L.9.1. DISCHARGE VALVES

Spring and lever swing check valve to be Mueller #A-2600-6-02 or approved equal. Spring check valves shall be manufactured from gray cast iron meeting or exceeding ASTM A126 grade B. Valves to comply with AWWA C 508, latest revision.

Gate valves to be Mueller Super-Seal Resilient Seat NRS #A-2370-6 with stainless steel fasteners of approved equal. Valve shall be manufactured to meet or exceed the requirements of ANSI/AWWA C-509, latest revision. All internal and external ferrous surfaces of the gate valve, including the interior of the gate, shall have Thermo setting bonded epoxy coating with a minimum thickness of 10 mils. Coating to be applied to castings prior to assembly to insure all exposed areas, including bolt holes and flange face surfaces, will be covered. Contractor shall furnish written certification of valve coatings from manufacturer.

L.9.2. EMERGENCY PUMP BY-PASS CONNECTION

Connection shall be four-inch (4”) or six-inch (6”) depending on station size. This will be determined by City. Connection to include gate valve, adapter flange with quick disconnect male fitting-part #FLA Cam and Groove as sold by Amazon Hose & Rubber Co. –with dust cap. Emergency pump bypass shall be installed as indicated on ‘Standard Drawings.’

L.9.3. PRESSURE GAUGES

Pressure gauges shall be installed with stainless steel nipple on each discharge pipe as indicated on ‘Standard Drawings.’ Each pressure gauge shall be directly mounted, stainless steel case, stainless steel sensing element, liquid filled, with a four and one-half-inch (4 ½”) diameter dial and furnished with a clear glass crystal window. All gauges shall be weather proofed. The face dial shall be white finished aluminum with jet-black graduations and figures. The face dial shall indicate the units or pressure measured in psig, with a 0-60 psi range. Pressure gauges shall be manufactured by Ashcroft, Inc. or approved equal. Pressure gauges shall be isolated by a ¼ inch stainless steel ball valve, Whitey “60” series as manufactured by Swagelok Co. or approved equal. Pressure gauge is to be protected by a ¼ inch “snubber” fitting as manufactured by Cajon Co. or approved equal. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by the City.

L.9.4. FIELD PAINTING

All pipe, valves, and fittings within valve vault shall receive after installation one 3 mil Coat Ply-Tile 520-W-45 (white) Primer with one 3 mil coat Ply-Thane 800 (gray) Coating, 052 line manufactured by M.A.B. Paints or approved equal. All pump discharge pipe and fittings within wet well shall receive after installation, two coats of coal tar epoxy paint. Each coat shall be 8 mil dry thickness. Paint thickness will be measured by City using mil thickness test gauge before acceptance.
L.9.5. CERTIFICATION OF GRADE

The Contractor shall furnish written notarized “Certification of Grade” from supplier or manufacturer of all equipment, fittings, or parts required to be 316 stainless steel.

L.10. PUMP STATION WATER SYSTEM

All wastewater pump stations shall be provided with a water system of adequate capacity and pressure for station wash down and other requirements. The station water system shall be completely separated from the potable water supply by means of a reduced pressure type backflow preventer or other City approved system. Water system to be installed as shown on ‘Standard Drawings’ and to end with ¾ inch hose bib. Top of meter box shall be set two inches (2”) above finished grade.

L.11. SITE FENCING

In general, all pump station sites shall be fenced. However, exception to this requirement may be made for pump station servicing residential areas only, on a case by case basis and subject to sufficient landscaping screening as approved by City. The Contractor shall furnish and erect a chain link fence and gate with material to be installed in accordance with the specifications and in conformity with the lines, grades, notes, and typical sections shown on the ‘Standard Drawing.’ Material specified as follows unless otherwise approved by City.

L.11.1. MATERIAL DETAILS

The fabric, posts, fastenings, fittings, and other accessories for chain link fence shall meet the requirements of AASHTO M 181 with the following changes:

a) The weight of coating on wire fabric shall be 1.2 ounces of zinc per square foot (class B).

b) The galvanizing of steel materials shall be hot dipped galvanized.

c) The weight of coating on posts and braces shall be 1.8 ounces of zinc per square foot, both inside and outside to meet the requirements of AASHTO-M-111.

The base metal of the fabric shall be a good commercial quality 9 gauge steel wire. The fabric shall be of uniform quality, and shall be six-foot (6’) high with a two-inch (2”) mesh size. All posts and rails shall be in accordance with the following schedule:

a) End, corner and pull posts – 2 3/8” o.d., schedule 40

b) Line posts and gate frames – 2” o.d., schedule 40

c) Gate posts – 3” o.d., schedule 40

d) Post braces and top rail – 1 5/8” o.d., schedule 20
e) Tension wire shall be 0.177 inch coiled spring wire tensioned along the bottom of the fabric and shall be coated similarly to the wire fabric.

f) Miscellaneous fittings and hardware shall be zinc coated commercial quality or better steel or zinc coated cast or malleable iron as appropriate for the article.

g) Post caps, designed to provide a drive fit over the top of the tubular post to exclude moisture, shall be provided.

L.11.2. INSTALLATION

L.11.2.A. POST SETTING

All posts shall be set three feet (3’) deep in concrete footings, 12” diameter for line posts, gate and corner posts. After the posts have been set, aligned, and plumbed, the hole shall be filled with 2500 psi concrete. The concrete shall be thoroughly worked into the hole so as to leave no voids. The exposed surface of the concrete shall be crowned to shed water. End corner, pull and gate posts shall be braced to the nearest post with horizontal brace used as a compression member and a galvanized 3/8” steel truss road and truss tightener used as a tension member. Corner posts and corner bracing shall be constructed at all changes of fence alignment of 30 degrees or more. All chain link fences shall be constructed with a top rail and bottom tension wire.

L.11.2.B. GATES

Swing gates shall be two (2) six-foot (6’) wide double hung gates as indicated on the ‘Standard Drawing’ and hinges to swing through 180 degrees from closed to open and shall be complete with latches, locking device, stops keeper, hinges, fabric and braces. Gates shall be the same height as the fence and the gate fabric shall be the same as the fence fabric.

Gate leaves less than eight feet (8’) wide shall have truss rods or intermediate braces and gate leaves eight feet (8’) or more in width shall have intermediate braces and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist.

L.11.2.C. PLACING FABRIC

The fabric shall not be placed until the posts have been permanently positioned and concrete foundations have attained adequate strength. The fabric shall be placed by securing one end and applying sufficient tension to remove all slack before making permanent attachments at intermediate points. The fabric shall be fastened to all corner, end, and pull posts by substantial and approved means. Tension for stretching the fabric shall be applied by mechanical fence stretchers.
L.12. PUMP STATION ELECTRICAL POWER AND CONTROL SYSTEMS

This subsection specifies the electrical power and duplex control system. These requirements for wastewater pump stations requirements apply when two or more pumps are involved except for the quantity of control equipment and panel size shall be increased accordingly. At all locations which require pump motors to be sized larger than 10 hp., a “Smart motor controller” as manufactured by Allen-Bradley, will be provided for each pump to ramp up to start speed and down to stop. All equipment and materials shall be installed and permanently grounded in accordance with the requirements of the National Electrical code. Driven ground rod, which does not have a resistance to ground of 25 OHMS or less, shall be augmented until the resistance to ground is 25 OHMS max. All cable and wire for feeders and branch wiring shall be copper type THW, or THWN. The contractor shall furnish all labor, materials, equipment, facilities, transportation and services required for furnishing, delivery, and installation of a complete workable electrical system.

L.12.1. ELECTRICAL CONNECTIONS

Connections to motor leads and float control leads will be made outside the wet well. Conduit seals shall be used to prevent the atmosphere of the wet well from gaining access to the control center. Conduit seals to be located below control center, provide stainless steel junction box for float control and motor leads located below conduit seals. Conduit from wet well to junction box will be sealed with “ductseal putty.” Direct motor leads and float leads will not enter control panel. Type THHN, THWN (for motor loads), type TFFN (for control) copper wire, will be used from control panel to stainless steel junction boxes.

L.12.2. ELECTRICAL SERVICE

Contractor will provide new underground electrical service. All service equipment and installations will be built to meet existing electrical conditions and requirements in the City’s Lift Stations system. Electrical services are required to match existing emergency generation systems and procedures.

Service will be 230-volt, three- (3) phase for motors 20 hp or smaller. Florida Power & Light’s (FP&L) high voltage leg (“High Leg”) will be located in the “C” position, far right and marked with orange tape. The “C” position will be used throughout the power system as “High Leg” including the control panel. 480-volt, three- (3) phase for 20 hp or larger. Connection to Florida Power & Light will be made at a hand-hole installed by FP&L. Contractor will provide all wire, pipe and associated equipment to FP&L point of connection. All services will be three- (3) phase, no single phase systems will be allowed. No phase converters will be accepted. The City will not accept a 208-volt system. Service will provide sufficient power to effectively operate the applicable pumping station and all associated equipment. Size and number of pumps and associated equipment will determine service amperage requirements. 100-amp minimum service
size. Contractor is responsible for all fees associated with the service installation as may be required by the electric utility, including temporary services.

The contractor will provide N.E.M.A. 4X stainless steel (fused) main disconnect switch to be mounted as shown on ‘Standard Drawings.’

- Square D # H323DS – 100 amp. Service
- Square D # H324DS – 200 amp. Service

Service will have three- (3) phase lighting protection on station main.

L.12.3. CONSTRUCTION MATERIALS

Due considerations shall be given to the selection of materials because of the presence of hydrogen sulfide and other corrosive gases, greases, oils, and other constituents frequently present in sewage. All mounting hardware will be type 316 stainless steel. (Nuts, bolts, washers, etc.). All enclosures and disconnects shall be type 304 stainless steel water tight N.E.M.A. 4X with gasket. All enclosures and disconnects will be lockable with a padlock. Exception: motor lead and float lead termination junction box shall have screw on watertight cover.

Pipe:

All exposed pipe shall be rigid galvanized steel pipe. All field cut steel pipe will have the threads cleaned and painted with cold galvanized paint. All steel pipe below grade will be painted with black asphalt paint, to a point of six inches (6”) above grade. This includes pipe form control panel to a point past first 90-degree ell fitting underground. PVC pipe form this point shall run to wet well to at least two inches (2”) inside well, with a PVC pipe end bell bushing in wet well. PVC shall be gray electrical type schedule 40. All exterior locknuts will be of the “Sealing” type on all equipment.

Control-Electrical Service Mounting:

Mounting rack shall be constructed of two-inch (2”) minimum, 304 stainless steel tube, 11 gauge. (Stainless steel “Unistrut” one and one-half-inch (1½”) minimum, mounted on 3-inch (3”) stainless steel pipe, may be used as alternate to tubing. Close the exposed pipe end with proper size PVC plug cap.)

The control panel, main disconnect, meter, and junction boxes shall be mounted directly to rack. All material and equipment to be level and plumb. Equipment to be mounted and rack to be constructed and installed as per ‘Standard Drawing.’ All enclosures, junction boxes, fasteners, hinges, anchors, nuts, bolts, screws, washers, rivets, etc., shall be type 316 stainless steel unless otherwise specified.
L.12.4.A. CONTROL PANEL COMPONENTS

Control panel shall be N.E.M.A. 3R stainless steel, with aluminum dead front interior door. Enclosure will have a three- (3) point latch system, operated with one common handle. All controls and wiring shall meet or exceed the requirement of the National Electric Code. All starters and breakers to be sized for the motor loads and associated equipment.

Control panel to include the following:

Pump breakers, pump starters, overload protection devices, overload reset buttons, control breakers, duplex 120-volt outlet with ground fault interrupter, emergency generator circuit breaker that includes mechanical interlock (or alternate method of positive isolation of electric power supply while generator circuit is active), control terminals, monitor terminals, main breaker, phase monitor and bypass switch (480-volt systems), ground lugs, neutral block, thermal overload terminals, generator receptacle (3-phase exterior), power transformer (480-volt systems), soft start controller, pump control unit, etc.

L.12.4.B. CONTROL PANEL ASSEMBLY

Pump station control panel shall be completely factory wired. Control panel will have an isolated neutral buss bar. Each control circuit wire shall have numbers as indicated on the schematic. No concealed wiring shall be allowed. Wiring shall be in “Panduit Raceway” or approved equal. Each device in the control circuit shall be identified with the proper control circuit abbreviation. All wiring shall be shown on electrical schematic diagrams. There shall be permanently affixed to the interior side of the exterior door a 10” x 12” stainless steel pocket for log sheet storage. An adhesive mylar copy of the schematic drawings and terminal diagram must be permanently affixed to the inside of the control panel door. Both outer and inter dead front door will have “door stops” to hold in the open position. Panel will be equipped with an exhaust fan to remove generated heat. Control will be through internal thermostat.

L.12.4.C. APPROVED CONTROL EQUIPMENT MANUFACTURERS

1) Breakers
   Square D Company or City approved equal
   (Full size FAL or KAL only)

2) Starters
   Square D Company or Furnas ESP 100

3) Phase Monitors
   Time Mark or CITY approved equal

4) Generator Receptacle
   Russellstoll #JRSB1044FR for 100 amp system
   Russellstoll #JRSB2044FR for 200 amp system
   -NO SUBSTITUTES, NO EQUAL-
   (must match existing system)
with 30 degree junction box. Rotation to be in
clock-wise direction with R1-A phase, S2-B phase,
T3-C phase.

5) Power Transformer  Square D Company or approved equal
                     3KVA (min.) sized for load, class 7410 or 7411

6) Pump Control Unit  Data Flow System, Inc.
                     PCU 001 / with BEM 001

7) Soft Start Controllers  Allen-Bradley (10 hp and larger)

L.12.4.D.  LIFT STATION OPERATIONS

The operation of the lift station will be based on a four-point control. In ascending order
the four points are:

   a) low water cut off point
   b) lead pump start point
   c) lag pump start point
   d) high water alarm point

The lead pump is energized when the sewage level reaches the “lead pump start point”. The lead pump shall operate continuously until the water level is lowered to the “low water cut-off point”. The lag pump shall be energized if the lead pump is incapable of handling the flow of sewage, allowing the water level to reach the “lag pump start point.” The lag pump shall then operate in unison with the lead pump until the water level is lowered to the “low water cut off point.” At this time, both pumps are de-energized. An automatic circuit will alternate the lead pump, lag pump, sequence on every pump down cycle. Provide time delay relay to prevent both lead and lag pumps from starting at the same time.

PCU Operation:

Station operation will be provided through the use of a “Pump Control Unit” (PCU001) as manufactured by Data Flow Systems, Inc. This unit, along with the Bus Extender Module (BEM001), is required for interface with the existing telemetry system. No substitutes. Interface of existing Lift Station control/telemetry system will be the responsibility of the contractor. Data Flow Systems, Inc. will inspect and start up the control/telemetry system and Remote Terminal Unit (RTU) (Model # subject to change).

L.12.4.E.  UL LABEL

The control panel enclosure shall be in accordance with Underwriters Laboratories and
must bear the manufacturer UL label for enclosures to indicate and qualify same.
L.12.4.F. MANUFACTURER NAMEPLATE

There shall be permanently affixed to the inside the enclosure door a nameplate indicating the voltage, phase, horsepower, order reference number, date manufactured and the control panel manufacturer’s name, address, and telephone number.

L.12.4.G. WIRING

All power wire shall be stranded copper and sized as required for load and application according to the National Electric Code (NEC). Electrical work shall be in accordance with the latest edition of the NEC and subject to all codes. All control and signal wire shall be a minimum of #14 AWG, 90 degree insulated and color-coded. Colors shall be red for all AC control, blue for all DC control, yellow for external source control, white for AC neutral, and green for equipment ground wiring. All wiring on the rear of the inner door shall be neatly bundled using tie wraps or other means. All internal wiring on the backplate shall be neatly routed in wire duct with removable covers. All wiring shall be continuous point-to-point (no splices) and be totally accessible with permanent number marking on each end to match the control schematic drawings.

L.12.4.H. QUALITY CONTROL AND TESTING

The panel shall be manufactured using quality workmanship and components. Upon completion of the panel, it shall be completely factory tested. All control and alarm operations shall be performed with external signals simulated to insure proper operation. The three- (3) phase line voltage source for which the panel is intended shall be used for testing.

L.12.5. REMOTE TERMINAL UNIT (RTU)

Control panel shall be capable of being monitored by existing City operated radio telemetry system main terminal unit. The RTU shall be manufactured and installed by Data Flow Systems, Inc. of Melbourne, Florida. Contractor is responsible for installation of RTU, antenna, all wire and pipe from RTU to control panel. RTU will be Data Flow Tac II system. It is the responsibility of the Contractor to have Data Flow Systems inspect and start up RTU system. City shall be given 48 hours notice prior to RTU start up. City representative to be on site at time of RTU start up. RTU will contain: RTU/w backplate, Bus Extender Module (BEM001), RIM005/w Radio, Power supply-PSM001-25 watt, battery, antenna, tower, cable and all parts to provide a working telemetry system compatible with existing system. (Model # subject to change)

L.12.6. ELECTRICAL GROUNDING SYSTEM

A grounding system shall be installed as per National Electrical Code, local codes, and ordinances. Submitted drawings shall clearly show the Electrical Grounding System. An underground perimeter cable grounding system shall be installed with connections to at least the following equipment:
1) Wet Well Cover  
2) Valve Vault Cover  
3) Control Panel Mounting Rack  
4) Main Disconnect Switch  
5) Fence

Bare copper wire (#4), to be connected to wet well cover and valve vault cover by way of approved mechanical connection. Wire (#4) to be poured into top slab of wet well and valve vault at foundry with 12” stub out for field connection. Under no circumstances shall (#4) wire be allowed to run across outside top slabs.

The submitted drawings shall show details of material and installation to construct a completely functional and operational electrical grounding system.

L.13. REQUIRED SUBMITTALS FOR PUMP STATIONS

Submittals shall be provided to the City in triplicate and include the following:

1) Shop and erection drawings showing all-important details of precast construction, dimensions, and anchor bolt locations.
2) Precast coating specifications and warranty information.
3) Descriptive literature, bulletins, and/or catalogs of equipment.
4) Data on the characteristics and performance of each pump. Data shall include guaranteed performance of curves. Based on actual shop tests of similar units, which show that they meet the specified requirements for head, capacity, efficiency, submergence, and horsepower. Curves shall be submitted on eight and one-half-inch (8 ½”) by eleven-inch (11”) sheets, at as large a scale as is practical. Curves shall be plotted from no flow at shut-off head to maximum manufacturer recommended pump capacity. Catalog sheets showing a family of curves will not be acceptable.
5) Complete layouts, wiring diagrams, telemetry or control schematics, including coordination with other electrical control devices operation in conjunction with the pump control system. Suitable outline drawings shall be furnished for approval before proceeding with manufacture of any equipment. Standard reprinted sheets or drawings simply marked to indicate applicability may not be acceptable.
6) A drawing showing the layout of the pump control panel shall be furnished. The layout shall indicate all devices mounted on the door and in the panel and shall be completely identified.
7) The weight of each pump.
8) Complete motor data shall be submitted including:
   a) Nameplate identification
   b) No-load current
   c) Full load current
   d) Full load efficiency
   e) Locked rotor current
   f) High potential test data
L.14. INSPECTION AND TESTING

A factory representative knowledgeable in pump operation and maintenance shall inspect and supervise a test run at the pumping station covered by this section. A minimum of one (1) working day shall be provided for the inspections. Additional time made necessary by faulty or incomplete work or equipment malfunctions shall be provided as necessary to meet the requirements in this section at no additional cost to the City. Upon satisfactory completion of the test run, the factory representative shall issue the required manufacturer’s certificate.

The test run shall demonstrate that all items of this section have been met by the equipment as installed and shall include, but not be limited to, the following tests:

1) That all units have been properly installed.
2) That the units operate without overheating or overloading any parts and without objectionable vibration.
3) That there are no mechanical defects in any of the parts.
4) That the pumps can deliver the specified pressure and quantity.
5) That the pumps are capable of pumping the specified material.
6) That the pump controls perform satisfactorily.

L.15. WASTEWATER PUMP STATIONS NOT ACCEPTED BY CITY

All Owners and/or Developers who intend to construct wastewater pump stations that are ‘NOT ACCEPTED BY THE CITY’ yet intend to discharge into the City wastewater collection system shall make access available to the City for such stations in the event of an emergency. The City shall have the right to deny pump station discharge into its wastewater collection system if access to pump station is ever denied. Pump station discharge shall be by way of ‘single service’ connection until tie in point with City system. Service connection to City wastewater collection system will have isolation valve installed per ‘Standard Drawings’ and ‘Specifications.’ Valve to be located at or close to owners’ property lines.

Pump station will be equipped with emergency generator connection compatible with the ‘City of Melbourne Technical Provisions for Sewer Lift Station Section L.12.– Generator Receptacle-‘. Pump station will be equipped with emergency pump by-pass connection compatible with the ‘City of Melbourne Technical Provision for Sewage Lift Stations Section L.9.2. –Pump By-Pass-.’

Prior to date of acceptance of discharge into City collection system, owner will provide name, address, and phone number of two persons or company responsible for all emergency responses to the facility. This will be a 24-hour per day, seven- (7) day a
week response number. This information will be posted on the front exterior of the control panel by means of a permanent phenolic label.

L.16. INSTALLATION GUIDE

This section serves as ONLY AN AID to clarify what services and/or equipment is NORMALLY AND CUSOMARILY furnished during the installation of a City accepted lift station. The Developer of Record is ultimately and solely responsible for the delegation and/or coordination or work, equipment, and materials required to construct and install the lift station. The lift station shall be constructed and installed as per City of Melbourne Water and Sewer Administration Technical Provisions for the Construction of Sanitary Sewer Lift Stations (1997, or latest revisions) prior to City acceptance.

The scope of work and materials/equipment provided is divided into five areas as follows:

Pump and Control Panel Supplier usually supplies the duplex submersible pump package and the associated control panel. This includes, but is not necessarily limited to, the following:

- (2) submersible sewage pumps with flush valve and adequately sized motor cables
- (2) discharge elbows with anchor bolts
- (2) sets of stainless steel guide rails and associated guide rail brackets
- (4) “Roto” floats and associated float brackets
- (1) set of aluminum hatch covers for wet well and valve vault
- (2) stainless steel lifting cable chain and associated hardware
- (1) control panel and component package which includes Data Flow Systems Pump Control Unit (PCU) and unattached generator receptacle
- (1) start up services and manufacturer’s acceptance of pump and panel installation as it pertains to pump and panel warranties (this includes all pertinent manuals and printed warranty information)

Telemetry System Manufacturer usually supplies and installs the telemetry panel and associated components which includes but is not necessarily limited to the following:

- Telemetry control panel box
- Printed circuit cards
- Uninterrupted power source unit
- Radio unit set at required frequency
- Antenna with tower
- Electrical grounding components and connection between antenna and telemetry panel
- Conduit and control wires between telemetry panel and lift station control panel
• Start up services and manufacturer’s acceptance of telemetry system as it pertains to telemetry warranties (this includes all pertinent manuals and printed warranty information)

Subcontractor (electrical) usually, but not necessarily, supplies and installs the following:

• Applicable electrical construction permits
• Stainless steel mounting rack for control panel and main disconnect
• Stainless steel
• Meter can and conduits as per FP&L requirements
• Electrical and float conduits between control panel and wet well
• Connect motor cables and float cables to panel
• Control panel grounding system, (including connection to site fencing)

The Underground Contractor usually, but not necessarily, supplies and installs the following:

• Wet Well (including all associated concrete invert work)
• Vale Vault (including drain piping)
• Potable water service (including backflow prevention device)
• All piping, valves, and associated fittings, etc., between base elbows and force main tie in
• Installation of base elbows, guide rails, float brackets, and submersible pumps

The Developer of Record usually, but not necessarily, supplies and installs the following:

• Site grading, ground cover (including required concrete work) and landscaping
• Site fencing, and driveway (including sidewalk, if required)
• FP&L construction meter
• Construction and/or potable water meter