85](#) and one (1) set of approved Construction Drawings, signed/sealed by a Florida registered Professional Engineer, shall be submitted to the UCNSB Engineering Department for UCNSB's approval and endorsement. Then digital files of the permit application and drawings will be required for issuance of an FDOT construction permit through [FDOT One-Stop Permitting](#).

### 7.03 Volusia County

A [Volusia County Use Permit](#) must be obtained for any work within the County right-of-way.

### 7.04 City of New Smyrna Beach

A [City Right-of-Way Use Permit](#) must be obtained for any work within the City right-of-way. An archaeological permit may also be required.

### 7.05 Florida East Coast (FEC) Railway

A permit is required when a gravity sanitary sewer main and/or force main is installed in the [FEC](#) right-of-way. Work adjacent to the right-of-way may require an FEC Flagger.

## SECTION 8 - FINAL ACCEPTANCE

The following shall be completed in order to obtain Final Acceptance and place new wastewater facilities in service:

### 8.01 CERTIFICATION

One (1) original [FDEP Form 62-604.300\(8\)\(b\)](#) and as-built record drawings shall be submitted to the UCNSB Engineering Department for UCNSB's approval and endorsement, and then submitted to the FDEP for issuance of a clearance certification.

The as-built record drawing shall be signed/sealed by a Florida registered Professional Engineer and Surveyor.

The as-built record drawing submittal shall include one (1) bond copy, a multi-page Adobe PDF file and an AutoCAD DWG file (AutoCAD 2000 or later version) with plot style table file.

As-built record drawings shall comply, at a minimum, with the following:

- Identify the vertical and horizontal datum used;
- Show a north arrow and scale in each viewport;
- List the horizontal and vertical scales in profile view;
- Show a legend on each sheet;
- Freeze, or show with gray line types, all layers that are not the subject of the as-built;
- Show and label all street names, right-of-way lines, lot lines, and lot numbers with black lines having a line weight thinner than that of new construction;
- For gravity sanitary sewer mains, show manhole numbers and stationing in plan and profile view, label rims, inverts, diameters, materials, slopes and lengths (from manhole centerline) in profile view and call out all sanitary sewer laterals with a station and direction (left or right of the main), e.g., 2+00R and
- For force mains, show and label all pipe, valves and fittings with length, size, type, degree of bend and location (by using tie dimensions or stationing) with deflections clearly indicated, e.g., 100 LF of 4" FM and 4" PV (plug valve).



## 8.02 INSPECTION

A final inspection shall be scheduled, once all tests have been passed and all clearances received, with the UCNSB Engineering Department Inspector and Engineer, a representative from the UCNSB Water Resources Department, the Engineer of Record and the Contractor.

All operation and maintenance manuals shall be submitted to the UCNSB Engineering Department prior to the final inspection and shall include two (2) hard copies and an Adobe PDF file.

The Contractor shall make all necessary corrections noted during the final inspection prior to Final Acceptance.

## 8.03 TRANSFER OF FACILITIES

The following documentation shall be submitted in order to transfer the wastewater facilities to the UCNSB's ownership:

- A Bill of Sale accompanied by an itemized cost including labor, materials and equipment.
- All recorded plat(s) and easement(s), or proof thereof.
- A Maintenance Bond with a one (1) year warranty period against all defects in material and workmanship. The Maintenance Bond shall be 25% of the total itemized cost and begin upon the date of Final Acceptance, specified by the UCNSB.

## SECTION 9 – DETAILS

<b>Wastewater Detail Title</b>	<b>AutoCAD Block Insertion Scale</b>
Standard Manhole .....	0.333
Shallow Manhole .....	0.333
Inside Drop Manhole .....	0.333
Standard Manhole Ring and Cover .....	1.000
Shallow Structure Ring and Cover .....	0.500
Joint Sealant .....	1.000
Flexible Pipe Connection.....	1.000
Plug Valve.....	1.000
Tapping Sleeve and Valve .....	0.500
Check Valve and Vault.....	0.500
Force Main Valve Layout.....	0.025
Air Release Valve with Clean Out.....	0.500
Sewer Lateral .....	0.333
Utility Separation .....	0.333
Valve Marker.....	1.000
Pipe Locating Wire and Tape .....	1.000
1" Test Service Stub Out .....	1.000
Submersible Pump Station with < 25 HP Pumps .....	Varies
Submersible Pump Station with < 25 HP Pumps and Back-Up Generator .....	Varies
Submersible Pump Station with ≥ 25 HP Pumps .....	Varies
Submersible Pump Station with ≥ 25 HP Pumps and Back-up Generator.....	Varies