

CITY OF LOVELAND

SEWAGE LIFT STATION STANDARDS

Revision Date: 5-10-01

ANY CONTRACTOR OR SUB-CONTRACTOR THAT WILL BE INSTALLING LIFT STATIONS FOR THE CITY OF LOVELAND, MUST BE ABLE TO PROVE PRIOR LIFT STATION EXPERIENCE TO THE CITY, AND BE APPROVED FOR THE INSTALLATION PRIOR TO ACCEPTANCE FOR THE PROJECT. FAILURE TO DO SO COULD RESULT IN THE CITY REJECTING THE CONTRACTOR FOR THE PROJECT.

This complete set of specifications must be attached to the plans before purchase by contractors. Copying these specifications onto the plans are not acceptable to the City due to the numerous errors encountered in the past and the omission of critical areas of concern which happen during the transfer process.

1. Types of Lift Station

- A. Wet Well With Submersible Pumps - All sewage lift stations shall be wet well stations with submersible pumps. have an on-site generator be designed and constructed in accordance with the following specifications.
- B. Dry Well/Wet Well Stations - Sewage lift stations consisting of a wet well and a separate dry well for the pump installation shall not be permitted unless the size requirement is too large for the use of submersible pumps. If such a station is needed, the design parameters shall be established by the Water/Wastewater Department.
- C. Individual Sewage Lift Stations - Individual sewage lift stations may discharge into the City's gravity sewer system. The station and force main shall be owned and maintained by the property owner or owners. Where more than one individual lift station uses the same force main, an agreement shall be made defining the maintenance and liability requirements between the various owners.

2. Wet Well

- A. Capacity - The wet well shall have sufficient capacity to contain the inflow for two hours during peak flow conditions. For residential areas, the capacity shall be determined as follows:

$$V \text{ (gal)} = [(F \times 80) + 50] \times P \times 83.4 \text{ where:}$$

P = tributary populations, in thousands

F = peaking factor

$$= (19.5 + P^{1/2}) / (3.5 + P^{1/2})$$

80 = average flow in gallons per person per day

50 = infiltration allowance in gallons per person per day

83.4 = 2 hour x 1000 people / 24 hours per day

In commercial, institutional and industrial areas, the peak flows shall be determined by the design engineer, subject to review and approval by the Water/Wastewater Department.

Up to fifty percent (50%) of the required capacity may be taken in the collection system provided that the water surface elevation at the required capacity is at least one foot below the lowest plumbing fixture or floor drain being served. The normal operating levels shall be contained within the wet well.

- B. Configuration - Wet wells shall be no smaller than a eight-foot inside diameter structure. Larger circular or rectangular wet wells are permitted if additional capacity is needed, and circumstances demand the same. City to decide. More than one structure may be constructed to provide the required capacity. If more than one structure is provided, the auxiliary structure (s) shall be above the primary structure so the normal operating levels are within the primary structure. For large structures, it may be necessary to install a sump for the pumps. Two objectives shall be satisfied in determining whether a sump is needed and in fixing it. First, the normal operating levels shall be set so the pumps cycle at least two times per day during low flow periods. Second, the depth of fluid in the wet well shall be sufficient to submerge the pump motor in accordance with the manufacturer's recommendations.

- C. Construction - The structures shall be designed for fully saturated earth load and H-20 vehicle loads.

The City has recently approved the use of Flowtite Fiberglass Wetwells by Containment Solutions, Inc. Design of all new lift stations shall include this type of wet well until advised otherwise by the City.

The inside of the wet wells and the discharge lines inside the wetwell shall be coated with a minimum of 100-125 mils of Tnemec series #264 Elasto-Shield, or CIM Industrial membrane #1000. Either coating must be first preceded by a primer coat of Tnemec # 66 primer, or CIM primer for concrete. Both primer and finish shall be sprayed on. The outside of the wetwells shall be coated with coal tar epoxy or similar bitsumastic type coating. The wet well shall be sealed from ground water infiltrations by installing a double mastic seal (reference City Sewer Standards) between precast sections, one on each of the upper and the lower lips of each section, rubber water stops between cast-in-place sections or other approved methods. All sealant between joints shall be flush with the exterior and interior surfaces so that the coating of elastomeric membrane will be a smooth finish with no seams. Any pockets, indentations or large cracks in the concrete shall be first troweled flush with patching mortar so that all surfaces are smooth. If any fasteners, anchors or holes are drilled after the membrane has been applied, care must be taken to seal any fixtures and fasteners where they enter the membrane wall surface. The floor of the wet well shall slope to the pump at a slope of 1/4" per foot, steeper slopes to be approved by the City.

The above paragraph may be eliminated with the use of Fiberglass wetwells.

A reinforced concrete base pad will first be installed to receive the wetwell per the specifications of Containment Solutions & the City.

It is imperative that the bottom section of the wet well is perfectly level in all directions, as being out of level will not allow the sides to remain plumb as they are stacked upwards. Maximum out of plumb allowable at the top will not exceed 1" (one) inch from top to bottom, and will be checked before being accepted.

All hardware Bolts, Nuts, Anchors, Brackets, etc, (With exception of pumps and piping only) within a wet well and valve vault shall be made of non-corrosive materials (eg. 316 stainless steel, PVC, or fiberglass Pump bases,) Rails, rail guides, and all rail and pipe brackets shall be of 316 stainless steel or of other City approved non corrosive materials.

Lift cables for pumps shall be 3/8" stainless steel cable. Cable clamps must also be of # 316 Stainless steel material. Any other Stainless must be approved by the City.

Each wet well shall have a ladder constructed of Type 316 stainless steel meeting the following specifications: 16" inside width between rails, 12" rung spacing, 3/8" x 2" wall brackets welded to inside of side rails halfway between rungs at six-foot intervals. Rungs of ladder shall be at least 6" from the wall to insure secure footing on the ladder. Side rails to be of 3/8" x 2." stainless steel. See detail.

Fiberglass wetwells will be supplied from the factory with a built in fiberglass ladder designed per OSHA regulations.

The safety rail and harnesses shall be the SAF-T-CLIMB fail prevention system manufactured by North Consumer Products, or 100% compatible and interchangeable with said system. Two harnesses and safety rail guides shall be provided at each lift station. The safety rail and mounting extension rail shall be of fiberglass per part numbers listed in the specifications document.

The ladder shall be installed in correlation with the simplex access hatch drawing and location. The Influent piping entering into the wet well shall not be designed to enter near the ladder where the flow will effect anyone descending the ladder.

A 3/4" stainless steel or aluminum solid material hand hold shall be embedded in the top of the wet well and valve vault covers, per detail, above the ladder. Minimum of 12" wide and must be a minimum of 4" between hand hold and concrete.

Wet wells shall be equipped with **aluminum** hatchways, and appurtenances manufactured by Hydromatic Corp. and be compatible with Hydromatic submersible pumps. The pump hatch shall have provisions for rails etc, and have either single, double or triple openings as number of pumps demand. The access hatch shall be a Hydromatic simplex type, without rail guides. All hatches shall have locking provisions. **The Pump rail system shall be a Pultruded rail system by Hydromatic.**

Hydromatic brand aluminum hatchways shall be designed and sized for the specific model pump that is used. No undersized or too small hatchways will be accepted. Pumps must clear the hatch with accessories attached with ease of maintenance.

3. Pumps
FOR 240V SERVICE

- A. Type-Pumps shall be Hydromatic, three-phase, 240 volts, submersible sewage pumps. All pumps shall be capable of passing a three (3") sphere. Any other voltage shall be approved by the City.

FOR 208V SERVICE

- A1. Type-Pumps shall be Hydromatic, three-phase, 200 volts, submersible sewage pumps. All pumps shall be capable of passing a three (3") sphere. Any other voltage shall be approved by the City.

If three-phase power is not available, then single phase pumps of 240V, shall be installed. If there is three phase power within a reasonable distance, the City shall be consulted to make the final determination as to whether three phase shall still be used at the pump station or whether to use single phase.

- B. Each lift station shall have a minimum of two Hydromatic submersible pumps. (more if design calls for). Each pump shall be capable of pumping at a rate equal to or greater than the peak wastewater inflow rate. The peak in flow rate for residential areas shall be computed as follows:

$$Q \text{ (gpm)} = [(F \times 80) + 50] \times p \times 0.69 \text{ where:}$$

P = tributary population, in thousands

F = peaking factor

$$= (19.5 + P^{1/2}) / (3.5 + P^{1/2})$$

80 = average flow in gallons per person per day

50 = infiltration allowance in gallons per person per day

0.69 = 1000 people/1440 minutes per day.

For commercial and industrial areas, the peak inflow rate shall be determined by the design engineer, subject to review and approval by the Department of Water/Power.

The flow rate of the pump shall be sufficient to maintain a velocity of not less than 2.5 feet per second nor greater than 6.0 feet per second in the force main.

<u>Flow Rate (gpm)</u>	<u>Force Main Size</u>
100-235	6"
220-530	6"
390-940	8"

- C. Controls - The pumps shall be controlled by a solid state level control system correlated with a transducer pickup, probe. Transducer cables are to be long enough to reach the control panel in one piece. No splices will be accepted. No electrical, communication splices or terminations are allowed within the wetwell.

Telemetry and communications equipment will be fabricated and installed by the City, and an amount of (\$ 10,000) will be added to the bid amount for the purchase of this equipment. This amount vary's as the prices of equipment fluctuates. A check from the Contractor to the City will be made for the above amount upon receiving the Notice to Proceed. The Contractor will provide power for this equipment in the manner shown on the enclosed drawings.

- D. One mechanical float ball will be purchased and installed by the Contractor for the purpose of a high wet well alarm. This cable shall be run through the same conduit as the transducer cable, and connected to the RTU as shown on drawing.

Two 3" conduits, & Two 2" Conduits shall be installed from the wet well to the control enclosure; one 3" for installation of each pump power cable, one 2" for the bubbler tube or transducer cable and float ball cable, and one 2" spare. The power cables for the pumps shall be supported by plastic strain reliefs mounted on a piece of stainless steel angle just under the 3" conduit that the power lines enter the wetwell in. (See Detail.) The bubbler tube or transducer cable shall be connected at the control panel as shown on the enclosed drawings. The main control panel shall be a Hydromatic QS Panel (Micro-Controller with remote submersible transducer) for Pump and Motor Controls. In addition to the standard features of the "QS" panel, the controls shall include the following:

- Elapsed time meters - one per pump
 - Time delay lag pump
 - Lead Lag pump selector switch
- Sewage Lift Station Specifications

Section 3 Pumps

Subsection C Controls

Add (2 each) door panel mounted amp-meters, each with its own selector switch to read amps on all phases of both pumps.

Hydromatic part #13620-001-1 50 amp indicator gauges.

- Manual reset heat sensor
- Pump failure. start lag pump
- High water telemetry and high water alarm
- Seal failure alarm lights and contacts for Remote Monitoring
- HOA switch for each pump

All motor starters shall be either Cutler Hammer or Allen Bradley.

All electrical relays and controls shall be " " " "

unless otherwise approved by the City before ordering.

Horsepower of pumps shall determine whether soft starts or VFD's will be required at the lift station. This will be determined by the Technical Services representative and the Engineering consultant and must be taken into consideration at the time of design with the City.

- E. The control panel shall be installed as close as possible to the wet well and shall be enclosed in accordance with subsection 8.A
All conduit entering the wet well shall be sealed with Waterguard Sealant. This can be purchased at an Electrical Supplier.

- F. A 1" minimum size potable water hydrant will be installed near the wet well for washing down the wet wells equipped with NPT threads. This hydrant shall be connected to the nearest potable water line and shall have a backflow preventer attached to it. Check with the City for an approved backflow model.

4. Piping

- A. Within Wet Well - The piping within the wet well shall be Class 50 ductile iron pipe with flange fittings. Individual pipes shall be installed to each pump. A-Lok, Link Seal or other approved water tight gaskets shall be used where the pipes penetrate the walls of

wet well and valve vault. No valves shall be installed on the pipes within the wet well. The ladder providing access to the wet well shall not be located in front of the inlet pipe. Locations of all fixtures and piping entering, leaving, and within the wet well or vaults shall first be discussed with the project manager on the job. See detail for force main clean out. Currently under revision.

- B. Within Valve Vault - Piping within the valve vault shall be Class 50 ductile iron pipe with flanged fittings. The discharge line from each pump shall have a check valve and a plug valve. See detail for valve locations and piping layout.

The check valve shall only be a flanged end, iron body "Mueller Check Valve" with lever and spring operations. It shall be fully bronze mounted with a rubber faced bronze clapper disc accurately seated against a bronze seat ring. The valve shaft shall be stainless steel, mounted in bronze bushings. The bushings shall be sealed with o-rings and held in place in the valve body by cap screws. The check valve shall be the first valve in-line after the pump. **No other brand shall be substituted without City approval.** Cutler Hammer, "Model E50AR1", limit switches, (**no other brand shall be substituted without City approval**), shall be attached to the lever arms of each check valve as a component of the "Pump Fail Alarm." A 1" conduit will be supplied between the valve vault for the alarm wires, separate from the conduit for the lighting wires.

The plug valve shall only be a "DeZurek" Series 100 Eccentric Valve. **No other brand shall be substituted without City approval.** It shall have a lever actuator, be installed with the valve shaft on a horizontal orientation, and be placed in-line after the check valve. The plug valve shall be mounted to close against back flow towards the lift station from the force main. (The normal direction of flow will be opposite the plug valves' orientation.). One wrench shall be supplied to operate the DeZurek valves.

- C. Force Main - The force main shall be Class 50 ductile iron pipe or C900, OR DR - 18 polyvinyl Chloride (pvc) pipe. No pipe smaller than 6"ID shall be used. Ductile iron pipe (including that between the wet well and the valve vault) shall be polyethylene encased unless soil tests indicate that it is not needed. See detail for force main clean out.

If pvc pipe is used, it shall start outside the valve vault. A 12-gauge insulated solid tracing wire shall be installed in the trench along the top of the force main. The tracing wire shall be brought to the surface in water valve boxes, or other approved structures, at both ends of the force main and intervals of not less than 1000 feet. If water valve boxes are used, the lids shall have no words on them. The tracing wire stations shall be in convenient, accessible locations.

The force main shall have a minimum cover depth of 4-1/2 feet. It shall be designed to slope uphill or level from the lift station to the discharge end, if possible. when it is necessary to have a high point on the force main, an Apco Combinations Sewage Air Release Valve, or approved equal, shall be installed at the high point. Other than when the force main leaves the wetwell, there shall be no other elbows allowed. **Should for some reason it would be necessary to make a turn, then 22 1/2 degree elbows must be used with a minimum of 3 feet of pipe between the elbows. The design must first be approved by the City Water Engineers. See Detail**

The force main shall be pressure tested with water to 150 psi or twice the maximum operating pressure whichever is greater. The duration of the test shall be one hour.

There shall be a clean out at each end of the force main as well as a 4 foot manhole every 400 feet with the bottom of the line passing through the manhole a minimum of 24" above the floor and a maximum of 30" above the floor of the manholes. A 36" piece of the pipe shall be removable from the center of the pipe in the manhole and shall be installed with compression type couplings for easy removal so that the lines can be flushed from each manhole. Currently under revision.

- A. Structure - The valve vault shall be a cast-in-place or precast reinforced concrete structure. Other types of preformed structures maybe accepted upon review and approval by the Water/Wastewater Department. The structure shall be designed for traffic loading.
- B. Dimensions - The minimum inside dimensions of the valve vault shall be eight feet long by six feet wide by six feet six inches tall. The vault shall be at least four feet from the wet well. The floor of the vault shall be pitched to the center which shall be 1" lower than all sides. The floor drain shall be installed flush with the center off the floor.
- C. Hardware - The vault access shall be a Hydromatic locking aluminum simplex hatch and frame cast into the top of the vault and have a clear opening of 25"x 30 1/2" of size #4. A # 316 Stainless Steel ladder shall be installed in the vault for access (Per ladder detail). Location of the ladder shall be coordinated with Water Department Project Manager before installing the ladder. A stainless steel or aluminum hand hold 3/4" in diameter shall be installed on the top of the vault for easy access as shown on the wet well detail. All hardware shall be #316 stainless steel. An vapor proof rough duty or fiberglass light shall be provided with the switch located in the control panel enclosure.

The vault shall have a floor drain returning to the wet well, with a 4" flapper type check valve to prevent the escape of gases from the wet well to the valve vault. Two 3/4 inch conduits shall be installed from the vault to the control enclosure; one for power to the light, and one from telemetry to the flow sensor. The vault shall be installed level and checked before backfilling to insure that it remains level. Any vault installed out of level shall be rejected.

6. Generator

- A. Type - An emergency standby generator shall be supplied for each pump station. The generator shall be manufactured by Generac or Onan as approved by the City, be supplied with a residential muffler, the muffler and pipe inside the building shall be insulated with asbestos substitute wet insulation and cover designed to handle the pipe and muffler temperatures. **The Generator shall be covered with plastic while insulating to protect from the fallout of the procedure.** The Generator must be fluid cooled and run on natural gas if available in the area. The generator shall be equipped with an external, magnetic, 115 volt oil pan heater, thermostatically controlled and supplied with a manual off/on switch to disable the heater in warm weather..
- B. Size - The generator shall be four-cycle unit not less than 35 KW, sized for a minimum of double the full load amp usage, and have a 12-volt starting system with a build in battery charger, and have a 3-phase output if three phase pumps are used, otherwise with a single phase output if single phase pumps are used.
- C. Controls - The unit shall have a remote and local selector switch, push button starting for local, relay starting for remote. A dry contact signal shall be installed for starting with a computer. All electrical terminals within the generator shall be coated with "No-Corrode," or equal.

The unit (**NO MATTER WHICH GENERATOR IS SUPPLIED**) shall be supplied with a Generac, automatic transfer switch wired to the power supply, that will automatically activate the generator in the event of a power failure. The automatic transfer switch shall have a phase monitor, three-phase to match the incoming power supply.

The generator shall be supplied with an automatic Deluxe cycling system that can be set to cycle the generator at any given time at intervals from one to seven days.

The unit shall have gauges showing volts, amps, temperature, oil pressure, and fuel level (if other than natural gas powered).

The unit shall be designed to shut down on low oil pressure, overheating, overcrank and loss of rpm sensor.

All pickup points to be monitored on the generator shall be supplied with the generator as listed below in 7 B, under Telemetry.

- D. Enclosure - The generator shall be enclosed in a fiberglass enclosure. The enclosure shall be a sand-brown model 3325 x 98 1/4" high Garrison Equipment Enclosure" manufactured by **Stillman Northern Plastics Corporation only**. The fiberglass enclosure, shall have contractor installed **gravity type** self-closing and self-operating louvers on the discharge end of the generator to exhaust hot air. **The discharge louver shall always face east. The intake louver, shall be installed on the south side**, also must be the **gravity type** and **both louvers** shall have **stainless steel screens of flat expanded metal**, with an opening size that will not allow fingers to be inserted, and shall not be located in front of the control panel. **Contractor shall first consult with the city for review of and be shown exactly how the city wants these louvers installed.** A double access door shall be provided to the building with Penta bolt locking. One door shall have spring loaded latches top and bottom./ All doors shall have provisions for locks. A louvered exhaust fan shall be installed in the wall of the building, a location to be determined by the City. This exhaust fan shall be a Graingers fan # 2C634 (7") or equivalent brand, and shall be controlled by a wall thermostat. This building shall be insulated with 1/2" **blue only** foam board insulation like other City installations. **The building shall also be supplied from the factory with a removable threshold.** A 8" reinforced concrete pad of building width wide by 10 feet long shall be installed in front of the double doors to enable easier removal of the Generator. **Care should be taken when assembling building that no scratches or damage occurs to the fiberglass. Also when installing the insulation board be sure that any writing on the board is facing the wall and not exposed to create an unsightly wall finish. Insulating boards shall be neatly cut and precisely fit at all joints. Bad workmanship will not be accepted and the job will have to be redone.**

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- E. If the building is a framed building, the same type of gravity louvers shall be installed in the building with stainless steel screens as specified above. **The gravity air louvers shall never be installed facing the North, due to prevailing winds. East is preferred.**

A Fire extinguisher of ABC dry type 1016 shall be supplied for both types of buildings.

- F. Mounting Pad - The generator shall be mounted on a reinforced concrete pad with # 4 re-bar every 12" on center both ways not less than eight inches thick and six inches larger on all four sides than the fiberglass enclosure. The concrete shall also be fibermesh filled. **In a framed building the mounting pad shall be 8" thick and 6" larger in all dimensions than the generator with the top of the pad flush with the floor..** The concrete floor shall be level in both directions and shall be a minimum of three inches above the normal ground elevation. A rectangular hole in the concrete floor should be blocked with Styrofoam or formed out when pouring the concrete so that the conduit is not cemented to the floor, should settling occur. See detail.

The opening should be large enough to allow for future conduits to be added at a later date. Note detail on drawings. The above paragraph pertains only to Generators enclosed in a fiberglass enclosure.

- G. Whatever type of building the Generator is located in, the Generator will be mounted on vibration dampeners such as Cork/Rubber type or other approved types. These must be approved by the City.

7. Remote Telemetry

- B. A separate circuit with 15 amp breaker shall be provided for the RTU.

Devices shall be installed and included in the purchase of the Generator, as directed through technical assistance by the City of Loveland, to monitor and transmit to the RTU for following conditions:

1. Power Monitor
2. No. 1 Pump Run
3. No. 1 Pump Fail
4. No. 2 Pump Run
5. No. 2 Pump Fail
6. High Wet Well Alarm
7. Generator Run
8. Generator Fail
9. Generator Low Oil Pressure
10. Generator Low Battery
11. Low Battery - RTU

All monitoring points shall be connected in a relay box located in the control enclosure with dry contracts for signal transmission to the RTU.

8. Site Security

- A. Control Panel/Generator Enclosure and Pad- The control panel, generator, breaker panel, auto-transfer switch, phase converter (if required), relay box and RTU shall be installed in a fiberglass enclosure on top of the ground within 10" of the wet well. The fiberglass enclosure shall be a sand-brown "Garrison Equipment Enclosure" manufactured by Stillman Northern Plastics Corporation, No other enclosure will be acceptable. The fiberglass enclosures shall be securely fastened to a reinforced concrete base six inches larger on all four sides than the enclosure. A silicone rubber seal shall be placed between the enclosure and the pad. The top of the pad shall be level and be a minimum of three inches above normal ground level. The concrete pad shall be at least 8 inches thick of reinforced concrete. All equipment in the enclosure shall be pedestal mounted, with the bottom of panels and equipment at least 36" from the floor, and configured to allow full opening of all cabinets and easy access to the equipment.

One or two fluorescent (City to decide on number and size) light fixtures shall be installed inside the enclosure, located as directed by the City before quoting on the project. A GFI type outlet shall be installed within the enclosure. The switch for the lights in the enclosure and valve vault shall be installed in the enclosure. This enclosure will be first approved by the City before ordering. Once installed the interior walls will be insulated as per City instructions and with a special insulating board with all printing facing the walls for the best cosmetic appearance. The contractor bidding on the job should first consult with the project manager for the City to be shown an enclosure that is in service to find out all the details before bidding. Any woodwork inside the enclosure or building shall be primed and painted with a light grey paint.

A waterproof fixture with a flashing red light shall be mounted on the light pole and connected to the high water float ball alarm system. Also an audible alarm horn (Federal Signal Model # 350-120-30) shall be connected to the same relay and can also be mounted on the light pole. Consult with the City representative before deciding location for these two items. Necessary sections of 240V or 208V baseboard heat (8' feet) and a thermostat will be mounted inside enclosure. A rectangular hole should be blocked out in the pad when pouring the concrete so that the conduits are not cemented to the pad so as to allow the pad and enclosure to be leveled should settling occur at a later date. The opening should be left large enough to allow for future conduit to be added. Note detail on drawings.

- B. Lighting-All stations shall have a fiberglass utility pole with a high pressure sodium 150-275 W bulb controlled by a photoelectric switch. Poles will be installed within 15 feet of the control enclosure and wet well unless approved otherwise by the City. The light fixture shall be at least 20 feet above the ground. All circuit breakers will be Cutler Hammer. A Fiberglass pole will be supplied by the City, paid for by the Contractor, through a purchase order supplied by the contractor. Light must also be able to be controlled with a hand switch that overrides the photoelectric cell. There will be a 3/4" conduit from the Control Enclosure to the pole for the lights, and a 1" conduit from the Control Enclosure to the pole for the radio antenna.
- C Fence-All lift station sites shall have a six-foot security fence with 3-strand barbed wire on top and drive-through gate, unless approved by the Department of Water & Power. The fence materials shall be as follows:
- Fence fabric - 9 gage chain link
 - Barbed wire - 12 gage, 2 point
 - Security wire - 12-1/2 gage
 - Terminal posts - 2-7/8" galvanized
 - Line posts - 1-7/8" galvanized
 - Gate posts - 4" galvanized
 - Top rails - 1-5/8" galvanized

If chain link fence is not acceptable to the developer, then as an option 6 foot Plastic privacy fence will be acceptable. Wood fence is not acceptable.

All posts shall be set in concrete. All posts shall be capped with outriggers or caps and fitted with three strands of barbed wire.

All fittings shall be industrial quality, galvanized fittings. The gate shall be a minimum of 14 feet wide and may be a double-swing or roller type.(City to make the decision and the type of gate). The gate shall also have 3 strands of barbed wire on top. The fence shall be constructed no closer than 20 feet from the generator and control enclosures. If a roller type gate is used, a concrete pad will be installed under the support wheels.

D. Building

Should a Developer require a framed type building for his development, other than the fiberglass one usually required by the City, then drawings must be submitted to the City for approval. An additional sheet of specifications will be supplied by the City for this type of building and must be adhered to.

E. Sign-All lift stations shall have a 12" x 18" sign made of polycarbonate resin with Black lettering on light grey background reading;

**CITY OF LOVELAND
SEWAGE PUMP STATION
Contact: Water & Power Department, at----663-8194-----**(phone number will be supplied by project manager).

The sign shall be securely fastened to the entry gate, or other approved location if a security fence is not installed.

9. Site Work

A. Grading - All lift station sites shall be graded with slopes away from the structures. Adequate capacity shall be provided in ditches and culverts to carry off-site flows around and past the lift station site. The entire area within the security fence shall be surfaced with compacted gravel, asphalt, or concrete.

The generator pad, the control enclosure pad, the top of the wet well and the top of the valve vault shall be at least one foot above the 100-year flood elevation.

B. Orientation - The lift station site shall be configured to allow direct access to the wet well and the valve vault by the City's winch truck. A minimum of 4 feet of clearance shall be provided on all sides of the generator and control enclosure to the fence and all other above grade structures. The structures, pads, enclosures, lids, and fence shall be installed to line and grade so all components are oriented "square" with the site.

- C. Access - A paved access shall be provided to the lift station. The minimum width of the access shall be 20 feet. A pull-thru or turn-around area may be required for sites having long or restricted access. See Detail. All access driveways must first be approved with the Technical Services Superintendent before finalizing.
- D. Landscaping - Site landscaping shall be subject to the review and approval of the City. At lift station sites where a security fence is installed, all landscaping shall be outside the fence.

SAFETY RAILS

All ladders of 15" overall length or longer shall be equipped with a center safety rail and two harnesses. The safety rail for all ladders shall be of fiberglass.

Brand name will be Norton (North) only. This is to conform with existing equipment so that all harnesses and rails are compatible.

Two harnesses shall be supplied for each pump station.

North Consumer Products A Division of Siebe North, Inc. 2664 B. Saturn Street,
Brea, California 92621 (714) 524-1655

Materials:

- One each Saf-T-Lok sleeve P/N 602-100-001 cast manganese bronze sleeve with cadmium plated steel roller bearings.
- Two each Saf-T-Belt P/N 728-200-001, Ansi Class I.
- Required length Saf-T-Notch rail fiberglass P/N 526-104-001, with ladder rung
Oclamps stainless steel 316 P/N 024-105-001.
- One each Saf-T-Pivot dismount section fiberglass model P/N 527-104-001.111

WATER OR SANITARY SEWER PUMP STATION BUILDING SPECIFICATIONS
FRAMED CONTROL BUILDING
Revised 5-10-01

1. Steel insulated Double doors shall be installed to allow removal of the Generator if necessary. One door shall be secured with a spring loaded, chain operated latch top and bottom, the second one shall be equipped with a Schlaege stainless steel commercial keyed entry set keyed alike to City's code supplied with 12 extra keys. This door shall also be equipped with a commercial type stainless steel door closer. All door hardware shall be stainless steel.
2. All clamps used to hold gas lines, conduit, or other items to a wall or other equipment shall be a durable manufactured type clamp e.g. (Uni-Strut). All plumbing must meet City code.
3. "All thread" shall not be used as standoffs or legs to brace or hold pipes in place. A fabricated bracket, approved by the City shall be used for this purpose.
4. The inside walls and ceiling of said building shall be insulated and sheet rocked with water resistant sheet rock conforming to local building code, with joints taped and spackled, and have one primer coat of white paint and two finish coats of semi gloss white to provide good cosmetic appearance. Windows and doors must be trimmed with plastic casings to resist moisture. Bottom of walls along floor shall be finished with vinyl floor/wall molding and cemented and caulked with water proof glues and sealants.
5. Lighting shall be fluorescent, plans for lighting shall be approved by City.
6. Heat will be by natural gas fueled ceiling hung fan equipped unit heater with wall mounted thermostat.
7. A High Pressure sodium 250 watt streetlight shall be attached to a fiberglass pole near the building to light the driveway and building entrance, controlled by a photo cell on the lamp and an isolation switch on the inside near the door. The lamp shall be a minimum of 20 ft above the ground and leave two feet of pole above the lamp for attaching an antenna to. **Location of this light pole must be determined by the City of Loveland water Department Project Manager.** Two standard duplex outlets rated at 20 amps each shall also be installed in conjunction with or near light switches, or if only one light switch then the second outlet to be in the opposite side of the room.
8. Contractor will install a ABC dry type 1016 Fire Extinguisher within the structure, and near the door.
9. Paint manufactures instructions for painting concrete floors will be followed to the letter, such as sandblasting, filling holes or voids, acid cleaning if necessary or whatever other instructions should accompany the coating. **Floor shall be coated with Sherwin Williams or equal Polyurethane floor enamel, light grey.**

10. A thermostatically controlled exhaust fan shall be mounted in the cupalo or ceiling to remove heated air.

11. If this facility houses water pumps, an overhead rail system shall be provided with a trolley and electric hoist rated at 1 ton to be positioned directly over valves and pumps with clearances to enable all pieces of equipment to be hoisted and transported by the hoist system through the doorway and above a truck box. The rail should extend outside the building far enough to back a truck under and unload the equipment.

12. A reinforced 8" concrete driveway 12' wide should extend from the building to the street for vehicle access.

13. A floor drain shall be installed near the pump area to drain off floor water.

14. If this facility houses lift station equipment A deep fiberglass tub on legs with a dual hot and cold hose bib faucet and drain shall be installed in a location designated by the project manager. A 50' high quality rubber hose and wall mounted hose rack shall also be near the tub. A 20 gallon hot water heater shall be installed for the hot water supply. A self draining all weather hose bid shall also be installed on the exterior of the building near the door.

15. An automatically controlled sprinkler system shall be installed for any lawns and shrubbery that is planned for the station.

16. Where sanitary sewer line conditions permit a toilet shall be installed in a corner room 36"x 48" with door & with an exhaust fan/light in the ceiling.

17. All stands, brackets, supports, skids, mounts, exposed conduit, piping, valves, and other miscellaneous related items not mentioned that are not pre-painted from the factory with an enamel finish, shall be primed and painted with an equipment enamel paint, the color of which will be determined by the City of Loveland Project Manager before construction is finished.

18. When all Contractors work is finished, the building shall be cleaned and all equipment checked out before calling the City for an inspection. A pre inspection by the City's Project Manager at least one week in advance of start up would help the contractor wrap up any details that might be questionable and insure that start up, inspection, and acceptance will happen on schedule.

19. Building will not be accepted unless all items are 100% completed and all details are in compliance.

Before finalizing drawings on any part of these specifications, the preliminary drawings should be first approved by the Technical Services Superintendent. " Bruno Lopez 962-3560".

COMMUNICATIONS & TELEMETRY REQUIREMENTS & COSTS

1747L532	SLC 500 PROC 503	847.55	
1747IA16	AC INPUT MODULE	202.16	
1746NIO4I	ANALOG I/O	611.71	
1746A7	7 SLOT EXPANSION RACK	213.00	
1746 P2	RACK MTD. POWER SUPPLY	299.63	
1747M11	EEPROM MEMORY MODULE	187.94	
1746OX8	AC/DC OUTPUT RELAY	169.70	
1747-BA	BATTERY ASSEMBLY	50.00	
1-IC+102	ISLATROL PLUS 2.5A	75.00	
HOFA242410LP	NEMA 12 ENCLOSURE	171.81	
1-HOFA24P24	PANEL	262.70	
4 VAL-MS	120 BE/FM @ \$41.00 EACH	164.00	
4 VAL-MS	120 ST @ \$82.65	330.60	
2-005G	IC-PRESS. TRANSDUCER @ \$53.00	106.00	
1-MCR-UI/UI-DCI	DC-DC CONVERTER	274.56	
1-RMA-3-SSV	ROTAMETER	21.00	
1-_____	AIR COMPRESSOR TANK	100.00	1FFZ838
	AIRLINE REGULATORS	17.35	
2-6Z836	AIR COMPR. 1/4 HP @ 257.63	515.26	
	PHOENIX TERMINAL BLOCKS	30.00	
1-1CM62-PS120AC/24DC/	PWR.SUPPLY	117.04	
1-CM62-PS1120AC/5DC/1	PWR.SUPPLY	107.71	
1-113488	PHONE	219.00	
1-317635	INTERFACE ADAPTER	226.00	
1-394809	ANTENNA MINI UHF	23.95	
1-	MARKET CONCESSION	75.00	
1-	MODEM		125.00
1-420VA	DELTEC UPS	100.00	
APCL400	DIGITAL READOUT	172.00	
1-49-434	EMERGENCY DIALER	79.00	
2-193-C1H1	SMP3 SMART MTR. PROTECTION @253.65	507.30	
1-1203-GK5	INTERFACE MODULE	315.50	
1-MDS 2310	Radio	922.00	
1-Scala TY-900	Yogi Antenna	188.00	
1-Polyphaser	surge protection	68.00	
300 ft	Antenna Cable	140.00	
1-Power Rite	UPS Backup power	135.00	
Labor	Panel Assembly- labor & Installation	2000.00	
	Total	<u>\$10,170.00</u>	