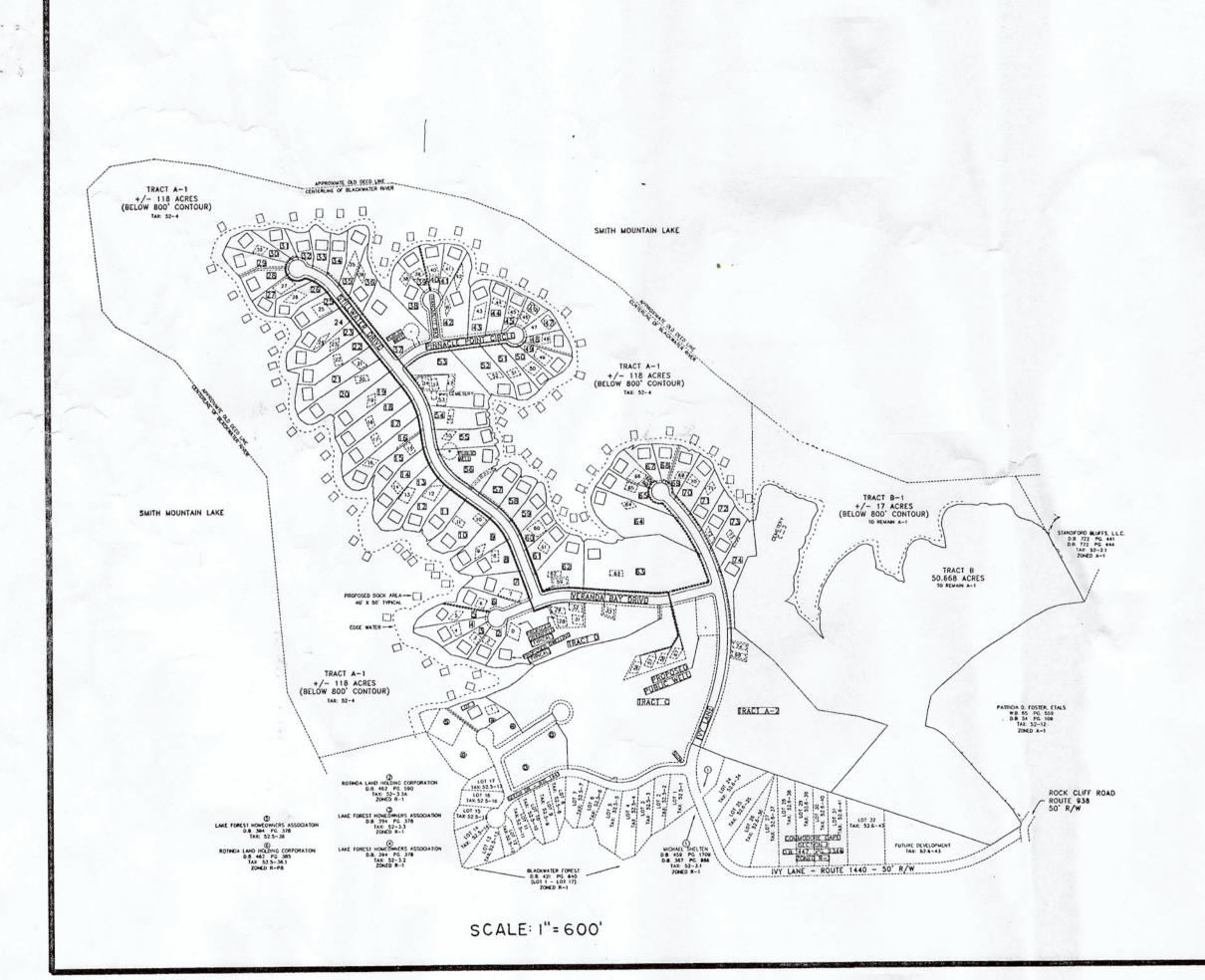
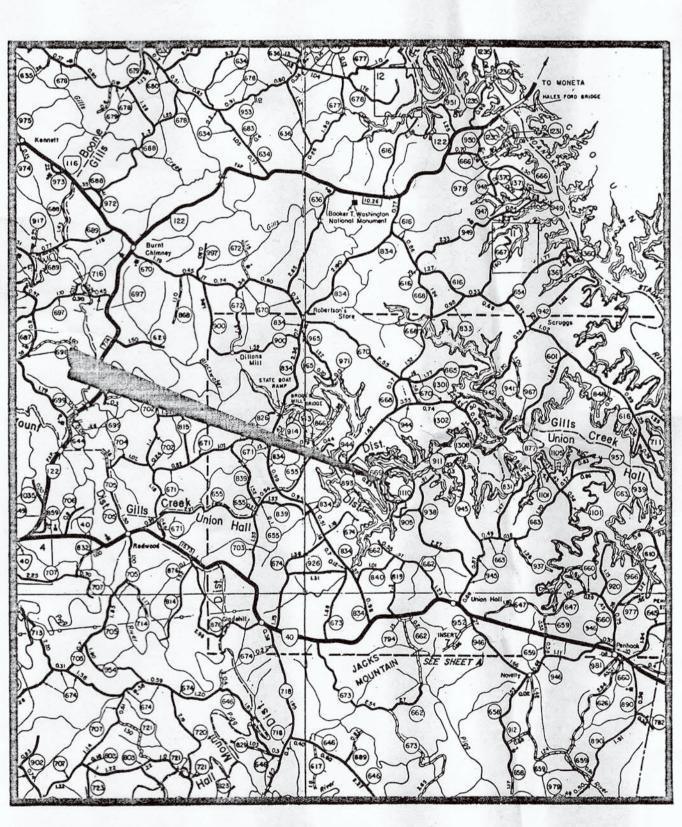


FRANKLIN COUNTY, VIRGINIA





VICINITY MAP

SHEETS 2 THROUGH 10 ARE BASED ON TOPOGRAPHIC INFORMATION AND PLAN AND PROFILE DRAWINGS PROVIDED BY: PHILIP W. NESTER. INC., P. O. BOX 827, ROCKY MOUNT, VIRGINIA 24151.

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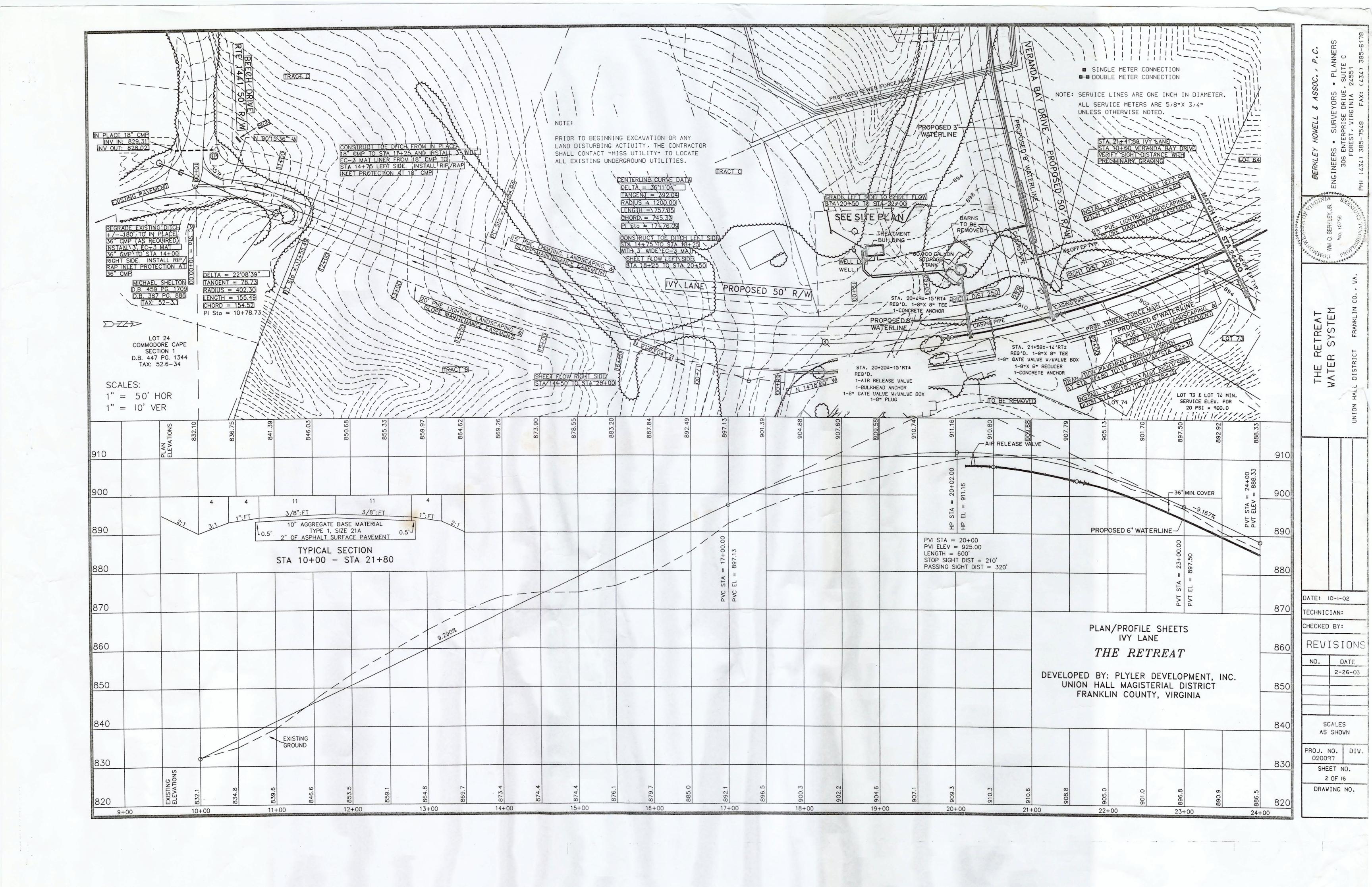
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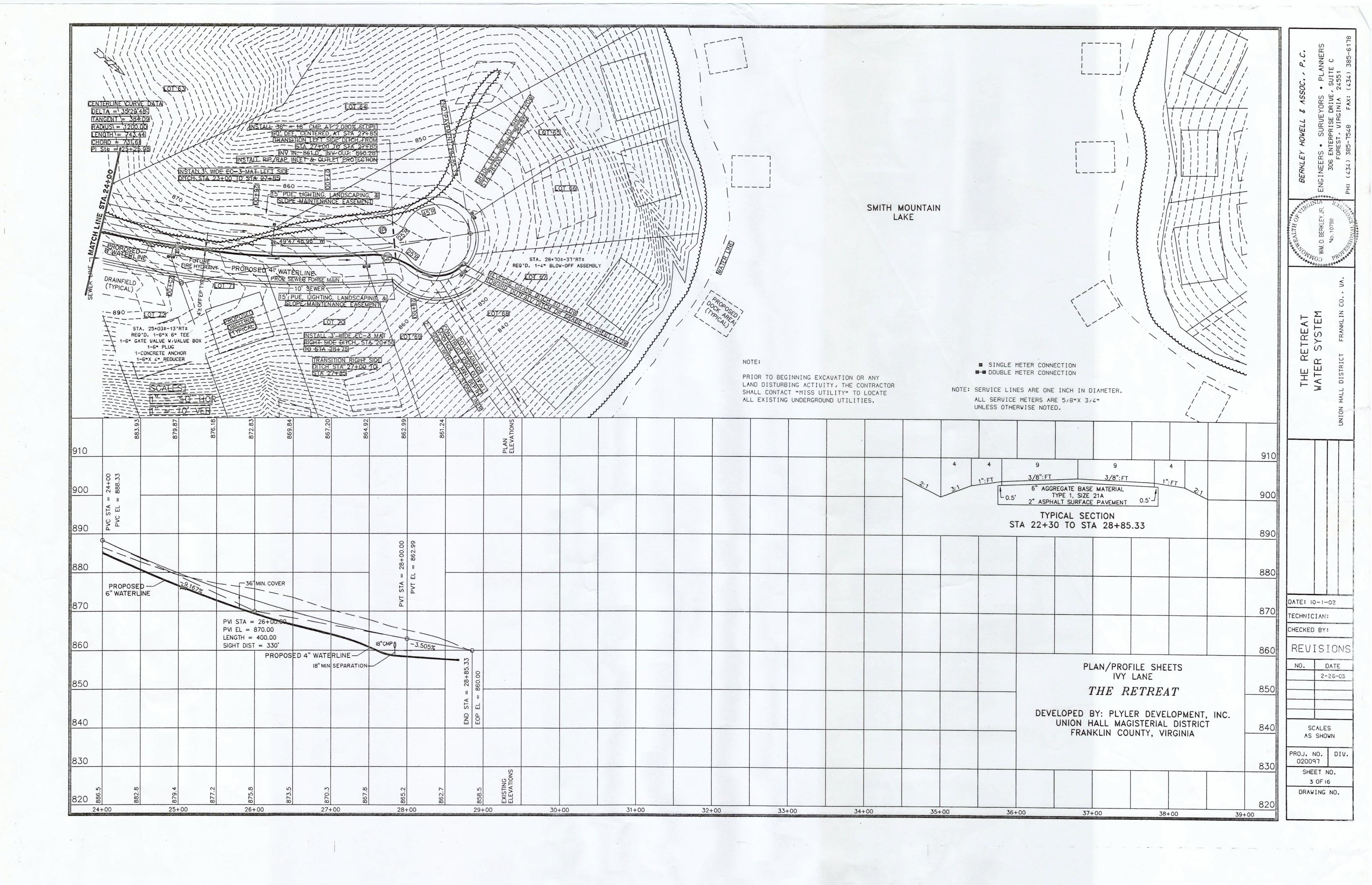
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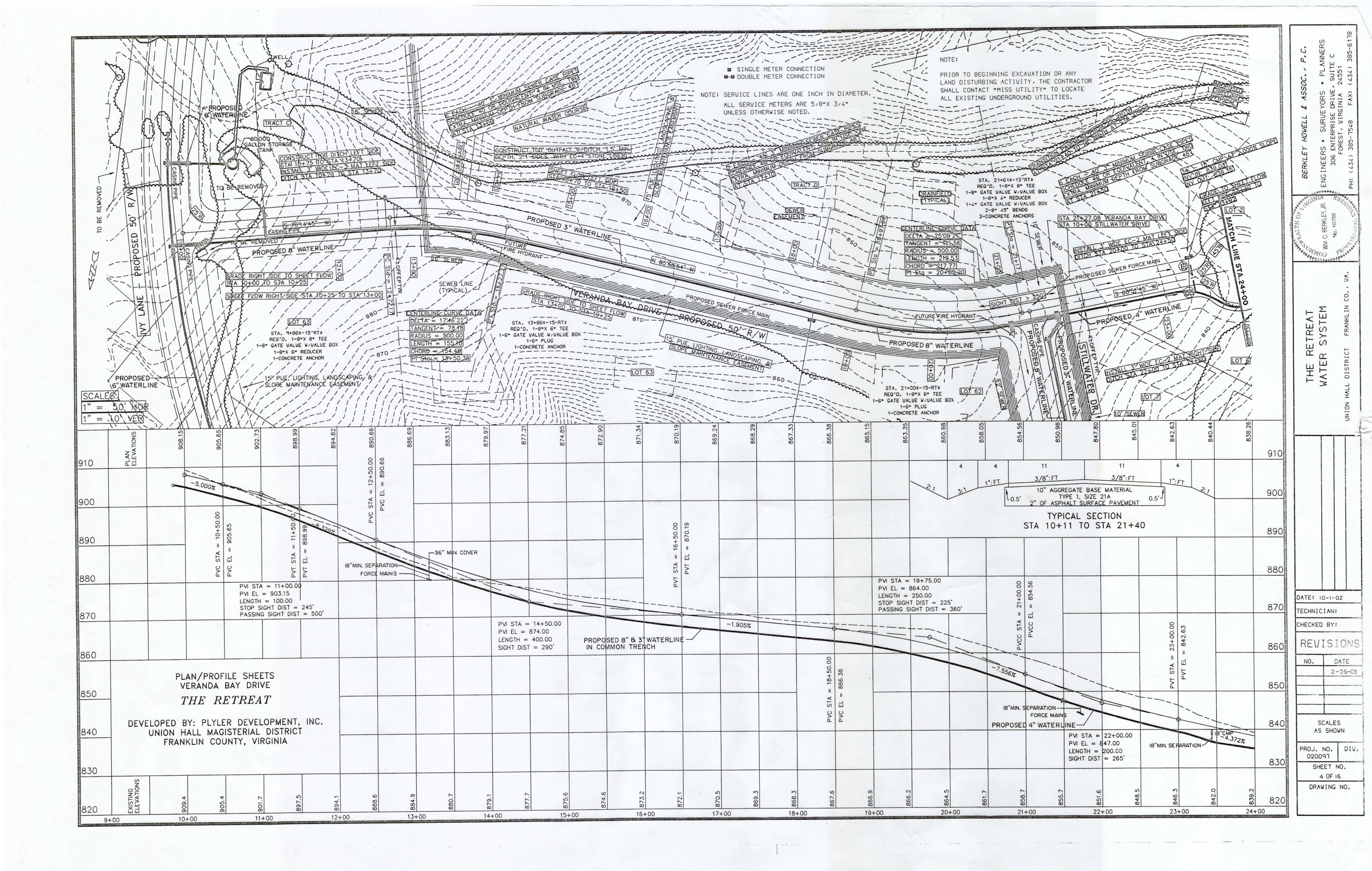
PROJ. NO. 020097 SHEET NO.

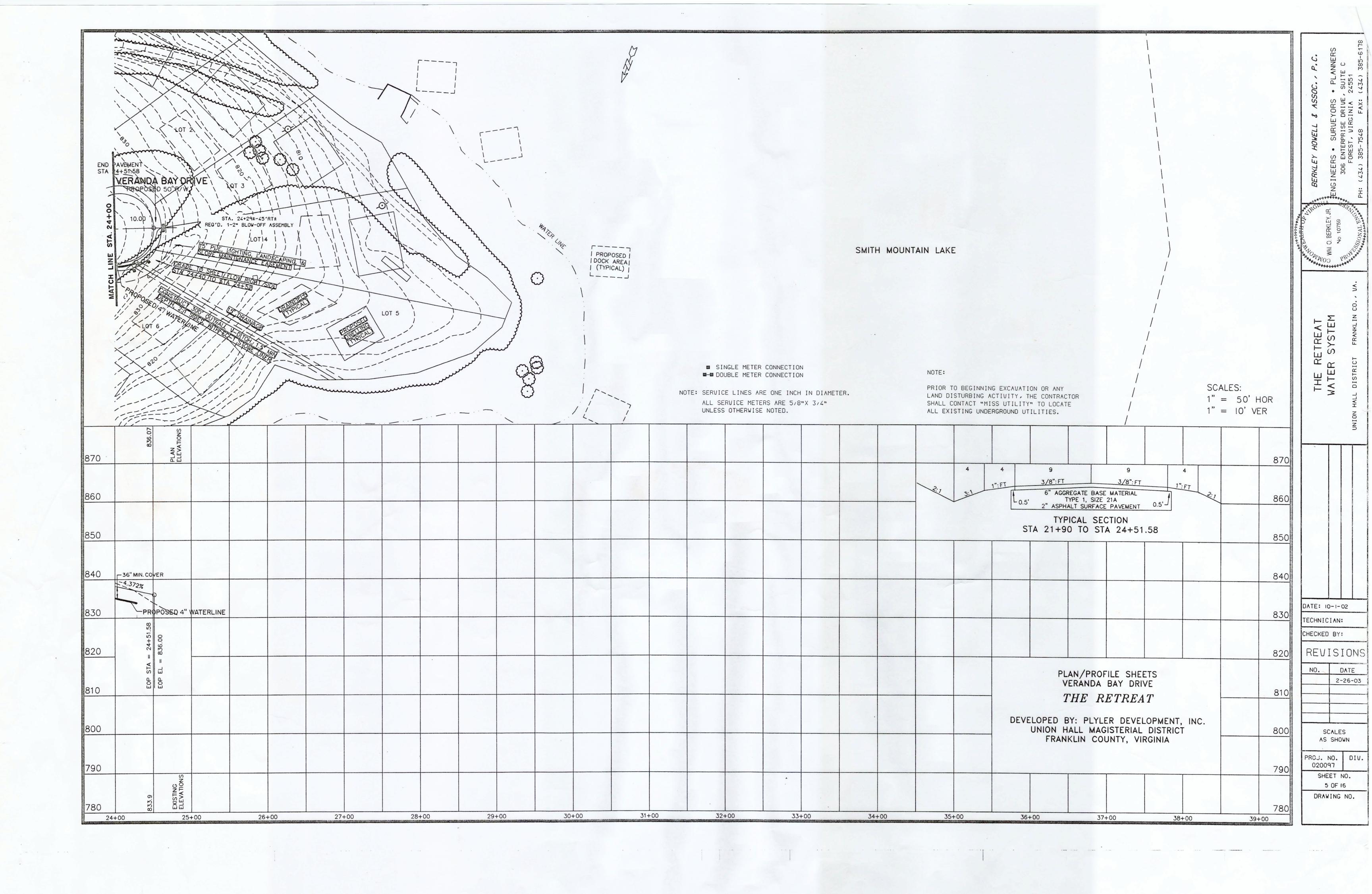
I OF 16 DRAWING NO.

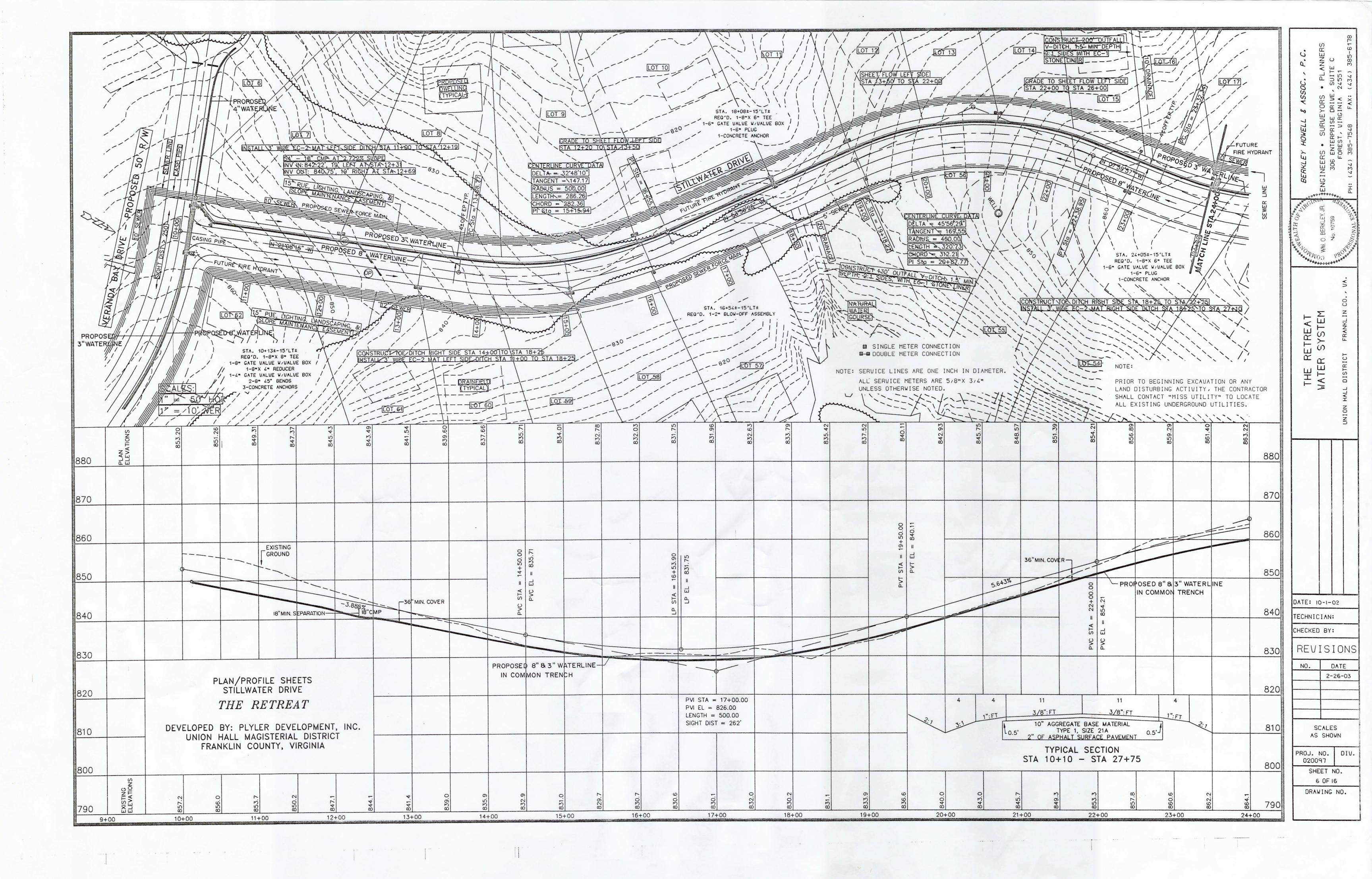
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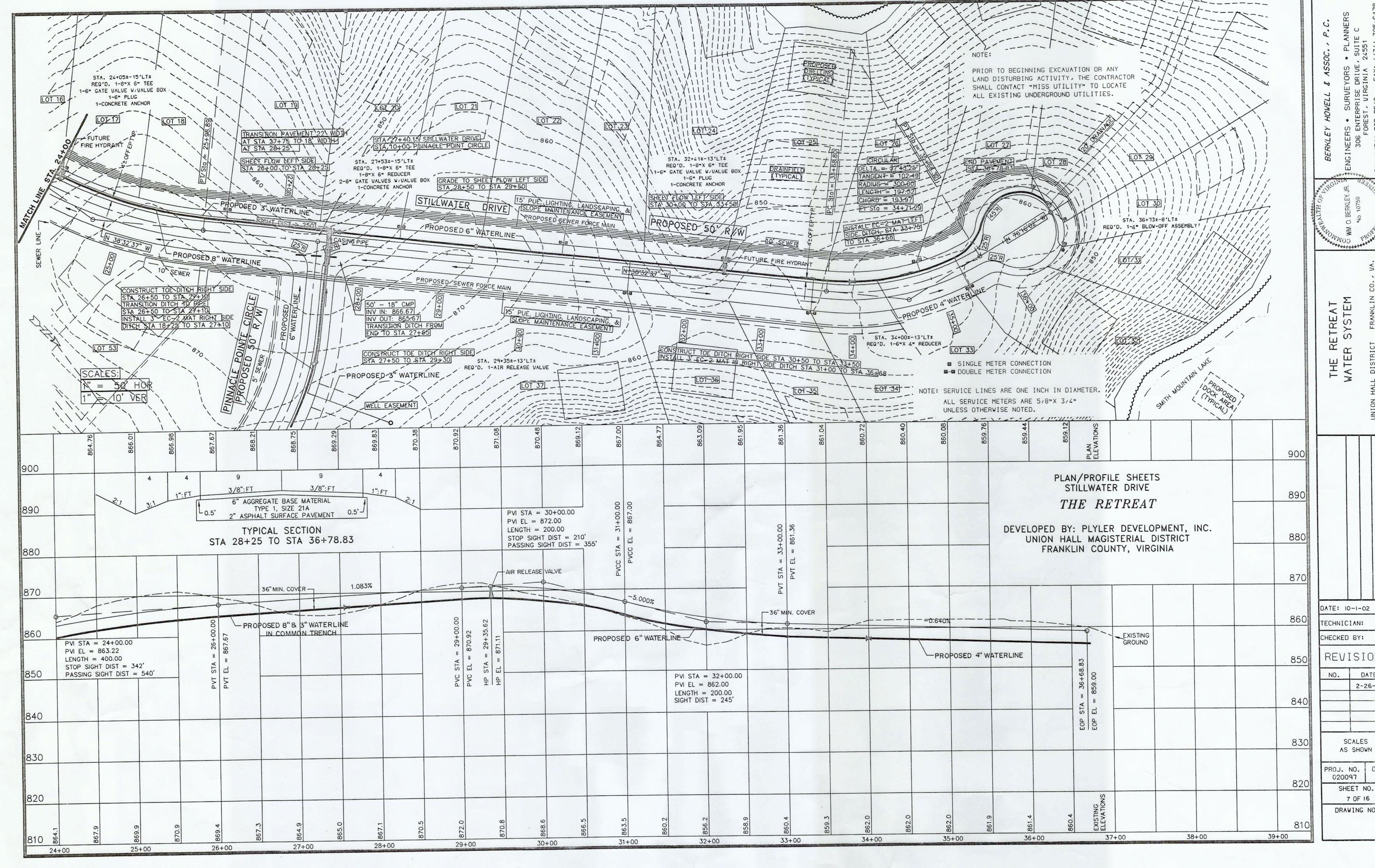










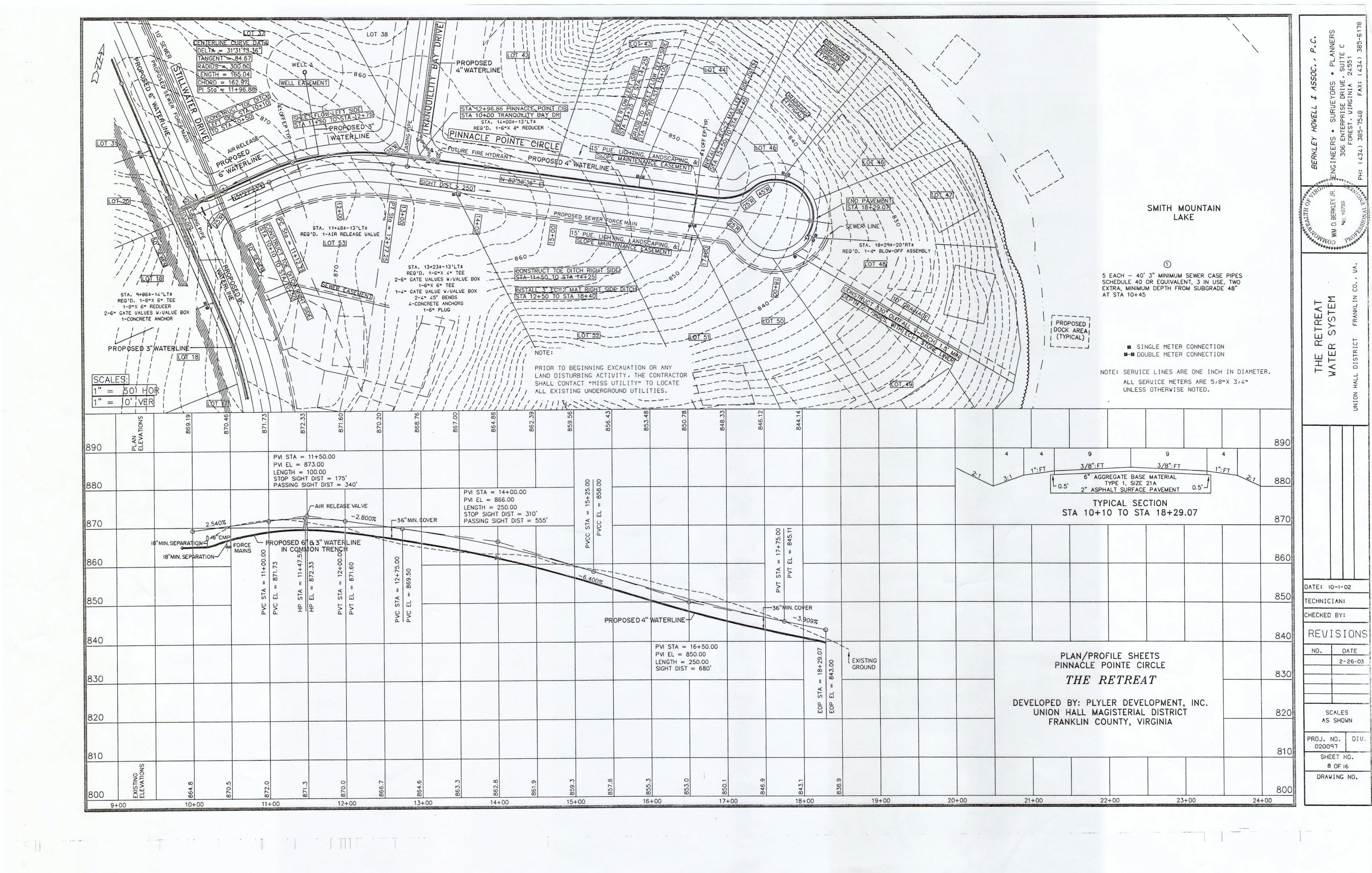


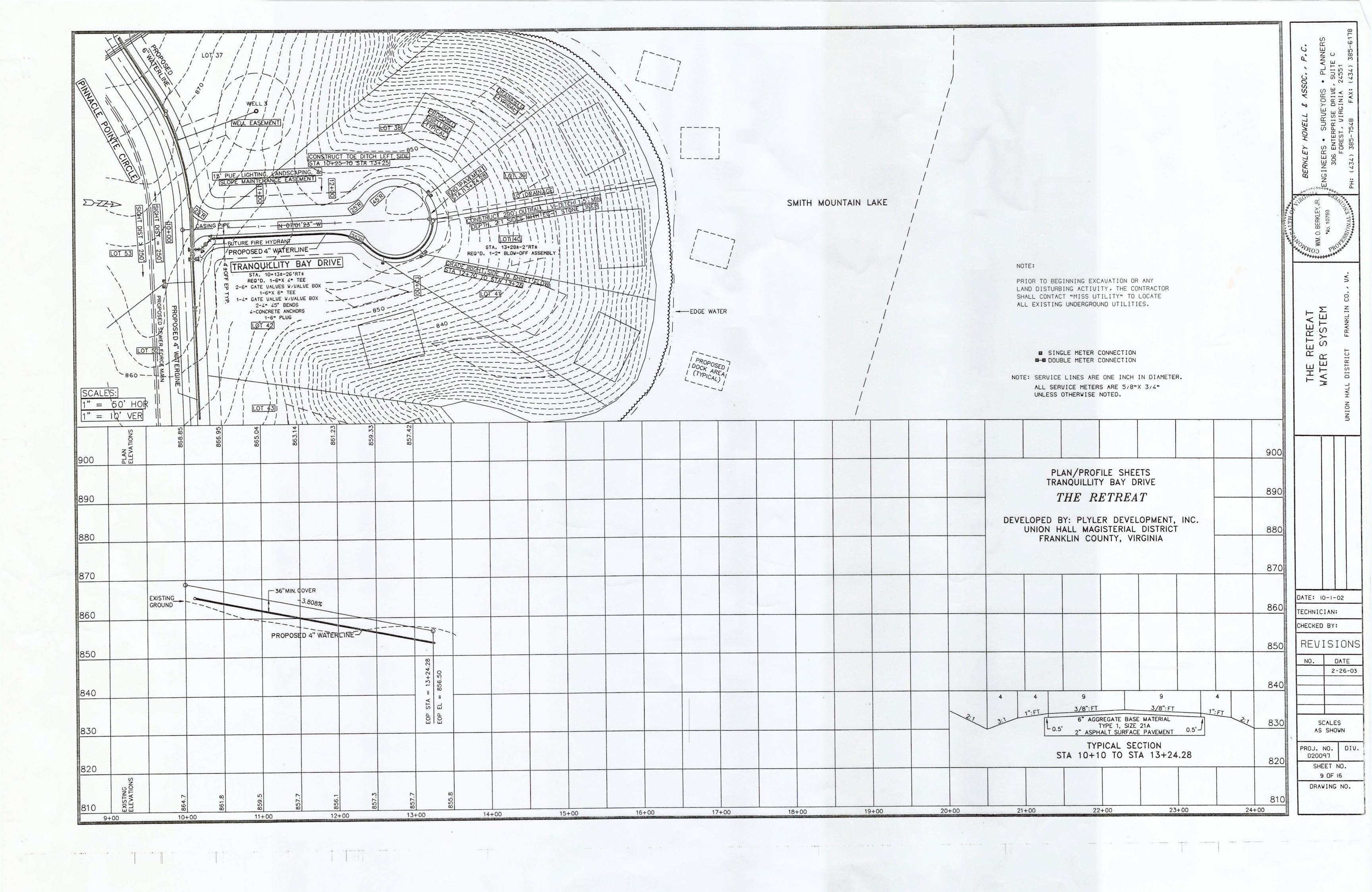
REVISIONS

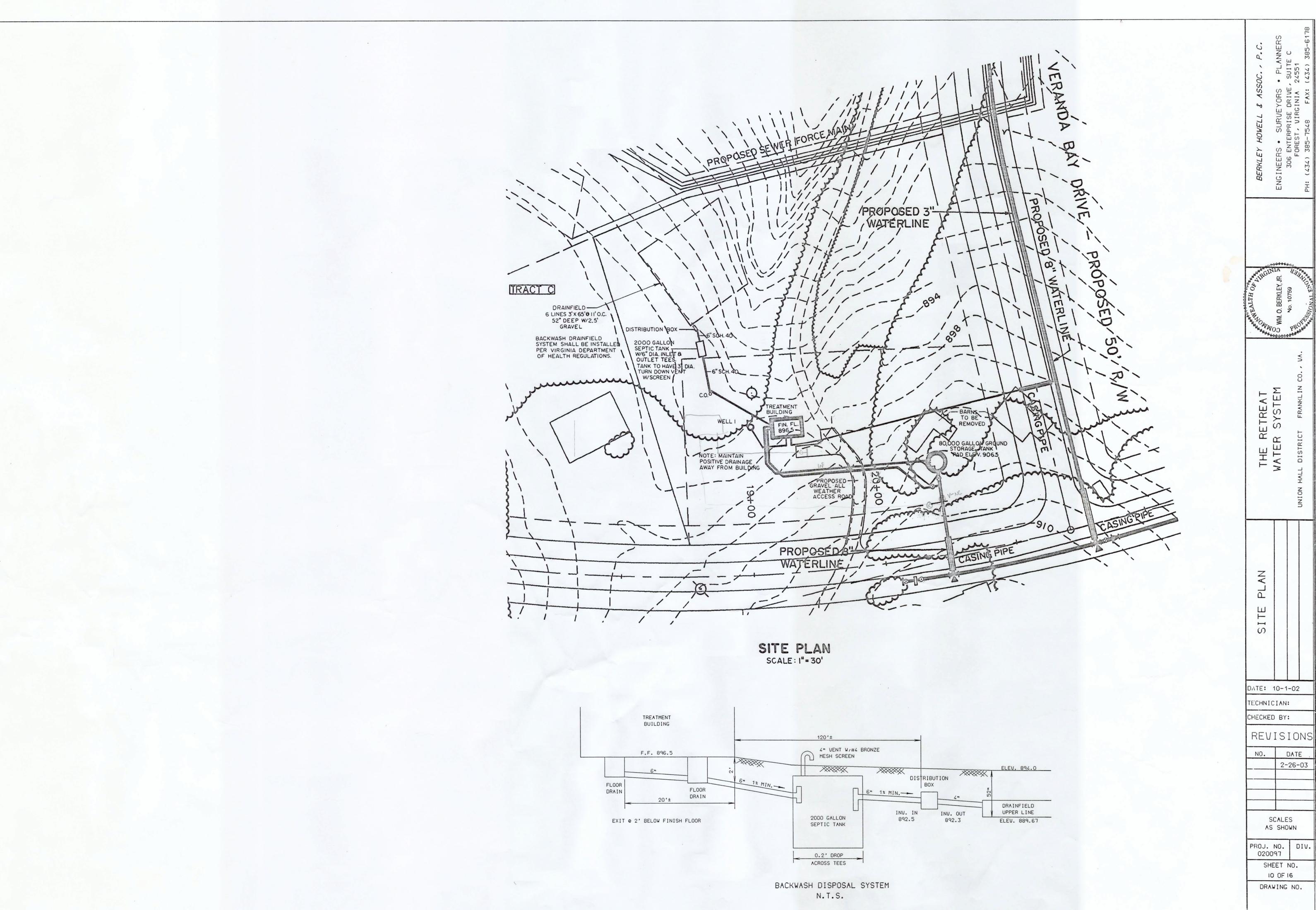
NO. DATE 2-26-03

PROJ. NO. DIV SHEET NO. 7 OF 16

DRAWING NO.







A AIR RELEASE 11"X 15" MANWAY

42"X 60" ASME STEEL TANK

TEST PORT 20 CU. FT. ANTHRACITE TEST ______ TEST 14 CU. FT. GREENSAND PORT 11"X 15" MANWAY

> GREENSAND FILTER TANK DETAIL N.T.S.

_	Chemical Feed System	Disinfection	on System	Filter Regeneration				
	Component		e for Disinfection	Potassium	Permanganate Solution			
1.	Solution Metering Pump							
	Series	Pulsatron Series E-Plus		Pulsatron Series E-Plus				
	Model No.	LPA3, 12 GPD @ 100 p	bi	LPB 2, 6GPM @ 250 P	81			
_	Operating Volts	115V		115V				
	Materials	THE RESERVE TO SERVE THE PARTY OF THE PARTY						
	Pump Head / Fitting	PVC/PVC		PVC/PVC				
	Balls / Checks	Ceramic		Ceramic				
	Seats / O-rings	Tellon		Teflon				
_	0	Actual: 30 psi; capacity 1	00 pel	Actual: 30 psi Capac	ltv: 250 psl			
2.	Operating Pressure	Four (4) or five (5) functi	on unive for enti-elphon	Four (4) or five (5) fund	ion valve for anti-siphon and bac			
3 Discharge Control Valve		and back pressure contro priming and discharge di	ol, pressure relief,	pressure control, pressure relief, priming and decharge drain; bleed valve				
4.	Injector	Injection check valve red		Injection check valve re	quired			
5. Solution Tank Size		30-35 gation tank and at ring; with heavy duty lid. 35 gal, tank with built in in flooded suction is accor-	and with top support shelf for mounting pump	15 gallon, yellow polyethylene tank with shelf or bracket mount for flooded suction arrangement.				
6.	Solution Tenk Mixer	None		None				
7.	Mixer Control	N/A		NA				
8.	Flow Indicator	3/8" acrylic body flow inc U7012309			dicator; Pulsatron P/N U701230			
9.	Calibration Column	100 ml x 3/8 with shut-	off valve	100 ml x 3/8" PVC column with shut-off valve				
10.	Solution Tubing	3/8" suction and dischar	ge tubing	0.375° or 3/8 ° O.D. suc	tion and discharge tubing			
11.	Solution Systems							
	Chemical basis	5% chlorine (Clorox)		Potassium Permanganate				
	% Solution	5 %; 4 mg/l residual		1.5%				
	Feed Rate	Design	Capacity	Design	Capacity			
	gpm	0.0015 gpm	0.0083 gpm	0.0012 gpm	0.0021 gpm			
	mVmln	5.7 m/m	31.4 m/m	4.5 mVm	6.0 mVm			
2000	Usage, GPD of solution							
71.5	max. avg.	2.34 gpd		1.77 gpd				
	Solution Pump Settings	**************************************						
	stroke rate	44 %		60%				
	stroke length	44 %		59 %				

Set chemical feed pump stroke length and rate adjustment controls to face interior of room for ease of operation and maintenance. In most cases ½ " and 3/8" "OD tubing will be satisfactory. Adjust size of connections, fittings, flow indicators, etc. as needed.

Stroke rate and stroke lengths are shown approximate. Field adjust per manufacturer's instruction to softleve desired feed rate.

Chemical Feed System Specifications

1.0 General

1.01 This specification covers the chlorine solution feed system for disinfection and the Potassium Permanganate feed system for filter regeneration.

The disinfection system is proposed as a future addition and is therefore not in the contract at this time.

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. Tank wall thickness shall be a minimum of 5/64 inch for 15-gallon tanks, 3/32 inch for 30 and 35 gallon tanks, and 5/16 inch for 50 gallon tanks and larger. Tanks shall be NSF approved or fda certified for food

2.02 Chemical Feed Pumps - One (1) chemical feed pump shall be furnished for each chemical feed system. Either pulsafeeder 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. Seats and o-rings shall be teflon or other suitable material for an orthophesphate solution or chlorine solutions. Each chemical feed pump shall be equipped with a four (4) or five (5) function control 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 - Not Applicable

2.04 Calibration Chambers - A 100 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 celibration 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

2.06 Appurtenances -- all appurtenances included in each chemical feed system, including ball valves, check valves, bulkhead connections, fittings, etc. Shall be constructed of corrosion resistant materials.

2.07 Chemicals

A. Chlorine Solutions – Solution percentages and chemical feed rates for "clorox" 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.

2.08 Laboratory Test Equipment

Portable ph Meler - 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 Hach 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 lod readout. Readout stability shall be battery operated with a field replaceable nine-volt battery.

Iron Test Kit - The iron test kit shall be a colorimeter catalog number 46700-22 Pocket Colorimeter by Hach with a range of 0-3.0 mg/l with a smallest increment of 0.01 mg/l or equal.

Manganese Test Kit - The manganese test kit shall be a colorimeter catalog number 46700-18 Pocket Colorimeter by Hach with a range of 0-0.7 mg/l with a smallest increment of 0.01 mg/l or equal.

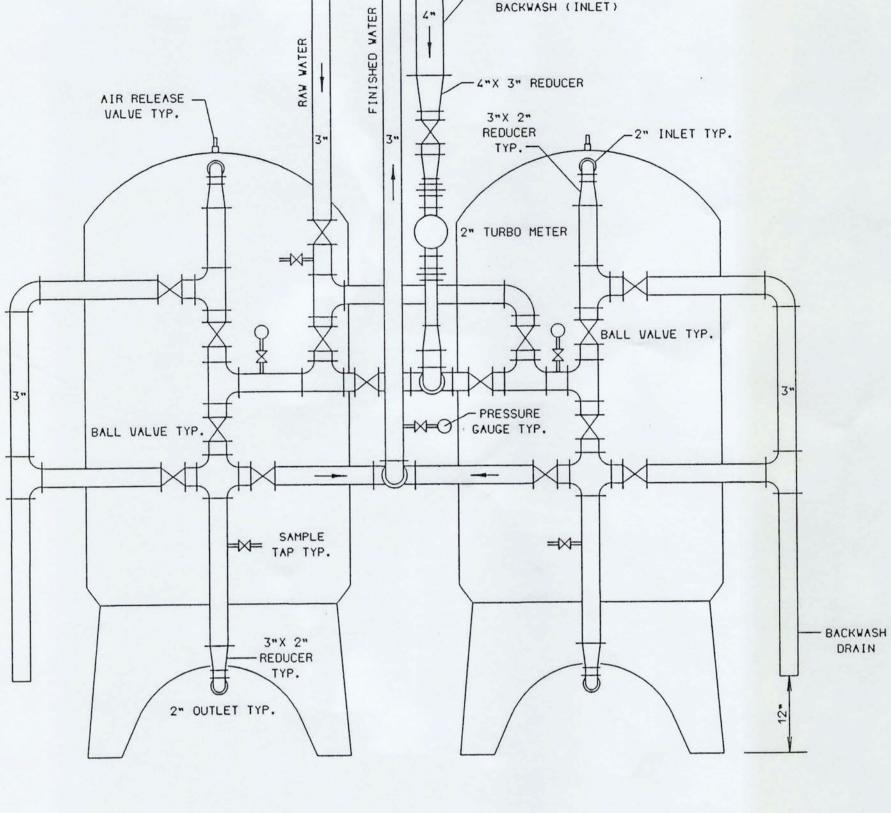
3.01 Each chemical feed system shall be provided with a storage tank, a chemical metering pump, a calibration chamber, a flow indicator, a four (4) or five (5) function discharge valve, tubing and all other appurtenances and connections necessary to provide a complete workable chemical feed system.

3.02 Each solution pump shall be mounted on a shelf on the wall above the chemical storage

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.



FINISHED WATER FOR

PIPING SCHEMATIC @ GREENSAND FILTER TANKS N.T.S.

GREEN SAND FILTER SPECIFICATIONS

CAPACITY = COMBINED WELL OUTPUT = 46 GPM. FILTER RATE = 3 GPM PER SQUARE FEET - EACH FILTER = 3.5 FEET IN

FILTER CAPACITY = 28.8 GPM. TOTAL FILTERING CAPACITY = 58 GPM. OPERATING INLET PRESSURE TO FILTER = 20 PSI (MIN.) CHEMICAL REGENERATION - AS PER MANUFACTURERS

RECOMMENDATIONS. BACKWASH: RATE = 10 GPM PER SQUARE FEET FOR 10 MINUTES. VOLUME = 100 GPM OPERATING PRESSURE = 20 PSI MIN. INTERVAL - FILTERS SHALL BE BACKWASHED INDIVIDUALLY, ONE

PER DAY, AFTER 40 HOURS OF OPERATION (66,000 GAL).

ALL EQUIPMENT TO BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS. EQUIPMENT SHALL BE NSF 61 APPROVED.

PRESSURE FILTERS (2 REQUIRED) FILTERS SHALL BE MARLO MGA-42 MANGANESE GREEN SAND/ANTHROCITE FILTERS WITH 42"X60" STEEL PRESSURE VESSELS ASME CERTIFIED. SYSTEM SHALL INCLUDE AIR RELEASE, 2-11" X 15" MANWAYS, BACKWASH FLOW CONTROL AND MANUAL VALVING FOR NORMAL FILTRATION AND

BACKWASH OPERATION. ALL FILTERS SHALL HAVE A MINIMUM SIDE WALL DEPTH OF 5 FEET AND FILTER WASHWATER TROUGH LOCATED 18" (MIN.)

ABOVE THE MEDIA. FILTER MEDIA SHALL CONSIST OF A 20 CUBIC FEET LAYER OF GRADED ANTHROCITE COAL ON TOP OF 14 CUBIC FEET OF MANGANESE GREEN SAND (16.6 MESH), FORMULATED FROM A GLAUCONITE GREEN SAND WITH IRON REMOVAL CAPACITY OF 12,000 PPM PER CUBIC FOOT AND UNIFORMITY COEFFICIENT OF

4. EACH FILTER SHALL BE FITTED WITH SAMPLE TAPS AT THE TOP AND MIDPOINT OF THE GREEN SAND MEDIA.

GENERAL DESCRIPTION OF OPERATION

A. TREATMENT

THE SYSTEM IS DESIGNED TO REMOVE IRON AND MANGANESE FROM THE WELLS RAW WATER BY THE USE OF PRESSURE FILTERS UTILIZING GREEN SAND. CHEMICAL FEEDERS ARE INCLUDED TO ADD CHLORINE AND POTASSIUM PERMANGANATE PRIOR TO FILTRATION. ALL CHEMICAL SOLUTIONS ARE TO BE PREPARED IN THE CHEMICAL TANKS USING ELECTRIC MIXERS. CHEMICALS ARE TO BE STORED IN THEIR ORIGINAL CONTAINERS IN THE SPACE PROVIDED AND PORTIONS ARE TO BE MEASURED BY WEIGHING. THE WELL PUMPS PROVIDE THE PRESSURE TO DELIVER THE WATER FROM THE WELL THROUGH THE TREATMENT SYSTEM AND DISCHARGE TO THE STORAGE TANK

B. FILTER BACKWASH AND WASTEWATER DISPOSAL

BACKWASH WATER IS TO BE TAPPED FROM THE MAIN DISTRIBUTION LINE LEAVING THE STORAGE TANK. FILTERS ARE TO BE BACKWASHED INDIVIDUALLY ON A ROTATING SCHEDULE SUCH THAT NO MORE THAN ONE (1) FILTER IS BACKWASHED IN ANY TWENTY-FOUR (24) OUR PERIOD. FLOW METER ON THE INLET PIPE AT EACH FILTER AND PRESSURE GAUGES GRADUATED OVER A RANGE OF 0.30 FEET LOCATED ON BOTH THE INLET AND OUTLET PIPES ARE TO BE MONITORED DAILY FOR USE AS A BASIS FOR SCHEDULING FILTER BACKWASH, BACKWASH IS TO BE INITIATED MANUALLY BY VALVES ON FACH FILTER THE RATE OF FLOW OF THE BACKWASH IS TO BE CONTROLLED BY A THROTTLING VALVE AND FLOW METER ON THE MAIN. BACKWASH FEED LINE. THE BACKWASH WASTE WATER IS TO BE DISCHARGED INTO A SUMP IN THE FLOOR OF THE FILTER ROOM WHICH DRAINS TO THE BACKWASH WASTE WATER DISPOSAL SYSTEM.

GENERAL SPECIFICATIONS - WATERWORKS BUILDING

One (1) swing, eye wash system with push hands shall be wall mounted where indicated. Unit shall meet ANSI Compliance criteria. Use Bradley Model S19-270B or equal.

PVC Pipe Inside Waterworks Building

Water line 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.

1/2" bronze angle stop valve copper to copper with 2" extension. Smooth bore with no threads. Valves by Nibco

or equal.

Where gate valves or ball valves are noted, PVC ball valves shall be used for on/off control and blocking valves for downstream repair. Seals and O-rings shall be EPDM. Use True Union Ball (TUB) valves as manufactured by Nibco or equal. 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 Pressure Gauge

Pressure gauges shall be liquid filled gauges, 1 1/2" diameter with a range of 0-200 psi. Install pressure gauge Pressure guages shall be similar to Ashcroft Series 1009 Industrial gauges with a 1/2" NPT lower connection, stainless steel socket, polycarbonate window in a liquid filled polished stainless steel case; or equal.

All waterworks equipment shall be NSF 61 rated

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 raised for sixty (60) gpm with minimum head loss. Use Atlantic Screen Static Mixer # AIM 1015-3 or equal.

Water Meters

Well # 1 Badges Model M25 Well # 3 Badges Model M70 Backwash Line - Badger 2" Recordall II Turbo Meter GENERAL NOTES - WATERWORKS BUILDING

BEN INK SP

AIR RELEASE VALUES SHALL BE PROVIDED AT HIGH POINTS IN PIPING WITHIN THE WATERWORKS BUILDING.

14'-0"

15 LINEAR FEET OF PIPE

CHEMICAL

-++

STORAGE

DUAL PORT -

STATIC MIXER

FEED PUMP

BETWEEN INJECTION POINTS -

CHEMICAL FEED SYSTEMS TO BE WIRED SUCH THAT POWER IS SUPPLIED ONLY WHEN WELL PUMPS ARE OPERATING

GREENSAND

FILTER #1

1. 4

1 1

FILTER #2

BACKWASH DRAIN SHALL TERMINATE 12" MIN. DIRECTLY

ABOVE 12"X 12" SUMP GRATE

FIN. FL. 896.5

STATIC MIXER

DISIN-

FECTION

CHEMICAL-

FEED PUMP

METER-BADGER

MODEL M25

12"X 12" SUMP

DRAIN W/GRATE

---- 6" DRAIN

1 1/4": 1' MIN. SLOPE

12"X 12" SUMP DRAIN W/GRATE

WATERWORKS BUILDING

SCALE: 3/8"=1'-0"

1. PIPING LAYOUT FOR SCHEMATIC AND SIZING PURPOSES ONLY, ACTUAL PIPE AND VALVE ARRANGEMENT MAY VARY.

ELECTRICAL PANELS AND CONTROLS SHALL BE AS REQUIRED FOR THE PROPOSED SERVICE. ALL ELECTRICAL WORK SHALL BE ACCOMPLISHED PER NEC.

3. WELL PUMP CONTROLS SHALL BE INSTALLED TO OPERATE AS OUTLINED ON THE PUMP CONTROL SCHEMATIC DIAGRAM.

4. SECURE ALL PUMP HOUSE PIPING TO WALL, CEILINGS OR FLOOR AS NECESSARY TO PROVIDE

PIPE THRUST RESTRAINT AND SUPPORT. USE GRINNEL PIPE SUPPORTS OR EQUAL. WATERWORKS BUILDING - PIPE AND FITTINGS:

ALL INTERIOR PIPE AND FITTINGS FOR WATER SHALL BE SCHEDULE 80 PVC, SOLVENT JOINTS, MARKED "NDF-PW" FOR DRINKING WATER. PIPE AND FITTINGS FOR WATER LINES THROUGH AND BELOW THE FLOOR SLAB SHALL BE SCHEDULE 80 PVC, "NSF-PW" FOR DRINKING WATER. ALL PIPE AND FITTINGS FOR THE WASTEWATER DISPOSAL SYSTEM SHALL BE SCHEDULE 40 PVC PIPING BELOW FLOOR. ALL PIPES BELOW FLOOR SHALL BE BEDDED IN MINIMUM 6"

METER-BADGER MODEL M70 HOSE BIBB W/VAC. BREAKER ______3" FROM WELL #3 # = = = = = 32" FROM WELL #1

2" BLOW-OFF TURN DOWN TO CONC. SPLASH BLOCK &

COVER W/ BRONZE SCREEN

BLOCK

CHECK VALVE

GATE VALVE

UNION

PRESSURE GAUGE

DATE: 10-1-02

TECHNICIAN: CHECKED BY: REVISIONS

DATE 2-26-03

SCALES AS SHOWN PROJ. NO. 020097 SHEET NO.

11 OF 16 DRAWING NO.

DETAIL 1

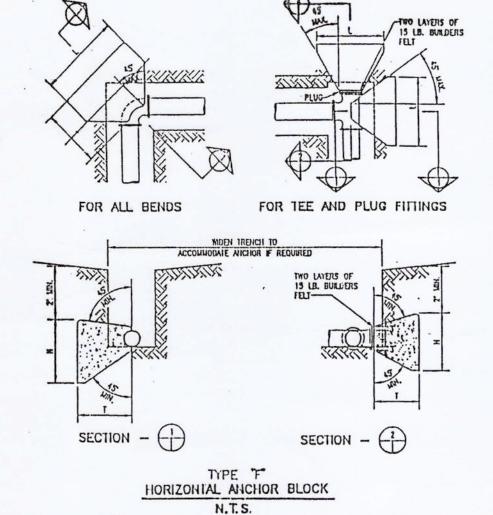
- 1. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES WITHIN THE CONSTRUCTION LIMITS OF THE PROJECT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- 2. CONTRACTOR SHALL FIELD VERIFY EXISTING WATER LINES AND SANITARY SEWER LOCATION AND DEPTH PRIOR TO CONSTRUCTION AND MAKE ADJUSTMENTS AS NECESSARY FOR CONNECTION OF THE WATER LINES AND SANITARY SEWER LINES.
- 3. SEPARATION OF WATER LINES AND SANITARY AND/OR COMBINED SEWERS OR SEWER FORCE MAINS. AS USED BELOW, THE WORK "SEWER" IS INTENDED TO ALSO INCLUDE SEWER FORCE A. FOLLOW STATE HEALTH DEPARTMENT STANDARDS FOR SEPARATION OF WATER MAINS AND SEWER LINES.
- B. PARALLEL INSTALLATION (1) NORMAL CONDITIONS - WATER LINES SHALL BE CONSTRUCTED AT LEAST 10 FEET HORIZONTALLY FROM A SEWER OR SEWER MANHOLE WHENEVER POSSIBLE, THE
- DISTANCE SHALL BE MEASURED EDGE-TO-EDGE. (2) UNUSUAL CONDITIONS - WHEN LOCAL CONDITIONS PREVENT A HORIZONTAL SEPARATION OF AT LEAST 10 FEET, THE WATER LINE MAY BE LAID CLOSER TO A SEWER OR SEWER A. THE BOTTOM OF THE WATER LINE IS AT LEAST 18 INCHES ABOVE THE TOP OF THE
- B. WHERE THIS VERTICAL SEPARATION CANNOT BE OBTAINED, THE SEWER SHALL BE CONSTRUCTED OF AWWA APPROVED WATER PIPE PRESSURE-TESTED IN PLACE TO 50 PSI WITHOUT LEAKAGE PRIOR TO BACKFILLING. THE SEWER MANHOLE SHALL BE OF WATERTIGHT CONSTRUCTION AND TESTED IN PLACE.
- (1) NORMAL CONDITIONS WATER LINES CROSSING OVER SEWERS SHALL BE LAID TO PROVIDE A SEPARATION OF AT LEAST 18 INCHES BETWEEN THE BOTTOM OF THE WATER
- LINE AND THE TOP OF THE SEWER WHENEVER POSSIBLE. (2) UNUSUAL CONDITIONS - WHEN LOCAL CONDITIONS PREVENT A VERTICAL SEPARATION DESCRIBED IN CROSSING, NORMAL CONDITIONS, PARAGRAPH ABOVE, THE FOLLOWING CONSTRUCTION SHALL BE USED. A SEWERS PASSING OVER OR UNDER WATER LINES SHALL BE CONSTRUCTED OF THE
- MATERIALS DESCRIBED IN PARALLEL INSTALLATION, UNUSUAL CONDITIONS . PARAGRAPH 2. ABOVE. B. WATER LINES PASSING UNDER SEWERS SHALL, IN ADDITION, BE PROTECTED BY
- . VERTICAL SEPARATION OF AT LEAST 18 INCHES BETWEEN THE BOTTOM OF THE SEWER AND THE TOP OF THE WATER LINE. 2. ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF THE JOINTS AND SETTLING ON AND BREAKING WATER LINE, 3. THAT THE LENGTH OF THE WATER LINE BE CENTERED AT THE POINT OF THE
- CROSSING SO THAT JOINTS SHALL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER. C. SANITARY AND/OR COMBINED SEWERS OR SEWER MANHOLES - NO WATER PIPES SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER
- 3.1 SEPARATION OF WATERLINES AND SEPTIC SYSTEMS WATERLINES (RAW AND FINISHED) SHALL BE CONSTRUCTED A MINIMUM OF 30 FEET FROM SEPTIC
- 4. CONTRACTOR SHALL INSTALL DETECTABLE TAPE ACCORDING TO MANUFACTURER'S RECOMMENDATION IN TRENCH ABOVE ALL NONMETALLIC PIPE. THE TAPE SHALL HAVE A METALLIC CORE PROTECTED BY A PLASTIC JACKET AND SHALL BE CONTINUOUSLY MARKED INDICATING THAT A WATER MAIN IS BURIED BENEATH THE TAPE.
- 5. CONCRETE FOR REACTION ANCHORS SHALL HAVE 3,500 PSI STRENGTH AT 28 DAYS AND SHALL MEET REQUIREMENTS OF ASTM C 94. CONCRETE REACTION ANCHORS SHALL BEAR AGAINST

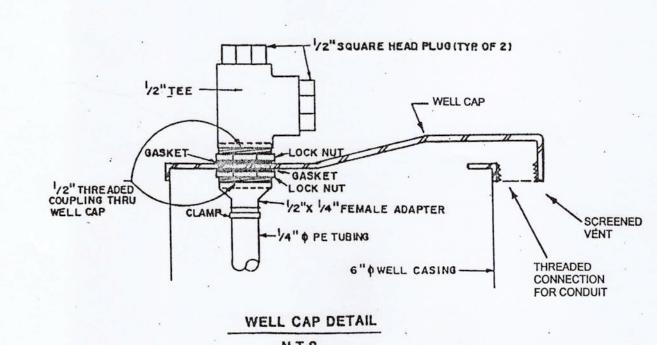
FITTING	SIZE, NCH		H		CU. TARUS
		ESCPRESSURE	- 150 PSL		
11 1/8		1.50	2.00	1.50	0.10
22 1/2		1.50	2.00	2.52	0.10
45	018	2.00	2.25	2 60	0.15
907	4"	2.50	2.50	3.01	0.24
331	96"	2.00	2.23	2.50	0.15
PLUG	86"	2.00	2.25	250	0.15
11 1/4		1.66	2.16	2 67	0.13
23 1/1		1.66	2.66	211	- 0.26
45		2.00	3.16	3.21	0.48
907		3.88	231	2.88	0.32
PLUG		3.16	231	2.66	0.32
11 1/5	12	2.00	2.50	3.00	0.22
22 1/2	12	2.50	2.75	3.02	0.70
45	l iž l	4.00	3.30	3.12	0.58
907	ii l	5.50	4 25	3.62	1.10
ITE	l ii l	4.50	3.73	3 00	0.67
PLUG	ii	4.50	3.75	3.00	0.67
7(00		IEST PRESSUR	= 200 PSI		
11 1/4		1.50	100	2.50	0.10
22 1/2	1	1.50	2.00	2.52	0.10
45		2.00	2.55	2.80	0.15
307	4"	3.00	2.75	3.01	0.32
TEE	11	2.50	2.50	2.50	2.00
PLUG	8 6"		-		
11 1/4		1.68	210	2.67	0.13
22 1/2		2.16	241	2.69	0.19
43	1 1	3.10	2.91	277	0.34
90	1 1	4.10	3.41	3.21	0.59
TEE	1 1	3.66	3.76	2.66	0.40
PLUG	1 1	3.66	3.16	2.64	8.40
11 1/5	12	2.00	2.50	3.00	0.22
22 1/2	12	3.00	3.00	3.02	0.38
45	12	4.50	3.75	3.12	0.70
907	12	6.50	4.75	3.82	1.44
331	12	9.50	4.23	3.00	0.93
PILLIA	12	JEST PHESSUR	= 250 PSI	3.00	0.91
		JEST PRESSUR	E = 250 PSL	2.30	0.10
11 1/4		1.50	2.00	2.52	0.10
22 1/2		1.50	2.00	2.50	9.21
45	411	2.50 3.50	2.50 3.00	3.01	0.41
90	4"	3.50	2.73	2.50	0.26
331	0 011	3.00			0.26
PLUG	8 6"	3.00	2.75	2.50	
11 1/4.		1.66	2.16	2.87	0.13
22 1/2		2.18	2.41	2.69	0.18
15		3.66	3.18	2.77	0.41
907		4.86	3.68	321	0.71
TE		1.18	3.41	2.66	0.49
PLUG		4.16	3.41	2.56	0.49
11 1/4	12	1.50	2.75	3 00	0.10
22 1/T	12	3.50	3.25	3.02	0.47
15	12	3.30	4.23	3.12	0.85
90"	12	150	3.25	3.82	1.82
		6 00	4.50	3.00	1.03
331	1 12				



ITEM	DESCRIPTION
Well Pump	
Well #1	Goulds Model 7GS15, 1.5 hp, 1 ph, 230 V, Operating Design - 8 GPM @ 446 FC TDH
Well#3	Goulds Model 33GS50, 5 hp, 1ph, 230 V, Operating Design - 38 gpm @ 370 FC TDH
	Pump Motors Shall Be Equipped With an HOA Switch
Watertight Well Cap	Campbell Model # WTC 6M Well Cap Shall be a unit certified for this use and approved by the Virginia Department of Health
Pitless Adapter	Campbell Model # B-20 Pitless Adapter shall be certified by PAS-1 and approved by the Virginia Department of Health.
Check Valves	Mueller, Watts, or Equal
Gate Valves	Mueller, Watts or Equal
Air Release Valve	Hoffman Model 79 or Equal
Pump Controls	Motor Minder Model 201B by Integra
Piping	See General Notes for Specifications

14"x /2" INCREASER





PORTABLE DRAWDOWN GAUGE ASSEMBLY - DETAIL

N.T.S.

12" STOP COCK -

UNDISTURBED EARTH. ANCHORS SHALL BE OF THE SIZE AND SHAPE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL PROVIDE REACTION ANCHORS AT ALL CHANGES IN DIRECTION AND AT ALL DEAD ENDS OF PRESSURE PIPELINES AND AS SHOWN ON THE DRAWINGS.

- 6. PROVIDE A COMBINATION AIR RELEASE VALVE AT LOCATIONS SHOWN ON DRAWINGS AND AT ALL HIGH POINTS ON THE MAINS. INSTALL GATE VALVE BETWEEN WATER MAIN AND RELIEF VALVE. CONSTRUCT MANHOLES/VALVE BOXES FOR VALVES BELOW GRADE. VALVES SHALL BE FOR WORKING PRESSURES INDICATED ON DRAWINGS. MANUFACTURERS SHALL BE VALVE & PRIMER CORP., AMERICAN DARLING VALVE AND MANUFACTURING, VAL-MATIC VALVE & MANUFACTURING
- 7. WATER LINE PIPE: PVC PIPE 4-12 INCHES IN DIAMETER SHALL MEET REQUIREMENTS OF AWWA C900. PIPE CONNECTION SHALL BE PLAIN END PIPE WITH A RUBBER GASKETED COUPLING OR PLAIN END AND RUBBER GASKETED BELL END. PIPE SHALL BE PRESSURE CLASS SHOWN ON THE DRAWINGS. THE PIPE SHALL CONFORM TO THE OUTSIDE DIMENSION OF DUCTILE IRON PIPE. PIPE FOR POTABLE WATER SHALL BE APPROVED BY NATIONAL SANITATION FOUNDATION. USE AWWA C900-DR18, 150 PSI PIPE.

POLYVINYL CHLORIDE (PVC) PLASTIC PIPE LESS THAN 4-INCH DIAMETER: PVC PIPE 4" AND SMALLER IN DIAMETER SHALL MEET THE REQUIREMENTS OF ASTM D1784 AND SHALL BE SUITABLE FOR USE AT THE MAXIMUM HYDROSTATIC WORKING PRESSURE OF 200 PSI AT 73 DEGREES F. CLASS 200 PIPE SHALL CONFORM TO THE REQUIREMENTS OF SDR-21 WITH STANDARD LAYING LENGTHS OF 13 AND 18 FEET WITH A TOLERANCE NOT TO EXCEED 1". USE

PROVISIONS FOR EXPANSION AND CONTRACTIONS AT EACH JOINT SHALL BE MADE WITH AN ELASTOMERIC RING. THE BELL SHALL CONSIST OF AN INTEGRAL WALL SECTION WITH AN ELASTOMERIC RING MEETING THE REQUIREMENTS OF ASTMF-477. THE WALL THICKNESS OF THE BELL SECTION SHALL CONFORM TO ASTM D3139.

ALL FITTINGS SHALL BE CLASS 250 GRAY CAST IRON CONFORMING TO ANSI A21.10-82 OR AWWA C110-82 OR CLASS 350 DUCTILE IRON. DUCTILE IRON SHALL CONFORM TO ASTM A 536-72, MINIMUM GRADE. NOMINAL THICKNESS OF ALL FITTINGS SHALL BE EQUAL TO OR EXCEED CLASS 53 DUCTILE IRON PIPE THICKNESSES. RADII OF CURVATURES SHALL CONFORM TO ANSI A21.10-82 OR

CERTIFICATION OF THE PVC PIPE AND CAST IRON FITTING WILL BE REQUIRED AND THE CONTRACTOR SHALL INDICATE THIS REQUIREMENT ON HIS PURCHASE ORDER. PIPE STIFFNESS USING F/Y FOR PVC MUNICIPAL WATER PIPE SHALL BE 375.

MATERIALS USED IN THE MANUFACTURE OF PVC PIPE SHALL CONFORM TO ASTM SPECIFICATIONS

EACH LENGTH OF PVC PIPE SHALL BE MARKED WITH THE MANUFACTURERS IDENTIFICATION, SIZE, MATERIAL, TYPE AND GRADE OF COMPOUND, PRESSURE RATING AND THE LETTERS NSF DENOTING NATIONAL SANITATION FOUNDATION APPROVAL FOR USE TO TRANSPORT POTABLE

- 8. PIPE LAYING EXERCISE CARE TO KEEP FOREIGN MATERIAL AND DIRT FROM ENTERING PIPE DURING STORAGE, HANDLING, AND PLACING IN TRENCH. CLOSE ENDS OF IN-PLACE PIPE AT THE END OF ANY WORK PERIOD TO PRECLUDE THE ENTRY OF ANIMALS AND FOREIGN MATERIAL. DO NOT LAY PIPE WHEN TRENCH BOTTOM IS MUDDY OR FROZEN, OR HAS STANDING WATER. REFER
- WATERLINE AND INDIVIDUAL SERVICE LINES SHALL BE CASED BENEATH ROADWAY. REFER TO
- 9. ACCEPTANCE TESTS A THE OWNER OR CONTRACTOR SHALL NOTIFY THE COUNTY AND ENGINEER AT LEAST TWENTY-FOUR (24) HOURS PRIOR TO THE COMMENCEMENT OF TESTING. TESTS SHALL BE MADE ON ALL SECTIONS OF PIPE THROUGHOUT THE ENTIRE PROJECT AND SHALL BE CONDUCTED ONLY IN THE PRESENCE OF THE COUNTY, AND ENGINEER OR ITS AUTHORIZED AGENT. TESTS SHALL BE MADE AFTER THE CORPORATION STOPS HAVE BEEN INSTALLED, AND SHALL BE MADE BETWEEN ADJACENT VALVES. CARE SHALL BE TAKEN TO ENSURE THAT THE ENTIRE TEST RUN OF PIPE IS SECURELY BRACED AND BLOCKED AGAINST THRUST WHEN PRESSURE IS APPLIED. ALL THRUST BLOCKS MUST BE COMPLETELY SET, AND ALL PIPE MUST BE FIRMLY SUPPORTED AND WEIGHTED DOWN BY PARTIAL BACKFILL SOIL ON TOP.
- B. ALL PIPE, JOINTS, VALVES AND FITTINGS IN THE TEST SECTION SHALL BE EXAMINED. DEFECTIVE MATERIAL DISCLOSED AS A CONSEQUENCE OF THE TESTS SHALL BE REMOVED AND REPLACED BY SOUND MATERIAL AT THE OWNER/CONTRACTOR'S EXPENSE. ANY JOINT SHOWING VISIBLE LEAKAGE SHALL BE MADE AIRTIGHT. THE TEST AS SHOWN BELOW SHALL BE REPEATED UNTIL ITS RESULTS ARE SATISFACTORY TO THE COUNTY AND ENGINEER.
- C. AFTER THE LINE HAS BEEN BACKFILLED AND AT LEAST 7 DAYS AFTER THE LAST CONCRETE REACTION ANCHOR HAS BEEN POURED, SUBJECT THE LINE OR ANY VALVED SECTION OF THE LINE TO A HYDROSTATIC PRESSURE TEST. FILL THE SYSTEM WITH WATER AT A VELOCITY OF APPROXIMATELY 1-FOOT PER SECOND WHILE NECESSARY MEASURES ARE TAKEN TO ELIMINATE ALL AIR. AFTER THE SYSTEM HAS BEEN FILLED, RAISE THE PRESSURE BY PUMP TO 1.5 TIMES THE WORKING PRESSURE. MEASURE PRESSURE AT THE LOW POINT ON THE SYSTEM COMPENSATING FOR GAGE ELEVATION. MAINTAIN THIS PRESSURE FOR 2 HOURS. IF PRESSURE CANNOT BE MAINTAINED, DETERMINE CAUSE, REPAIR, AND REPEAT THE TEST
- D. A LEAKAGE TEST SHALL BE CONDUCTED CONCURRENTLY WITH THE PRESSURE TEST. LEAKAGE SHALL BE DETERMINED WITH A CALIBRATED TEST METER FURNISHED BY THE CONTRACTOR. LEAKAGE WILL BE DEFINED AS THE QUANTITY OF WATER REQUIRED TO MAINTAIN A PRESSURE WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE, AFTER AIR HAS BEEN EXPELLED, AND THE PIPE FILLED WITH WATER. LEAKAGE, IN GALLONS PER HOUR, SHALL NOT EXCEED THAT QUANTITY DETERMINED BY L=SD x SQUARE ROOT OF P + 133200 (P=AVG. TEST PRESSURE IN PSIG). IF LEAKAGE EXCEEDS THAT AMOUNT, FIND AND REPAIR THE LEAKS AND REPEAT THE TEST UNTIL SUCCESSFUL. ALL VISIBLE LEAKS SHALL BE REPAIRED REGARDLESS OF THE AMOUNT OF LEAKAGE
- 10. DISINFECT AND TEST WATER MAINS AND ACCESSORIES IN ACCORDANCE WITH THE PROCEDURES LISTED BELOW AND MEET REQUIREMENTS OF VDH AND IN ACCORDANCE WITH AWWA C651.
- A. PRELIMINARY FLUSHING: THE MAIN SHALL BE FLUSHED PRIOR TO DISINFECTION, EXCEPT WHEN THE TABLET METHOD IS USED. FLUSHING SHALL BE AT A VELOCITY OF NOT LESS THAN 2.5 FEET PER SECOND. ADEQUATE PROVISIONS SHALL BE MADE FOR DRAINAGE OF FLUSHING
- B. FORM OF CHLORINE FOR DISINFECTION (1) CALCIUM HYPOCHLORITE CONTAINS 70 PERCENT AVAILABLE CHLORINE BY WEIGHT. IT SHALL BE EITHER GRANULAR OR TABULAR IN FORM. THE TABLETS, SIX TO EIGHT TO THE OUNCE, ARE DESIGNED TO DISSOLVE SLOWLY IN WATER. A CHLORINE-WATER SOLUTION SHALL BE PREPARED BY DISSOLVING THE GRANULES OR TABLETS IN WATER IN THE PROPORTION REQUISITE FOR THE DESIRED CONCENTRATION.
- (2) SODIUM HYPOCHLORITE IS SUPPLIED IN STRENGTHS FROM 5.25 TO 16 PERCENT AVAILABLE CHLORINE. THE CHLORINE-WATER SOLUTION SHALL BE PREPARED BY ADDING HYPOCHLORITE TO WATER. PRODUCT DETERIORATION SHALL BE RECKONED WITH IN COMPUTING THE QUANTITY OF SODIUM HYPOCHLORITE REQUIRED FOR THE DESIRED
- (3) APPLICATION: THE HYPOCHLORITE SOLUTIONS SHALL BE APPLIED TO THE WATER MAIN WITH A GASOLINE OR ELECTRICALLY-POWERED CHEMICAL FEED PUMP DESIGNED FOR FEEDING CHLORINE SOLUTIONS. FOR SMALL APPLICATIONS, THE SOLUTIONS MAY BE FED WITH A HAND PUMP; FOR EXAMPLE, A HYDRAULIC TEST PUMP. FEED LINES SHALL BE OF SUCH MATERIAL AND STRENGTH AS TO WITHSTAND SAFELY THE MAXIMUM PRESSURES THAT MAY BE CREATED BY THE PUMPS. ALL CONNECTIONS SHALL BE CHECKED FOR TIGHTNESS BEFORE THE HYPOCHLORITE SOLUTION IS APPLIED TO THE MAIN.

C. METHODS OF CHLORINE APPLICATION (1) CONTINUOUS FEED METHOD: WATER FROM THE EXISTING DISTRIBUTION SYSTEM OR OTHER APPROVED SOURCES OF SUPPLY SHALL BE MADE TO FLOW AT A CONSTANT, MEASURED RATE INTO THE NEWLY-LAID PIPELINE. THE WATER SHALL RECEIVE A DOSE OF CHLORINE, ALSO FED AT A CONSTANT, MEASURED RATE. THE TWO RATES SHALL BE PROPORTIONED SO THAT THE CHLORINE CONCENTRATION IN THE WATER IN THE PIPE IS MAINTAINED AT A MINIMUM OF 50 MG/L AVAILABLE CHLORINE. TO ASSURE THAT THIS CONCENTRATION IS MAINTAINED, THE CHLORINE SHALL BE MEASURED AT INTERVALS NOT EXCEEDING 2,000 FEET IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN THE CURRENT EDITION OF "STANDARD METHODS" AND AWWA M12 - "SIMPLIFIED PROCEDURES FOR WATER EXAMINATION." IN THE ABSENCE OF A METER, THE RATE MAY BE DETERMINED EITHER BY PLACING A PITOT GAGE AT THE DISCHARGE OR BY MEASURING THE TIME TO FILL A CONTAINER OF KNOWN VOLUME. TABLE 1 GIVES THE AMOUNT OF CHLORINE REQUIRED FOR EACH 100 FEET OF PIPE OF VARIOUS DIAMETERS. SOLUTIONS OF 1 PERCENT CHLORINE MAY BE PREPARED WITH SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE. THE LATTER SOLUTION REQUIRES APPROXIMATELY 1 POUND OF CALCIUM HYPOCHLORITE IN 8.5 GALLONS OF WATER.

CHLORINE REQ'D TO PRODUCE 50 MG/L CONC. IN 100 FT OF PIPE - BY

100% CHLORINE 1% CHLORINE SOL'NS PIPE SIZE POUNDS GALLONS 0.027 0.33 INCHES 4 AND SMALLER DURING THE APPLICATION OF THE CHLORINE, VALVES SHALL BE MANIPULATED TO

PREVENT THE TREATMENT DOSAGE FROM FLOWING BACK INTO THE LINE SUPPLYING THE WATER. CHLORINE APPLICATION SHALL NOT CEASE UNTIL THE ENTIRE MAIN IS FILLED WITH THE CHLORINE SOLUTION. THE CHLORINATED WATER SHALL BE RETAINED IN THE MAIN FOR AT LEAST 24 HOURS, DURING WHICH TIME ALL VALVES IN THE SECTION TREATED SHALL BE OPERATED IN ORDER TO DISINFECT THE APPURTENANCES. AT THE END OF THIS 24-HOUR PERIOD, THE TREATED WATER SHALL CONTAIN NO LESS THAN 25 MG/L CHLORINE THROUGHOUT THE LENGTH OF THE MAIN.

(2) TABLET METHOD: USE ONLY WHEN SCRUPULOUS CLEANLINESS HAS BEEN EXERCISED BECAUSE PRELIMINARY FLUSHING CANNOT BE USED. DO NOT USE THIS METHOD IF TRENCH WATER OR FOREIGN MATERIAL HAS ENTERED THE MAIN OR IF THE WATER IS BELOW 41 DEGREES F (5 DEGREES C). THIS METHOD MAY BE USED FOR MAINS UP TO 12 INCHES IN DIAMETER AND WHERE THE TOTAL LENGTH OF THE MAIN IS LESS THAN 2,500

PLACE TABLETS IN EACH SECTION OF PIPE AND OTHER APPURTENANCES. ENOUGH TABLETS SHALL BE USED TO ENSURE THAT A CHLORINE CONCENTRATION OF 25 MG/L IS PROVIDED IN THE WATER. ATTACH TABLETS USING PERMATEX NO. 1 ADHESIVE OR APPROVED EQUAL, EXCEPT FOR THE TABLETS PLACED IN HYDRANTS AND IN THE JOINTS BETWEEN THE PIPE SECTIONS. TABLETS SHALL BE FREE OF ADHESIVE EXCEPT ON THE ONE BROAD SIDE TO BE ATTACHED. PLACE ALL TABLETS AT THE TOP OF THE MAIN. IF THE TABLETS ARE ATTACHED BEFORE THE PIPE SECTION IS PLACED IN THE TRENCH, MARK THE POSITION OF THE TABLET IN THE PIPE AND ASSURE THAT THE PIPE IS PLACED WITH THE TABLET AT THE TOP. THE FOLLOWING TABLE SHOWS THE NUMBER OF 5-GRAIN HTH TABLETS NECESSARY PER JOINT OF PIPE TO OBTAIN 50 PPM CHLORINE. TABLETS PER JOINT

PIPE SIZE 3-INCH AND SMALLER 4-INCH WHEN INSTALLATION IS COMPLETED, FILL THE MAIN WITH WATER AT A VELOCITY OF LESS THAN 1-FOOT PER SECOND. THE WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 24 HOURS. OPERATE VALVES SO THAT THE STRONG CHLORINE SOLUTION WILL NOT FLOW

D. FINAL FLUSHING: AFTER THE APPLICABLE RETENTION PERIOD, THE HEAVILY CHLORINATED WATER SHALL BE FLUSHED FROM THE MAIN UNTIL THE CHLORINE CONCENTRATION IN THE WATER LEAVING THE MAIN IS NO HIGHER THAN THAT GENERALLY PREVAILING IN THE SYSTEM, OR LESS THAN 1 MG/L. CHLORINE RESIDUAL DETERMINATION SHALL BE MADE TO ASCERTAIN THAT THE HEAVILY CHLORINATED WATER HAS BEEN REMOVED FROM THE PIPELINE.

BACK INTO THE LINE SUPPLYING THE WATER.

ACCORDANCE WITH SECTION E ABOVE.

E. BACTERIOLOGIC TESTS (1) AFTER FINAL FLUSHING AND BEFORE THE WATER MAIN IS PLACED IN SERVICE, SAMPLES SHALL BE COLLECTED AND TESTED FOR BACTERIOLOGIC QUALITY AND SHALL SHOW THE ABSENCE OF COLIFORM ORGANISMS. AT LEAST TWO SAMPLES SHALL BE COLLECTED AT LEAST 24 HOURS APART AT INTERVALS NOT EXCEEDING 2,000 FEET, AND TESTED BY A STATE HEALTH DEPARTMENT APPROVED LABORATORY AND RESULTS SUBMITTED TO

(2) SAMPLES FOR BACTERIOLOGICAL ANALYSIS SHALL BE COLLECTED IN STERILE BOTTLES TREATED WITH SODIUM THIOSULFATE. IF LABORATORY RESULTS INDICATE THE PRESENCE OF COLIFORM BACTERIA, THE SAMPLES ARE UNSATISFACTORY AND DISINFECTION SHALL BE REPEATED UNTIL THE SAMPLES ARE SATISFACTORY.

(3) A SAMPLING TAP CONSISTING OF A CORPORATION COCK WITH METAL PIPE SHALL BE INSTALLED WITHIN 2 FEET OF VALVES. THE CORPORATION STOP INLET SHALL BE MALE, 1 INCH IN SIZE, AND THE OUTLET SHALL HAVE 1 INCH I.P. THREADS AND A CAP.

F. CLEANING, DISINFECTION, AND TESTING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. WATER FOR THESE OPERATIONS WILL BE FURNISHED BY THE OWNER, BUT THE CONTRACTOR SHALL INCLUDE IN HIS BID THE COST OF LOADING, HAULING, AND DISCHARGING THE WATER.

G. TESTING AND DISINFECTION OF THE COMPLETED SECTIONS SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO REPAIR OR REPLACE ANY CRACKED OR DEFECTIVE PIPE. ALL WORK NECESSARY TO SECURE A TIGHT LINE SHALL BE DONE AT THE CONTRACTOR'S EXPENSE.

H. DISINFECTION - PIPING, TREATMENT UNITS, AND ACCESSORIES WITHIN TREATMENT BUILDING. PIPING, TREATMENT UNITS AND ACCESSORIES WITHIN THE TREATMENT BUILDING SHALL BE DISINFECTED SIMILARLY IN ACCORDANCE WITH SECTION 11 ABOVE. BACTERIOLOGICAL SAMPLE TESTS SHALL BE COLLECTED AND TESTED AT EACH RAW WATER TAP AND FILTER TAP SIMILARLY IN

DATE: 10-1-02 TECHNICIAN:

CHECKED BY:

NO. DATE 2-26-03 SCALES

PROJ. NO. 020097 SHEET NO. 12 OF 16

DRAWING NO.

AS SHOWN

WATER STORAGE TANK

ABOVE GROUND STORAGE TANK / NON-PRESSURE RATED

Construction The above ground, steel, water storage tank shall be constructed in accordance with AWWA

D100 specification (current edition) excepting roof hatch, outside ladder and manway size. Tanks shall be constructed of A-283 steel plate and welded in accordance with AWWA D100. All nlet/outlet piping shall be threaded or flanged as noted. The tank shall be fabricated with a standard steel pipe vent with vented cap and bird/insect screen. The vent shall be installed at the top, center of the roof. The tank shall also be

constructed with a standard weight, steel overflow pipe. The overflow pipe shall be extended to within twelve (12) inches of grade as shown, terminating with a screened discharge. Adequate brackets shall be used to brace the overflow pipe at four (4) foot ± Intervals. See plans for vent and overflow pipe size. A concrete splash pad shall be installed at grade under the overflow pipe

A reinforced manway opening sized 11" x 15" shall be installed near the bottom of the tank. A twenty-four (24) inch flanged, circular manway shall also be required at the bottom of the tank

A twenty-four (24) inch square manway manhole access shall be provided on the top of the tank. It shall be framed six (6) inches above the surface of the roof. The top shall be fitted with a solid, water-tight cover which overlaps the framed opening and extends vertically down the side of the framed opening at least two (2) inches, i.e. shoe box design. The top shall be hinged at one side and fitted with a locking device or hasp on the opposite side. A circular, 24" manway access with a shoe box design lid shall be acceptable.

A flanged tank drain line shall also be installed where shown on the plan. A concrete splash block shall be installed under the tank drain.

An outside ladder with 2 - 3/8" side rails and 1/4" round bar rungs at 16" on centers, or similar construction, shall be installed as shown on the drawings. The ladder shall terminate 10'-0" above the base of the tank to deter vandalism. Ladder shall be designed to meet OSHA specifications and shall be equipped with a safety climb device as specified. An interior ladder with safety climb device shall also be provided. The inside ladder shall terminate 3'-0" above the

Threaded or flanged openings shall also be installed where shown on the drawing and sized as indicated. The tank shall also be fitted with eight (8) anchors/brackets as shown on the plans.

WATER STORAGE TANK SURFACE PREPARATION AND PAINTING

PAINTING

1.01 GENERAL

- Painting materials specified herein are the coating systems of the Tnemec Company, Inc. Similar coatings manufactured by Pennsbury Coatings, Valspar Corporation, or equal may be used. Comparable product of other responsible manufacturers may be used when approved by the Engineer. When the Contractor desires to substitute paint products of another manufacturer, data on past performance, composition, directions for use, and other required information shall be provided for review by the Engineer. Any and all interior paint used or substituted shall be approved for said use by the Virginia Department of Health or the National Sanitary Foundation Standard 61. No materials shall be used without the Engineer's approval. Material shall be delivered to the project in the manufacturer's sealed containers marked with their instruction for use. Painting operations shall be in accordance with AWWA D102 where applicable and the following instructions. All coatings shall be applied in accordance with the manufacturer's
- Coatings shall be applied during good painting weather. Air and surface temperatures shall be within limits prescribed by the manufacturer for the coating being applied. Work areas shall be reasonably free of airborne dust at the time of application and while the
- Materials shall be mixed, thinned and applied accordingly to the manufacturer's printed
- Recommended recoat times specified by the manufacturer shall be adhered to closely. Allow each coat to dry thoroughly before applying next coat.
- The Contractor shall provide adequate ventilation during surface preparation and coating on the tank interior and during the drying phase to carry off solvents
- Where applicable, the Contractor shall meet the requirements "Worker and Environmental Controls for Industrial Lead Paint Removal Projects" and perform all work having knowledge of the hazardous nature of lead removal projects.
- Finish coats shall be uniform in color and sheen without streaks, laps, runs, sags or
- Allow minimum of seven (7) days curing time after application of final coat on the interior before flushing, disinfection or filling with water.
- It is imperative that coating operations, once begun are completed promptly. If approaching cold weather season is imminent,, it will be necessary to consider coating system additives which will permit painting the tank when surface temperatures can be expected to drop to a minimum of 35°F. All such additives or "accelerators" shall be NSF approved for surfaces to be in contact with potable water and competible with the

1.02 INTERIOR COATING SYSTEM

A. Interior Surface Preparation and Coatings

- 1. The interior surfaces shall then be pressure cleaned to remove any, mud, silt or foreign debris. These contaminants and debris shall be removed from the tank and properly disposed at the County Landfill.
- The interior surfaces shall then be sand blasted clean to an SSPC-SP 10 *near white" metal finish. This surface preparation shall include all ladders, interior piping as may be determined and other accessories. The underside of the roof deck and any new ladder or other appurtenances shall also be included in this surface preparation procedure
- All interior surfaces shall then be cleaned using compressed air to remove any dust build-up. Surface preparation and application of specified primer shall be completed incrementally to prevent rust development on prepared steel substrate prior to the application of specified primer.
- All incremental surface area preparation shall overlap to prevent gaps in surface preparation or proper primer coat application.

Preferred Interior Coating System

 The preferred interior coating system shall be a three (3) coat system. The preferred interior coatings system with a final dry film thickness of between 10.5 and 15.5 mils shall be applied in contrasting colors and per the manufacturer's Prime Coat:

prime coat shall be Series 91-H₂O Hydro-Zinc 2000 as manufactured by Tnemec Company or equal. The primer shall be installed per the manufacturer's recommendations with a dry film thickness of between 2.5 to 3.5 mils.

Intermediate Coat: The intermediate coat shall be a polyamide epoxy certified by NSF International in accordance, with ANSI/NSF Std. 61. The product shall be installed per the manufacturers recommendations to a dry film thickness of 4.0 to 6.0 mils. The color of the intermediate coat shall be beige. The coating shall be similar to Series 20-1255, Pota-Pox as manufactured by Tnemec Company Incorporated

The green-gray prime coat shall be a two (2) component, moisture-cured, zinc-

rich primer meeting the zinc-rich primer requirements of AWWA D102-97. The

5. Finish Coat The finish coat shall be a polyamide epoxy designed specifically as an interior finish coat and white in color to a dry film thickness of 4.0 to 6.0 mils. The product shall be certified by NSF International, NSF Company Incorporated as suitable for contact with potable water in accordance with ANSI/NSF Std. 61. The finish coat shall be Series 20-Pota-Pox (WH02) (tank white) as manufactured by Themec Company Incorporated or equal.

Alternate Interior Coating System

1. An alternate interior coating system shall be a two (2) coat system. The alternate interior coatings system with a final dry film thickness of between 7.0 and 11.0 mils shall be applied in contrasting colors and per the manufacturer's

Prime Coat

The beige prime coat shall be a two (2) component, epoxy primer meeting the primer requirements of AWWA D102-97. The prime coat shall be Series 20-Pota-Pox as manufactured by Tnemec Company or equal. The primer shall be installed per the manufacturer's recommendations with a dry film thickness of between 3.0 to 5.0 mils.

Finish Coat

The finish coat shall be a polyamide epoxy coating designed specifically as an interior finish coat and white in color to a dry film thickness of 4.0 to 6.0 mils. The product shall be certified by NSF International, NSF Company Incorporated as suitable for contact with potable water in accordance with ANSI/NSF Std. 61. The finish coat shall be Series 20-Pota-Pox (WH02 tank white) as manufactured by Tnemec Company Incorporated or equal.

Epoxy additives designed to accelerate the cure rate and allow for interior coating applications at temperatures down to 35°F shall be compatible with the coating system used. The product shall be similar to Series 44-710 accelerator as manufactured by TNEMEC Company or equal. These additives shall only be used when approved by the

1.03 EXTERIOR COATING SYSTEM

A Preferred Exterior Coating System

Exterior Surface Prepoaration and Coating

The General Contractor shall prepare the exterior steel surface to an SSPC-SP6 commercial blast specification. The exterior three (3) coat system shall consist of a moisture-cured, zinc-rich urethane primer, an epoxy intermediate coat and a polyurethane (semi-gloss) finish coat with a total dry-film thickness of between 6.5 to 9.5 mils.

Prime Coat:

The exterior prime coat shall be a two (2) component moisture-cured, zinc-rich urethane system applied to a dry film thickness of between 2.5 to 3.5 mils. The green-gray prime coat shall be Series 91 H₂O - Hydro-Zinc as manufactured by Tnemec Company Incorporated or equal.

Intermediate Coat:

The Intermediate coat shall be a polyamide epoxy certified by NSF International in accordance with ANSI/NSF Std. 61. The coating shall be installed per the manufacturer's recommendations to a dry film thickness of 2.0 to 3.0 mils. The color of the intermediate coat shall be beige. The coating shall be similar to Series 66, Hi-Build Epoxoline as manufactured by Tnemec Company Incorporated or equal.

4. Finish Coat;

The finish top coat shall be an aliphatic acrylic polyurethane coating highly resistant to abrasion, wet conditions, corrosive fumes, chemical contact and exterior weathering applied to a dry-film thickness of 2.0 to 3.0 mils. The coating shall have semi-gloss finish. The Owner shall select the color for the finish coating from the manufacturer's available colors for this series. The finish coat shall be Series 73, Endura-Shield as manufactured by Tnemec Company Incorporated or equal.

The exterior finish coating shall be smooth without runs or laps.

Alternate Exterior Coating System

The General Contractor shall prepare the exterior steel surface to an SSPC-SP6 commercial blast specification. The exterior three (3) coat system shall consist of an epoxy primer, an epoxy intermediate coat and a polyurethane (semi-gloss) finish coat with a total dry-film thickness of between 6.0 to 9.0 mils.

Prime Coat:

The exterior prime coat shall be a two (2) component epoxy system applied to a dry film thickness of between 2.0 to 3.0 mils. The beige prime coat shall be Series 20-1255 as manufactured by Tnemec Company Incorporated or equal.

Intermediate Coat:

The intermediate coat shall be a polyamide epoxy certified by NSF International in accordance with ANSI/NSF Std. 61. The coating shall be installed per the manufacturer's recommendations to a dry film thickness of 2.0 to 3.0 mils. The color of the intermediate coat shall be beige. The coating shall be similar to Series 66-Hi-Build Epoxoline manufactured by Tnemec Company Incorporated or equal.

Finish Coat:

The finish top coat shall be an aliphatic acrylic polyurethane coating highly resistant to abrasion, wet conditions, corrosive fumes, chemical contact and exterior weathering applied to a dry-film thickness of 2.0 to 3.0 mils. The coating shall have semi-gloss finish. The Owner shall select the color for the finish coating from the manufacturer's available colors for this series. The finish coat shall be Series 73, Endura-Shield as manufactured by Tnemec Company Incorporated or equal.

The exterior finish coating shall be smooth without runs or laps.

Epoxy additives designed to accelerate the cure rate and allow for exterior coating application at temperatures down to 35°F shall be compatible with the coating syster used. The product shall be similar to Series 44-710 as manufactured by TNEMEC Company or equal. These additives shall only be used when approved by the Engineer

1.04 GUARANTEE

- The Contractor shall deliver all surface coating work covered by these specifications to the Owner, complete and in first class condition in every respect and shall guarantee material and workmanship for a period of twelve (12) months after completion. If, during guarantee time, any defects should show up due to defective material, negligence or want of proper care on the part of the Contractor, the latter shall furnish new materials, labor and equipment as necessary for repairs at this own expense on receipt of notice of such defects from the Owner or the Owner's representative
- The Contractor shall also submit Certification that the coating system specified herein was applied in accordance with the Specifications and the manufacturer's

EXECUTION OF THE WORK

2.01 Surface Preparation and Coating Systems

Surface preparation and coating systems shall be implemented and installed as specified in Section 09920.

2.02 Safety Devices

The General Contractor shall also be required to install the safety devices outlined below.

An OSHA approved, safety climbing device shall be installed on the inside and outside fixed, vertical access ladders. The safety climb device shall be of the flexible, stainless steel cable system type. The safety climbing system shall meet VOSHA regulation 1910.27 and other related ANSI regulations. The system shall be provided complete with all necessary attaching hardware such as galvanized mounting brackets, non-metallic cable guides, 3/8" galvanized cable on the outside ladder, 3/8 of stainless steel cable on the inside mount. Two (2) worker harnesses each with detachable safety sleeves shall be provided. Both harnesses shall be universal sizing.

Each harness shall also be equipped with a six (6) foot adjustable safety, shock

The safety climb system shall be similar to the tensioned steel cable system as manufactured by Lad-Safe, or equal. The universal harness system shall be the Lad-Safe® System as manufactured by D.B. Industries, Inc. or similar units manufactured by Miller Equipment or equal. The shock absorbing lanyards shall be similar to the Dyna-Break and Expanyard ™ shock absorbing lanyard manufactured by Rose, Inc., Miller Equipment or equal.

- One (1) telescoping extension, compatible with the safety climb device shall be provided at the top of the exterior ladder. The ladder safety extension shall be constructed of aluminum and stainless steel and be constructed similarly to the Series L1E Safety Extension as manufactured by Halliday Products or equal.
- A locking ladder guard shall also be installed on the new access ladder. The ladder guard shall be approximately eight (8) feet in length as constructed of heavy-gauge (1/8" TK) rust-proof aluminum. The unit shall have angled sides. All braces and hardware shall be fabricated from galvanized, heavy gauge steel.

The interior and exterior fixed, access ladders shall be dimensioned to meet VOSHA Regulation Para. 1910.27 and properly installed. The ladder shall meet the dimensional characteristics shown in the standard ladder detail.

E. Handrail System at Top of tank

A VOSHA approved handrail system shall be installed on the top and around the circumference of the standpipe. The handrail package system shall be constructed and installed per VOSHA Regulation 1910.23 and generally detailed as shown on the standard detail on the Contract Drawings.

A standard railing shall consist of a top rail, intermediate rail and post. The railing shall have a vertical height of 42 inches nominal measured from the upper surface of the top rail to the top of the tank. The top rail shall be smooth surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the surface of the top of the tank. The end of the rails shall stop at the entrance to the ladder providing a clear width opening of thirty (30) inches. The ends of the rails shall not overhand the terminal posts. The handrail system shall be constructed of pipe railing and post of at least 1 1/2" minimal diameter with post spaced at not more than eight (8) feet on centers Each post shall be fitted with a bearing plate at least 3"x3" and such plate shall be welded securely to the top plate of the roof.

The terminal post at the vertical access ladder shall be fitted with angled pipe supports extending from the top rail down to the roof plates at approximately 45°, each lateral support ending in a bearing plate, which shall be securely welded to the roof plate. The spacing shall be adjusted as necessary to rest on either side of the interior access roof hatch at the top of the tank.

A standard toe board four (4) inches nominal vertical height and 1/2" thick plate shall be attached to the inside of the handrail post approximately 1/2" above the top of the roof deck. The toe board shall be securely fastened in place.

As a separate fitting, a steel eye bolt with sufficient interior diameter to receive the latching devices of the shock absorbing lanyard specified above shall be welded to the top rail of the handrail system at each post location. The eye bolt shall be dimensioned and welded to the top rail as necessary to support a 200#

2.03 Tank Structural and Appurtenance Improvements

improvements outlined below

The General Contractor shall provide the following structural and appurtenance

than fifty (50) lbs., hinges shall be provided

Shell Manway and Vent Manway Shell manway shall be installed on the first ring of the tank shall where ndicated on the Contract Drawings. If the manway cover weighs more

The size of the manway manhole shall be a circular at twenty-four (24)

The shell plate where such manway is indicated shall be reinforced to comply with AWWA D-100 paragraph 3.1.3 and all portions of the manway shall be reinforced to withstand the weight and pressure of the

The vent manway may be sized as discussed previously.

2.04 Cleaning and Disinfection

When the painting has been completed, the coatings are properly cured and the system accepted by the Owner, the Interior tank surfaces and interior piping shall be thoroughly cleaned and flushed with clear potable water. The water shall be made available from the two (2) Class II B wells to be constructed under this Contract. The wells shall be completed per the Specification, disinfected and approved for use prior to initiating tank testing and disinfections procedures. Any waterline required to convey water to the storage shall also have been disinfected per the Specifications and related Virginia Department of Health criteria.

Disinfection

- The procedures used for the disinfection of the water storage shall be compliant with Virginia Department of Health regulations outlined in Waterworks Regulations, Section VR 355-18-011.01 paragraph 3.45."O" Disinfection and applicable sections of AWWA C652.
- After the interior tank surfaces have been cleaned and flushed, water containing fifty (50) ppm (parts per million) of free chlorine shall be placed in the tank to such a depth that, when the tank is filled, the resultant chlorine concentration shall be no less than two (2) ppm. The water containing the fifty (50) ppm shall be used to spray the underside of the roof and the interior tank walls while the tank is being filled. The required solutions for chlorine residual shall be as outlined on the drawings. The depth of water with 50 ppm shall be approximately five (5) ft. The standpipe shall be allowed to stand with this solution for at least twenty-four (24) hours before the tank is filled to the overflow.
- The full tank shall then be allowed to stand with the two (2) ppm residual
- When the tank disinfection process has been deemed satisfactory and acceptable, the General Contractor shall proceed with the bacteriological analysis outlined below.

- Two (2) water samples of bacteriological analysis shall be collected at least twenty-four (24) hours apart and analyzed by an independent certified laboratory. The results of these sample test shall indicate no coliform bacteria before the tank can be considered acceptable for
- In the event that contamination is indicated, the procedure outlined above shall be repeated until satisfactory results are obtained.

4. Placing the Tank Into Service

- After satisfactory bacteriological samples have been obtained, the tank may be placed into service without draining the water used to disinfect
- Water used for cleaning and disinfection during the initial standpipe cleanup and fill procedures will be supplied by the Owner from the approved Class II-B well, and treated as necessary for use within the system.

All work shall be accomplished by experienced workmen, using equipment best adapted to the specified scope of work. Upon completion of the tank, the standpipe shall be watertight. Under the provisions of AWWA D-100, the standpipe shall be filled with water to test for water tightness. The watertight inspections shall be accomplished during tank disinfe-

Repair work as needed to eliminate leaks shall be neatly accomplished. amaged coatings shall be repaired

The General Contractor shall deliver the work covered by the Specifications in a complete, first class condition in every respect. The General Contractor shall guarantee the material and workmanship for a period of twelve (12) months after the established date of substantial completion. If, during the warranty period, any defects should be revealed due to defective material or paint, negligence or lack of proper care on the part of the General Contractor, the latter shall finish nev materials and the labor and equipment necessary for any such reports, at his own expense. The warranty work shall be accomplished promptly upon receipt of written notice from the Owner or the various Representative of such defect

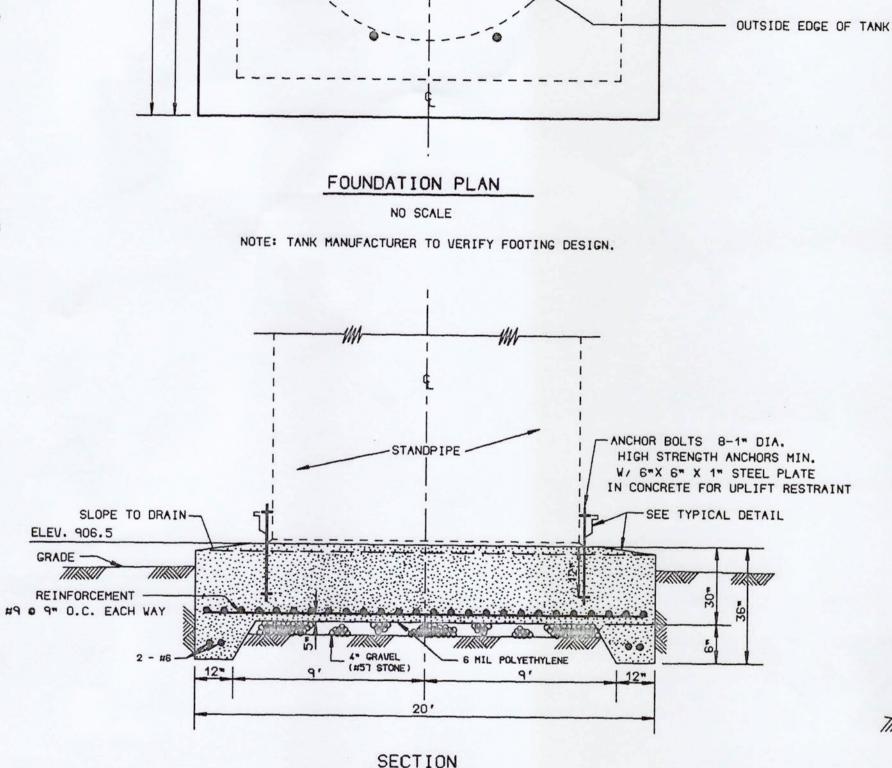
The General Contractor shall also submit certification from the manufacturer's representative that the coating system installed was installed per the manufacturer's recommendation.

TOP OF TANK -

START ELECTRODE-

ELECTRODE HOLDER @

WATER STORAGE TANK



12" ANCHOR BOLT

PROJECTION

SOLID WATERTIGHT

LID WITH LOCK

THERMOSTAT FACTORY

- STOP ELECTRODE

HEATER SHUT-OFF

350 WATT IMMERSION

ELECTRODE

SET TO CLOSE @ 32° F

TYPICAL DETAIL

NO SCALE

- 1" DIA. HIGH STRENGTH

STANDPIPE

WATER STORAGE TANK

UPPER HATCH DETAIL

BOLT A-325 STEEL

PIPE SUPPORTS (TYPICAL) 15'-4" DIAMETER 80.000 GALLON WATER STORAGE TANK -3" RISER PIPE PROVIDE 10' STEP LADDER W/SUPPORTS IN CONCRETE FOR UPLIFT RESTRAINT FOR ACCESS TO TANK LADDER. STORE IN A LOCKED AREA ON SITE -MANHOLE INSULATE PER NOTE 2-BLOCK EL. 906.5 WEEP HOLE IN 3" ELBOW INSIDE OF TANK 8" DIAMETER --3" DIAMETER OUTLET INLET

EFFECTIVE

STORAGE

ELEV. 949.5

GRADE W/SCREEN WATER STORAGE TANK ELEVATION

INLET - OUTLET PIPING

(INSULATE PER NOTE 2)

-- 18" WIDE ATTACHED

WITH LADDER

8-1"DIA. X 2' ANCHOR

WELDED TO BOLT EACH SIDE

NOTE: CONTRACTOR TO VERIFY

ON TANK PRIOR TO SETTING

ANCHOR BOLT LINE ± (VERIFY)

ANCHOR BOLT LAYOUT & SPACING

BOLTS W/R 1"X6"X6"

(GALV. AFT. FAB.)

- EDGE OF SLAB

EDGE OF FOOTING

GALV. LADDER. START

SAFE-T-CLIMB DEVICE

10' FROM SLAB. PROVIDE

-WATER

LEVEL

INDICATOR

- 2' X 2' HATCH W/LOCK

-SCREEN VENT

EL. 962.5

ELECTRODE WATER

LEVEL CONTROLS

- 4" SCH. 40 STEEL

OVERFLOW DIS-

CHARGE TO GRADE

(SCREENED OUTLET)

DISCHARGE PIPE (PROVIDE SCREEN . OPENING) --- SPLASH BLOCK

SHOEBOX LID

HINGED AT BACK

-6" C.I. DRAIN PIPE TO

EROSION CONTROL

2' - 6" MIN.

1. ALL PIPING BELOW GRADE AND UNDER CONCRETE SLAB SHALL BE GALVANIZED STEEL OR DUCTILE IRON.

ALL BLOW-OFFS AND DISCHARGES EMPTY INTO

SPLASH BLOCKS

2. ALL EXPOSED PIPING SHALL BE INSULATED TO PREVENT FREEZING TO A DEPTH 3' BELOW GRADE WITH "CERTAINTEED" WRAP OR APPROVED EQUAL.

- 4. GALVANIZED STEEL OR DUCTILE IRON PIPE SHALL BE USED FOR ALL 5. FOUNDATION MATERIALS
- a. CONCRETE: fc'= 4000 PSI b. REINFORCEMENT: Fy = 60,000 PSI

3. CUT OR FILE ALL THREADS FROM DISCHARGE OF SAMPLE TAPS. ABOVE-GRADE PIPING AT THE WELL AND AT THE STANDPIPE STORAGE TANK.

6. SOIL BEARING CAPACITY: 3500 pef MIN.

DATE: 10-1-02 TECHNICIAN: CHECKED BY: REVISIONS NO. DATE 2-26-03 SCALES AS SHOWN PROJ. NO. DIV. 020097 SHEET NO.

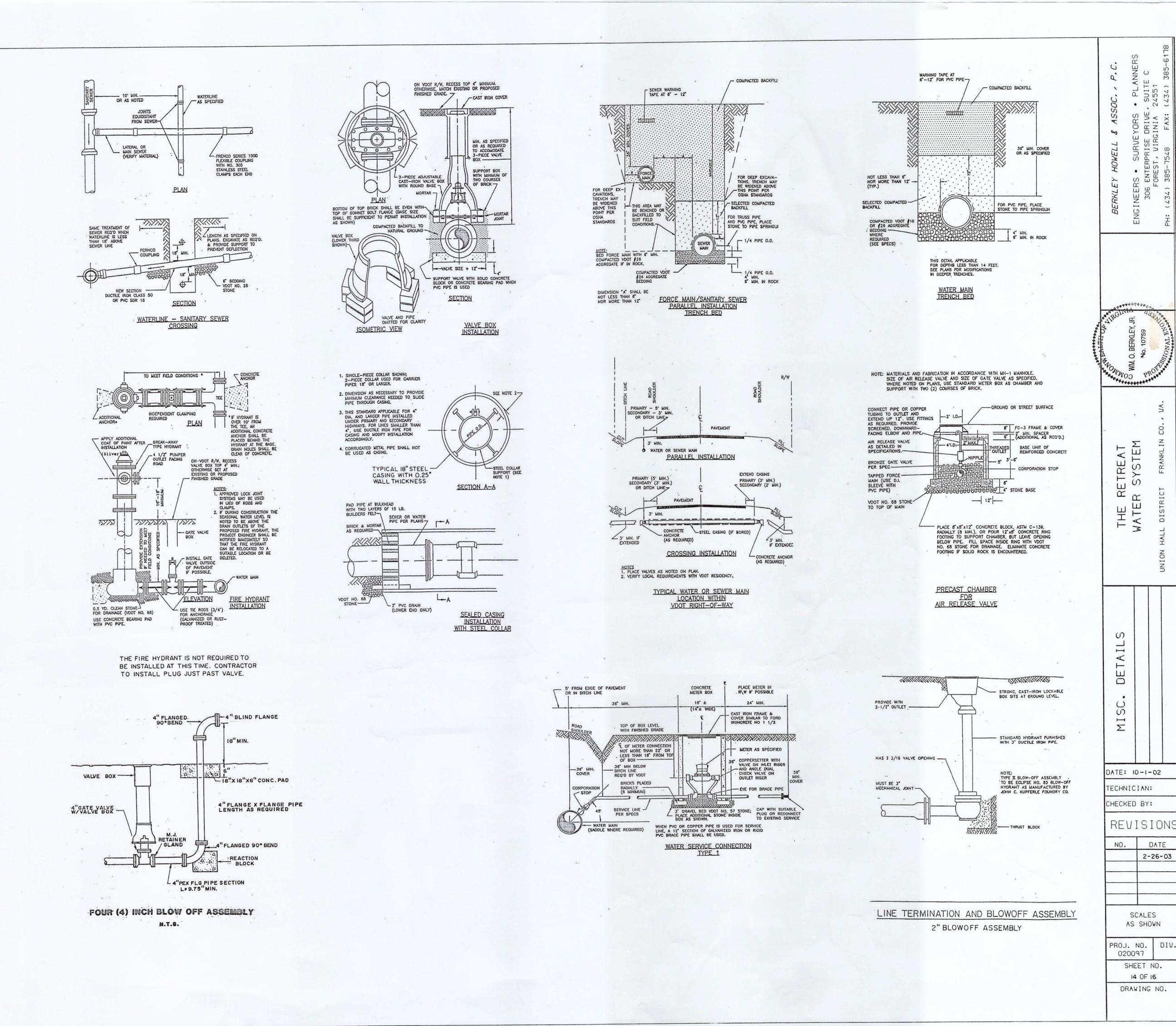
13 OF 16

DRAWING NO.

DETAIL2

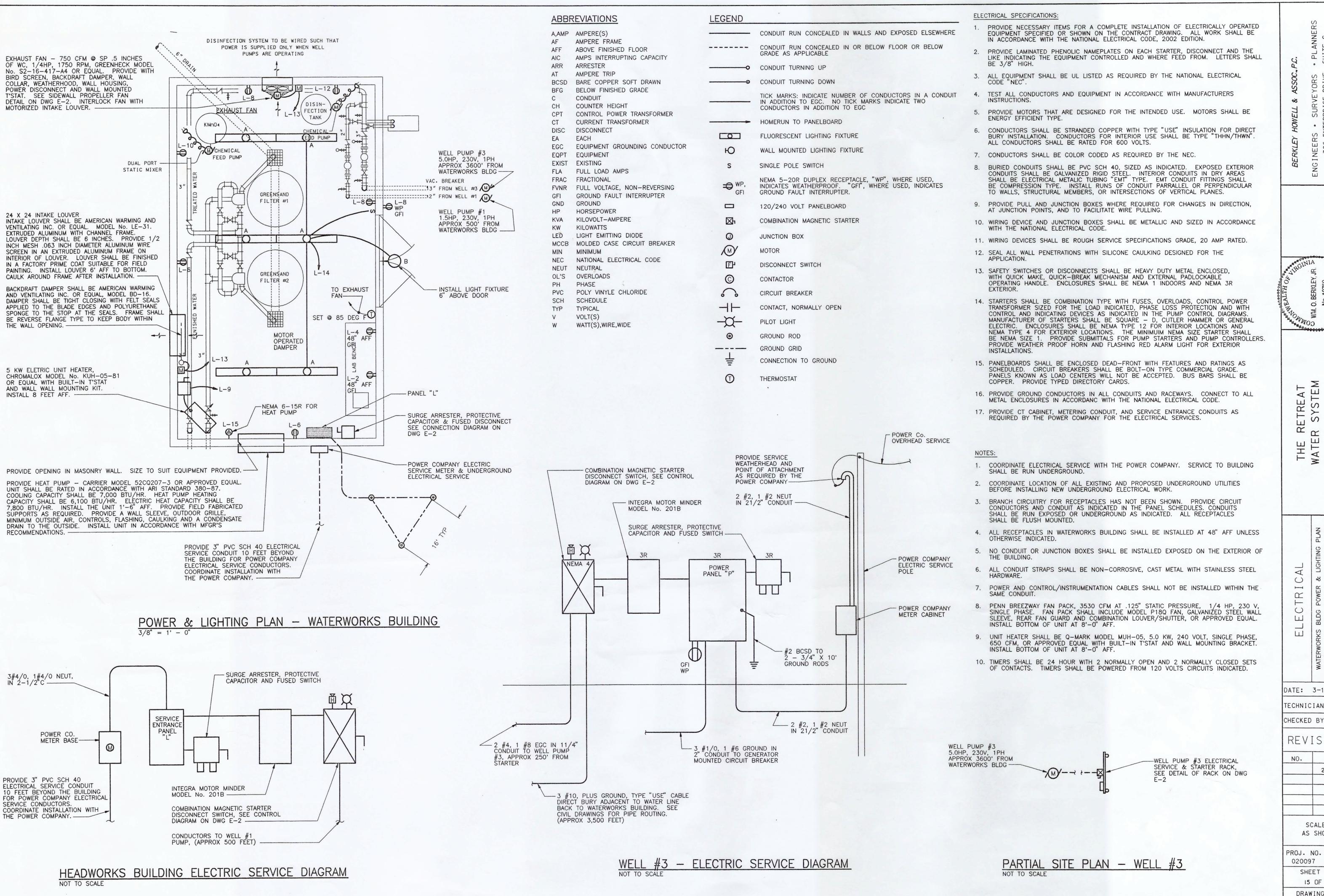
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DATE

2-26-03



DIAGRAMS

DATE: 3-11-03 TECHNICIAN: WAYNE CHECKED BY: WOB

REVISIONS DATE

2-26-03

SCALES AS SHOWN

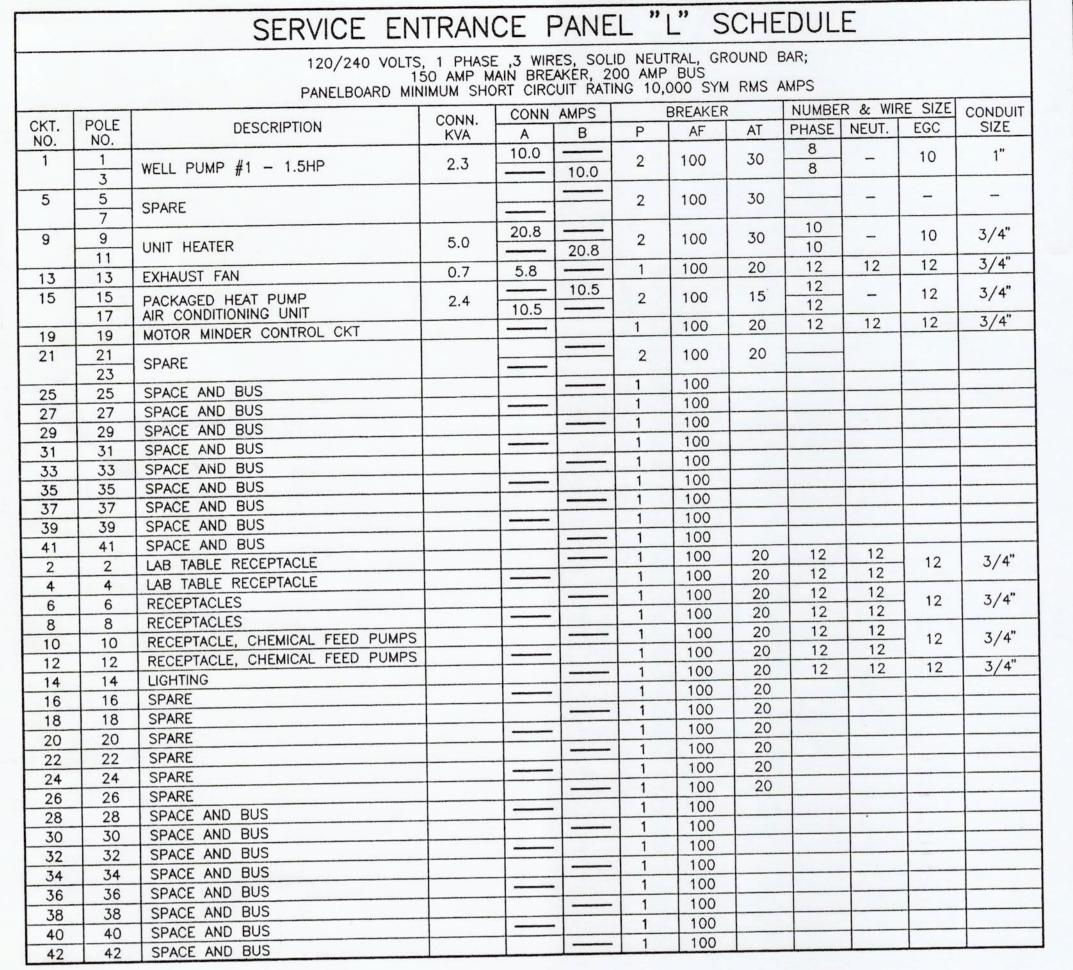
020097 SHEET NO. 15 OF 16 DRAWING NO.

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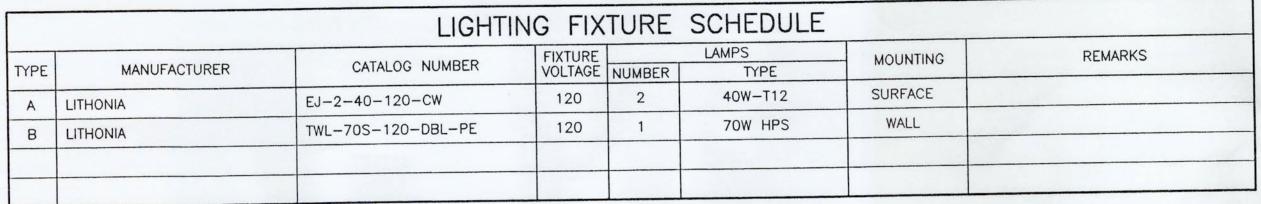
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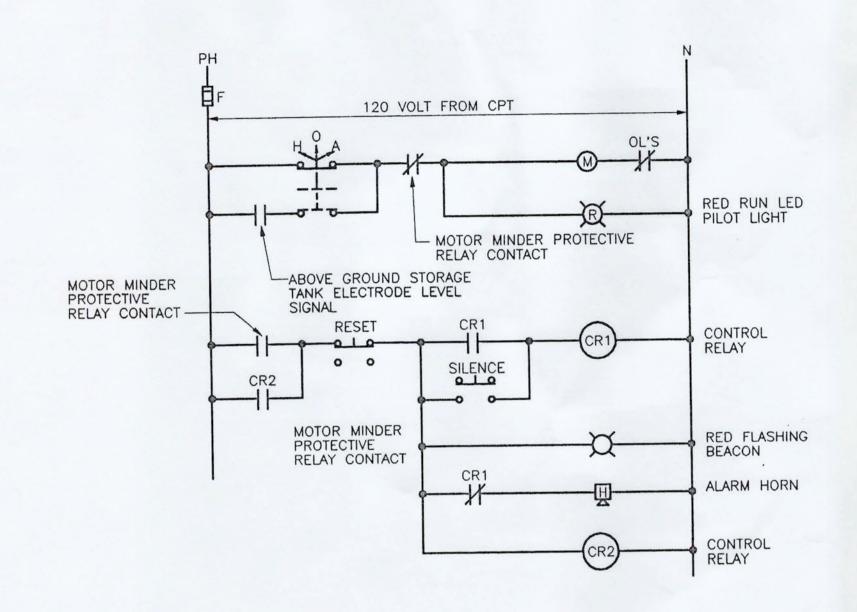
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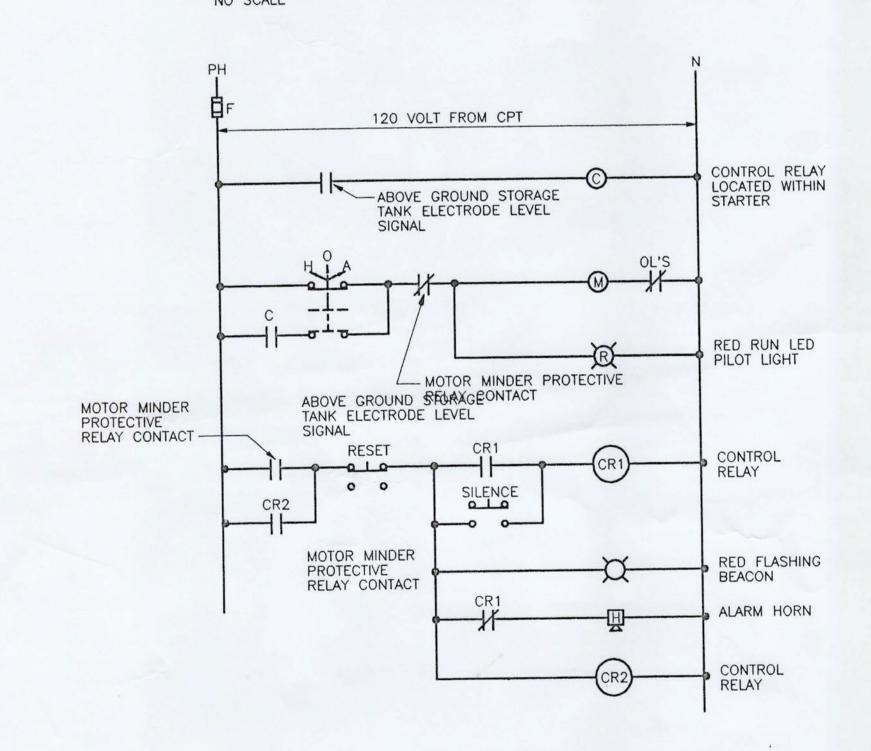


		NEMA 3R SERV	ICE EN	TRAN	ICE	PAN	VEL '	'P"	SCH	EDU	LE	
		120/240 VO PANELBOARD	DLTS, 1 PHAS	E ,3 WIR	ES, SOL	ID NEU 00 AMF	TRAL, GR	OUND	BAR; AMPS			
		PANELBUARD		T CONIN	AMPS		BREAKER		TNUMBE	R & WII	RE SIZE	CONDL
CKT.	POLE	DESCRIPTION	CONN. KVA	A	B	P	AF	AT	PHASE		EGC	SIZE
NO.	NO. 1	WELL PUMP #3	6.4	28.0	28.0	2	100	50	4	_	10	1"
F	<u>3</u> 5	SPACE & BUS ONLY				1	100					
5 7	7	SPACE & BUS ONLY				1	100					
9	9	SPACE & BUS ONLY				1	100					
11	11	SPACE & BUS ONLY				1	100					
13	13	SPACE & BUS ONLY				1	100					
15	15	SPACE & BUS ONLY				1	100					
17	17	SPACE & BUS ONLY				1	100					
19	19	SPACE & BUS ONLY				11	100		-		-	
21	21								-			
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						-		-				
				-		1	100	20	12	12	12	3/4
2	2	RECEPTACLE				1	100	20	12	12	12	3/4
4	4	MOTOR MINDER CONTROL CKT			1	1	100	20				
6	6	SPARE			1	1	100	20				
8	8	SPARE		-	1	1	100	20				
10	10	SPARE				1	100	20				
12	12	SPARE ONLY				1	100					
14	14	SPACE & BUS ONLY				1	100					
16	16	SPACE & BUS ONLY				1	100					
18	18	SPACE & BUS ONLY				1	100					
20	20	SPACE & BUS ONLY										
				-	-	-		-			1	
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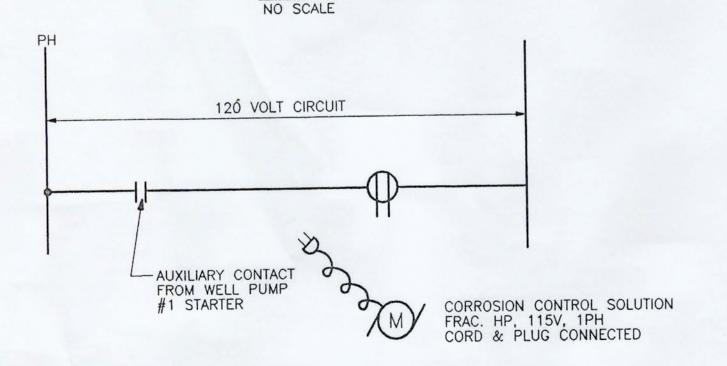




WELL PUMP #1 CONTROL DIAGRAM NO SCALE



WELL PUMP #3 CONTROL DIAGRAM



CHEMICAL FEED PUMP CONTROL DIAGRAM

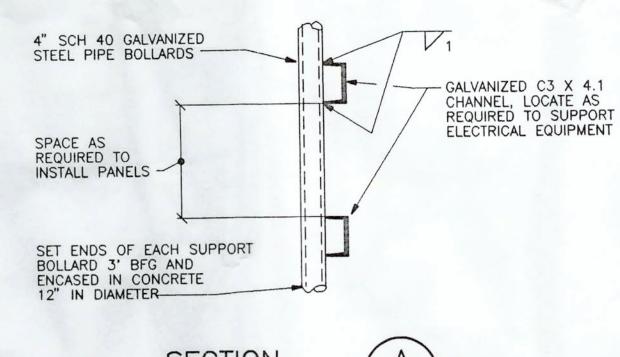
NO SCALE

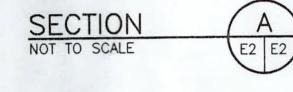
CHEMICAL FEED PUMP CONTROL DIAGRAM NO SCALE

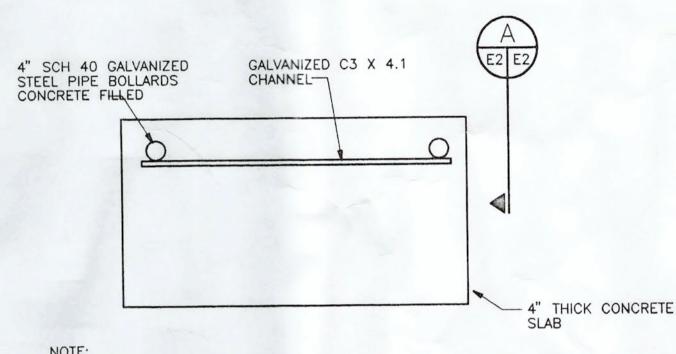
DISINFECTION SOLUTION
FRAC. HP, 115V, 1PH
CORD & PLUG CONNECTED

120 VOLT CIRCUIT

-- AUXILIARY CONTACT FROM WELL PUMP #1 STARTER

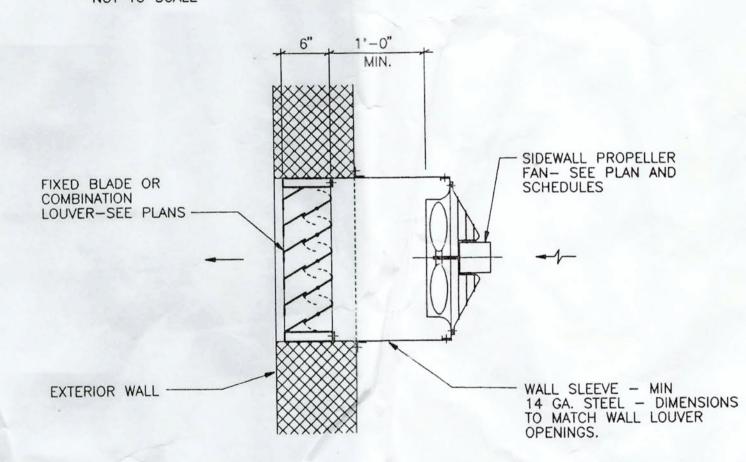




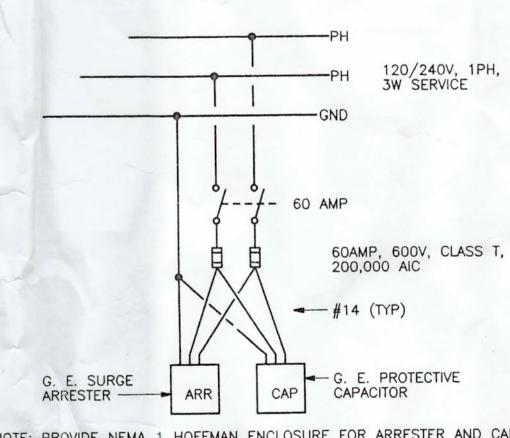


ALL ELECTRICAL EQUIPMENT ENCLOSURES ON RACK SHALL BE NEMA 3R RATED UNLESS OTHERWISE INDICATED. PAINT PIPE BOLLARDS WITH 3 COATS OF BLACK ENAMEL PAINT.

WELL #3 ELECTRICAL SERVICE RACK DETAIL



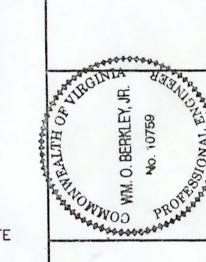
DETAIL - SIDEWALL PROPELLER FAN NOT TO SCALE



NOTE: PROVIDE NEMA 1 HOFFMAN ENCLOSURE FOR ARRESTER AND CAPACITOR IN WATERWORKS BUILDING AND NEMA 3R ENCLOSURE @ WELL SITE #3.

DETAIL SURGE ARRESTER & PROTECTIVE CAPACITOR CONNECTIONS

NO SCALE



RETREAT THE

AL 0 \vdash CTR ليا L

DATE: 3-11-03

TECHNICIAN: WAYNE CHECKED BY: WOB DATE 2-26-03

REVISIONS NO.

SCALES AS SHOWN

PROJ. NO. DIV. 020097 SHEET NO. 16 OF 16 DRAWING NO.

RETWATEREO2.DGN

E-2