

TOWN OF CHANDLER UTILITIES

Addendum #1

To the

Sanitary Sewer Design and Construction Standards

Specifications and Details

Adopted November 20, 2017

Adding

**Low Pressure Sewer Systems
Specification and Details**

January 2023

Prepared by:
Beam, Longest & Neff, LLC.

Purpose

This Addendum establishes the minimum standards and design criteria for low pressure sanitary sewer systems using packaged grinder pump stations and appurtenances. Low pressure sewer systems will be considered by the Chandler Utilities for septic system elimination, or in areas where traditional gravity sewers are not feasible. Low pressure sewer systems must be specifically approved by the Town for new development and will not be allowed in areas where traditional gravity sewers can be installed. All variances from these design standards must be approved prior to commencement of design.

This Chapter covers the following topics:

- Low Pressure Sewer System Study
- Responsibility
- Design and Layout
- Maximum Connections to Grinder Pump Stations
- Grinder Pump Type
- Grinder Pump Equipment

Low-Pressure Sewer System Study

The applicant shall prepare a Low-Pressure Sewer System Study prior to commencement of any design. The purpose of the study will be to demonstrate to the Utility that a low-pressure system is warranted, traditional gravity sewers are not feasible or will be cost prohibitive.

Responsibility

Chandler Utilities will be responsible for the operation and maintenance of the common force main, i.e. the main line low pressure force main, the property owner is responsible for the building sewer beginning at the saddle/curb stop at the common gravity or force main. Chandler Utilities will provide the saddle and curb stop at the common gravity or force main.

The property owner shall be responsible for installation, operation, and maintenance of all piping, pumping equipment, and appurtenances.

Refer to the Low Pressure Sanitary Detail drawing for a plan and profile view of the components and configuration.

Design and Layout

Due to the variability of each site, the design of low-pressure sewer systems shall rely on sound engineering judgment and manufacturer's recommendations. Chandler Utilities may, if justified, make any requirement deemed necessary to assure the system performs as intended.

The minimum requirements for the design and layout of low-pressure sewer systems shall be per the most recent version of the Standard Detail Sheets, the manufacturer's recommendations, and as follows:

Pipe Size

Pipe size for the common force main shall be per the design engineer's recommendations. Minimum size of the grinder pump station discharge force main shall be one and one-quarter (1 ¼) inches. All common force mains shall be designed to achieve a minimum cleansing velocity of two (2) feet per second, at least once per day; and without any "loops" or parallel pumping segments in the system.

Cleanouts

Cleanouts shall be located per pump manufacturer's recommendations but at a minimum at the following locations:

At the terminal end of each common force main; and
Where two or more force mains are connected.

Air Release Valves

Air release valves shall be installed at the following locations:

All high points in the force main; and
At intervals of 2,000 feet on all horizontal runs lacking a clearly defined high point.

Building Sewer Connection

Refer to Low Pressure Sanitary Sewer standard drawing.

The developer, property owner, and/or engineer shall provide to Chandler Utilities information on proposed pump system and force main alignment. Chandler Utilities will approve all grinder pump stations before commencing construction.

All building sewer connections shall have two check valves on the discharge force main line from the grinder pump. One check valve can be located inside the wet well.

The installer and/or property owner shall contact Chandler Utilities at time of grinder pump station and force main connection for waste discharge.

Installation will be inspected by Chandler Utilities.

Maximum Connections to Grinder Pump Stations

No more than one building will be permitted to connect to a grinder pump station.

Common grinder pump stations for one building with multiple residential units are also prohibited, except for the following:

Condominiums or townhomes where different floors have different owners (only one building per grinder pump station), provided that each building is on a single water meter. Otherwise, each unit with an individual water meter will be on a separate water grinder station.

The intent is to have individual residential units be served by individual grinder pump stations.

Commercial/Industrial facilities will be handled on a case-by-case basis.

Grinder Pump Type

To assure all the grinder pump stations are compatible, all units serving the same low pressure sewer system shall be the same make and model number, and have the same pump performance characteristics, unless justified.

Replacement units shall be the same make and model as was originally approved by Chandler Utilities.

The type of grinder pumps and allowable applications are as follows:
Positive Displacement Pumps

Semi-Positive Displacement Pumps
Centrifugal Pumps

Grinder Pump Station Equipment

Simplex or duplex grinder pumps may be used for single dwelling units. For uses other than single dwelling units, the Engineer shall determine which is appropriate.

General equipment requirements are as follows:

Grinder Pump Station

The grinder pump stations shall be a complete package consisting of all equipment and appurtenances required for a fully operable pumping system. Pump, wet well, level controls, starter, alarm, piping, fittings, valves, and all accessories shall be part of a factory fabricated package so that after burying the wet well, the field connection of the gravity lateral, discharge line and electrical service line to the control box will complete the installation.

Manufacturer

Each grinder pump station shall be manufactured and assembled by a single manufacturer.

Pumps

The pumps shall be capable of macerating all materials in normal domestic and commercial wastewater, including reasonable amounts of foreign objects such as wood, plastic, glass, rubber, and the like to a fine slurry that will pass freely through the pump and 1 ¼-inch discharge pipe.

The following pumps are pre-approved by Chandler Utilities:

1. Model VR2 as manufactured by Myers;
2. Model HVR200 as manufactured by Hydromatic;
3. Model LSG200 Omnivore as manufactured by Liberty Pump;
4. Model 810/815 as manufactured by Zoeller Pump Company, or approved equal.

Electrical Motor and Level Controls

Electrical and level controls shall be provided by the pump manufacturer. All controls shall be mounted so they can be cleaned or replaced without disturbing the pump or piping.

Control Panels

The control panels and all associated components on each standard unit shall be U.L. Approved and installed per manufacturer's recommendations. All equipment associated with each unit shall meet the current requirements of all applicable Federal, State, and Local electrical codes.

Generator Connection

The grinder pump station shall be equipped with a generator connection.

The Engineer and manufacturer are responsible for assuring the equipment is designed properly and will operate in a safe manner.

**SECTION 11321
RESIDENTIAL/COMMERCIAL GRINDER PUMP STATIONS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes premanufactured fiberglass reinforced polyester (FRP) or high-density polyethylene (HDPE) grinder pump station structures with simplex grinder pumps and equipment, including:
1. Wet wells and valve vaults.
 2. Pumps.
 3. Guide rails and pump removal components.
 4. Valves.
 5. Pump control system.
 6. Hatches.
 7. Control panel.
- B. Related sections include the following:
1. Section 01700 – Execution for construction layout, field engineering and surveying, and maintenance of utility services.
 2. Section 02080 – Piped Utilities–Basic Materials and Methods for sealing of structure penetrations, pipe supports, bonding, and other general piping requirements.
 3. Section 02240 – Dewatering for dewatering requirements.
 4. Section 02260 – Excavation Support and Protection for excavation support and protection requirements.
 5. Section 02300 – Earthwork for excavating, trenching, bedding and backfill, and pipe identification material.
 6. Section 02530 -- Gravity Sanitary Sewerage for connecting gravity sewer pipes.
 7. Section 02545 -- Sewer Force Mains for connecting sewer force mains.
 8. Section 02410 - Horizontal Directional Drilling Piping Installation
 9. Section 02700 – Bases and Pavements for site drives.

10. Section 02821 – Chain Link Fences and Gates for site fencing.
11. Section 09900 – Painting for coating of exposed piping.
12. Division 16 for electrical requirements.

C. Related regulations include the following:

1. 327 IAC 3-6-9 for separation requirements with water mains and wells.

1.2 DEFINITIONS

- A. AFBMA – Anti-Friction Bearing Manufacturers Association
- B. NEC – National Electric Code
- C. FM – Factory Mutual
- D. ANSI - American National Standards Institute.
- E. ASTM - American Society for Testing & Materials.
- F. HI - Hydraulic Institute.
- G. NEMA - National Electric Manufacturer's Association
- H. NFPA – National Fire Protection Association
- I. UL – Underwriters Laboratories
- J. ASTM D883 - Standard Terminology Relating to Plastics

1.3 SYSTEM REQUIREMENTS

A. Design Requirements

1. Submersible grinder pumps shall be capable of meeting the following design criteria:
 - a. Number of Pumps: 1 Pump
 - b. Pump Type: Semi-Positive Displacement or Centrifugal
 - c. Primary Design Flow: TBD
 - d. Primary Design Head: TBD
 - e. Minimum Operating Point: 8 gpm @ 100' TDH
 - f. Motor Horsepower: 1 HP Minimum
 - g. Motor Speed: 1,750 RPM
 - h. Electrical: 230 Volt, 1 phase, 60 Hz
 - i. Pumped Material: Raw Sewage

1.4 SUBMITTALS

A. Action Submittals

1. Product List
 - a. Premanufactured lift station and components.
 - b. Recommended spare parts list.
2. Product Data
 - a. Manufactured control system products.
 - b. Pumps and motors, including:
 - 1) Size, type, design, and model.
 - 2) Performance characteristics.
 - 3) Materials of construction.
 - c. Guide rails and pump removal system components.
 - d. Valves.
 - e. Hatches.
3. Shop Drawings
 - a. Wet well and valve vault construction, including:
 - 1) Dimensioned drawings of components, including details of reinforcing.
 - b. Dimensioned piping, structure, equipment mounting, and valve layouts.
 - c. Electrical control panels, including:
 - 1) Power supply line drawings.
 - 2) Manufacturer's literature on incorporated components.
 - 3) Control schematics.
 - 4) Control panel layout.
 - 5) Bill of materials.

B. Informational Submittals

1. UL certification for control panel.
2. Manufacturers' Instructions
3. Product Warranties

C. Project Record Documents

1. Product Data
2. Shop Drawings
3. Manufacturer's operations and maintenance literature
4. Record Drawings

1.5 QUALITY ASSURANCE

A. Qualifications

1. Pumps shall be manufactured and tested in accordance with the applicable requirements of the Hydraulic Institute and ASTM/ANSI standards.
2. All pump and control equipment shall be an integral package supplied by a single manufacturer/representative to provide undivided responsibility.
3. Pump manufacturer shall have a local certified repair company capable of providing on-site emergency service within 24-hours of notice.
4. Valves
 - a. Valves, gear actuators, and motor operators shall comply with AWWA standards.
 - 1) Where no AWWA standard exists, comply with ASTM standards.
5. Control System
 - a. Panel shall certified by Underwriters Laboratories (UL) as being a UL 508 and UL 698A listed systems panel manufacturer certified to install a serialized label for quality control and insurance liability considerations.
 - b. Use only components readily available locally or through national mail-order electrical suppliers.

B. Regulatory Requirements

1. Motors and electrical controls shall meet all applicable requirements of the National Electrical Code and state and local regulations.
2. Comply with requirements of utility company providing wastewater service.
3. Comply with standards of authorities having jurisdiction for sewer-service piping, including materials, installation, and testing.
4. Comply with requirements of IDEM and EPA regarding wastewater facilities and service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection

1. Environmentally sensitive electrical equipment such as motor starters and controls shall be protected against injury or corrosion due to environmental conditions or physical damage by storing under roof in a structure properly heated in cool weather and ventilated in hot weather. Control humidity in the storage at no more than 50 percent relative.
2. Contractor shall not store submersible pump units in the wet well.

3. All openings shall be capped with dustproof closures and all edges sealed or taped to provide a dust-tight closure.
4. Structures
 - a. Protect units from dirt and damage during transportation and handling.
 - b. Do not place units in positions which will cause overstress, warp, or twist.
 - c. Store units off the ground.
 - d. Place stored units so that identification marks are discernable.

1.7 PROJECT CONDITIONS

- A. Climatic Conditions: All components exposed to weather must be constructed of material that is resistant to corrosion and will not require surface protection throughout its expected life. In general, these materials are stainless steel, aluminum, Krydon, fiberglass reinforced polyester (FRP), high density polyethylene (HDPE), and ultraviolet stabilized PVC.
- B. Hazardous Locations: Pumps, electrical systems, and controls in the wet well shall meet NEC Class 1, Division 1, Group C & D requirements. Electrical systems and controls in the pump control panels shall meet NEC Class 1, Division 2, Group C & D requirements. Rail packages shall be of the non-sparking configuration.
- C. Interruption of Existing Sewer Service: Do not interrupt sewer service from facilities occupied by Owner or others or sewer flow through the sewer system unless permitted under the following conditions and then only after arranging to provide temporary sewer service according to requirements indicated:
 1. Notify property owner, Engineer, and Owner no fewer than two (2) days in advance of proposed interruption of service.
 2. Do not proceed with interruption of sewer service without Owner's written permission.
 3. Comply with requirements of utility owner in providing temporary sewer service.

1.8 SCHEDULING

- A. Ensure completion and acceptance of downstream facilities prior to testing and commissioning.

PART 2 - PRODUCTS

2.1 PUMPS

A. General

1. Pump shall be of the positive displacement type or centrifugal type with an integrally built-in grinder unit and submersible-type motor. The grinder unit shall be capable of macerating normal domestic and commercial sewage.

B. Design Basis Product

1. PRE

2.2 INTEGRAL CONTROL PANEL

- A. The control panel shall be a NEMA 4X type enclosure. The enclosure shall be of one piece construction with smooth, rounded corners, smooth exterior and interior, and shall be provided with weather hoods.
- B. Standard features include lockable latches, subdoor, raised back panel, flashing red alarm light, electronic horn, and “touch-to-silence” pad in a NEMA 4X enclosure.
- C. A circuit breaker with overload protection and manual reset shall be provided for each pump. A separate circuit breaker shall be supplied for power to the control circuit. The control panel shall include a voltage transformer to reduce supply to 24 volt, single (1) phase to be used for the float circuit and associated relays. A terminal strip shall be provided to make field connections of pump power leads, and float switches.
- D. The control panel shall have a high water alarm built-in the main enclosure. The high water alarm shall consist of a flashing alarm light with red plastic cover or red glass globe with metal guard mounted on top of the enclosure such that it is visible from all directions. A push to test light button shall be mounted inside the enclosure.
- E. All internal wiring shall be neat and color coded. Each wire shall be a different color or stripe (except for ground), and all incoming wires shall terminate into a terminal block (except incoming power).
- F. A schematic diagram (showing wire color) shall be permanently fastened to the inside of the enclosure.
- G. Intrinsically Safe Relays (ISRs) shall be used at all locations necessary to meet IEC and local requirements. ISRs shall be UL and FM approved and designed to interface devices in hazardous locations with equipment in non-hazardous locations. The ISR shall operate from 120VAC and accept a minimum of two (2) inputs from a hazardous area.

- H. A minimum four (4) inch PVC schedule 40 wall conduit shall be provided from the wet well basin to the control panel which will allow the pump power cables, sensor cables and float switch cables to be pulled through without difficulty and allow the use of one (1) piece cables from the pumps and float switches to the control panel. The conduit shall be sealed at the control panel to avoid entrance of sewer gases into the control panel.

2.3 LEVEL CONTROL SENSORS

- A. Float Switches
 - 1. Control of pump on, off, and alarm levels shall be by float switches.
 - 2. Switches shall consist of a mercury tube switch sealed in a corrosion-resistant polypropylene housing with a minimum of 18 gauge, 2 wire, SJOW/A jacketed cable.
 - 3. Float switches shall be suspended from the bracket so that adjustment or replacement may be done without the use of any tools.
- B. Cable shall be of sufficient length to reach the control panel with no splices.
- C. Level controls shall be UL/CSA listed.

2.4 STATION PIPING

- A. Piping within the lift station shall be stainless steel, PVC or flexible hose rated for the maximum design output of the pump.

2.5 VALVES

- A. Shut-off valves shall be NRS brass full port gate valves.
- B. Check valves shall be swing checks of the rubber flapper type recommended by the manufacturer for wastewater applications.
 - 1. Flapper shall be Buna-N.

2.6 POWER SUPPLY AND DISTRIBUTION

- A. Provide underground power supply from house power meter according to the NEC.
- B. Provide mounting panels for power supply and control panels as shown on Drawings.
- C. Provide disconnects, grounds, conduit, fuse and breaker boxes, wiring, and other electrical power distribution components as required by electrical codes.

PART 3 - EXECUTION

3.1 WET WELL AND VALVE VAULT INSTALLATION

- A. Granular material shall be placed and graded to be flat and level in the bottom of the excavation prior to tank installation. Material type and depth shall be according to manufacturer's instructions, but depth shall not be less than 6".
- B. Place the wet well on a concrete pad and fill with grout covering the entire steel anti-floatation flange. The amount of grout shall be sufficient to prevent floatation of the wet well based on the jobsite conditions.

3.2 POWER SUPPLY

- A. Coordinate with local power company to provide necessary power to the site if power supply must be upgraded.
- B. Coordinate with Owner and power company for location of power lines.
- C. Provide required power from electric meter to all electrical components and systems.

3.3 PUMP INSTALLATION

- A. All pumps and pumping equipment shall be installed per the manufacturer's recommendations.
- B. During pump installation, the open power cable ends are to be suspended above the maximum flood elevation or maximum expected water level. If not installed in this manner, replace the pump motors and cables with new units to ensure that water has not penetrated the cable and entered the motor housing.
- C. Pumps will be tested after installation using clean water. Tests shall include:
 - 1. Pumping draw-down test to confirm pump output meets or exceeds design.
 - 2. Test controls for proper function.
 - 3. Amp test to confirm power draw within equipment limits.

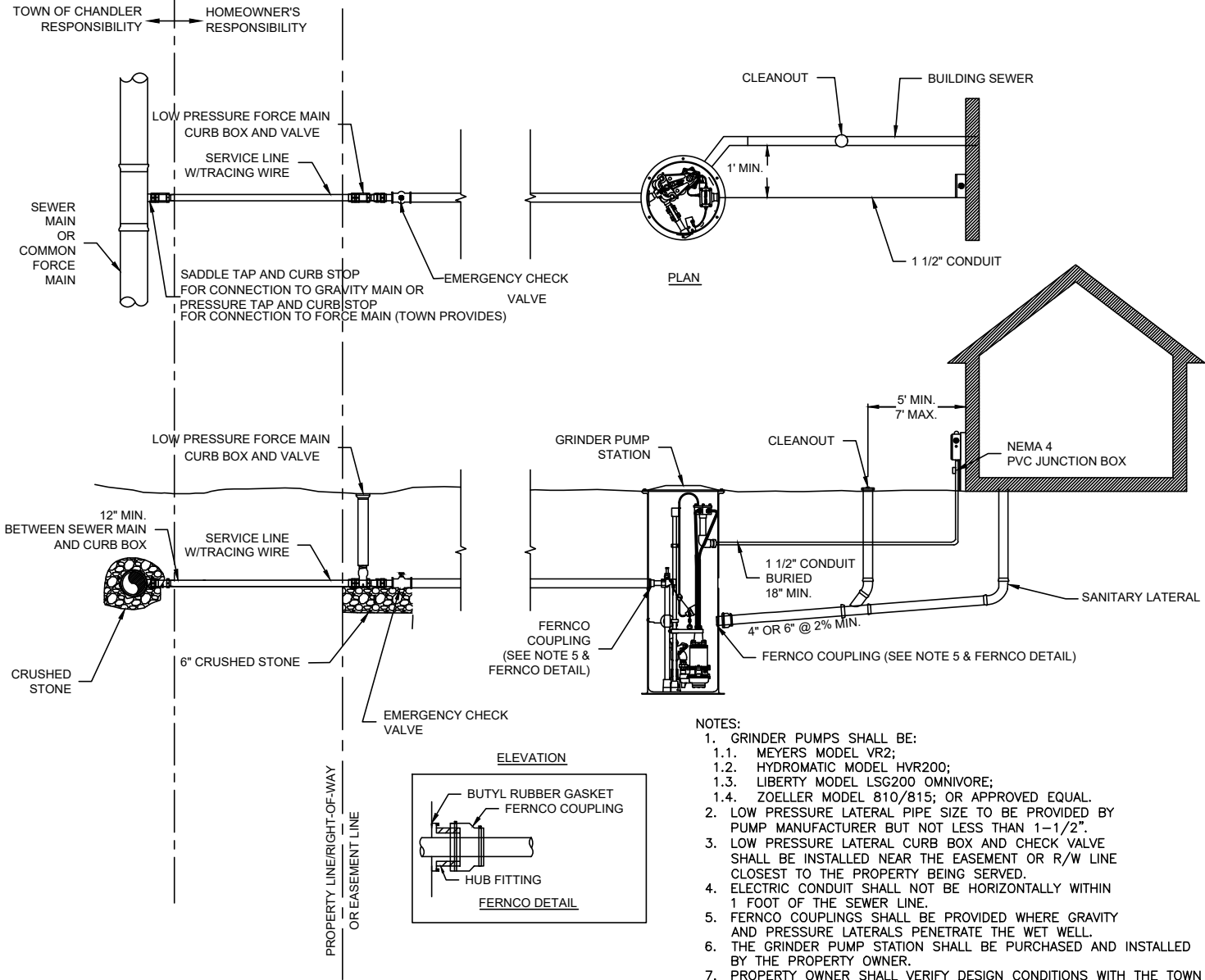
3.4 CONTROLS AND POWER DISTRIBUTION

- A. Control wiring and pump power wiring shall be installed in separate conduits from the wetwell to the control panel. Seal conduits watertight on both ends.
- B. Control panel shall be mounted at the location agreed to with property owner.

3.5 FIELD PAINTING

- A. Shop coats of paint or other protective coatings damaged in transit or during construction shall be touched up in the field with paint products provided by manufacturer.
- B. Colors of paint shall match existing.

END OF SECTION 1132



NOTES:

1. GRINDER PUMPS SHALL BE:
 - 1.1. MEYERS MODEL VR2;
 - 1.2. HYDROMATIC MODEL HVR200;
 - 1.3. LIBERTY MODEL LSG200 OMNIVORE;
 - 1.4. ZOELLER MODEL 810/815; OR APPROVED EQUAL.
2. LOW PRESSURE LATERAL PIPE SIZE TO BE PROVIDED BY PUMP MANUFACTURER BUT NOT LESS THAN 1-1/2".
3. LOW PRESSURE LATERAL CURB BOX AND CHECK VALVE SHALL BE INSTALLED NEAR THE EASEMENT OR R/W LINE CLOSEST TO THE PROPERTY BEING SERVED.
4. ELECTRIC CONDUIT SHALL NOT BE HORIZONTALLY WITHIN 1 FOOT OF THE SEWER LINE.
5. FERNCO COUPLINGS SHALL BE PROVIDED WHERE GRAVITY AND PRESSURE LATERALS PENETRATE THE WET WELL.
6. THE GRINDER PUMP STATION SHALL BE PURCHASED AND INSTALLED BY THE PROPERTY OWNER.
7. PROPERTY OWNER SHALL VERIFY DESIGN CONDITIONS WITH THE TOWN PRIOR TO PURCHASE OF THE GRINDER STATION.
8. PROPERTY OWNER IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE GRINDER STATION AND LATERAL(S) TO THE CONNECTION POINT WITH THE TOWN'S FORCE MAIN.

EXHIBIT:	
SCALE:	
DATE:	

TOWN OF CHANDLER
LOW PRESSURE
SANITARY DETAIL

