AN ORDINANCE AMENDING CHAPTER 14, APPENDIX F, TECHNICAL SPECIFICATIONS FOR WATER & SEWER SYSTEMS

THE BOARD OF COMMISSIONERS OF THE TOWN OF HILLSBOROUGH ORDAINS:

Section 1. Chapter 14, Appendix F Technical Specifications for Water & Sewer Systems is hereby amended as follows:

(1) Delete the words with strikethrough marks and add the words in underlined italics to the existing Appendix F as follows:

"TOWN OF HILLSBOROUGH
TECHNICAL SPECIFICATIONS
for
WATER & SEWER SYSTEMS

GENERAL:

48-hours notice shall be required for utilities construction and inspections. Utilities construction activities shall normally be between 7am and 4pm Monday through Friday, unless otherwise approved.

Prior to any blasting operations, the contractor shall notify the Town Engineer and the Hillsborough Fire Marshal to obtain blasting permits as required. The contractor shall furnish proof (certification) of insurance specifically covering any and all obligations assumed pursuant to the use of explosives.

WATER:

Piping shall be Ductile Iron Pipe (DIP) Pressure Class 350 cement mortar lined interior/asphaltic coated exterior, or Class K Copper (less than 3"). Bedding shall be as recommended by the manufacturer. Fittings shall be mechanical joint for all buried pipe. Pipe shall have a burial depth of 36" minimum.

Hydrants shall be 5 ¼", dry-barrel, AWWA C502, as manufactured by Clow (Medallion), or AVK (Series 27 Nostalgic). Alternate manufacturers and models are not acceptable without pre-approval by the Town Engineer. Hydrant flange shall be installed between 2" and 6" above surrounding final grade (after landscaping), and hydrants shall be installed with a minimum 12" clearance between the edge of the hydrant and the sidewalk. Hydrants shall be located a minimum of: 6 feet behind the edge of the curb, 10 feet from the edge of pavement in locations without a drainage ditch, or behind the ditch. Spacing shall be 500 to 700 feet between hydrants. Resilient wedge gate valves shall be required on the main line and hydrant leg at all hydrants. Hydrant legs shall be restrained joint and rodded from the main through the valve and to the hydrant. Fire Department Connection (FDC) shall be mounted between 24" and 36" above surrounding grade. Private hydrants shall be painted Safety Yellow, and shall have an RP-Detector backflow preventer installed on the customer's side of the property line near the service connection.

Resilient wedge gate valves (AWWA C509) shall be used on water lines in buried service. Two valves shall be installed at all tees, and three valves at all crosses. Valves shall be installed every 1000 feet on water lines without hydrants (<6" mains).

All castings shall be made-in-USA conforming to ASTM A48, Class 35B, gray cast iron.

A *#9800 Eclipse Automatic flushing device (manufactured by The Kupferle Foundry Company)* ~~Hydro-Guard HG-5-Air.Comp automatic flushing device with INS.COM Thermal Control Upgrade and 1" meter prior to unit~~ shall be installed or provided to the Town for every 2,500 feet of water line installed for all new water line extension projects. *A 2" Neptune T-10 water meter (with Auto-Detect ARB and R-900 MIU (radio read) shall be installed for each installed flushing device. A #9400 Eclipse unit may be substituted with prior approval, dependent upon specific site conditions.*

All utilities (electric, phone, gas, cable TV, etc.) shall be installed a minimum of 3 feet horizontally from all

Town waterlines (existing and proposed). Where other utilities are installed closer or cross water lines, they shall be installed in rigid conduit. Electrical transformers, and cable TV & telephone distribution boxes shall not be located on the same property line as water meters.

A Reduced Pressure (RP) backflow prevention assembly (AWWA C511) is required immediately after the meter in an above-ground ASSE 1060 compliant enclosure for all commercial, industrial, institutional, or irrigation services where a severe hazard exists (as defined in NCAC 15A-18C Appendix B). A double check valve assembly (DCVA) (AWWA C510) shall be installed immediately after the meter in an above-ground ASSE 1060 compliant enclosure for all commercial/industrial/institutional/irrigation services not requiring an RP (unless requirement is waived on a case-by-case basis). The location of backflow preventers within the Historic District shall be determined on a case-by-case basis, in compliance with Historic District Design Guidelines. A dual check valve shall be installed on residential services at the meter yoke. RP and DCVA assemblies shall be approved by USC-FCCCHR and ASSE, shall be tested by a certified tester after installation, and test results shall be provided to the Town. Dual check valves shall be ASSE approved. RP assemblies shall have a minimum of 12" clearance on all sides. DCVA shall have adequate clearance for testing. A Detector assembly shall be provided for all fire services (RP-D or DCDA depending on hazard level). An RP-D is required if a Fire Department Connection is installed on the fire service. The detector meter shall be compatible with the Town's radio-read system, or be purchased directly from the Town. Fire service strainers shall be installed on fire services prior to the backflow preventer. RP and DCVA assemblies shall be installed over a concrete pad base, and all exposed (non-buried) piping through vaults shall be flanged ductile iron or copper (compression joints/fittings). Copper piping passing through concrete shall include a collar/sleeve at the concrete interface. *All fire service installations shall fully comply with NFPA requirements.*

All water main taps 4" and greater require a stainless steel tapping sleeve with full circumferential seal, mechanical joint outlet, and stainless steel bolts. Taps onto asbestos-concrete (AC) or PVC mains require an extended-length sleeve on the main being tapped. Taps onto equal size mains (e.g. 8" tap on an 8" main) must be cut & sleeved with a tee and main line valve installed.

All flushing and other use of water from the Town system shall be coordinated with the Town Engineer or Utility Inspector. Contractor shall pay for all water used.

All water piping shall be pressure tested in accordance with AWWA C600 to 200 psi for a 2 hour period. Allowable leakage from the main is determined by the following formula:

$$L=(S*D*P^{1/2})/\textit{148000}\ \sout{133200}$$

L=Allowable leakage (gallons per hour), S=Length of pipe tested (feet)
D=Nominal diameter of pipe (inches), P=Average test pressure (psig).

After successful pressure testing, all water piping shall be sterilized by chlorination in accordance with NCDENR and AWWA C651 *(Section 4.4.3 - Continuous Feed Method)* requirements. *The requirements of NCAC Title 15A, Subchapter 18C, section .1003 are to be followed (50 ppm chlorine, hold for 24 hours with a minimum of 10 ppm during that period).* Super-chlorinated water shall be de-chlorinated upon discharge from the water lines and metered. The line shall produce two consecutive negative *bacteria* samples drawn at least 24 hours after flushing of super-chlorinated water, and at least 24 hours apart, and tested by a *State-approved* laboratory. *A list of approved laboratories is located on the Public Water Supply website at: http://www.ncwater.org/pws/Compliance/electronic_reporting.html.* If any samples fail, the sterilization procedure shall be repeated until satisfactory results are obtained. Copies of all testing results *and water usage data* shall be submitted to the Town Engineer *or Utilities Inspector*.

Meters shall be Schlumberger Neptune T-10 (<2") or Tru/Flo Compound (2" and larger) with Auto-Detect ARB and R-900 MIU (radio read). All meters shall be purchased directly from the Town. Flanged bronze strainers by Neptune shall be installed immediately before all 2" and larger meters with appropriately sized spacer installed between the strainer and meter (to avoid meter inaccuracies). All residential size meter box lids shall be cast iron with pre-drilled 2" hole for Pro-Read disk installation. Hatches for large meter boxes shall be hinged aluminum and also be drilled with a 2" hole adjacent to hinge area. Residential size meter boxes (3/4" and 1") shall be standard rectangular black plastic boxes, 18" deep, with flared bottom. Boxes for 1" meters shall be a minimum of 22" x 35" at the base. Large (>1") meter boxes/vaults shall be pre-cast concrete, with drain pipe at the bottom of the vault to daylight (and shown on the plans), unless approved otherwise. All

piping (>1") through vaults shall be flanged ductile iron or copper (compression joints/fittings). All meter vaults shall be no deeper than 48" (from ground surface to vault bottom) with adequate personnel entry points for service. Water taps shall be a minimum of 1" from the main to the meter box, with a reducer prior to the meter box for 3/4" meters.

All water meter locations shall be coordinated with the Meter Reader Supervisor. Meters shall be grouped in pairs at adjoining property lines, unless approved otherwise. All water meters shall be located at the property line adjoining the public road right-of-way (unless approved otherwise), and shall be no deeper than 18" below grade for residential size meters. *The domestic service may be tapped off the fire service only when the fire service is 6" or larger (NFPA 24).*

Water services shall be Class K copper or Class 350 DIP. All service connections shall be backfilled properly under the corporation stop to prevent undue stress on the connection. Residential water meter boxes shall have orange temporary safety fencing (or other Town-approved barrier) installed around the meter area to protect the installation during home construction activities.

Temporary faucets installed for construction shall be a minimum of 10 feet from the meter box. Temporary faucets shall be removed before occupation of the structure.

Additional construction and material requirements are shown on the Town detail sheets available from the Town Engineer.

SEWER:

Gravity Sewer piping shall be Ductile Iron Pipe (DIP) Pressure Class 350 epoxy lined interior/ asphaltic coated exterior, or SDR 35 PVC. Sewer force main piping shall be *green PVC DR14* ~~DIP~~ Class *200 or Schedule 40 or 80* ~~350 epoxy lined interior/ asphaltic coated exterior~~, with combination air & vacuum valves at all high points. *Force main shall be installed in casing pipe where installed under roads.* Piping deeper than 16 feet shall be DIP for the entire length between manholes, with 5 foot diameter manholes required. Manholes 20 feet deep or deeper shall be 6 foot diameter, and are approved on a case-by-case basis. Pipe bedding shall be as recommended by the manufacturer, with crushed stone bedding required for PVC pipe. Manholes shall be pre-cast concrete with cast-in-place or pre-cast inverts.

Manhole tops shall be a minimum of 18" above grade in unpaved areas not adjacent to public roads (grade rings not allowed in unpaved areas). No more than 12" of concrete grade rings will be allowed from the top of the cone to the bottom of the manhole ring (including 2' diameter sections cast into the manhole sections above the cone). Conseal CS-212 Polyolefin backed exterior joint wrap or approved equal shall be used on all manhole joints, including grade rings. Cored holes with rubber boots shall be required for manholes and pump stations where pipes are inserted.

All castings shall be made-in-USA conforming to ASTM A48, Class 35B, gray cast iron.

An individual sewer service shall be provided for each property from the property line to the sewer main, unless approved otherwise on a case-by-case basis. Sewer services for new construction shall be installed with an in-line wye fitting. Saddles are not acceptable for new construction. Services to be tapped into existing iron sewer mains shall use Romac CB4 or Sealtite 4EB saddles, or SDR35 saddle wye with gasketed skirt for existing PVC mains, or pre-approved equal, and shall have precision-cut entries into the sewer main that match the saddle used (no sharp or protruding edges). Services shall be constructed with SDR-35 PVC or DIP. Services shall have cleanouts installed at all changes in direction. A pre-cast concrete ring or 2' x 2' cast in place concrete pad shall be installed around all cleanouts at the property line and within the road right-of-way or sewer easement. Concrete shall be level with finished grade, and top of cleanout 2" above the concrete.

All new manholes shall be vacuum tested (ASTM C1244) to 10.6" Hg (5.2 psi) to the top of the cast iron manhole frame, and the minimum amount of elapsed time for the vacuum to drop 1" (0.5 psi) of mercury shall be as follows:

Manhole Depth (4 ft Dia.)	Min. Elapsed Time for a Pressure Loss of 1" Hg
10 ft or less	60 seconds
>10 ft but <15 ft	75 seconds
>15 ft	90 seconds

For 5 ft diameter manholes, add 15 seconds.
For 6 ft diameter manholes, add 30 seconds.

All gravity sewer mains shall be air tested (AWWA C828) after services are installed, and force mains shall be pressure tested to 50 psi above maximum system pressure (AWWA C600). Allowable leakage shall be as determined by the formula listed previously in the water piping pressure testing requirements. A mandrel (92.5% of base ID) shall be pulled through all PVC gravity mains to test for unacceptable deflection. All gravity sewer mains and services (to the customer cleanout) shall be smoke-tested and TV inspected in the presence of Town personnel after all other utilities have been installed, and at the end of the warranty period, and DVD disks of the inspection and smoke-test reports shall be provided to the Town prior to acceptance. Deficiencies shall be corrected prior to acceptance and operation. Copies of all testing results shall be submitted to the Town Engineer.

Additional construction and material requirements are shown on the Town detail sheets available from the Town Engineer.

SEWAGE PUMP STATIONS:

Sewage pump stations shall be duplex submersible or suction-lift style, unless approved otherwise. Motors shall be minimum of 5 hp, and must be 3 phase, 480V, 60 Hz, 1800 rpm maximum. Pumps shall be non-clog centrifugal pumps, unless approved otherwise. Grinder pumps shall only be approved when conditions preclude other selections. Pumps shall be as manufactured by ABS, Fairbanks Morse, Flygt, Smith & Loveless, or Gorman Rupp. Pump station wet wells shall be round pre-cast concrete, 6 feet inside diameter minimum. Top shall be pre-cast concrete, with cast-in hatch. A 1,000 gallon odor control chemical tank and chemical feed metering pump (adjustable and sized for manufacturer's recommended application rate), piped to a point just below the wet well hatch, shall also be provided, and shall be filled with "Odor Klean 200" odor control compound (calcium nitrate tetrahydrate) prior to operation.

Pump station electrical panels shall be NEMA 4X, UL listed, with alarm horn/light with silence switch, pump alternator & switch, pump run-time hour meters, contacts for RTU/SCADA, heater/thermostat, phase monitor, and run lights. An MJK 704 Level/Pump Controller/Transmitter/Flowmeter/Datalogger with Model 2100 Pressure Transmitter & mounting bracket shall be installed to control the pump operation. Two level control floats shall be provided for low level alarm and high level alarm as backup units, tied-into the power control panel (separate from the pump controller). All electrical panels shall be mounted to an aluminum or 0.4 pressure treated lumber backboard with 4" diameter aluminum or 6"x6" 0.4 PTL posts, with aluminum rain cover extending 36" from backboard over panels. A 4 foot dual fluorescent tube light with switch shall be mounted under rain cover.

Resilient wedge gate valves shall be installed on the influent piping and force main piping. Force main gate and check valves shall be in a separate vault next to the wet well. Gate valves shall be installed on each pump line and on the force main, and check valves on each pump line. A tee (with the leg facing up), gate valve, and quick-connect fitting shall be installed on the discharge side of one check valve as a "pump-around" connection inside the valve vault. An equal size blind flange shall also be provided for maintenance purposes.

All guide rails, fasteners, and miscellaneous metals inside the wet well shall be stainless steel. Access ladders shall be aluminum or stainless steel. Piping inside the wet well shall be flanged ductile iron or stainless steel. Wet well vent shall be flanged ductile iron pipe with a screened outside end. A yard hydrant and water meter connected to potable water shall be installed at the pump station site, unless approved otherwise.

Access hatches shall be hinged and lockable, with stainless steel or aluminum frame, and ¼" thick aluminum diamond plate door(s). All hardware and hinges shall be stainless steel.

One spare pump and motor shall be provided, that is identical to the pumps installed in the station.

All new pump stations shall have permanent on-site standby power with auto transfer switch and Mission M110 RTU telemetry equipment installed with the first year of service pre-paid. Generators shall be as manufactured by Generac, Kohler, Caterpillar/Olympian, or pre-approved equal. Generator shall operate on natural gas, or diesel fuel only if natural gas is unavailable to the site. Generator shall be sized to operate both pumps simultaneously and start the lag pump while the lead is operating. A 110V GFCI power outlet shall be installed in the electrical panel.

Pump station sites shall be at least 50 feet square, have 4" depth (minimum) of ABC stone covering entire site underlain with geotextile fabric (to prevent weed growth), and include perimeter black plastic-coated chain link fencing (6 feet high, topped with 3 strands of barbed wire, and 16 foot wide double leaf gate), and dusk-to-dawn high-pressure sodium area light with independent circuit breaker (or switch) in main electrical panel. Alternate fencing materials may be required based on individual site conditions. Padlocks shall be provided for the gate, electrical panels, and access hatch(es) and shall be keyed to the Town's system.

Additional construction and material requirements are shown on the Town detail sheets available from the Town Engineer.

EASEMENTS:

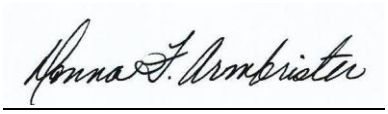
Easements shall be a minimum of 20 feet wide for a single utility pipeline, and a minimum of 30 feet wide for pipes deeper than 16 feet. For multiple lines, easement shall provide a minimum of 10 feet clearance on either side of each pipe."

Section 2. All provisions of any Town ordinance in conflict with this ordinance are repealed.

Section 3. This ordinance shall become effective upon adoption.

The foregoing ordinance, having been submitted to a vote, received the following vote and was duly adopted this the _14th_ day of _November_, 2011.

Ayes: 5
Noes: 0
Absent or Excused 0



Donna F. Armbrister
Town Clerk