GRAND STRAND WATER & SEWER AUTHORITY

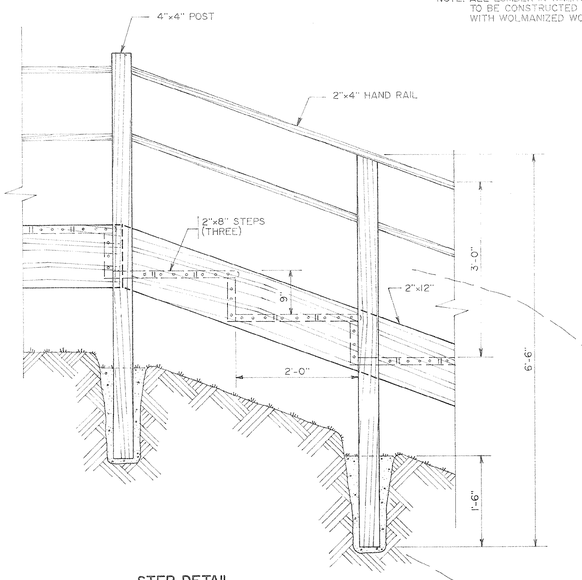
SURFACE WATER TREATMENT PROJECT

CHEMICAL FEED INSTALLATION

RAW WATER PUMP STATION
SURFACE WATER TREATMENT PLANT
SOUTH BOOSTER PUMP STATION
CONWAY BOOSTER PUMP STATION

HOBBS, UPCHURCH & ASSOCIA
CONSULTING ENGINEE
SOUTHERN PINES, NORTH CARO

33-011-001

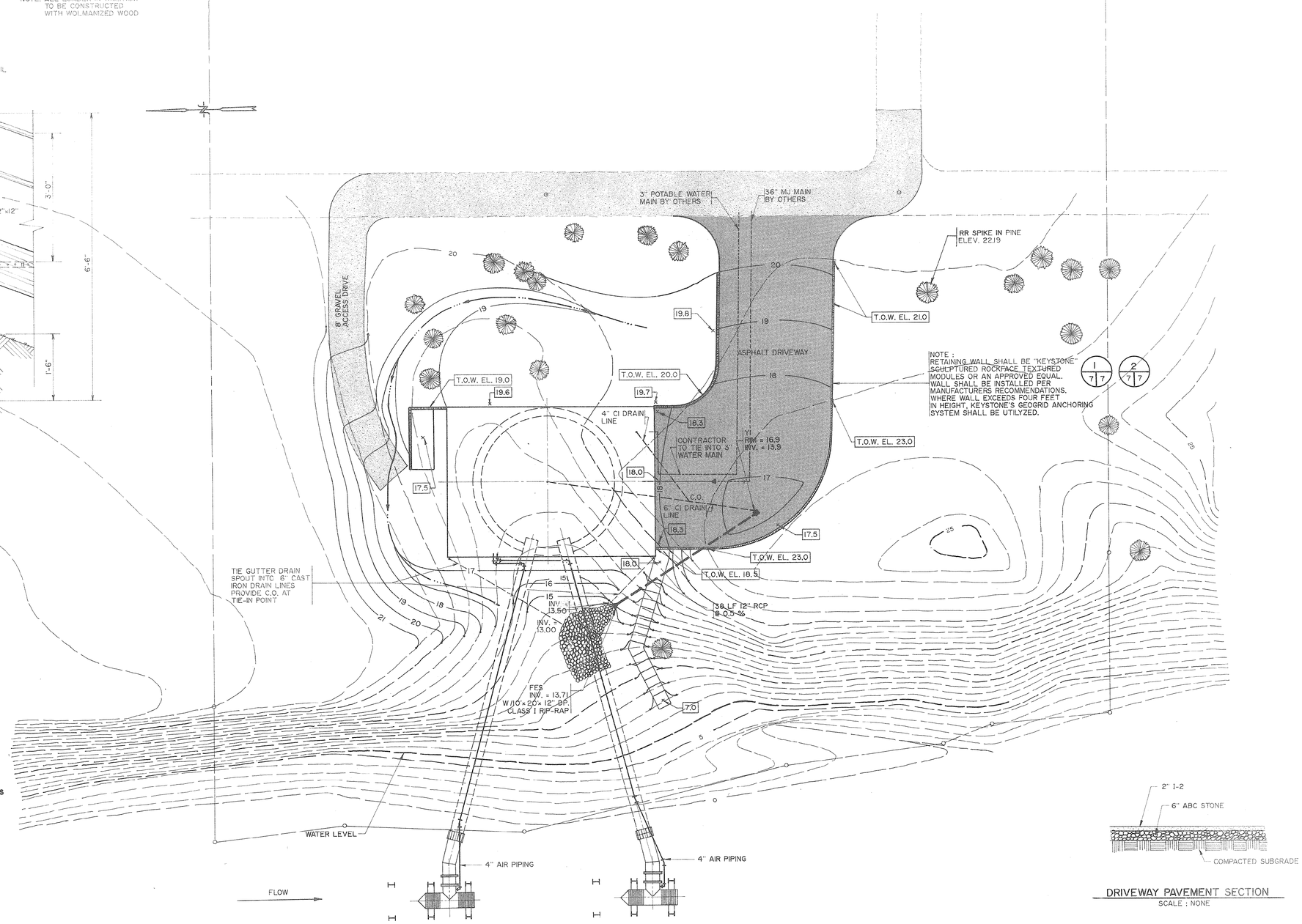


NOTE: ALL LUMBER IN WALKWAY TO BE CONSTRUCTED WITH WOLMANIZED WOOD

STEP DETAIL
SCALE : NONE

NOTE: USE OF PRECAST BOXES SUBJECT TO APPROVAL BY THE ENGINEER.

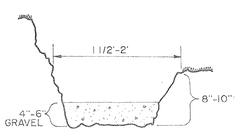
YARD INLET DETAIL
SCALE : NONE



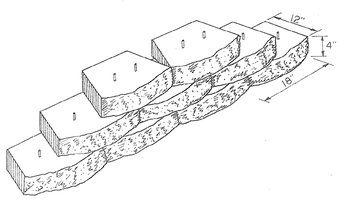
DRIVEWAY PAVEMENT SECTION
SCALE : NONE

RAW WATER PUMP STATION SITE PLAN

SCALE: 1" = 10'-0"



2/7/7 RETAINING WALL BASE COURSE FOOTING PREP. DETAIL
N.T.S.



1/7/7 RETAINING WALL DETAIL
N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-99

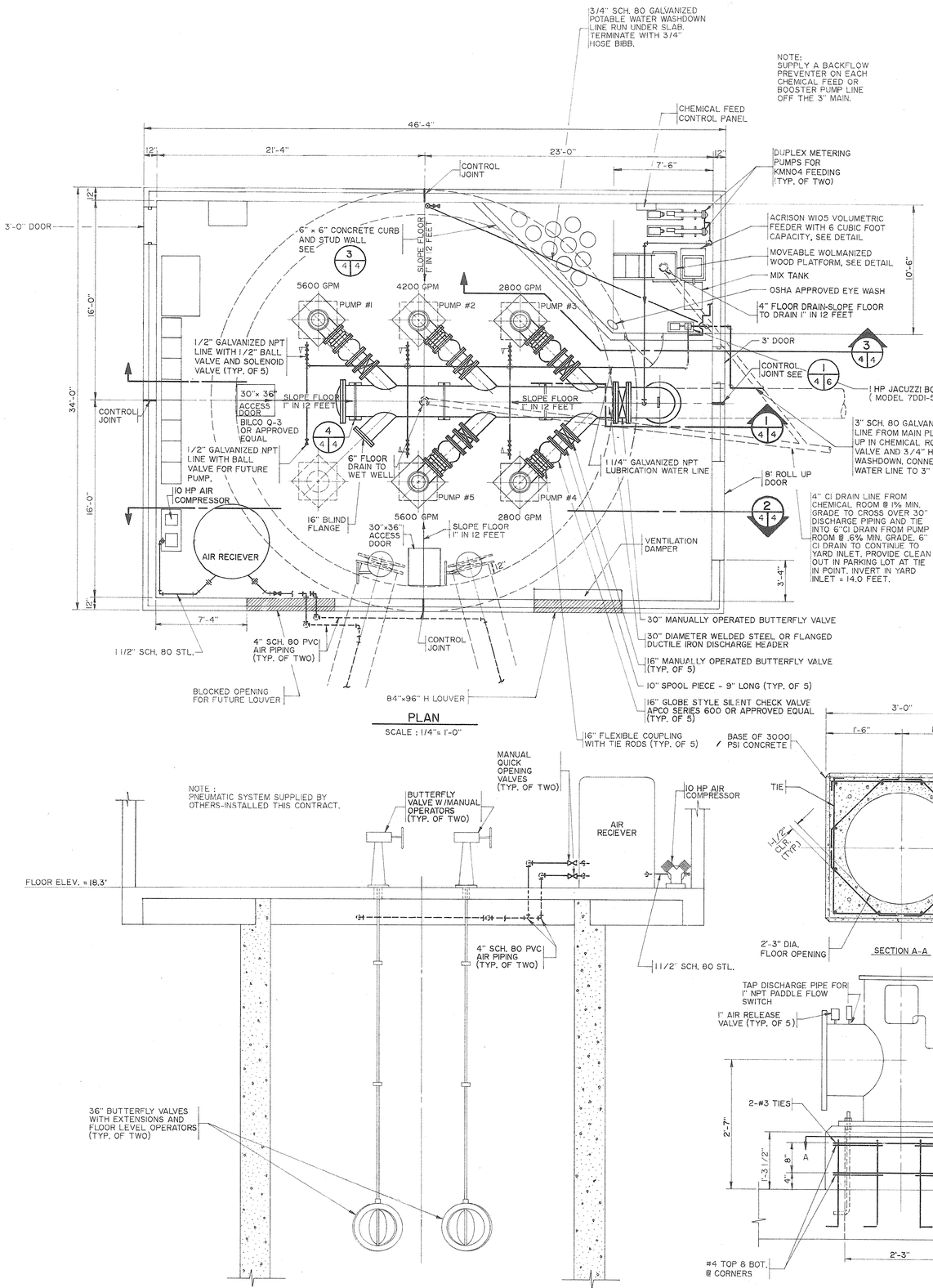
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12935 JOSEPH W. McDOUGALD III 12-1-99

SURFACE WATER TREATMENT PLANT PROJECT
GRAND STRAND WATER AND SEWER AUTHORITY

RAW WATER PUMP STATION SITE PLAN
33-011-003

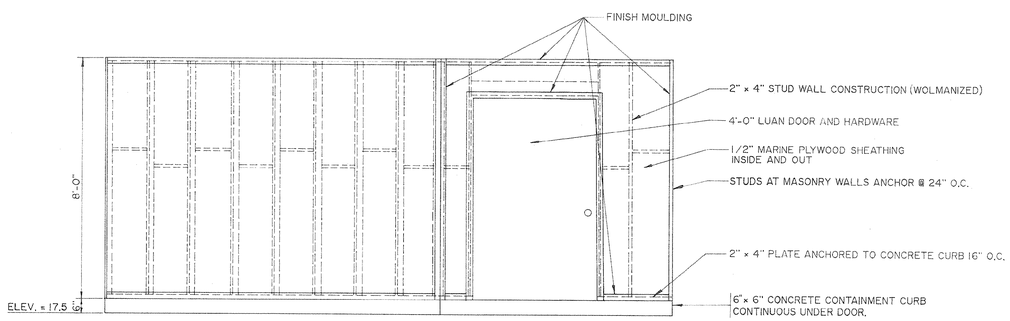
DATE:	JUNE, 1999
DESIGNED:	WSH
DRAWN:	TW
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	G-3
OF:	

GS8805



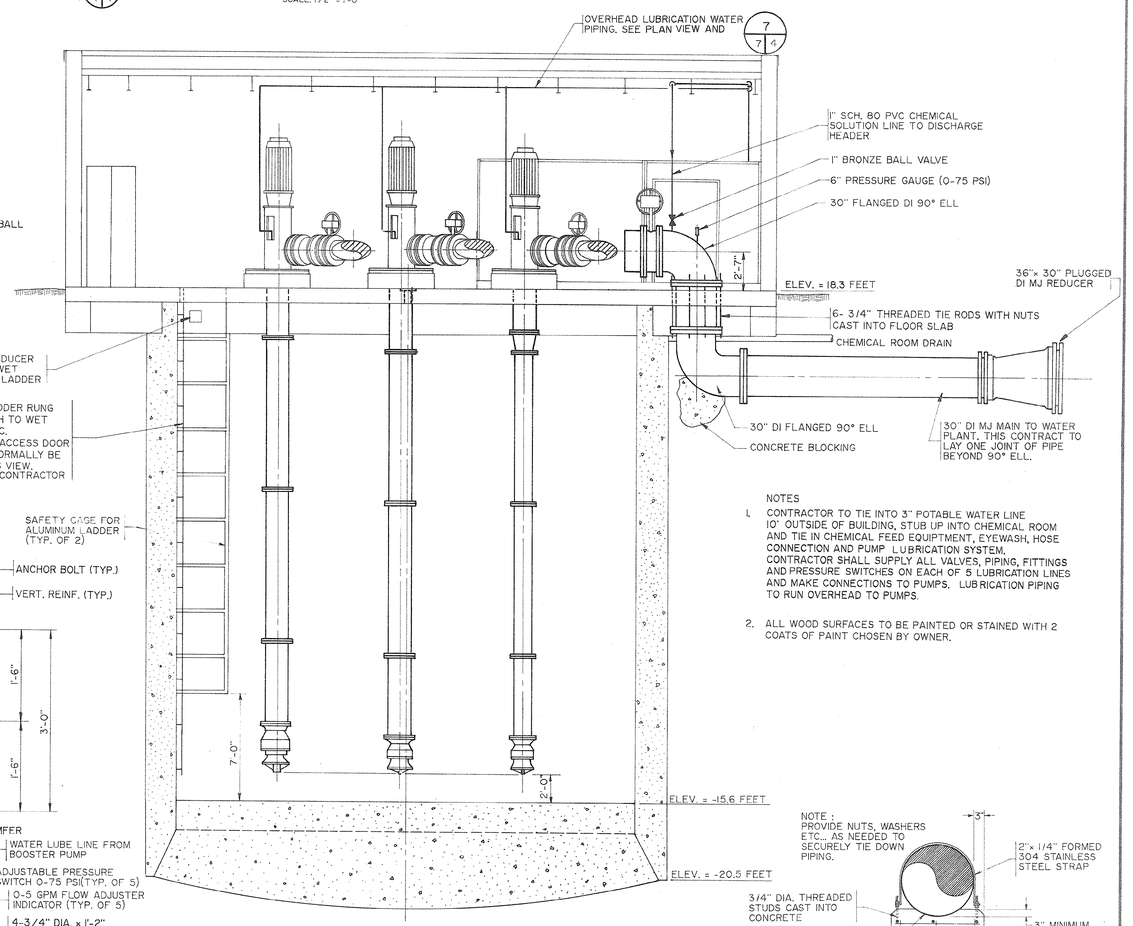
PLAN

SCALE : 1/4"= 1'-0"



3/4 4 CHEMICAL FEED ROOM ELEVATION & CONSTRUCTION DETAIL

SCALE: 1/2" = 1'-0"

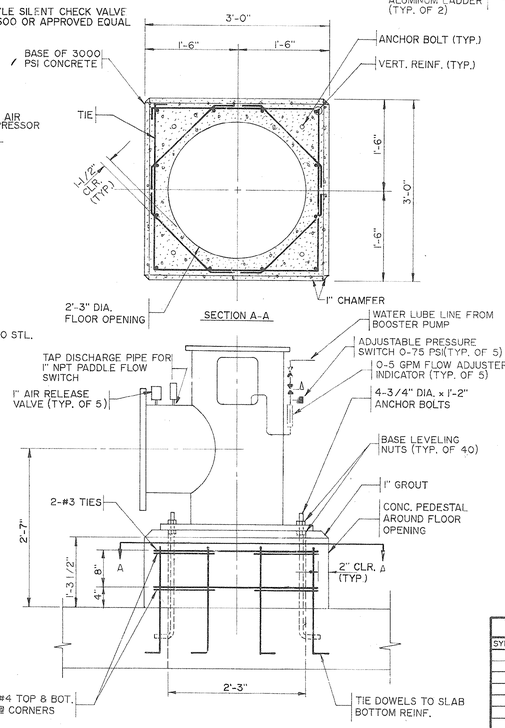


NOTES

1. CONTRACTOR TO TIE INTO 3" POTABLE WATER LINE 10' OUTSIDE OF BUILDING, STUB UP INTO CHEMICAL ROOM AND TIE IN CHEMICAL FEED EQUIPTMENT, EYEWASH, HOSE CONNECTION AND PUMP LUBRICATION SYSTEM. CONTRACTOR SHALL SUPPLY ALL VALVES, PIPING, FITTINGS AND PRESSURE SWITCHES ON EACH OF 5 LUBRICATION LINES AND MAKE CONNECTIONS TO PUMPS. LUBRICATION PIPING TO RUN OVERHEAD TO PUMPS.
2. ALL WOOD SURFACES TO BE PAINTED OR STAINED WITH 2 COATS OF PAINT CHOSEN BY OWNER.

2/4 STATION SECTION VIEW

SCALE : 1/4"= 1'-0"

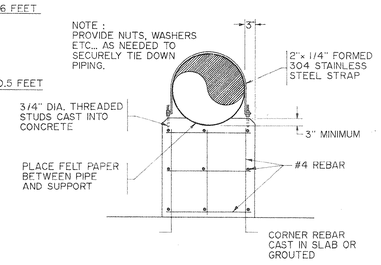


7/7 4 PUMP BASE AND APPURTENANCE DETAIL

N.T.S.

1/4 4 SECTION

SCALE : 1/4"= 1'-0"



4/4 CONCRETE PIPE CRADLE AND STRAP DETAIL (TYP. OF 3)

N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12935 DAVID T. UPCHURCH 12-1-89

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12935 JOSEPH W. McDOUGLE 12-1-89

SURFACE WATER TREATMENT PLANT PROJECT

GRAND STRAND WATER AND SEWER AUTHORITY

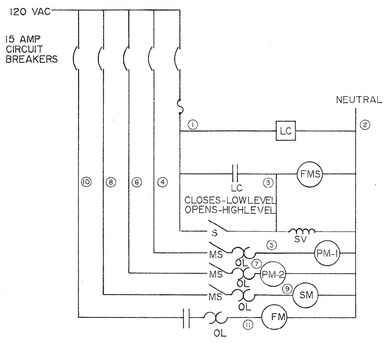
RAW WATER PUMP STATION PLAN AND SECTIONS

DATE:	JULY, 1989
DESIGNED:	RSH
DRAWN:	TFW
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	G-4
OF:	

GS8805

33-011-004

SOUTHERN PHOTO - GREENSBORO N.C.

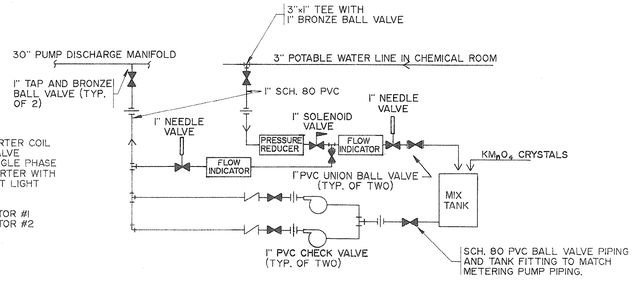


LEGEND:

LC LEVEL CONTROL
OL OVERLOAD
FMS FEEDER MOTOR STARTER COIL
SV WATER SOLENOID VALVE
SM STIRRER MOTOR-SINGLE PHASE
MS MANUAL MOTOR STARTER WITH OVERLOAD AND PILOT LIGHT
○ WIRE NUMBER
S TOGGLE SWITCH
PM-1 METERING PUMP MOTOR #1
PM-2 METERING PUMP MOTOR #2
FM FEEDER MOTOR

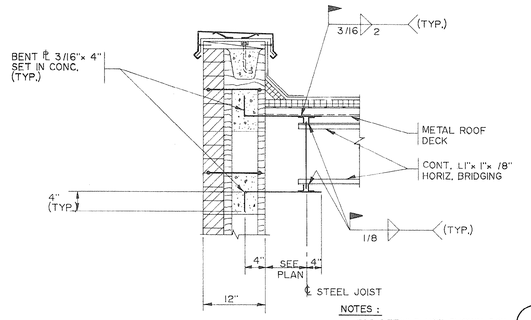
$KMnO_4$ FEED CONTROLS

SCALE : NONE



$KMnO_4$ FEED PIPING SCHEMATIC

SCALE : NONE

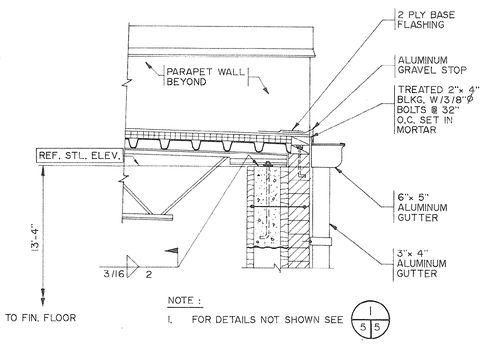


NOTES :

1. FOR DETAILS NOT SHOWN SEE (1/5|5)
2. BRIDGING ANCHORS SHALL BE ACCURATELY LOCATED AND EMBEDDED IN WALLS DURING CONSTRUCTION OF MASONRY WORK.

(3/5|5) TYPICAL SECTION THRU SIDE WALL

SCALE : 1"= 1'-0"

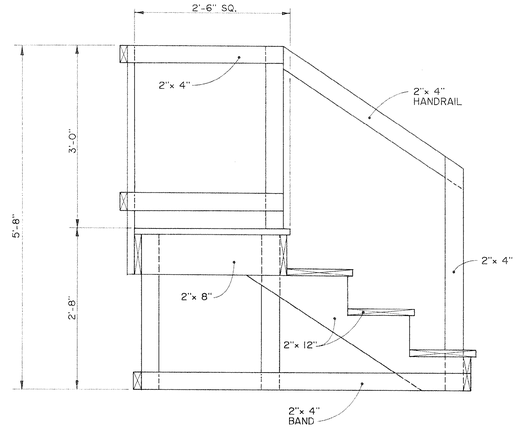


NOTE :

1. FOR DETAILS NOT SHOWN SEE (1/5|5)

(2/5|5) TYPICAL WALL SECTION AT REAR OF BUILDING

SCALE : 1"= 1'-0"

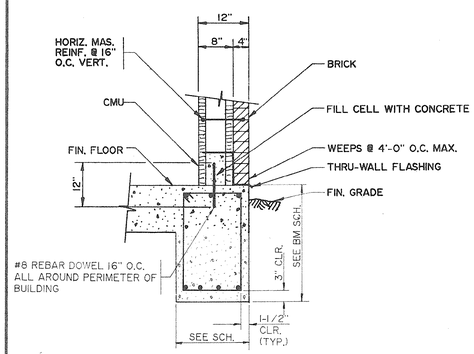


NOTE :

STEPS TO BE CONSTRUCTED OF ALL WOLMANIZED LUMBER.

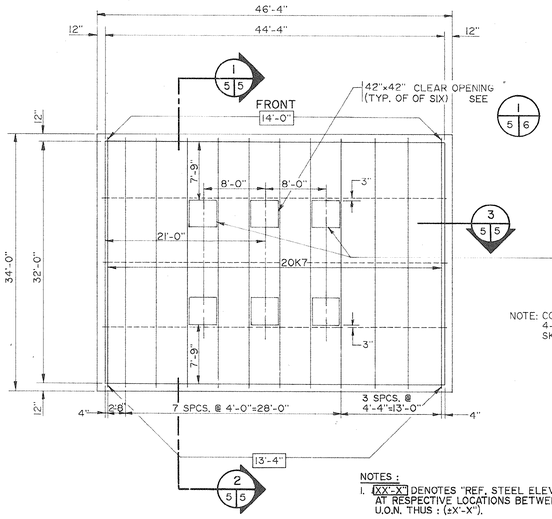
STEPS DETAIL

SCALE : 1"= 1'-0"



TYP. WALL FOOTING REINF.

SCALE : NONE



ROOF VENTILATORS TO BE LOCATED ON THESE 42"x42" OPENINGS (TYP. OF TWO)

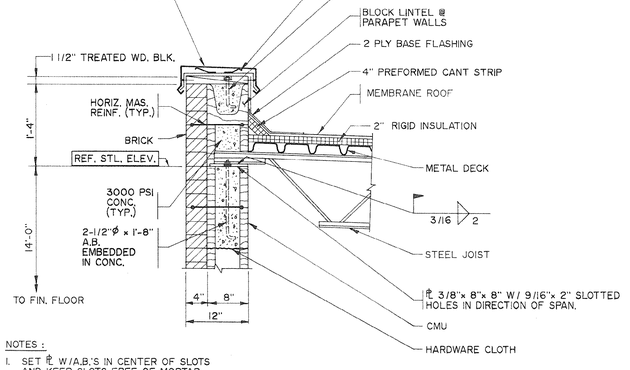
NOTE: CONTRACTOR TO INSTALL 4-42" SQ. REMOVEABLE SKYLIGHTS

NOTES :

1. XX-X DENOTES "REF. STEEL ELEV." A.F.F. AT RESPECTIVE LOCATIONS BETWEEN ARROWS U.O.N. THUS : (XX-X").
2. ----- DENOTES LOCATION OF ROWS OF CONT. HORIZ. BRIDGING.

ROOF FRAMING PLAN

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

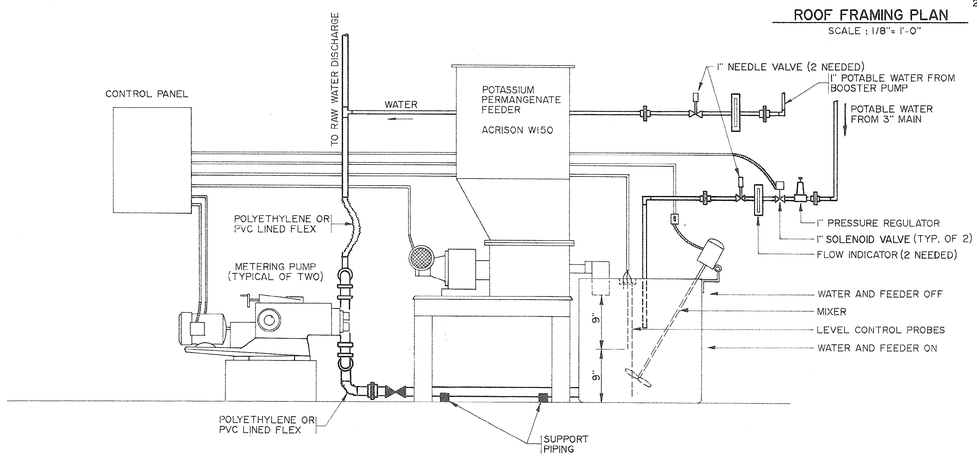


NOTES :

1. SET ℄ W/A.B.'S IN CENTER OF SLOTS AND KEEP SLOTS FREE OF MORTAR AND GROUT.
2. PAINT EXPOSED BASE FLASHING W/ ALUMINUM COATING AS RECOMMENDED BY ROOFING MANUFACTURER.

(1/5|5) TYPICAL WALL SECTION AT FRONT OF BUILDING

SCALE : 1"= 1'-0"



POTASSIUM PERMANGENATE FEED SYSTEM

SCALE : 1"= 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL No. 10,187 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL No. 12339 JOSEPH M. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT PROJECT

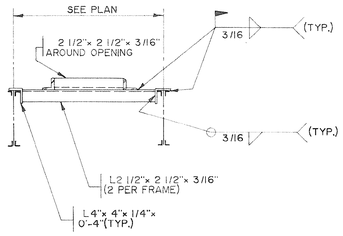
GRAND STRAND WATER AND SEWER AUTHORITY

RAW WATER PUMP STATION DETAILS

DATE:	JULY, 1989
DESIGNED:	RSH
DRAWN:	TFW
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	G-5
OF:	

33-011-005 GS8805

SOUTHERN PHOTO - GREENSBORO N.C.

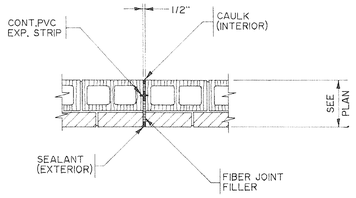


NOTES :

1. WHERE JOIST OR BM. SPA. OR OPNG. SIZE EXCEEDS 4'-0", USE L 5-5"x 3"x 1/4".
2. VERIFY EXACT LOCATION & SIZE OF OPNG. W/ARCH. & MECH. CONTR. BEFORE FABRICATION.

5/6 — TYPICAL FRAME AROUND ROOF OPENING

SCALE : NONE

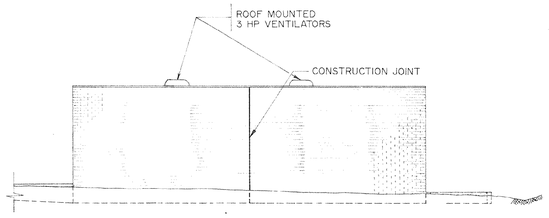


NOTE :

1. PROVIDE CONTROL JOINTS IN MAS. WALLS AT LOCATIONS DENOTED "C.J." ON PLAN FROM TOP OF WALL TO FTG. MAS. JOINT REINF. SHALL BE DISCONTINUOUS AT "C.J.'S."

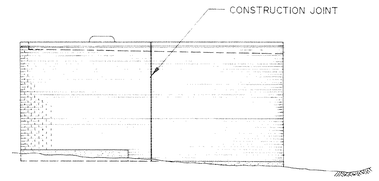
3/5 — TYPICAL MAS. WALL CONTROL JT.-(C.J.)

SCALE : NONE



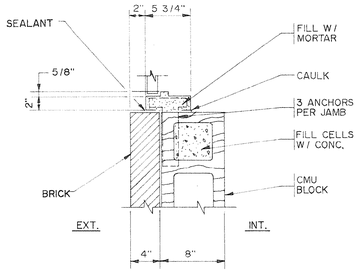
EAST ELEVATION

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



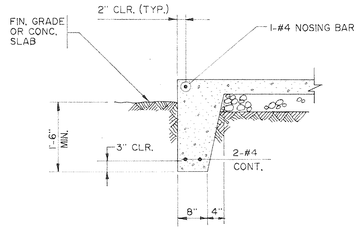
NORTH ELEVATION

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



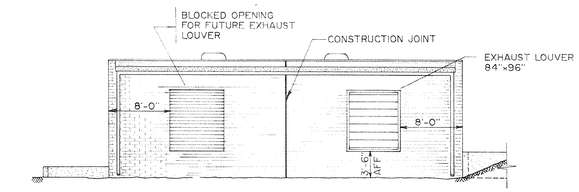
TYPICAL DOOR JAMB DETAIL

SCALE : NONE



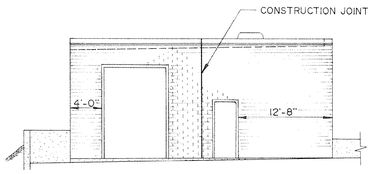
TYPICAL SLAB EDGE REINFORCING

SCALE : 3/4"= 1'-0"



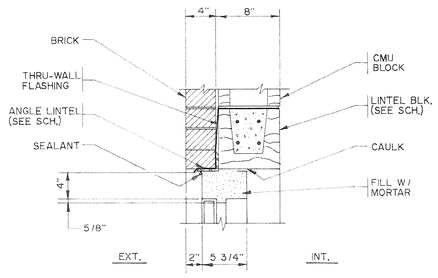
WEST ELEVATION

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



SOUTH ELEVATION

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



TYPICAL DOOR HEAD DETAIL

SCALE : NONE

LINTEL SCHEDULE

OPENING	LINTEL		BEARING
0'-0" to 1'-4"	1 L - 3 1/8"x 3 1/2"	*	8"
1'-4" to 4'-0"	1 L - 3 1/2"x 3 1/2"x 5/16"	*	8"
4'-0" to 6'-8"	1 L - 4"x 3 1/2"x 5/16"	*	8"
6'-8" to 8'-0"	1 LL- 5"x 3 1/2"x 5/16"	*	8"

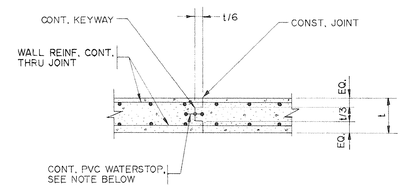
* PER 4" OF WALL THICKNESS.

NOTE :
ALL UNSCHEDULED OPENINGS INCLUDING OPENINGS FOR MECHANICAL WORK SHALL BE PROVIDED WITH LINTELS IN ACCORDANCE WITH THIS SCHEDULE. USE THE FOLLOWING N.C. CONCRETE MASONRY ASSOCIATION STYLES OF LINTEL BLOCK : NCCMA-#6816-55, #8816-59, #12816-59.

OPENING	5 5/8"OR 7 5/8" WALL	11 5/8" WALL	BEARING
2'-0" to 4'-0"	7 5/8": 2-#3 / 2-#3	2-#3 / 2-#3	8"
4'-0" to 5'-4"	7 5/8": 2-#4 / 2-#5	2-#4 / 3-#4	8"
5'-4" to 8'-0"	7 5/8": 2-#5 / 2-#6	2-#5 / 3-#5	8"

REQUIRED LINTELS NOT OTHERWISE INDICATED ON THE DRAWINGS SHALL BE AS SHOWN IN THE ABOVE SCHEDULE.

CONCRETE MASONRY LINTELS SHALL BE FILLED WITH 3000 PSI CONCRETE.



NOTE :

1. PROVIDE CONSTRUCTION JOINTS IN ALL WALLS AND SLABS AS REQUIRED FOR CONSTRUCTION OR AT 30'-0" MAX. PROVIDE CONTINUOUS PVC WATER-STOPS AT ALL CONSTRUCTION JOINTS AT EXTERIOR WALLS & SLABS AND ANY INTERIOR WALLS WHERE DIFFERENTIAL HEIGHTS OF FLUIDS EXIST ON EITHER SIDE OF WALL.

TYPICAL SLAB OR WALL CONSTRUCTION JOINT

SCALE : NONE

REVISIONS

SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7588 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT PROJECT
GRAND STRAND WATER AND SEWER AUTHORITY

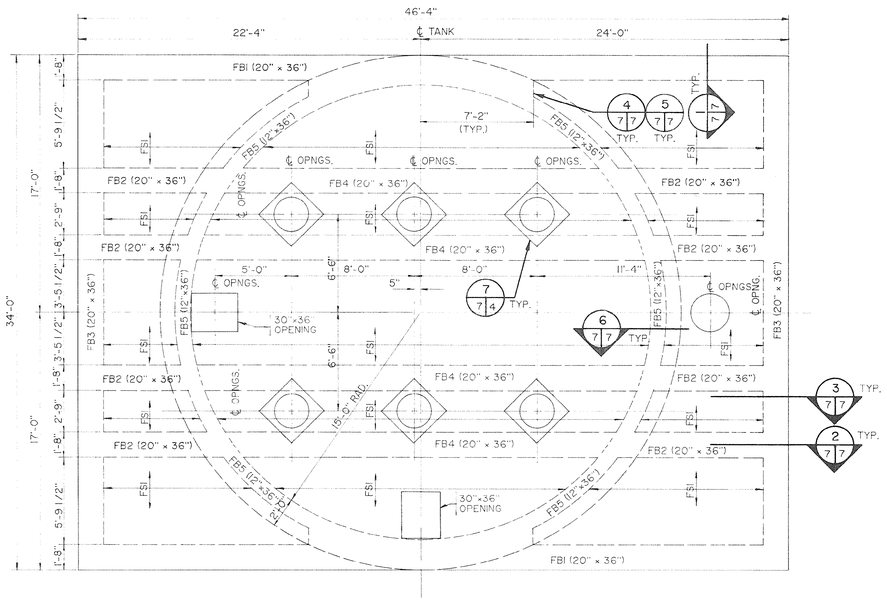
RAW WATER PUMP STATION ELEVATIONS AND DETAILS

DATE: JULY/1989
DESIGNED: RSH
DRAWN: TFW
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO: G-6
OF: ____

GS8805

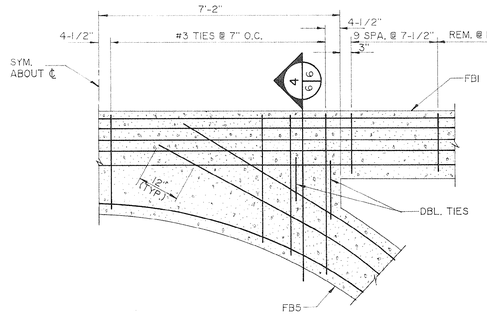
33-011-006

SOUTHERN PHOTO-REPRODUCE 12"x18"



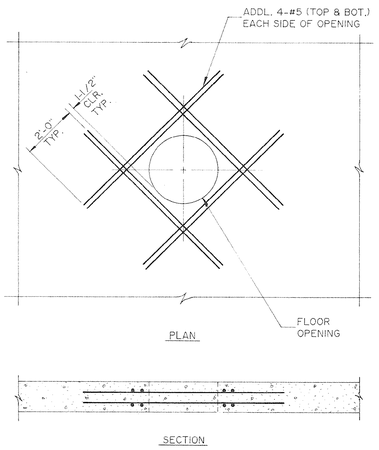
FLOOR FRAMING PLAN

SCALE: 1/4" = 1'-0"



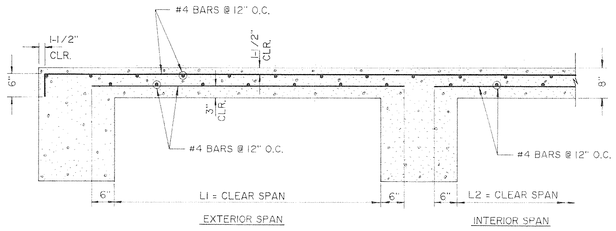
5 / 7 7 PLAN DETAIL AT BEAMS FBI & FB5

N.T.S.



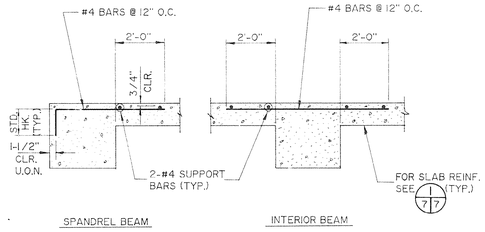
TYPICAL REINFORCING AT FLOOR OPENING

N.T.S.



1 / 7 7 FLOOR SLAB REINFORCING DETAIL

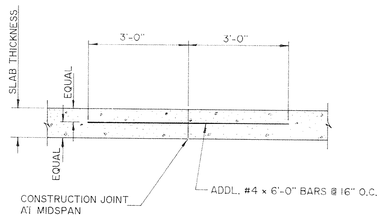
SCALE: 3/4" = 1'-0"



NOTE:
BEAM REINFORCING NOT SHOWN.
SEE BEAM SCHEDULE.

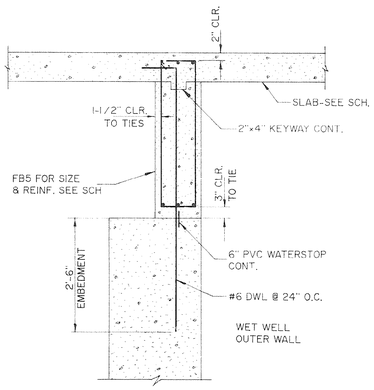
3 / 7 7 TYP. SLAB REINF. PERPENDICULAR TO MAIN SLAB REINF.

N.T.S.



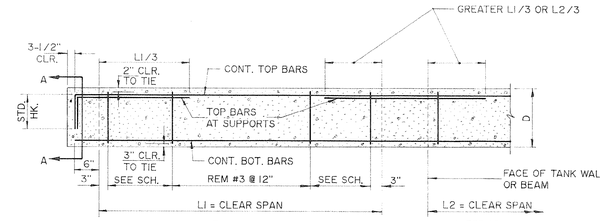
TYPICAL SLAB CONSTRUCTION JOINT

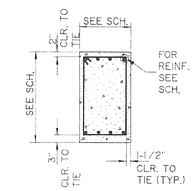
N.T.S.



6 / 7 7 SECTION THRU FB5 BEARING AT TANK WALL

N.T.S.





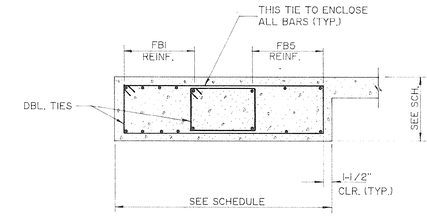
SECTION A-A

BEAM SCHEDULE

MARK	SIZE W	SIZE D	CONT. BOT. BARS NO.	CONT. BOT. BARS SIZE	CONT. TOP BARS NO.	CONT. TOP BARS SIZE	TOP BARS AT SUPPORTS NO.	TOP BARS AT SUPPORTS SIZE	TOP BARS AT SUPPORTS LOCATION	TIES NO@SPA.	TIES SIZE	REMARKS
FBI	20"	36"	4	#7	3	#8	2	#8	@ TANK WALL	NOTE 1	#3	NOTE 1, SEE DETAIL E
FB2	20"	36"	4	#7	5	#9	-	-	-	-	#3	
FB3	20"	36"	4	#7	6	#8	-	-	-	-	#3	
FB4	20"	36"	4	#7	3	#9	2	#9	-	-	#3	
FB5	12"	36"	3	#5	3	#5	-	-	-	-	#3	CURVED BM.

2 / 7 7 TYPICAL BEAM REINFORCING DETAIL

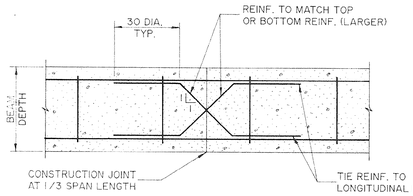
N.T.S.



NOTE:
SEE SCHEDULE FOR BEAM REINFORCING.
SLAB REINFORCING NOT SHOWN FOR CLARITY.

4 / 7 6 TYPICAL SECTION THRU BEAMS FBI & FB5

N.T.S.



TYPICAL BEAM CONSTRUCTION JOINT

N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7355 HAROLD T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14355 JOSEPH W. McGOUGH 12-1-89

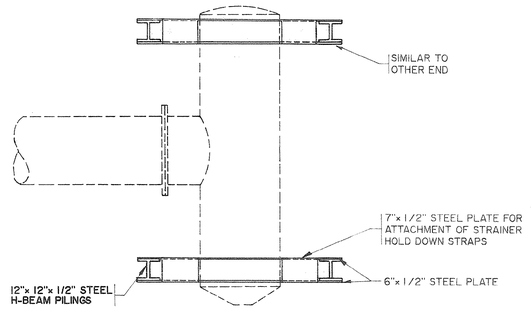
SURFACE WATER TREATMENT PLANT PROJECT
GRAND STRAND WATER AND SEWER AUTHORITY

RAW WATER PUMP STATION
FLOOR FRAMING PLAN & DETAILS

DATE: JULY, 1989
DESIGNED: RSH
DRAWN: AWH
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. G-7
OF: _____

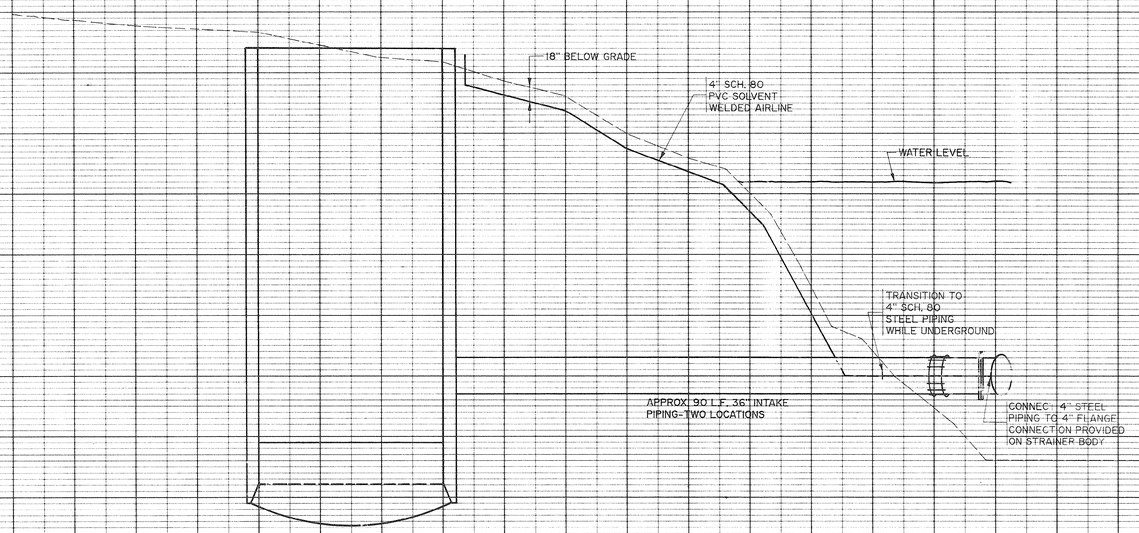
GS8805

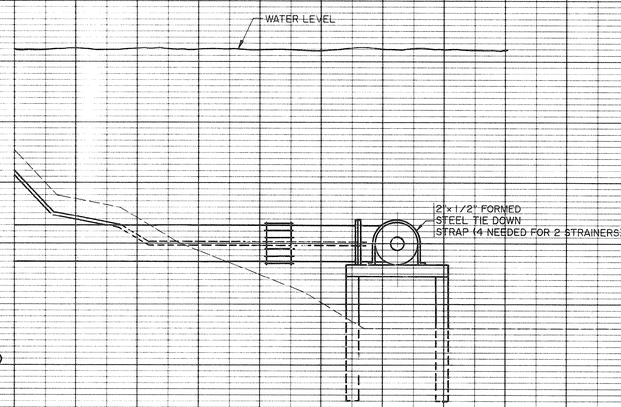
33-011-007



INTAKE CRADLE DETAIL

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





REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL No. 7604 RICHARD T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL No. 13115 JOSEPH W. McGOUGHAN 12-1-89

SURFACE WATER TREATMENT PLANT PROJECT
GRAND STRAND WATER AND SEWER AUTHORITY

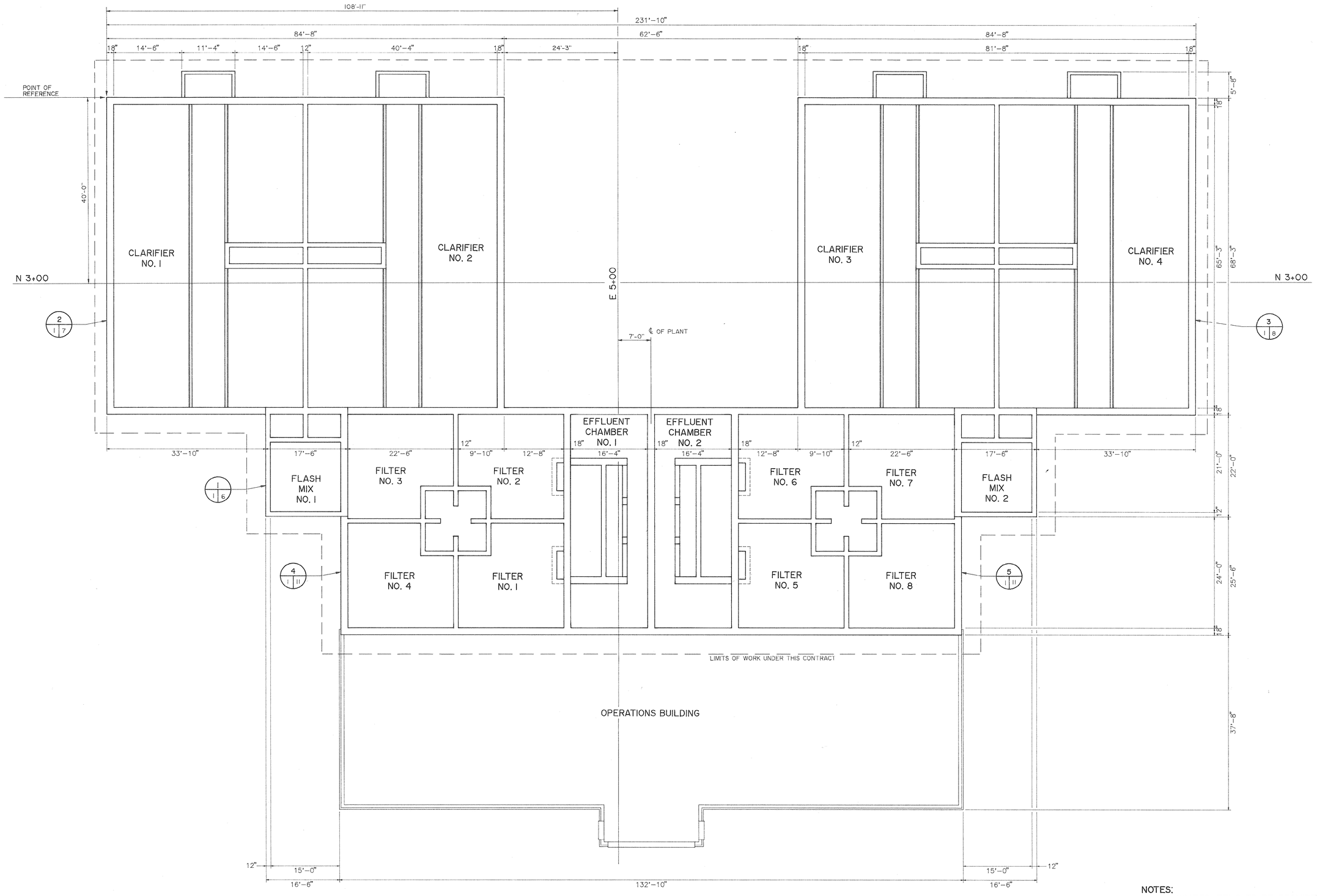
INTAKE AND AIR MAIN PIPING PROFILE AND DETAILS

DATE:	JUNE, 1989
DESIGNED:	RSH
DRAWN:	TFW
CHECKED:	
SCALE:	AS SHOWN
SHEET NO:	G-8
OF:	

GSAB05

33-011-008

SOUTHERN PHOTO - GREENSBORO N.C.



NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

PLANT UNIT LAYOUT
SCALE: 1/8" = 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12127 DONALD T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14035 JOSEPH W. McCOLLUM 12-1-89

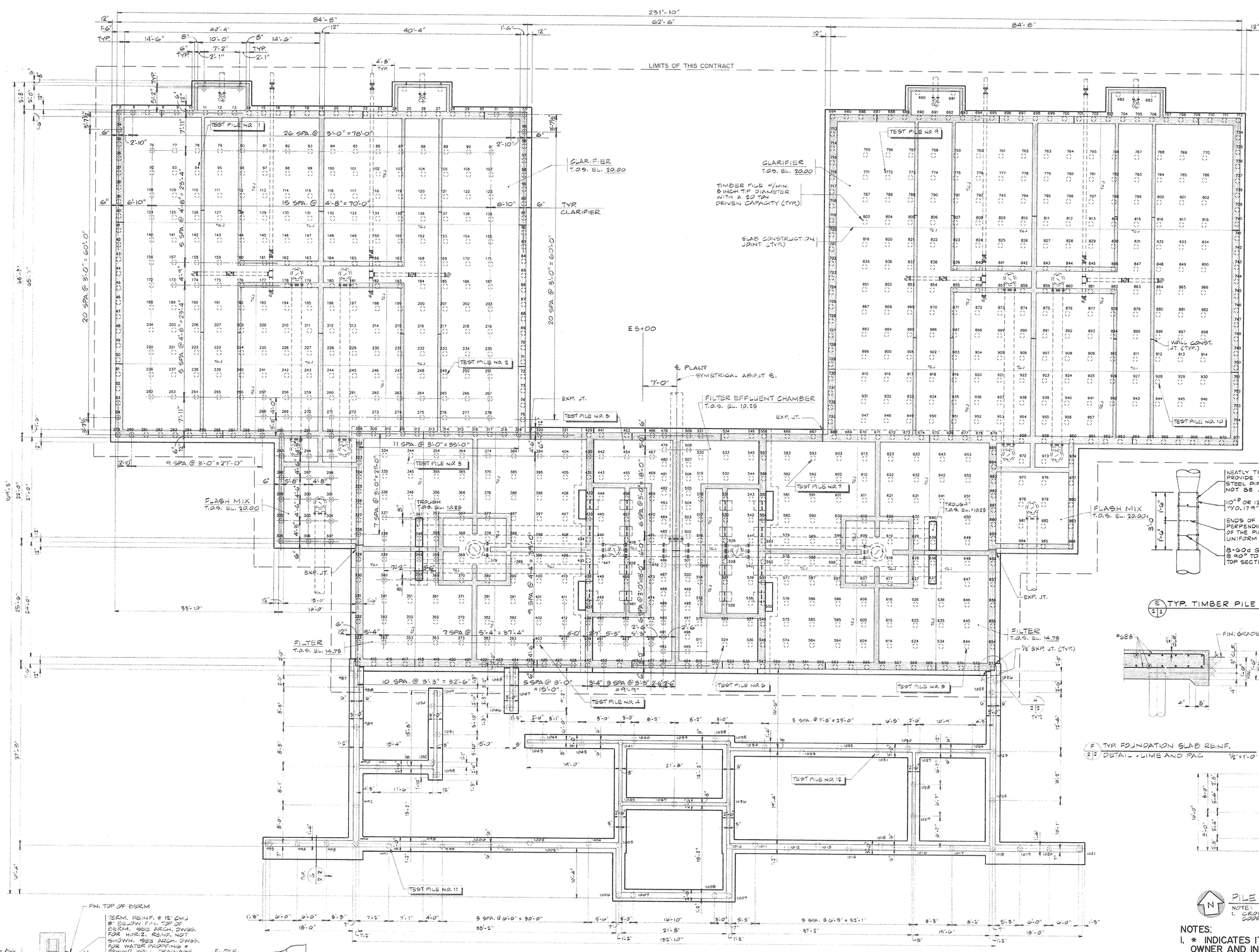
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

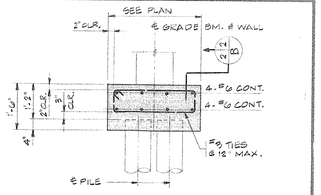
PLANT UNIT LAYOUT

33-011-009

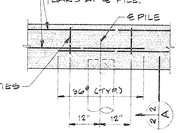
DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: 1/8" = 1'-0"
SHEET NO. S-1
OF

SOUTHERN PHOTO - GREENSBORO N.C.

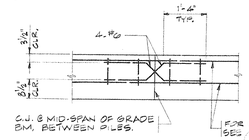




A 2/2 TYP. GRADE BEAM REINFORCING DETAIL 1/2"=1'-0"

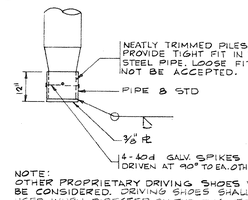


B 2/2 TYP. GRADE BEAM REINFORCING DETAIL 1/2"=1'-0"

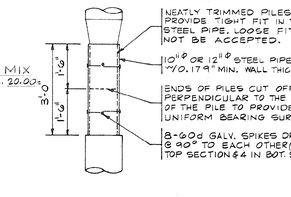


NOTE:
VERIFY LOCATION OF CONSTRUCTION JOINT (C.J.) W/ ARCHITECT BEFORE CONSTRUCTION.

C 2/2 TYP. ELEVATION OF GRADE BEAM CONSTRUCTION JOINT (C.J.) 1/2"=1'-0"



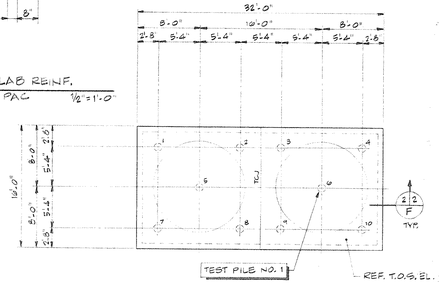
NOTE:
OTHER PROPRIETARY DRIVING SHOES WILL BE CONSIDERED. DRIVING SHOES SHALL BE USED WHEN DIRECTED BY THE ENGINEER.



E 2/2 TYP. TIMBER PILE SPLICE DETAIL 1/2"=1'-0"

D 2/2 TYP. TIMBER PILE DRIVING SHOE NO SCALE

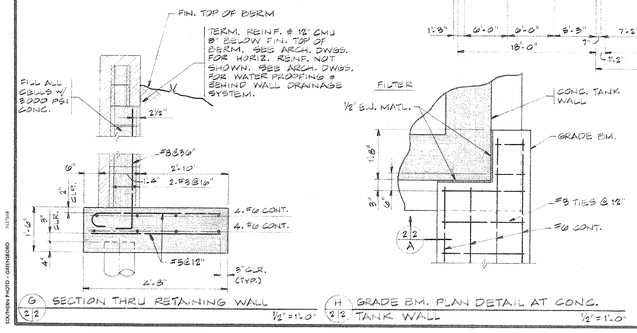
F 2/2 TYP. FOUNDATION SLAB REINF. DETAIL - LIME AND PAC 1/2"=1'-0"



N PILE PLAN - LIME AND PAC 1/8"=1'-0"

NOTE:
1. CROWN TOP OF FOUNDATION SLAB FOR DRAINAGE. COORD. SLOPE WITH ENGINEER.

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.



G 2/2 SECTION THRU RETAINING WALL 1/2"=1'-0"

H 2/2 GRADE BM. PLAN DETAIL AT CONC. TANK WALL 1/2"=1'-0"

N PILE FOUNDATION PLAN 1/8"=1'-0"

OPERATIONS BLDG., FILTERS AND CLARIFIERS

NOTE:
1. TOP OF GRADE BM. ELEV. = 10.42 ; U.O.N. THUS: XX.XX.
2. SEE ARCH. DWGS. FOR UNDER FLR. DRAINAGE SYSTEM.
3. SEE ARCH. DWGS. FOR LOCATION OF FLR. FINISHES REQUIRING DEPRESSED FLR. SLABS AND FOR LOCATION OF MAS. PARAITITIONS ON THICKENED SLABS.
4. ALL SLABS SHALL BE 6" THICKNESS, U.O.N.
5. ALL SLABS SHALL BE PLACED OVER VAPOR BARRIER AND 4" COMPACTED STONE AND REINFORCED W/10X6-W2.9XW2.9 WWF, U.O.N.
6. FIN. BUILDING FLR. ELEV. = 18.42 U.O.N.
7. SEE ARCH. DWGS. FOR STAIR DETAILS AND DIMENSIONS NOT SHOWN.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED SLAB REINFORCING	2-5-90	JWM

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

Greiner
GREINER, INC.
Raleigh, North Carolina

SOUTH CAROLINA PROFESSIONAL ENGINEER 10821 WILLIAM T. BIGGER 4/1/89

R0075.00

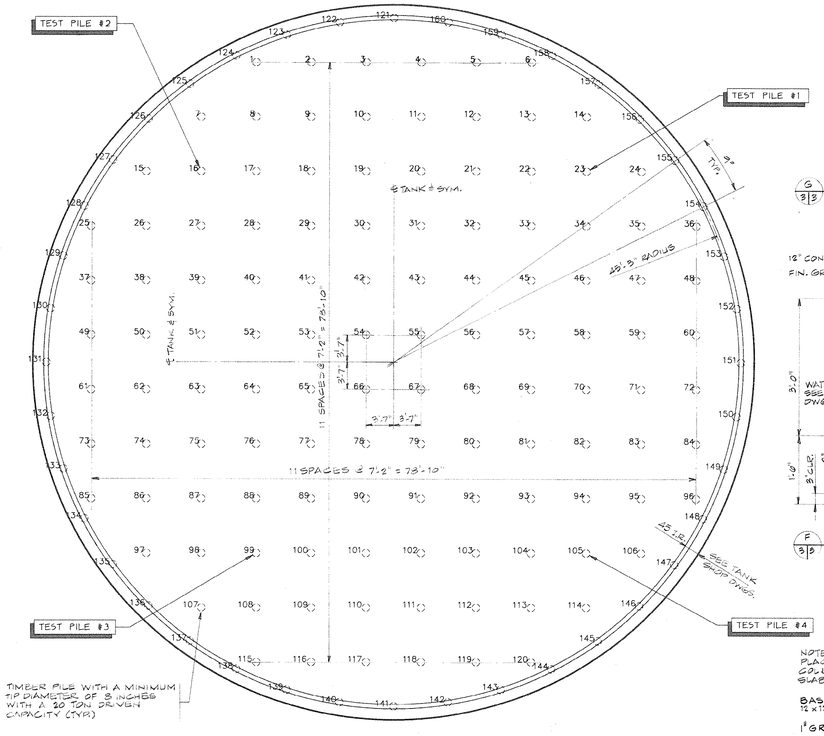
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

PILE FOUNDATION PLAN
OPERATIONS BLDG., FILTERS AND CLARIFIERS
LIME AND PAC

DATE:	12-13-89
DESIGNED:	WPD
DRAWN:	LAW
CHECKED:	WPD
SCALE:	AS NOTED
SHEET NO.	S-2
OF:	

33-011-010

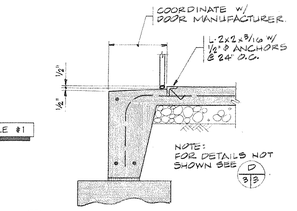
SOUTHERN PHOTO-GREENSBORO 142168



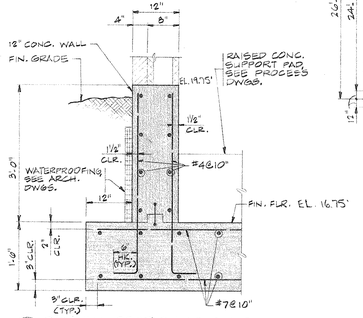
PILE PLAN - 500,000 GALLON CLEARWELL

1/8"=1'-0"

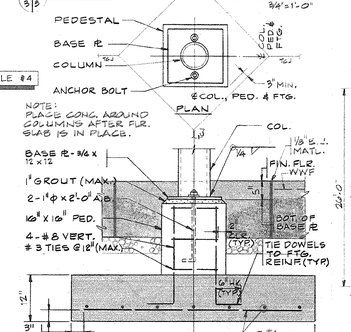
NOTE:
1. PILE LOCATIONS AND NUMBER ARE FOR BIDDING PURPOSES ONLY. PILE LOCATIONS MAY VARY SLIGHTLY AS REQUIRED BY TANK MANUFACTURER TO ACCOMMODATE PIPING.
2. VERIFY TANK AND PILE PLAN ORIENTATION WITH SITE PLAN AND TANK SHOP DRAWINGS.
3. TIMBER PILES SHALL CONFORM TO ASTM D25.
4. TIMBER PILES SHALL HAVE A NET CREOSOTE RETENTION OF NOT LESS THAN 12 POUNDS PER CUBIC FOOT BY ASSAY.
5. EXCAVATE TO PLAN DEPTH OF TANK SLAB PRIOR TO COMMENCING PILE DRIVING. CONFIRM W/ TANK SHOP DRAWING.



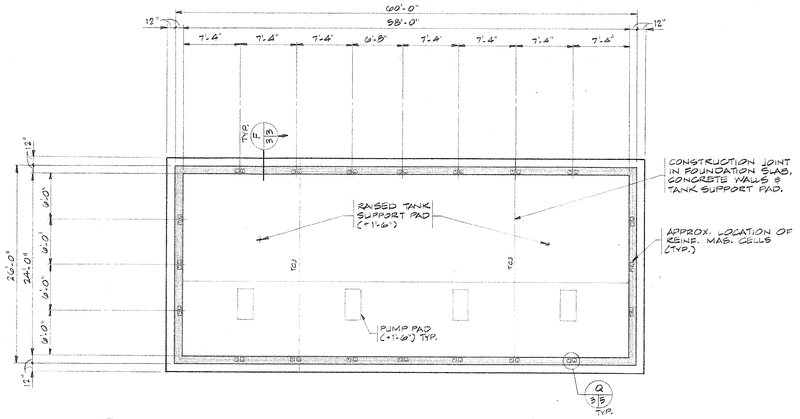
G 3/3 SECTION THRU SLAB AT ROLL-UP DOOR 3/4"=1'-0"



F 3/3 TYP. WALL SECTION AT FIN. FLOOR 3/4"=1'-0"



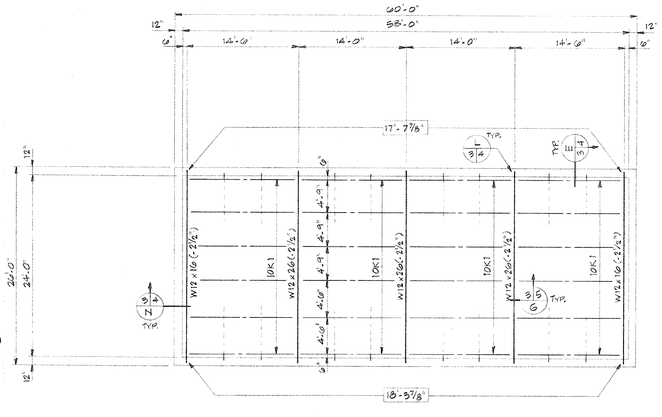
E 3/3 TYP. PIPE COLUMN BASE DETAIL NO SCALE



FOUNDATION PLAN - BULK CHEMICAL STORAGE

1/8"=1'-0"

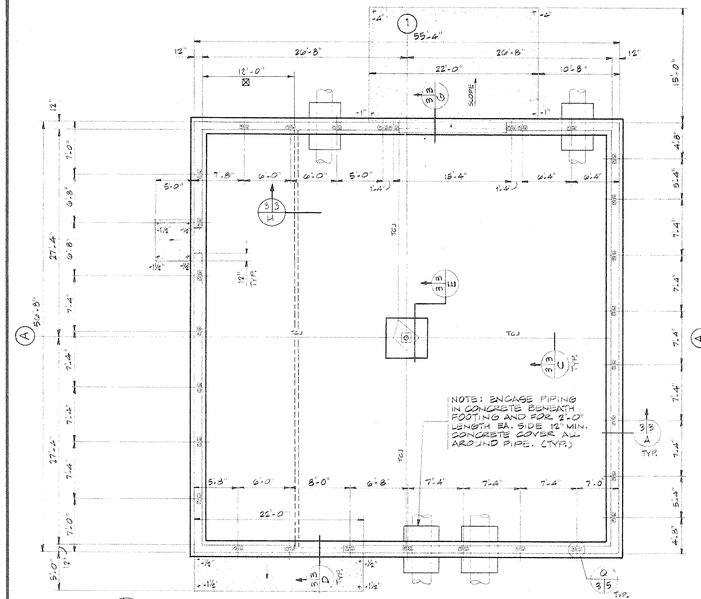
NOTE:
1. FIN. FLOOR ELEV. = 13.50 U.O.N.
2. SEE ARCH. DWGS. FOR STAIR DETAILS AND DIMENSIONS NOT SHOWN.
3. LOCATIONS OF REINF. MAS. CELLS ARE APPROX. COORD. EXACT LOCATION WITH MAS. OPENINGS. REINF. MAS. CELLS AT 7'-4" O.C. MAX.



ROOF FRAMING PLAN - BULK CHEMICAL STORAGE

1/8"=1'-0"

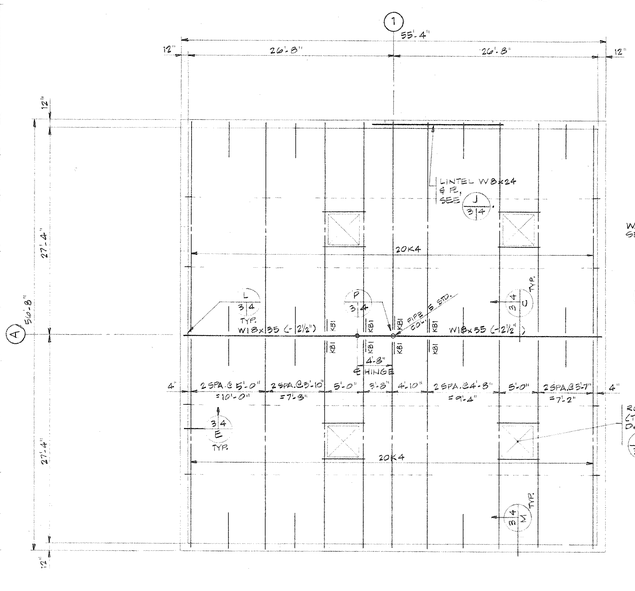
NOTE:
1. SEE "ROOF FRAMING PLAN - OPERATIONS BUILDING", SHEET S-4, FOR NOTES.



FOUNDATION PLAN - FINISHED PUMPING STATION

1/8"=1'-0"

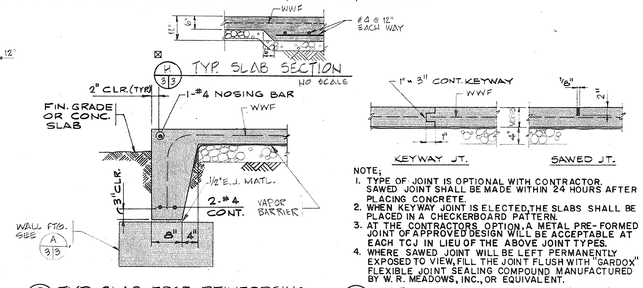
NOTE:
1. TOP OF WALL FTG. ELEV. = 13.50 U.O.N. THUS: XX.XX
2. TOP OF COL. FTG. ELEV. = 8.83 U.O.N. THUS: XX.XX
3. SEE ARCH. DWGS. FOR LOCATION OF MAS. WALLS NOT DIMENSIONED.
4. ALL SLABS SHALL BE 8" THICKNESS AND SHALL BE PLACED OVER VAPOR BARRIER AND 4" COMPACTED STONE AND REINFORCED W1.6XG - W2.9 x W2.9 WWF U.O.N.
5. FIN. FLR. ELEV. = 13.50 U.O.N.
6. SEE ARCH. DWGS. FOR LOCATION AND DETAILS OF CONC. STEPS.
7. ALL WALL DIMENSIONS SHOWN ARE NOMINAL DIMENSIONS.



ROOF FRAMING PLAN - FINISHED PUMPING STATION

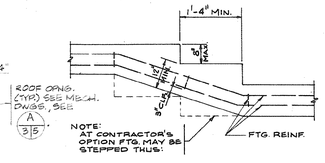
1/8"=1'-0"

NOTES:
1. SEE "ROOF FRAMING PLAN - OPERATIONS BUILDING", SHEET S-4, FOR NOTES.
2. REF. STEEL ELEV. = 14'-10⅞" A.F.F. U.O.N.
3. PROVIDE JOISTS ON COLUMN CENTERLINE W/ 2-½"ø ERECTION BOLTS EA.

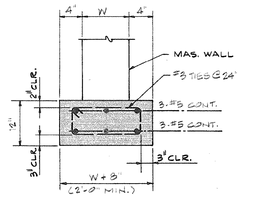


D 3/3 TYP. SLAB EDGE REINFORCING 3/4"=1'-0"

C 3/3 TYP. CONTROL JOINT (TCJ) AT SLAB-ON-GRADE NO SCALE



P 3/3 TYP. STEPPED FOOTING DETAIL NO SCALE



A 3/5 TYP. WALL FOOTING REINF. NO SCALE

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

GENERAL NOTES

A. FOUNDATIONS.
1. MAXIMUM ALLOWABLE SOIL PRESSURE = 2000 PSF.
2. FOOTING EXCAVATIONS AND FORMS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
3. FOOTINGS SHALL BE LOWERED WHEN DIRECTED BY THE ENGINEER TO REACH FIRM, UNDISTURBED SOIL.
4. CONSTRUCTION JOINTS IN WALL FOOTINGS SHALL BE MADE AT LEAST TWO FEET FROM THE INTERSECTION WITH ANOTHER WALL FOOTING.
5. PLACE CONCRETE FOR FOUNDATION WALLS, RETAINING WALLS AND TANK WALLS IN ALTERNATE SECTIONS AND PROVIDE CONSTRUCTION JOINTS AT LOCATIONS SHOWN ON THE DRAWINGS, OR AT 30 FEET MAXIMUM ON CENTER. CONSTRUCTION JOINTS IN TANK WALLS SHALL BE AT LEAST 10 FEET FROM THE INTERSECTION WITH ANOTHER WALL.
6. PROVIDE BRACING AGAINST WALLS AS REQUIRED TO PREVENT DAMAGE DURING COMPACTION OF FILL.
7. ALL FILL BENEATH STRUCTURES SHALL BE SELECT MATERIAL FREE FROM ROOTS, TRASH, WOOD SCRAPS, AND OTHER EXTRANEOUS MATERIALS. PLACE FILL IN LIFTS NOT EXCEEDING 8 INCHES AND COMPACT EACH LIFT TO 95% DENSITY, 98% UPPER 12 INCHES, AT OPTIMUM MOISTURE CONTENT AS MEASURED BY ASTM D698. FILL PLACEMENT SHALL BE UNDER THE CONTROL OF AN INDEPENDENT TESTING LABORATORY.
8. TIMBER PILES SHALL BE CREOSOTE TREATED AND SHALL CONFORM TO ASTM D25 WITH A MINIMUM TIP DIAMETER OF 8 INCHES AND SHALL BE DRIVEN TO 20 TONS CAPACITY. SEE SPECIFICATIONS.
9. TIMBER PILES SHALL HAVE A NET CREOSOTE RETENTION OF NOT LESS THAN 12 POUNDS PER CUBIC FOOT BY ASSAY.
10. EXCAVATE TO PLAN DEPTH OF TANK SLAB OR GRADE BEAMS PRIOR TO COMMENCING PILE DRIVING.
11. ALL GRADE BEAMS, SLABS AND FOOTINGS SHALL BE FORMED WITH WOOD OR METAL FORMING MATERIALS TO THE DIMENSIONS AS SHOWN ON THE DRAWINGS.

B. CONCRETE.
1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS:
   CONCRETE FOR TANKS AND GRADE BEAMS 4000 PSI
   ALL OTHER CONCRETE 3000 PSI
2. CONCRETE WORK SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE," ACI 318-83, INCLUDING SUPPLEMENTS.
3. SLABS-ON-GRADE 6 INCHES THICK, UNLESS OTHERWISE NOTED.
4. PLACE 1/2 INCH EXPANSION JOINT MATERIAL BETWEEN EDGES OF SLABS AND VERTICAL SURFACES UNLESS OTHERWISE NOTED.
5. PROVIDE CONSTRUCTION OR CONTROL JOINTS IN SLABS AT LOCATIONS SHOWN ON DRAWINGS, AT OFFSETS AND CHANGES IN DIRECTION, AND AT 30 FEET MAXIMUM.
6. CHAMFER EXPOSED EDGES OF CONCRETE (AND ALL CORNERS OF ALL COLUMNS) 3/4 INCH, UNLESS OTHERWISE NOTED.
7. SEE ARCHITECTURAL FINISH SCHEDULE FOR REQUIRED FLOOR FINISHES.
8. CONCRETE SHALL BE CURED A MINIMUM OF 7 DAYS BY ONE OR MORE METHODS SPECIFIED IN CHAPTER 12 OF THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS," ACI 301-84 (REVISED 1988), EXCEPT POLYETHYLENE FILMS SHALL NOT BE USED FOR THE CURING OF CONCRETE WORK.
9. IN ADDITION, CONCRETE WORK SHALL CONFORM TO THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS," ACI 301-84 (REVISED 1988), EXCEPT AS OTHERWISE NOTED.
10. CONCRETE FORMWORK SHALL CONFORM TO "RECOMMENDED PRACTICE FOR CONCRETE FORMWORK," ACI 347-78(84) AND "FORMWORK FOR CONCRETE," ACI MANUAL SP-4.

C. REINFORCING STEEL.
1. BARS SHALL BE ROLLED FROM NEW BILLET-STEEL OF DOMESTIC MANUFACTURE CONFORMING TO "STANDARD SPECIFICATION FOR DEFORMED AND PLAIN BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT," ASTM A615, GRADE 60 AND SUPPLEMENTARY REQUIREMENT S1.
2. WELDED WIRE FABRIC SHALL CONFORM TO "STANDARD SPECIFICATION FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT," ASTM A185.
3. DETAIL AND FABRICATE REINFORCING STEEL IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE "ACI DETAILING MANUAL - 1980," PUBLICATION SP-66.
4. REINFORCING STEEL IN PLACE SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
5. PROVIDE BARS AT CORNERS AND INTERSECTIONS OF THE SAME NUMBER AND SIZE AS LONGITUDINAL BARS IN FOOTINGS, GRADE BEAMS AND WALLS.
6. PROVIDE 4-#5 BARS (2 EACH FACE) AT EACH SIDE OF OPENINGS IN SLABS AND WALLS AND EXTEND 2'-0" PAST OPENING. IF SUCH AN EXTENSION IS NOT OBTAINABLE, TERMINATE THE BAR WITH A STANDARD HOOK.

D. WATERSTOPS.
1. PROVIDE CONTINUOUS PVC WATERSTOPS WHERE SHOWN ON DRAWINGS, AT EXTERIOR WALL CONSTRUCTION JOINTS AND WHERE DIFFERENTIAL HEIGHTS OF FLUIDS EXIST ON EITHER SIDE OF WALL.
2. WATERSTOPS SHALL BE MANUFACTURED OF VIRGIN MATERIAL COMPOSED OF AN ELASTOMERIC POLYVINYL CHLORIDE COMPOUND MEETING THE REQUIREMENTS OF CORPS OF ENGINEERS CRD-C572. SUBMIT MANUFACTURER'S LITERATURE SHOWING COMPLIANCE WITH THE ABOVE SPECIFICATION AND SHOWING WATERSTOP SHAPES FOR USE.
3. WATERSTOPS AT CONSTRUCTION JOINTS SHALL BE 6-INCH MIN. LENGTH "DUMBELL" TYPE UNLESS OTHERWISE INDICATED ON DRAWINGS. WATERSTOPS AT EXPANSION JOINTS SHALL BE 9 INCH MIN. LENGTH "DUMBELL" TYPE WITH 3/4 INCH MIN. INSIDE DIAMETER CENTER BULB, UNLESS OTHERWISE INDICATED ON DRAWINGS.
4. ALL SPLICING OF WATERSTOPS SHALL BE SHOP FABRICATED EXCEPT THAT BUTT SPLICES MAY BE FIELD FABRICATED.

E. STRUCTURAL STEEL.
1. STEEL SHALL CONFORM TO "STANDARD SPECIFICATION FOR STRUCTURAL STEEL," ASTM A36.
2. STRUCTURAL TUBING SHALL CONFORM TO "STANDARD SPECIFICATION FOR HOT-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING," ASTM A501.
3. STEEL WORK SHALL CONFORM TO "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC., EFFECTIVE NOVEMBER 1, 1978, INCLUDING ALL SUPPLEMENTS, AND THE "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES," EFFECTIVE SEPTEMBER 1, 1976.
4. CONNECTION BOLTS SHALL BE 3/4 INCH DIAMETER CONFORMING TO "STANDARD SPECIFICATION FOR HIGH-STRENGTH BOLTS FOR STRUCTURAL STEEL JOINTS," ASTM A325, UNLESS OTHERWISE NOTED. CONNECTIONS ARE BEARING TYPE WITH THREADS EXCLUDED FROM SHEAR PLANES. INSTALL EACH BOLT WITH A HARDENED WASHER UNDER THE NUT OR HEAD, WHICHEVER IS TURNED FOR TIGHTENING TO THE REQUIRED TENSION.
5. OVERSIZE HOLES AND SLOTTED HOLES SHALL NOT BE USED FOR BOLTED CONNECTIONS ON THIS PROJECT EXCEPT AT LOCATIONS NOTED ON THE DRAWINGS.
6. WELDING SHALL BE BY WELDERS AND WELDING OPERATORS WHO HAVE BEEN PREVIOUSLY QUALIFIED BY TESTS AS PRESCRIBED IN THE "STRUCTURAL WELDING CODE," AWS D1.1-89 OF THE AMERICAN WELDING SOCIETY TO PERFORM THE TYPES OF WELDS REQUIRED ON THIS PROJECT.
7. BEAMS AND LINTELS SHALL BEAR 8 INCHES MINIMUM ON MASONRY UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY BRACING, SHORING AND GUYING OF FRAMING AGAINST WIND, CONSTRUCTION LOADS AND OTHER TEMPORARY FORCES UNTIL SUCH PROTECTION IS NO LONGER REQUIRED FOR THE SAFE SUPPORT OF THE FRAMING.
9. ANCHOR BOLT LENGTHS SHOWN ON THE DRAWINGS SHALL INCLUDE HOOKS OF NOT LESS THAN 3 INCHES IN LENGTH. PROVIDE ONE NUT AND ONE WASHER WITH EACH ANCHOR BOLT UNLESS OTHERWISE NOTED.
10. ALL STRUCTURAL STEEL, BOLTS AND ACCESSORIES NOTED ON THE DRAWINGS AS H.D.G. SHALL RECEIVE, AFTER FABRICATION AND BEFORE ASSEMBLY, A PROTECTIVE COATING OF ZINC IN CONFORMANCE WITH "STANDARD SPECIFICATION FOR ZINC (HOT-GALVANIZED) COATINGS ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES, BARS, AND STRIP," ASTM A123 AND "STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE," ASTM A153.
11. ALL OTHER STRUCTURAL STEEL SHALL BE GIVEN ONE SHOP COAT OF PAINT OF NOT LESS THAN 3 MILS DRY FILM THICKNESS CONFORMING TO STEEL STRUCTURES PAINTING COUNCIL SSPC PAINT 2, SSPC PAINT 13 OR SSPC PAINT 14.

F. OPEN WEB STEEL JOISTS.
1. FABRICATE AND ERECT JOISTS IN ACCORDANCE WITH "STANDARD SPECIFICATIONS, LOAD TABLES AND WEIGHT TABLES FOR STEEL JOISTS AND JOIST GIRDERS," OF THE STEEL JOIST INSTITUTE, 1986 EDITION.
2. PROVIDE CEILING EXTENSIONS FOR JOISTS SUPPORTING CONTACT CEILINGS AND WHERE SHOWN ON DRAWINGS.
3. JOISTS SHALL HAVE MINIMUM BEARING ON SUPPORTS IN ACCORDANCE WITH THE SJI SPECIFICATIONS UNLESS OTHERWISE NOTED.
4. BRIDGING SHALL BE IN PLACE, ANCHORED AND REVIEWED BY THE ENGINEER PRIOR TO PLACING CORRUGATED STEEL FORMS OR DECKING.
5. ANCHOR BOLT LENGTHS SHOWN ON DRAWINGS SHALL INCLUDE A STANDARD HOOK. PROVIDE ONE NUT AND ONE WASHER WITH EACH ANCHOR BOLT UNLESS OTHERWISE NOTED.
6. JOISTS SHALL RECEIVE ONE SHOP COAT OF PAINT OF NOT LESS THAN 3 MILS DRY FILM THICKNESS CONFORMING TO STEEL STRUCTURES PAINTING COUNCIL SSPC PAINT 15, TYPE I (RED OXIDE) OR TYPE II (ASPHALT).

G. CORRUGATED STEEL FORMS.
1. USE 28 GAGE MINIMUM, GALVANIZED, CORRUGATED STEEL FORMS WITH NOMINAL 9/16" CORRUGATION DEPTH FOR STAY-IN-PLACE FLOOR FORMS.
2. FURNISH A MINIMUM OF 25 WELDING WASHERS PER 100 SQ. FT. OF FORMS AND ATTACH SHEETS BY PLUG WELDING THE SHEETS AS FOLLOWS:
   a. END LAPS - WELD IN VALLEY OF SIDE LAPS AND MIDDLE OF SHEET (MINIMUM OF THREE WELDS AT EACH END OF SHEET).
   b. INTERMEDIATE SUPPORTS - WELD THE VALLEY OF SIDE LAPS ON EVERY OTHER JOIST AND IN THE VALLEY OF THE CENTER CORRUGATION ON THE REMAINING JOISTS (X-PATTERN).
3. TO PREVENT THE LEAKAGE OF CONCRETE AT SIDE LAPS, PLACE CONCRETE IN THE OPPOSITE DIRECTION TO WHICH THE SHEETS WERE ERECTED SO THAT TOP SHEET RECEIVES WEIGHT OF CONCRETE FIRST.

H. STEEL ROOF DECK.
1. STEEL ROOF DECK SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THE "SDI STEEL ROOF DECK SPECIFICATIONS" AND THE "SDI CODE OF RECOMMENDED STANDARD PRACTICE, ROOF DECK CONSTRUCTION," 1981-82, OF THE STEEL DECK INSTITUTE.
2. THE STEEL DECK SHALL BE 1 1/2 INCHES IN DEPTH, 22 GAGE, INTERMEDIATE RIB, AND SHALL BE ZINC COATED.
3. PROVIDE ALL RIDGE AND VALLEY PLATES, CANT STRIPS, SUMPS AND OTHER ACCESSORIES TO BE ATTACHED TO THE DECK FOR THE INSTALLATION OF INSULATION, ROOFING AND DRAINAGE.
4. SPOT PAINT ALL FIELD WELDS, FIELD CUT EDGES AND SERIOUS ABRASIONS TO THE SHOP COAT WITH ZINC CHROMATE PRIMER CONFORMING TO STEEL STRUCTURES PAINTING COUNCIL SSPC PAINT 11.
5. ANCHOR DECK TO STRUCTURAL SUPPORTS AT 12 INCHES O.C. MAXIMUM WITH 1/2 INCH DIAMETER PUDDLE WELDS OR 3/16" DIAMETER SELF-TAPPING SCREWS.

I. GROUT.
1. PROVIDE NON-SHRINK, NON-METALLIC, NON-STAINING, HIGH-STRENGTH GROUT UNDER ALL COLUMN BASE PLATES AND BEAM BEARING PLATES AND WHERE SHOWN ON DRAWINGS. USE "SONOGROUT" MANUFACTURED BY SONNEBORN BUILDING PRODUCTS DIVISION, "SUPREME GROUT" MANUFACTURED BY GIFFORD-HILL & CO., INC., "CONSTRUCTION GROUT" MANUFACTURED BY THE W.R. BONSAL COMPANY OR "FIVE STAR GROUT" MANUFACTURED BY U.S. GROUT CORPORATION, OR EQUIVALENT.

FOR CONTINUATION SEE SHEET S-4.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED SLAB REINFORCEMENT	2-5-90	JWM
☒	FLOOR SLAB THICKNESS	3-7-90	JWM

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

Greiner
GREINER, INC.
Raleigh, North Carolina

R0075.00

SOUTH CAROLINA PROFESSIONAL ENGINEER 30982 WILLIAM L. BROOKER 10/6/97

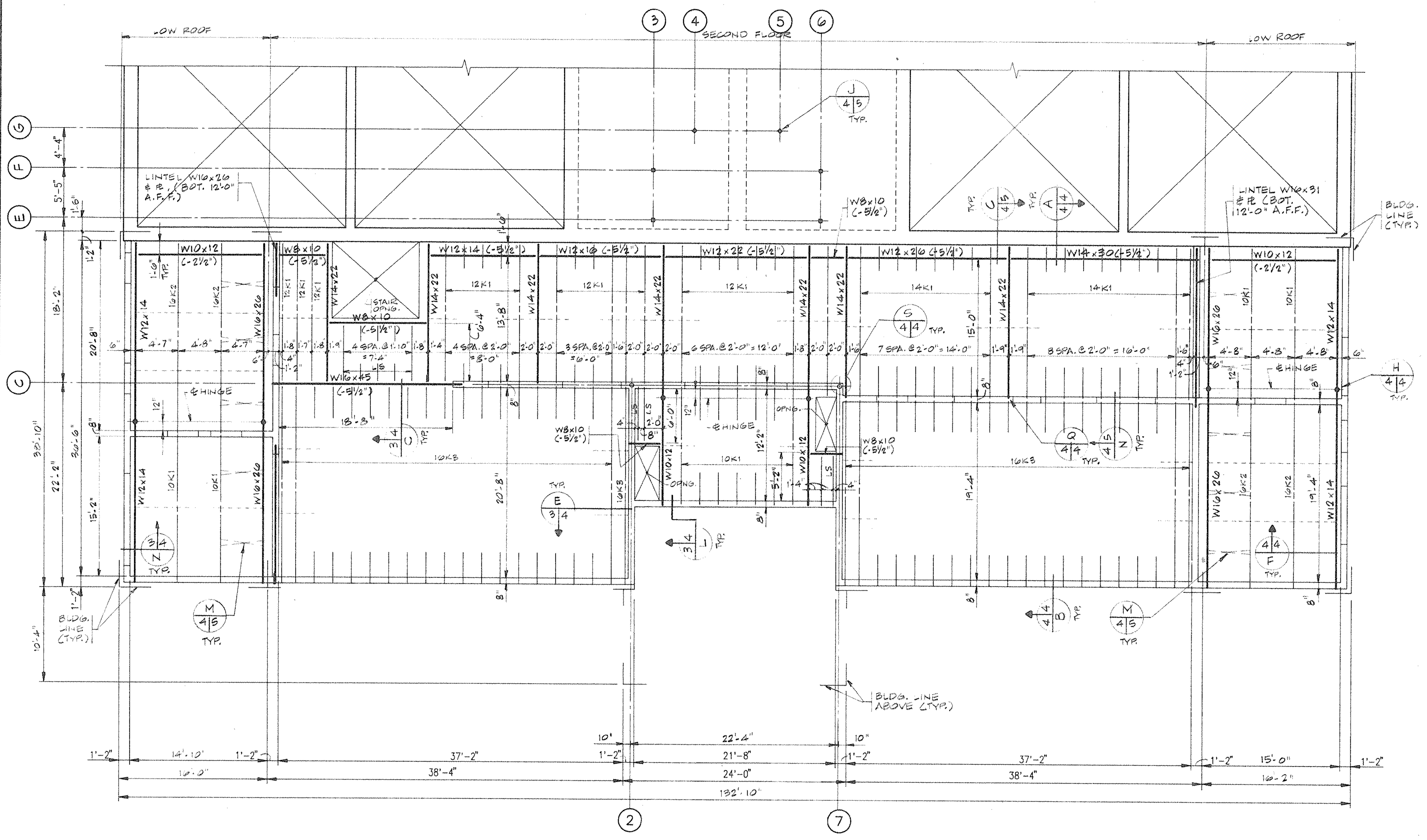
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

PILE PLAN - CLEARWELL
BULK CHEMICAL STORAGE
FINISHED PUMPING STATION

DATE: 12/27/89
DESIGNED: WPD
DRAWN: LAW
CHECKED: WPD
SCALE: AS NOTED
SHEET NO. S-3
OF.

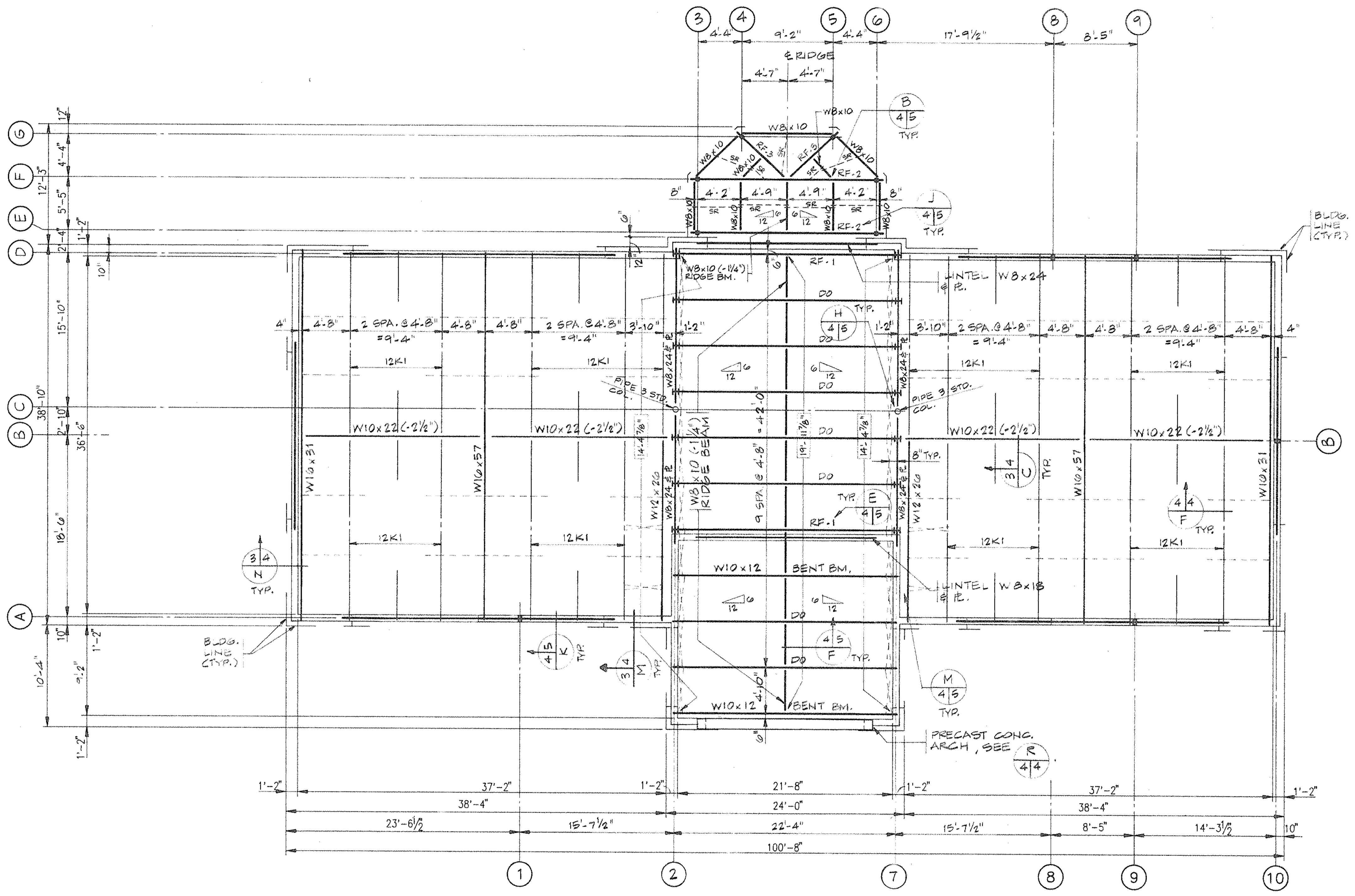
33-011-011

SOUTHERN PHOTO-GRAPHICS N1764



SECOND FLOOR AND LOW ROOF FRAMING PLAN - OPERATIONS BLDG. 1/8"=1'-0"

NOTE:
1. TOP OF STEEL = 3" BELOW FIN. FLR. U.O.N. THUS: (±X'-X"). FLOOR FRAMING.
2. ------DENOTES LOCATION OF ROWS OF CONT. HORIZ. BRIDGING.
3. SEE ARCH. DWGS. FOR LOCATION AND ELEVATION OF LINTELS.
4. "LS" DENOTES BUILT-UP ANGLE SUPPORT AT FLOOR, SEE D/4|4.
5. SEE ARCH. DWGS. FOR EXTENT OF FLOOR FINISHES REQUIRING DEPRESSED FLOOR SLABS NOT SHOWN ON PLAN.
6. ONLY LOAD BEARING WALLS ARE SHOWN. SEE ARCH. DWGS. FOR LOCATION OF MAS. PARTITIONS NOT SHOWN.
7. "REF. STL. ELEV." AT LOW ROOF = 12'-10⅞" A.F.F. U.O.N. THUS: (±X'-X").
8. ⋊⋉ DENOTES LOCATION OF ROWS OF CONT. CROSS BRIDGING.

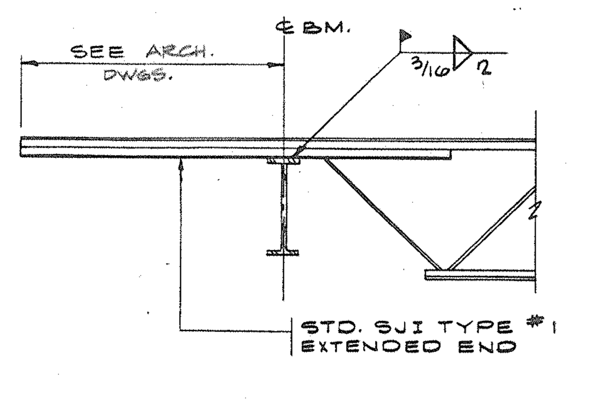


NOTE:
AT CONTINUOUS LINTELS, PROVIDE 2 3/4" DIA. BY 2'-0" A.B. AT 6" MAXIMUM FROM EACH END OF WALL BEARING AND AT 6'-0" MAX O.C., FILL WALL SOLID WITH CONCRETE FOR 2'-0" WIDTH, MINIMUM 3 BLOCK COURSES BELOW BEARING.

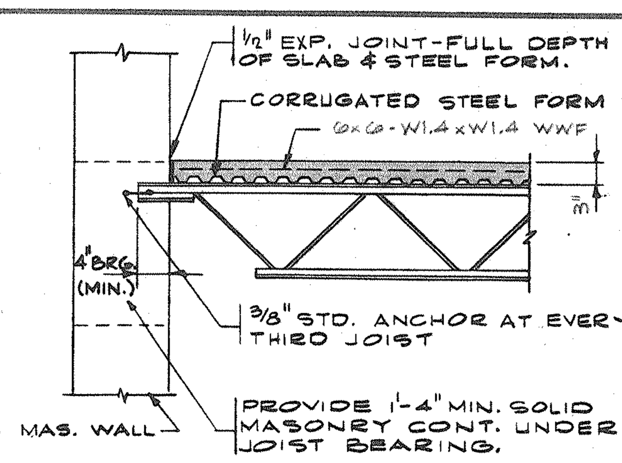
ROOF FRAMING PLAN - OPERATIONS BLDG. 1/8"=1'-0"

NOTE:
1. [XX'-X"] DENOTES "REF. STEEL ELEV." ABOVE FIN. 2ND FLR. AT RESPECTIVE LOCATIONS BETWEEN ARROWS U.O.N. THUS: (±X'-X").
2. ------ DENOTES LOCATION OF ROWS OF CONT. HORIZ. BRIDGING.
3. ⋊⋉ DENOTES LOCATION OF ROWS OF CONT. CROSS BRIDGING.
4. SEE ARCH. DWGS. FOR LOCATION AND ELEVATION OF LINTELS.
5. SEE ARCH. AND MECH. DWGS. FOR LOCATION OF ROOF OPNGS.
6. "REF. STL. ELEV." = 10'-10⅞" ABOVE FIN. 2ND FLR., U.O.N. THUS: (±X'-X").
7. "SR" DENOTES SAG ROD, SEE D/4|5.

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.



A 4|4 TYP. JOIST EXTENDED END DETAIL — NO SCALE



B 4|4 TYP. FLOOR JOIST BEARING DETAIL — NO SCALE

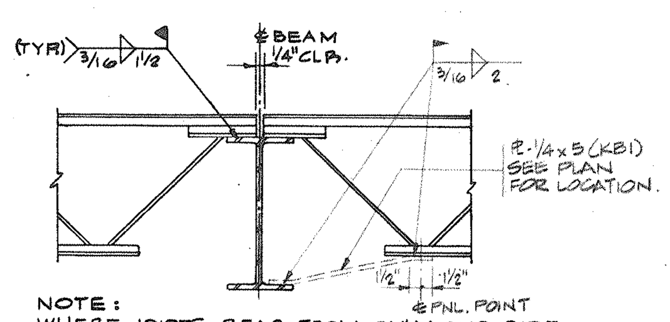
GENERAL NOTES CONTINUED

J. DESIGN LIVE LOADS.
STRUCTURAL MEMBERS ARE DESIGNED FOR FULL DEAD LOADS AND THE FOLLOWING LIVE LOADS:

1.	ROOF	20 PSF
2.	WIND	25 PSF
3.	CORRIDORS, STAIRS, LOBBIES, ASSEMBLY AREAS AND PUBLIC SPACES	100 PSF
4.	ALL OTHER FLOORS	100 PSF

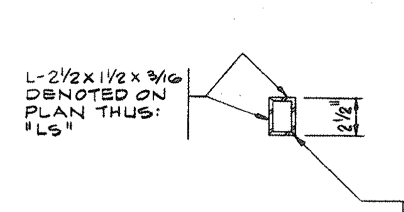
K. ABBREVIATIONS.
THE FOLLOWING LIST OF ABBREVIATIONS IS NOT INTENDED TO REPRESENT ALL THOSE USED ON THESE DRAWINGS, BUT TO SUPPLEMENT THE MORE COMMON ABBREVIATIONS USED:
1. TYP. - TYPICAL
2. SIM. - SIMILAR
3. UON - UNLESS OTHERWISE NOTED
4. CLR - CLEAR, CLEARANCE
5. TCJ - TYPICAL CONTROL JOINT, TYPICAL CONSTRUCTION JOINT
6. EJ - EXPANSION JOINT

L. CONSTRUCTION SAFETY.
THESE DRAWINGS DO NOT CONTAIN NECESSARY COMPONENTS FOR SAFETY DURING CONSTRUCTION.



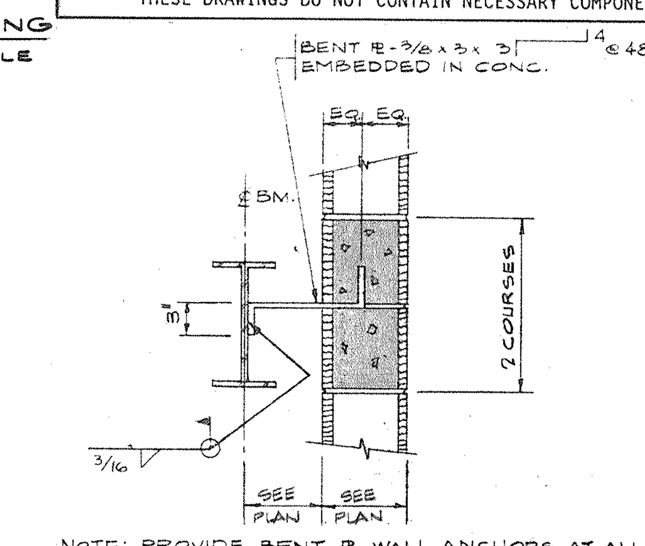
NOTE:
WHERE JOISTS BEAR FROM ONLY ONE SIDE OR ARE NOT OPPOSITE ONE ANOTHER, EXTEND FULL BEARING TO FULL WIDTH OF BEAM FLANGE, U.O.N.

C 3|4 TYP. JOIST TO BEAM CONN. & KB1 — NO SCALE



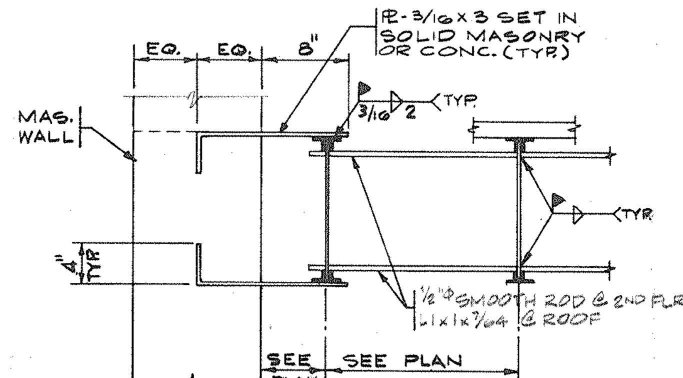
NOTE:
CONN. DETAILS SIM. TO THOSE FOR JOIST BEARINGS.

D 4|4 TYP. BUILT-UP ANGLE SUPPORT DETAIL — 1½"=1'-0"



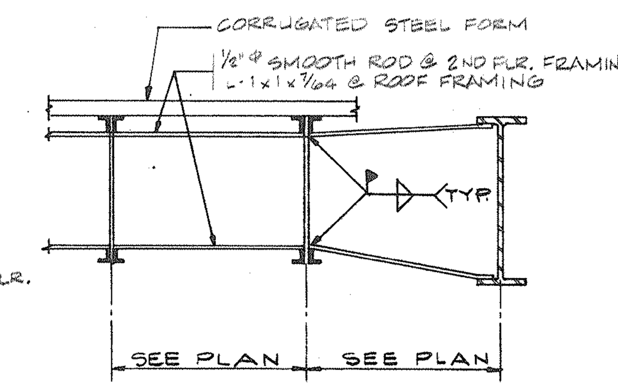
NOTE: PROVIDE BENT PL WALL ANCHORS AT ALL BMS. ADJACENT TO REINFORCED MASONRY WALLS.

N 3|4 TYP. MASONRY WALL TO BM. ANCHORAGE DETAIL — NO SCALE

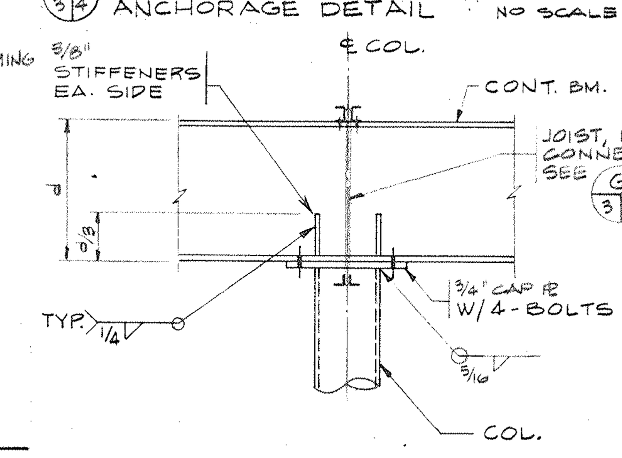


NOTE:
BRIDGING ANCHORS SHALL BE ACCURATELY LOCATED AND EMBEDDED IN WALLS DURING CONST. OF MAS. WORK.

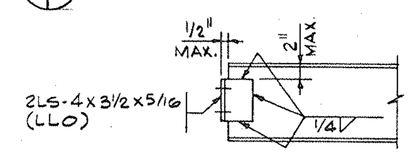
E 3|4 TYP. JOIST BRIDGING DETAIL — NO SCALE



F 4|4 TYP. HORIZONTAL BRIDGING DETAIL — NO SCALE



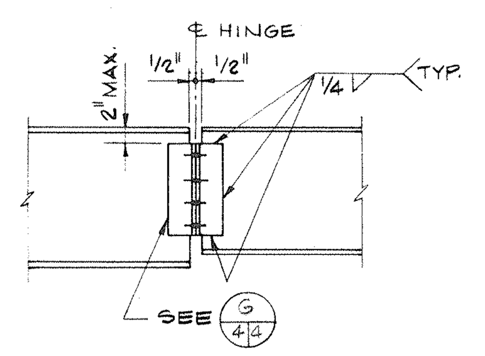
P 3|4 TYP. CONT. BEAM TO COL. CONN. — NO SCALE



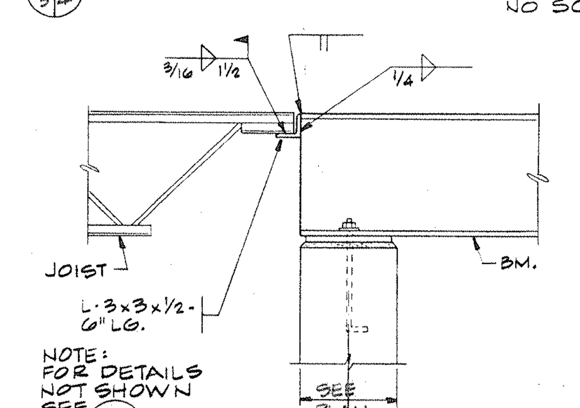
BEAM CONN. SCHEDULE			
BM. DEPTH	L LENGTH	NO. BOLTS L CONN.	NO. BOLTS PL CONN.
8", 10"	0'-5½"	4	2
12", 14"	0'-8½"	6	3
16", 18"	0'-11½"	8	4
21", 24"	1'-2½"	10	5

NOTE:
1. USE 2LS-3½x3x5/16 (SLO) WHERE BM. FRAMES INTO W8 COL. WEB.

G 4|4 TYP. BEAM CONNECTIONS — NO SCALE

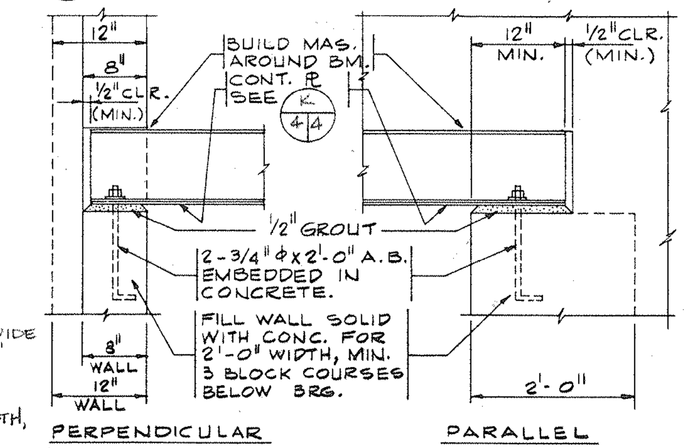


H 4|4 TYP. HINGE DETAIL AT BEAMS — NO SCALE

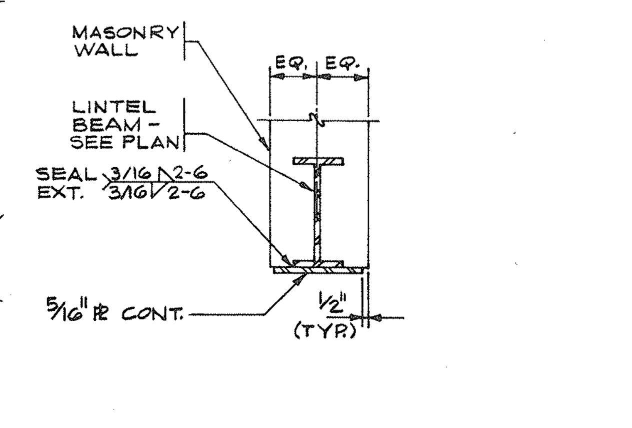


NOTE:
FOR DETAILS NOT SHOWN SEE –/3|4.

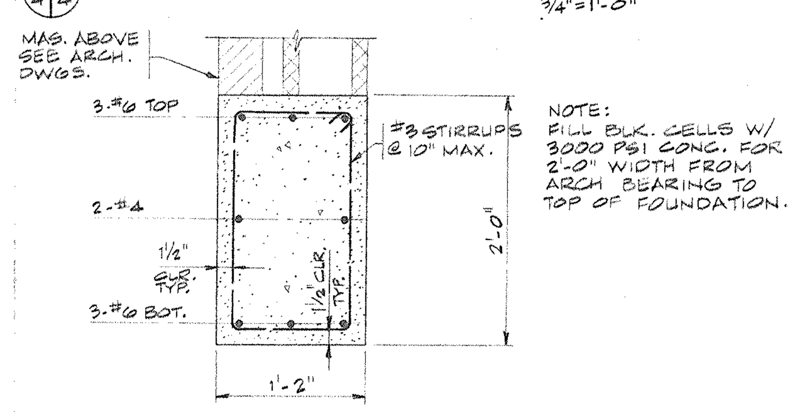
Q 4|4 JOIST BRG. AT BEAM DETAIL — ¾"=1'-0"



J 3|4 TYP. LINTEL BEARING DETAIL — NO SCALE



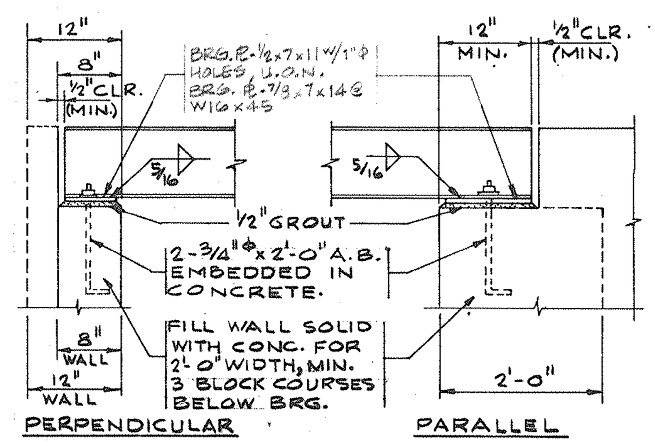
K 4|4 TYP. LINTEL DETAIL — NO SCALE



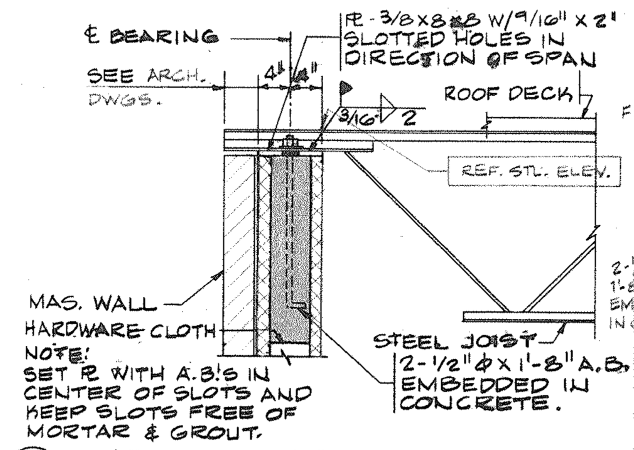
NOTE:
FILL BLK. CELLS W/ 3000 PSI CONC. FOR 2'-0" WIDTH FROM ARCH BEARING TO TOP OF FOUNDATION.

NOTE:
BEAR ARCH 1'-4" MIN. EA. END. PROVIDE ½" MIN. LEVELING GROUT UNDER BEARING.

R 4|4 TYP. PRECAST CONC. ARCH REINF. — 1"=1'-0"

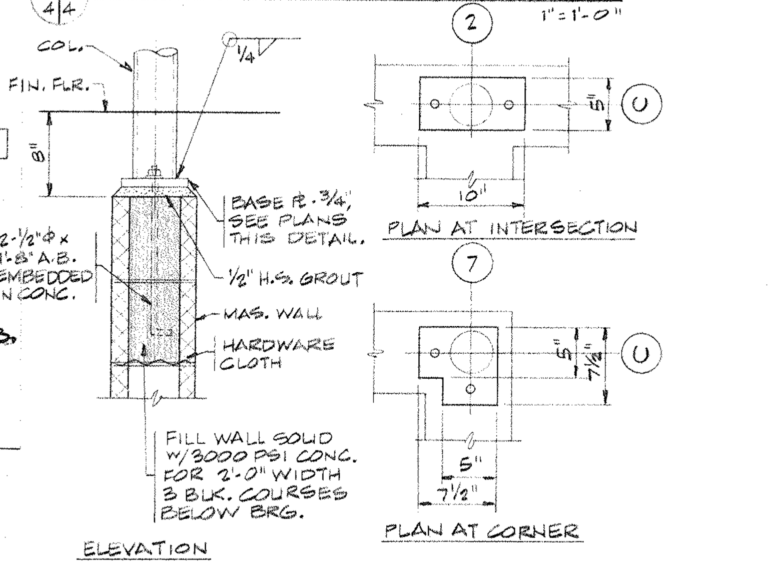


L 3|4 TYP. BEAM BEARING DETAILS AT WALLS — NO SCALE



NOTE:
SET PL WITH A.B.'S IN CENTER OF SLOTS AND KEEP SLOTS FREE OF MORTAR & GROUT.

M 3|4 TYP. JOIST BRG. DETAIL - ¾"=1'-0"



S 4|4 COLUMN BRG. ON MASONRY WALL — 1"=1'-0"

LINTEL SCHEDULE							
OPENING	LINTEL	BEARING	OPENING	6" OR 8" WALL	10" OR 12" WALL	BEARING
0'-0" to 1'-4"	1 PL - ⅜ x 3½ *	8"	2'-0" to 4'-0"	2-#3 / 2-#3	2-#3 / 2-#3	8"
1'-4" to 4'-0"	1 L - 3½ x 3½ x 5/16 *	8"				
4'-0" to 6'-8"	1 L - 4 x 3½ x 5/16 *	8"	4'-0" to 5'-4"	2-#4 / 2-#5	2-#4 / 3-#4	8"
6'-8" to 8'-0"	1 L - 5 x 3½ x 5/16 *	8"	5'-4" to 8'-0"	2-#5 / 2-#6	2-#5 / 3-#5	16"

* PER 4" OF WALL THICKNESS.
NOTE:
ALL UNSCHEDULED OPENINGS INCLUDING OPENINGS FOR MECHANICAL WORK SHALL BE PROVIDED WITH LINTELS IN ACCORDANCE WITH THIS SCHEDULE.

REQUIRED LINTELS NOT OTHERWISE INDICATED ON THE DRAWINGS SHALL BE AS SHOWN IN THE ABOVE SCHEDULE.
CONCRETE MASONRY LINTELS SHALL BE FILLED WITH 3000 PSI CONCRETE.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

Greiner
GREINER, INC.
Raleigh, North Carolina
R0075.00

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER 3082 WILLIAM I. BIGGER 12/28/89

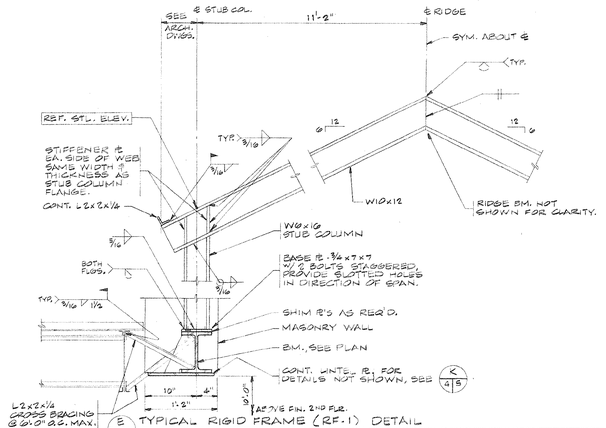
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

OPERATIONS BUILDING STRUCTURAL PLANS

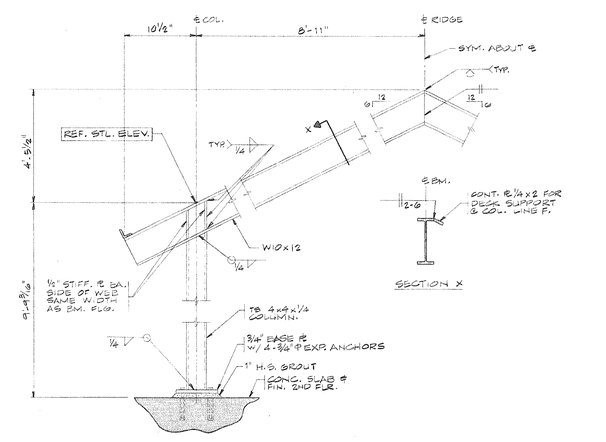
DATE: 12/27/89
DESIGNED: WPD
DRAWN: LAW
CHECKED: WPD
SCALE: AS NOTED
SHEET NO. S-4
OF:

33-011-012

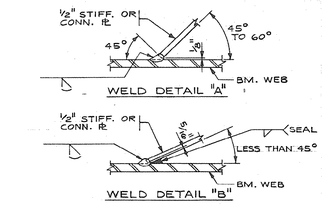
SOUTHERN PHOTO - GREENSBORO N37848



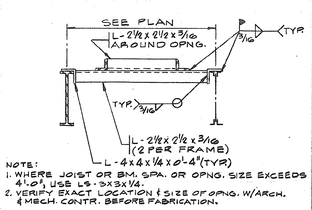
E 4/S TYPICAL RIGID FRAME (RF.1) DETAIL — NO SCALE



J 4/S TYPICAL RIGID FRAME (RF.2) DETAIL — NO SCALE



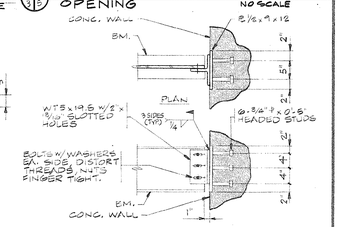
B 4/S TYP. SKEWED PLATE WELD DETAILS — NO SCALE



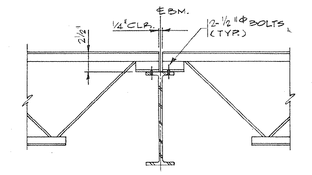
NOTE:
1. WHERE JOIST OR BM. SPA. OR OPNG. SIZE EXCEEDS 4'-10", USE L6 x 3½ x 1/4.
2. VERIFY EXACT LOCATION & SIZE OF OPNG. W/ARCH. & MECH. CONTR. BEFORE FABRICATION.

A 3/S TYP. FRAME AROUND ROOF OPENING — NO SCALE

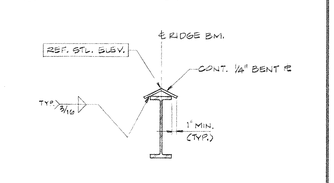
D 4/S TYP. SAG ROD DETAIL — NO SCALE



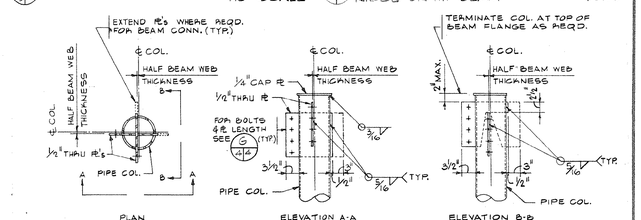
C 4/S TYP. BEAM TO CONCRETE WALL CONNECTION DETAIL — 3/4" = 1'-0"



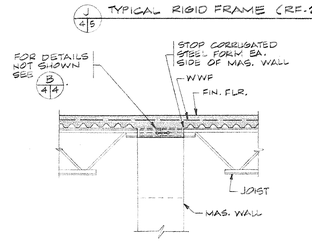
G 3/S TYP. JOIST TO BEAM CONNECTION — NO SCALE



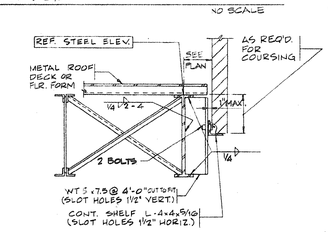
F 4/S TYP. DECK SUPPORT DETAIL AT RIDGE OR HIP BEAM — 1" = 1'-0"



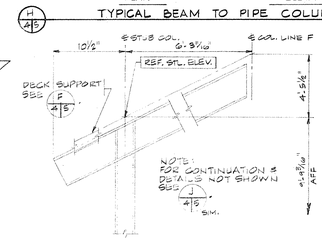
H 4/S TYPICAL BEAM TO PIPE COLUMN CONNECTION — 3/4" = 1'-0"



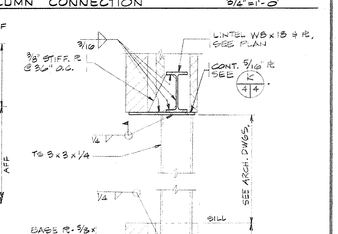
N 4/S TYP. DETAIL AT FLOOR OVER LOAD BRG. MAS. WALL — NO SCALE



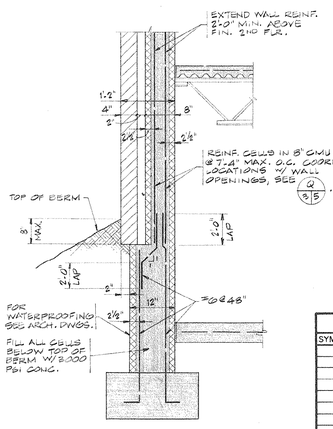
M 4/S TYP. BRICK SUPPORT — NO SCALE



L 4/S TYP. RIGID FRAME (RF.3) DETAIL — NO SCALE

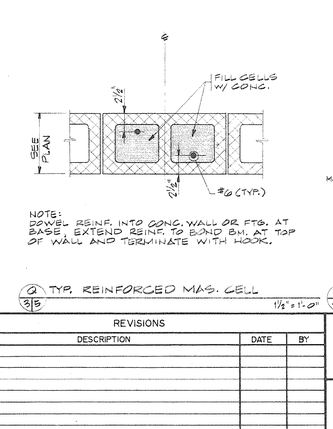


K 4/S TYP. TUBE COLUMN DETAIL AT WINDOW — 1" = 1'-0"



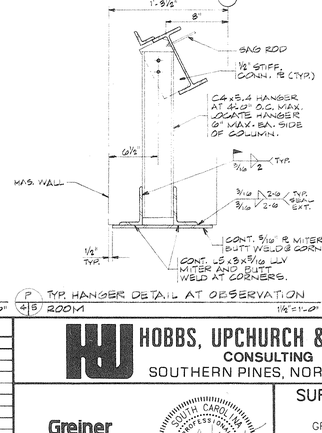
NOTE: FOR HORIZ. REINF. SEE ARCH. DWGS.

R 5/S TYP. MAS. WALL REINF. DETAIL AT EXT. WALL OPERATION BLDG. — NO SCALE



NOTE:
DOWEL REINF. INTO CONC. WALL OR FTG. AT BASE, EXTEND REINF. TO BOND BM. AT TOP OF WALL AND TERMINATE WITH HOOK.

Q 5/S TYP. REINFORCED MAS. CELL — 1 1/2" = 1'-0"



P 4/S TYP. HANGER DETAIL AT OBSERVATION ROOM — 1 1/2" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

Greiner
GREINER, INC.
Raleigh, North Carolina

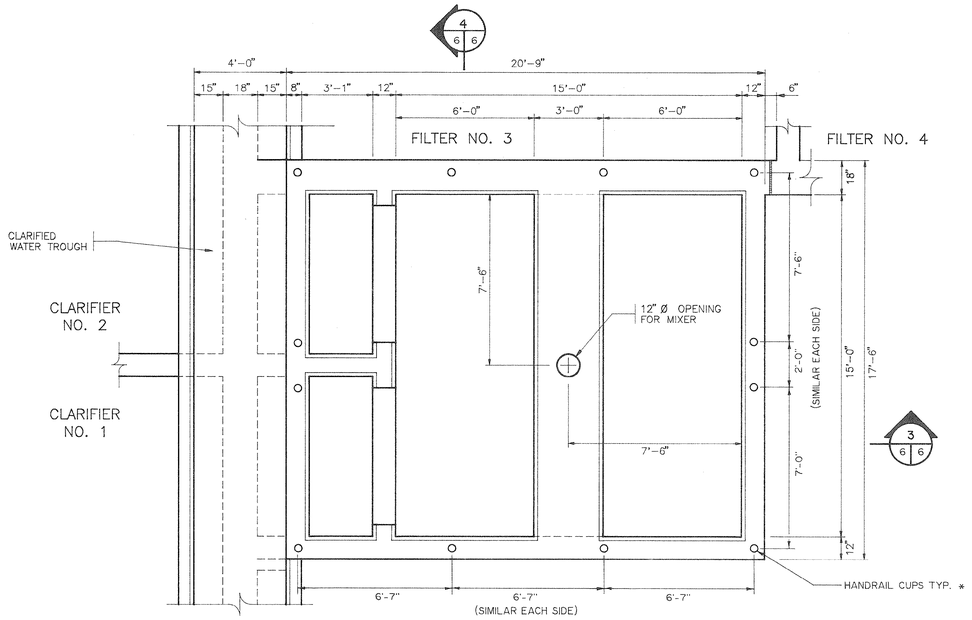
R0075.00

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

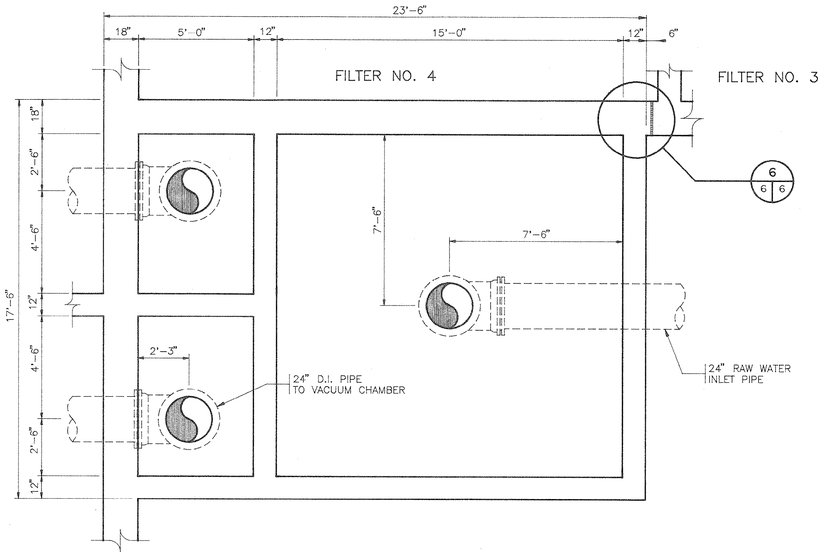
OPERATIONS BUILDING
STRUCTURAL DETAILS

DATE: 12.27.89
DESIGNED: WPD
DRAWN: MAW
CHECKED: WPD
SCALE: AS SHOWN
SHEET NO. S-5
OF: _____

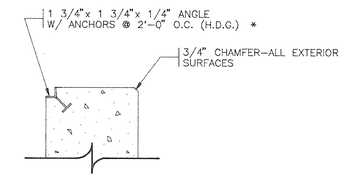
33-011-013



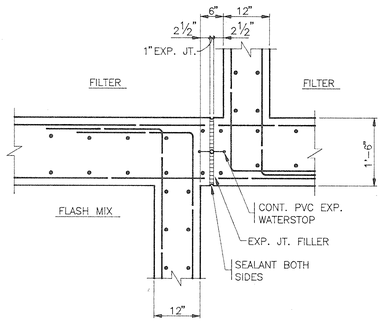
1 6 FLASH MIX NO. 1 UPPER PLAN VIEW
SCALE: 3/8" = 1'-0"



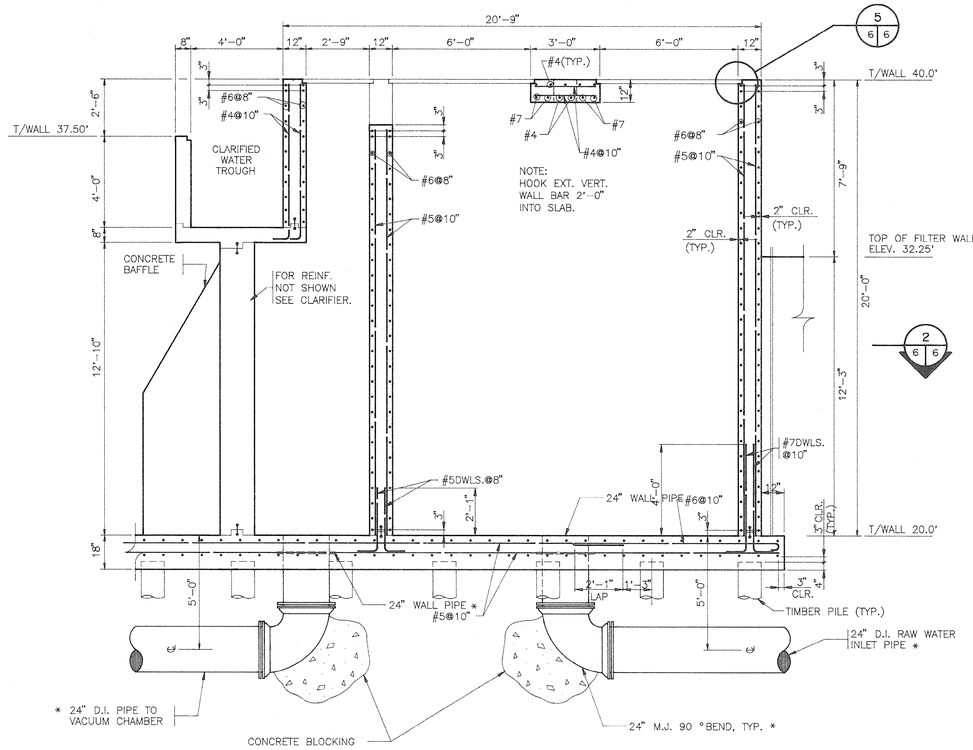
2 6 6 FLASH MIX NO. 1 LOWER PLAN VIEW
SCALE: 3/8" = 1'-0"



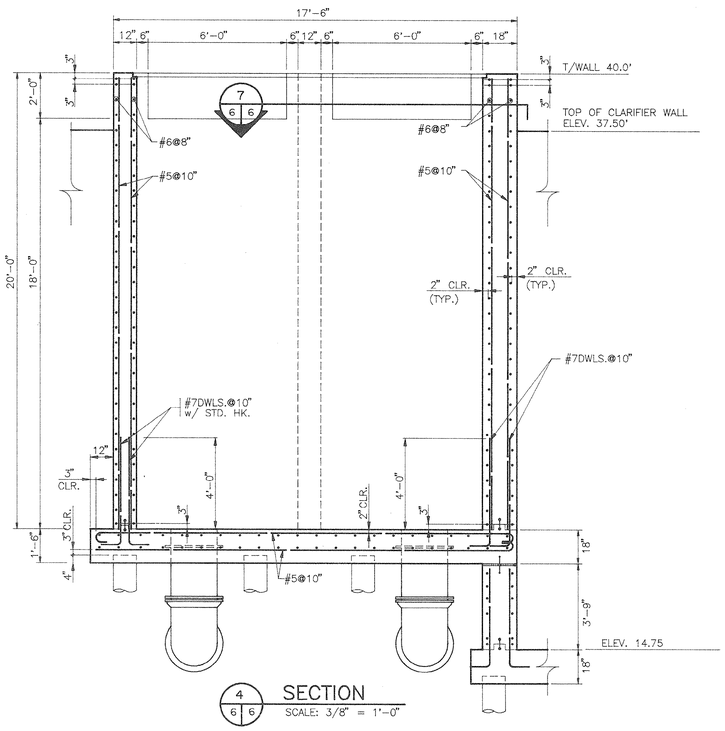
5 6 6 GRATE WALL CHANNEL
SCALE: 1" = 1'-0"



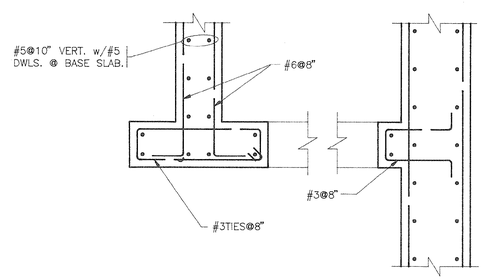
6 6 6 SECTION
SCALE: 1" = 1'-0"



3 6 6 SECTION
SCALE: 3/8" = 1'-0"



4 6 6 SECTION
SCALE: 3/8" = 1'-0"



7 6 6 SECTION
SCALE: 1" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12427 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12535 JOHN W. McGUIGAN 12-1-89

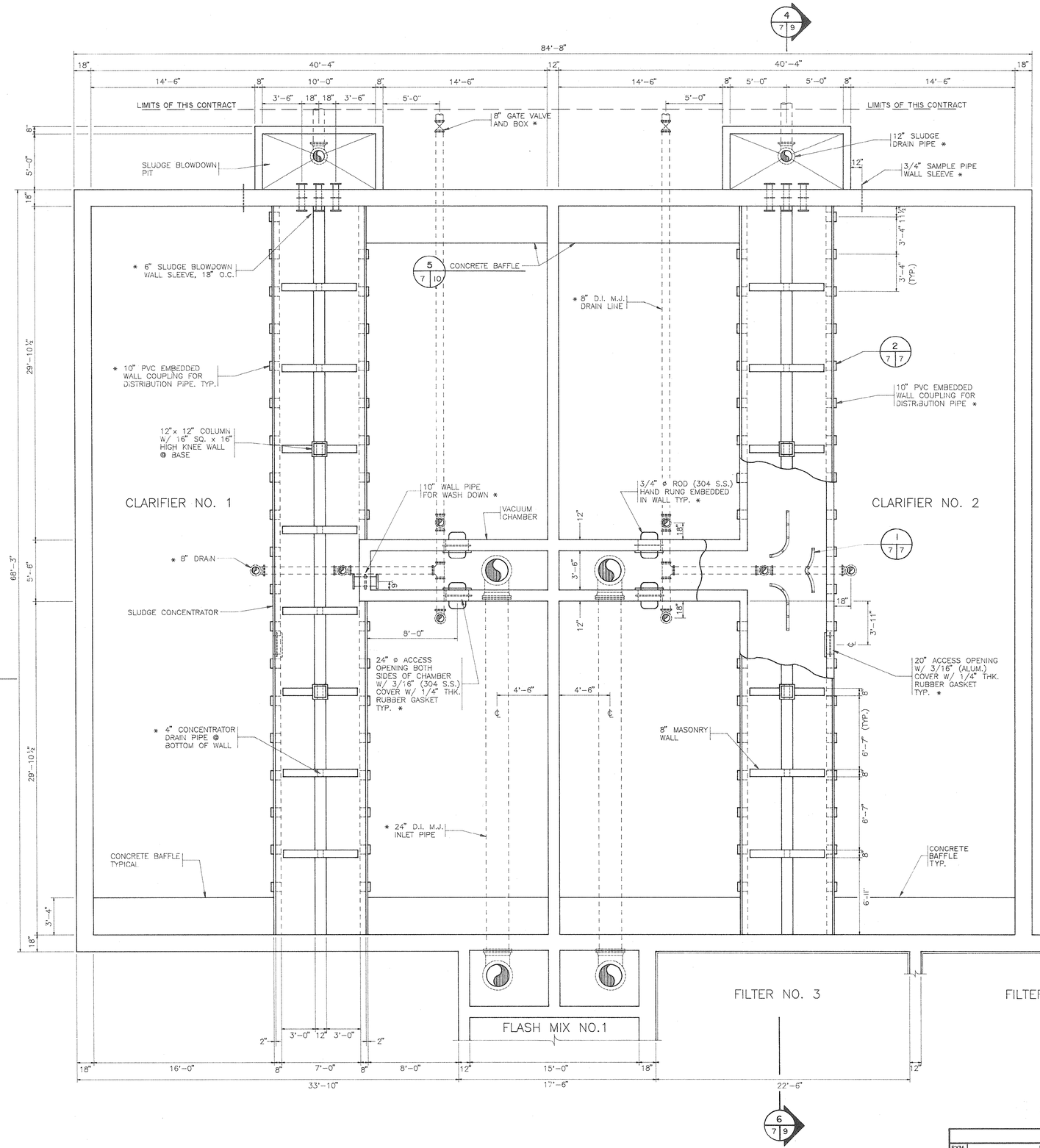
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FLASH MIX PLAN AND SECTIONS

33-011-014

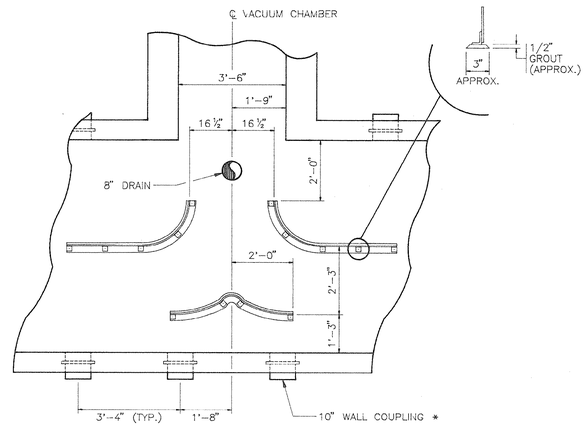
DATE:	NOV., 1989
DESIGNED:	JWM
DRAWN:	EEW
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	S-6
OF:	

SOUTHERN PHOTO - GREENSBORO 1-1748

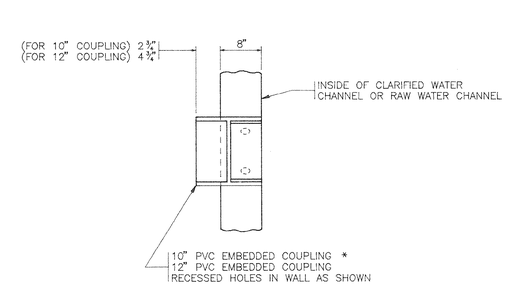


2 / 1 7 CLARIFIERS NO. 1 & 2 – LOWER PLAN
SCALE: 1/4" = 1'-0"

NOTE: BOLT BAFFLES TO TOP OF CHANNEL FIRST. GROUT UNDER BAFFLES ON BOTTOM ALONG FULL LENGTH OF EACH BAFFLE.



1 / 7 7 DISTRIBUTION CHANNEL BAFFLE *
NTS



2 / 7 7 COLLECTOR & DISTRIBUTOR WALL COUPLING
NTS

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

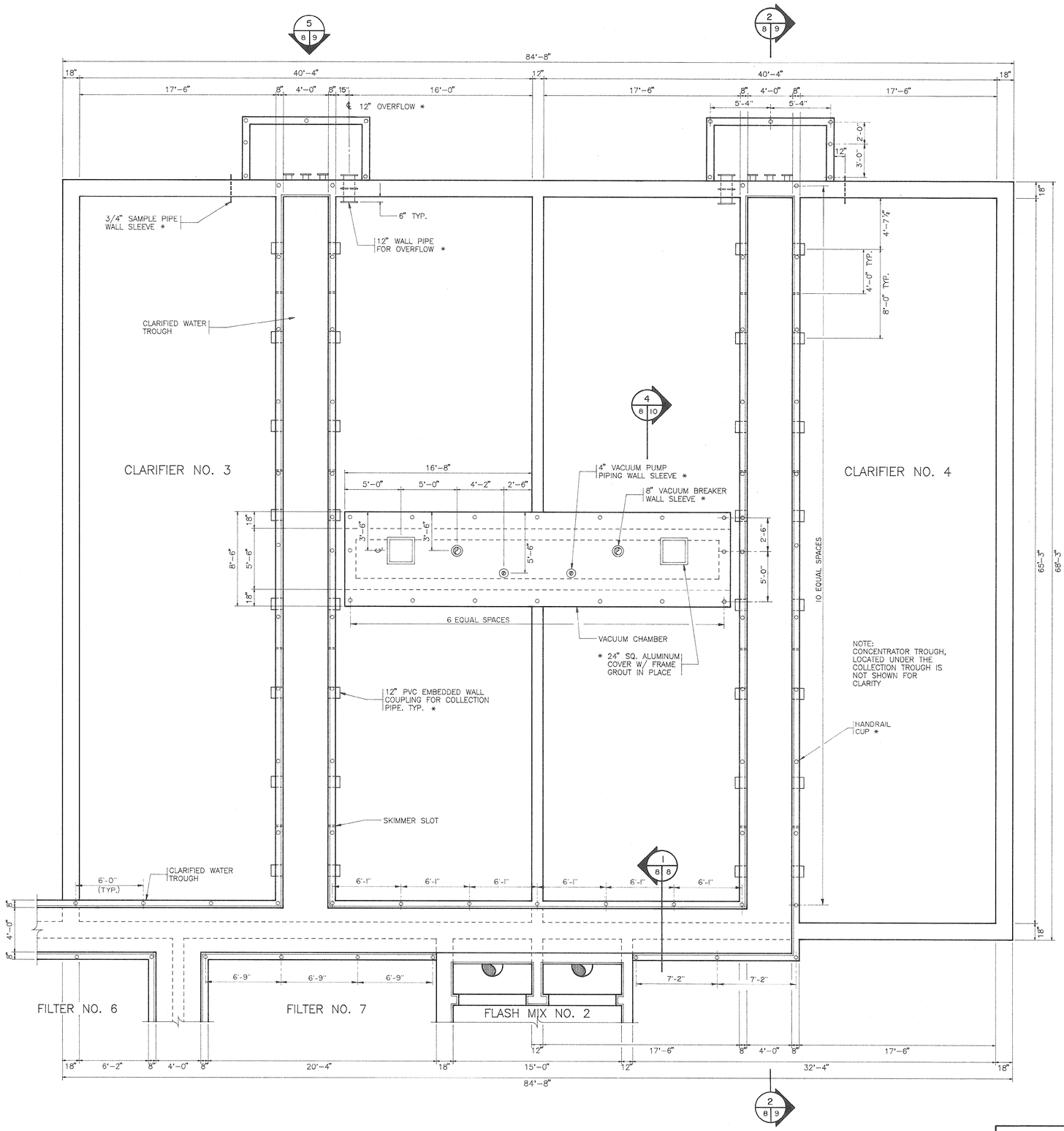
SOUTH CAROLINA REGISTERED PRIN. LAND SURVEYOR No. 12435 JOSEPH M. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

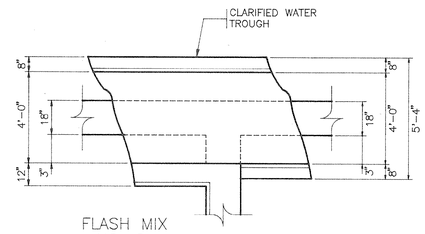
CLARIFIERS NO. 1 & 2
LOWER PLAN

DATE: NOV.,1989
DESIGNED: JWM
DRAWN: EEW
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-7
OF:

33-011-015

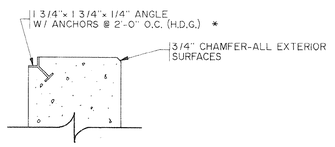


3/1 8 CLARIFIERS NO. 3 & 4 – UPPER PLAN
SCALE: 1/4" = 1'-0"

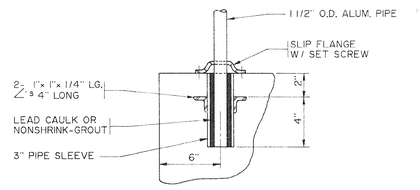


FLASH MIX NO. 2

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



GRATE WALL CHANNEL DETAIL
SCALE : 1"= 1'-0"



HANDRAIL CUP DETAIL *
N.T.S.

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER — LEONARD T. UPCHURCH — 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12035 — JOSEPH W. McGUGAN — 12-1-89

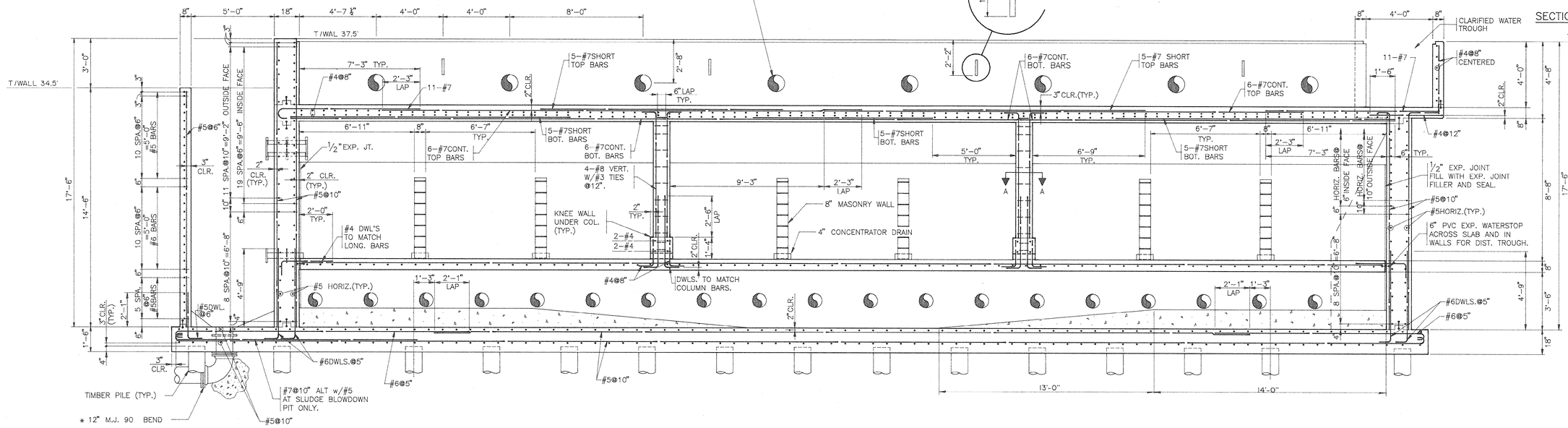
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CLARIFIERS NO. 3 & 4
UPPER PLAN

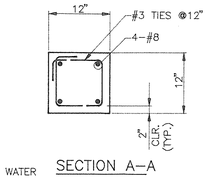
DATE: NOV.1989
DESIGNED: JWM
DRAWN: EEW
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-8
OF: ____

33-011-16

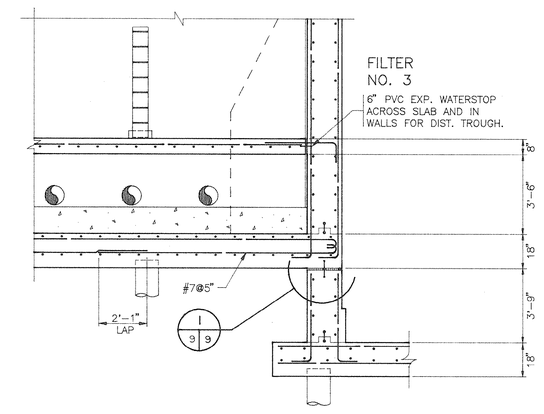
SOUTHERN PHOTO - GREENSBORO N17949

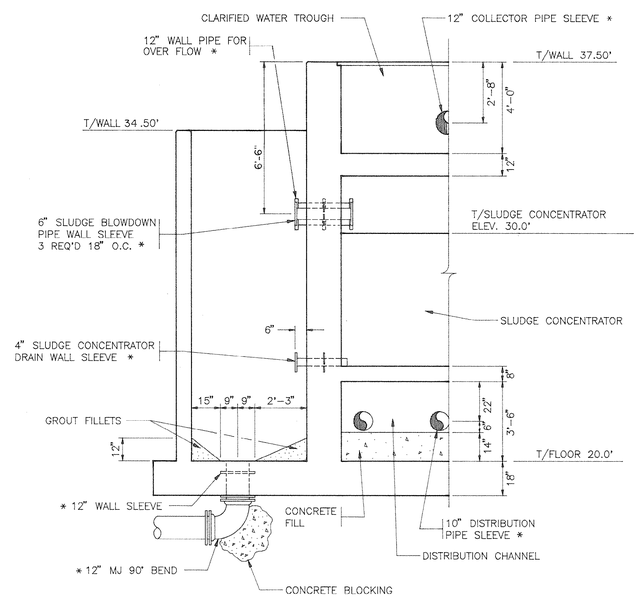


2 / 8 9 SECTION
SCALE: 3/8" = 1'-0"

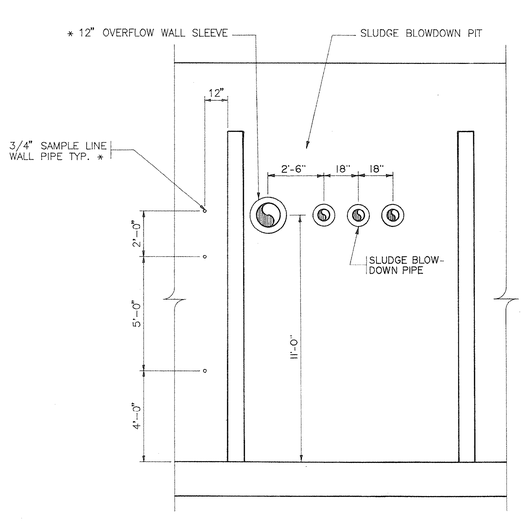


SECTION A-A

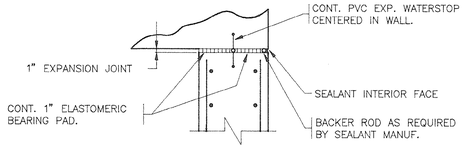




4 / 7 9 SECTION
SCALE: 3/8" = 1'-0"



5 / 8 9 SAMPLE LINE LOCATION
3/8" = 1'-0"



I / 9 9 TYP. HORIZ. EXP. JT. AT FILTER WALL
NO SCALE

6 / 7 9 SECTION
SCALE: 3/8" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE.	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 16235 JAMES W. McGOUGAN 12-1-89

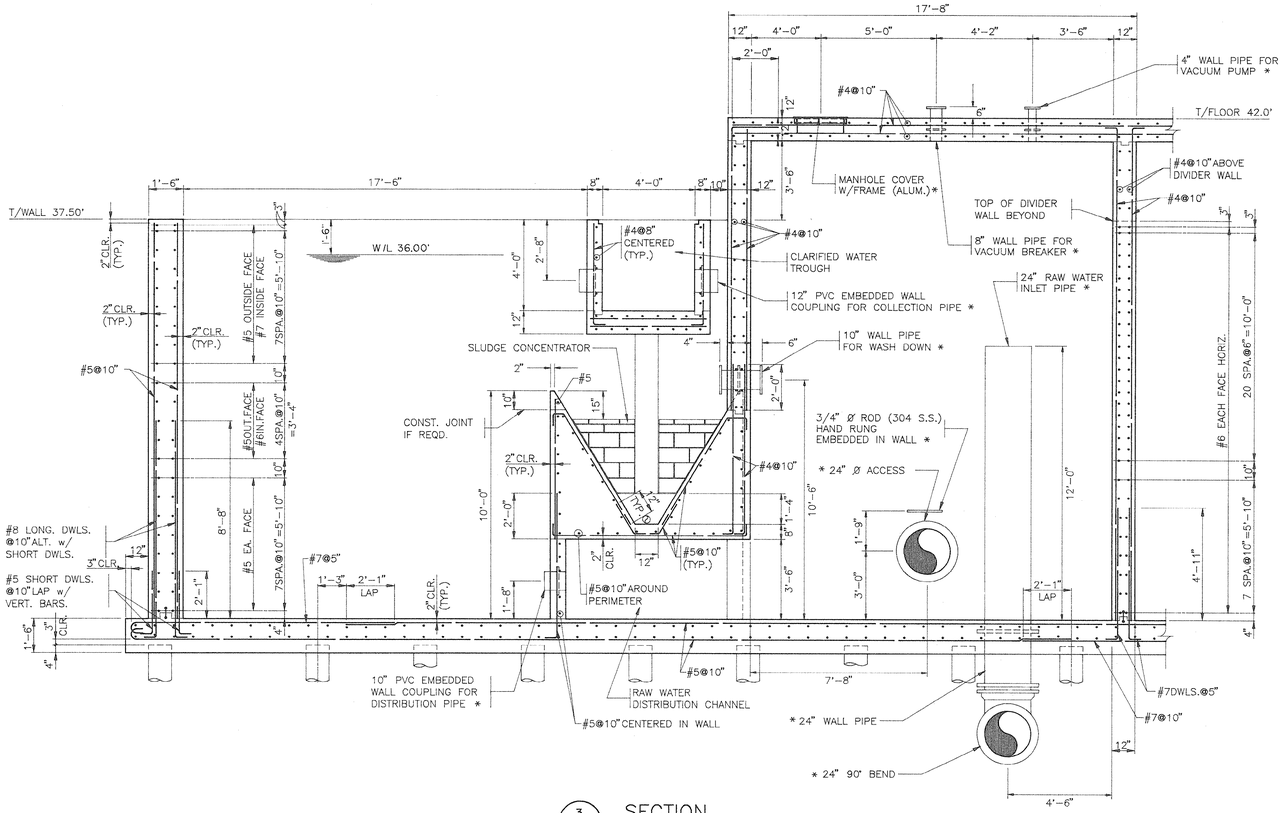
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CLARIFIER SECTIONS

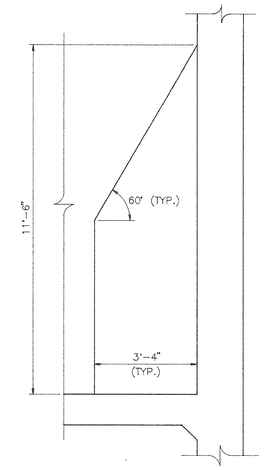
33-011-17

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-9
OF: _____

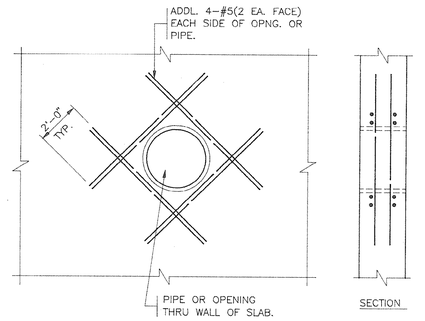
SOUTHERN PHOTO - GREENSBORO



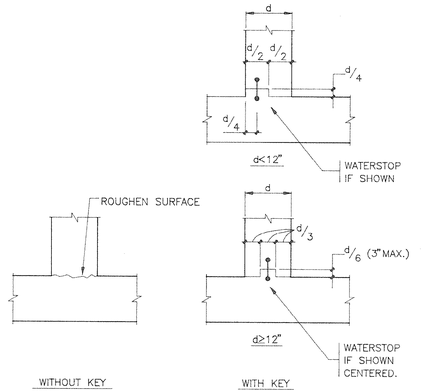
3 / 10 SECTION
SCALE: 3/8" = 1'-0"



5 / 7 | 10 CONCRETE BAFFLE
SCALE: 1/2" = 1'-0"

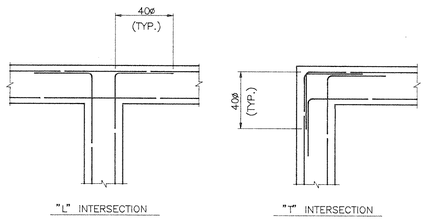


TYP. REINF. AT PIPE & OPENING
NO SCALE



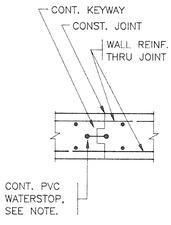
NOTE: ALL WATERSTOPS 6" PVC "DUMBBELL" TYPE UNLESS OTHERWISE NOTED.

STANDARD KEYWAY DETAILS
NO SCALE



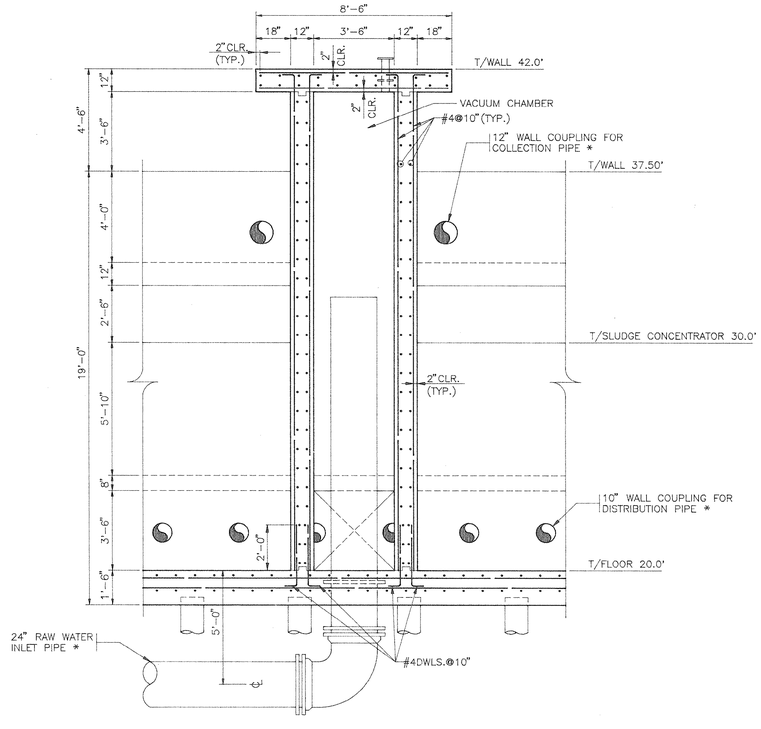
NOTE:
VERTICAL REINFORCING NOT SHOWN FOR CLARITY.

TYP. WALL INTERSECTION REINF. DETAIL
NO SCALE



NOTE:
PROVIDE CONSTRUCTION JOINTS IN ALL WALLS AS REQUIRED FOR CONSTRUCTION AND AT 30'-0" MAX. PROVIDE CONTINUOUS PVC WATERSTOPS AT ALL VERT. WALL CONSTRUCTION JOINTS AT EXTERIOR WALLS WHERE DIFFERENTIAL HEIGHTS OF FLUIDS EXIST ON EITHER SIDE OF WALL. PLACE CONC. IN ALTERNATE SECTIONS.

TYP. WALL OR SLAB CONSTR. JT. DETAIL
NO SCALE



4 / 8 | 10 SECTION
SCALE: 3/8" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 19267 DAVID T. UPCHURCH 12-1-89

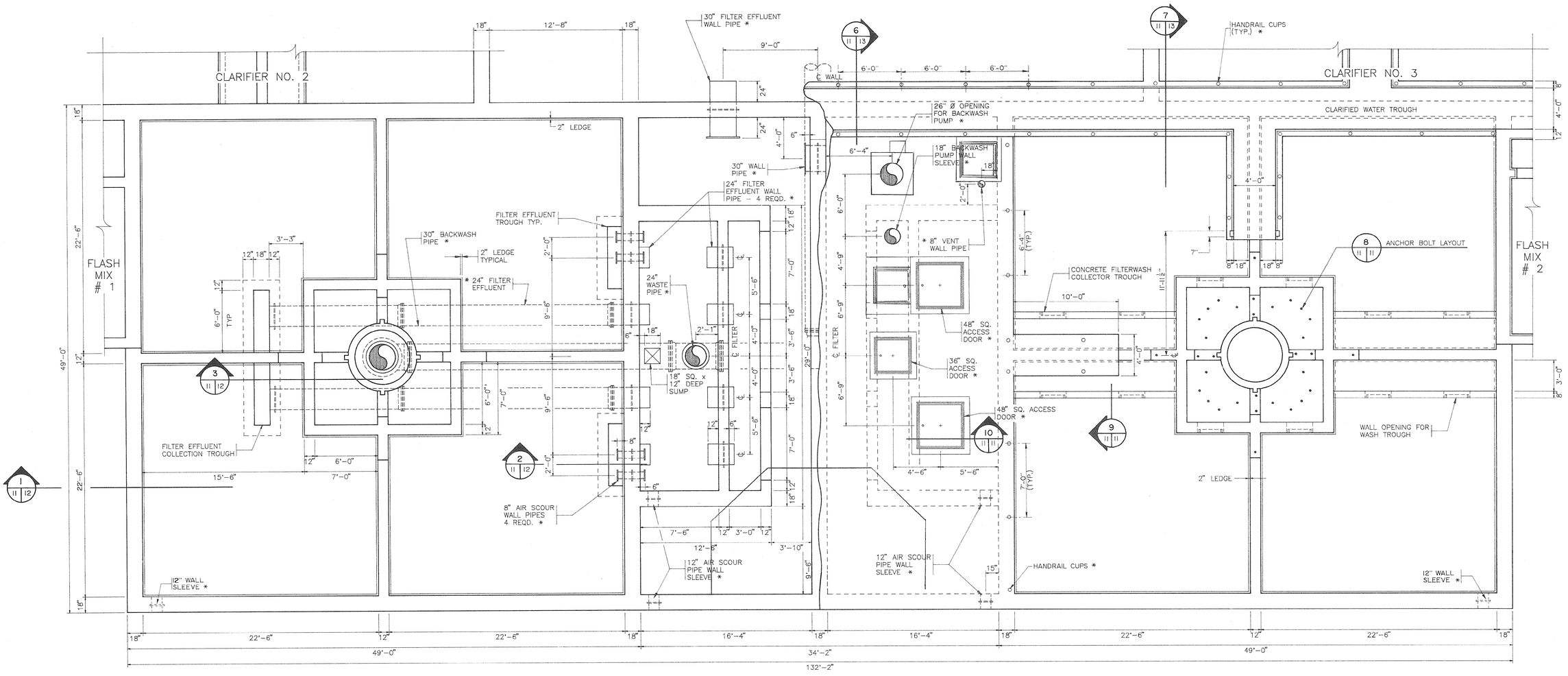
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGUIGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CLARIFIER SECTIONS
33-011-018

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-10
OF: ____

SOUTHERN PHOTO - GEORGETOWN 763-1348

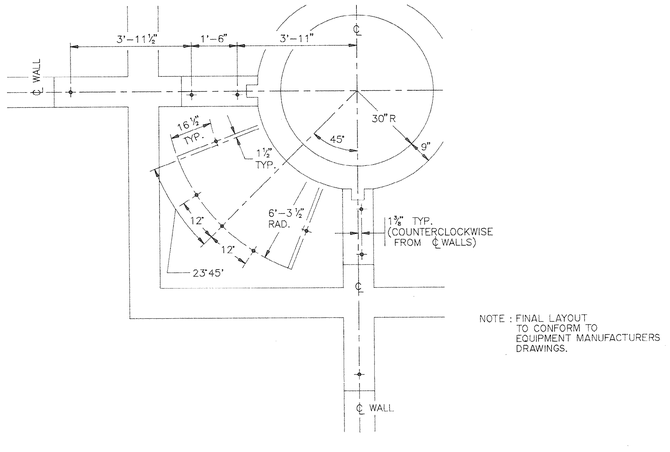


4 FILTERS NO. 1–4 LOWER PLAN

SCALE: 1/4" = 1'-0"

5 FILTERS NO. 5–8 UPPER PLAN

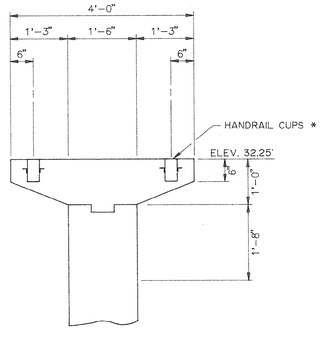
SCALE: 1/4" = 1'-0"



NOTE : FINAL LAYOUT TO CONFORM TO EQUIPMENT MANUFACTURERS DRAWINGS.

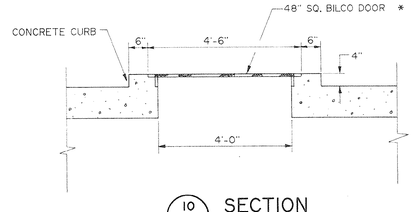
8 ANCHOR BOLT LAYOUT *

SCALE: 1/2" = 1'-0"



9 WALKWAY SECTION

NTS



10 SECTION

N.T.S.

NOTES:
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REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

REGISTERED PROFESSIONAL ENGINEER SOUTH CAROLINA No. 12227 DAVID I. UPCHURCH 12-1-89

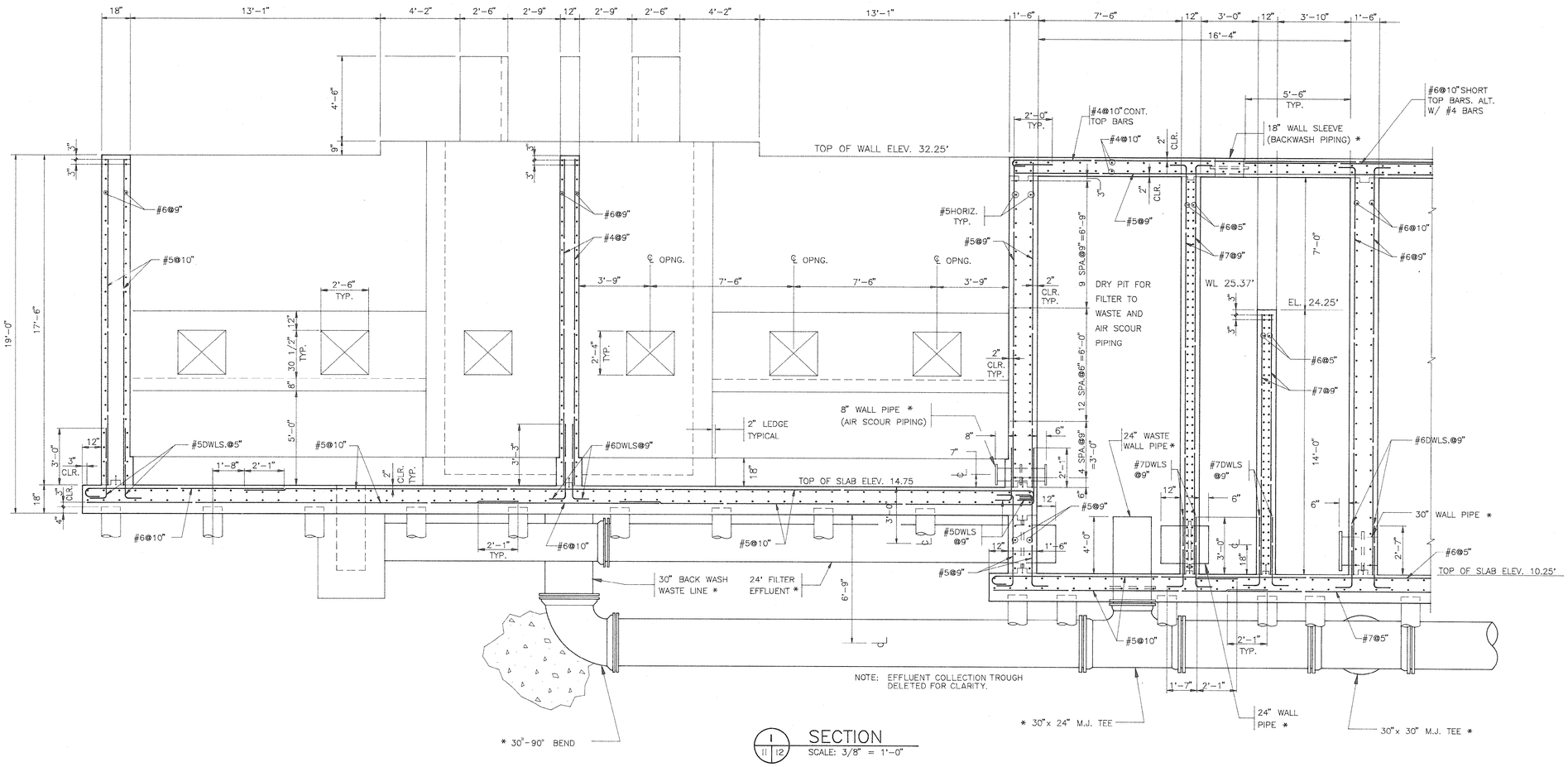
REGISTERED PROFESSIONAL ENGINEER SOUTH CAROLINA No. 18335 JOSEPH W. McDUGALD 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

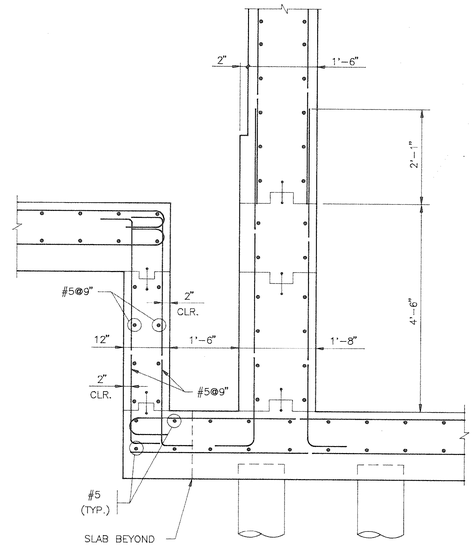
FILTER PLAN
33-011-019

DATE: NOV.,1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-11
OF:

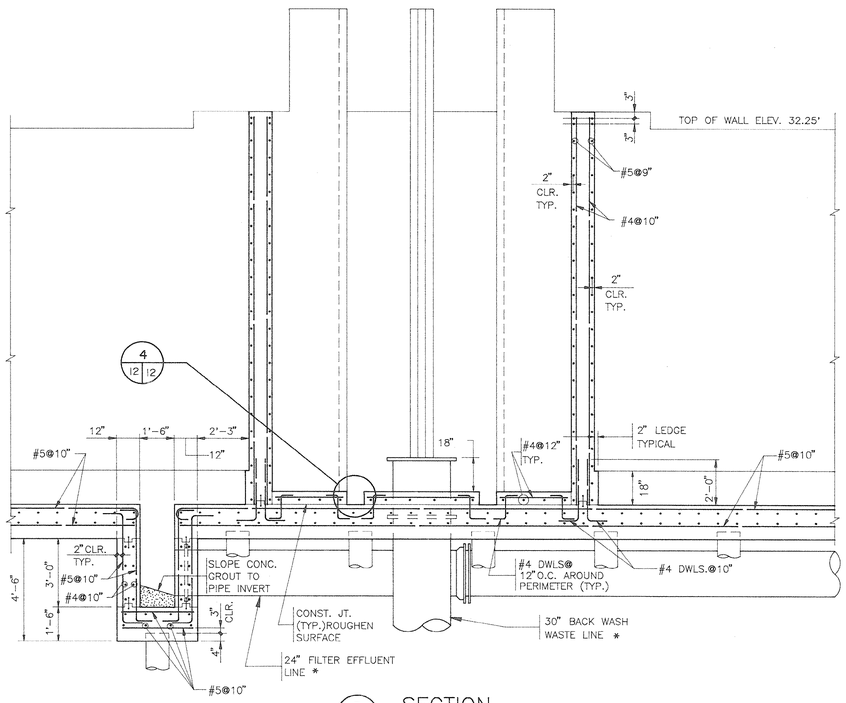
SOUTHERN PHOTO - GREENSBORO 747888



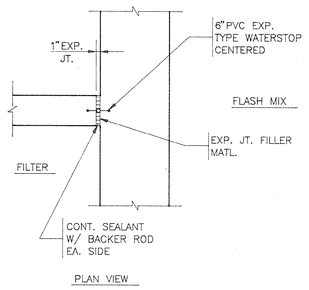
1 | 11 12 SECTION
SCALE: 3/8" = 1'-0"



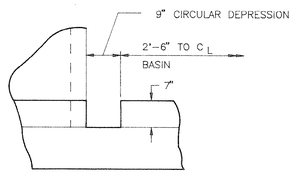
2 | 11 12 TYP. SECTION AT FILTER EFFLUENT COLLECTION TROUGH
SCALE: 3/4" = 1'-0"



3 | 11 12 SECTION
SCALE: 3/8" = 1'-0"



EXP. JT. DETAIL AT FILTER WASH TROUGH TO FLASH MIX
SCALE: 3/4" = 1'-0"



4 | 12 12 DETAIL
SCALE: 3/4" = 1'-0"

NOTES:
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REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12222 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGAN 12-1-89

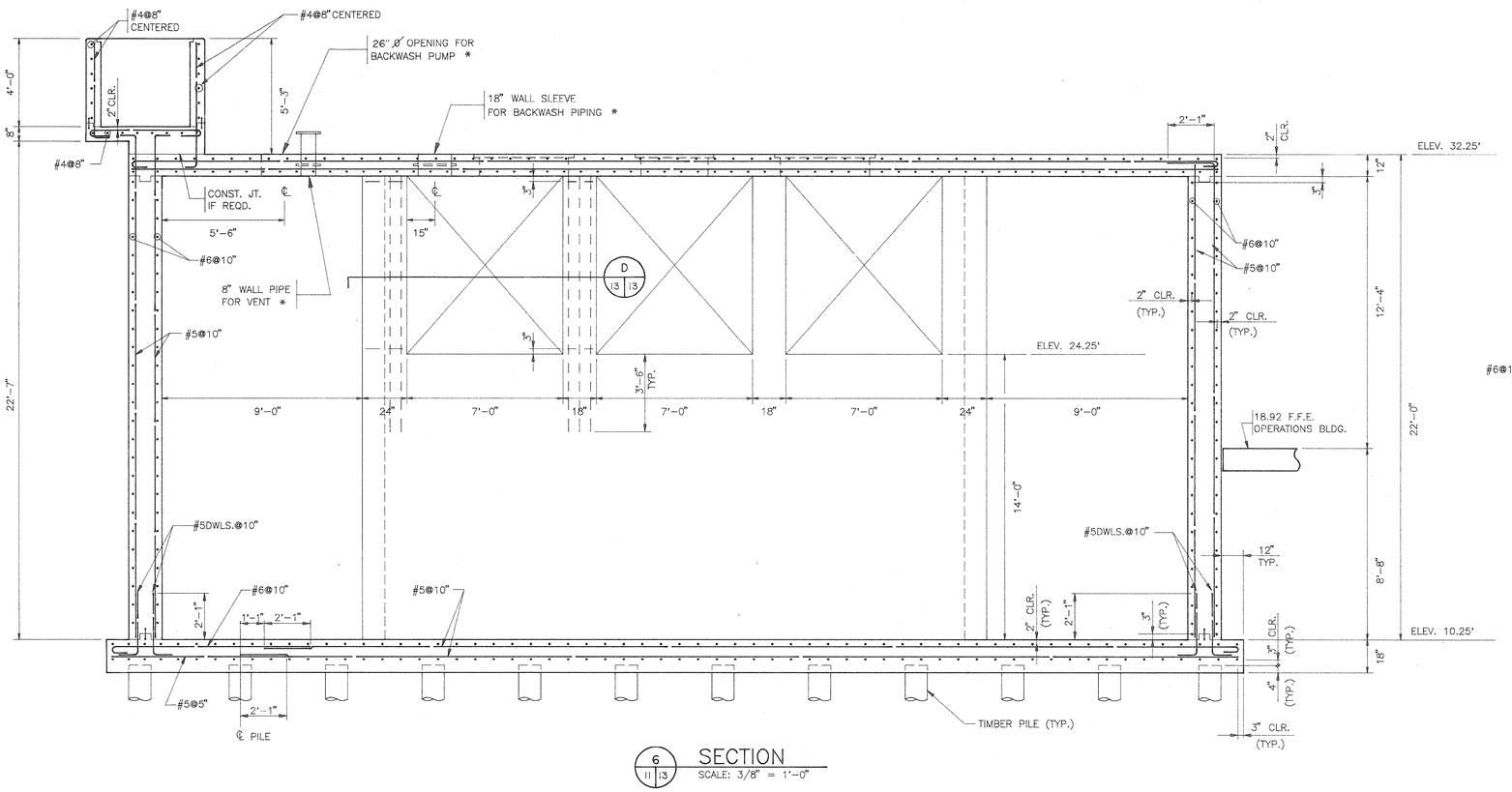
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FILTER SECTIONS

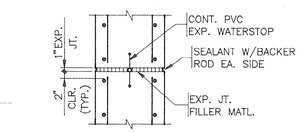
33-011-020

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-12
OF: _____

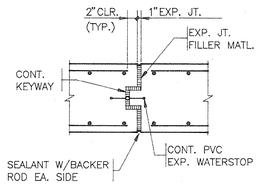
SOUTHERN PHOTO - GREENSBORO 112748



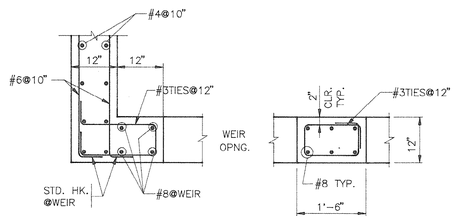
6 / 11 13 SECTION
SCALE: 3/8" = 1'-0"



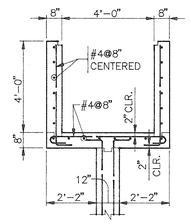
A / 13 13 HORIZ. EXP. JT. FILTER WALL
SCALE: 3/4" = 1'-0"



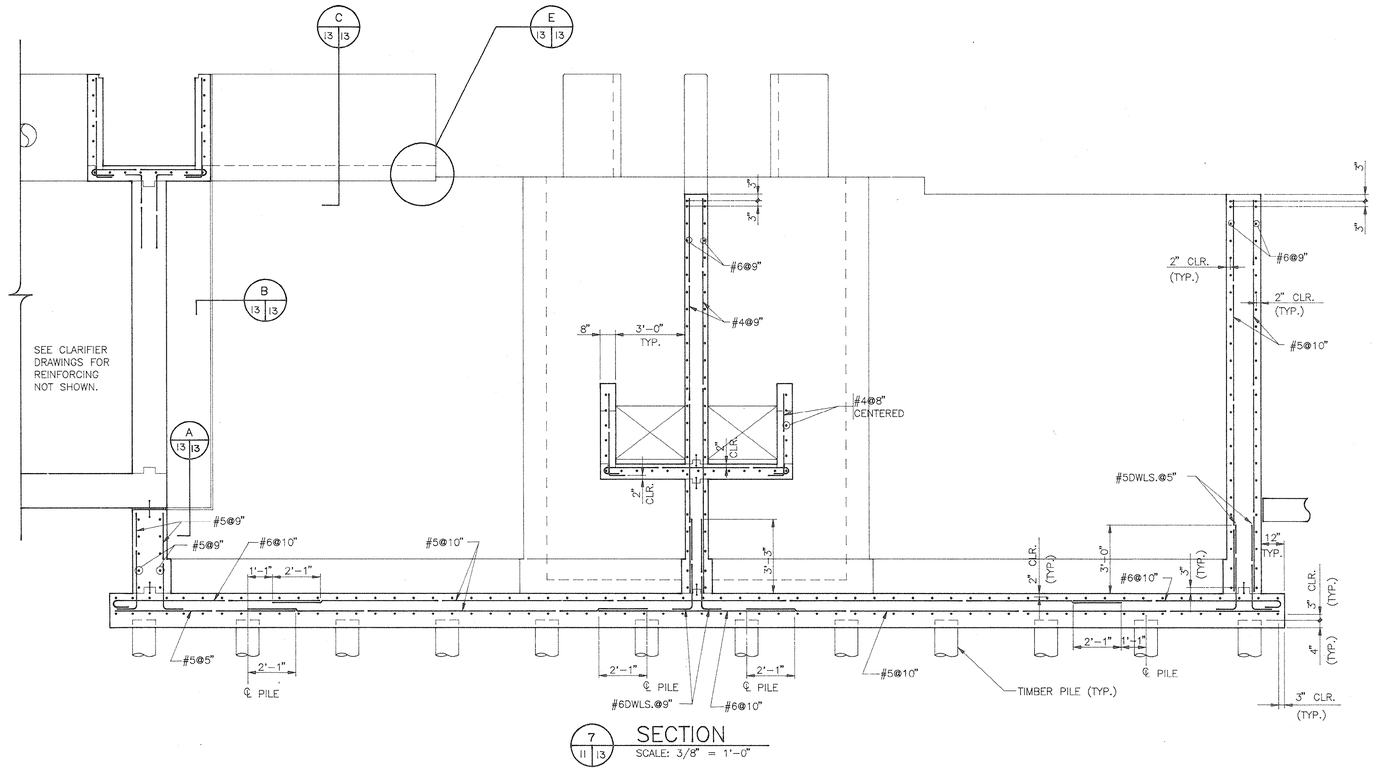
B / 13 13 VERT. EXP. JT. FILTER WALL
SCALE: 3/4" = 1'-0"



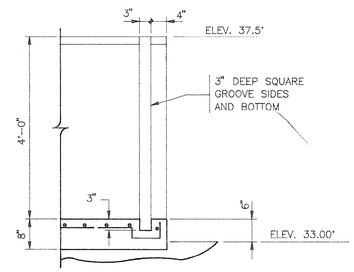
D / 13 13 TYP. REINF. DETAIL ABOVE TOP OF WEIR OPNG.
SCALE: 3/4" = 1'-0"



C / 13 13 SECTION THRU CLARIFIED WATER TROUGH AT FILTER WALL
SCALE: 3/8" = 1'-0"



7 / 11 13 SECTION
SCALE: 3/8" = 1'-0"



E / 13 13 DETAIL
SCALE: 3/4" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

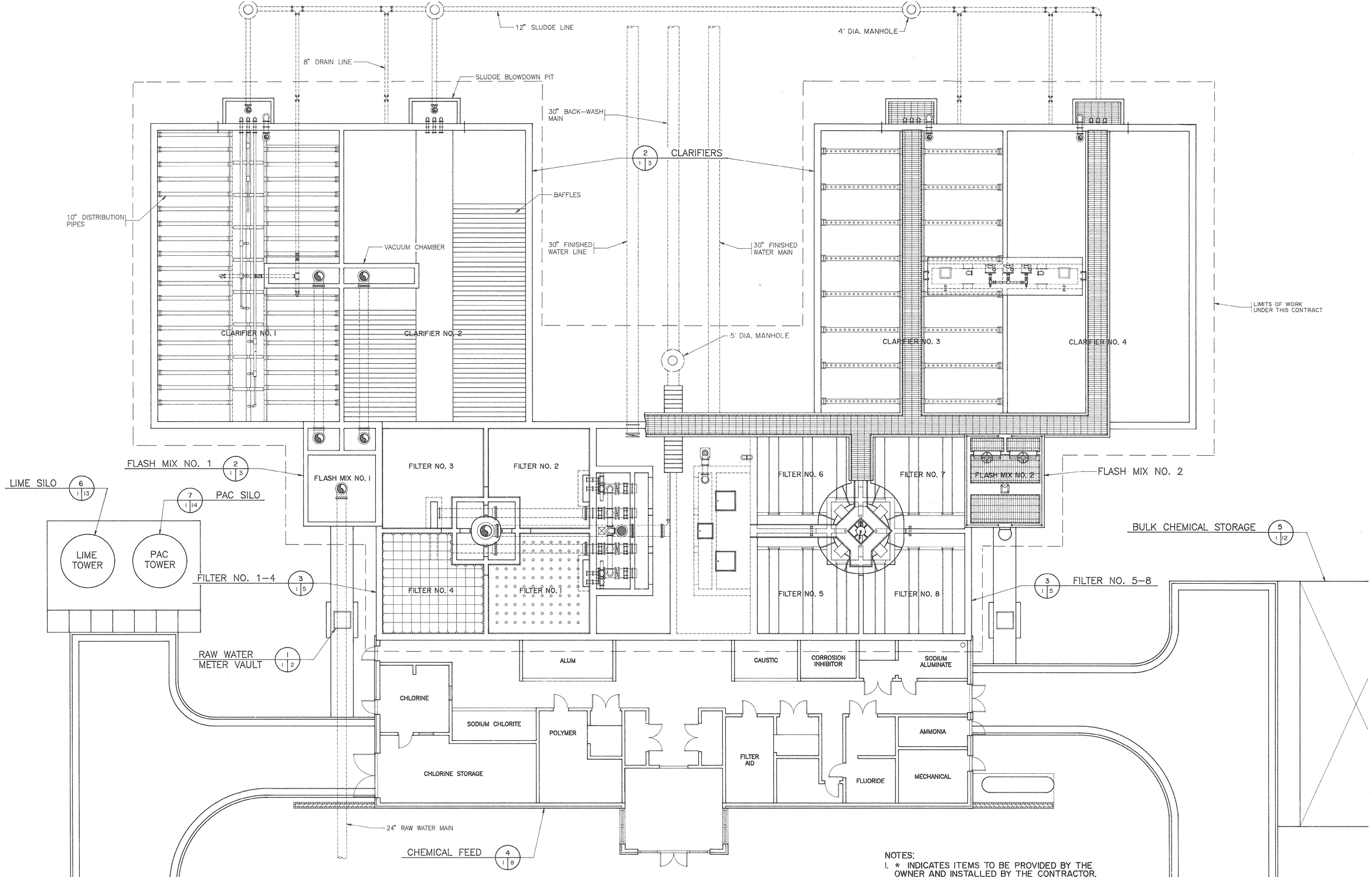
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12315 JOSEPH W. McGUIGIN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FILTER SECTIONS
33-011-021

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. S-13
OF: ____

SOUTHERN PHOTO - GREENSBORO N21949



NOTES:
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PLANT UNIT LAYOUT
SCALE: 1/8" = 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7947 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED LAND SURVEYOR No. 1933 JOHN W. McDOUGALD 2-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

PLANT UNIT LAYOUT
33-011-022

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-1
OF: _____

SOUTHERN PHOTO - GREENSBORO 1/27/89

E 0+00

E 5+00

E 10+00

N 5+00

N 0+00

BACKWASH EQUALIZATION LAGOON

CHEMICAL SPILL LAGOON

MAINTENANCE BUILDING

FEED PIT "A"

CLARIFIERS 1 & 2

CLARIFIERS 3 & 4

4'-0"

POST LIME

PRE LIME (2 EA.)

LIME & PAC

FILTERS 1–4

FILTERS 5–8

(2) 1.5" Sch 80 PVC Pipe

35'

34.5'

FEED PIT "B"

OPERATIONS BLD.
1st FLOOR CHEMICAL FEED
2nd FLOOR OPERATIONS

BULK CHEM. STORAGE

FINISHED WATER PUMP STATION

AMMONIA

CHLORINE
FLUORIDE
CORR.INHIBITOR
AMMONIA (2 EA.)
SPARE

500,000 GALLON CLEARWELL

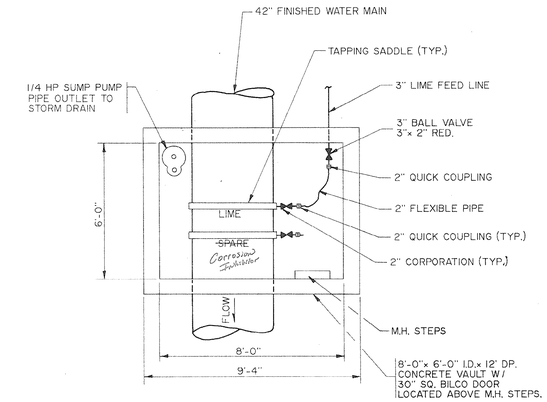
PAC

NOTE :

SEE EN-8 FOR OPERATIONS BUILDING CHEMICAL FEED SCHEMATIC.

PLANT PIPING

SCALE: 1" = 40'



FEED PIT "A"

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

FEED PIT "B"

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

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	6-22-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No.12335 JOSEPH W. McGOUGAN

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No.12227 DAVID T. UPCHURCH

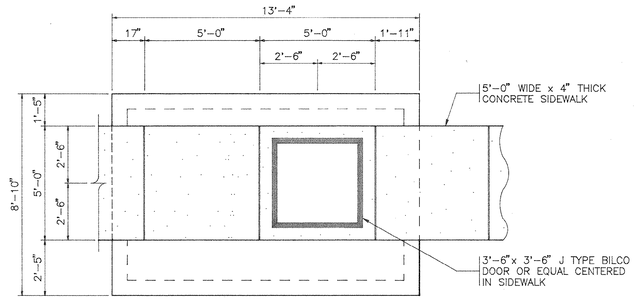
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CHEMICAL FEED PIPING LAYOUT

DATE: 6-19-90
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-1A
OF:

PROJECT # 033002 FILE NAME EN-1ALING DATE: 6-19-90 SCALE: 1"=40'

033-011-033

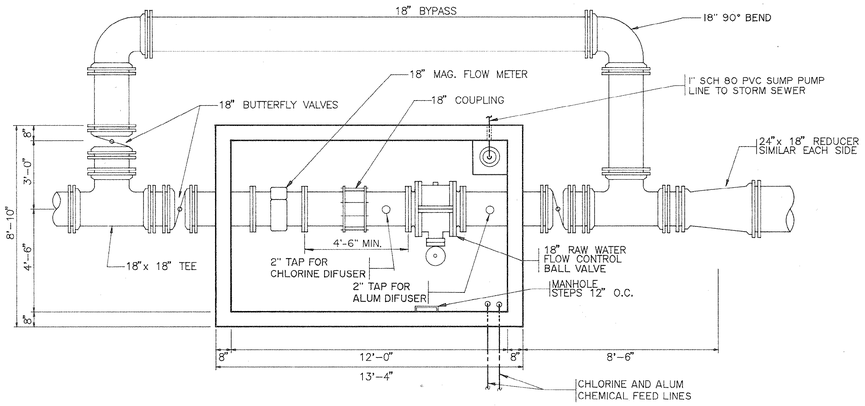


1

RAW WATER CONTROL VAULT TOP VIEW

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

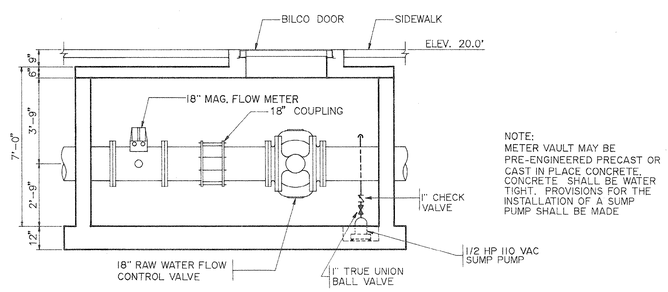
NIC



RAW WATER CONTROL VAULT LOWER PLAN VIEW

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

NIC



NOTE:
METER VAULT MAY BE PRE-ENGINEERED PRECAST OR CAST IN PLACE CONCRETE. CONCRETE SHALL BE WATER TIGHT. PROVISIONS FOR THE INSTALLATION OF A SUMP PUMP SHALL BE MADE

SECTION

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

NIC

NOTES:
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REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12261 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12085 JOSEPH W. McDOUGH 12-1-89

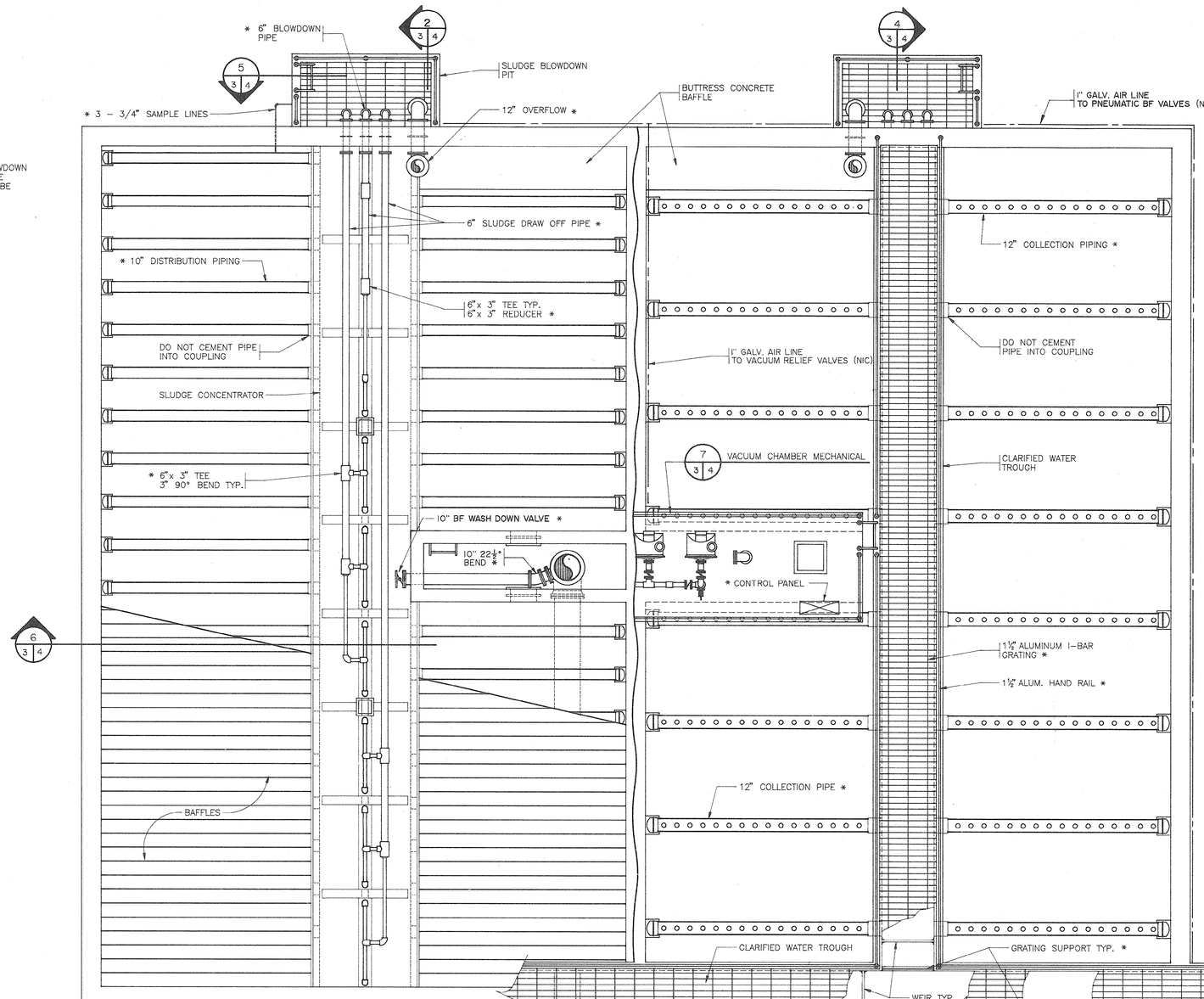
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

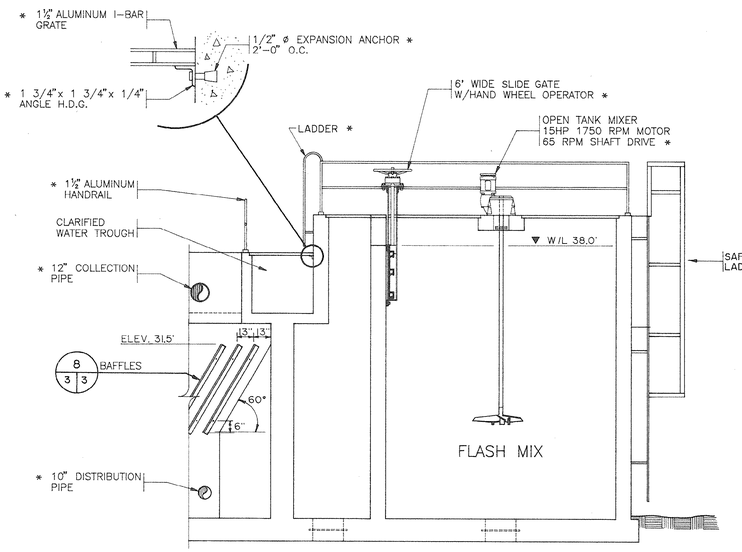
RAW WATER CONTROL VAULT MISC. DETAILS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-2
OF:

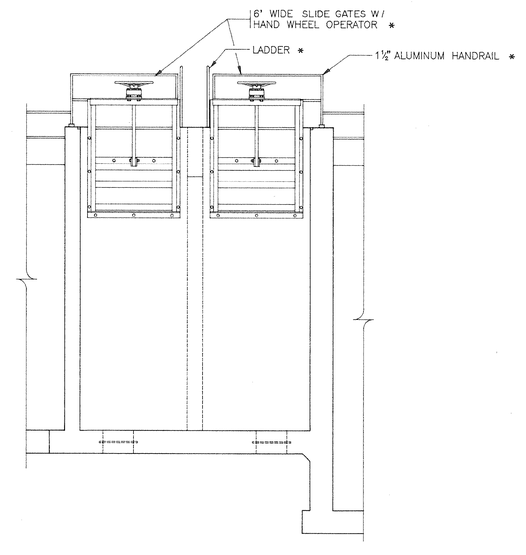
033-011-024

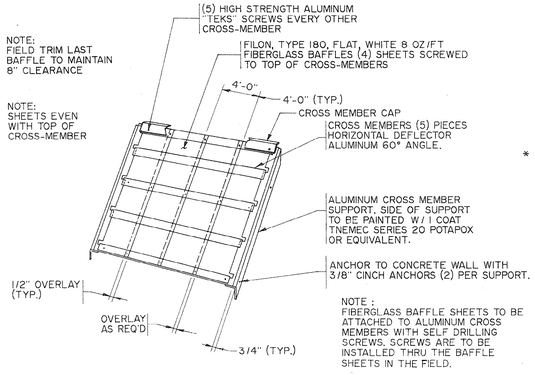
NOTE:
ALL SLUDGE BLOWDOWN PIPING WITHIN THE CLARIFIER SHALL BE SCH 80 PVC





1 3 3 SECTION
SCALE: 1/4" = 1'-0"





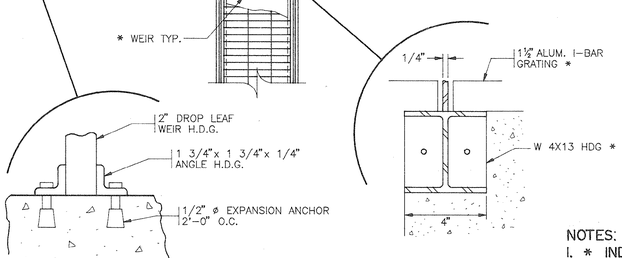
NOTE:
FIELD TRIM LAST BAFFLE TO MAINTAIN 8" CLEARANCE

NOTE:
SHEETS EVEN WITH TOP OF CROSS-MEMBER

NOTE :
FIBERGLASS BAFFLE SHEETS TO BE ATTACHED TO ALUMINUM CROSS MEMBERS WITH SELF DRILLING SCREWS. SCREWS ARE TO BE INSTALLED THRU THE BAFFLE SHEETS IN THE FIELD.

8 3 3 BAFFLE ASSEMBLY *
NTS

2 1 3 FLASH MIX AND CLARIFIER
SCALE: 1/4" = 1'-0"



NOTE:
DROP LEAF WEIR TO BE INSTALLED IN SIMILAR LOCATIONS IN CLARIFIERS 3 & 4

3 3 3 SECTION
SCALE: 1/4" = 1'-0"

NOTES:
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REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12233 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 13905 JOSEPH W. McDOUGALD 12-1-89

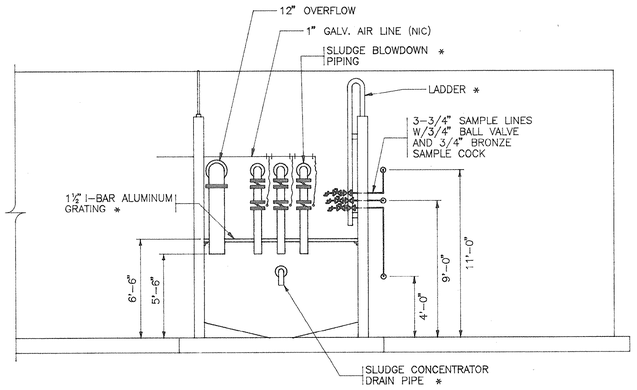
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FLASH MIX AND CLARIFIER PLAN AND SECTIONS

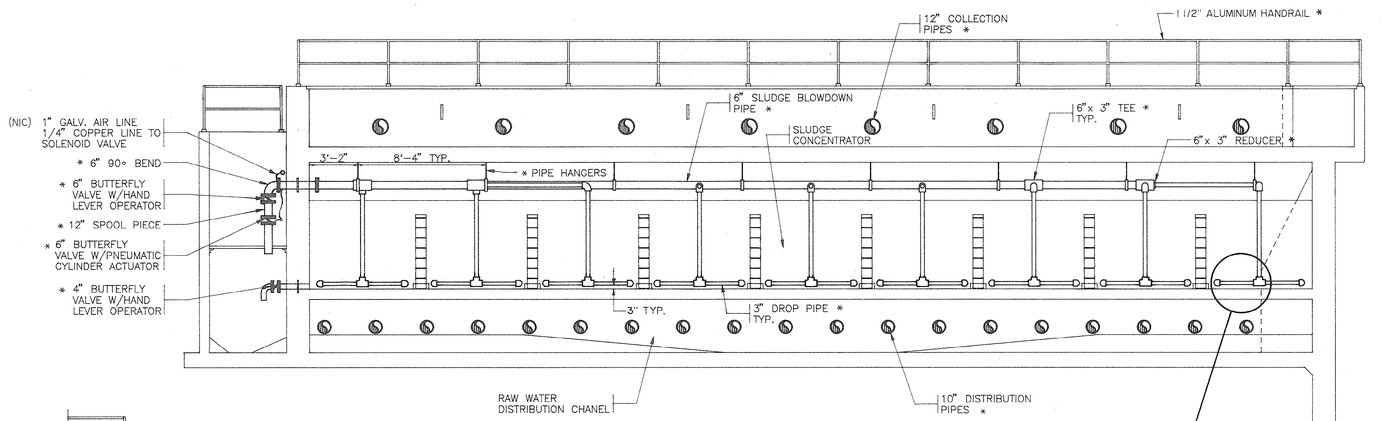
033-011-025

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-3
OF:

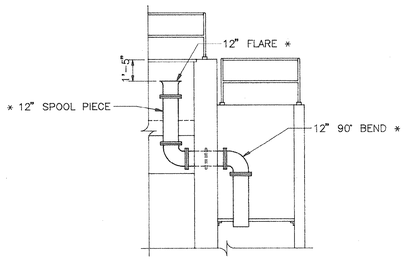
SOUTHERN PHOTO - GREENSBORO 747848



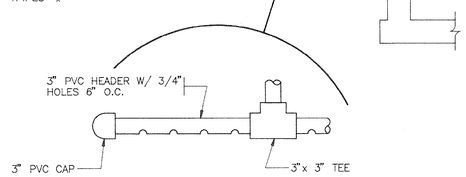
5/3|4 SECTION
SCALE: 1/4" = 1'-0"

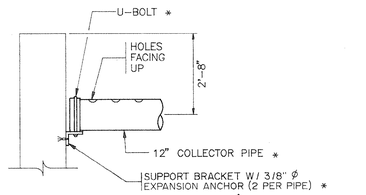


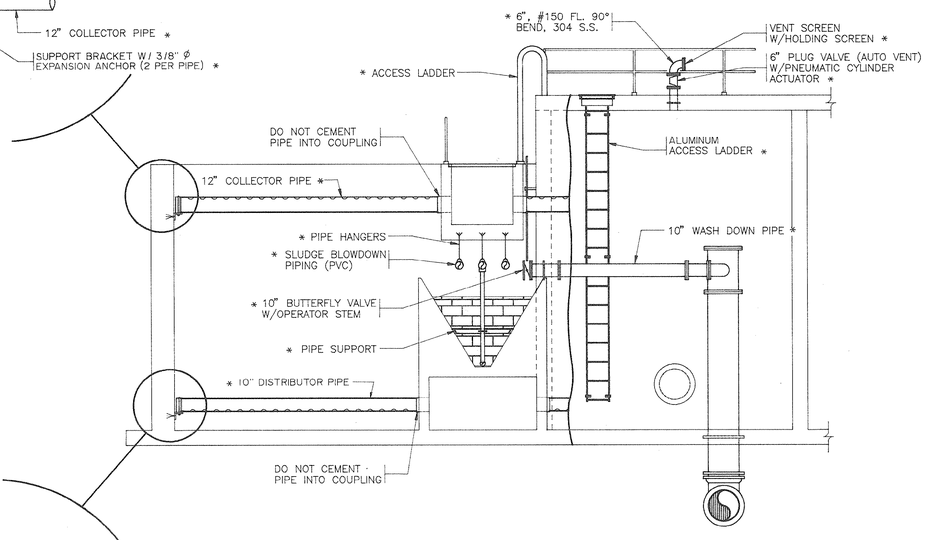
4/3|4 SECTION
SCALE: 1/4" = 1'-0"



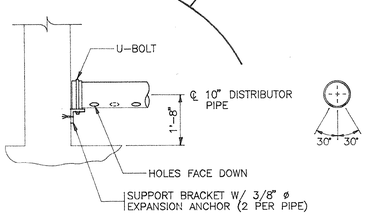
2/3|4 SECTION
SCALE: 1/4" = 1'-0"

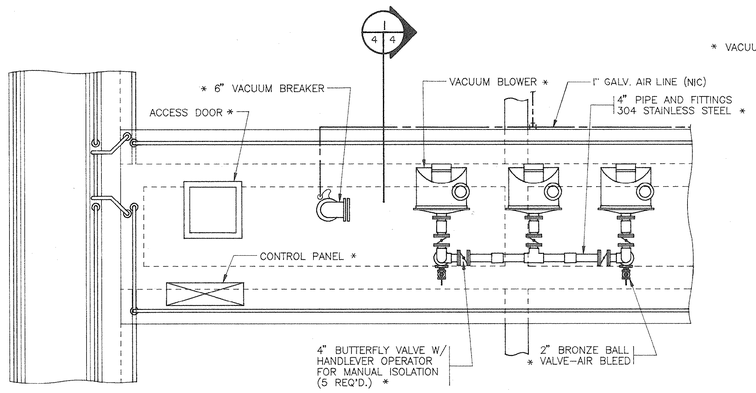




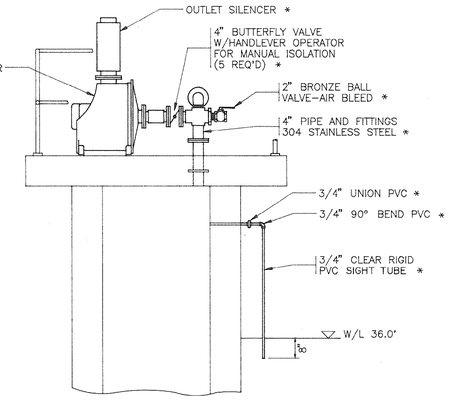


6/3|4 SECTION
SCALE: 1/4" = 1'-0"





7/3|4 SECTION
SCALE: 3/8" = 1'-0"



1/4|4 SECTION
SCALE: 1/2" = 1'-0"

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12206 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12206 JOHN W. McCLURKIN 12-1-89

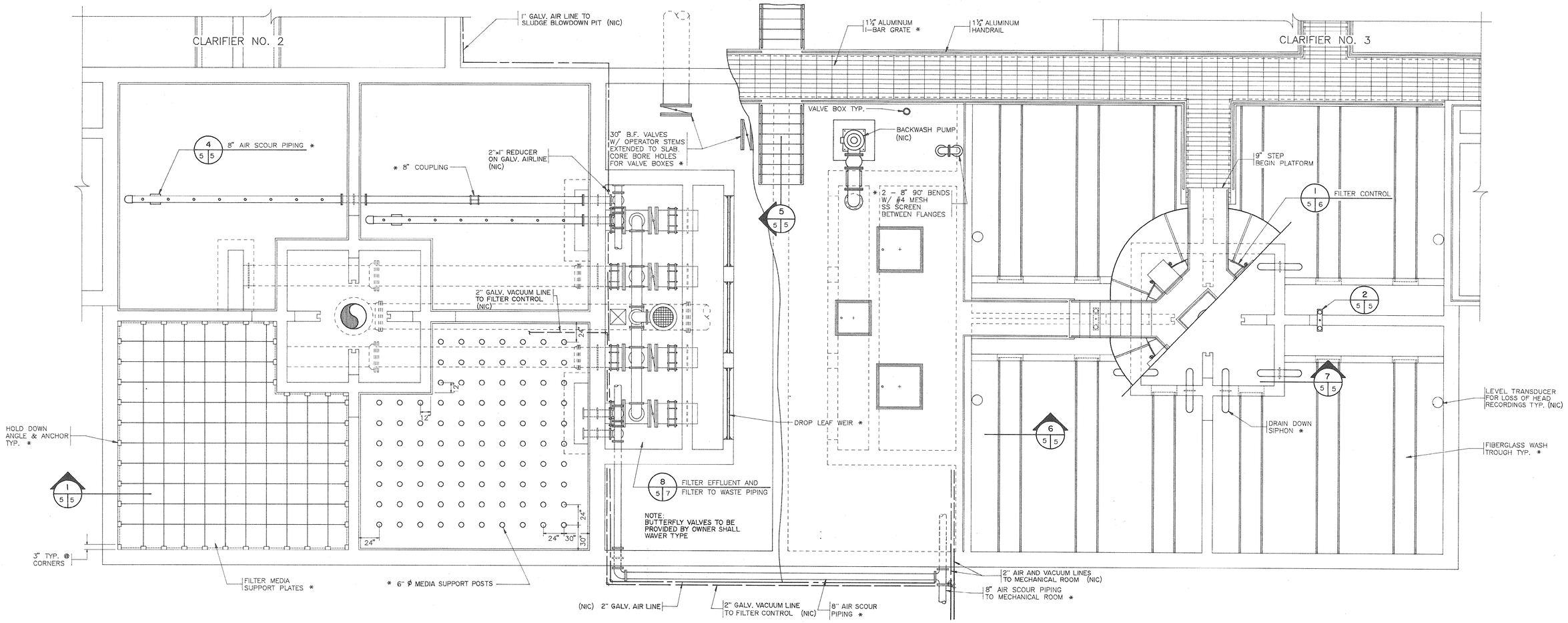
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CLARIFIER SECTIONS

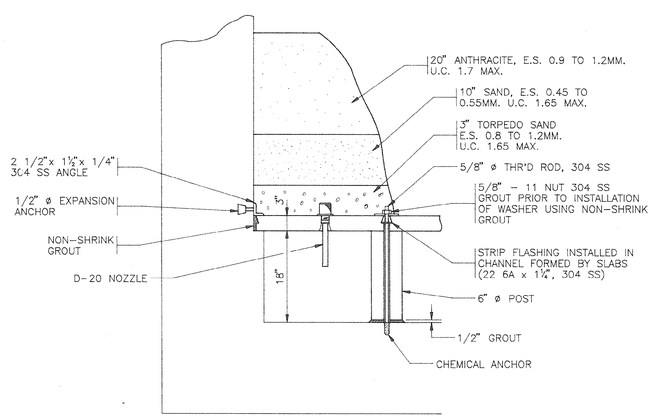
033-011-026

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-4
OF: _____

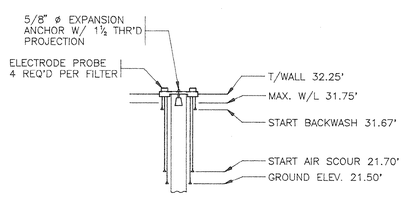
SOUTHERN PHOTO REPRODUCTION 10/1/89



3 / 1 5 FILTER NO. I-B
SCALE: 1/4" = 1'-0"

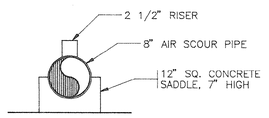


1 / 5 5 FILTER MEDIA SECTION *
SCALE: 1" = 1'-0"

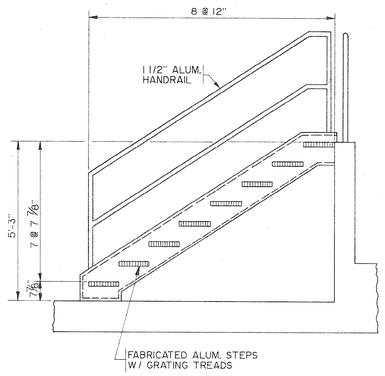


NOTE: CONDUIT & WIRING BY OTHERS

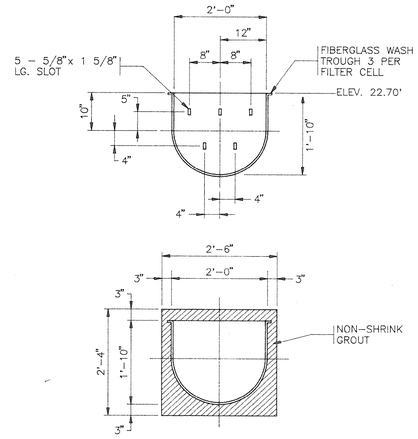
2 / 5 5 FILTER BACKWASH PROBE *
NTS



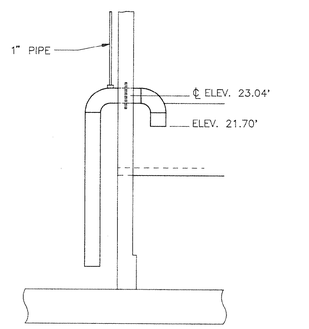
4 / 5 5 8" AIR SCOUR PIPE *
NTS



5 / 5 5 STEP SECTION *
SCALE: 1/2" = 1'-0"



6 / 5 5 FILTER WASH TROUGH *
NTS



7 / 5 5 DRAIN DOWN SIPHON DETAIL *
NTS

NOTES:
1. * INDICATES ITEMS TO BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

REGISTERED PROFESSIONAL ENGINEER SOUTH CAROLINA No. 12365 DAVID T. UPCHURCH 12-1-89

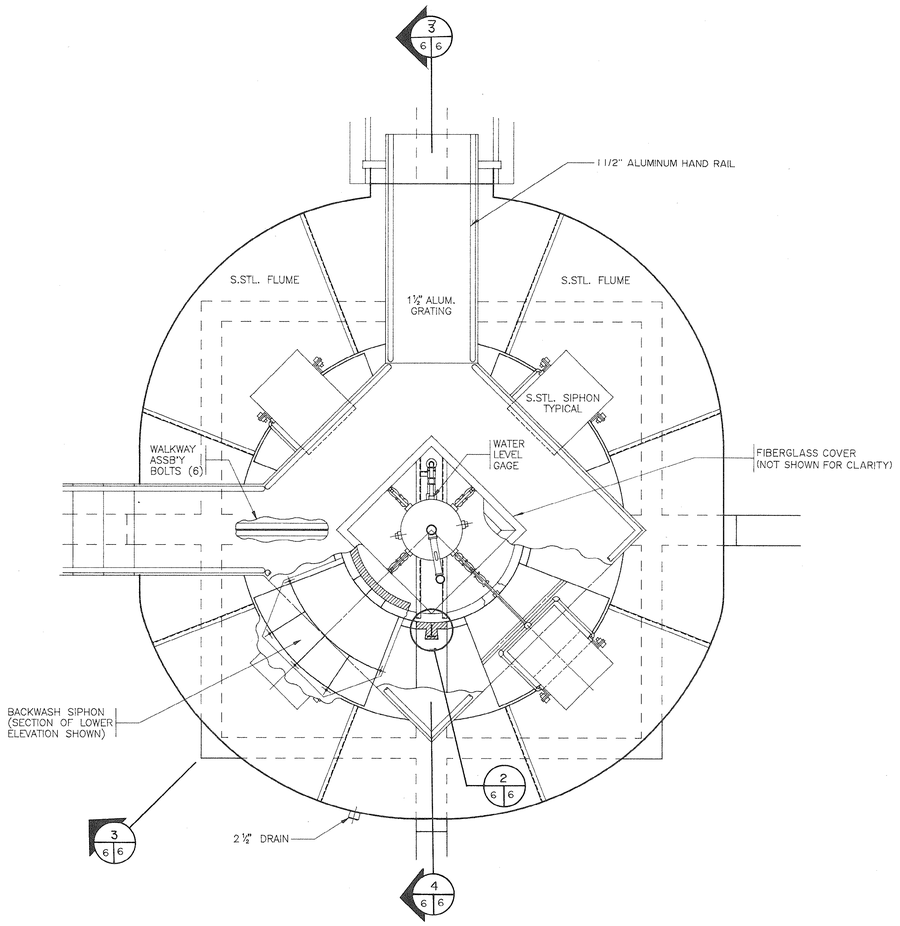
REGISTERED PROFESSIONAL ENGINEER SOUTH CAROLINA No. 12905 JOSEPH W. McDOUGALD 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FILTER PLAN AND DETAILS
033-011-027

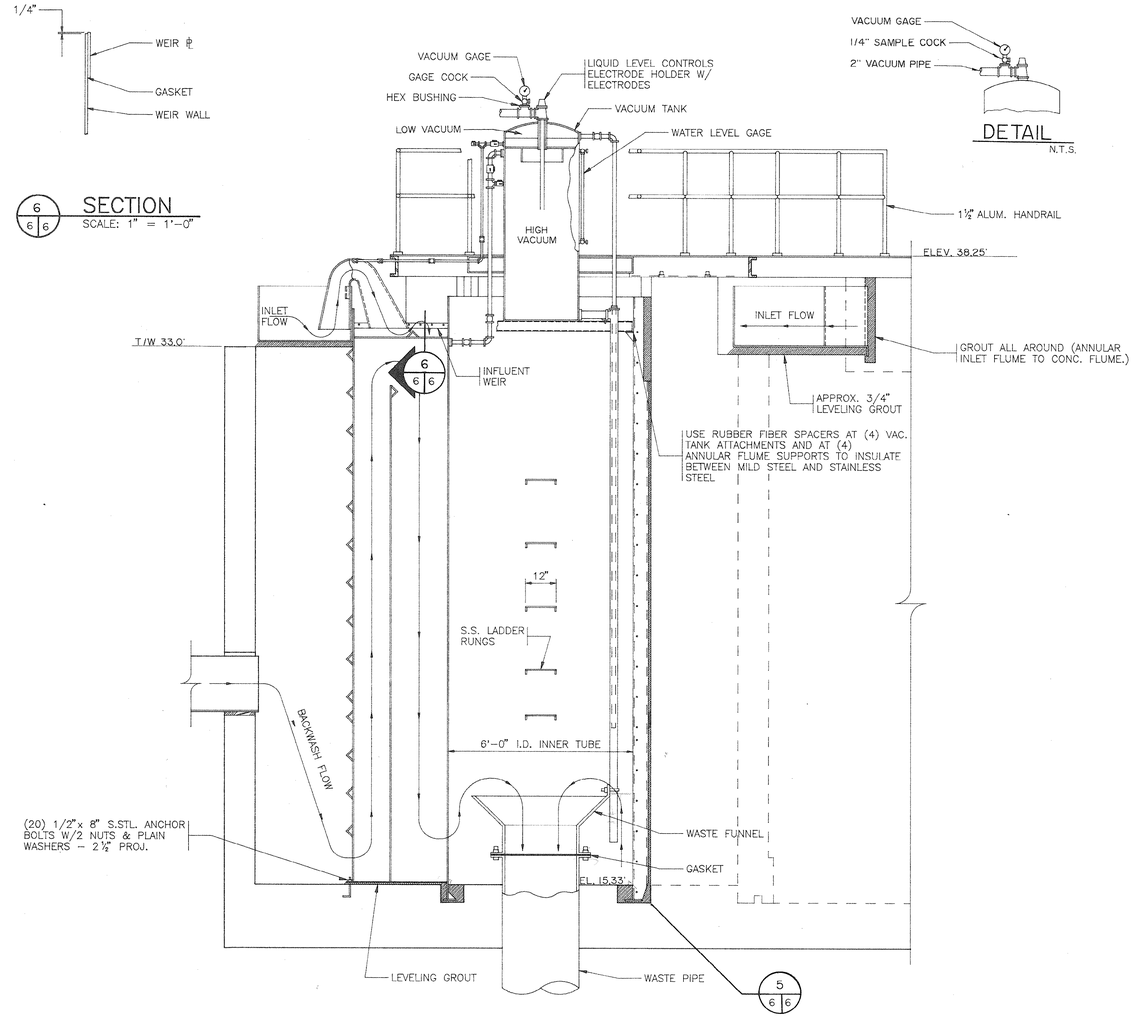
DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO: EN-5
OF:

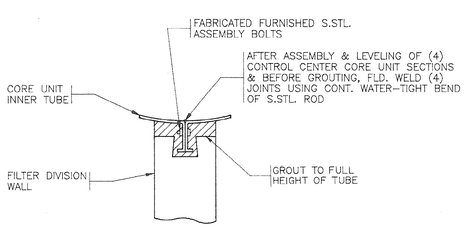
SOUTHERN PHOTO - GREENSBORO 167948



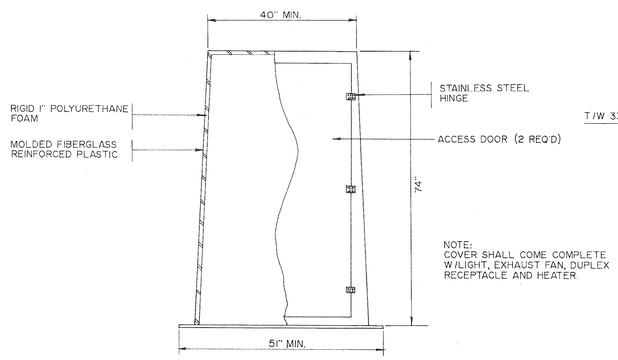
1 / 5 6 OPERATIONS PLATFORM — PLAN *
SCALE: 1/2" = 1'-0"

6 / 6 6 SECTION
SCALE: 1" = 1'-0"

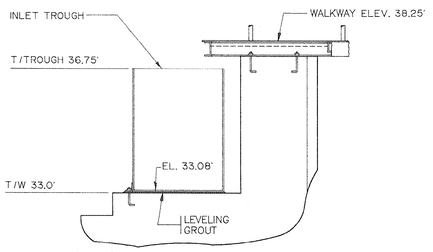




2 / 6 6 SECTION
SCALE: 1" = 1'-0"

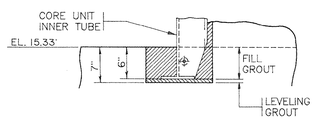


FIBERGLASS COVER DETAIL *
N.T.S.



4 / 6 6 SECTION
SCALE: 1" = 1'-0"

3 / 6 6 SECTION *
SCALE: 1/2" = 1'-0"



5 / 6 6 SECTION
SCALE: 1" = 1'-0"

NOTES:
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2. NIC INDICATES ITEMS NOT IN THIS CONTRACT.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

NORTH CAROLINA Registered Professional Engineer No. 12385 JOSEPH W. McGOUGAN 12-1-89

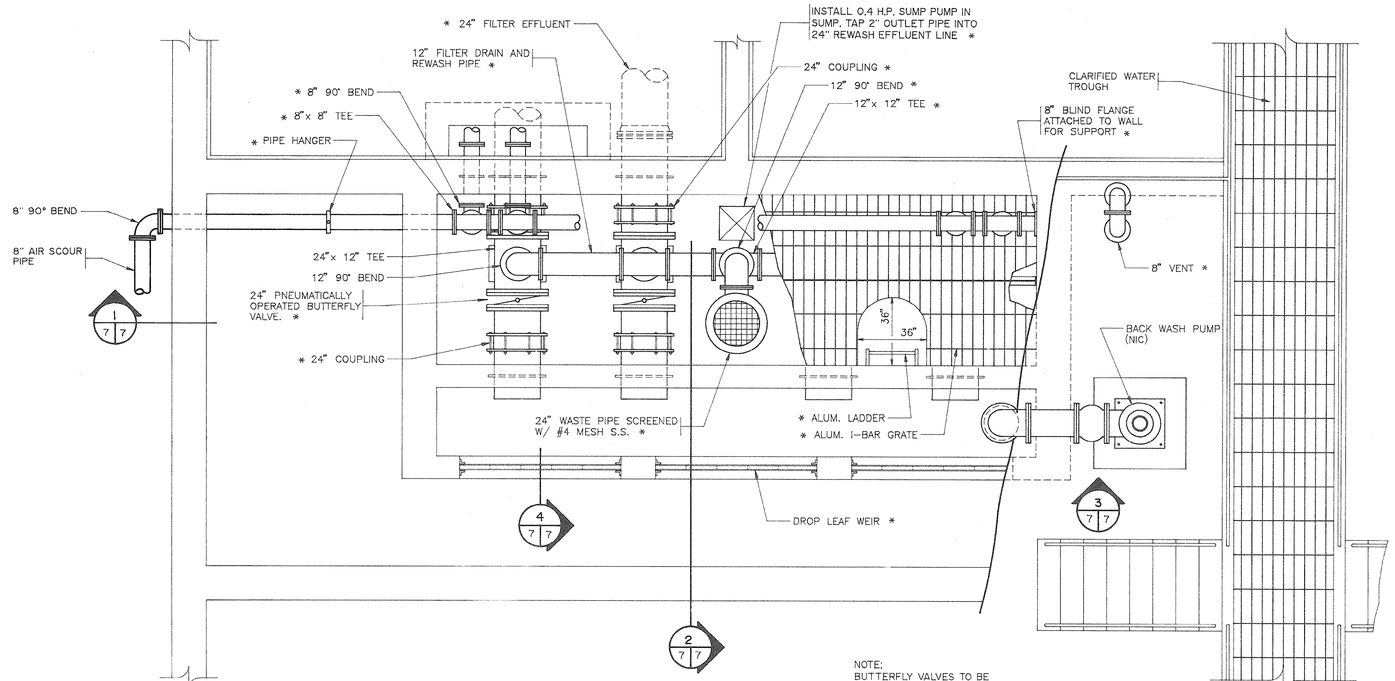
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FILTER CONTROL PLAN AND SECTIONS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO: EN-6
OF:

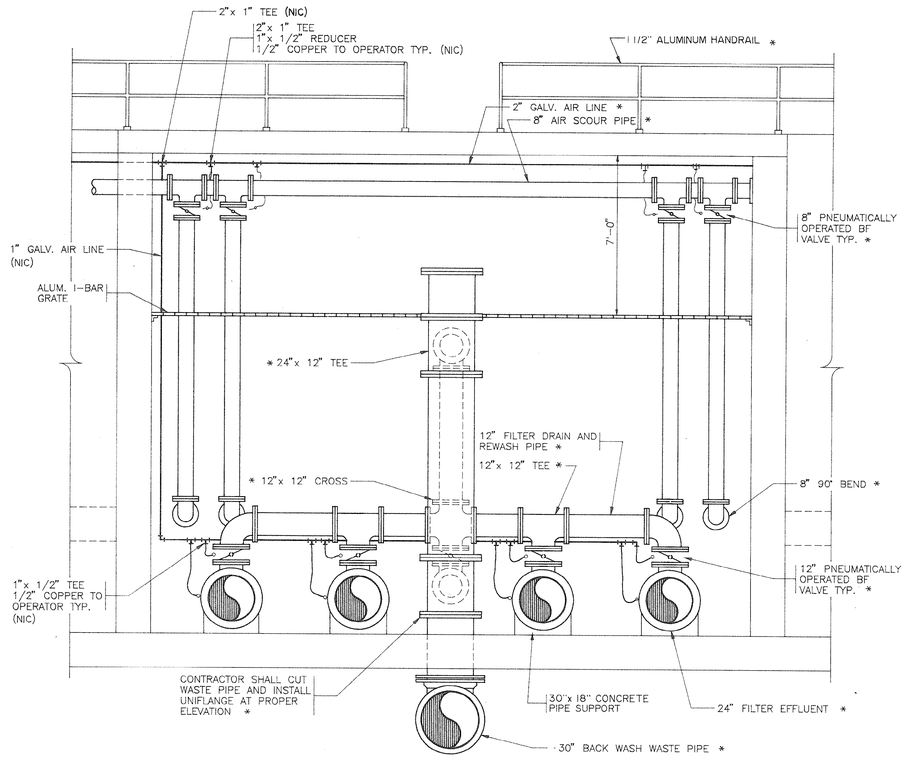
33-011-028

SOUTHERN PHOTO - GREENSBORO

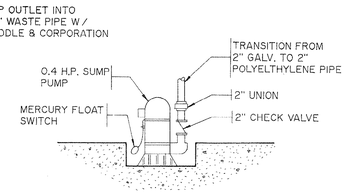


NOTE;
BUTTERFLY VALVES TO BE PROVIDED BY OWNER SHALL BE WAFER TYPE.

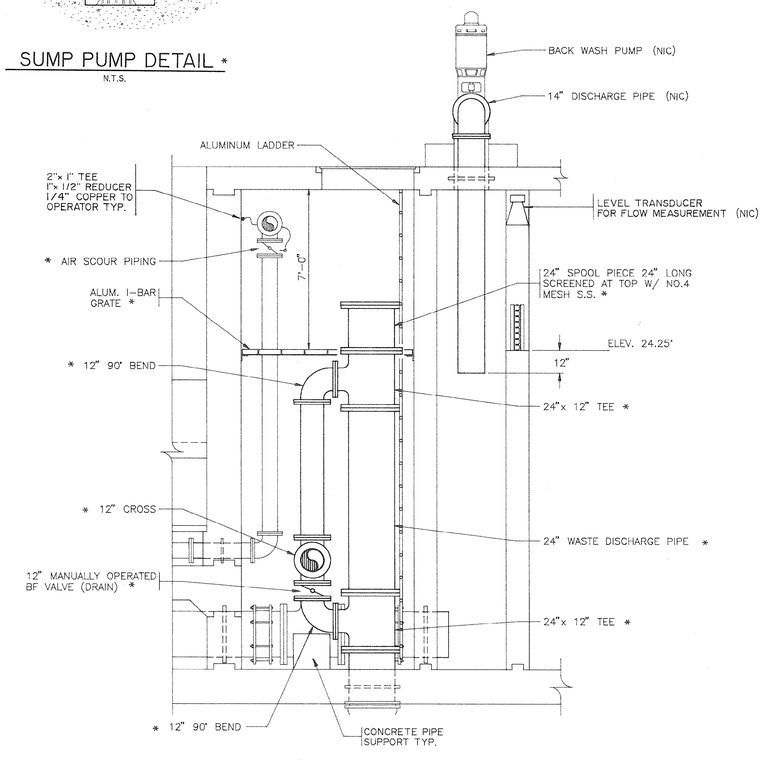
8 5 7 EFFLUENT CHAMBER LAYOUT
SCALE: 3/8" = 1'-0"



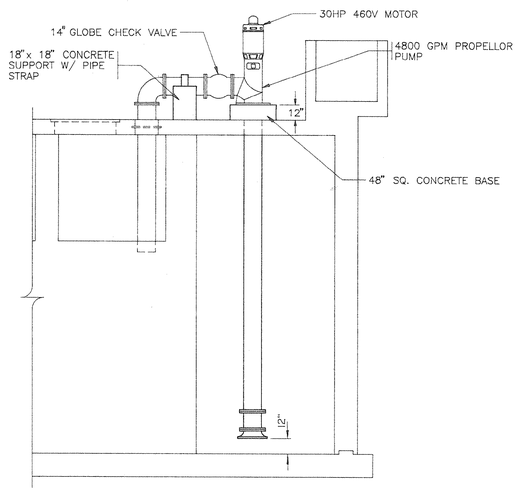
1 7 7 SECTION
SCALE: 3/8" = 1'-0"



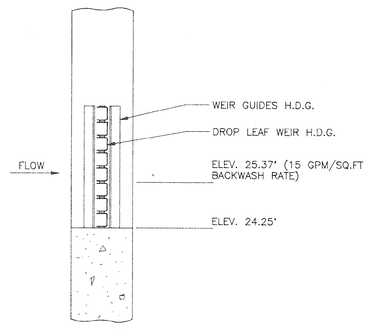
SUMP PUMP DETAIL *
N.T.S.



2 7 7 SECTION
NTS



3 7 7 BACKWASH PUMP DETAIL (NIC)
SCALE: 1/4" = 1'-0"



4 7 7 DROP LEAF WEIR DETAIL *
NTS

NOTES:
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REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER DAVID T. UPCHURCH 12-1-89

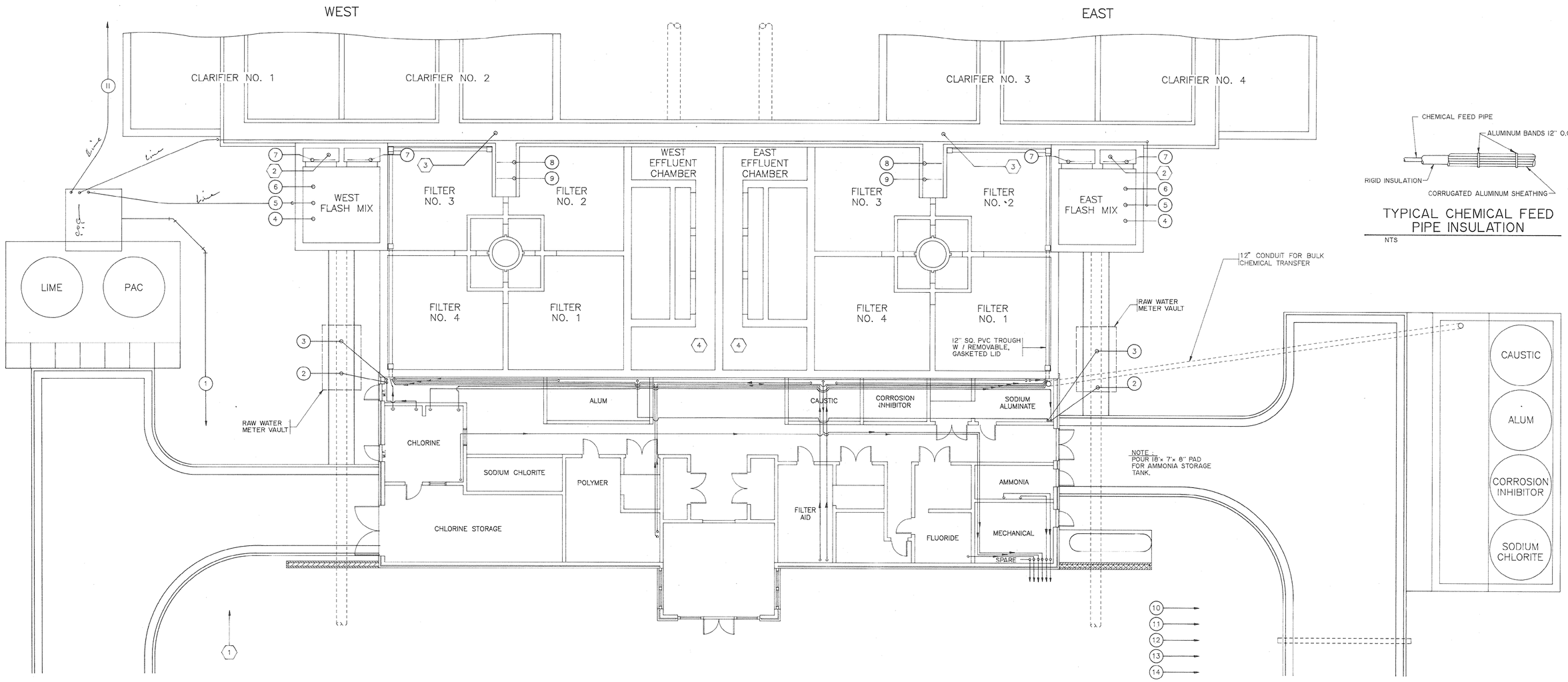
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12135 JOSEPH W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

FILTER EFFLUENT AND FILTER TO WASTE PIPE
33-011-029

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: EEW
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-7
OF: _____

SOUTHERN PHOTO - DESIGNS/OCRO 12/1948



CHEMICAL APPLICATION AND SAMPLE POINTS

NTS

TYPICAL CHEMICAL FEED PIPE INSULATION

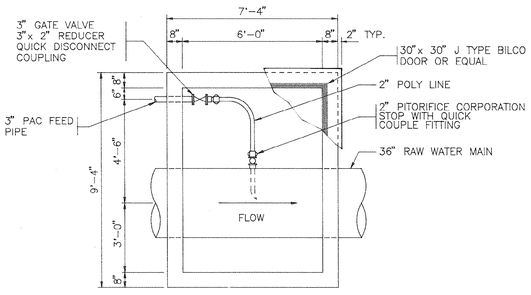
NTS

SAMPLE PUMP LOCATION		
	TYPE	LOCATION
1	RAW WATER	TAP IN RAW WATER PRIOR TO PAC
2	TREATED WATER	SUCTION IN FLASH MIX EFFLUENT CHAMBER
3	SETTLED WATER	SUCTION IN CLARIFIED WATER TROUGH
4	FILTERED WATER	SUCTION IN FILTER EFFLUENT CHAMBER

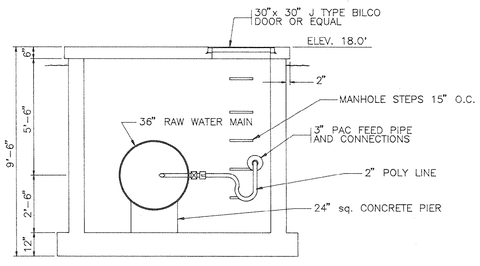
CHEMICAL APPLICATION POINTS		
	CHEMICAL	LOCATION
1	PAC	TAP IN RAW WATER MAIN LINE NO. 1
2	CHLORINE	TAP IN RAW WATER MAIN LINE NO. 2 & 3
3	ALUM	TAP IN WATER MAIN LINE NO. 2 & 3
4	SODIUM ALUMINATE	OPEN DISCHARGE IN FLASH MIX
5	LIME	OPEN DISCHARGE IN FLASH MIX
6	CAUSTIC	OPEN DISCHARGE IN FLASH MIX
7	POLYMER	DIFUSER UNDER FLASH MIX WEIR
8	FILTER AID	DIFUSER IN CLARIFIED WATER TROUGH
9	CHLORINE	DIFUSER IN CLARIFIED WATER TROUGH
10	FLUORIDE	TAP IN FILTER EFFLUENT LINE LINE NO. 6
11	LIME (OR CAUSTIC)	TAP IN FILTER EFFLUENT LINE LINE NO. 6
12	CHLORINE	TAP IN FILTER EFFLUENT LINE LINE NO. 6
13	CORROSION INHIBITOR	TAP IN CLEARWELL LINE LINE NO. 7
14	AMMONIA	TAP IN PUMP DISCHARGE LINES NO. 10 & 11

NOTE:
SEE PLANT PIPING SHEET FOR LINE NUMBERS AND LOCATIONS.

NOTE:
SEE LAYOUT PLAN G-4 FOR LOCATION OF VAULT



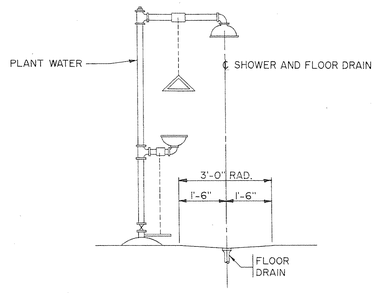
PLAN



SECTION

PAC FEED VAULT

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



SAFETY SHOWER AND EYEWASH

N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM
	REVISED	6-22-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 11220 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGUIGIN 12-1-89

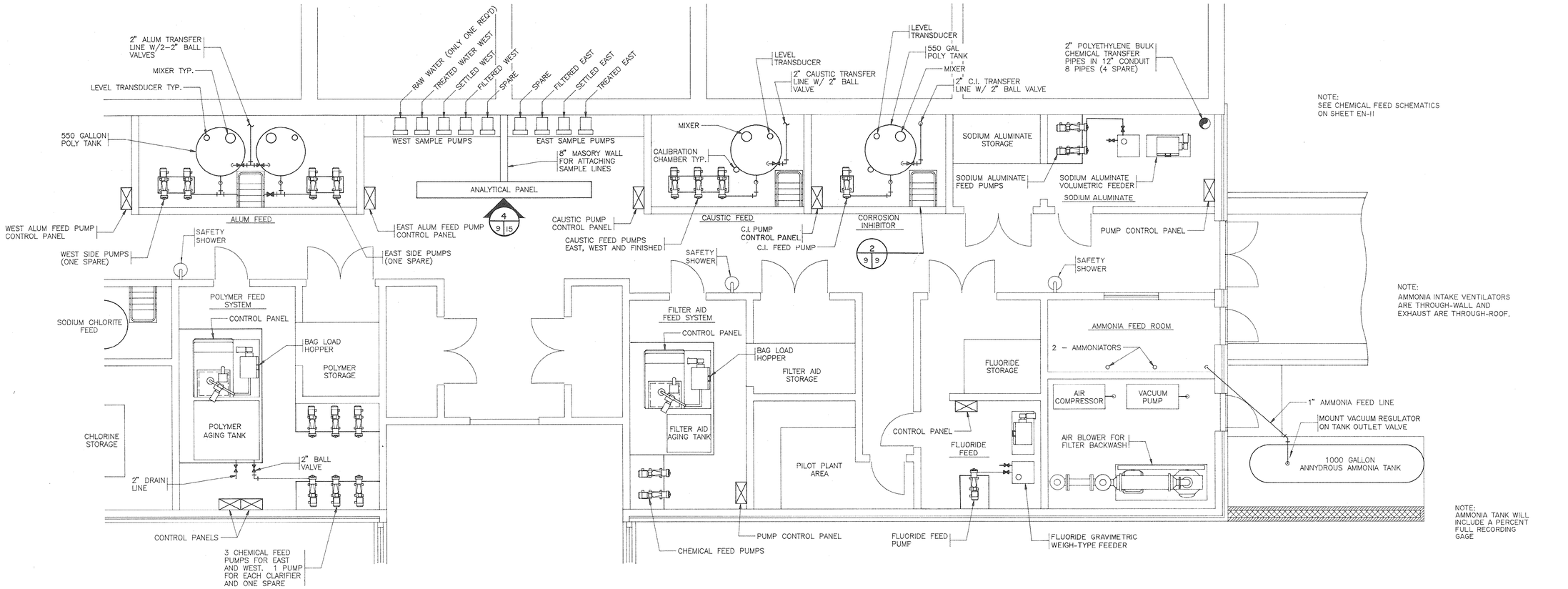
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CHEMICAL APPLICATION AND SAMPLE POINTS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-8
OF: _____

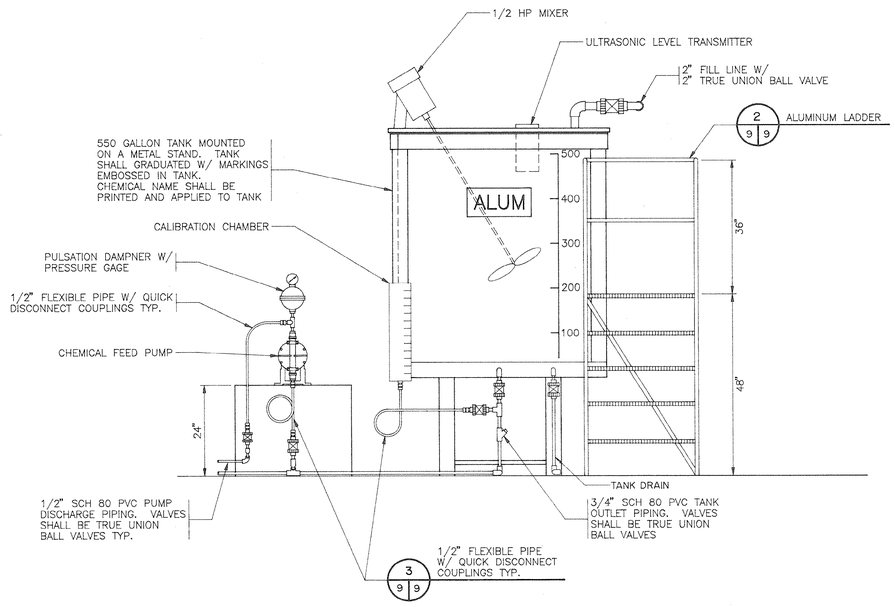
33-011-030

SOUTHERN PHOTO - DRAFTING N1194



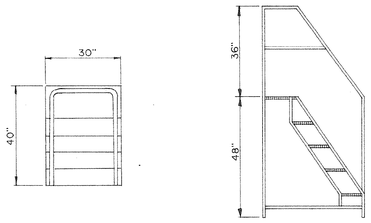
1/8 | 9 CHEMICAL FEED LAYOUT – PLAN

SCALE: 1/4" = 1'-0"



TYPICAL LIQUID CHEMICAL FEED SYSTEM

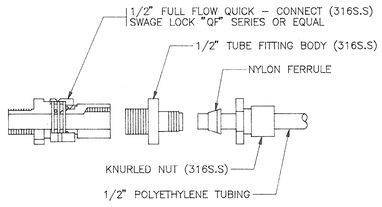
NTS



2 / 9 | 9 ALUMINUM LADDER DETAIL

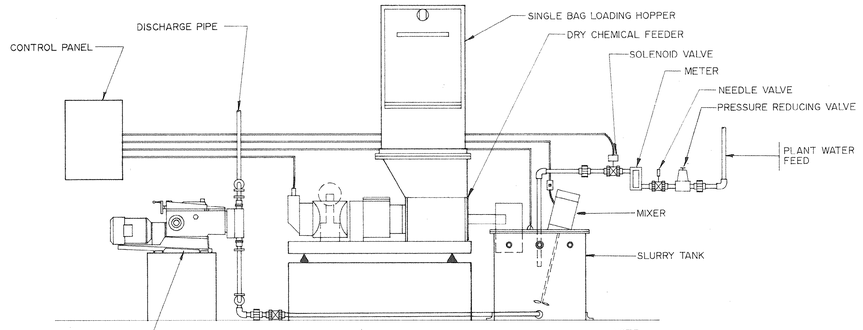
NTS

NOTE: LADDER FOR CAUSTIC DAY TANKS SHALL BE SIMILAR DIMENSIONS BUILT FROM PRESSURE TREATED LUMBER



3 / 9 | 9 QUICK COUPLING DETAIL

NTS



NOTE: FLUORIDE FEED SYSTEM SHALL BE GRAVIMETRIC W/ RECORDING SCALES, ALL OTHER SYSTEM SHALL BE VOLUMETRIC.

TYPICAL DRY CHEMICAL FEEDER

NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER DAVID T. UPCHURCH 12-1-89

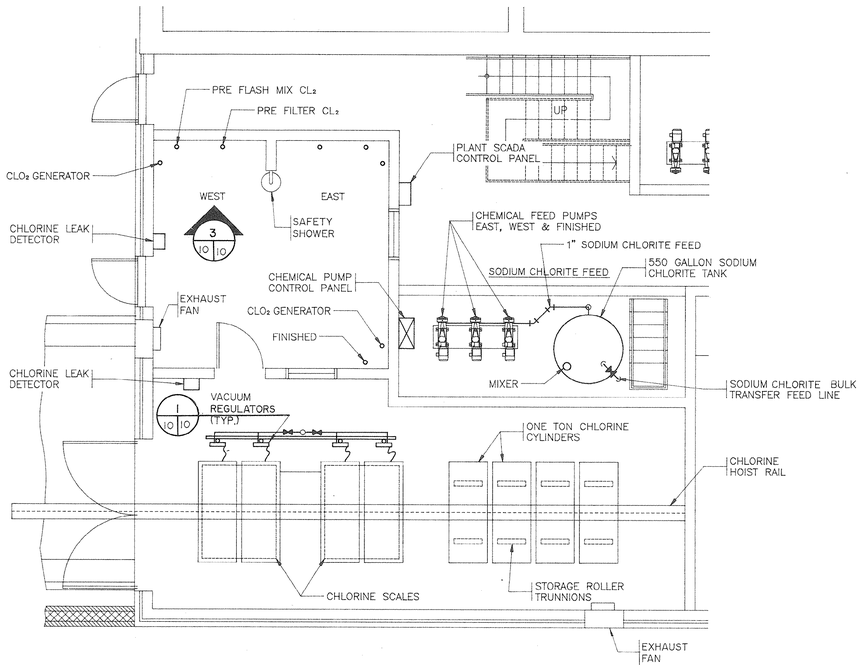
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12027 JOSEPH W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

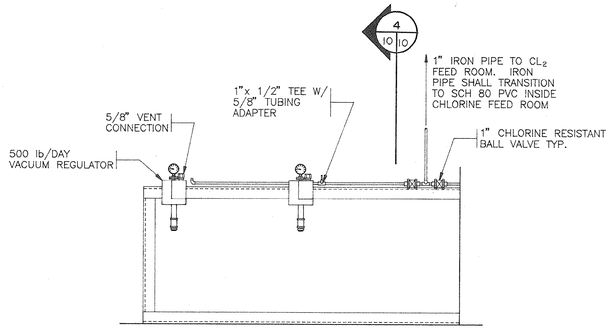
CHEMICAL FEED LAYOUT AND DETAILS
33-011-031

DATE: NOV., 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-9
OF:

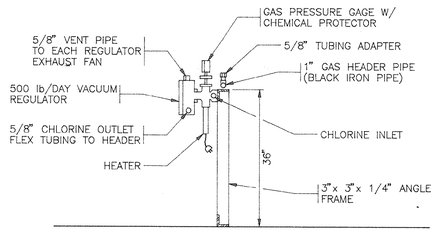
SOUTHERN PKGD - GREENWOOD 103148



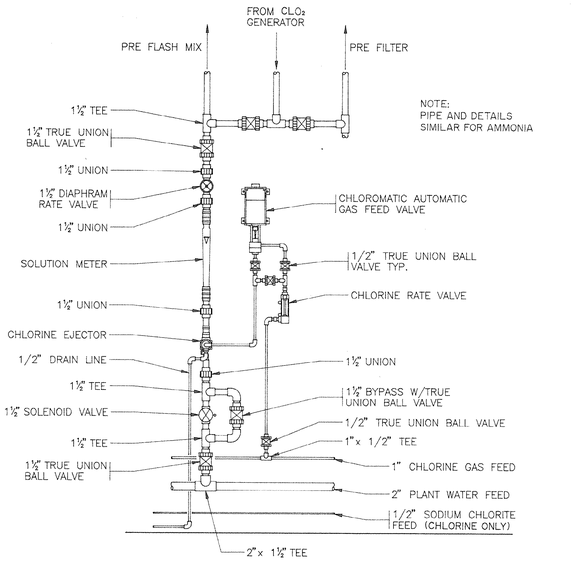
2 / 8 | 10 CHLORINE AND CHLORINE DIOXIDE FEED — LAYOUT
SCALE: 1/4" = 1'-0"



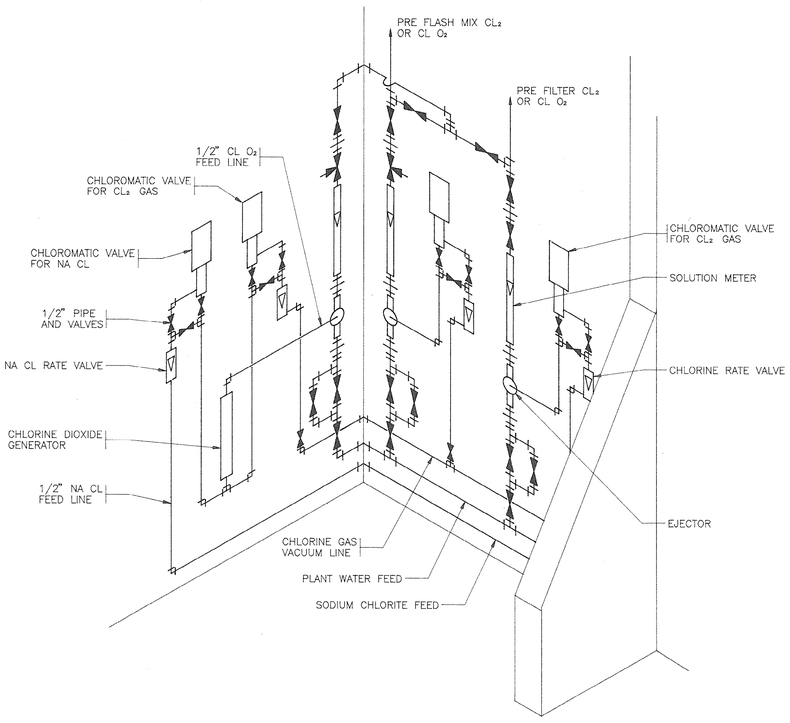
1 / 10 | 10 VACUUM REGULATORS — DETAIL
NTS



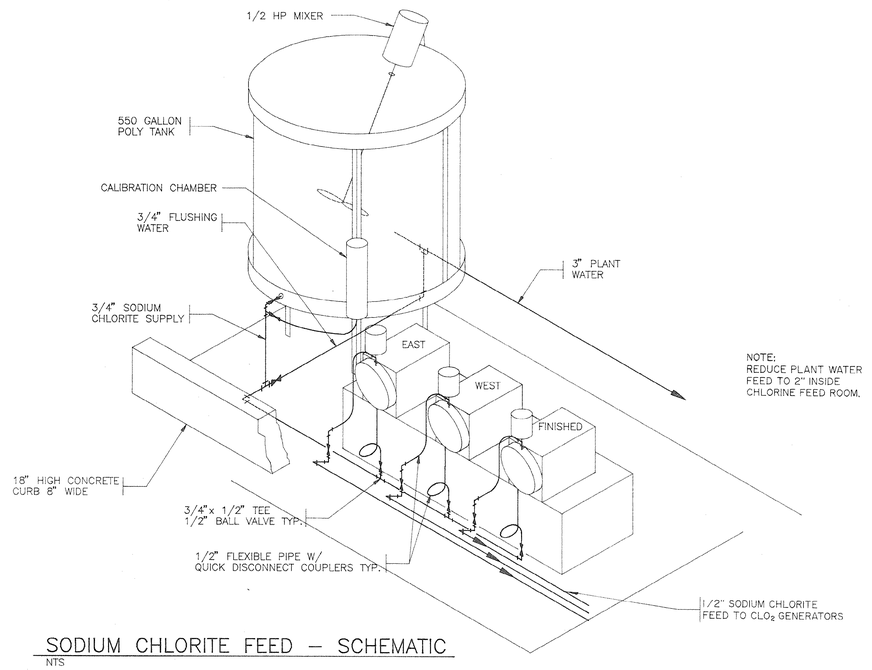
4 / 10 | 10 VACUUM REGULATORS — SECTION
NTS



CHLORINE AND AMMONIA FEED PIPING — DETAIL
NTS



3 / 10 | 10 WEST CHLORINE FEED SCHEMATIC
NTS



SODIUM CHLORITE FEED — SCHEMATIC
NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 10627 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED LANDSCAPE ARCHITECT No. 1235 JAMES W. McGOUGAN 12-1-89

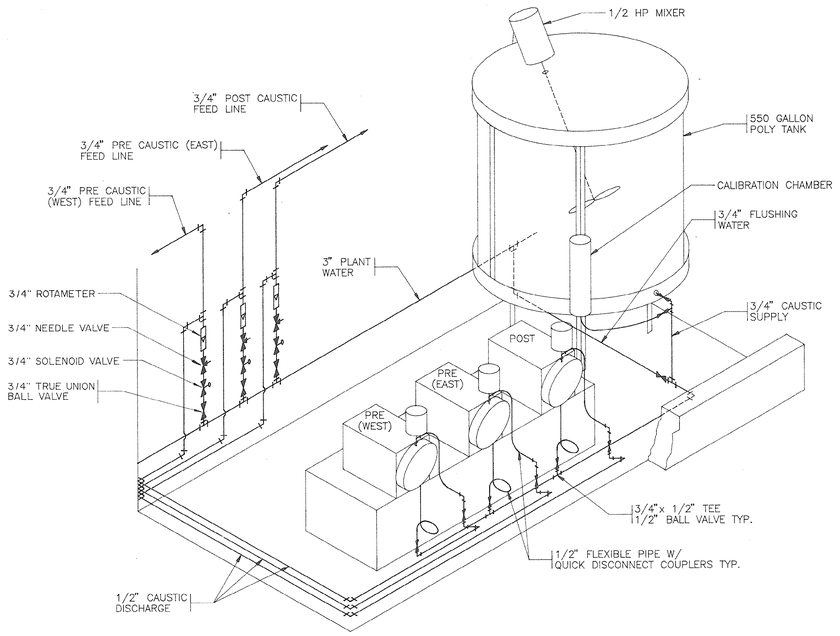
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CHLORINE, CHLORINE DIOXIDE AND AMMONIA PLAN AND DETAILS

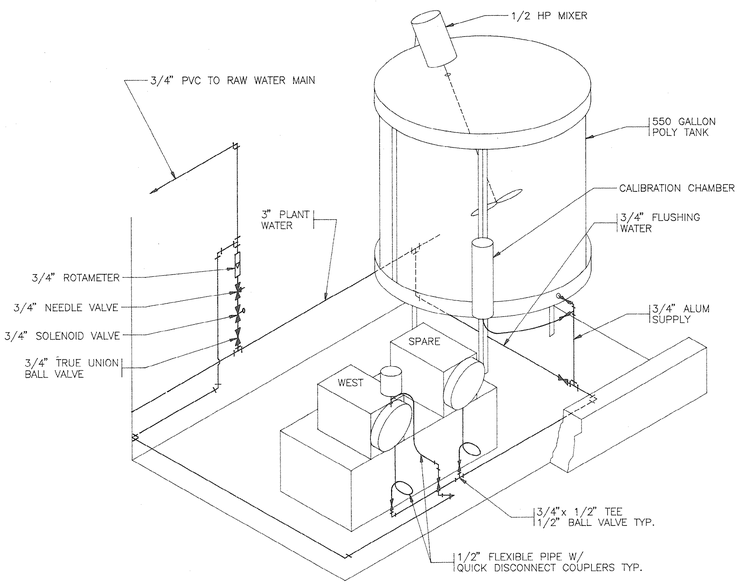
DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-10
OF:

33-011-032

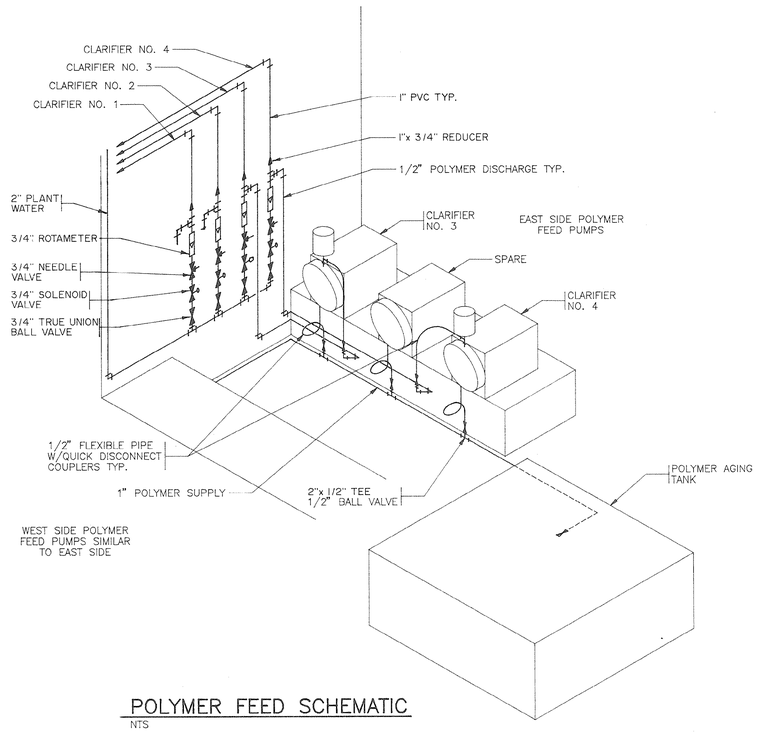
SOUTHERN PHOTO - GREENSBORO N2748



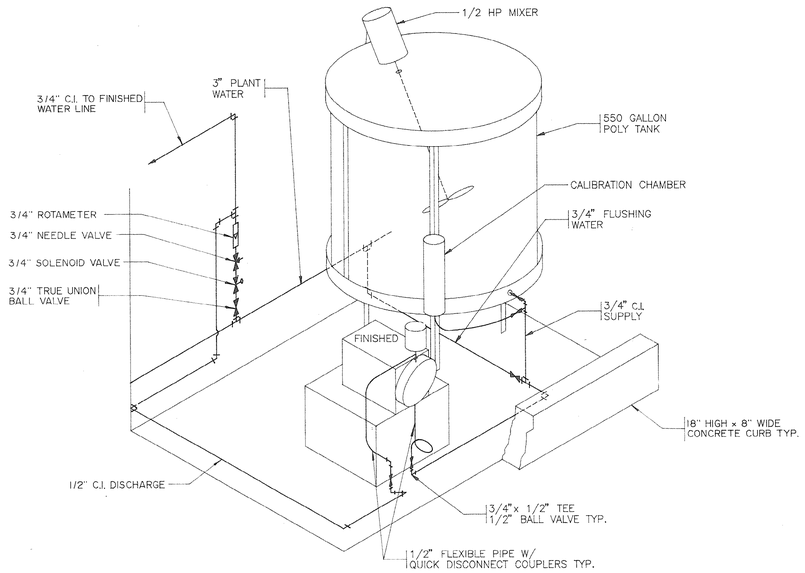
CAUSTIC FEED SCHEMATIC
NTS



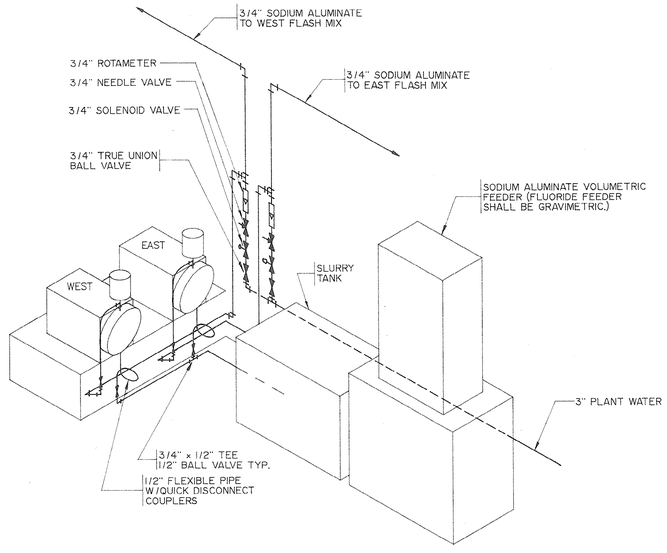
ALUM FEED SCHEMATIC
NTS



POLYMER FEED SCHEMATIC
NTS

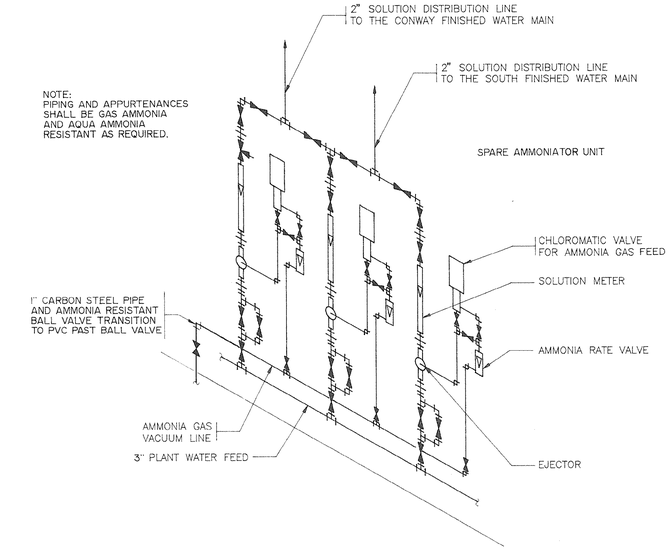


CORROSION INHIBITOR FEED SCHEMATIC
NTS



SODIUM ALUMINATE FEED SCHEMATIC
NTS

NOTE:
FLUORIDE SCHEMATIC MIRROR IMAGE WITH EXCEPTION OF ONLY ONE CHEMICAL FEED PUMP REQUIRED.



AMMONIA FEED SCHEMATIC
NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18067 DAVID T. UPCHURCH 12-1-89

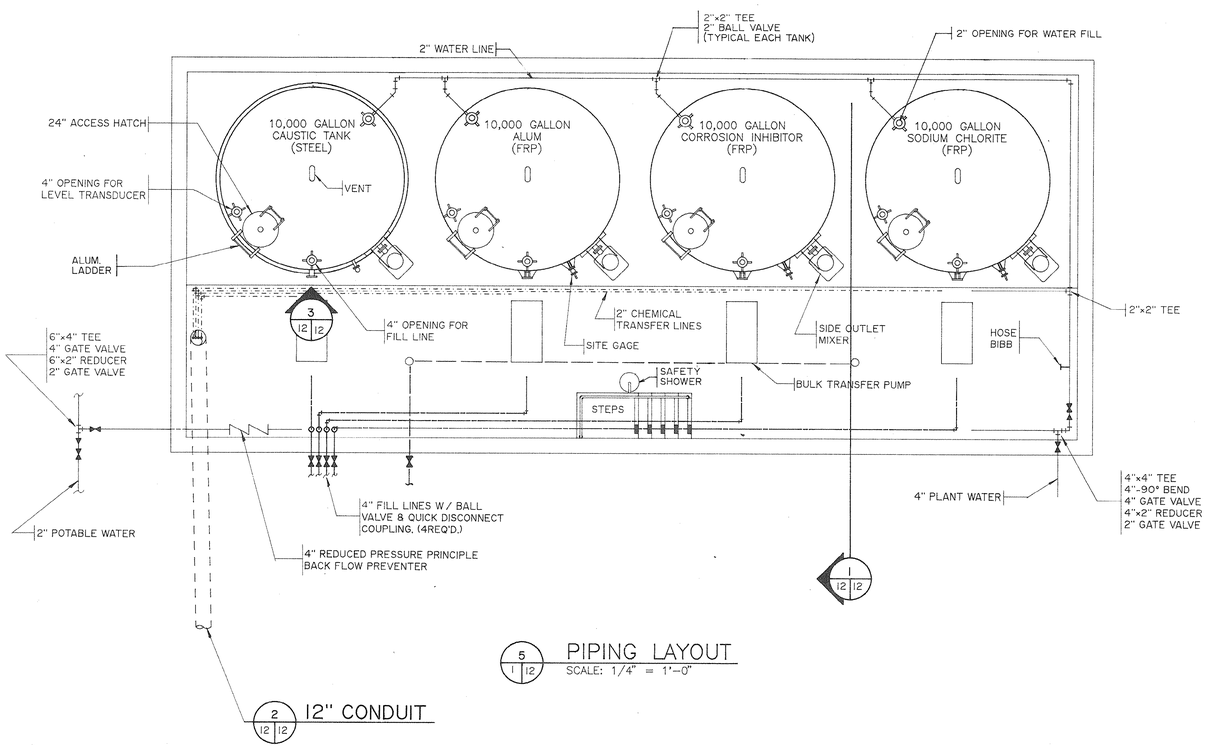
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 19035 JOHN W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

CHEMICAL FEED SCHEMATIC
33-011-033

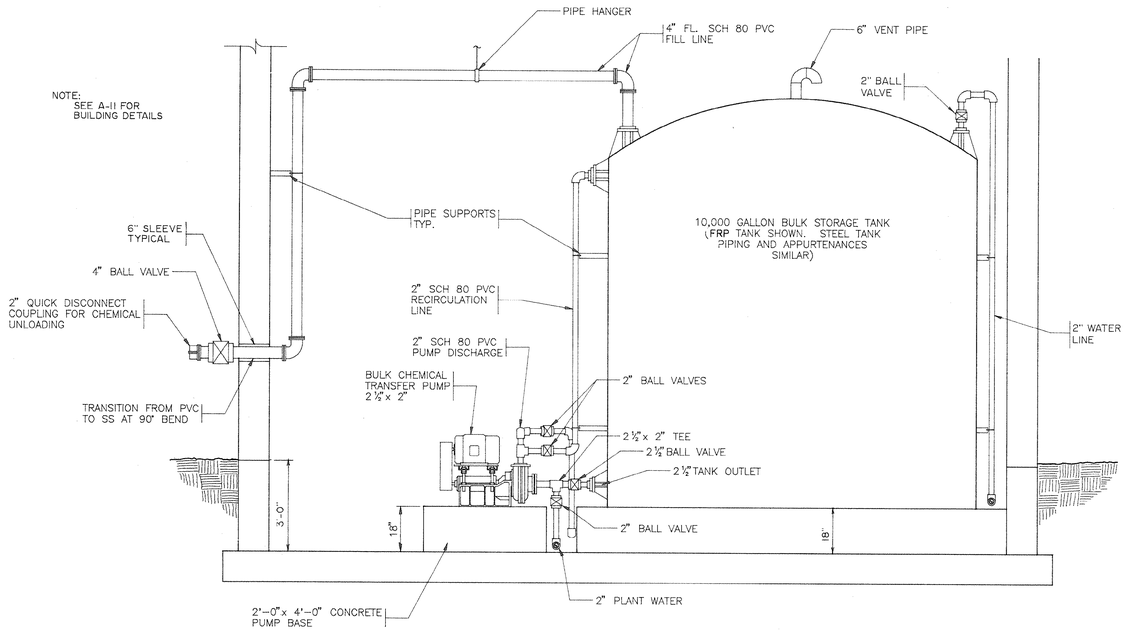
DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: NONE
SHEET NO.: EN-11
OF: _____

SOUTHERN PHOTO - GEENSBORO 13748

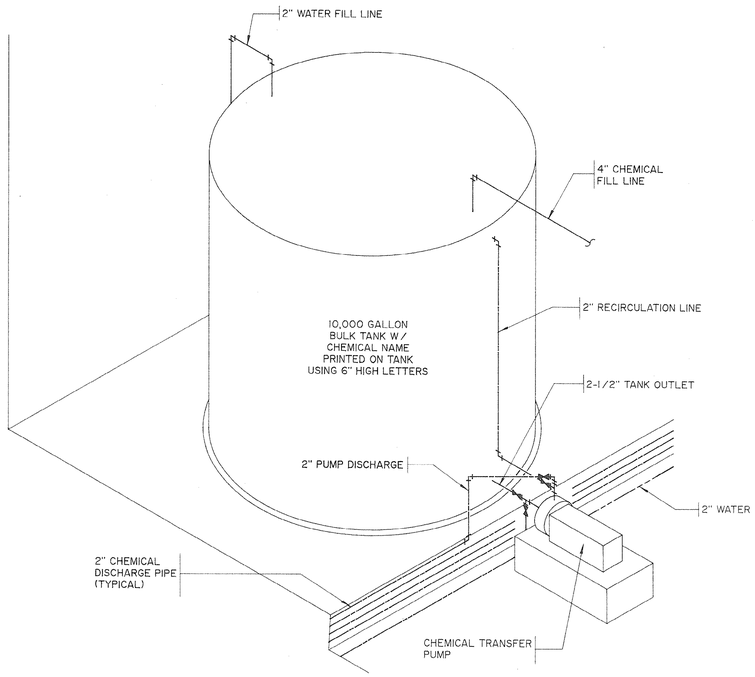


5 / 1 12 — PIPING LAYOUT
SCALE: 1/4" = 1'-0"

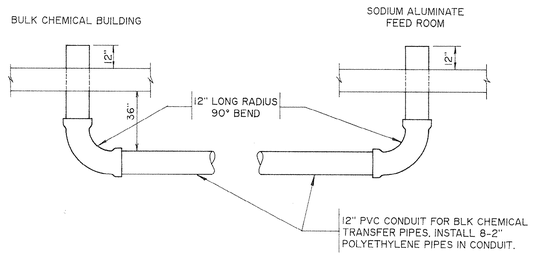
2 / 12 12 — 12" CONDUIT



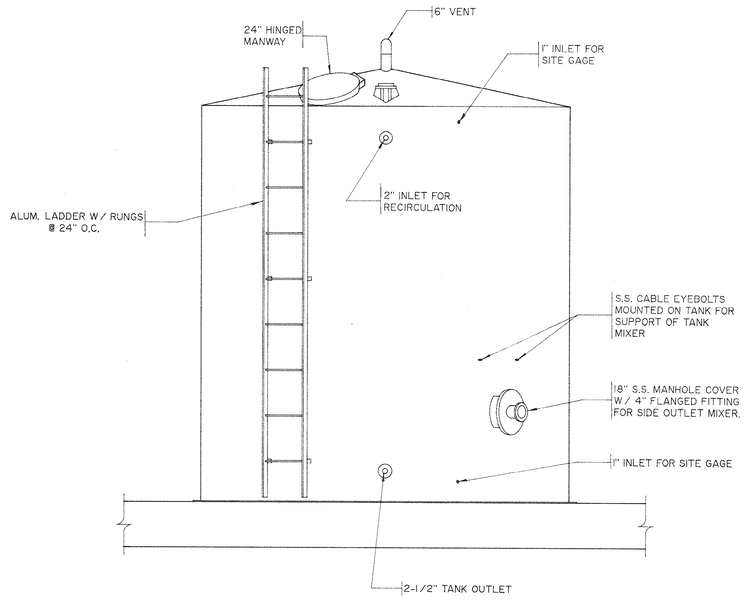
1 / 12 12 — DETAIL
SCALE: 1/2" = 1'-0"



PIPING SCHEMATIC
NTS



2 / 12 12 — 12" CONDUIT
NTS



3 / 12 12 — TANK OPENING AND APPURTENANCES DETAIL
SCALE: 1\2" = 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12835 DAVID T. UPCHURCH 12-1-89

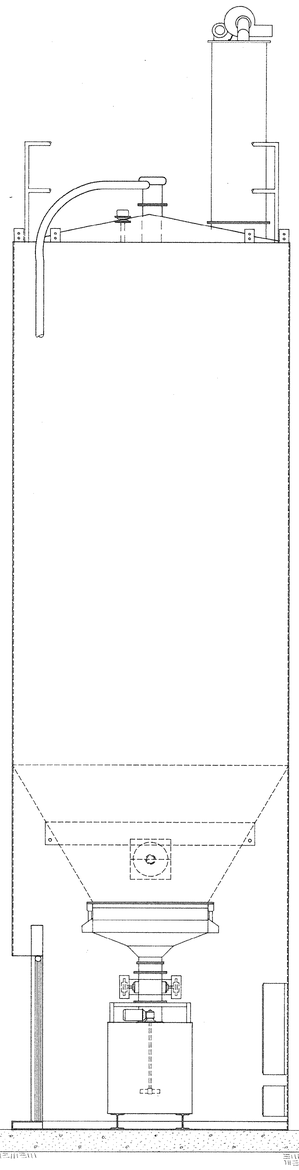
SOUTH CAROLINA REGISTERED PROF ESSIONAL ENGINEER No. 10935 JAMES W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

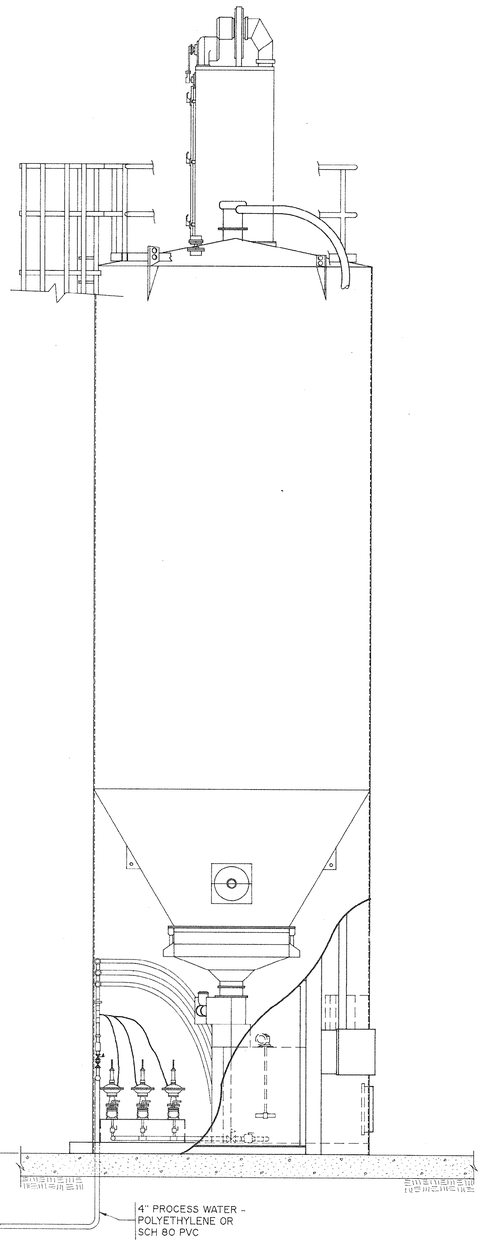
BULK CHEMICAL STORAGE
33-011-03

DATE:	NOV. 1989
DESIGNED:	JWM
DRAWN:	DC
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	EN-12
OF:	

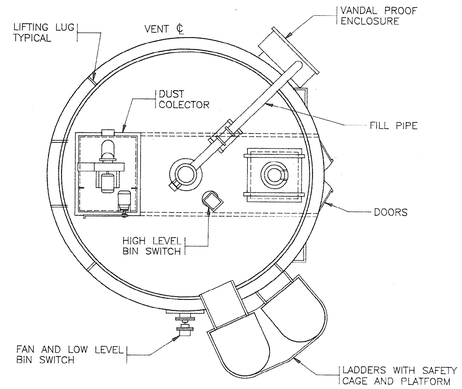
SOUTHERN PHOTO - GREENSBORO N27163



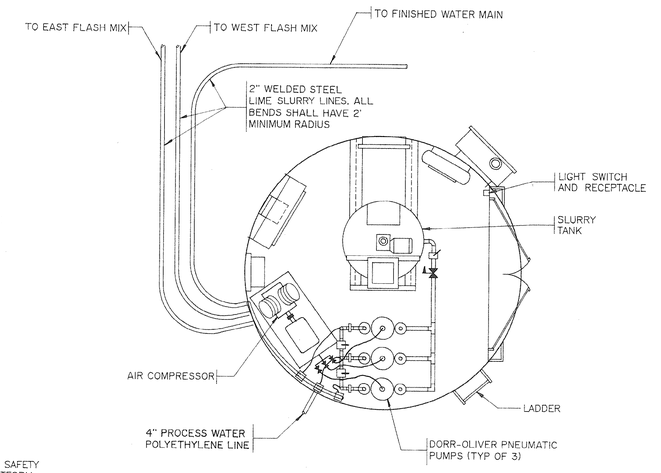
6 / 13 LIME TOWER - ELEVATION VIEW
SCALE: 3/8" = 1'-0"



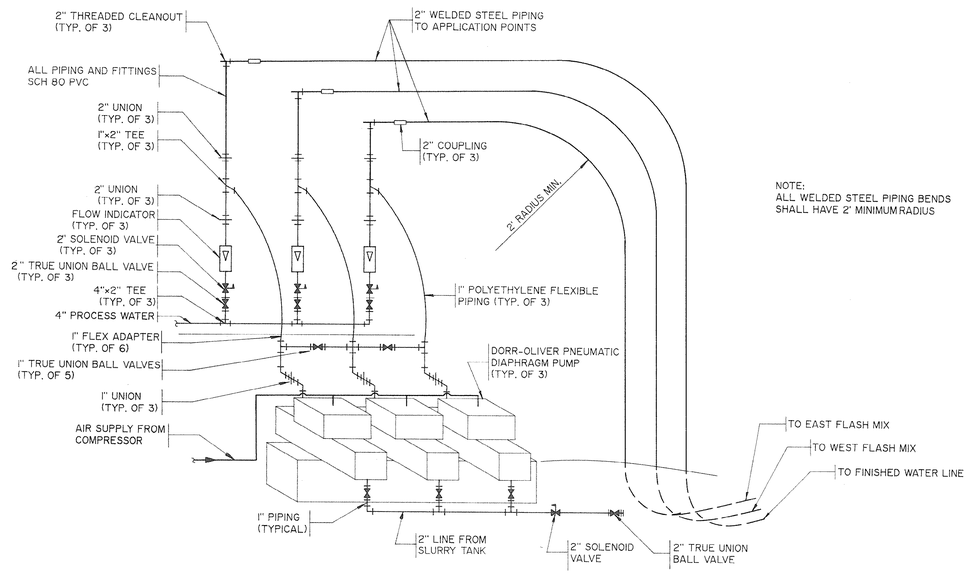
LIME TOWER - CUTAWAY ELEVATION
SCALE: 3/8" = 1'-0"



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



BOTTOM FLOOR PLAN
SCALE: 3/8" = 1'-0"



LIME FEED SCHEMATIC
N.T.S

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12254 DAVID F. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12235 JOHN W. McGOUGAN 12-1-89

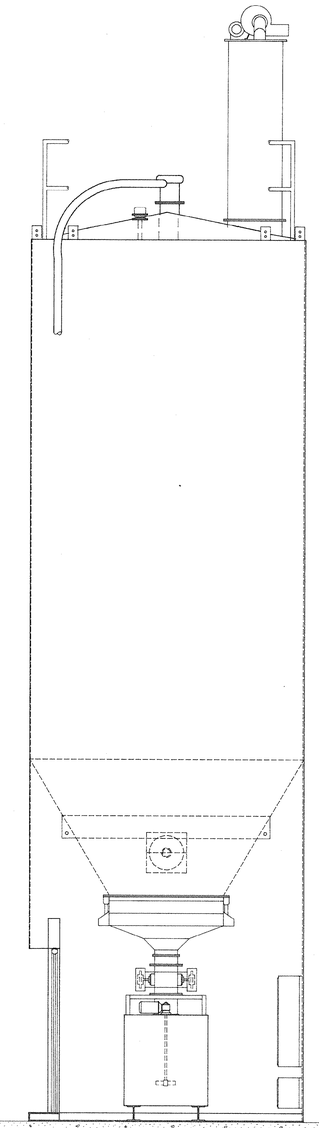
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

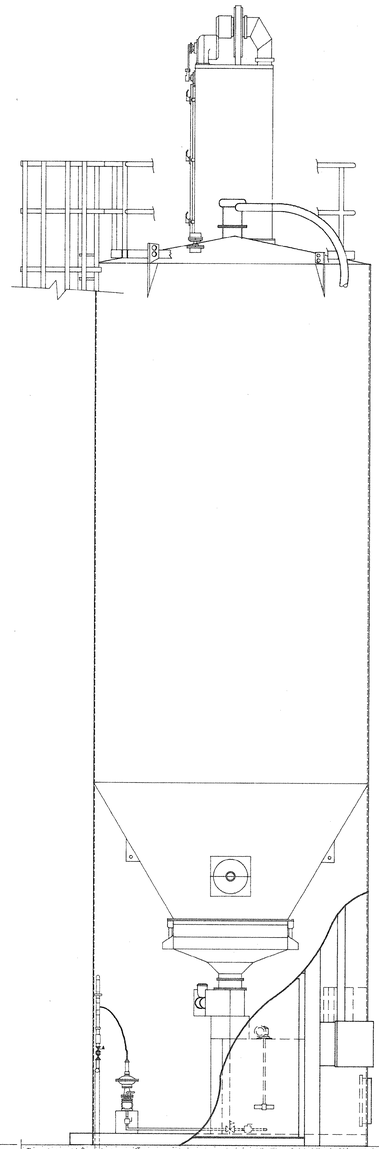
LIME TOWER PLANS AND DETAILS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: AWH
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-13
OF: ____

33-011-035

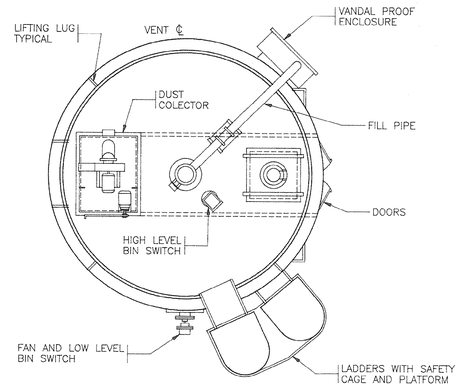
SOUTHERN PHOTO - GREENSBORO 1-12744



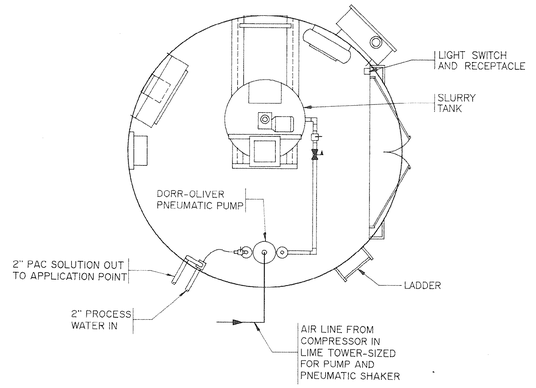


7
1 | 14 CARBON TOWER ELEVATION VIEW
SCALE: 3/8" = 1'-0"

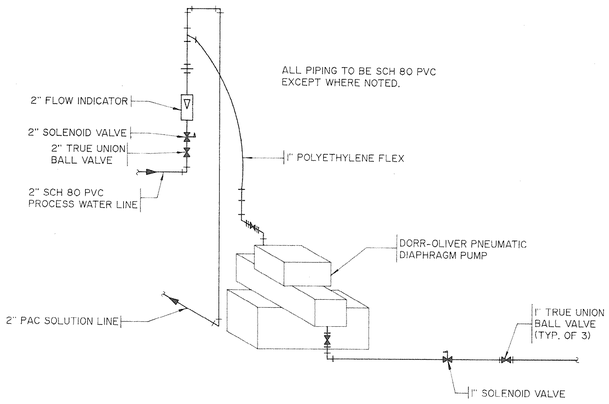
ELEVATION BREAK-OUT VIEW
SCALE: 3/8" = 1'-0"



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



BOTTOM FLOOR PLAN
SCALE: 3/8" = 1'-0"



POWDERED ACTIVATED CARBON
FEED SCHEMATIC
N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 17261
DAVID T. UPCHURCH
12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 16385
JOHN W. McCOUGH
12-1-89

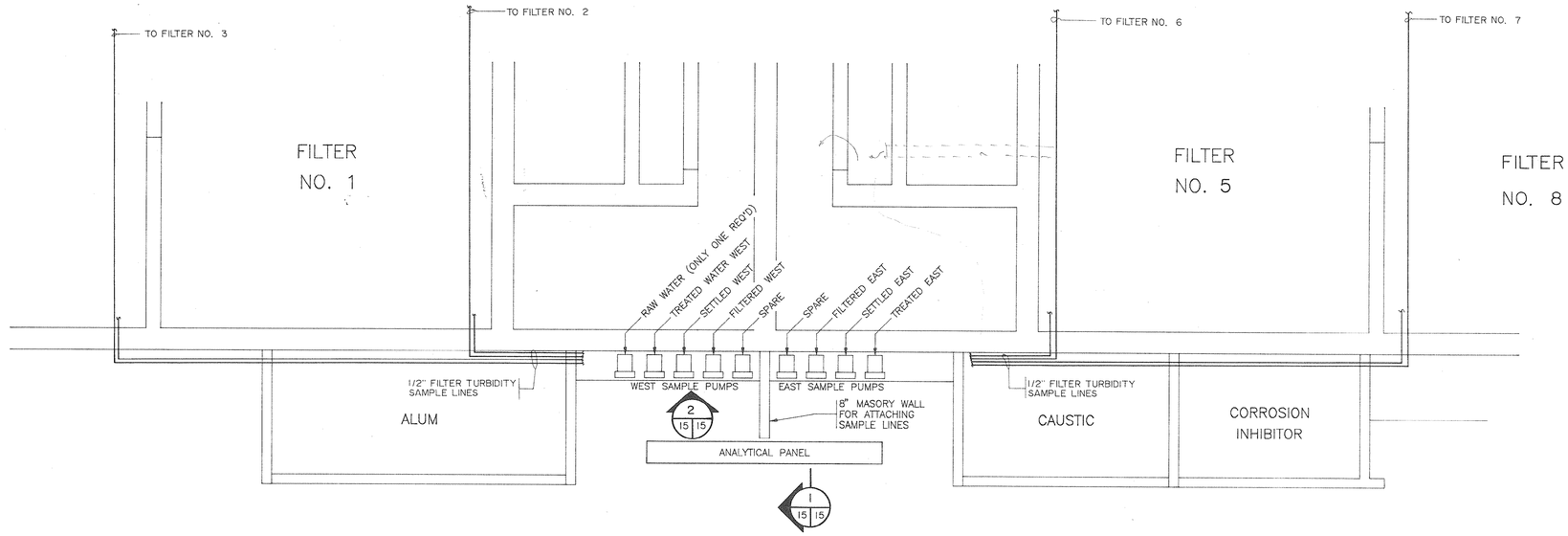
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

POWDERED ACTIVATED CARBON TOWER AND DETAILS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: AWH
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-14
OF: _____

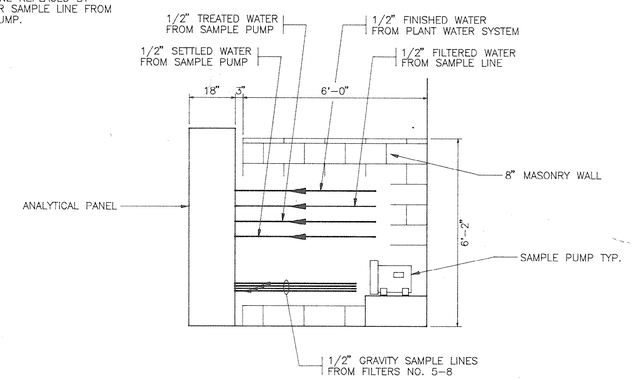
33-011-036

SOUTHERN PHOTO - GREENSBORO

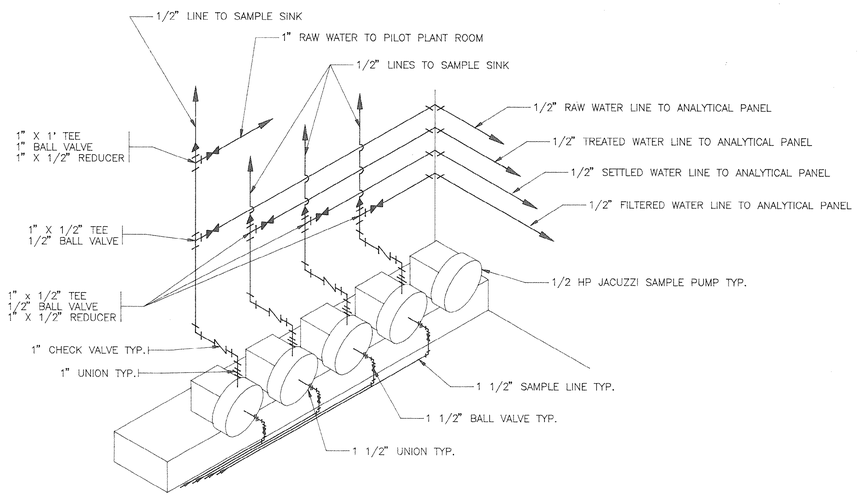


SAMPLE POINT LAYOUT
NTS

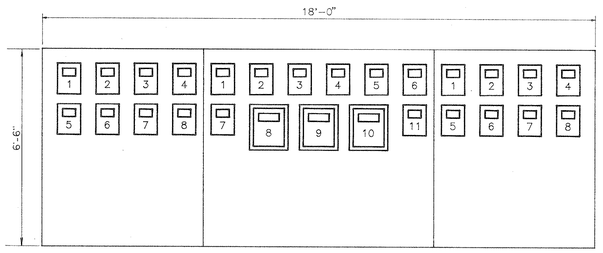
NOTE: WEST SAMPLE PIPING SIMILAR TO EAST WITH THE EXCEPTION OF FINISHED WATER SAMPLE LINE REPLACED BY RAW WATER SAMPLE LINE FROM SAMPLE PUMP.



2 / 15 | 15 EAST SAMPLE LINES
SCALE: 1/2" = 1'-0"



1 / 15 | 15 WEST SAMPLE PUMPS – SCHEMATIC
NTS



WEST	CENTRAL PLANT	EAST
1. SETTLED WATER TURBIDITY 2. FILTERED WATER TURBIDITY 3. TREATED WATER PH 4. SETTLED WATER PH 5. FILTER NO. 1 TURBIDITY 6. FILTER NO. 2 TURBIDITY 7. FILTER NO. 3 TURBIDITY 8. FILTER NO. 4 TURBIDITY	1. RAW WATER TURBIDITY 2. FINISHED WATER TURBIDITY 3. RAW WATER PH 4. FINISHED WATER PH 5. FLUORIDE RESIDUAL 6. CONDUCTIVITY 7. SPARE 8. FILTERED WATER CHLORINE RESIDUAL – WEST 9. FINISHED WATER CHLORINE RESIDUAL 10. FILTERED WATER CHLORINE RESIDUAL – EAST 11. SPARE	1. SETTLED WATER TURBIDITY 2. FILTERED WATER TURBIDITY 3. TREATED WATER PH 4. SETTLED WATER PH 5. FILTER NO. 5 TURBIDITY 6. FILTER NO. 6 TURBIDITY 7. FILTER NO. 7 TURBIDITY 8. FILTER NO. 8 TURBIDITY

4 / 9 | 15 ANALYTICAL PANEL LAYOUT
NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7744 DANIEL T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14835 JOHN W. McDOUGALD 12-1-89

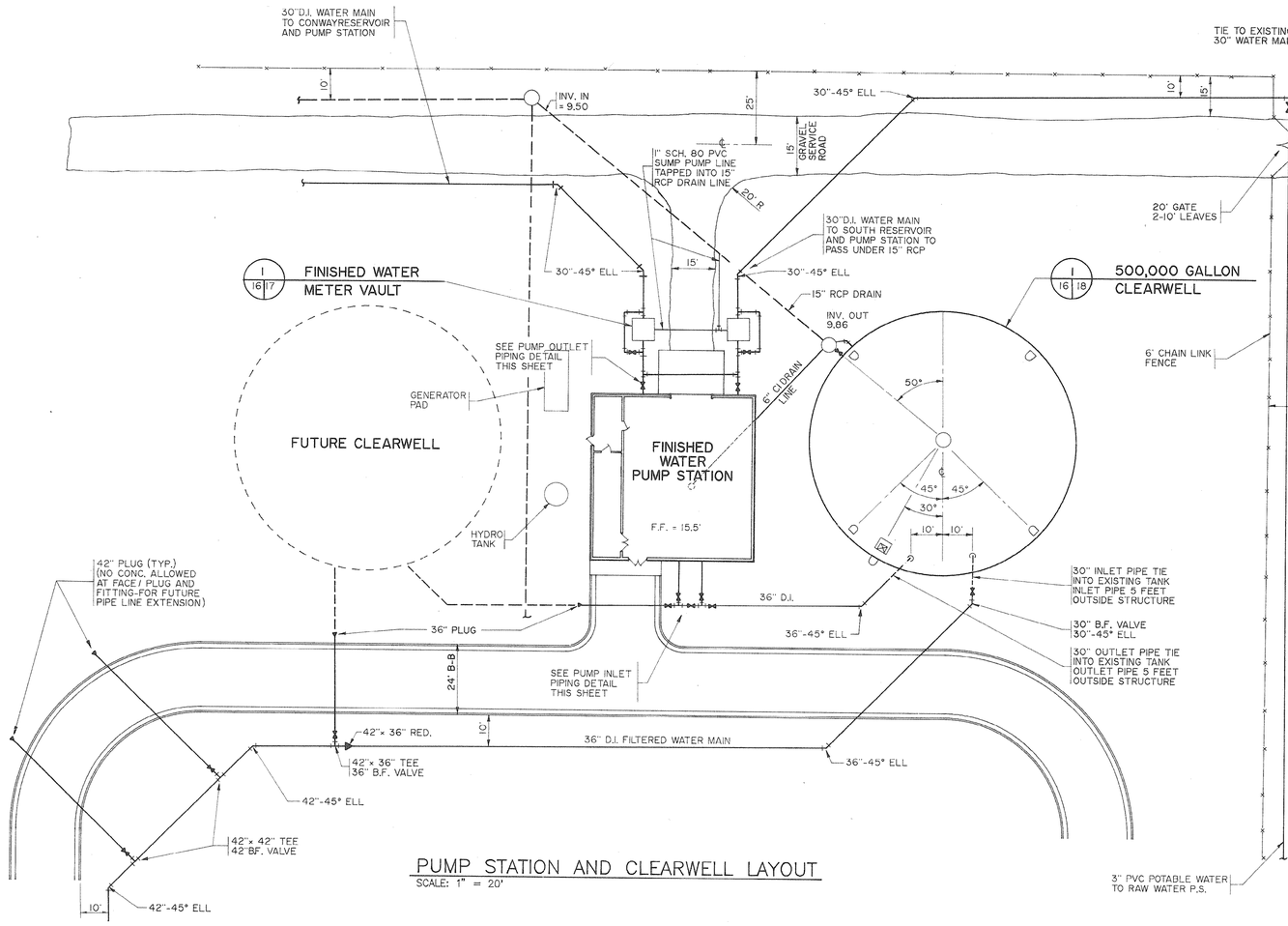
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

ANALYTICAL PANEL AND SAMPLE PUMPS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-15
OF: _____

33-011-37

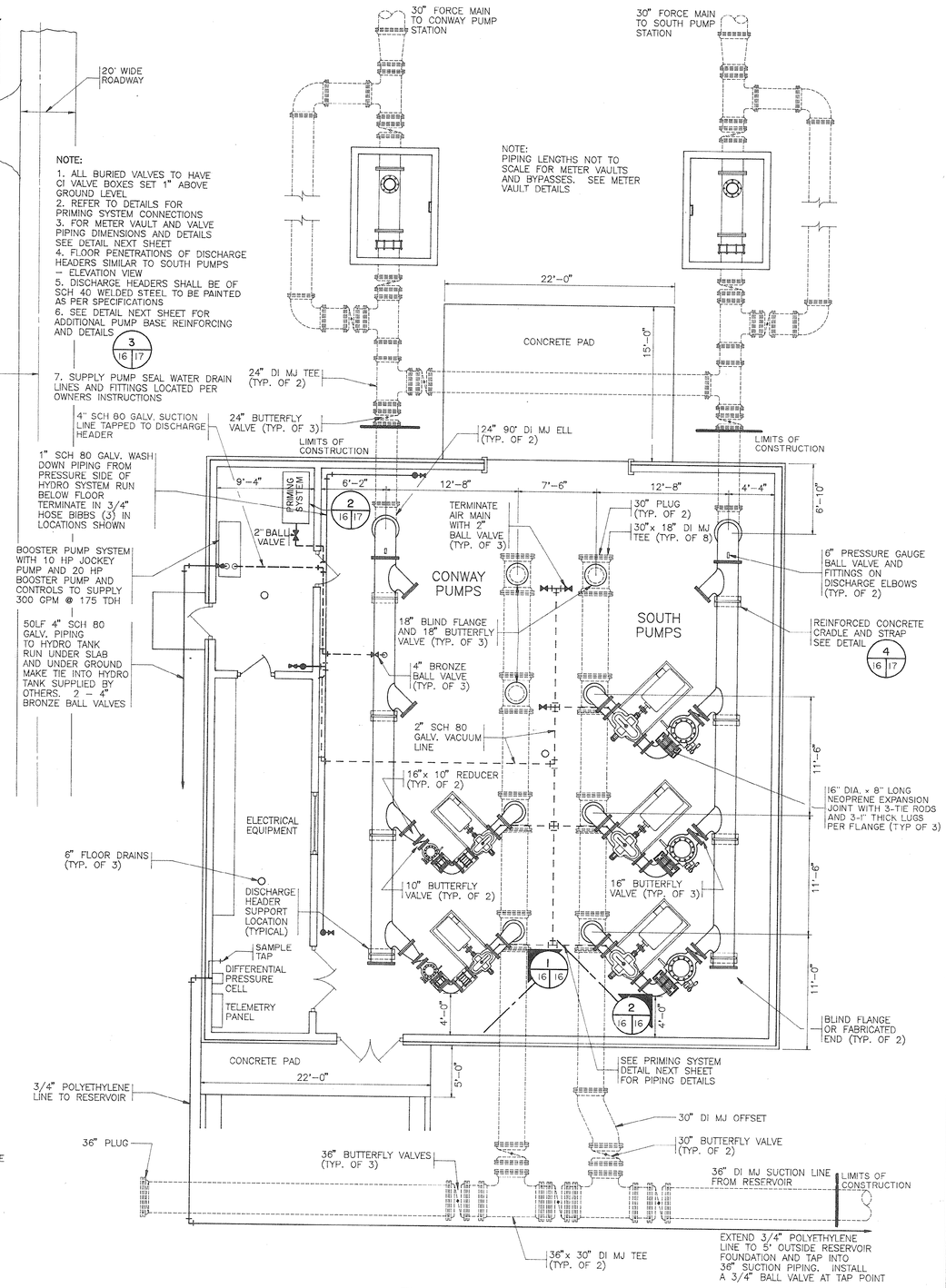
SOUTHERN PHOTO - GREENSBORO N17345



PUMP STATION AND CLEARWELL LAYOUT

SCALE: 1" = 20'

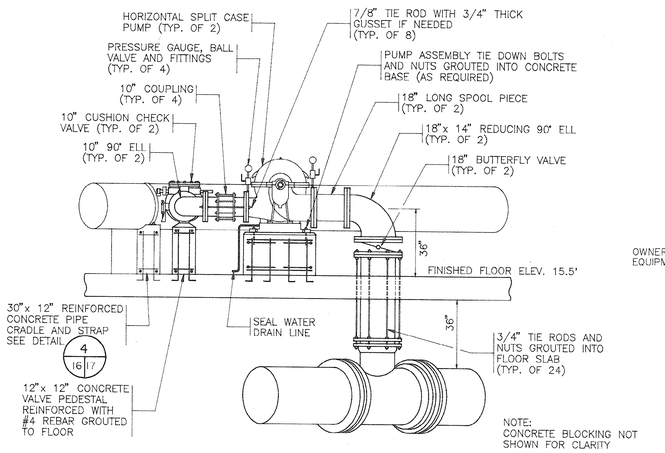
NOTE:
1. ALL BURIED VALVES TO HAVE CI VALVE BOXES SET 1" ABOVE GROUND LEVEL
2. REFER TO DETAILS FOR PRIMING SYSTEM CONNECTIONS
3. FOR METER VAULT AND VALVE PIPING DIMENSIONS AND DETAILS SEE DETAIL NEXT SHEET
4. FLOOR PENETRATIONS OF DISCHARGE HEADERS SIMILAR TO SOUTH PUMPS – ELEVATION VIEW
5. DISCHARGE HEADERS SHALL BE OF SCH 40 WELDED STEEL TO BE PAINTED AS PER SPECIFICATIONS
6. SEE DETAIL NEXT SHEET FOR ADDITIONAL PUMP BASE REINFORCING AND DETAILS 3/16/17
7. SUPPLY PUMP SEAL WATER DRAIN LINES AND FITTINGS LOCATED PER OWNERS INSTRUCTIONS



FINISHED WATER PUMP STATION

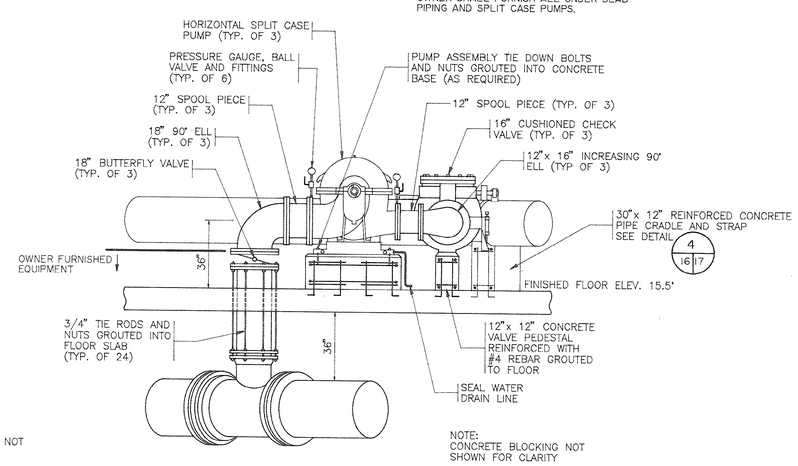
SCALE: 3/16" = 1'-0"

NOTE :
CONTRACTOR SHALL FURNISH AND INSTALL ALL PIPE FITTINGS AND VALVES FROM BUTTERFLY VALVE ON SUCTION LINE THROUGH THE 90° BEND ON DISCHARGE HEADER. OWNER SHALL FURNISH ALL UNDER SLAB PIPING AND SPLIT CASE PUMPS.



1/16/16 CONWAY PUMPS – ELEVATION VIEW

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



2/16/16 SOUTH PUMPS – ELEVATION VIEW

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

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12127 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED LAND SURVEYOR No. 12335 JAMES W. McGUIRE 12-1-89

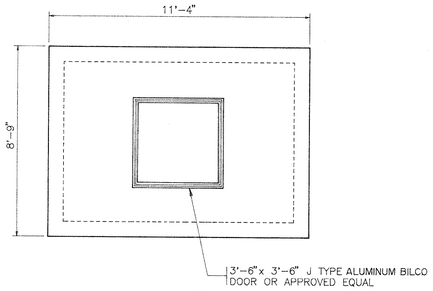
SURFACE WATER TREATMENT PROJECT
GRAND STRAND WATER AND SEWER AUTHORITY

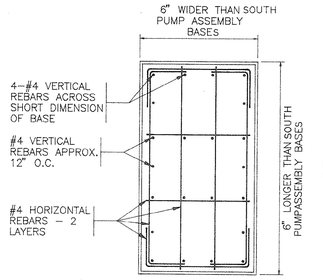
FINISHED PUMPING STATION
33-011-038

DATE: NOV.,1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-16
OF:

SOUTHERN PHOTO - REPRO/BOND 11758

NOTE:
1. ALL PIPING TO BE 24" DI MJ EXCEPT DI FLANGED IN METER VAULTS AND PVC MAINS TO CONWAY AND SOUTH PUMP STATIONS
2. METER VAULT AND PIPING SHOWN FOR CONWAY SIDE, SOUTH SIDE WILL BE A MIRROR IMAGE OF CONWAY

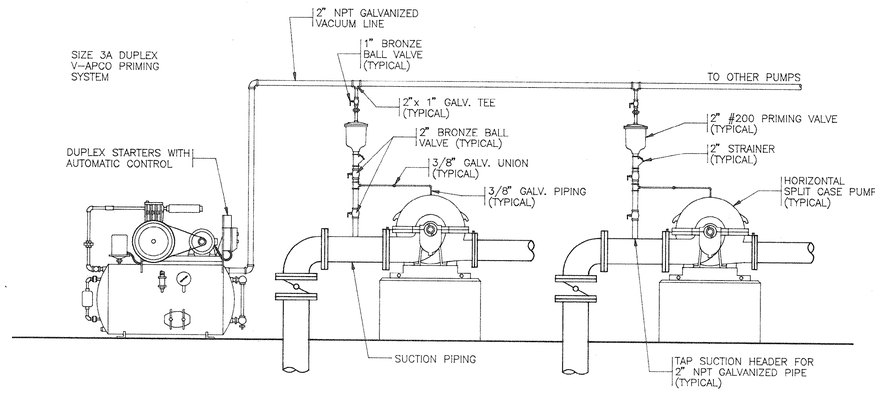




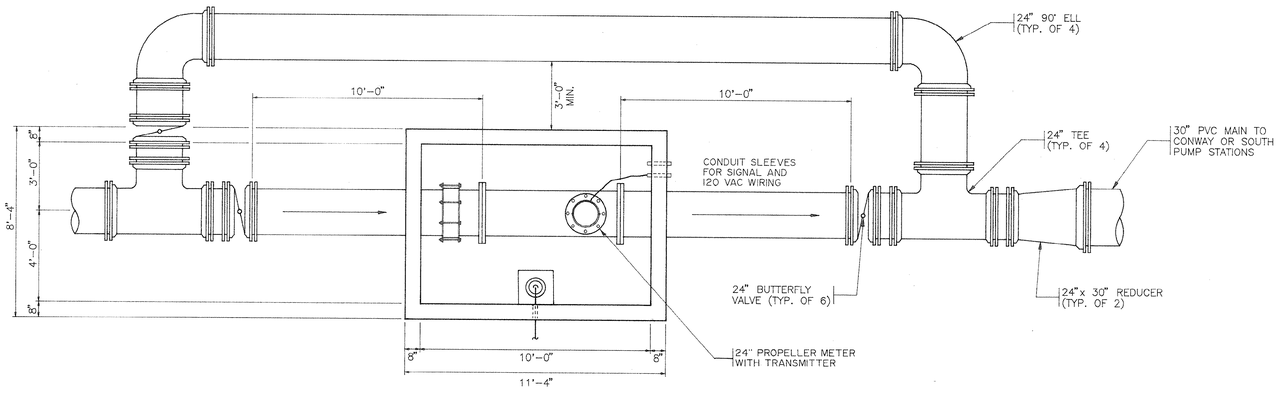
NOTE :
MAKE ALL 5 PUMP BASES OF EQUAL DIMENSIONS SO THAT LARGER PUMPS CAN BE INSTALLED IN THE FUTURE. MAKE ALL THE SAME HEIGHT AND GROUT AS NECESSARY TO PUMP ASSEMBLY LEVEL.

BASE OF 3000 PSI CONCRETE

3 / 16 | 17 CONCRETE PUMP BASE DETAIL
SCALE: 1/2" = 1'-0"

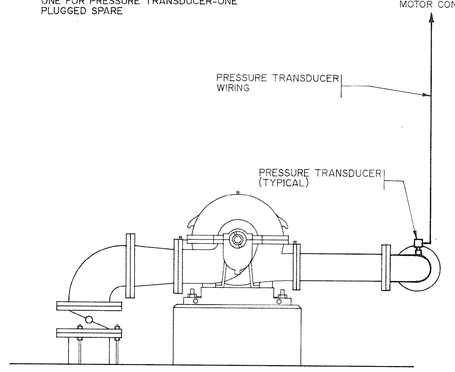


2 / 16 | 17 PUMP PRIMING SYSTEM
SCALE: 1/2" = 1'-0"

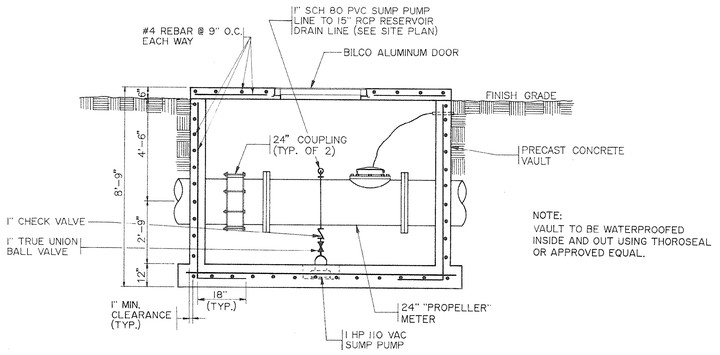


PLAN VIEWS

SUPPLY 2 - 1" NPT FEMALE TAPS- ONE FOR PRESSURE TRANSDUCER-ONE PLUGGED SPARE

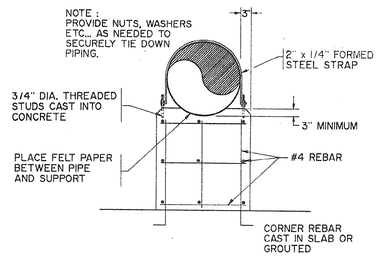


PUMP CONTROL SCHEMATIC
NTS



NOTE:
VAULT TO BE WATERPROOFED INSIDE AND OUT USING THOROSEAL OR APPROVED EQUAL.

1 / 16 | 17 METER VAULT DETAILS
SCALE: 3/8" = 1'-0"



4 / 16 | 17 CONC. PIPE CRADLE AND STRAP DETAIL
N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14402 GRADY T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 17003 DONALD W. McGOUGHAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

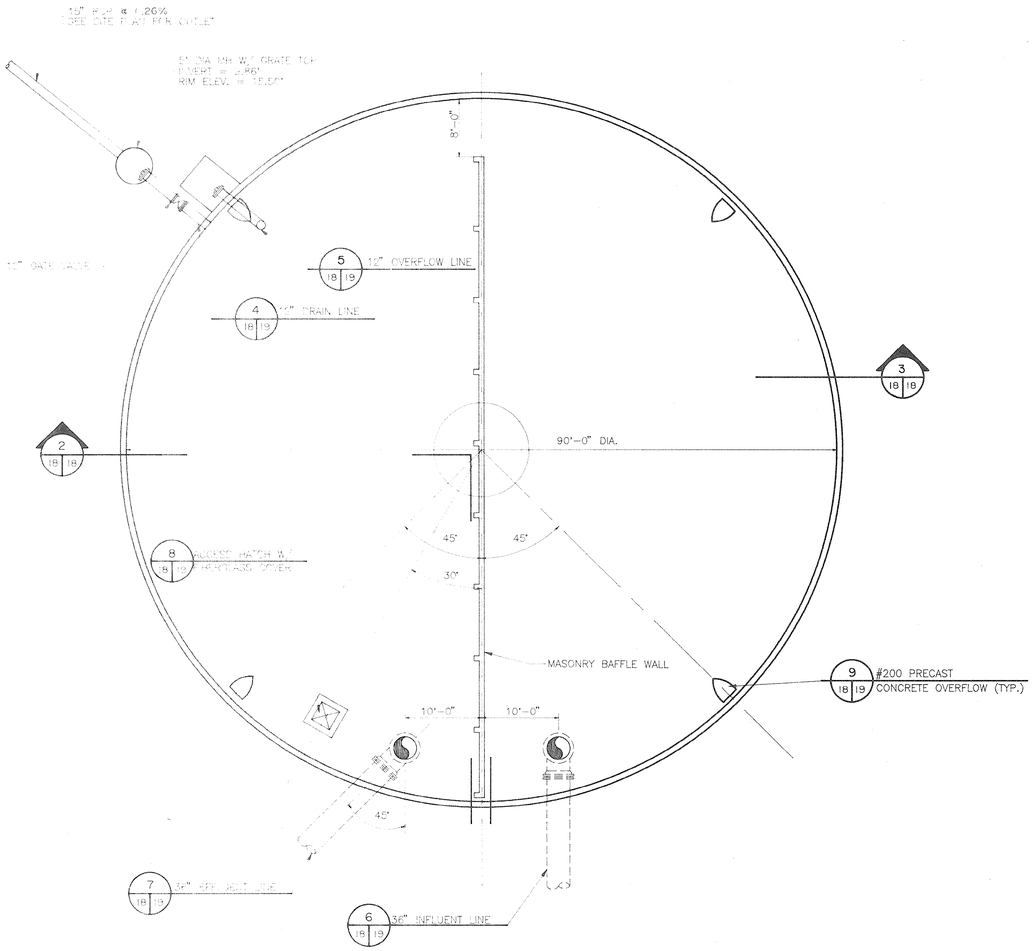
FINISHED PUMP STATION DETAILS

DATE:	NOV., 1989
DESIGNED:	RSH
DRAWN:	DC
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	EN-17
OF:	

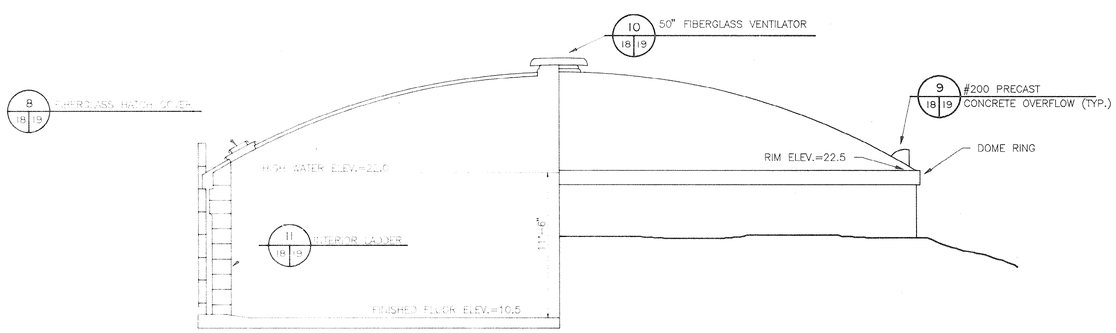
GS8805

33-011-039

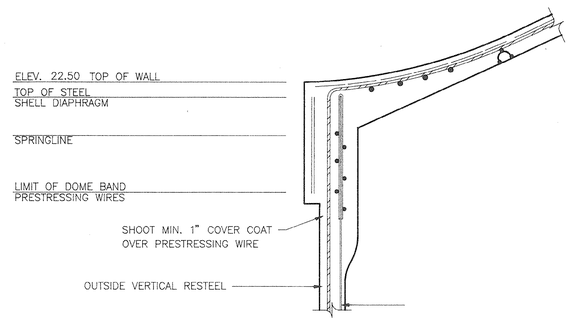
SOUTHERN PHOTO - GREENSBORO NC/148



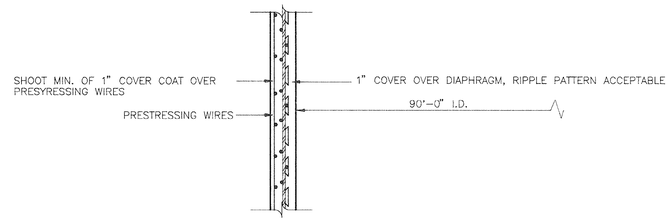
1 16|18 500,000 GALLON CLEARWELL – PLAN
NTS



2 18|18 500,000 GALLON CLEARWELL – SECTION
NTS



3 18|18 DOME RING DETAIL
NTS



3 18|18 HORIZONTAL WALL SECTION
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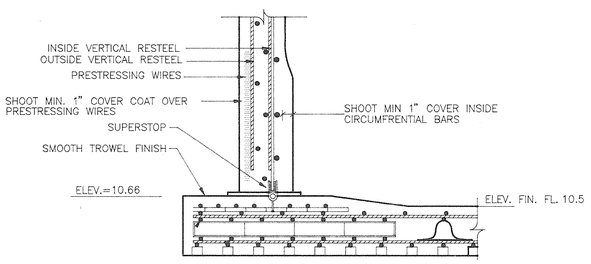


3 18|18 FLOOR–WALL DETAIL
NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM
	REVISED	2-13-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

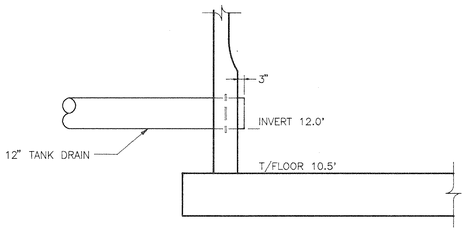
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGAN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

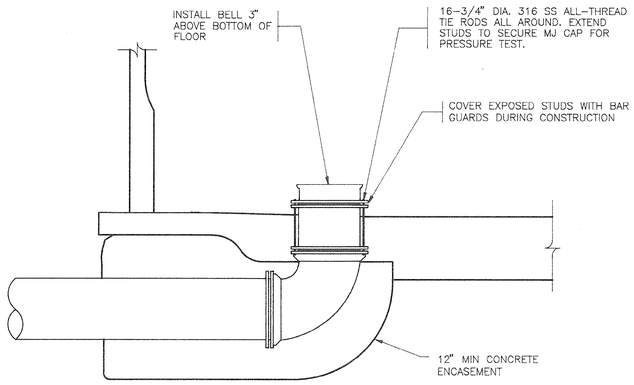
500,000 GALLON CLEARWELL PLAN AND SECTIONS

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-18
OF:

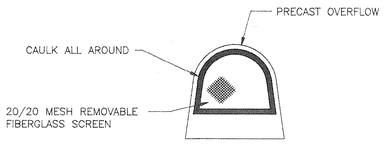
33-011-040



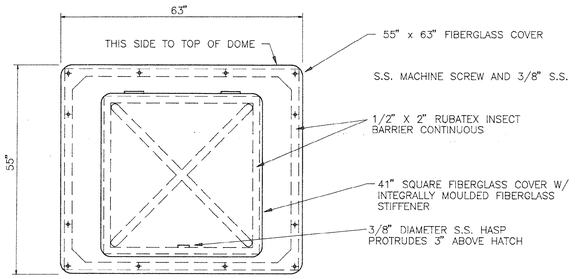
4 | 18 | 19 12" DIP DRAIN
NTS



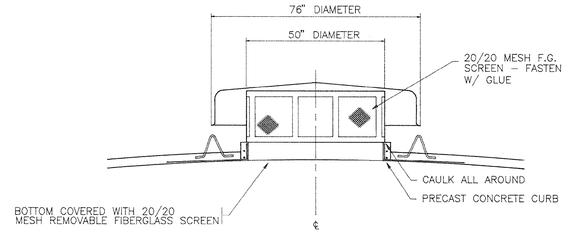
6 | 18 | 19 36" INFLUENT
NTS



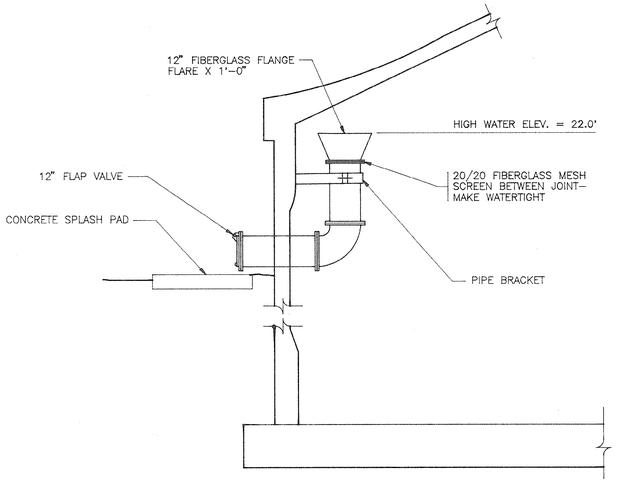
9 | 18 | 19 OVERFLOW DETAIL
NTS



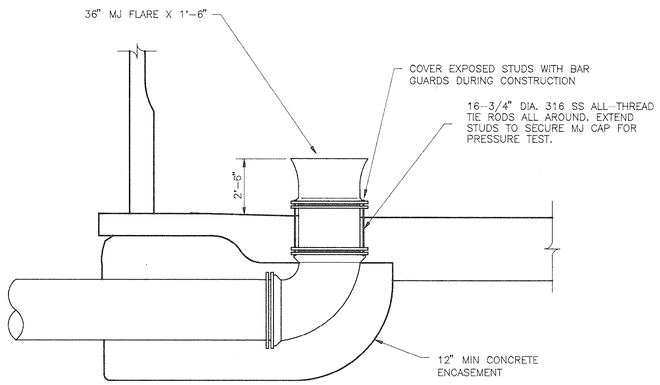
8 | 18 | 19 FIBERGLASS HATCH COVER
NTS



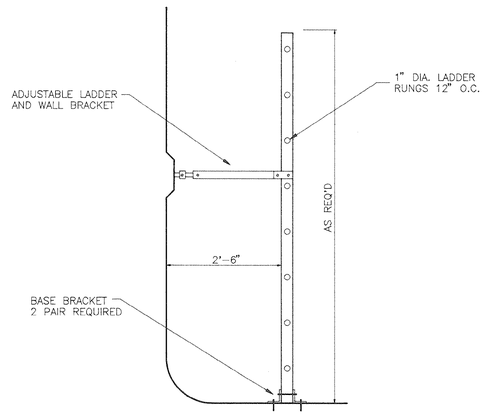
10 | 18 | 19 50" FIBERGLASS VENTILATOR
NTS



5 | 18 | 19 12" DIP OVERFLOW
NTS



7 | 18 | 19 36" EFFLUENT
NTS



11 | 18 | 19 INTERIOR FIBERGLASS LADDER
NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM
	REVISED	2-13-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGIN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

500,000 GALLON CLEARWELL DETAILS
33-011-041

DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-19
OF: ____

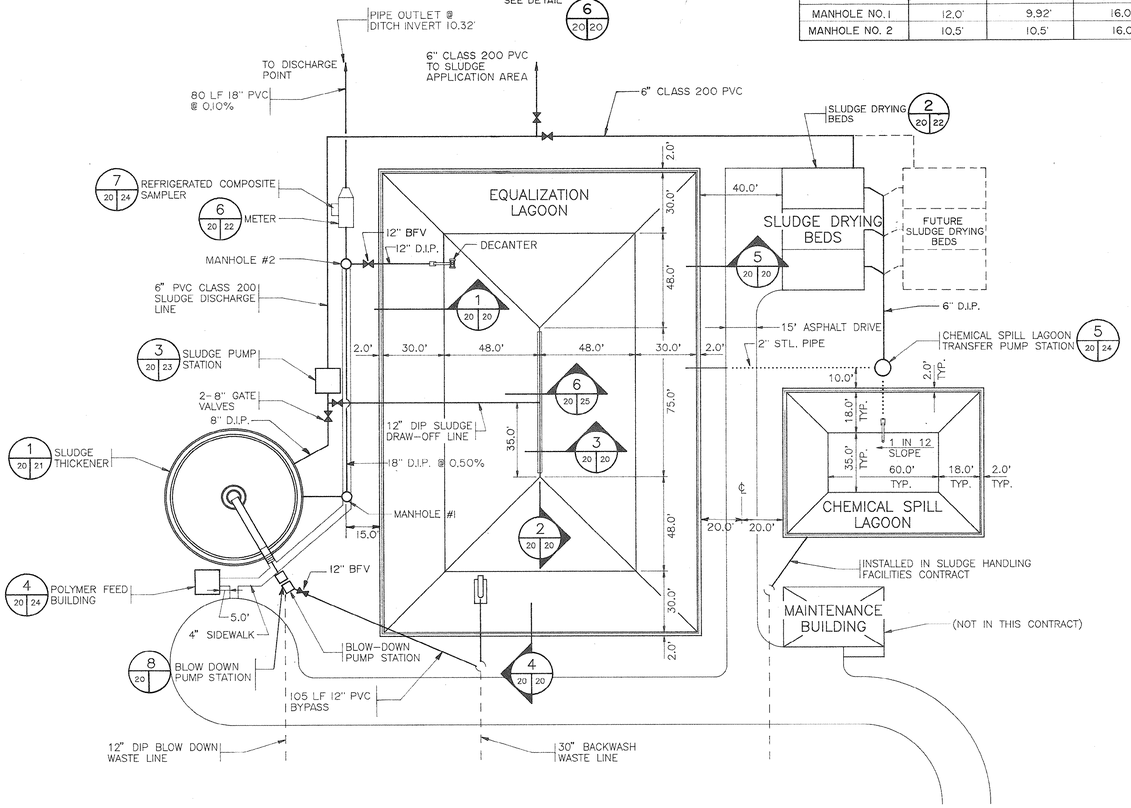
SOUTHERN PHOTO - GREENSBORO N.C.P.M.

NOTE :

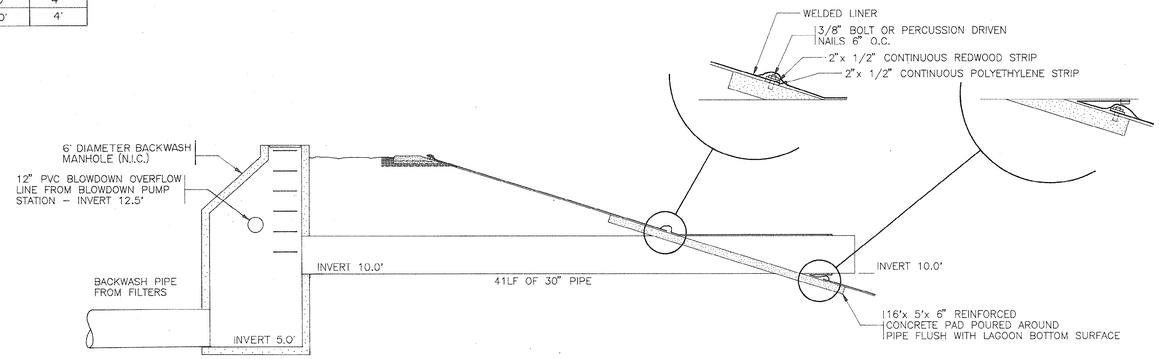
CONSTRUCT CONCRETE HEADWALL AT OUTLET OF PIPE. SEE DETAIL 6 (20|20)

MANHOLE SCHEDULE

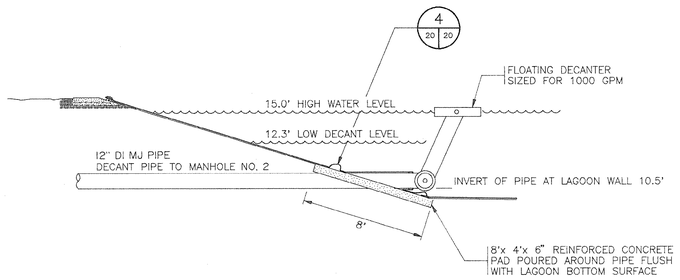
MANHOLE NO.	INVERT IN	INVERT OUT	RIM ELEV.	DIA.
MANHOLE NO. 1	12.0'	9.92'	16.0'	4'
MANHOLE NO. 2	10.5'	10.5'	16.0'	4'



ALUM SLUDGE FACILITIES – REVISED LAYOUT PLAN
SCALE: 1" = 30'

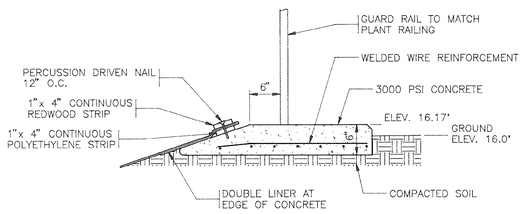


4 (20|20) BACKWASH PIPING TO LAGOON DETAIL
NTS

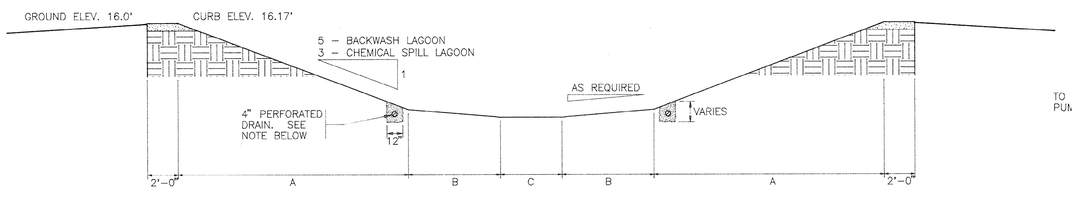


1 (20|20) LAGOON DECANT AND THICKENER EFFLUENT PIPING DETAIL
SCALE: 1/4" = 1'-0"

NOTE:
HAND RAILS WILL BE INSTALLED AROUND THE LAGOONS UNDER THE SLUDGE HANDLING FACILITY CONTRACT.



5 (20|20) LAGOON PERIMETER AND LINER ATTACHMENT DETAIL (TYPICAL)
SCALE: 1" = 1'-0"



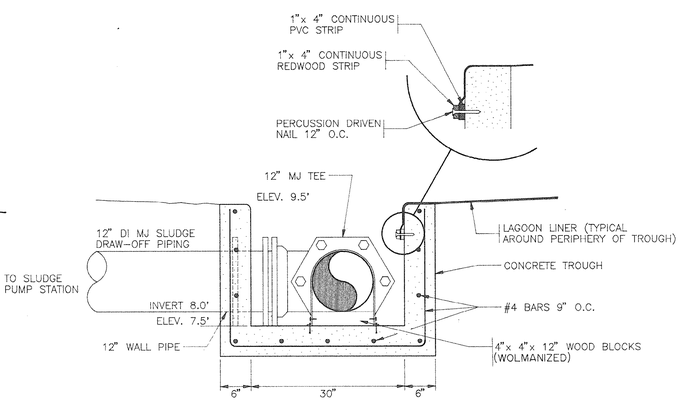
NOTE:
LINE THE EQUALIZATION AND CHEMICAL SPILL LAGOON WITH 8" OF GRANULAR FILL PRIOR TO PLACEMENT OF FABRIC.

NOTE – SEE LAYOUT PLAN

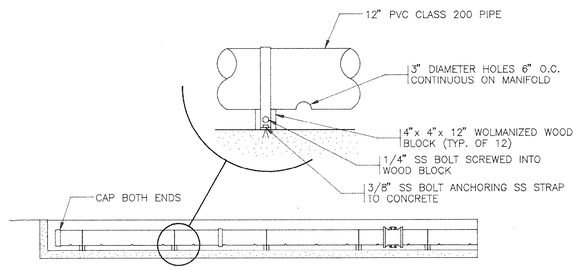
TYPICAL LAGOON CROSS SECTION
SCALE: 1/4" = 1'-0"

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.

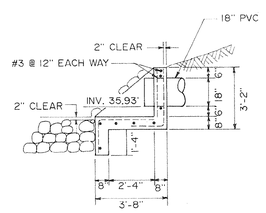
LAGOON DIMENSION TABLE				
	A	B	C	BOTTOM ELEVATION
MAIN SLUDGE LAGOON				
LONG AXIS	30'	48'	75'	9.5'
SHORT AXIS	30'	48'	N/A	9.5'
CHEMICAL SPILL LAGOON				
LONG AXIS	18'	N/A	60'	10.16'
SHORT AXIS	18'	N/A	35'	10.16'

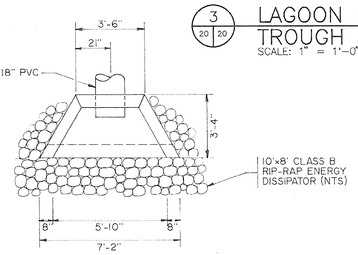


3 (20|20) LAGOON SLUDGE DRAW-OFF TROUGH AND PIPING DETAIL
SCALE: 1" = 1'-0"



2 (20|20) SLUDGE DRAW-OFF MANIFOLD
SCALE: 1/4" = 1'-0"





6 (20|20) HEADWALL DETAIL
N.T.S.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM
	REVISED	8-1-90	JWM
	REVISED	8-21-90	RKK
	REVISED	9-6-90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGAN 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 11227 DAVID T. UPCHURCH 12-1-90

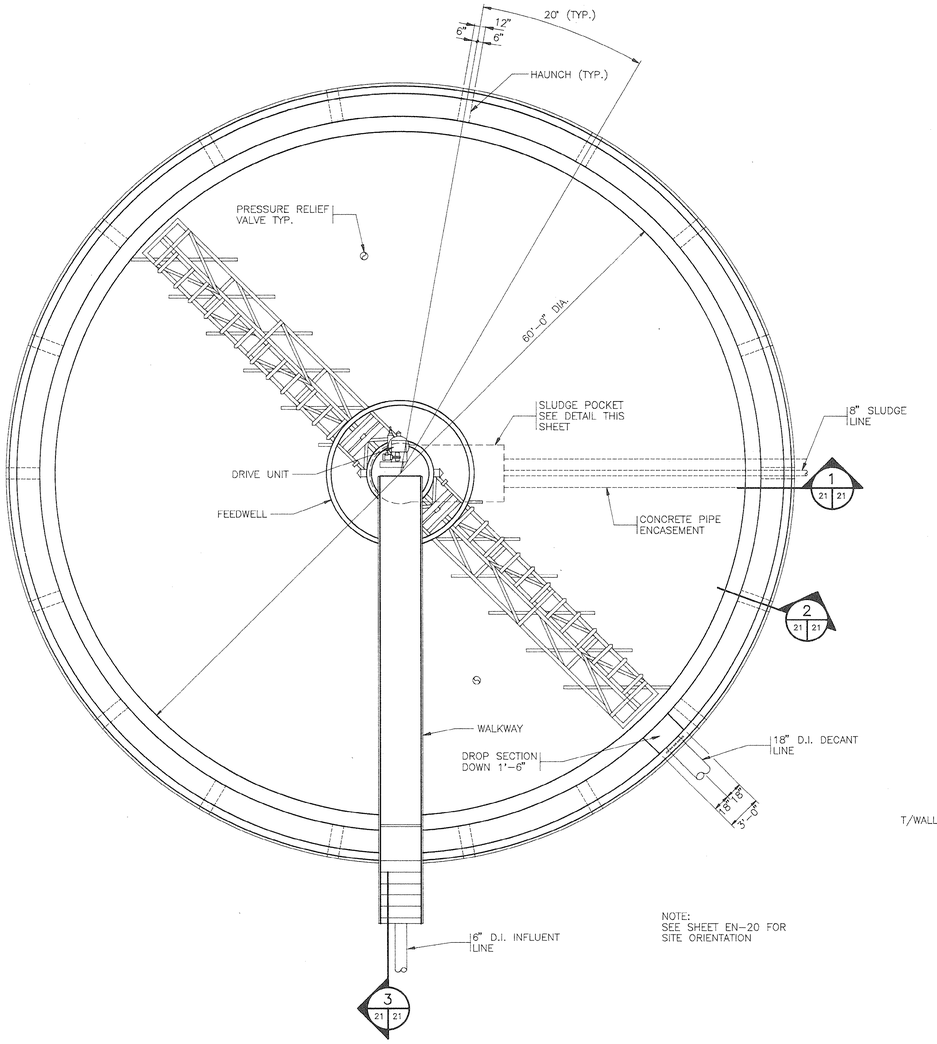
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

ALUM SLUDGE FACILITIES PLAN AND DETAILS

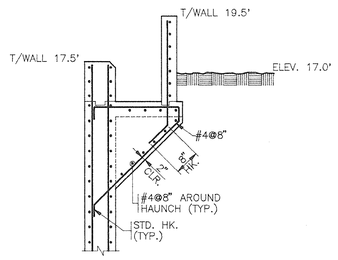
DATE: NOV. 1989
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-20
OF: 26

PROJECT #: GS8802 FILE NAME: 1&3.DWG DATE: 8-1-90 SCALE: 1/4"=1'-0"

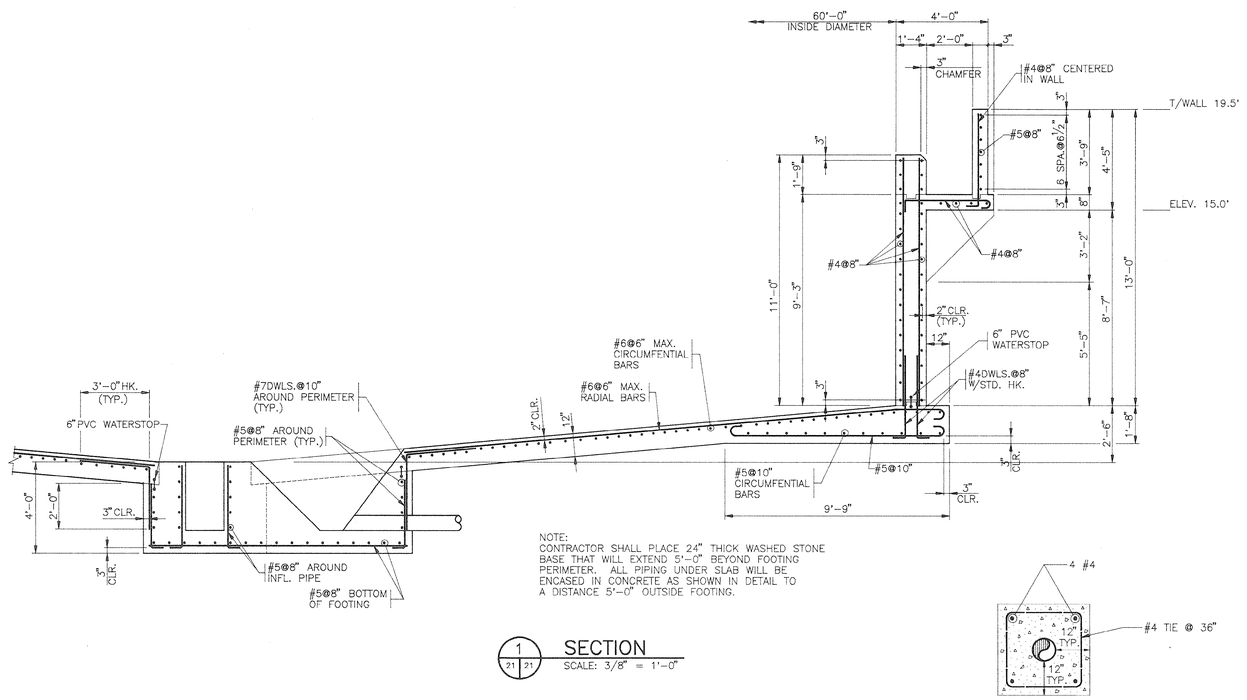
33-011-042



1 / 20 21 PLAN – SLUDGE THICKENER
SCALE: 3/16" = 1'-0"

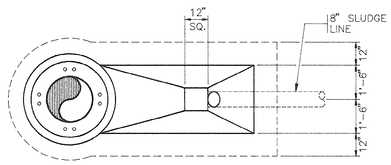


2 / 21 21 SECTION THRU HAUNCH
SCALE: 3/8" = 1'-0"

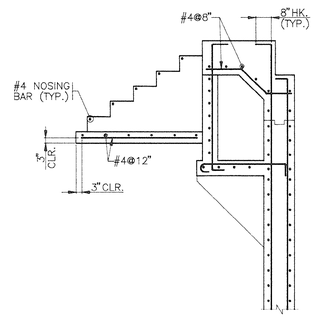


1 / 21 21 SECTION
SCALE: 3/8" = 1'-0"

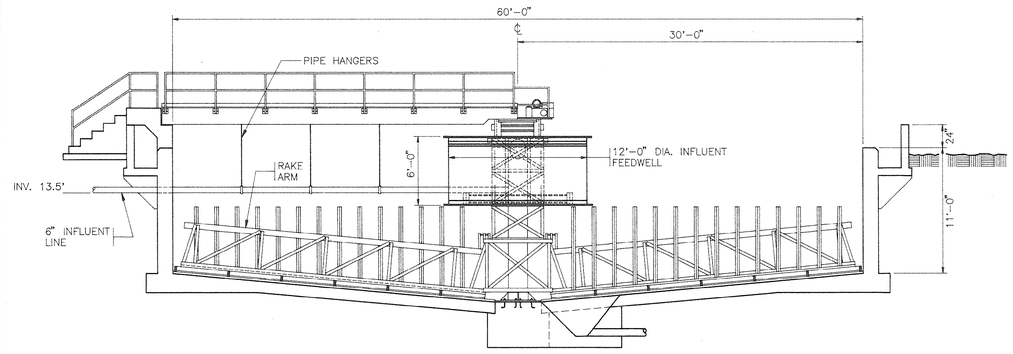
PIPE ENCASEMENT DETAIL
N.T.S.



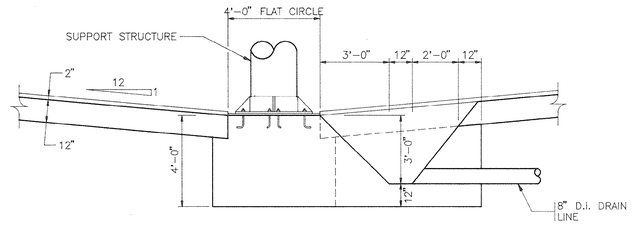
PLAN–SLUDGE POCKET
SCALE: 3/8" = 1'-0"



3 / 21 21 SECTION THRU STAIR
SCALE: 3/8" = 1'-0"



ILLUSTRATIVE SECTION
SCALE: 3/16" = 1'-0"



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

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGIN 8-1-90

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12387 DAVID T. UPCHURCH 8-1-90

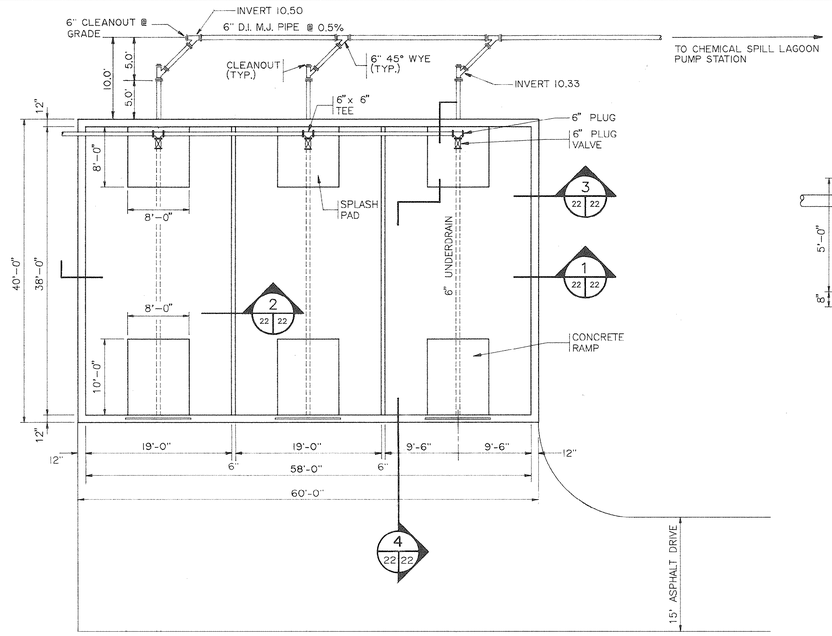
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

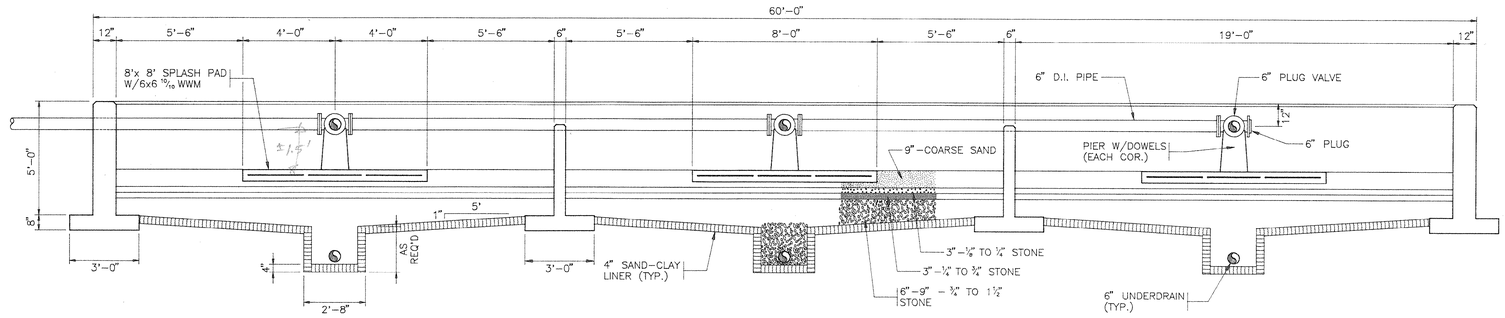
SLUDGE THICKENER PLAN AND SECTIONS

DATE:	8-1-90
DESIGNED:	JWM
DRAWN:	DC
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	EN-21
OF:	26

PROJECT #: GS8802 FILE NAME: EN27.DWG DATE: 8-1-90 SCALE: 3/16"=1'-0"

33-011-043

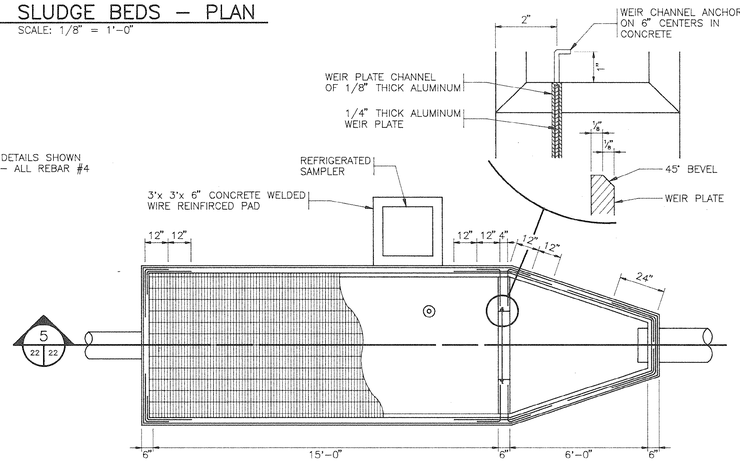




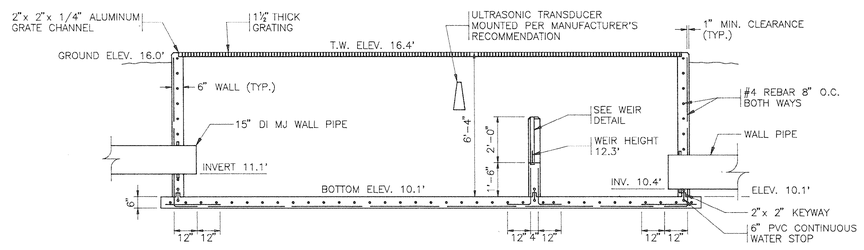
1 / 22 22 SECTION
SCALE: 3/8" = 1'-0"

2 / 20 22 SLUDGE BEDS — PLAN
SCALE: 1/8" = 1'-0"

REINFORCING DETAILS SHOWN ARE TYPICAL — ALL REBAR #4

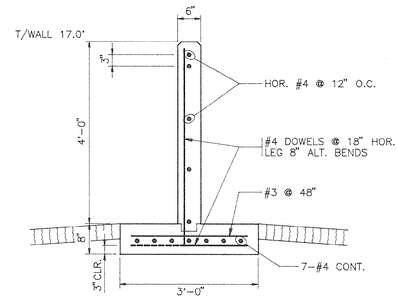


6 / 20 22 WEIR BOX FOR FLOW MEASUREMENT PLAN VIEW
SCALE: 3/8" = 1'-0"

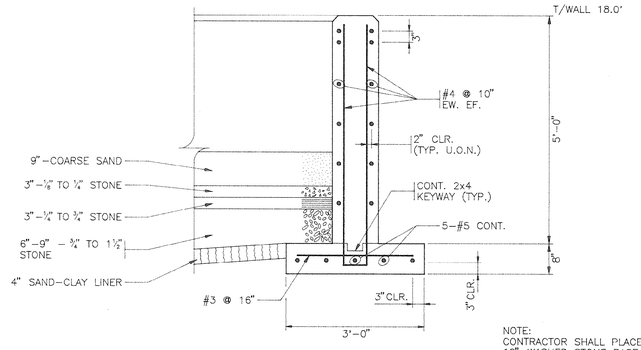


5 / 22 22 WEIR BOX FOR FLOW MEASUREMENT SECTION VIEW
SCALE: 3/8" = 1'-0"

NOTE:
CONTRACTOR SHALL PLACE 12" WASHED STONE BASE UNDER STRUCTURE, EXTENDING 12" BEYOND FOOTING PERIMETER.



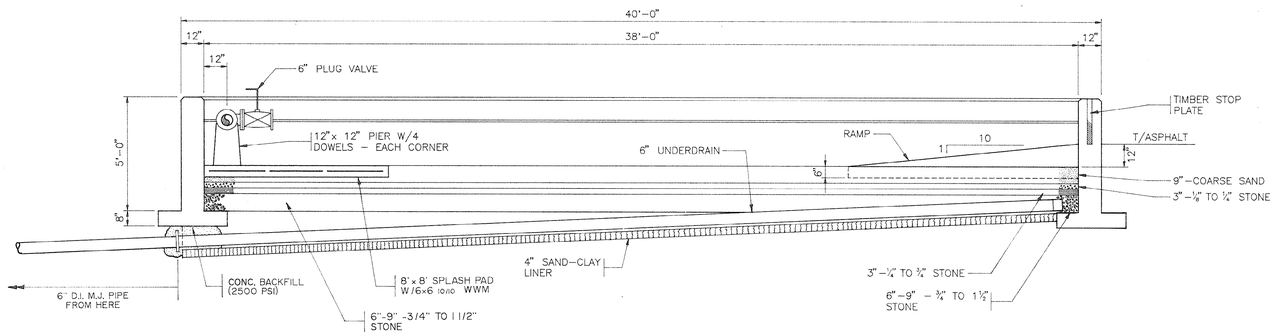
2 / 22 22 SECTION
SCALE: 3/4" = 1'-0"



3 / 22 22 SECTION
SCALE: 3/4" = 1'-0"

NOTE:
CONTRACTOR SHALL PLACE 12" WASHED STONE BASE UNDER FOOTINGS, EXTENDING 12" OUTSIDE FOOTING PERIMETER.

NOTE: CONTRACTOR MAY SUBSTITUTE 2" MUD SEAL (3000PSI) FOR 4" SAND CLAY LINER.



4 / 22 22 SECTION
SCALE: 3/8" = 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REVISED	8/21/90	JWM

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGIN 8-1-90

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12227 DAVID T. UPCHURCH 8-1-90

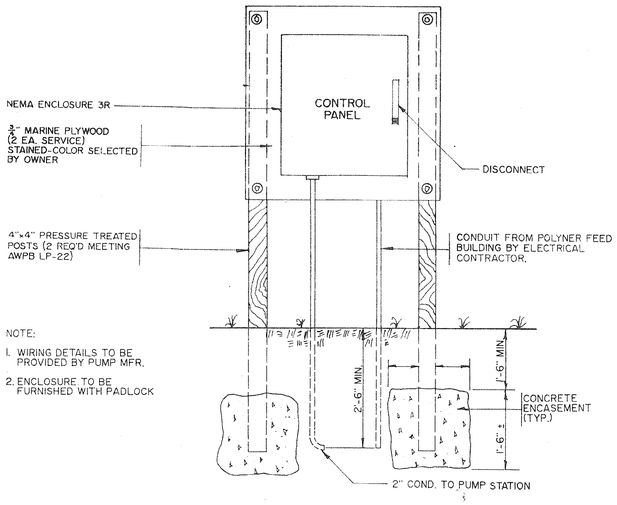
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

SLUDGE DRYING BEDS SECTIONS AND DETAILS

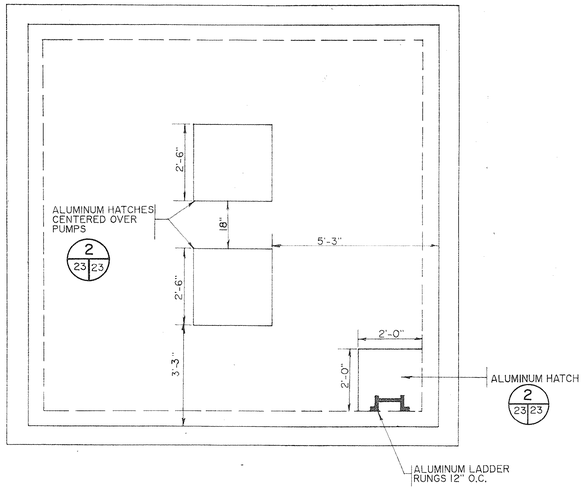
DATE: 8-1-90
DESIGNED: JWM
DRAWN: DC
CHECKED: DTU
SCALE: AS SHOWN
SHEET NO. EN-22
OF: 26

PROJECT #: 0588902 FILE NAME: EN26.DWG DATE: 8-1-90 SCALE: 1/8"=1'-0"

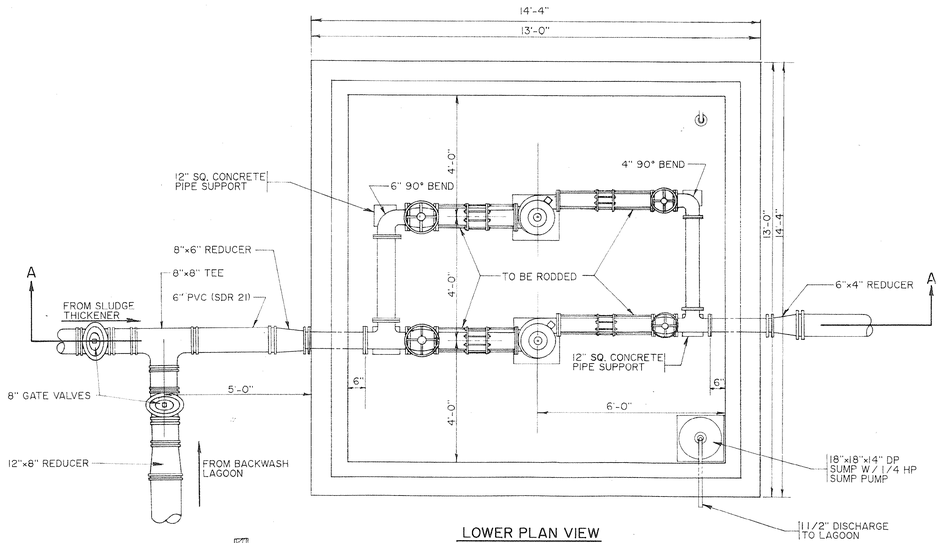
33-011-044



1 / 23 23 ELECTRICAL SERVICE DETAIL

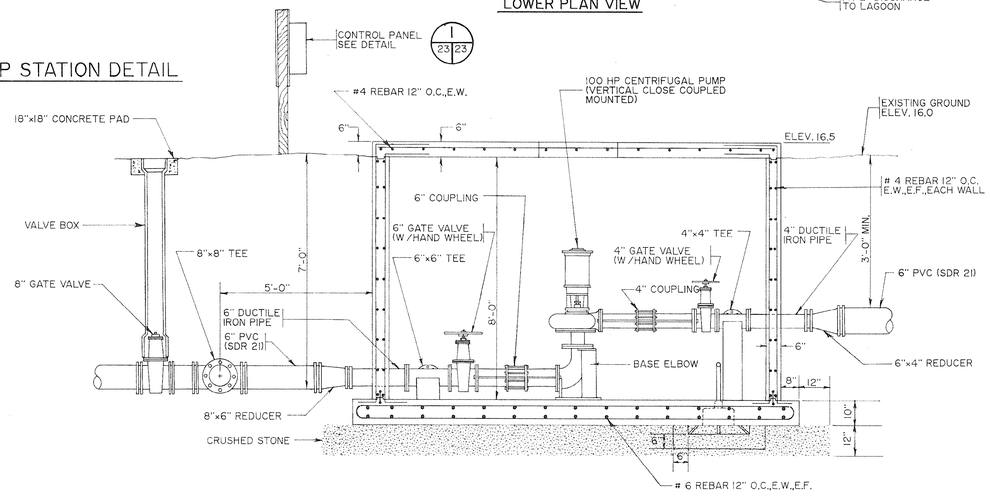


UPPER PLAN VIEW

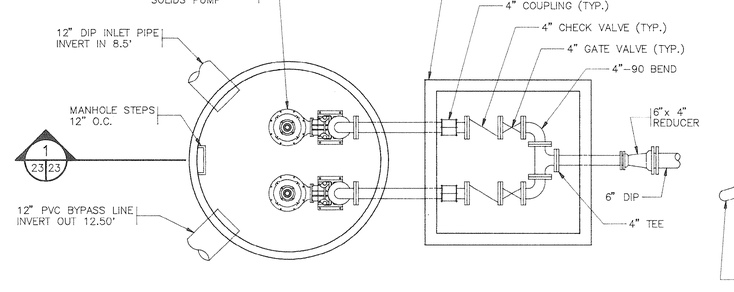


LOWER PLAN VIEW

3 / 20 23 PUMP STATION DETAIL

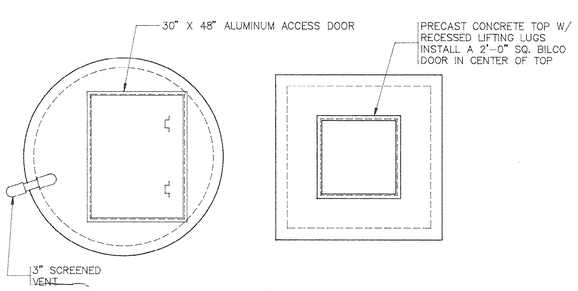


SECTION A-A



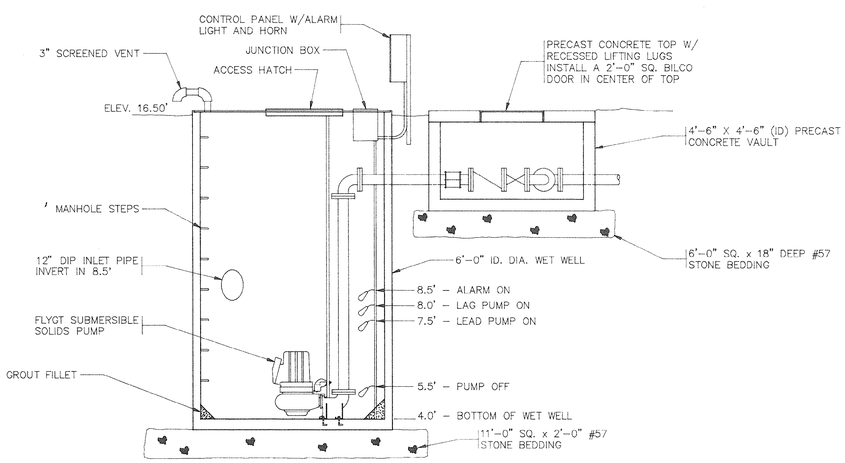
SLUDGE BLOW-DOWN PUMP STATION

NTS



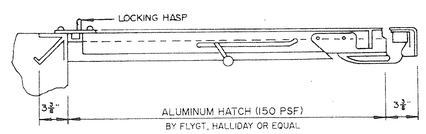
PUMP STATION TOP – PLAN VIEW

NTS



1 / 23 23 SECTION

NTS



2 / 23 23 HATCH DETAIL

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	CHANGED PUMP STATION ONE PUMP TO TWO	8-27-90	CKT

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

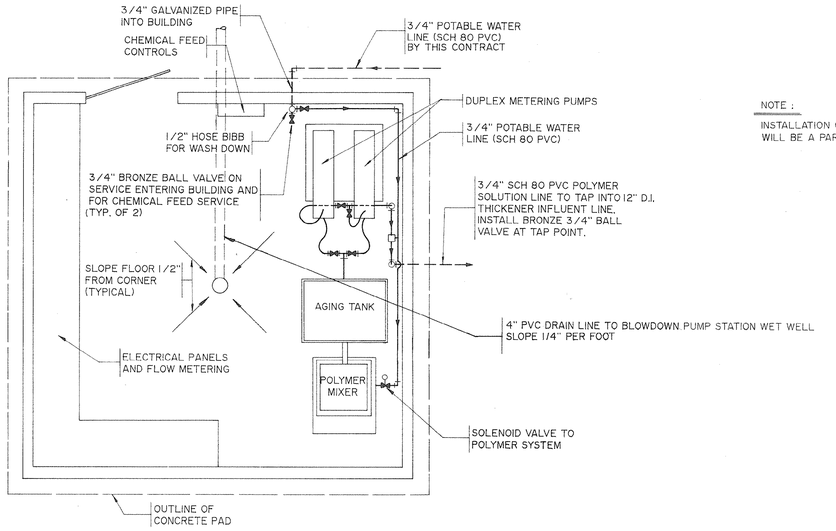
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

THICKENED SLUDGE PUMP STATION

DATE: AUG. 1990
DESIGNED: ETW
DRAWN: CKT
CHECKED: JWM
SCALE: AS SHOWN
SHEET NO. EN-23
OF: 26

33-011-045

SOUTHERN PHOTO - GREENSBORO N.C.

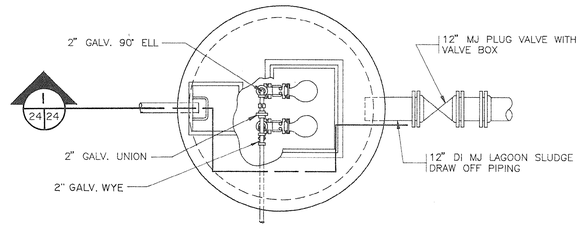


NOTE :

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

4/20|24 POLYMER BUILDING - PLAN VIEW

SCALE: 1/2" = 1'-0"



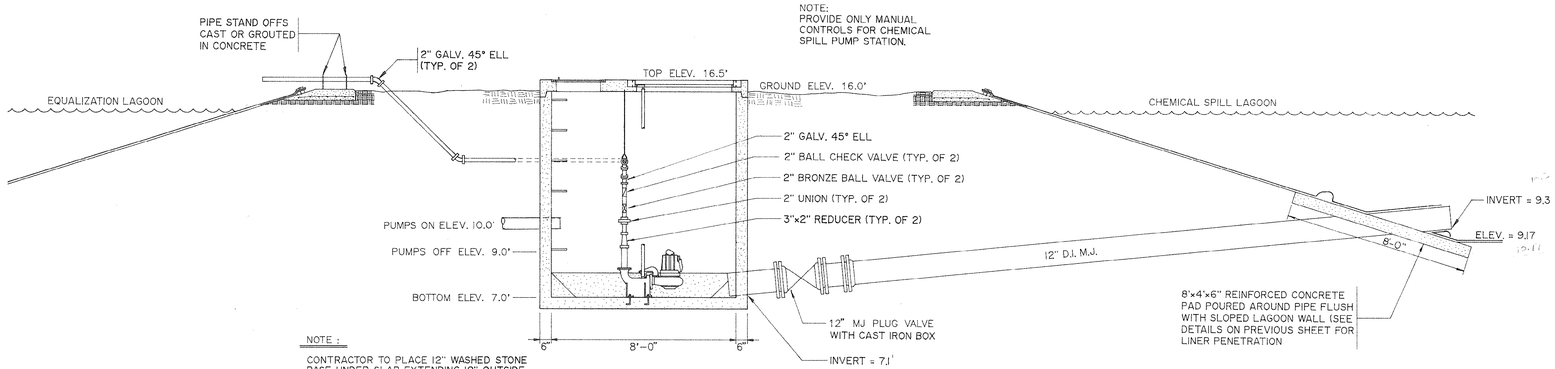
5/20|24 CHEMICAL SPILL LAGOON DRAW-OFF PUMP STATION - PLAN VIEW

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

NOTE:

INSTALLATION OF INLET PIPE (8" D.I.) INTO CHEMICAL SPILL LAGOON SHALL BE SIMILAR TO DETAIL 4/20|20

INVERT IN SHALL BE 12.75'

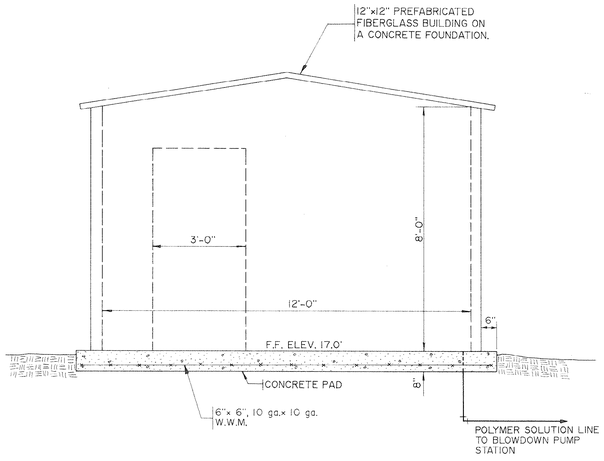


NOTE :

CONTRACTOR TO PLACE 12" WASHED STONE BASE UNDER SLAB EXTENDING 12" OUTSIDE WET WELL PERIMETER.

1/24|24 CHEMICAL SPILL LAGOON DRAW-OFF PUMP STATION - SECTION VIEW

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

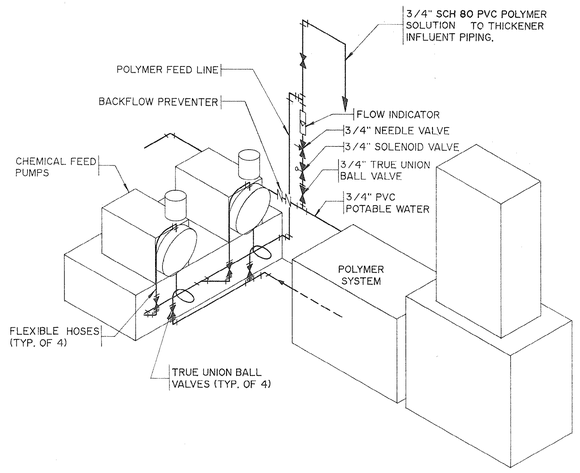


POLYMER BUILDING - SOUTH ELEVATION

SCALE: 1/2" = 1'-0"

NOTE :

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

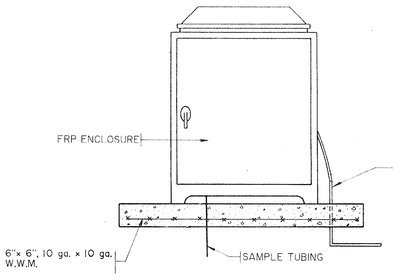


SLUDGE THICKENER POLYMER FEED SCHEMATIC

N.T.S.

NOTE :

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



NOTE :

SAMPLER FURNISHED BY OWNER, INSTALLED BY CONTRACTOR.

7/20|24 REFRIGERATED SAMPLER

N.T.S.

REVISIONS			
SYM.	REVIS DESCRIPTION	DATE	BY
	REVISED	2-6-90	JWM
	CHANGED LOCATION OF 4" PVC DRAIN LINE	7-30-90	CKT

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12035 GREGORY T. UPCHURCH 12-1-89

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12035 JOSEPH W. McGOUGAN 12-1-89

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-24
OF: 26

SOUTHERN PHOTO - GREENSBORO

33-011-046

1920

900

Rdwy

N

11.00'

1015'

N 09°55'11" E 1124.90'

PROPERTY LINE

915'

N 18°41'38" E 363.98'

EDGE OF DITCH BOUNDARY

N 12°29'35" E 670.70'

REMOVE EXISTING CULVERT

60'

MW # 4

50'

REGRADE THIS AREA TO SLOPE TO DITCH

MW # 3

MW # 2

S 79°56'27" E 336.17'

10.0'

PUMP STATION

REGRADE DITCH BANKS TO PROVIDE SURFACE DRAINAGE

6" PLUG

6"x6" TEE WITH 36"x6" RISER CONNECTION (TYP.) PROVIDE VALVE OPENING ELBOW WITH CLAMP-LOC-RING

35'

GUN CART (TYPICAL)

2-6" GATE VALVES

EQUALIZATION LAGOON

6" SDR 21 PVC PIPE (TYPICAL)

PROVIDE 4' OF COVER OVER THIS MAIN

1130LF 6" SDR 21 PVC WATER MAIN

260LF 6" SDR 21 PVC WATER MAIN

295'

6"x6" TEE 3-6" GATE VALVES

9.0'

EDGE OF DITCH BOUNDARY

SLUDGE DRYING BEDS

0.35 % SLOPE

270LF 6" SDR 21 VC WATER MAIN

295'

INVERT 8.00'

MW #1

MW #5

S 80°22'50" E 663.14'

EXISTING 36" CULVERT

EXISTING SOIL ROAD

6" PLUG

EXISTING SOIL ROAD

SPRAY FIELD BOUNDARY ADJACENT PROPERTY OWNER-GSW&SA

155'

160' (TYPICAL)

S 12°16'50" W 295.39'

SEE SHEET G-6

SPRAY FIELD BOUNDARY ADJACENT PROPERTY OWNER-GSW&SA

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.

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 MOTOGRADER, "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.

REVISIONS			
SYM.	DESCRIPTION	DATE	BY
	REMOVED LAGOONS & PUMP STATION	5-23-90	CKT
	REROUTED IRRIGATION INLET PIPE	5-23-90	CKT
	EXTENDED GUNCART PATTERN	5-23-90	CKT
	REROUTED PROPOSED 20' ACCESS ROAD	5-23-90	CKT
	REVISED GUNCART 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	JHR
	REVISED LOCATION OF MONITORING WELL # 1	1-16-91	CKT
	REVISED LOCATION OF MONITORING WELL #1 & #5	3-21-91	JWP

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 12224 DAVID T. UPCHURCH 2-1-89

SOUTH CAROLINA REGISTERED LAND SURVEYOR No. 12748 ERIC T. WEATHERLY 12-15-89

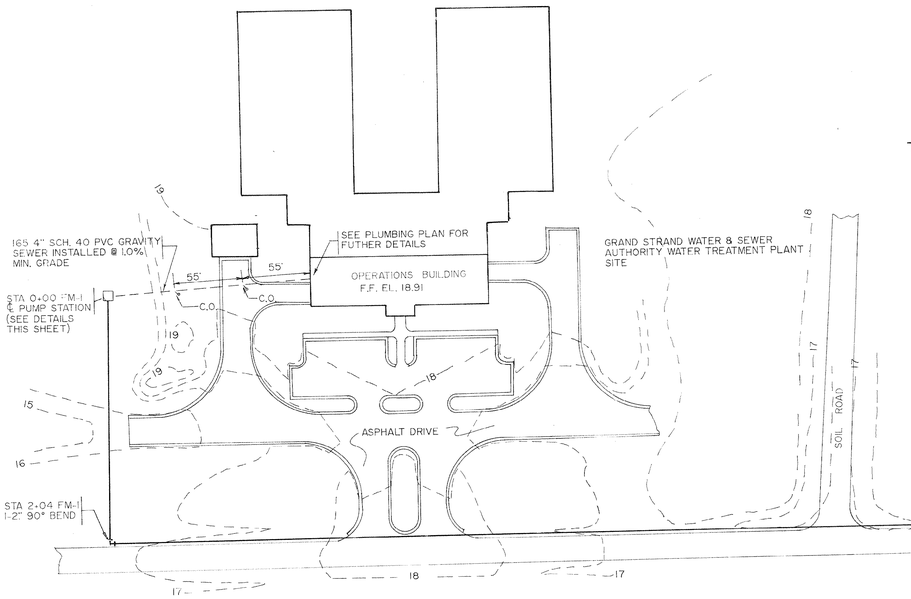
SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

SLUDGE LAND APPLICATION SITE PLAN

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

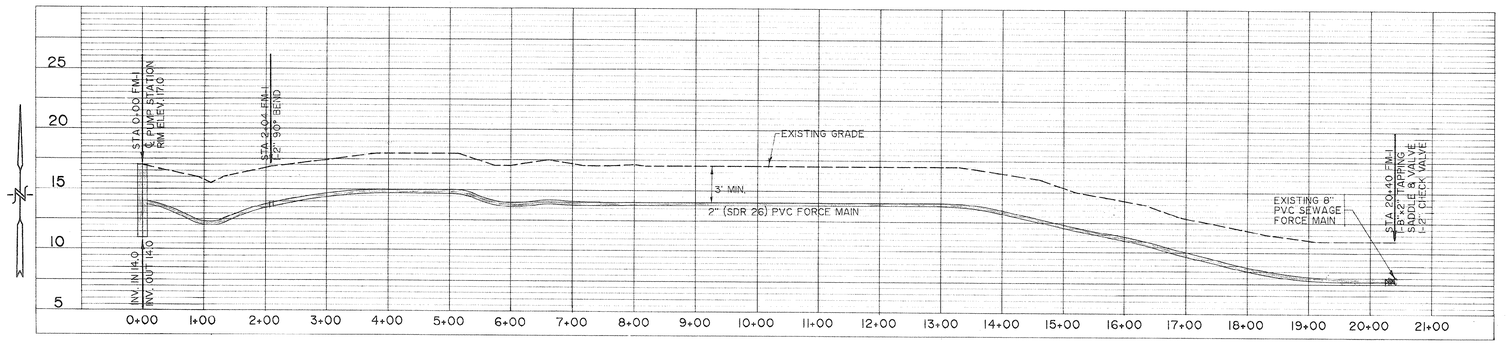
33-011-047

SOUTHERN PHOTO - GEORGIA



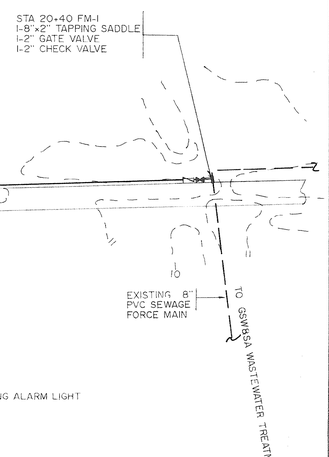
SITE PLAN

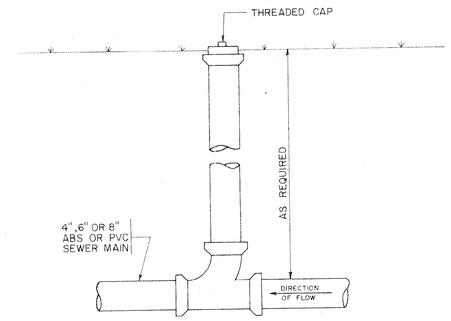
SCALE 1"=50'



FORCE MAIN PROFILE

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





CLEAN OUT DETAIL

NTS

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 PIPE 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.

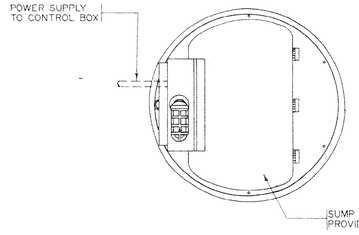
3.) SEWER FORCE MAIN SHALL BE INSTALLED WITH A MINIMUM OF 3'-0" COVER.

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

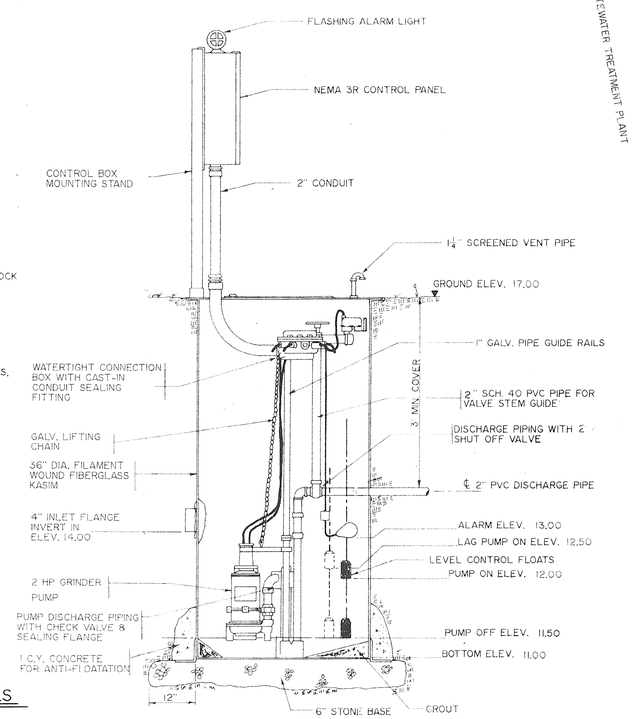
DESIGN DATA

1. USE 2 HP DUPLEX PUMP SYSTEM WITH 2" SDR 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 SPECIFIED 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, 3500 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 WATER ALARM SYSTEM (LIGHT AND AUDIBLE ALARM), PUMP 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 NEMA 3R 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.



DUPLEX PUMP STATION DETAILS

NTS

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

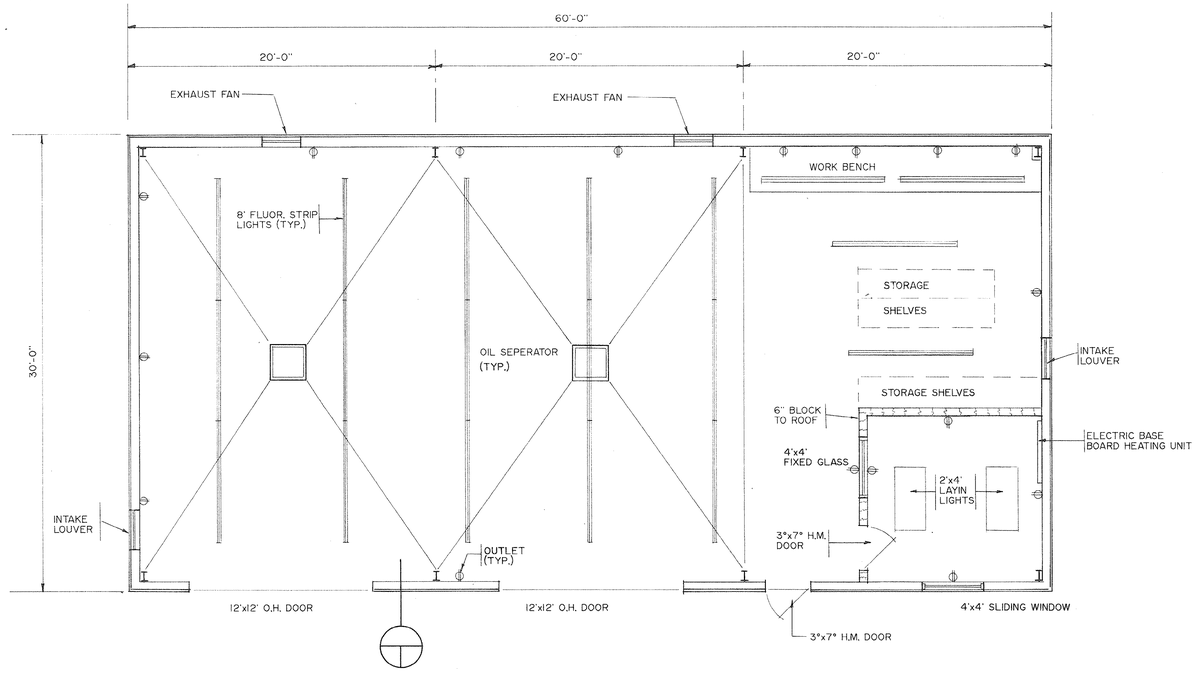
HOBBS, UPCHURCH & ASSOCIATES, P.A.
CONSULTING ENGINEERS
SOUTHERN PINES, NORTH CAROLINA 28387

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

DOMESTIC WASTE
PUMP STATION & FORCE MAIN

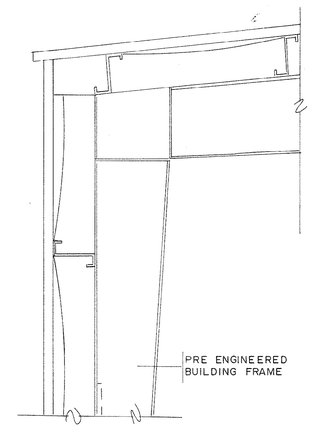
DATE: NOV. 1989
DESIGNED: ETW
DRAWN: PSW
CHECKED: JWM
SCALE: AS SHOWN
SHEET NO. EN-26
OF:

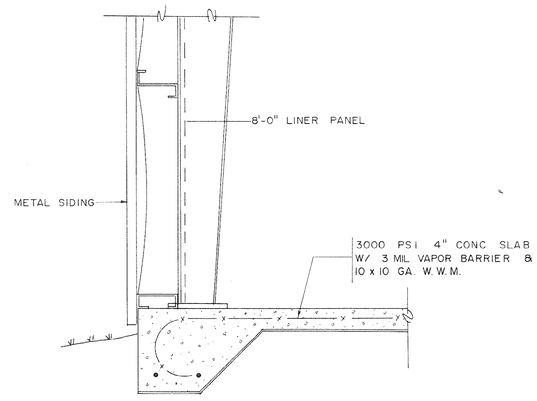
33-011-048



FLOOR PLAN

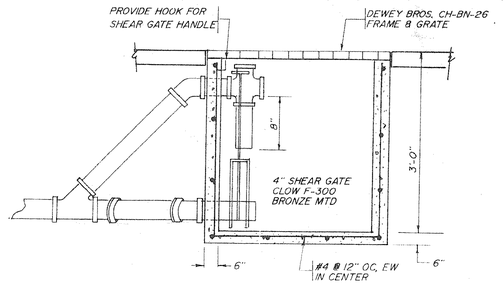
1/4" = 1'-0"





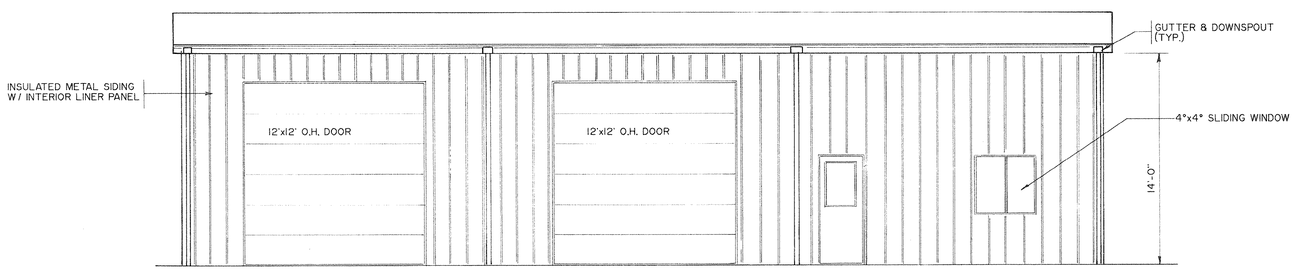
WALL SECTION

1" = 1'-0"



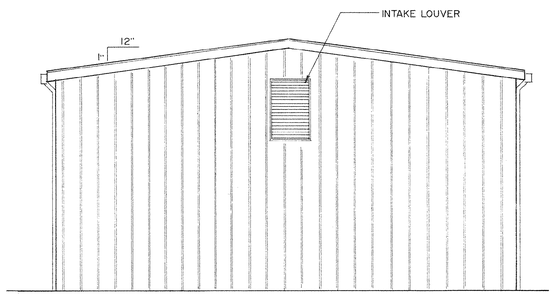
GREASE & GRAVEL TRAP DETAIL

NTS



FRONT ELEVATION

1/4" = 1'-0"



RIGHT SIDE ELEVATION

1/4" = 1'-0"

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 12235 DAVID T. UPCHURCH 12-1-89

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 12335 JOSEPH W. McGOUGHN 12-1-89

SURFACE WATER TREATMENT PLANT
GRAND STRAND WATER AND SEWER AUTHORITY

MAINTENANCE BUILDING PLAN AND SECTIONS

DATE:	NOV.1989
DESIGNED:	PSW
DRAWN:	PSW
CHECKED:	DTU
SCALE:	AS SHOWN
SHEET NO.	EN-27
OF:	

33-011-049