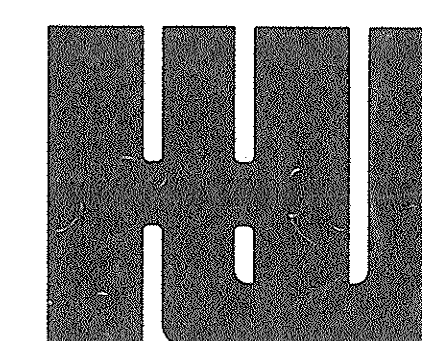
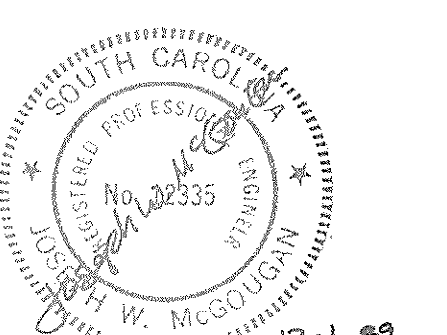


GRAND STRAND WATER & SEWER AUTHORITY
SURFACE WATER TREATMENT PROJECT

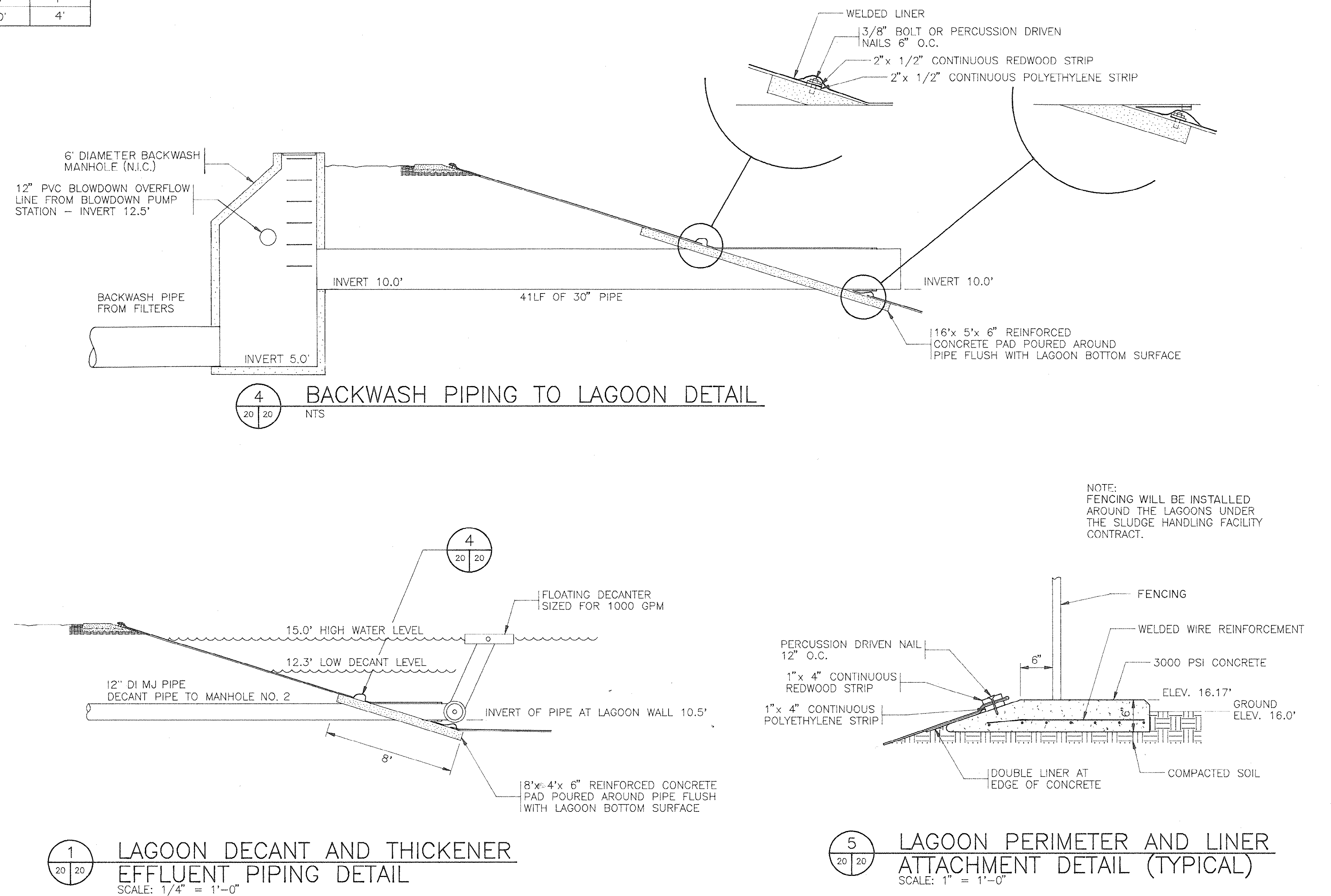
SLUDGE HANDLING FACILITIES
SURFACE WATER TREATMENT PLANT
BUCKSPORT, SOUTH CAROLINA



HOBBS, UPCHURCH & ASSOCIATES, P.A.
CONSULTING ENGINEERS
SOUTHERN PINES, NORTH CAROLINA 28387

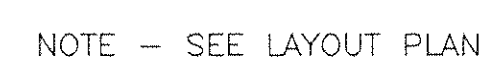


NOTE :
CONSTRUCT CONCRETE HEADWALL
AT OUTLET OF PIPE.
SEE DETAIL 

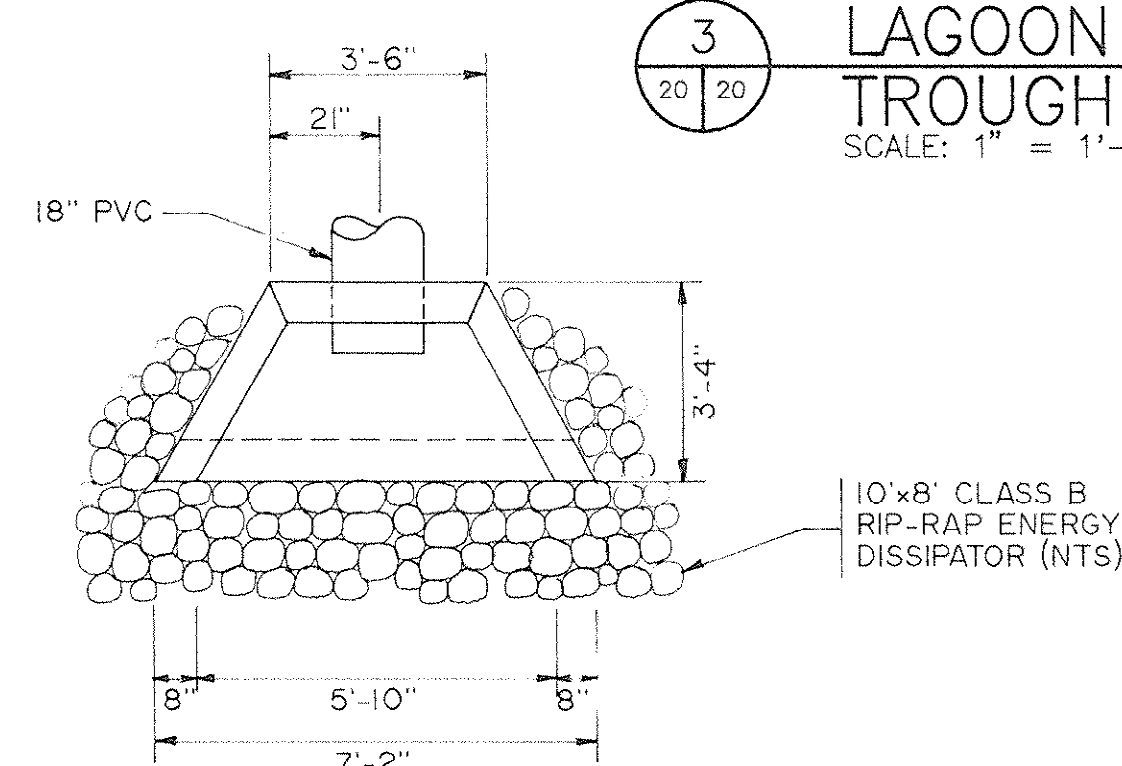


1 LAGOON DECANT AND THICKENER
20 20
EFFLUENT PIPING DETAIL
SCALE: 1/4" = 1'-0"


 LAGOON PERIMETER AND LINER
 ATTACHMENT DETAIL (TYPICAL)
 SCALE: 1" = 1'-0"



3 LAGOON SLUDGE DRAW-OFF
20 20 TROUGH AND PIPING DETAIL
SCALE: 1" = 1'-0"



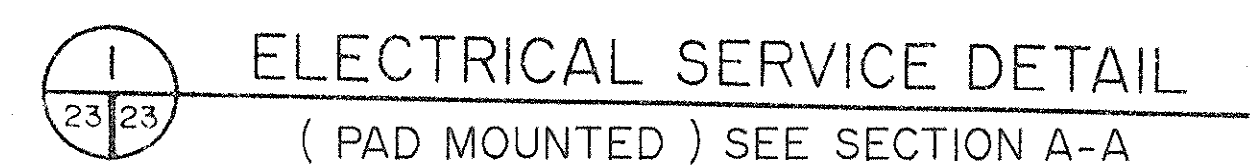
6 HEADWALL DETAIL
2020 N.T.S.

[illegible]

		SURFACE WATER TREATMENT PLANT GRAND STRAND WATER AND SEWER AUTHORITY	DC DTU SCALE: AS SHOWN
ALUM SLUDGE FACILITIES PLAN AND DETAILS		ALUM SLUDGE FACILITIES PLAN AND DETAILS	SHEET NO. EN-20

NOTE:
A 4" PERFORATED DRAIN SYSTEM WILL BE INSTALLED AROUND THE BOTTOM PERIMETER OF THE BACKWASH LAGOON AND THE CHEMICAL SPILL LAGOON, PIPED TOGETHER AND DISCHARGED INTO DITCH AT THE STORM DRAINAGE HEAD WALL. THE PERFORATED PIPE WILL BE INCASED IN WASHED STONE AND WRAPPED WITH A FILTER FABRIC. THE OUTLET WILL BE COVERED WITH A FIBERGLASS RODENT SCREEN SECURED TO THE PIPE WITH STAINLESS STEEL BAND CLAMPS.

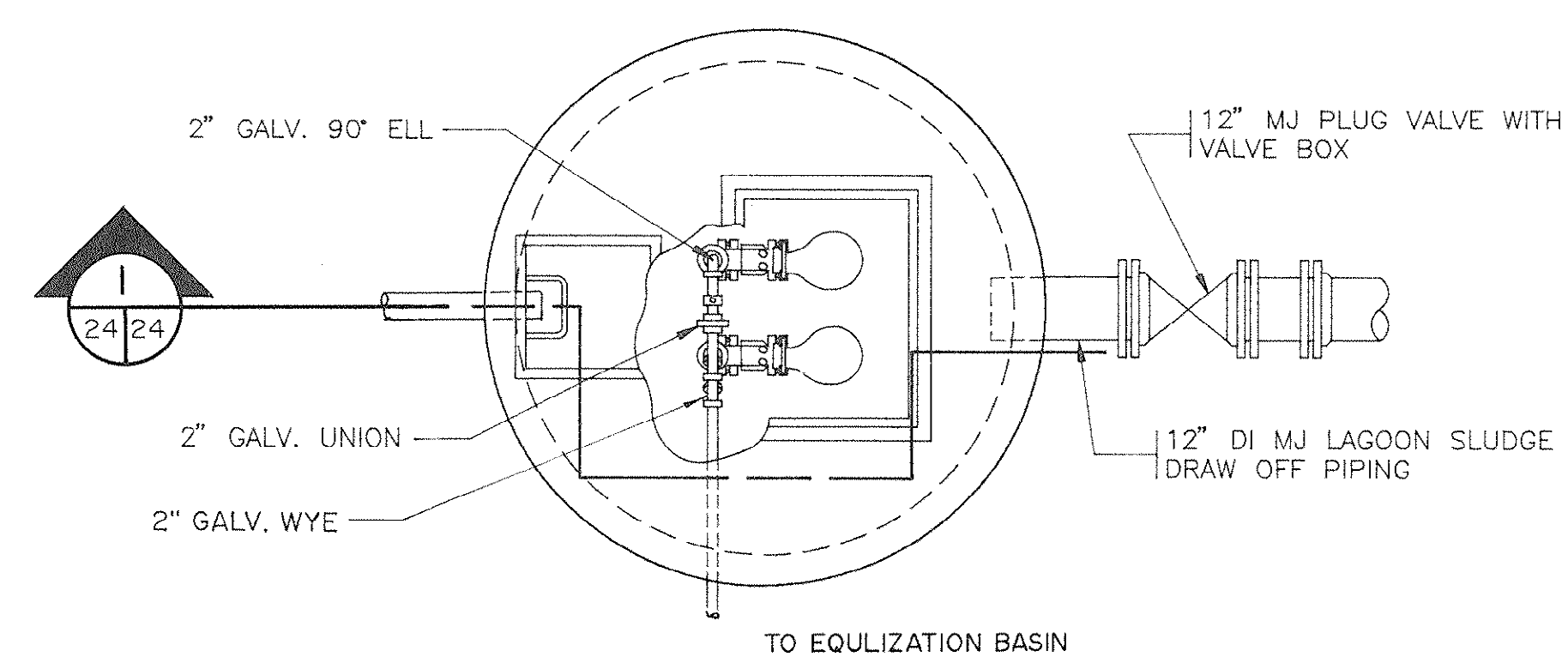
PROJECT #: GS8802 FILE NAME: 163.DWG DATE: 8-1-90 SCALE: 1/4" = 1'-0"



REVISIONS					HOBBS, UPCHURCH & ASSOCIATES, P.A. CONSULTING ENGINEERS SOUTHERN PINES, NORTH CAROLINA 28387		DATE: AUG. 1990
SYM.	DESCRIPTION	DATE	BY				DESIGNED: ETW
	CHANGED PUMP STATION ONE PUMP TO TWO RECORD DRAWING	8-27-90 1-13-92	CKT RAC				DRAWING: CKT
						CHECKED: JWM	
						SCALE: AS SHOWN	
					SURFACE WATER TREATMENT PLANT	SHEET NO. EN-23	
					GRAND STRAND WATER AND SEWER AUTHORITY	26	
					THICKENED SLUDGE PUMP STATION		

POLYMER BUILDING - PLAN VIEW

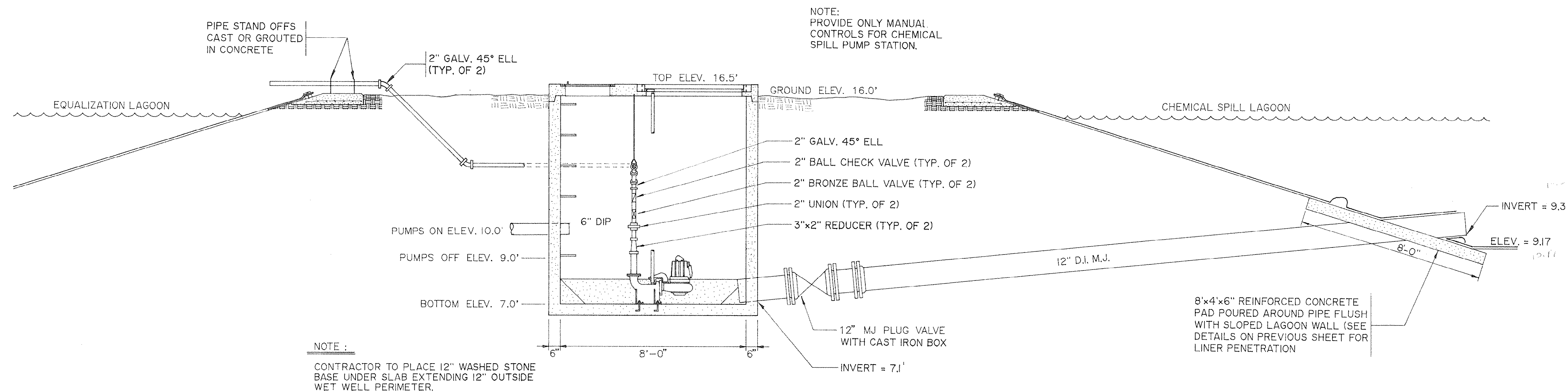
NOTE :
INSTALLATION OF CHEMICAL FEED SYSTEM
WILL BE A PART OF THIS CONTRACT.



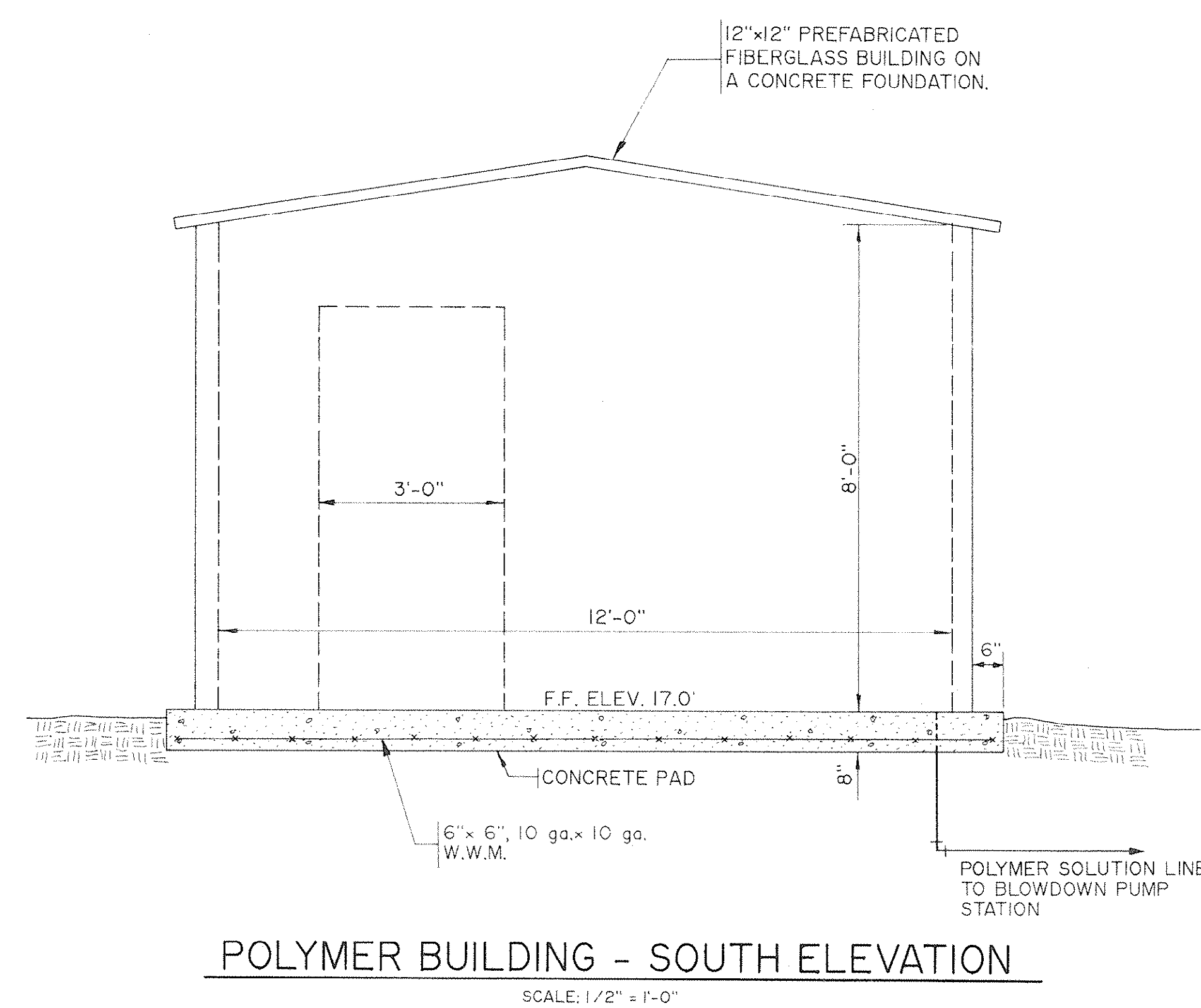
5 CHEMICAL SPILL LAGOON DRAW-OFF
PUMP STATION - PLAN VIEW
SCALE: 3/8" = 1'-0"

NOTE:
INSTALLATION OF INLET PIPE (8" D.I.)
INTO CHEMICAL SPILL LAGOON SHALL BE
SIMILAR TO DETAIL

INVERT IN SHALL BE 12.75'

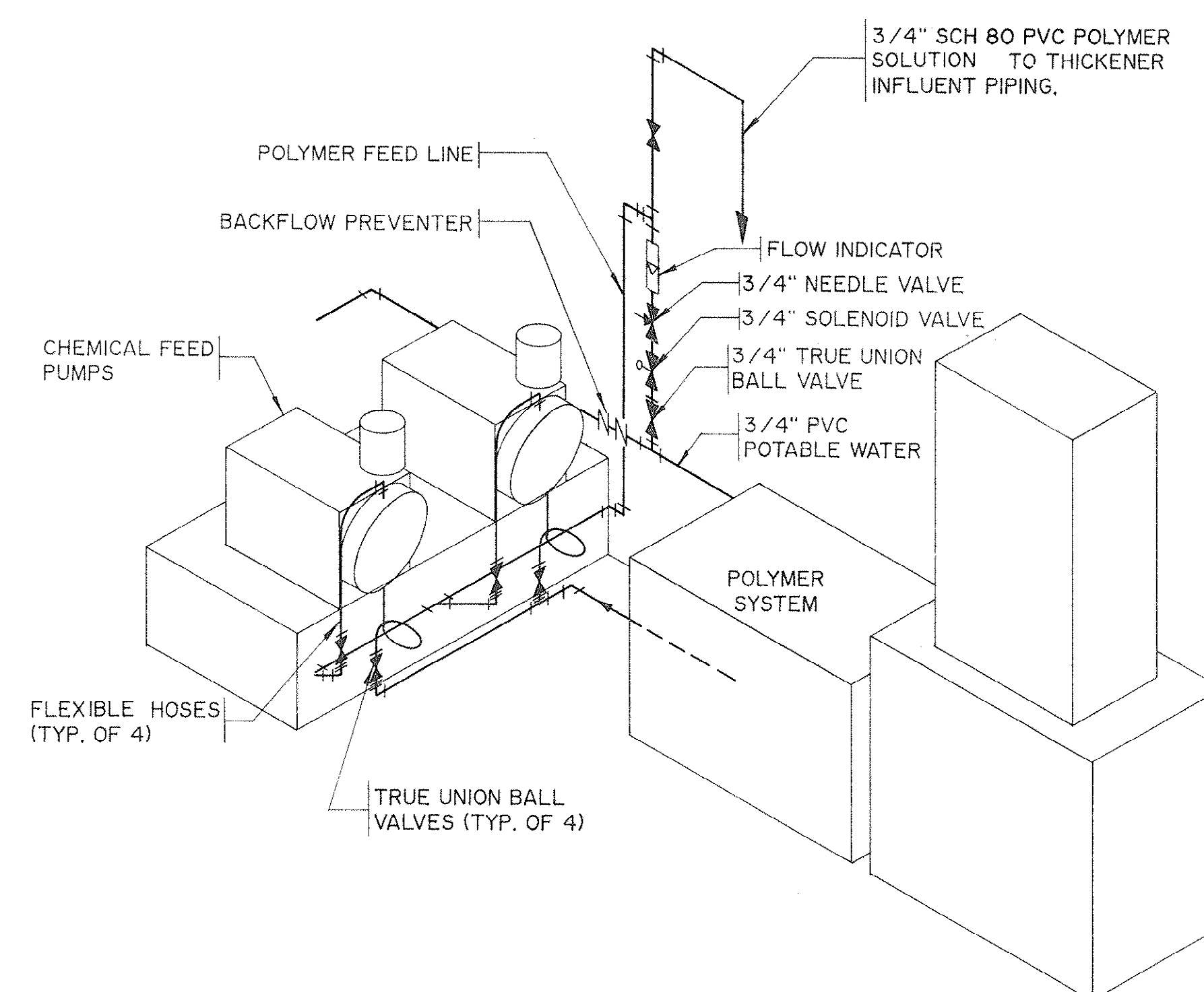



 CHEMICAL SPILL LAGOON DRAW-OFF
 PUMP STATION - SECTION VIEW
 SCALE: 3/8" = 1'-0"



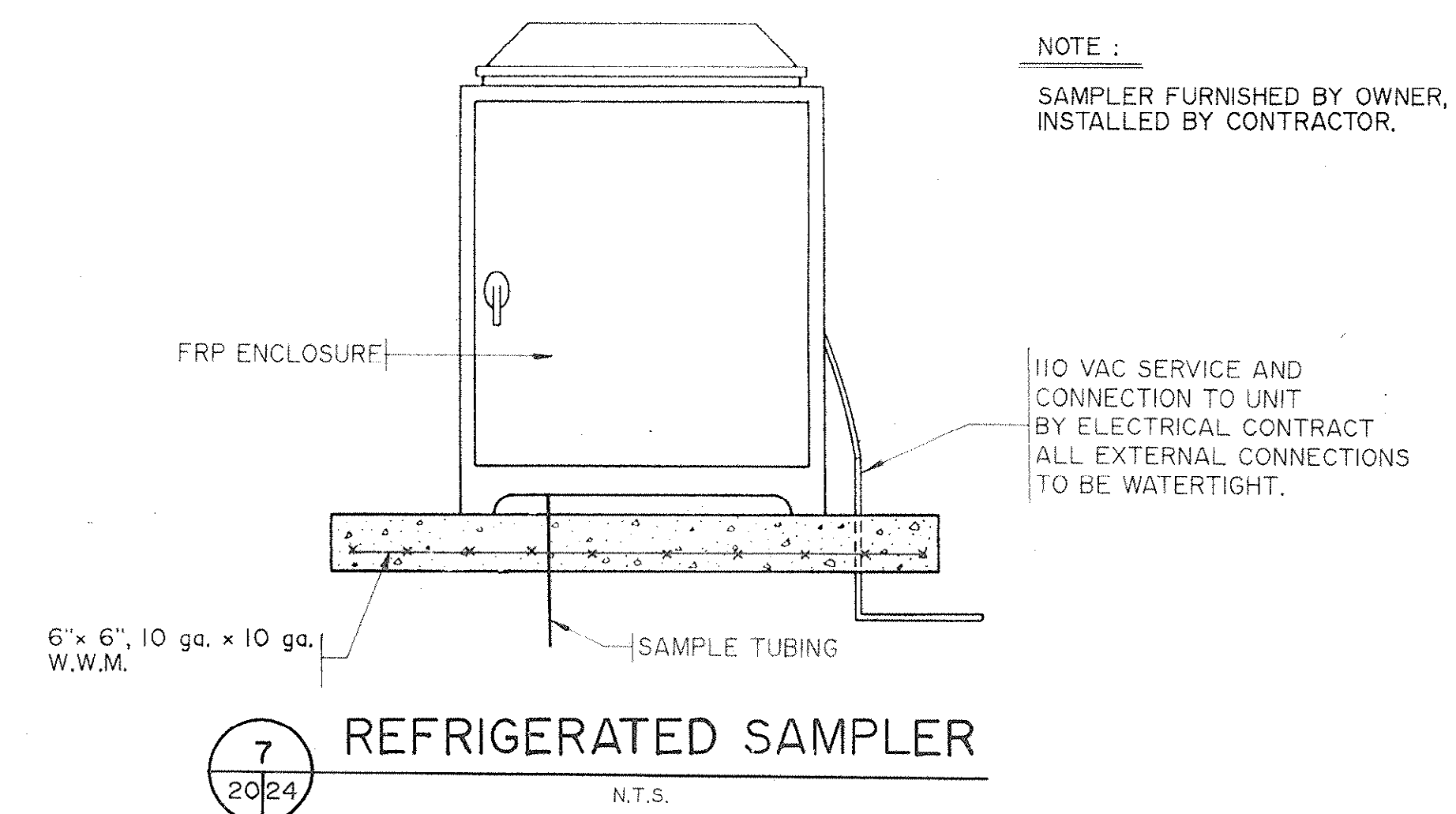
POLYMER BUILDING - SOUTH ELEVATION

NOTE :
CONTRACTOR SHALL PLACE 12" WASHED
STONE BASE UNDER SLAB EXTENDING 12"
OUTSIDE SLAB PERIMETER.



SLUDGE THICKENER POLYMER FEED SCHEMATIC

NOTE :
EQUIPMENT AND INSTALLATION NOT IN THIS CONTRACT. THIS CONTRACT DOES INCLUDE 3/4" SCH. 80 PVC LINE FROM BUILDING TO BLOWDOWN PUMP STATION.



REFRIGERATED SAMPLER

NOTE :
SAMPLER FURNISHED BY OWNER,
INSTALLED BY CONTRACTOR.

110 VAC SERVICE AND
CONNECTION TO UNIT
BY ELECTRICAL CONTRACT
ALL EXTERNAL CONNECTIONS
TO BE WATERTIGHT.

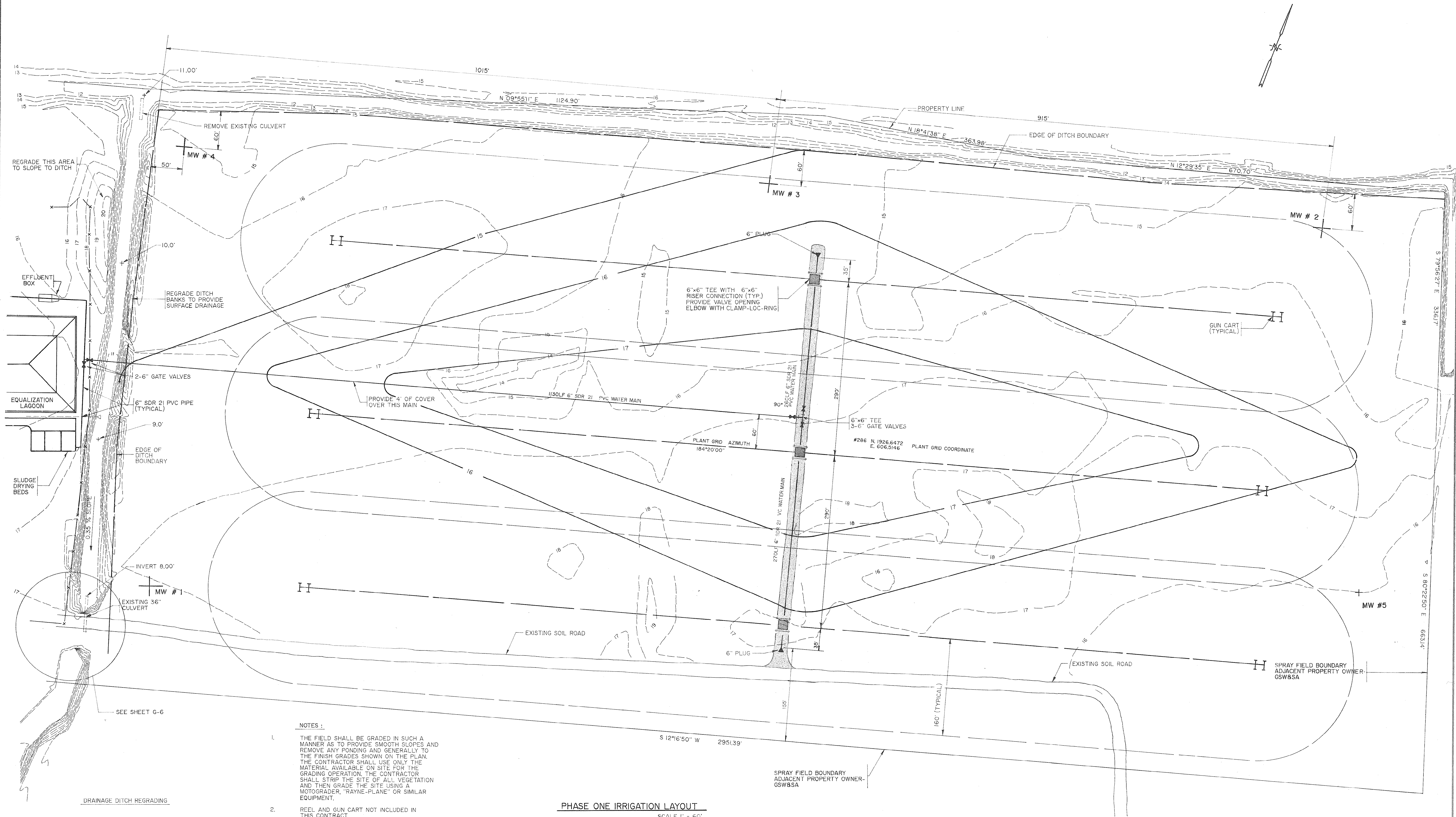
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CONSULTING ENGINEERS
SOUTHERN PINES, NORTH CAROLINA 28387

SURFACE WATER TREATMENT
PLANT
GRAND STRAND WATER AND SEWER
AUTHORITY

SLUDGE POLYMER SYSTEM
AND CHEMICAL SPILL LAGOON
PUMP STATION

DATE:	NOV. 1989
DESIGNED:	RSH
DRAWN:	AWH
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	EN-2
OF	26



NOTES :

1. THE FIELD SHALL BE GRADED IN SUCH A MANNER AS TO PROVIDE SMOOTH SLOPES AND REMOVE ANY PONDING AND GENERALLY TO THE FINISH GRADES SHOWN ON THE PLAN. THE CONTRACTOR SHALL USE ONLY THE MATERIAL AVAILABLE ON SITE FOR THE GRADING OPERATION. THE CONTRACTOR SHALL STRIP THE SITE OF ALL VEGETATION AND THEN GRADE THE SITE USING A MOTORGRADER, "RAYNE-PLANE" OR SIMILAR EQUIPMENT.
2. REEL AND GUN CART NOT INCLUDED IN THIS CONTRACT.
3. DITCH GRADES PROVIDED FOR REGRADING PORTION OF THIS PROJECT (SECTION C IN SCHEDULE OF BID ITEMS). SEE NOTES THIS SHEET.
4. GRAVEL ROAD SHALL BE 20 FEET WIDE, COMPACTED WITH A SLIGHT CROWN IN ROAD. THE SURFACE SHALL BE 8" OF COMPACTED ABC.

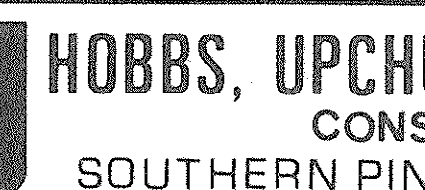
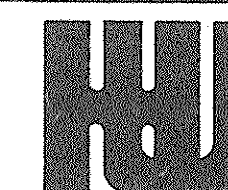
PHASE ONE IRRIGATION LAYOUT

SCALE 1" = 60'

DRAINAGE DITCH REGRADING

1. REGRADE DITCH TO SPOT SHOTS SHOWN ABOVE
2. TYPICAL CROSS SECTION OF DITCH SHOWN IN SPECIAL PROVISIONS
3. REGRADE DITCH BANKS TO ALLOW SURFACE RUN-OFF TO ENTER DITCH
4. REMOVE AND DISPOSE OF ALL DEBRIS AND SPOIL MATERIAL FROM DITCH AND DITCH BANKS. SUITABLE SOIL WILL BE STOCKPILED ON SITE. UNSUITABLE SOIL SHALL BE DISPOSED OF AS DIRECTED BY ENGINEER
5. DITCH SECTION SHALL BE SEEDED, MULCHED AND TACKED
6. THE OWNER MAY FLAG TREES THAT ARE TO REMAIN.

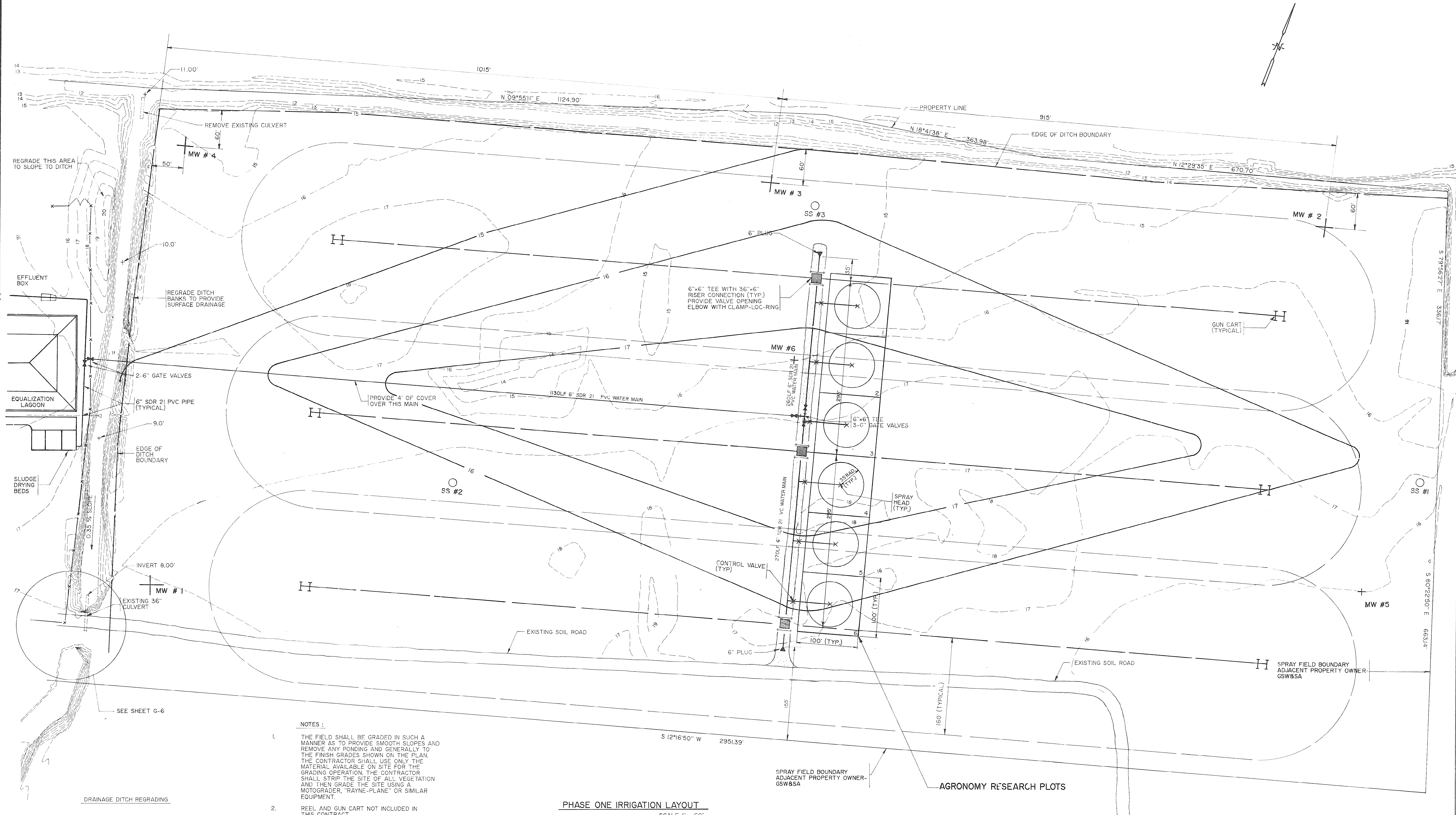
REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REMOVED LAGOONS & PUMP STATION	5-23-90	CKT
	REROUTED IRRIGATION INLET PIPE	5-23-90	CKT
	EXTENDED GUN CART PATTERN	5-23-90	CKT
	REROUTED PROPOSED 20' ACCESS ROAD	5-23-90	CKT
	REVISED GUN CART PATTERN & BUFFER ZONES	7-30-90	CKT
	REVISED ROAD AND SPRAY FIELD	8-17-90	TFW
	REVISED GUN CARTS	10-26-90	LSD
	ADDED MONITORING WELLS	12-11-90	JWR
	REVISED LOCATION OF MONITORING WELL #1	1-16-91	CKT
	REVISED LOCATION OF MONITORING WELL #8 & #5	3-21-91	JWR
	RECORD DRAWING	1-13-92	RAC



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SOUTHERN PINES, NORTH CAROLINA 28387

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY
SLUDGE LAND APPLICATION SITE PLAN

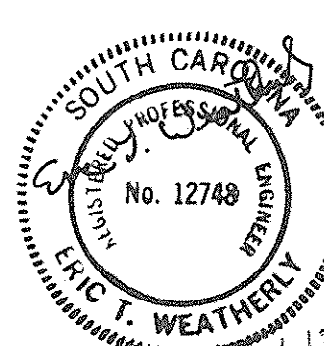
DATE: NOV. 1989
DESIGNED: ETW
DRAWN: CKT
CHECKED: JTW
SCALE: AS SHOWN
SHEET NO. EN-25
OF 26



PHASE ONE IRRIGATION LAYOUT
SCALE 1" = 60'

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
1	REMOVED LAGOONS & PUMP STATION	5-23-90	CKT
2	REROUTED IRRIGATION INLET PIPE	5-23-90	CKT
3	EXTENDED GUN CART PATTERN	5-23-90	CKT
4	REROUTED PROPOSED 20' ACCESS ROAD	5-23-90	CKT
5	REVISED GUN CART PATTERN & BUFFER ZONES	7-30-90	CKT
6	REVISED ROAD AND SPRAY FIELD	8-17-90	TFW
7	REVISED GUN CARTS	10-26-90	LSJ
8	ADDED MONITORING WELLS	12-11-90	JHR
9	REVISED LOCATION OF MONITORING WELL #1	1-16-91	CKT
10	REVISED LOCATION OF MONITORING WELL #1 & #5	3-21-91	JWP
11	ADDED AGRONOMY RESEARCH PLOTS	9-18-91	JGH
12	RECORD DRAWING	1-13-92	RAC

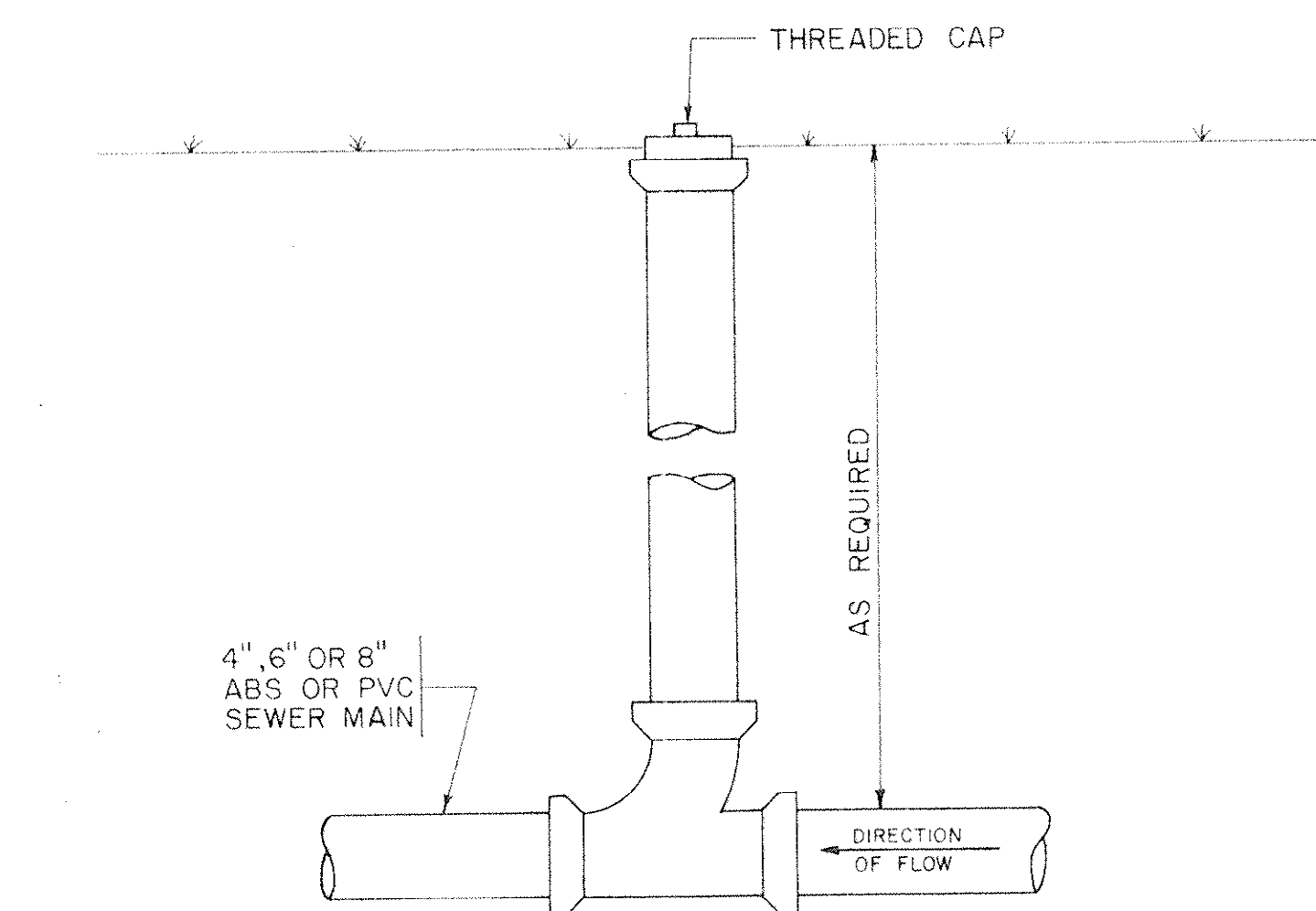
HOBBS, UPCHURCH & ASSOCIATES, P.A.
CONSULTING ENGINEERS
SOUTHERN PINES, NORTH CAROLINA 28387



SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

SLUDGE LAND APPLICATION SITE PLAN

DATE: NOV. 1989
DESIGNED: ETW
DRAWN: CKT
CHECKED: CKT
SCALE: AS SHOWN
SHEET NO. EN-25a
OF: 26

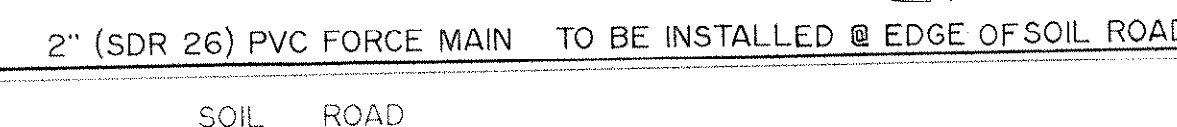


CLEAN OUT DETAIL

NTC

NOTES

- 1) THE CONTRACTOR SHALL CONTACT THE POWER CO., GAS CO., AND TELEPHONE CO. FOR THE EXACT LOCATION OF ALL UNDERGROUND MAINS, CABLES, OR LINES BEFORE CONSTRUCTION BEGINS.
- 2) PIPE SEPARATION: THE FOLLOWING MINIMUM PIPE SEPARATION WILL BE MAINTAINED: 12 INCHES VERTICAL SEPARATION BETWEEN CROSSING OF SANITARY SEWER AND STORM SEWERS, 18 INCHES VERTICAL SEPARATION BETWEEN CROSSING OF SEWER INCLUDING FORCE MAINS AND WATER MAINS, AND 10 FEET HORIZONTAL SEPARATION BETWEEN SANITARY SEWER (INCLUDING FORCE MAIN) AND WATER MAINS. IF THESE SEPARATIONS CANNOT BE MAINTAINED, DUCTILE IRON PIPES WILL BE USED 10 FEET EITHER SIDE OF CROSSING AND ALONG ENTIRE LENGTH OF LINE LESS THAN 10 HORIZONTAL FEET FROM WATER MAINS. THE CONTRACTOR SHALL RECEIVE APPROVAL FROM THE ENGINEER IN THE FIELD BEFORE PAYMENT WILL BE MADE AT DUCTILE IRON PRICES.
- 3) SEWER FORCE MAIN SHALL BE INSTALLED WITH A MINIMUM OF 3'-0" COVER.



FORCE MAIN PROFILE

SCALE : H: 1"=50'
V: 1"=5'

SITE PLAN

SCALE 1"=50

FLOW DATA

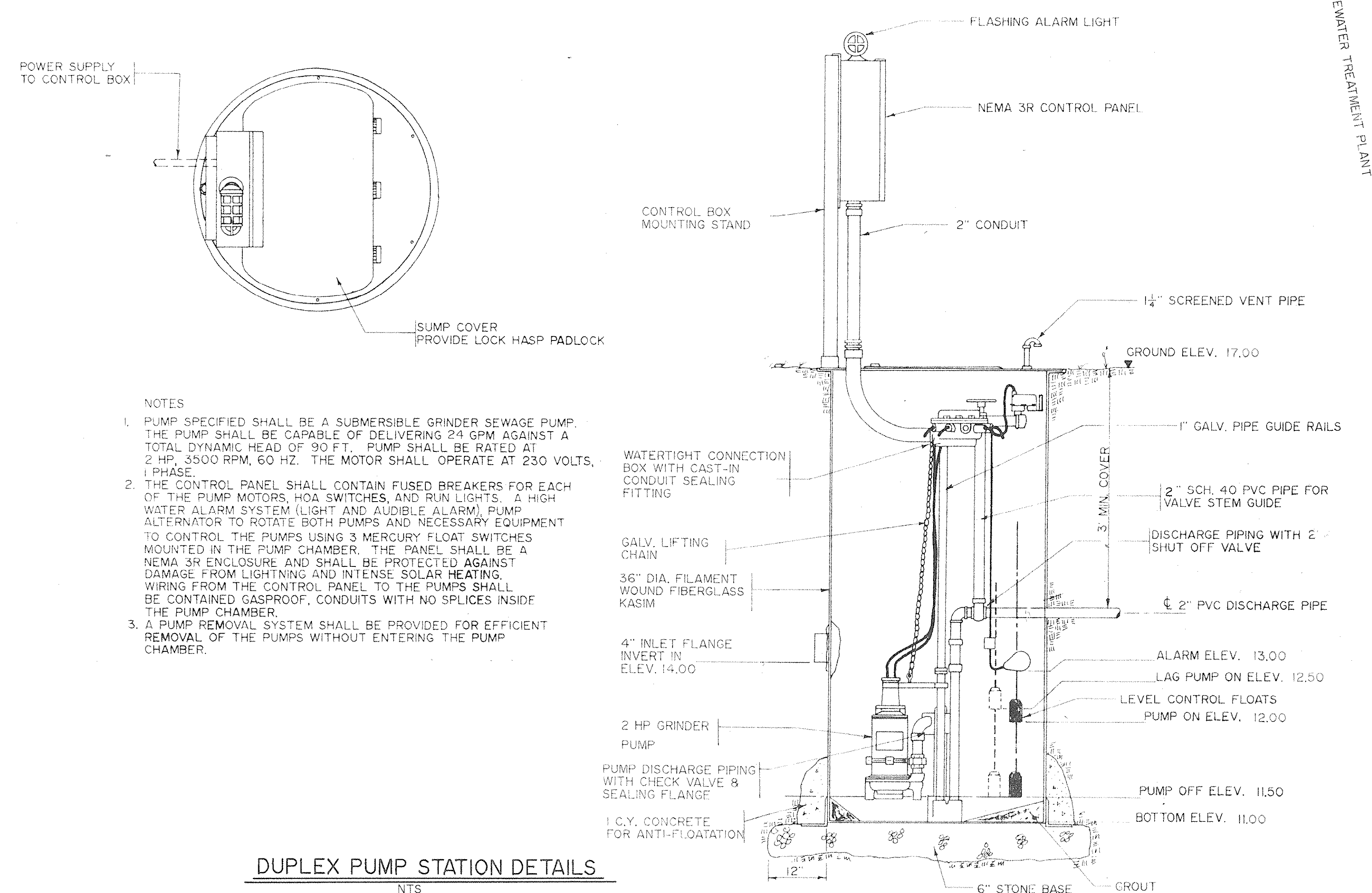
1. DAILY FLOW PER EMPLOYEE = 25 GALLON/EMPLOYEE/SHIFT
2. AVERAGE DAILY FLOW RATE (10 EMPLOYEE MAX.)= 250 GPD
3. PEAK DAILY FLOW RATE (2.5 PEAK FACTOR) = 625 GPD

DESIGN DATA

1. USE 2 HP DUPLEX PUMP SYSTEM WITH 2" SD 26, PVC FORCE MAIN
2. PUMP CAPACITY = 24 GPM @ 90 FT. HEAD
3. WET WELL DETENTION TIME FOR FILLING OPERATIONAL VOLUME = 52 MIN (20 MIN. @ PEAK FLOW)
4. PUMP RUN TIME = 11 MIN.
5. PUMP CYCLES PER HOUR = 1 (3 FOR PEAK FLOW)
6. LIQUID VELOCITY AT 24 GPM = 2.5 FPS
7. EMERGENCY STORAGE AVAILABLE = 0.85 DAYS

NOTES

1. PUMP SPECIFICATIONS SHALL BE A SUBMERSIBLE GRINDER SEWAGE PUMP. THE PUMP SHALL BE CAPABLE OF DELIVERING 24 GPM AGAINST A TOTAL DYNAMIC HEAD OF 90 FT. PUMP SHALL BE RATED AT 2 HP, 1150 RPM, 60 HZ. THE MOTOR SHALL OPERATE AT 230 VOLTS, 1 PHASE.
2. THE CONTROL PANEL SHALL CONTAIN FUSED BREAKERS FOR EACH OF THE PUMP MOTORS, HOA SWITCHES, AND RUN LIGHTS. A HIGH VOLTAGE CUTOFF SWITCH SHALL BE INSTALLED TO PROTECT THE ALTERNATOR TO ROTATE BOTH PUMPS AND NECESSARY EQUIPMENT TO CONTROL THE PUMPS USING 3 MERCURY FLOAT SWITCHES MOUNTED IN THE PUMP CHAMBER. THE PANEL SHALL BE A NEW 18" X 18" ENCLOSURE AND SHALL BE PROTECTED AGAINST DAMAGE FROM LIGHTNING AND INTENSE SOLAR HEATING. WIRING FROM THE CONTROL PANEL TO THE PUMPS SHALL BE CONTAINED GASPROOF, CONDUITS WITH NO SPLICES INSIDE THE PUMP CHAMBER.
3. A PUMP REMOVAL SYSTEM SHALL BE PROVIDED FOR EFFICIENT REMOVAL OF THE PUMPS WITHOUT ENTERING THE PUMP CHAMBER.



DUPLIX PUMP STATION DETAILS

NTS

[illegible]

W

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CONSULTING ENGINEERS
SOUTHERN PINES, NORTH CAROLINA 28387

SURFACE WATER TREATMENT
PLANT

GRAND STRAND WATER AND SEWER
AUTHORITY

DOMESTIC WASTE
PUMP STATION & FORCE MAIN

DATE:	NOV. 1989
DESIGNED:	ETW
DRAWN:	PSW
CHECKED:	JWM
SCALE:	AS SHOWN
SHEET NO.	EN-26