

- 1.0 General**
- 1.01 This specification covers the sodium carbonate (soda ash) feed systems for pH control and chlorine solution feed system for disinfection.
- 2.0 Products**
- 2.01 Chemical feed system storage tanks shall be of polyethylene construction and shall have the storage capacity indicated on the drawings. The tanks shall be equipped with a removable, but rigid, heavy duty, polyethylene cover. The cover for the soda ash system shall also have a covering for a mixer shaft. Tank wall thickness shall be a minimum of 5/16 inch for 15-gallon tanks, 3/32 inch for 30 and 55 gallon tanks, and 5/16 inch for 50 gallon tanks and larger. Tanks shall be NSF approved or FDA certified for food grade service.
- 2.02 Chemical feed pumps - One (1) chemical feed pump shall be furnished for each chemical feed system. Either Milton Roy LMI, Pulsatone or equal may be used. The pumps shall be of the series, model and capacity shown on the drawing or equal. Pumps shall be fitted with PVC or PVDF pump head, ceramic balls (check valve) and fittings. Seals and O-rings shall be Viton or other suitable material for soda ash or chlorine solutions. Each chemical feed pump shall be equipped with a four (4) function valve for pressure relief, control of back pressure, anti-siphon, discharge drain and aid in priming the pump on the discharge side of the metering pump.
- 2.03 Mixers - A mixer shall be provided for the soda ash solution feed system indicated on the drawings. The mixer shall be a single, side-mounted mixer with a totally enclosed motor. Motor speed, impeller size and shaft length shall be as shown on the drawing or larger if recommended by the manufacturer to provide adequate mixing of the specified solution throughout the specified tank size. Shaft and impeller shall be of stainless steel or PVC coated steel construction. Mixer shall be furnished with an adjustable 24-hour timer capable of controlling the operating time in fifteen (15) intervals to vary length and frequency of mixer operation.
- 2.04 Calibration Chambers - A 200 ml calibration chamber shall be provided for each chemical feed system. The calibration chambers shall be sized for the chemical feed pumps specified for each system. The chamber of standard dimensions shall be constructed of PVC and graduated in milliliters. Each calibration chamber shall be securely (wall) mounted with a shut-off valve.
- 2.05 Chemical feed suction and discharge tubing shall be clear polyethylene flexible tubing of the diameter indicated on the drawing. Tubing shall be NSF approved or FDA food grade.
- 2.06 Appurtenances - All appurtenances included in each chemical feed system, including ball valves, check valves, ballhead connections, fittings, etc. shall be constructed of corrosion resistant materials.

SITE
SCALE: 1" = 100'

- 2.07 Chemicals**
- A. Sodium Carbonate (soda ash) - The soda ash shall be certified by NSF 60 standards. Solution percentages and chemical feed rates shall be as specified on the drawings.
- B. Chlorine Solutions - Solution percentages and chemical feed rates for "chlorox" solutions shall be as specified on the drawings. All products used shall be certified by NSF 60 standards. Sodium hypochlorite solutions may be used in lieu of the 5% chlorine solutions noted. (NIC)
- 2.08 Laboratory Test Equipment**
- A. Portable pH Meter - The portable pH meter shall be a temperature compensated, combination pH electrode for pH and temperature. The unit shall include 4.0 and 7.0 buffers, three plastic beakers, a replaceable nine-volt battery. A durable hard plastic carrying case shall be furnished with the unit, capable of housing the entire unit including beakers and solutions. The meter shall be Model No. 51700-11 as manufactured by Hicon Company or equal with conventional pH/temperature electrode.
- B. Chlorine Residual Test Kit - The chlorine test kit shall be a digital chlorine analyzer, Model 46700-00 as manufactured by Hach Company or equal. The chlorine analyzer shall be a single wave length, direct-reading colorimeter type instrument. The unit shall have a range of 0 to 4.0 PPM of free and total chlorine and a three-digit LCD readout. Readout stability shall be battery operated with a field replaceable nine-volt battery. (NIC)
- 3.0 Execution**
- 3.01 Each chemical feed system shall be provided with a storage tank, a chemical metering pump, a mixer (as indicated on the drawings), a calibration chamber, a flow indicator, a four (4) function discharge valve, tubing and all other appurtenances and connections necessary to provide a complete workable chemical feed system.
- 3.02 The chlorine solution pump for metering disinfection solutions shall be mounted on a shelf on the wall above the chemical storage tank and the soda ash solution pump shall be mounted on a shelf bracket on the floor below the soda ash solution tank. Mixers shall be bracket mounted in accordance with manufacturer's recommendations based on individual tank size.
- 3.03 The system shall be installed at the locations shown on the drawing.
- 3.04 A chemical feed equipment shall be installed in accordance with manufacturer's instructions and the drawings.
- 3.05 The appropriate test kit for each chemical feed system shall be included in the project.

Contact Time for Disinfection

Thirty (30) minutes of contact time is required for disinfection of public water supplies. While disinfection is not required at this time, the solution feed system of chlorinated sodium for disinfection of the water supply is shown on this set of Contract Drawings.

At the well output rate of 55.5 gpm, approximately ten (10) minutes of contact time is provided in the 1000 LF of three (3) inch diameter water line between the well house and the 55,000 gallon storage tank. Additional chlorine contact time in the storage tank cannot be verified because of the possibility of short circuiting in the tank. When the installation of the disinfection system is required at this facility, the thirty (30) minute contact time must then be achieved.

Thirty (30) minutes of contact time can be achieved by implementing either of two (2) alternatives. First, the inlet line into the storage tank can be raised to an elevation slightly less than the present tank overflow elevation to maximize storage time in the tank and promote turnover of the water stored in the tank. The installation of the fill line would add as much as five (5) to six (6) additional days of contact time in the tank, more than enough to provide the minimum required contact time. An alternate means of providing chlorine contact time for disinfection would be to install a specified length of large diameter pipe in a serpentine manner on the well house site, augmenting the contact time in the tank feed line, to provide the total amount of retention time needed for disinfection. See Chart.

On-Site Storage Pipe for Disinfection

Line Size	Length of Pipe Required
12"	198 LF
14"	144 LF
18"	90 LF

It is recommended that the storage tank inlet line should be extended or raised in the tank to near overflow elevation when the storage tank is taken off-line for maintenance, or site disinfection going added, whenever disinfection of water is required, whenever occurs first. Final design for either alternative will be required before the selected alternative is implemented.

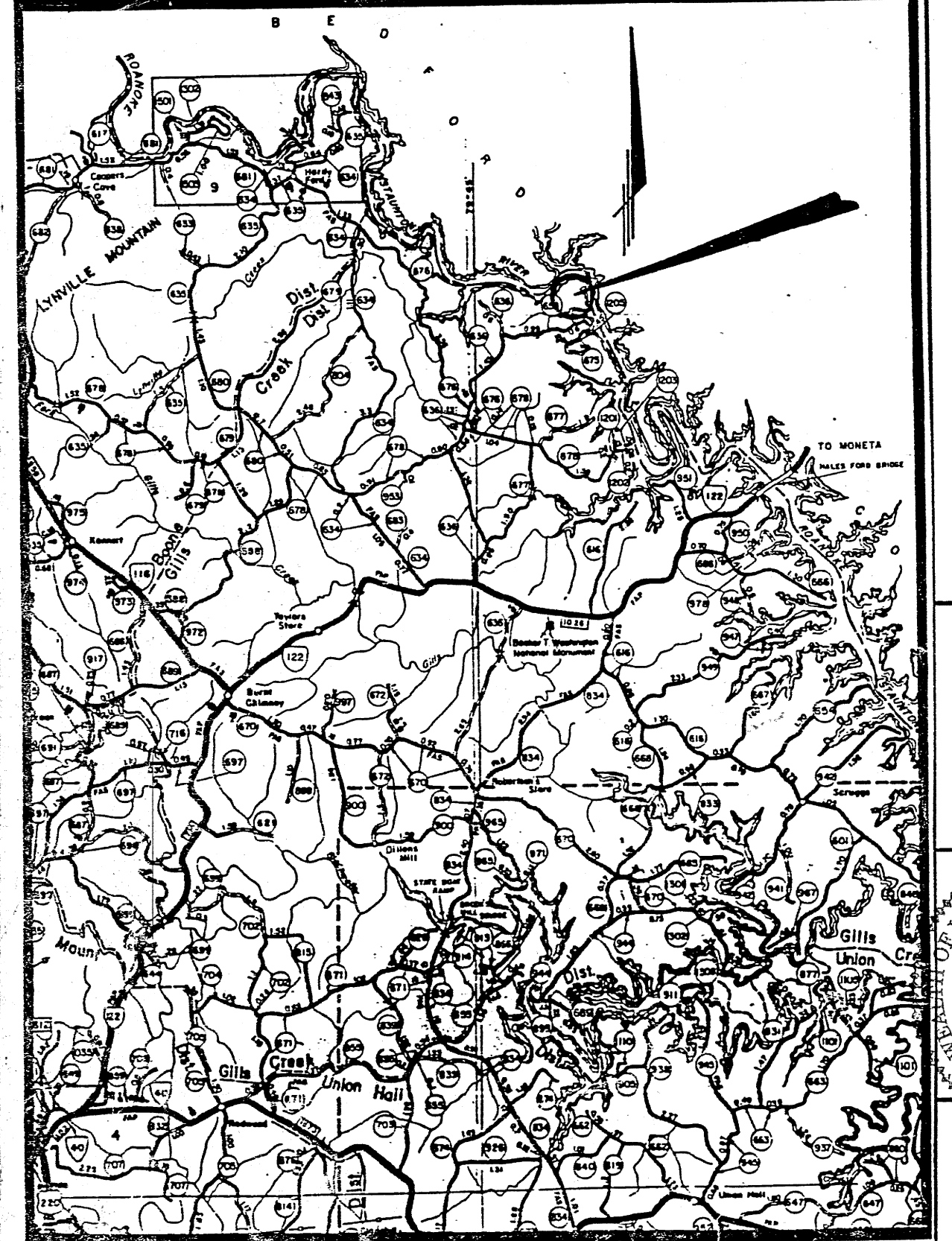
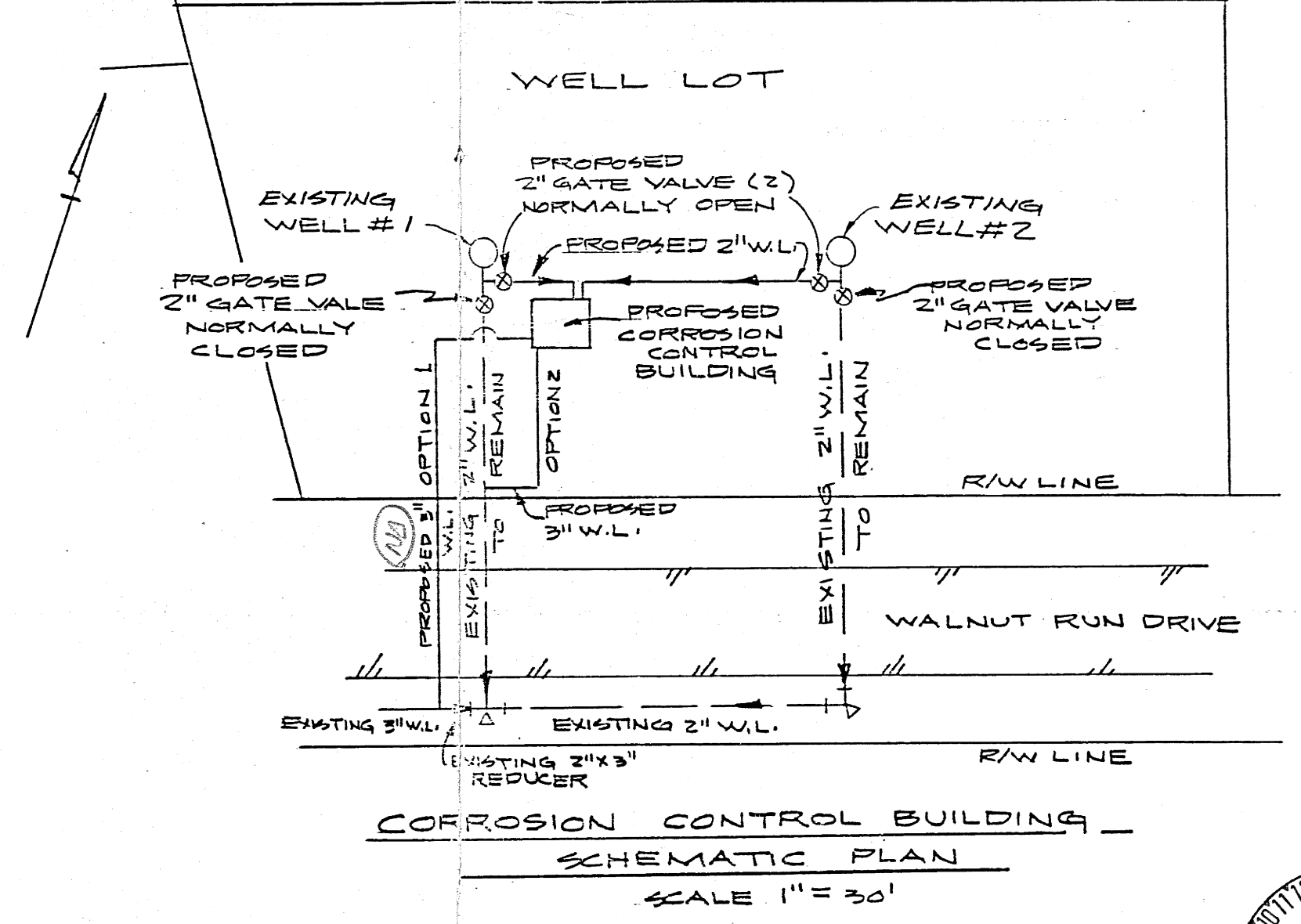
**Walnut Run Subdivision
Water Distribution System
Corrosion Control and Disinfection System**

Chemical Feed System Component	Corrosion Control System pH Control / Soda Ash Solutions	Disinfection System Chlorine Solutions for Disinfection
1. Solution Metering Pump	Milton Roy LMI, Series M Model No. M151-225 Operating Voltage: 115V Materials: Pump Head: PVC Seals / Check Seats / O-rings: Ceramic / Polypropylene	Milton Roy LMI - Series A A151-2251 115V PVC/PVDF Ceramic Polypropylene
Alternate Pump Selection	Pulsatone Series M - Model L12	Pulsatone Series E-Plus - LPD4SATC1-520
2. Operating Pressure	110 psi	110 psi
3. Discharge Control Valve	Four (4) function valve for anti-siphon and back pressure control, pressure relief, priming and discharge drain.	Four (4) function valve for anti-siphon and back pressure control, pressure relief, priming and discharge drain.
4. Inletor	Not required; use in-line static mixer as shown.	Not required; use in-line static mixer as shown.
5. Solution Tank Size	50 gallon tank and stand with top support ring and bracket for mixer with heavy duty 1/2" x 1/2" mixer opening.	35 gallon, tapered polyethylene tank; graduated with fill.
6. Solution Tank Mixer	1/2" hp, 115V, pre-wired mixer with 36" stainless steel shaft, totally enclosed motor.	None
7. Mixer Control	24-hr timer with 15 minute on/off interval; plug into 120 volt outlet.	N/A
8. Flow Indicator	Solution metering pump sized with 1/2" tubing; use 1/2" flow indicator with streamers, Pulsatone P/N 5200-000508 or equal.	1/2" x 3/8" acrylic body flow indicator; Pulsatone P/N U7012209 or LMI flow indicator #25414
9. Calibration Column	200 ml x 1/2" PVC column calibrated with shut-off valve.	200 ml x 3/8" with shut-off valve.
10. Solution Tubing	1/2" suction and discharge tubing.	3/8" suction and discharge tubing.
11. Solution Systems	Soda Ash Chemical basis: 17.5% @ 59°F Feed Rate: gpm: 0.04137 gpm gph: 2.48 gph ml/min: 156.8 ml/min Usage, GPD of solution: average: 3.69 gpd max: 6.05 gpd Solution Pump Settings: stroke rate: 30% stroke length: 25% w/ Milton Roy Pump 35% w/ Pulsatone Pump	5.25% chlorine (Chlorox) 1% 4 mgd feed rate 0.0047 gpm 0.283 gph 17.8 ml/min 2.6 gpd (50% chl. of water) (NIC) 3.3 gpd (50% chl. of water) (NIC)

Note: 1. Set chemical feed pump stroke length and rate adjustment controls to face interior of room for ease of operation and maintenance.

SPECIFICATIONS

- Water Meters**
- Both Well No. 1 and 2 shall be provided with 1 1/2" positive displacement water meters, reading in galleys.
- Static Mixer**
- One (1) - three (3) inch diameter in-line static mixer with dual injection points shall be provided on the combined well output line where indicated. The static mixer shall be rated for sixty (60) gpm with minimum head loss. Use Atlantic Screen Static Mixer # AIM 1015-3 or equal.
- Eye-Wash**
- One (1) swing, eye wash system with push handle shall be wall mounted where indicated. Unit shall meet ANSI Compliance criteria. Use Bradley Model S19-270B or equal.
- PVC Pipe**
- Waterline pipe and fittings used in the water treatment building shall be Schedule 80 PVC, meeting ASTM Standard D-1784 and D-1785 and NSF Standard 61. Standard fittings for Schedule 80 pipe shall also be used. Pipe shall be pressure rated at not less than 300 PSI.
- Gate/Ball Valve**
- Where gate valves or ball valves are noted, PVC ball valves shall be used for on/off control and as stopping valves for downstream repair. Seals and O-rings shall be EPDM. Use True Union Ball Check Valves (TUC) as manufactured by Nibco or equal.
- Butterfly Valves**
- PVC butterfly valves shall be used where indicated to provide both on-off flow control or throttling. The seats and O-ring seals shall be EPDM. The valves shall be lever operated and set in place so that the lever can be operated easily throughout its operating range.
- In-Line Check Valves**
- The in-line check valves shall be manufactured of PVC material with EPDM seals and seats. The connections shall be either flanged or threaded. The check valves shall be True Union Ball Check Valves (TUC) as manufactured by Nibco or equal.
- Pressure Gauge**
- Pressure gauges shall be liquid filled gauges, 2 1/2" diameter with a range of 0 - 200 psi. Install pressure gauge with an inline stop cock valve.
- Pressure gauges shall be similar to Ashcroft Series 1009 Industrial gauges with a 1/4" NPT lower connection, stainless steel socket, polycarbonate window in a liquid filled polished stainless steel case or equal.



VICINITY MAP

Scope of Work

The scope of work required by these plans is the addition of soda ash feed equipment to the waterworks system for the Walnut Run Subdivision. The ground water supplies from Well No. 1 and No. 2 will be directed into the proposed waterworks building, where the pH of the water outside of the chlorinated wells will be adjusted by the addition of soda ash solutions. In addition the water will be metered. Sample tests and flow off assemblies will also be installed. A metering pump assembly for feeding chlorine solutions for water supply disinfection is shown but not installed.

**VIRGINIA DEPARTMENT OF HEALTH
DIVISION OF WATER SUPPLY ENGINEERING**

APPROVED BY: *[Signature]*
ENGINEERING FIELD DIRECTOR

DATE: 8/14/01

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CONSTRUCTION CONTROL SYSTEM FOR WALNUT RUN SUBDIVISION

CHEMICAL FEED SYSTEM

DATE: MAY 2, 2001
TECHNICIAN: TMM
CHECKED BY: RTM

REVISIONS

NO.	DATE
1	7-20-01
2	8-2-01

SCALES AS SHOWN

PROJ. NO.	DIV.
010145	

SHEET NO. 1 OF 2
DRAWING NO. MASTER

RECEIVED AUG 2001
OFFICE OF WATER PROGRAMS
PANAMA REGIONAL OFFICE

MANUSCRIPT DRAWING NUMBER: _____
VIEWS TO CREATE THIS DRAWING: _____
FIELDBOOK IDENTIFICATION: _____
SURVEY DATUM USED: _____