CONSTRUCTION PLANS
FOR
WASTEWATER SYSTEM IMPROVEMENTS

HARRIMAN UTILITY BOARD
HARRIMAN, TENNESSEE
WASTEWATER TREATMENT PLANT UPGRADE

CONTRACT S02-01

SEPTEMBER, 2002

GRW Elrod Dunson, Inc.

Engineers, Architects, Planners

404 BNA Drive, Suite 201 NASHVILLE, TN 37217
PH. (615)366-1600 FAX (615)366-0406

LEXINGTON LOUISVILLE NASHVILLE KNOXVILLE INDIANAPOLIS

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER AGRICULTURE NO. 012845 STATE OF TENNESSEE

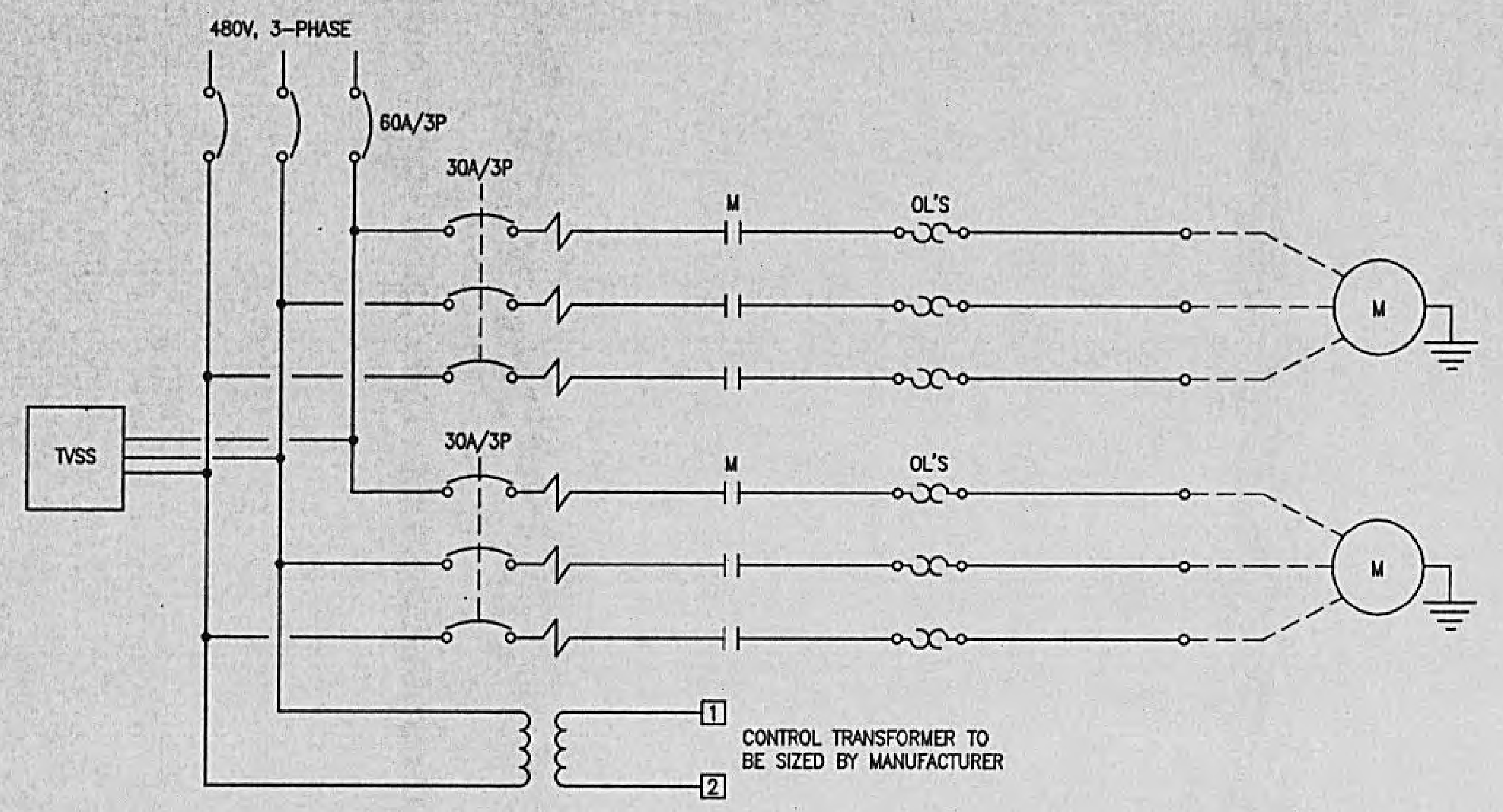
9-30-02

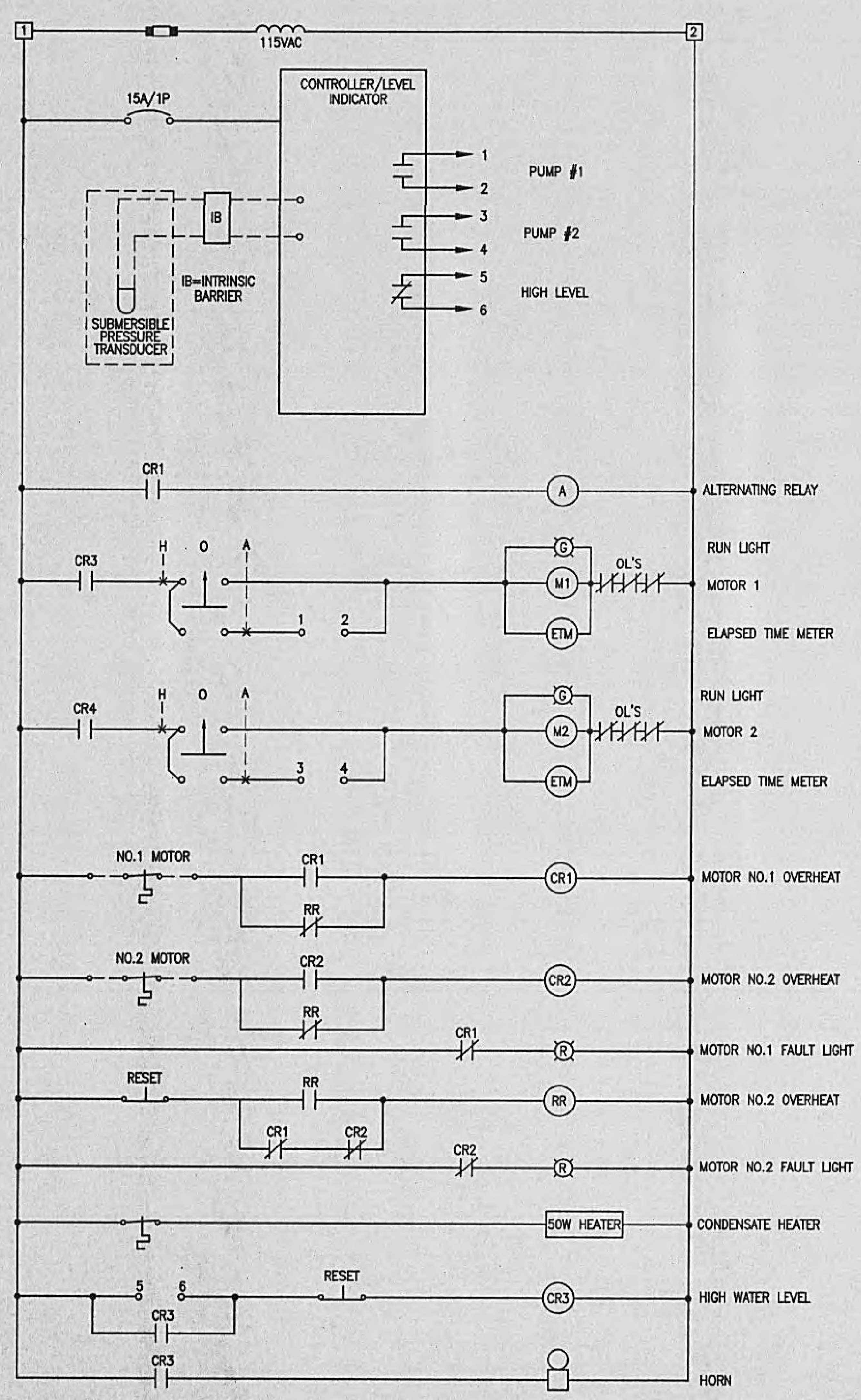
Accepted By: Charles B. Hope
Title: MANAGER
For: HARRIMAN UTILITY BOARD
Date: 9/30/02

PROJECT NO. 7601-10

SET NO.

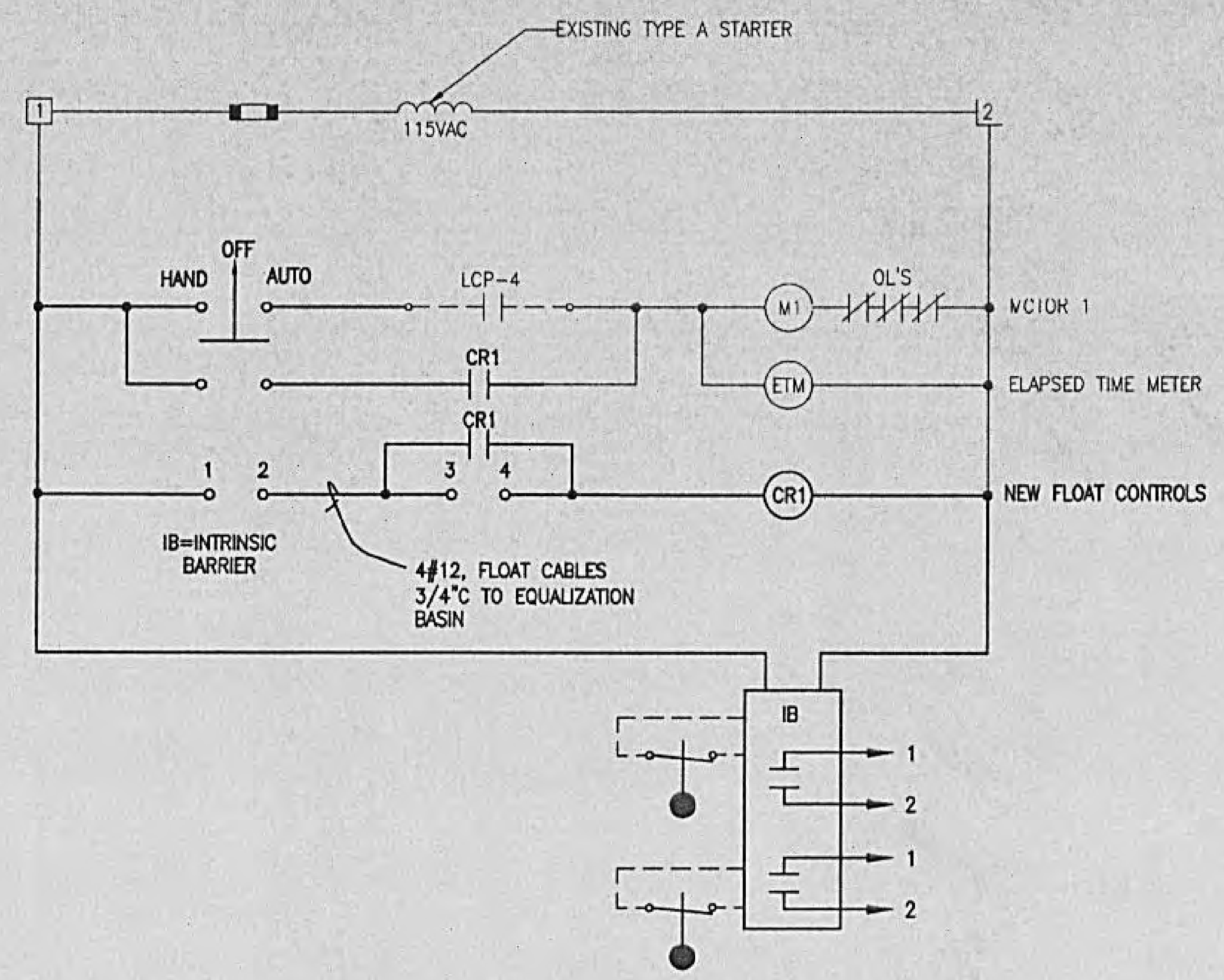
FILE NAME: $FILE$





UTILITY PUMP STATION CONTROL PANEL

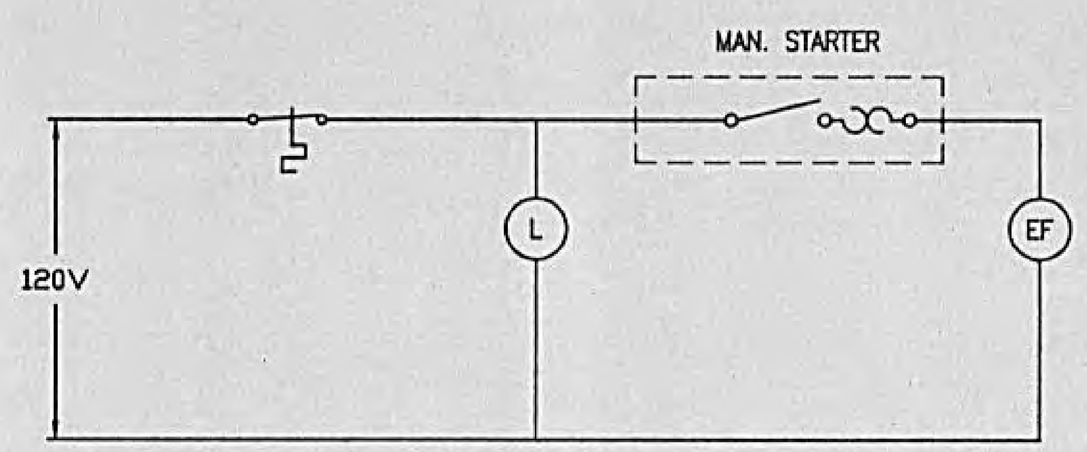
NEMA 4x CONROL PANEL MOUNTED @ PUMPS



EXISTING BLOWERS FOR NEW EQUALIZATION BASINS

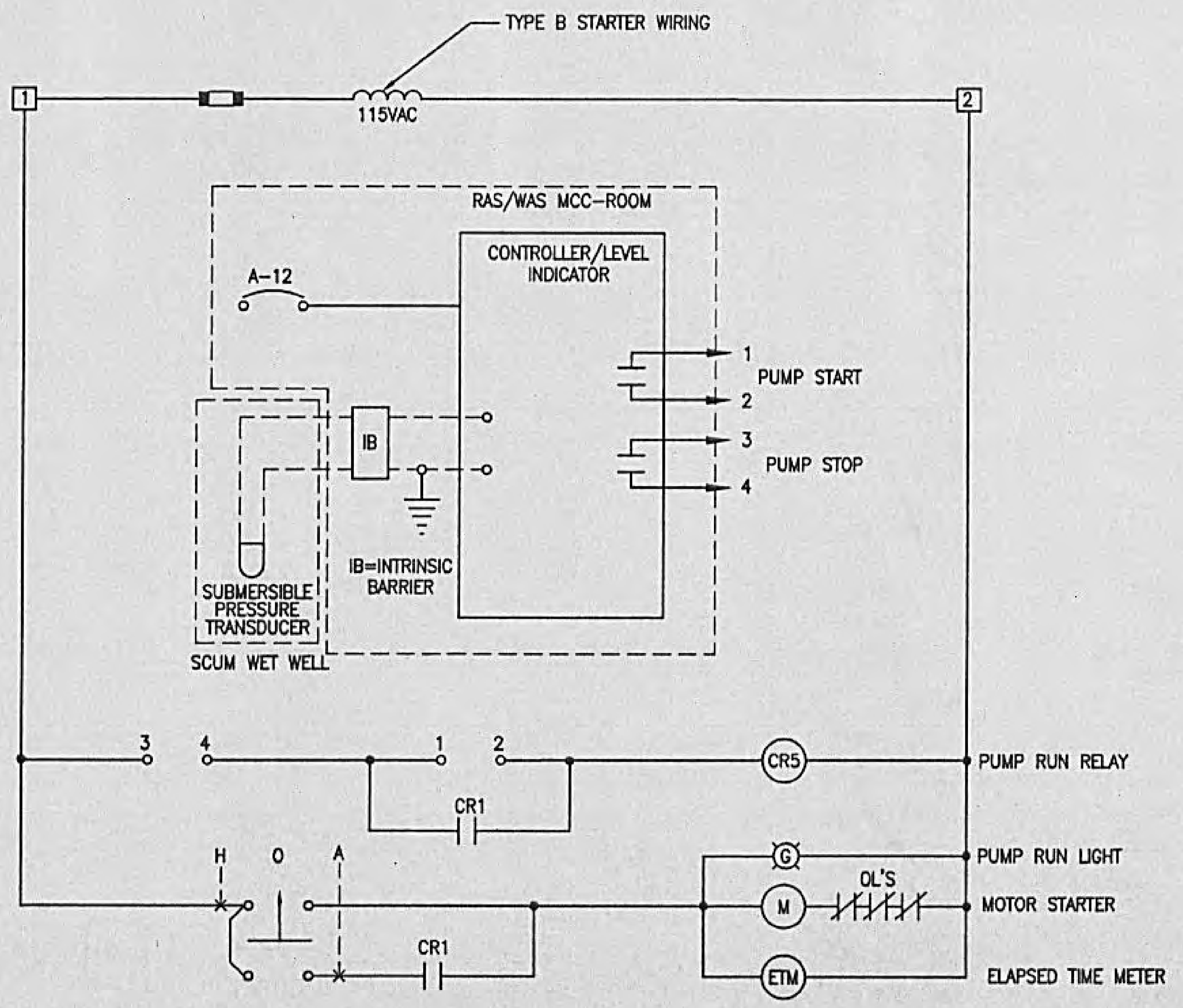
(2 TYPICAL)

CONTRACTOR SHALL REWIRE EXISTING BLOWERS AS SHOWN ABOVE. DARK PEN IN CONTROL CIRCUIT REPRESANTS NEW WORK. BLOWERS SHALL TURN ON WHEN LEVEL IN EQUILIZATION BASIN REACHES 5ft. AND TURN OFF WHEN BASIN LEVEL REACHES 4ft. SEE SHEET E-13 FOR FLOAT MOUNTING DETAIL.



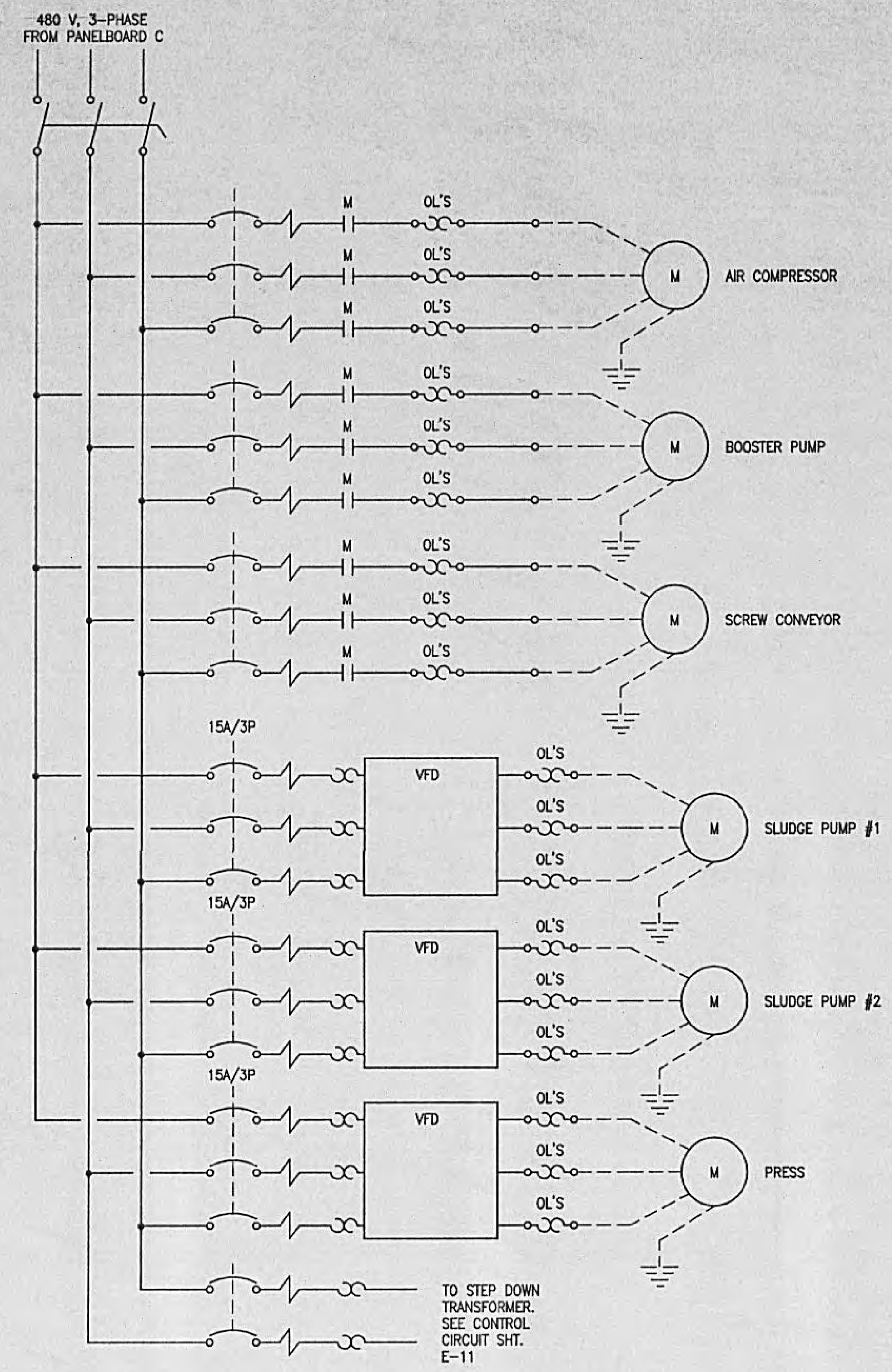
EXHAUST FAN CONTROL CIRCUIT

EF-1, EF-4, EF-3



SCUM PUMP

1 REQUIRED MCC-RWB



BELT PRESS CONTROL PANEL

NEMA 4X ENCLOSED

GRW PROJECT NO. 7601-10

CONTROL CIRCUITS

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
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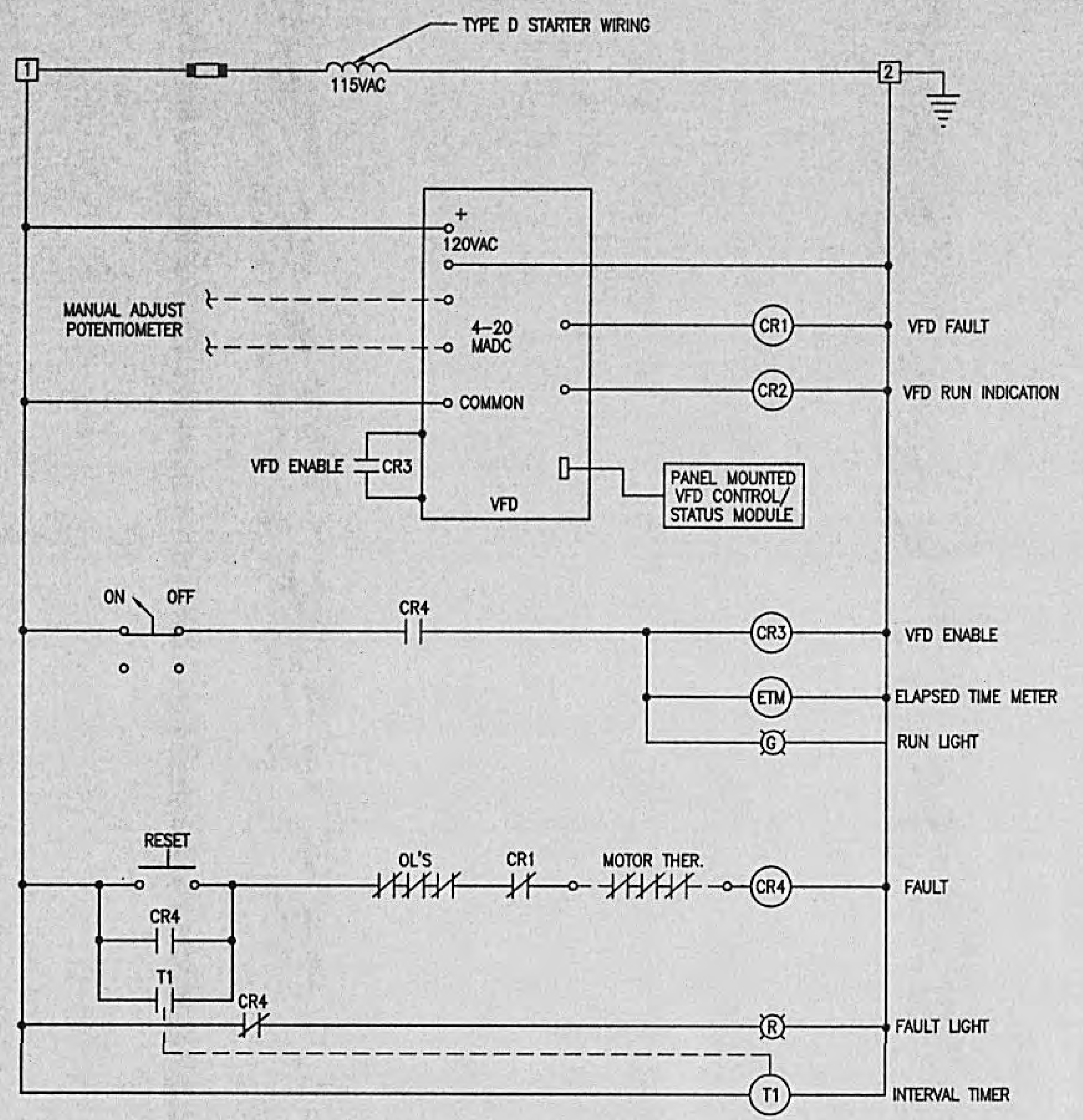
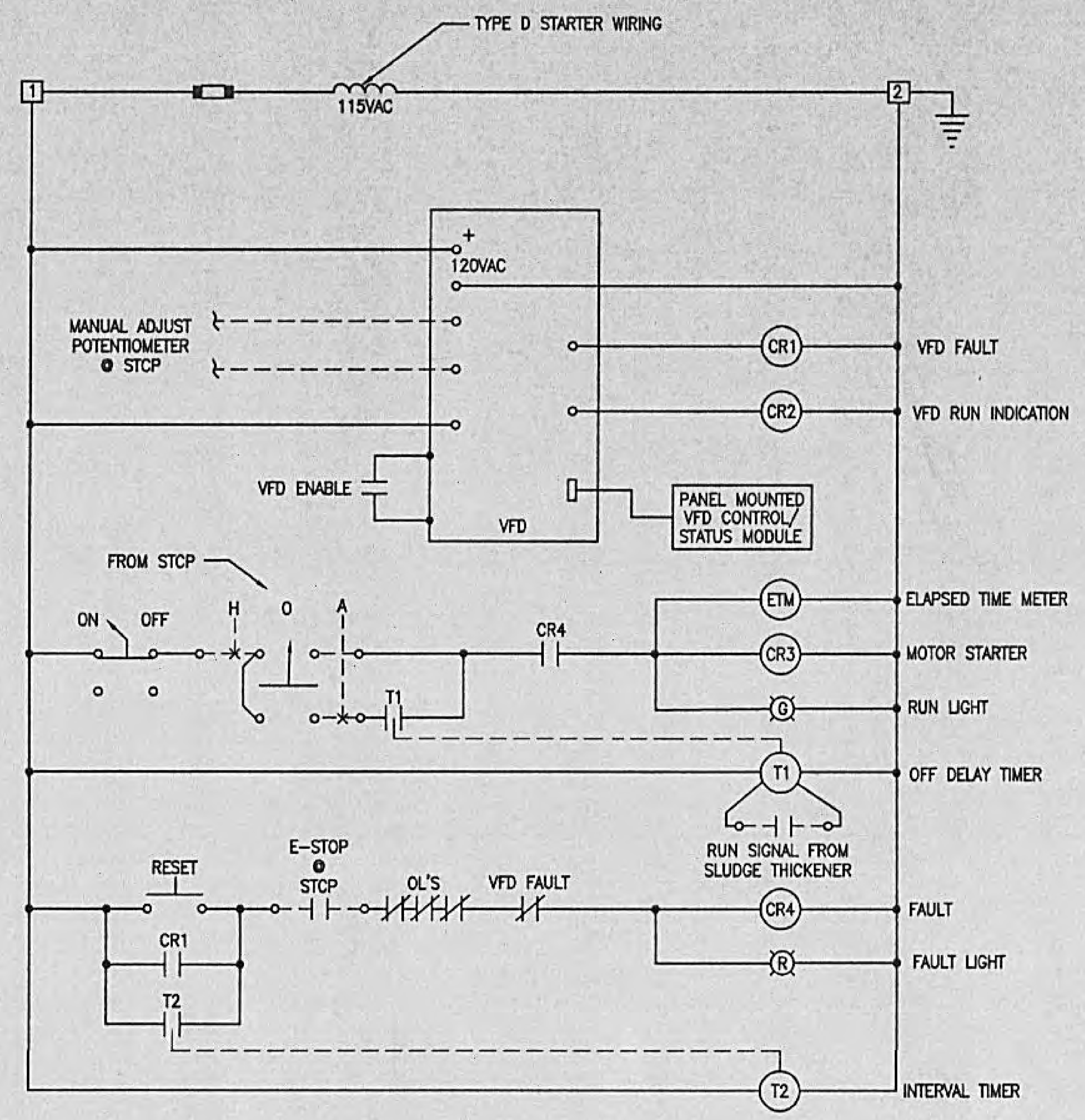


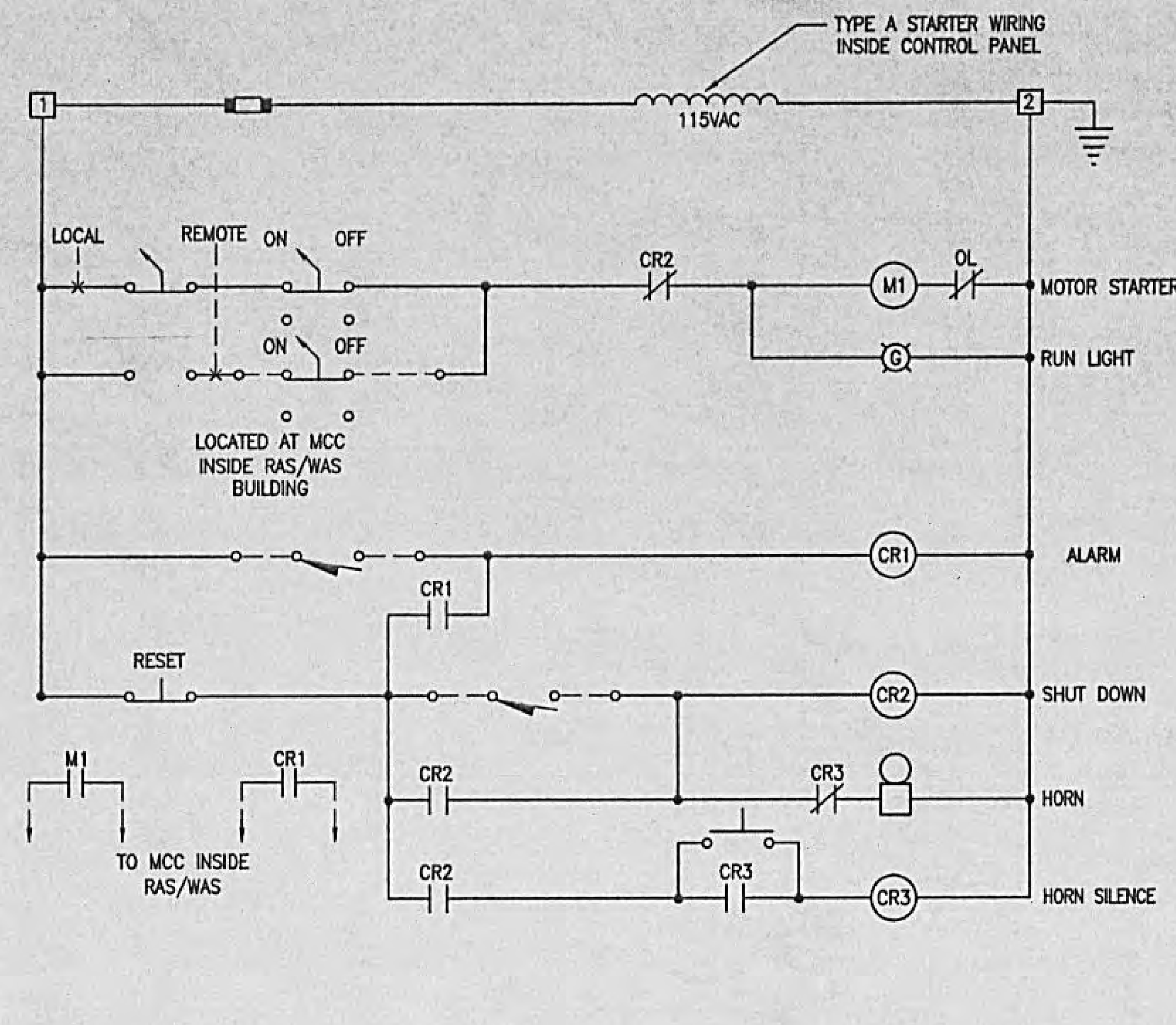
RETURN SLUDGE PUMPS

4 REQUIRED MCC-RWB



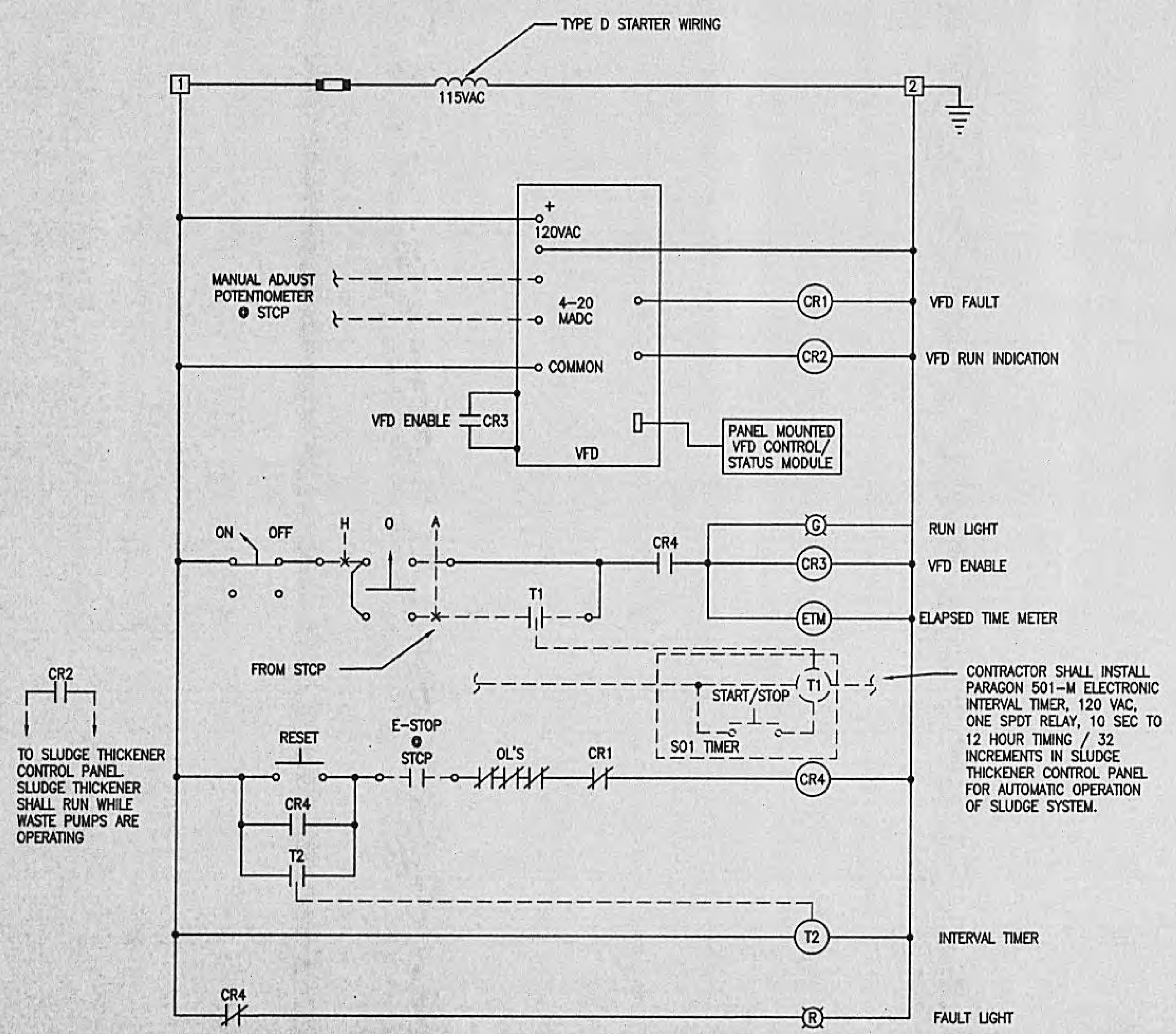
SLUDGE TRANSFER PUMP

1 REQUIRED MCC-RWB



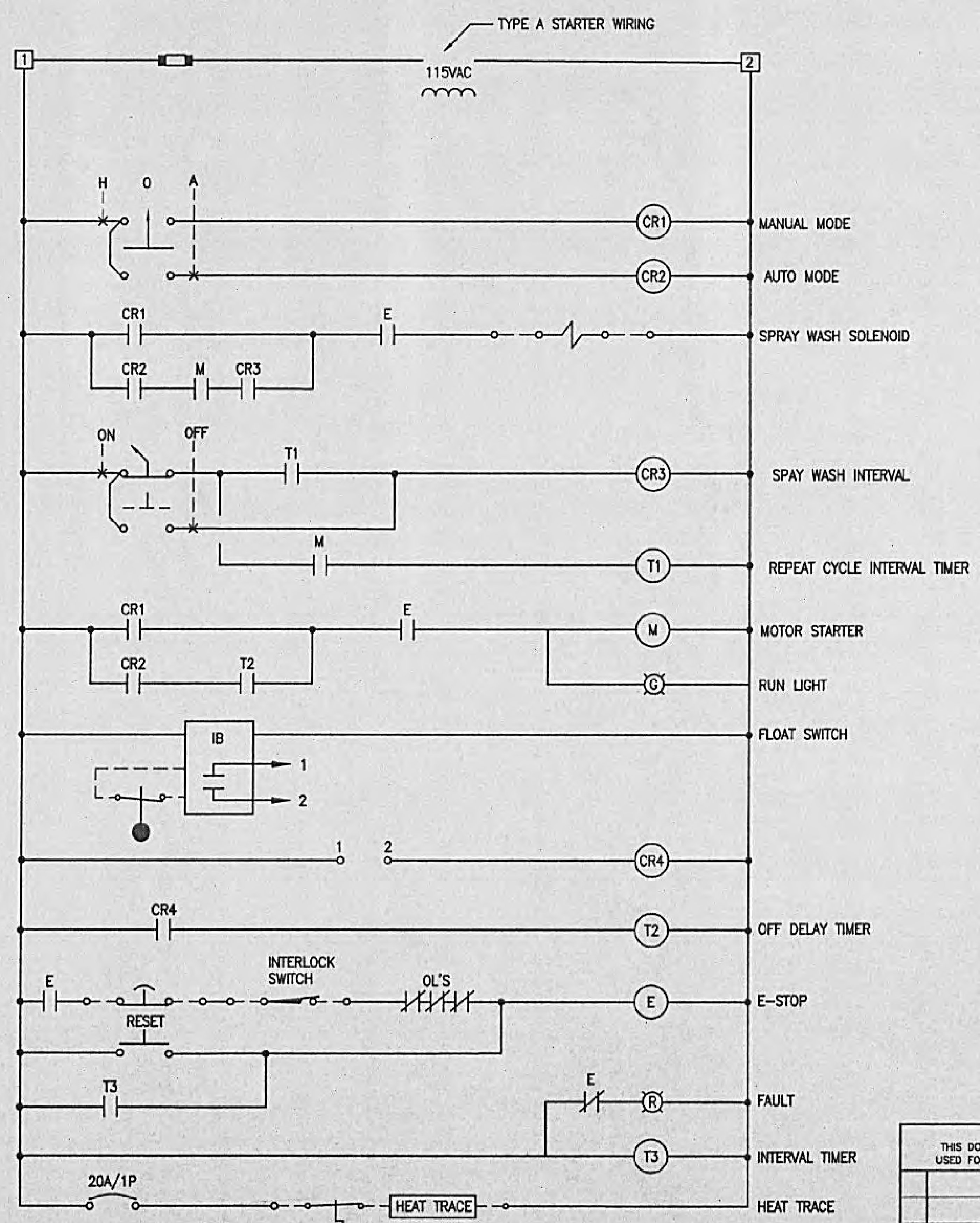
CLARIFIERS CONTROL PANEL

2 UNITS REQUIRED NEMA 4x ENCLOSURE
INSTALL TVSS IN PANEL



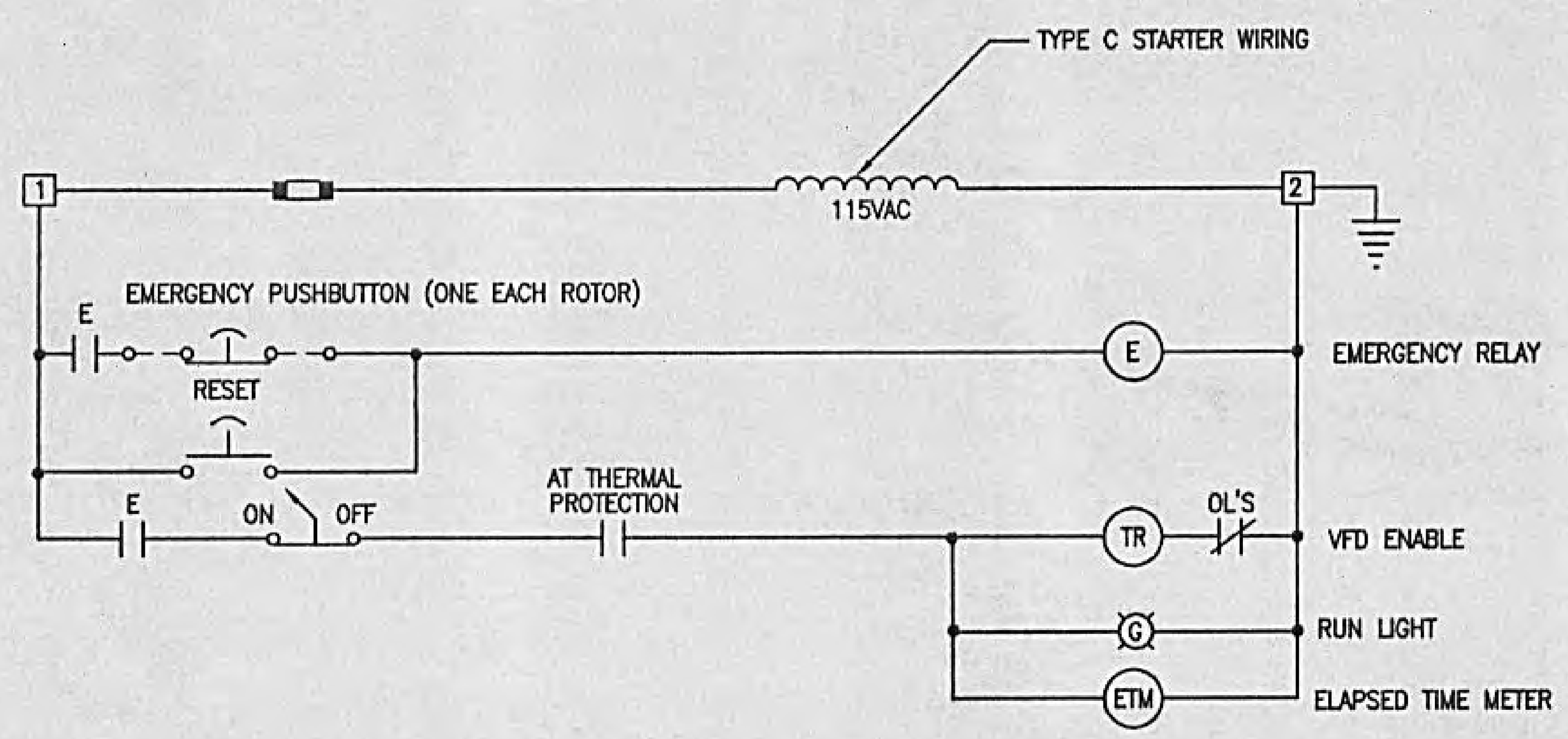
WASTE SLUDGE PUMPS

2 REQUIRED MCC-RWB



FINE SCREEN CONTROL PANEL

NEMA 4x CONTROL PANEL
INSTALL TVSS IN PANEL



OXIDATION DITCH ROTORS

4 UNITS REQUIRED MCC-RWB

GRW PROJECT NO. 7601-10

CONTROL CIRCUITS

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

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REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
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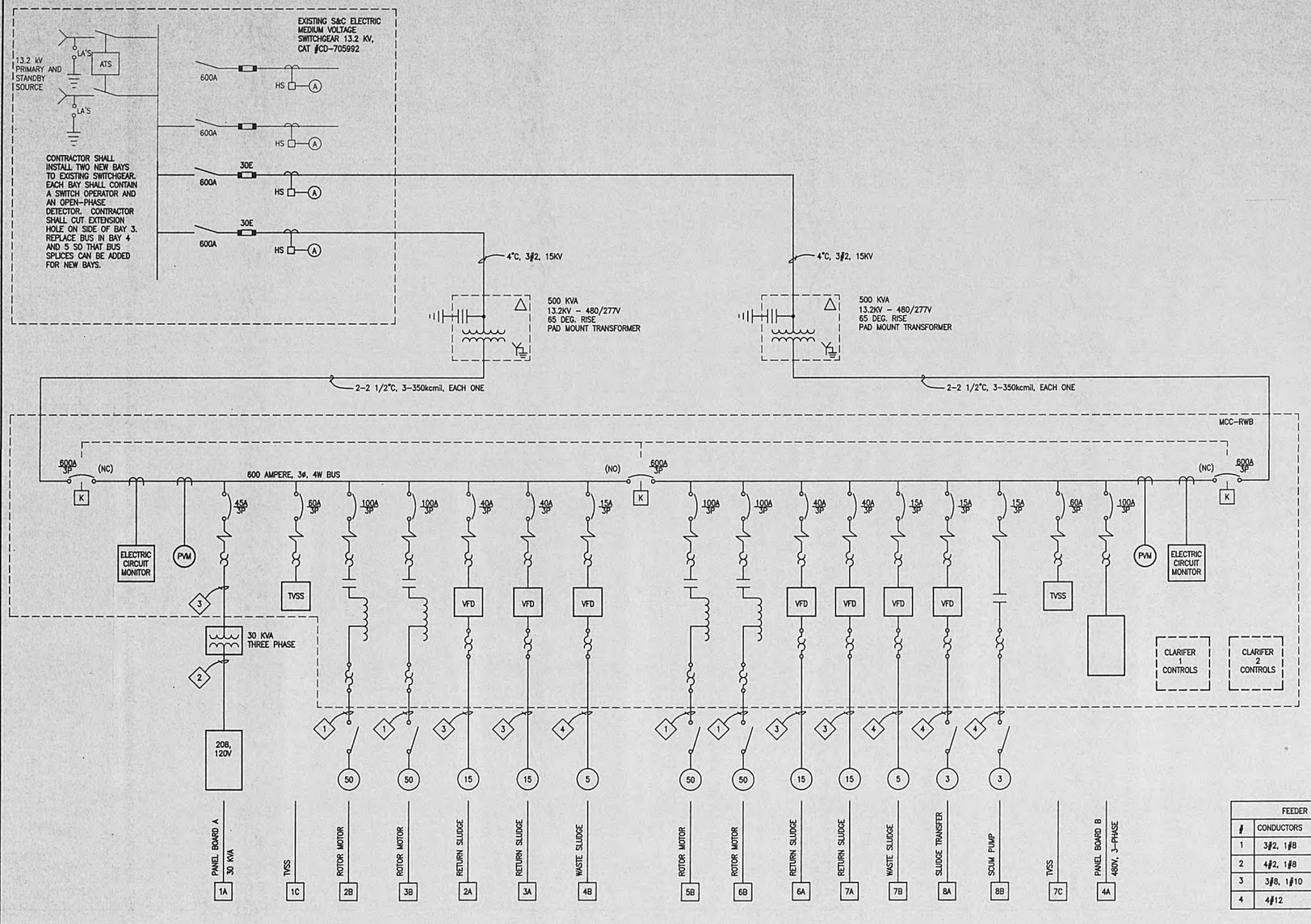
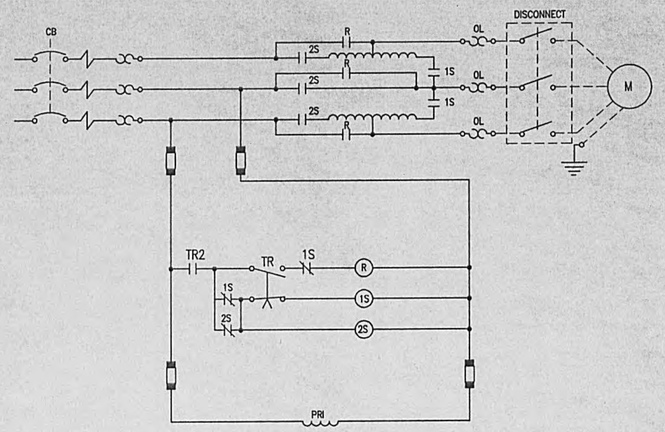
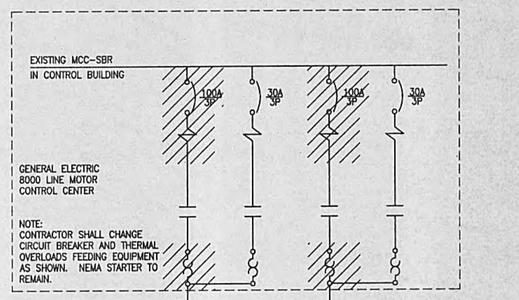


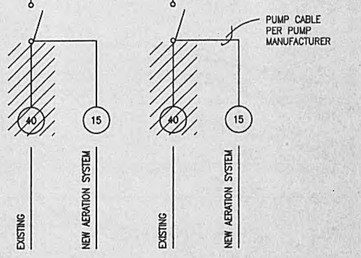
MOTOR CONTROL CENTER—MCC—RWB

FEEDER SCHEDULE		
#	CONDUCTORS	CONDUIT
1	3#2, 1#8	1 1/4"
2	4#2, 1#8	1 1/2"
3	3#8, 1#10	3/4"
4	4#12	3/4"

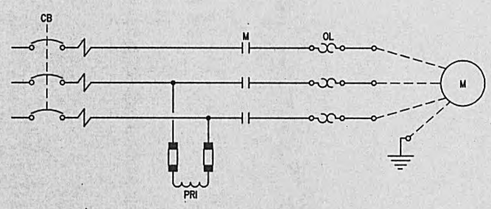


TYPE C RVAT STARTER

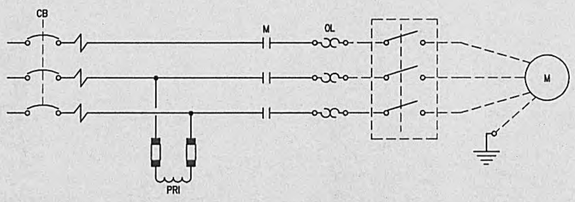




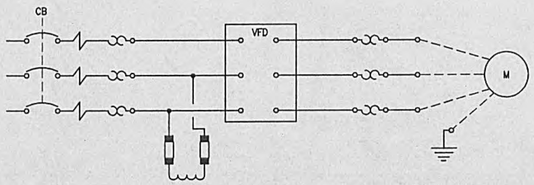
EXISTING MCC-SBR NEW WORK



TYPE A STARTER WIRING FVNR



TYPE B STARTER WIRING FVNR



VFD TYPE D STARTER

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW PROJECT NO. 7601-10

CONTROL CIRCUITS AND ONE LINE DIAGRAMS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
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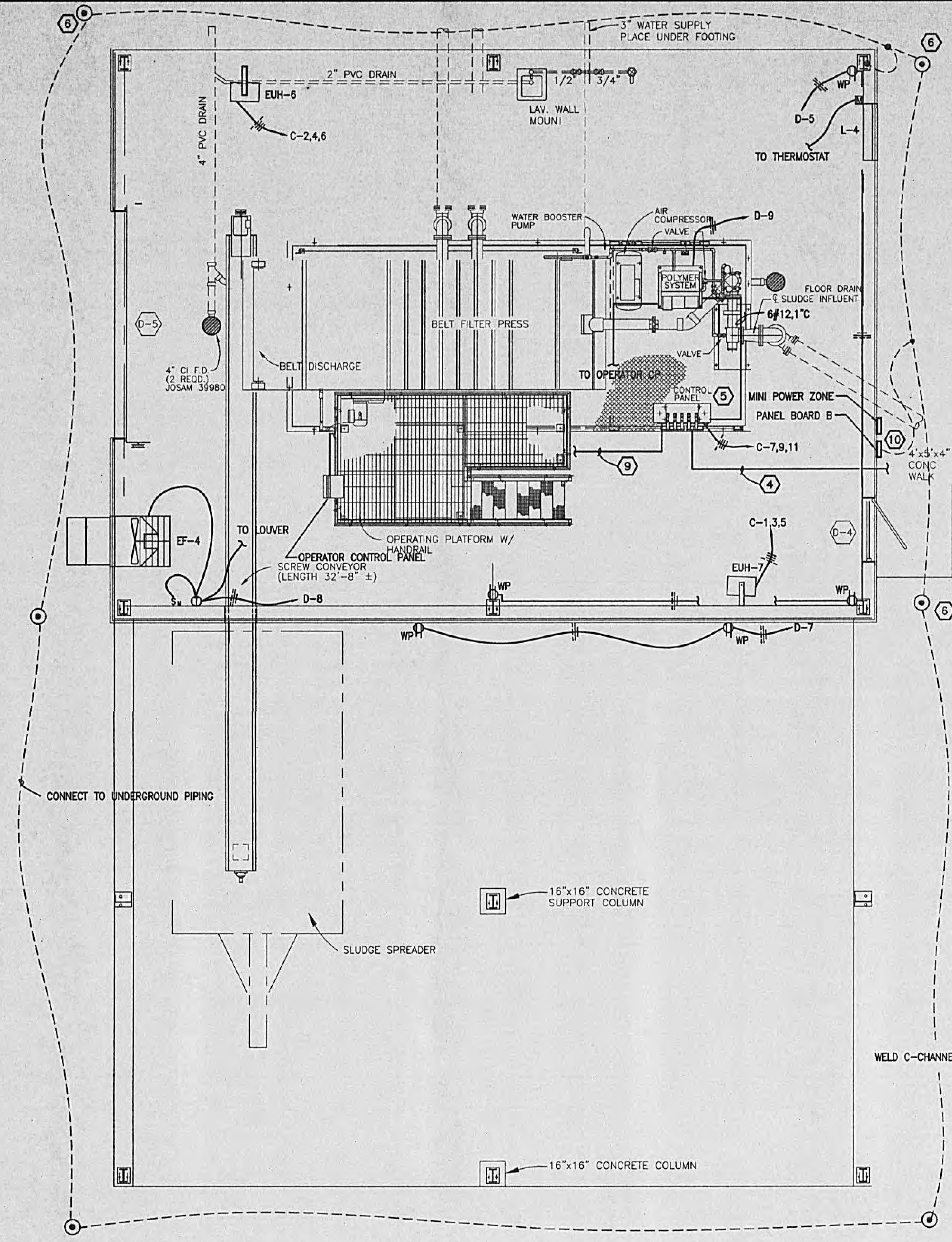
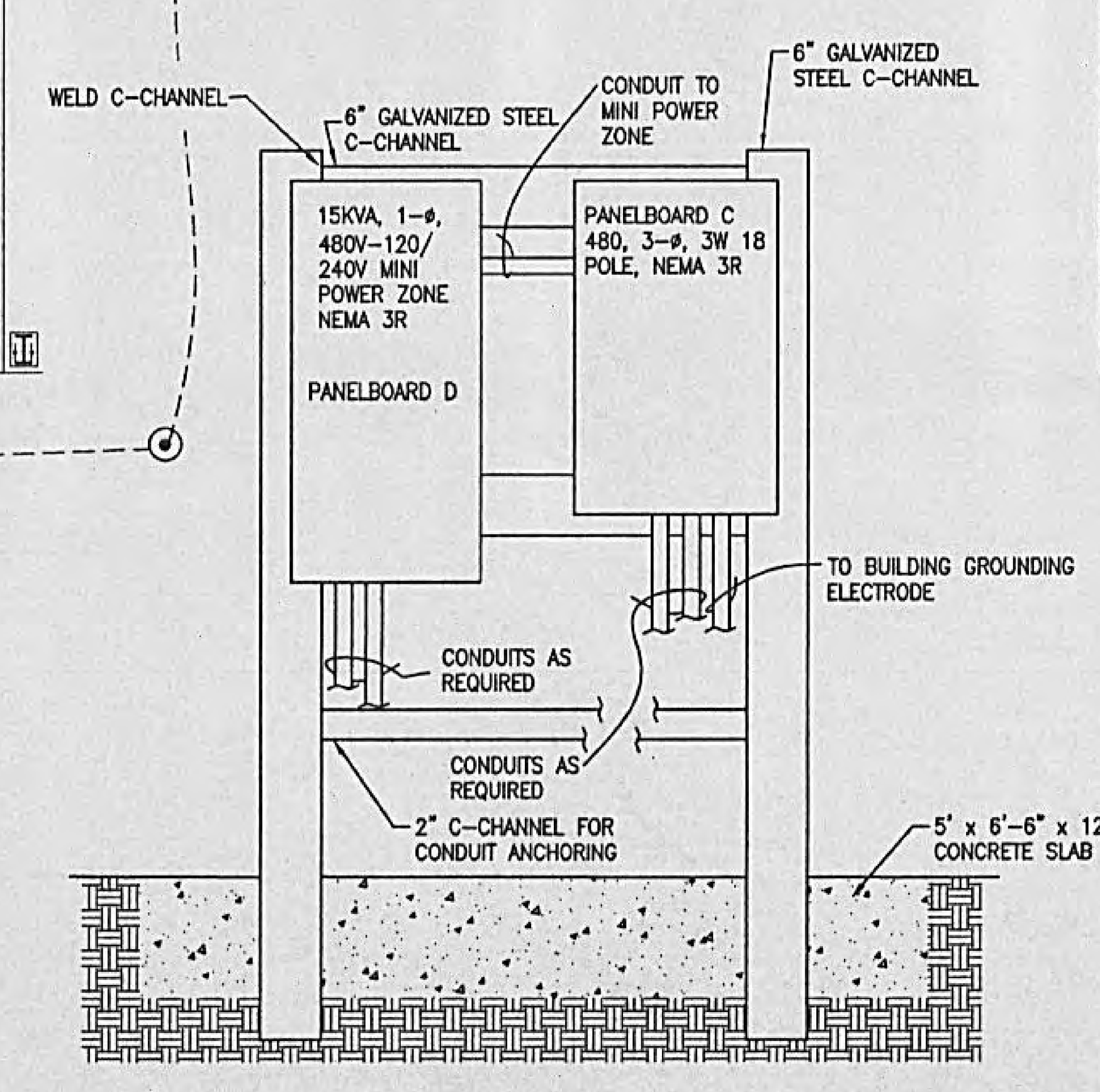
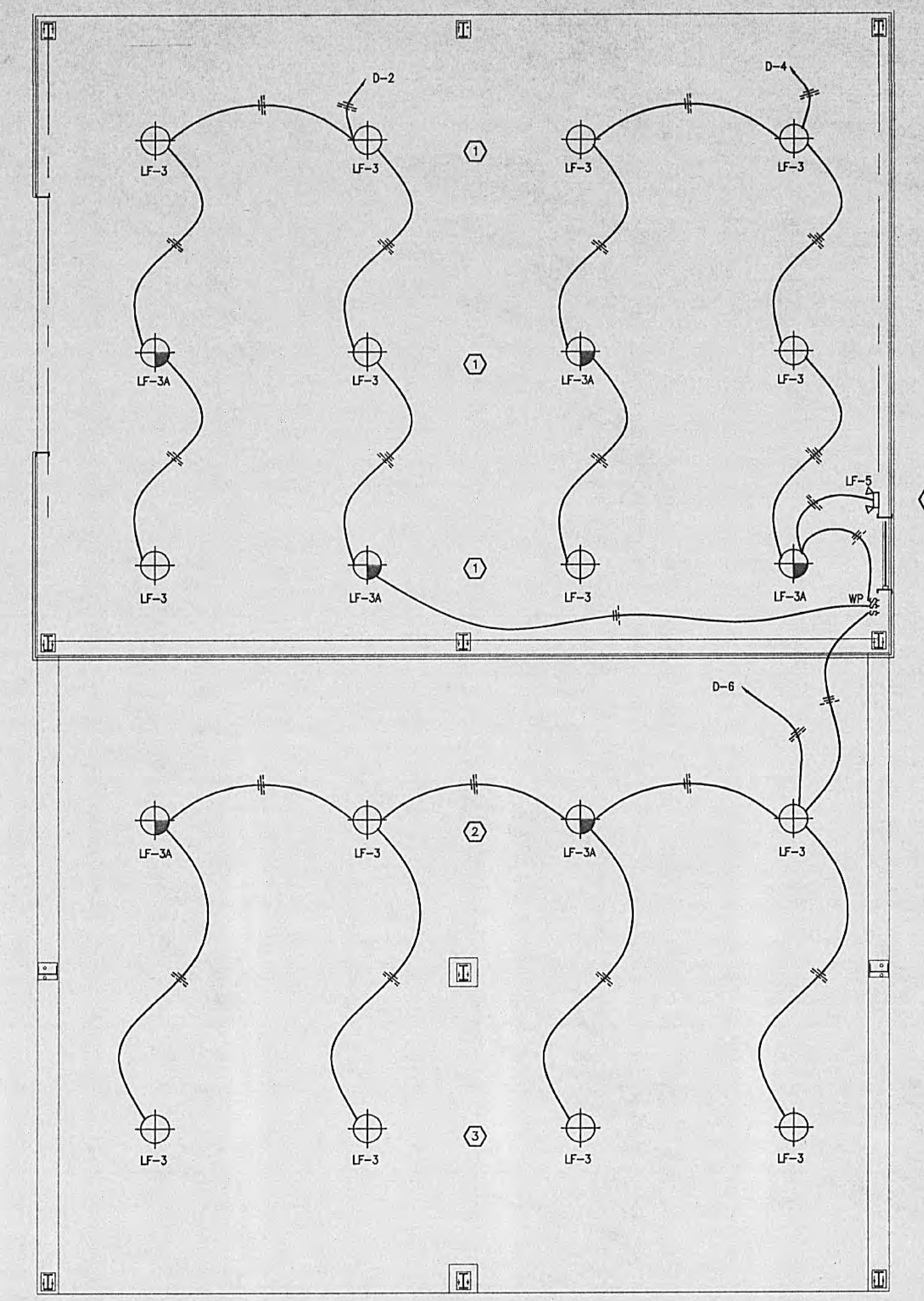


1. FIXTURES TO BE PENDENT MOUNTED AT 13' AFF.
2. FIXTURES TO BE PENDENT MOUNTED AT 16' AFF.
3. FIXTURES TO BE PENDENT MOUNTED AT 15' AFF.
4. TO SLUDGE PUMPS IN DIGESTER BUILDING; 2-4#10, 3/4"C.
5. CONTROL PANEL SHALL HAVE MINIMUM 3'-6" OF CLEAR AREA IN FRONT OF DOOR.
6. CONTRACTOR SHALL INSTALL #2 AWG BARE COPPER CONDUCTOR WITH GROUND RODS. GROUND RODS SHALL BE A MINIMUM OF 10' LONG AND 5/8" DIAMETER.
7. EMERGENCY LIGHT FIXTURE. MOUNT FIXTURE AT 6'-6".
8. NEMA 4x EXPLOSION PROOF NON-FUSED DISCONNECT FOR WASTE SLUDGE PUMPS.
9. CONDUITS AND CONDUCTORS PER MANUFACTURERS RECOMMENDATION.
10. SEE BFP ELECTRICAL DETAIL FOR MOUNTING OF PANELS.

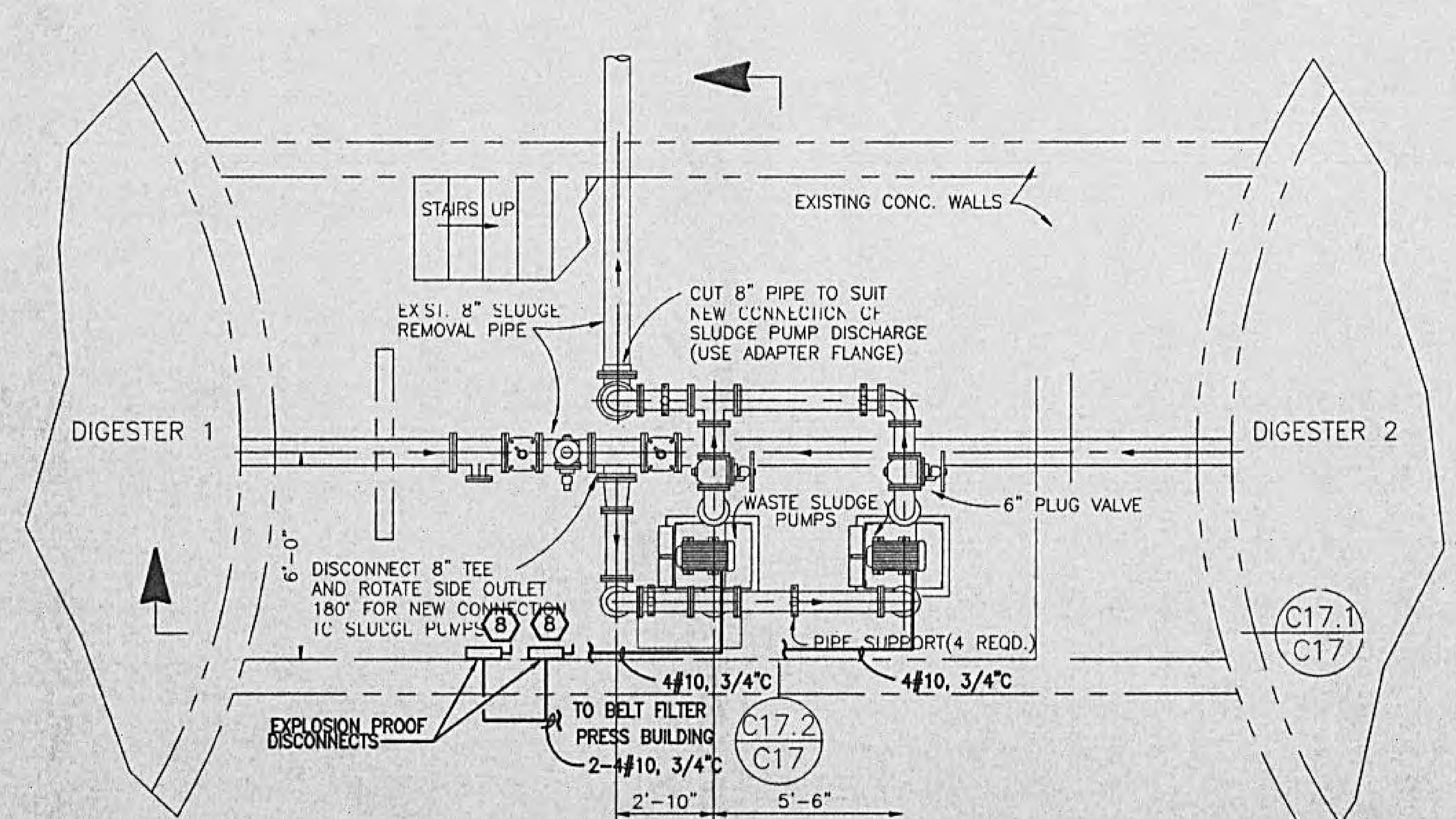
NOTES:



BFP ELECTRICAL DETAIL
SCALE: 3/4"=1'-0"



BELT FILTER PRESS LIGHTING PLAN
SCALE: 1/4"=1'-0"



DIGESTER PUMP ROOM
SCALE: 1/4"=1'-0"

GRW PROJECT NO. 7601-10

DIGESTER PUMP ROOM &
BELT FILTER PRESS BUILDING
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

MICHELLE HOWERTON – REGISTERED ENGINEER – AGRICULTURE – COMMERCE – NO. 00105945 – STATE OF TENNESSEE
10/2/02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS
NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
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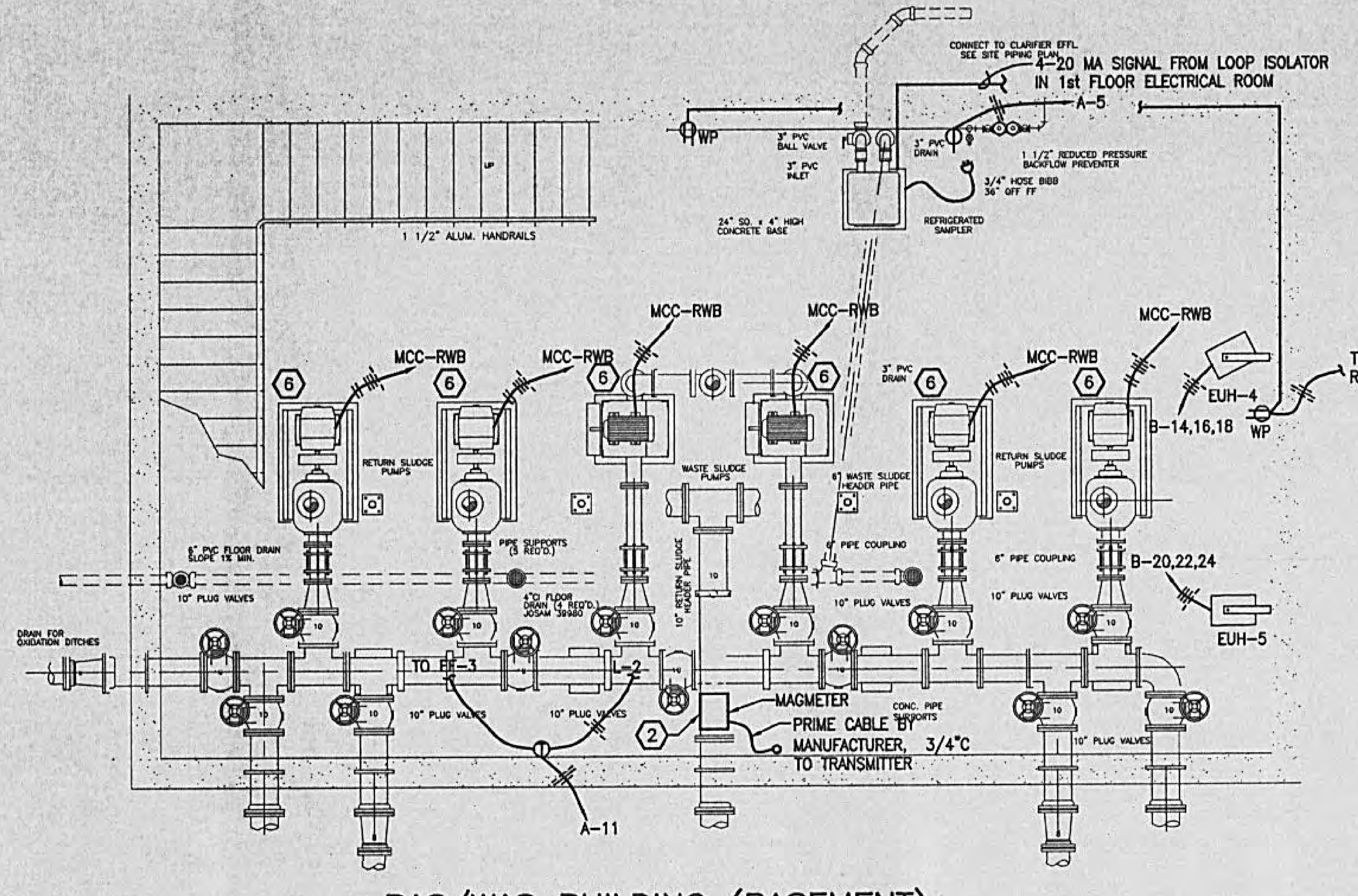
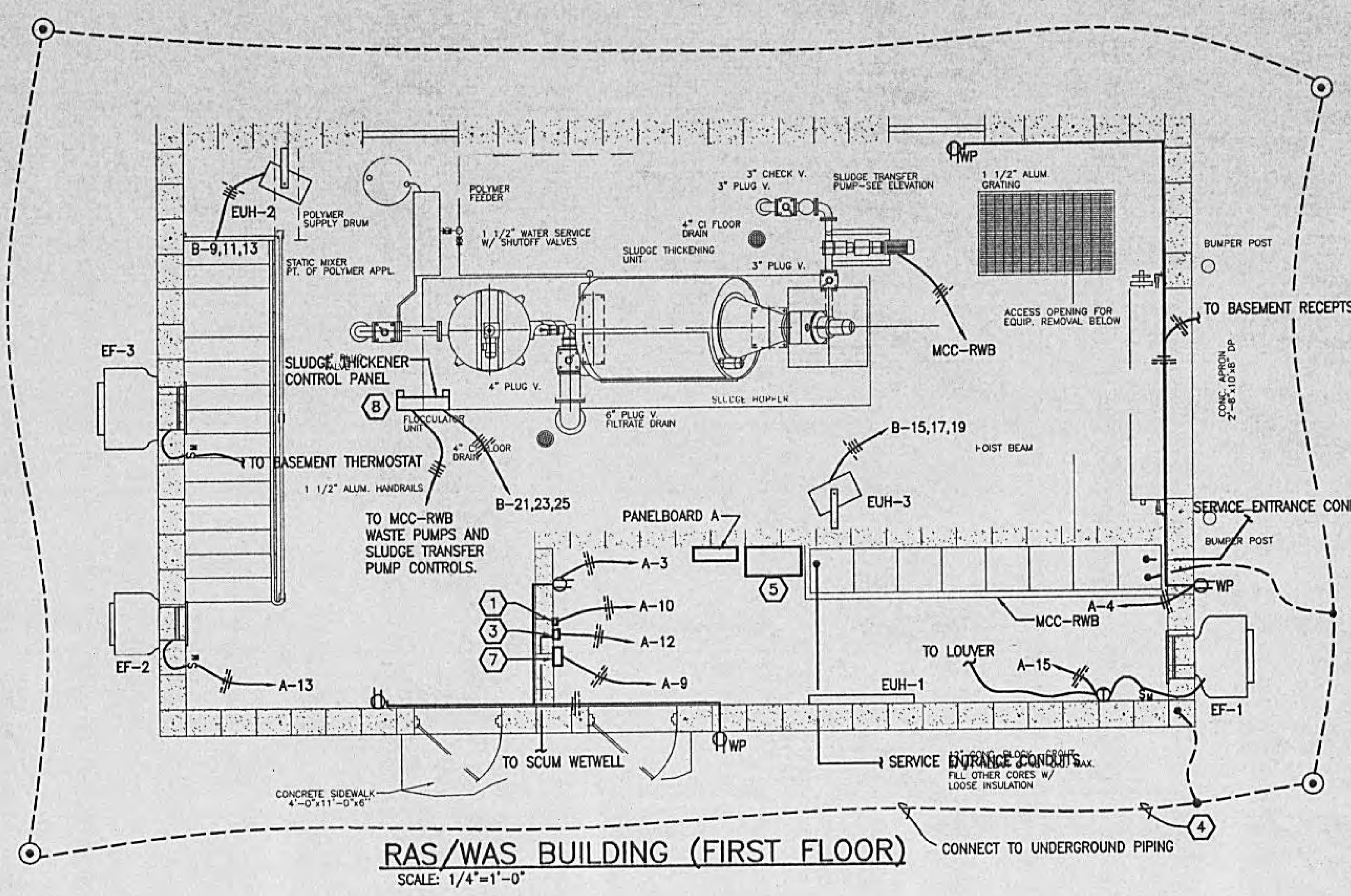


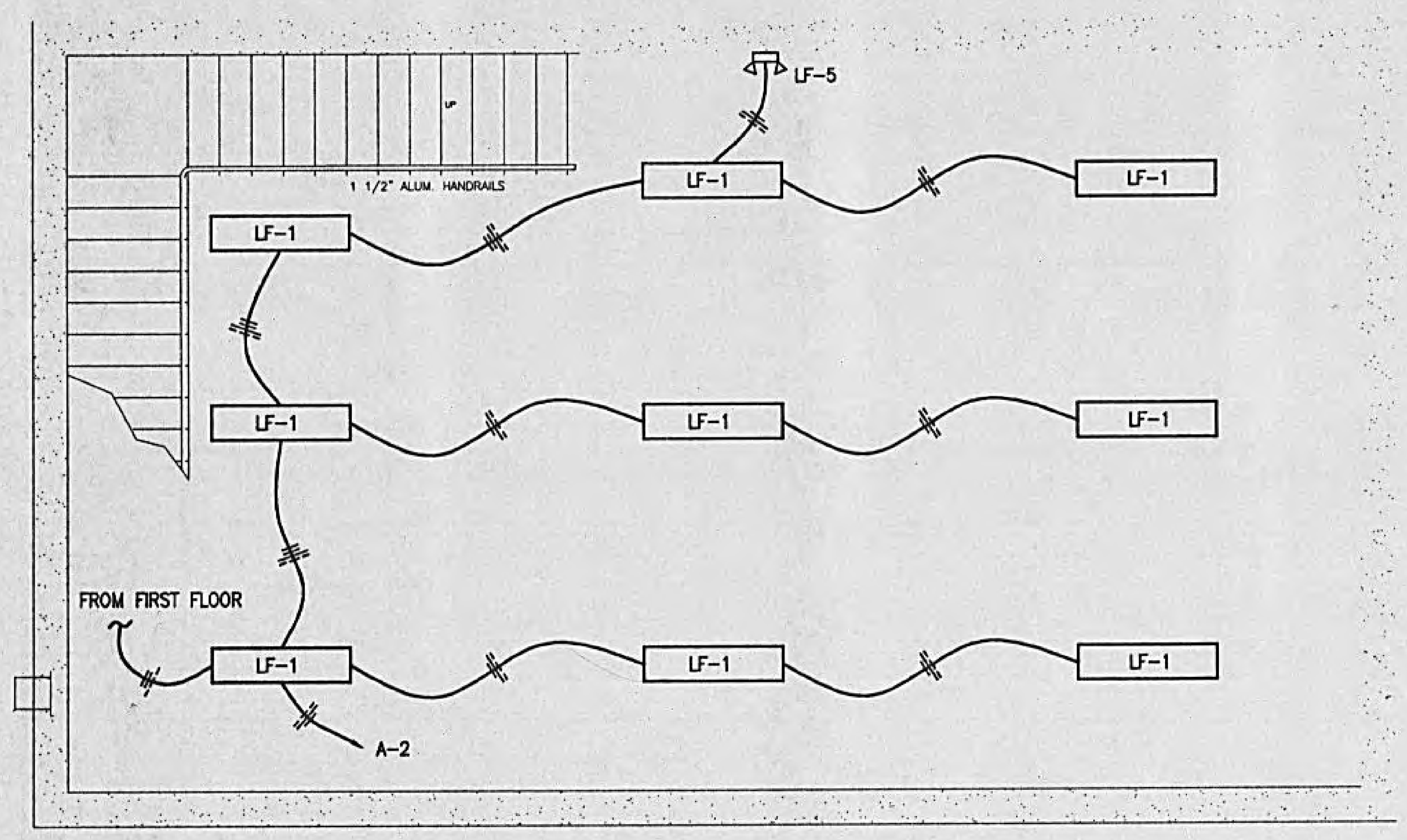
RAS/WAS BUILDING (BASEMENT)

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



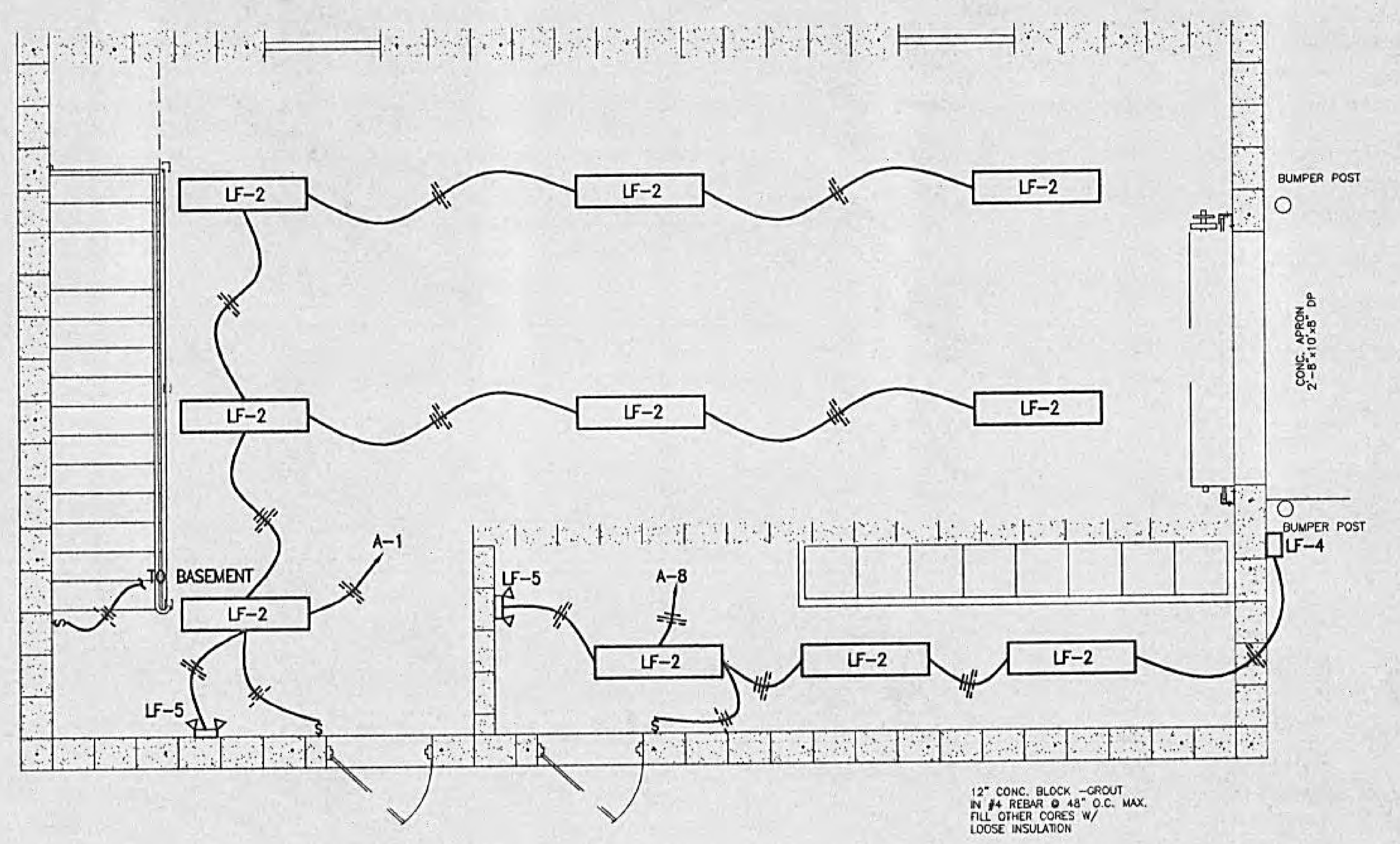
RAS/WAS BUILDING (FIRST FLOOR)

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



RAS/WAS LIGHTING PLAN (BASEMENT)

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



RAS/WAS LIGHTING PLAN (FIRST FLOOR)

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

NOTES:

1. FLOW DISPLAY TRANSMITTER FOR RETURN SLUDGE FLOW. PRIMARY CABLE FROM SENSOR TO TRANSMITTER TO BE IN 3/4" CABLE.
2. SENSOR FOR FLOW METER TO BE MOUNTED ON 6" PIPE. SENSOR SHALL HAVE 7 PIPE DIAMETERS OF STRAIGHT RUN BEFORE, AND 3 PIPE DIAMETER AFTER.
3. SUBMERSIBLE PRESSURE TRANSDUCER (TRANSMITTER) FOR MONITORING SCUM WETWELL LEVEL. TRANSDUCER CABLE TO TRANSMITTER IN 3/4"C.
4. CONTRACTOR SHALL INSTALL 3/0 BARE COPPER CONDUCTOR WITH GROUND RODS. REFER TO CONTRACT SPECIFICATION FOR GROUND ROD PARAMETERS AND CONNECTIONS.
5. 30 KVA WALL MOUNTED TRANSFORMER, 480V-120/208V, 3 PHASE.
6. CIRCUIT BREAKER FOR PUMP SHALL HAVE THE OPTION OF BEING LOCKABLE IN THE OFF POSITION.
7. LOOP ISOLATORS FOR NEW INTERMEDIATE FLOW METER CONTROL LOOP. NEMA 1 ENCLOSURE.
8. CONTRACTOR SHALL PROVIDE CONDUIT AND WIRING FROM CONTROL PANEL TO SLUDGE THICKENER EQUIPMENT.

GRW PROJECT NO. 7601-10

RETURN AND WASTE
SLUDGE PUMP BUILDING
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

MICHELLE HOWLETT REGISTERED ENGINEER AGRICULTURE COMMERCE NO. 00105945 STATE OF TENNESSEE

10/2/02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS
NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
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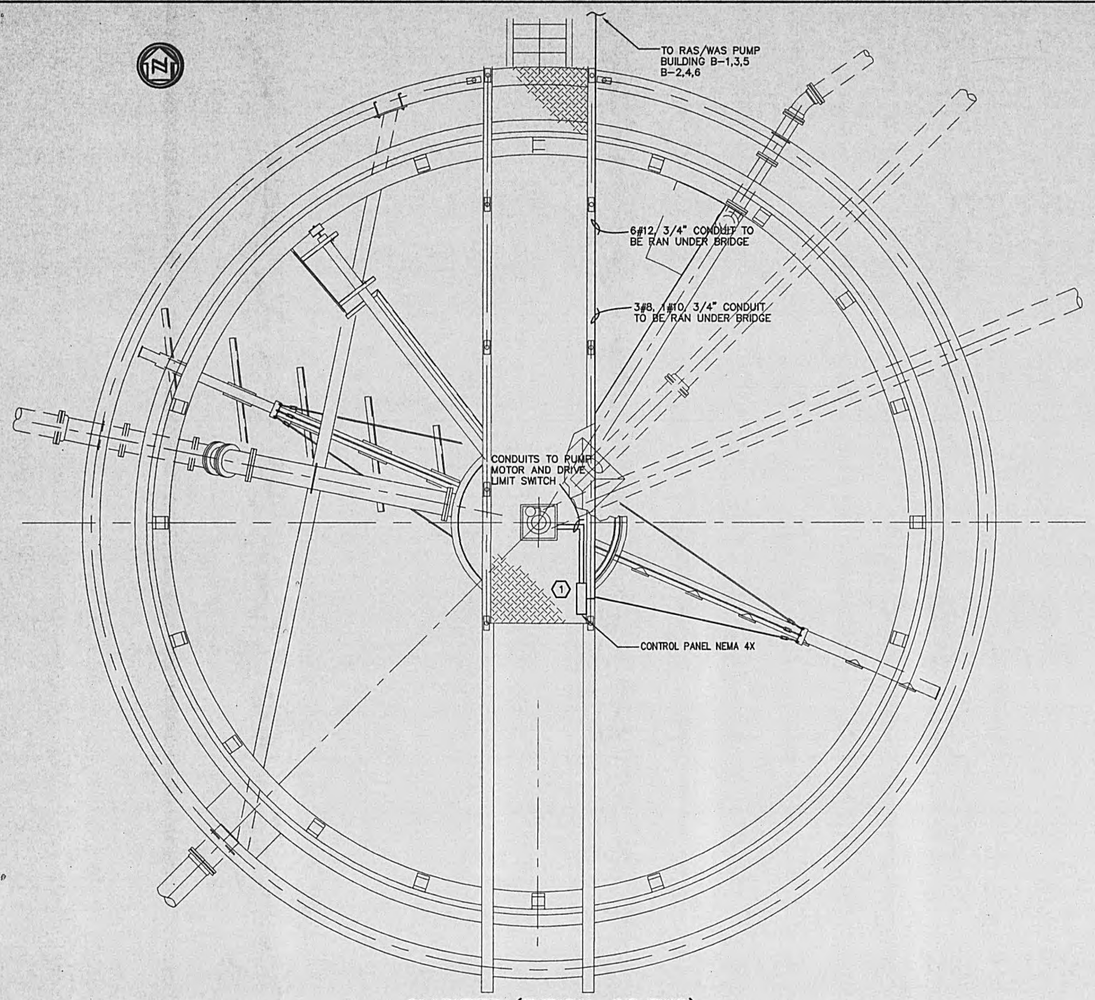
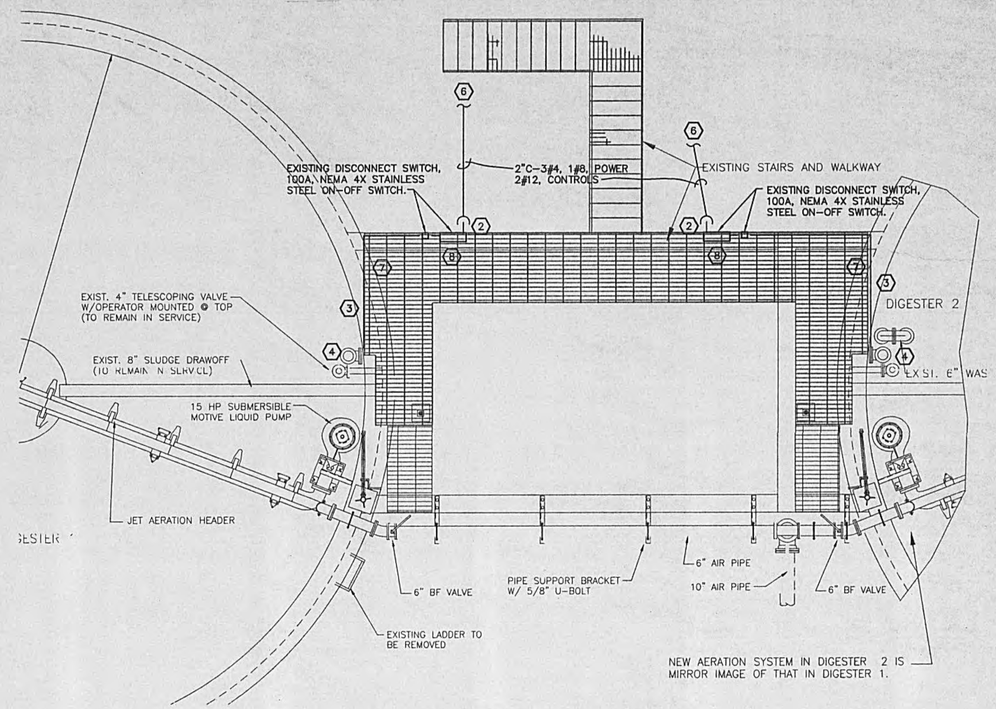


CLARIFIER (TYPICAL OF TWO)
SCALE: 1/4"=1'-0"



DIGESTER ROOF PLAN
SCALE: 1/4"=1'-0"

GENERAL NOTES:

1. AREA SHOWN IS CONSIDERED A CLASS 1 DIVISION 2 AREA. CLASS 1, DIVISION 2 AREA EXTENDS TO 18" ABOVE TOP OF TANK WALL AND 18" BEYOND EXTERIOR SIDE WALL.
2. CONDUITS ENTERING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING BEFORE ENTRANCE INTO AREA. CONDUITS LEAVING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING INSTALLED AFTER LEAVING HAZARDOUS AREA.

NOTES:

(1) CONTROL PANEL TO BE MOUNTED 18" ABOVE TOP OF TANK WALL TO AVOID CLASS 1, DIVISION 2 HAZARDOUS LOCATION. PANEL SHALL BE RATED NEMA 4X.

(2) EXISTING DISCONNECT, ON-OFF SWITCH AND WIRING BACK TO CONTROL BUILDING (MCC-SBR) TO REMAIN.

(3) CONTRACTOR SHALL INSTALL PUMP POWER CABLE IN 1 1/4" CONDUIT TO JUNCTION BOX. CONTRACTOR SHALL VERIFY LENGTH NEEDED FOR PUMP POWER CABLE.

SEE PUMP CABLE SUPPORT DETAIL FOR TRANSITION OF PUMP CABLE FROM CONDUIT TO MOTOR.

(4) CONTRACTOR SHALL RUN PUMP CABLE FROM CONDUIT TO MOTOR BOX. INSTALL STRAIN RELIEF CONNECTION TO PUMP CABLE.

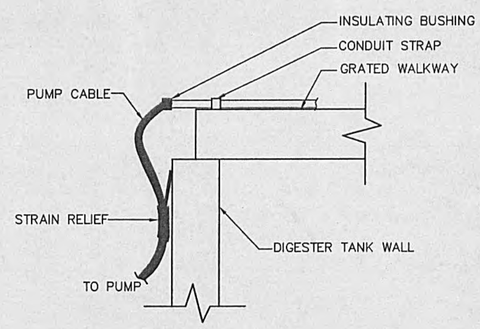
(5) CONDUIT AND WIRING BACK TO MCC IN CONTROL BUILDING. CONTRACTOR SHALL REPLACE EXISTING CIRCUIT BREAKERS AND OVERLOADS IN "GE" 8000 LINE MOTOR CONTROL CENTER. NEW CIRCUIT BREAKER FOR 15HP PUMPS SHALL BE 40 AMPS. CONTROLS SHALL WORK THE SAME AS EXISTING PUMPS BEING REMOVED. SEE DETAIL SHEET E-8.

(6) CONTRACTOR SHALL REMOVE EXISTING WIRING AND CONDUIT TO EXISTING SLUDGE DIGESTER 40HP MOTORS.

INSTALL SEAL FITTING BEFORE ENTRANCE OF PUMP CABLE AND CONDUIT INTO DISCONNECT SWITCH.

(7)

(8)



PUMP CABLE SUPPORT DETAIL
NOT TO SCALE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

GRW PROJECT NO. 7601-10

CLARIFIER 1 & 2, DIGESTER
ELECTRICAL PLANS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
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LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

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10/2/02

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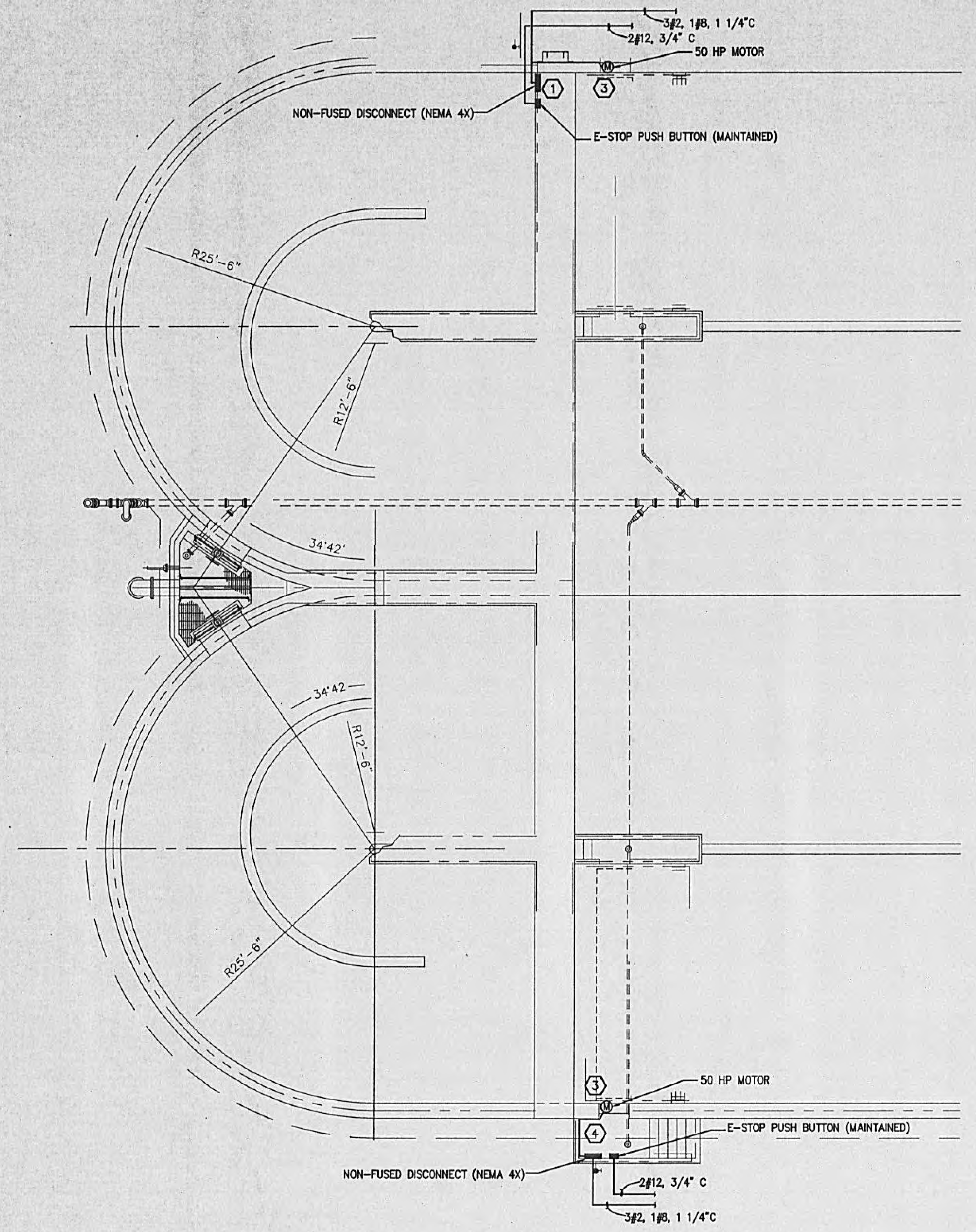
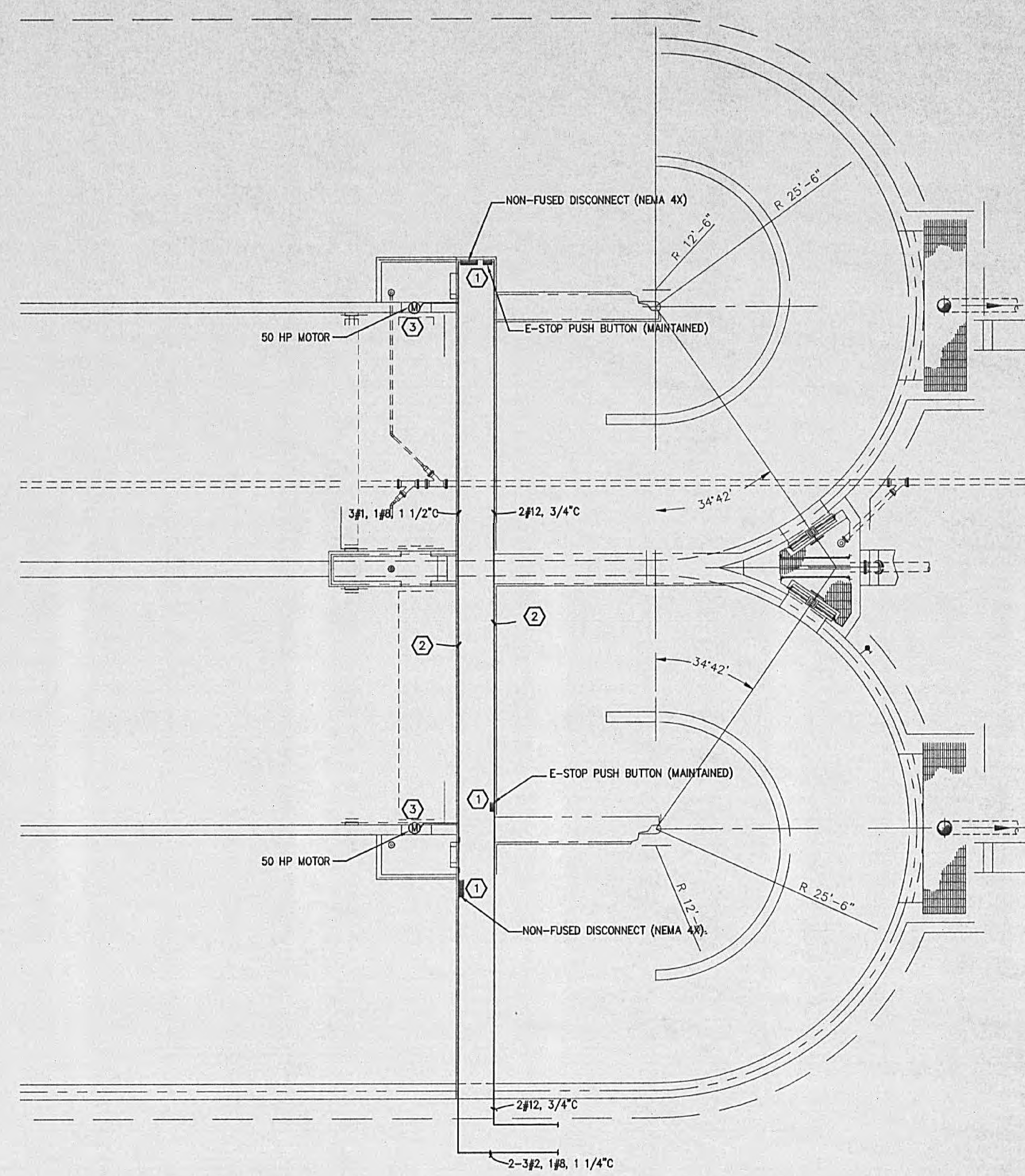


OXIDATION DITCH

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



GENERAL NOTES:

1. AREA SHOWN IS CONSIDERED A CLASS 1 DIVISION 2 AREA. CLASS 1, DIVISION 2 AREA EXTENDS TO 18" ABOVE TOP OF TANK WALL AND 18" BEYOND EXTERIOR SIDE WALL. ANY EQUIPMENT LOCATED WITHIN CLASSIFIED AREA SHALL BE UL LISTED FOR THAT AREA.
2. NON-FUSED DISCONNECTS AND EMERGENCY PUSH BUTTONS SHOWN ON PAGE SHALL BE RATED NEMA 4X.
3. CONDUITS ENTERING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING BEFORE ENTRANCE INTO AREA. CONDUITS LEAVING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING INSTALLED AFTER LEAVING HAZARDOUS AREA.

NOTES:

(1) MOUNT EQUIPMENT 18" ABOVE OXIDATION DITCH WALL.

(2) CONDUIT TO BE RAN UNDERNEATH WALKWAY. PROVIDE SEAL FITTINGS AS NEEDED.

(3) MOTORS INSTALLED WITHIN THE CLASS 1, DIVISION 2 AREA SHALL MEET THE REQUIREMENTS NEC 501.8 (B). OVER TEMPERATURE DEVICES (16220.2.02.N) HAVE INTENTIONALALY NOT BEEN INCLUDED IN THE CONTROL CIRCUIT TO MEET THESE REQUIREMENTS.

(4) MOUNT DISCONNECT AND EMERGENCY PUSH BUTTON MORE THAN 18" AWAY FROM CONCRETE SPLASH WALL.

GRW PROJECT NO. 7601-10

OXIDATION DITCH PLAN
ELECTRICAL PLAN
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

M. MICHELLE HOWLETT REGISTERED ENGINEER AGRICULTURE COMMERCE NO. 00105945 STATE OF TENNESSEE
10/2/02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

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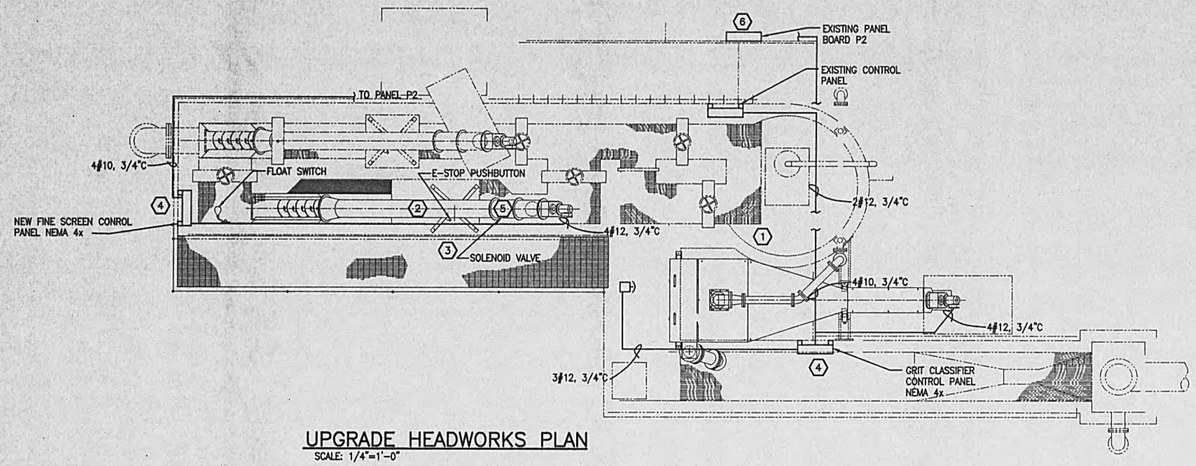
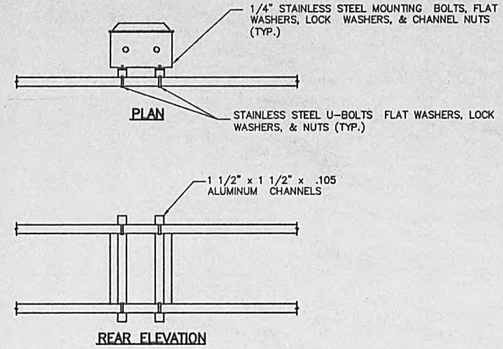


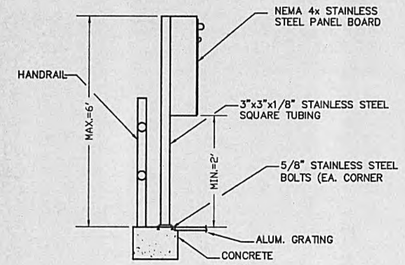
UPGRADE HEADWORKS PLAN

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



HANDRAIL MOUNTED EQUIPMENT

NOT TO SCALE



TYPICAL PANEL MOUNTING-HEADWORKS

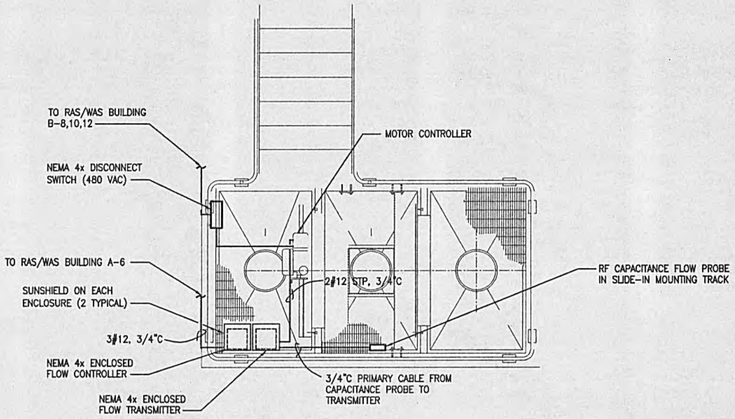
SCALE: 3/4"=1'-0"

GENERAL NOTES:

1. AREAS SHOWN (HEADWORKS & SPLITTER BOX) ARE CONSIDERED A CLASS 1, DIVISION 2 AREA. CLASS 1, DIVISION 2 AREA EXTENDS TO 18" ABOVE TOP OF TANK WALL AND 18" BEYOND EXTERIOR SIDE WALL. ANY EQUIPMENT LOCATED WITHIN THE CLASSIFIED AREA SHALL BE UL LISTED FOR THAT AREA.
2. CONDUITS ENTERING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING BEFORE ENTRANCE INTO AREA. CONDUITS LEAVING HAZARDOUS LOCATIONS SHALL HAVE SEAL FITTING AFTER LEAVING HAZARDOUS AREA.

NOTES:

1. REMOVE ALL ELECTRICAL CONNECTIONS TO EXISTING GRIT CLASSIFIER EQUIPMENT. REMOVE CONDUITS AND WIRING.
2. CONTRACTOR SHALL WIRE E-STOP PUSHBUTTON TO NEW FINE SCREEN CONTROL PANEL. 2#12, 3/4"C.
3. CONTRACTOR SHALL WIRE 120VAC SOLENOID VALVE TO NEW FINE SCREEN CONTROL PANEL. 3#12, 3/4"C.
4. BOTTOM OF CONTROL PANEL TO BE MOUNTED 24" MINIUM ABOVE GRATING.
5. CONTRACTOR SHALL CONNECT HEAT TRACE WIRING AND THERMOSTAT. 3#12, 3/4"C.
6. CONTRACTOR SHALL INSTALL TWO 30AMP/3P, 480V CIRCUIT BREAKER TO EXISTING PANEL P2 TO FEED NEW EQUIPMENT.



ADJUSTABLE WEIR SPLITTER BOX

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

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

GRW PROJECT NO. 7601-10

NEW HEADWORKS FLOOR PLAN & SPLITTER STRUCTURE
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO. E-3
APPROVED: TMH	

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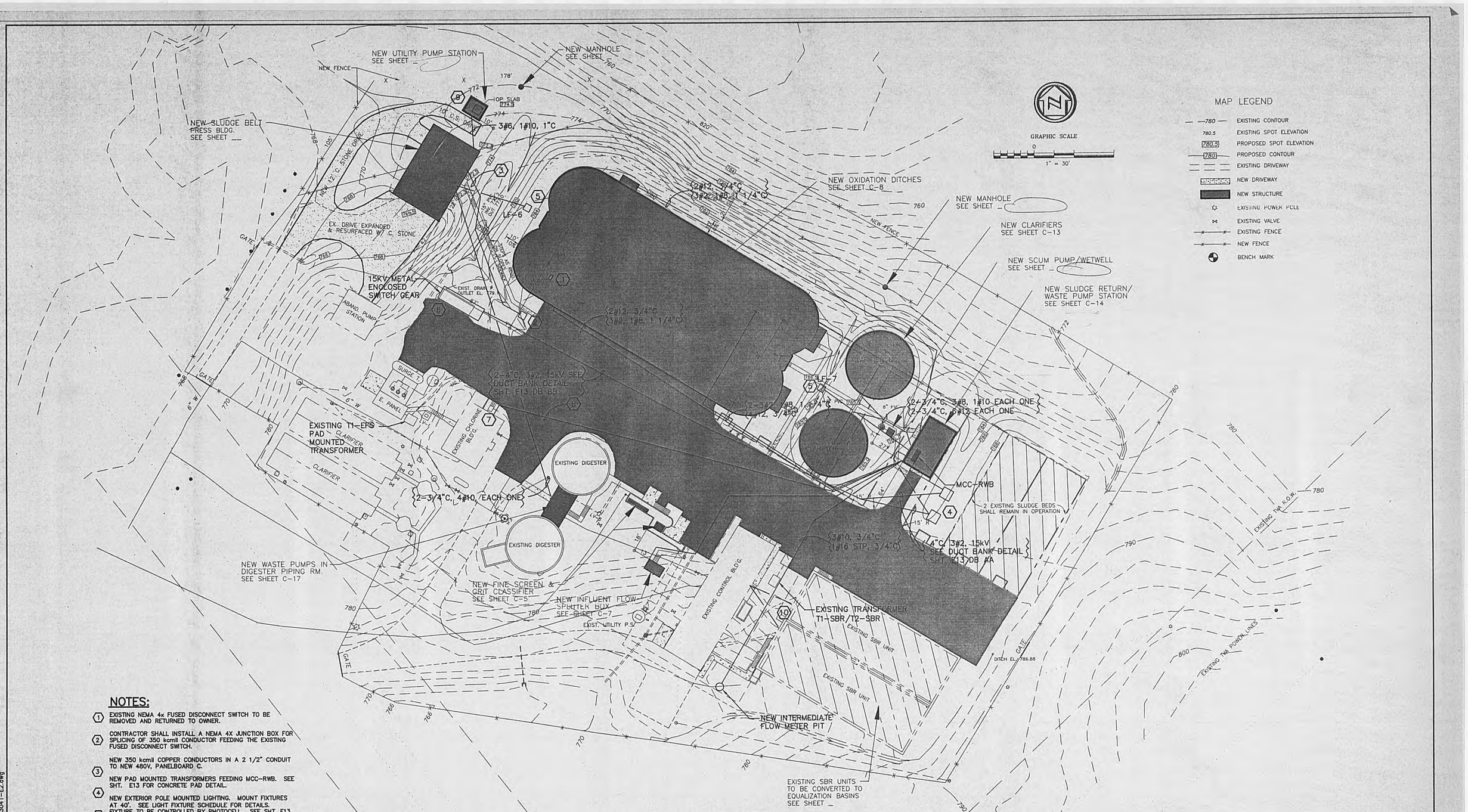

NOTES:

1. EXISTING NEMA 4x FUSED DISCONNECT SWITCH TO BE REMOVED AND RETURNED TO OWNER.
2. CONTRACTOR SHALL INSTALL A NEMA 4X JUNCTION BOX FOR SPLICING OF 350 kcmil CONDUCTOR FEEDING THE EXISTING FUSED DISCONNECT SWITCH.
3. NEW 350 kcmil COPPER CONDUCTORS IN A 2 1/2" CONDUIT TO NEW 480V, PANELBOARD C.

   NEW PAD MOUNTED TRANSFORMERS FEEDING MCC-RWB. SEE SHT. E13 FOR CONCRETE PAD DETAIL.
4. NEW EXTERIOR POLE MOUNTED LIGHTING. MOUNT FIXTURES AT 40'. SEE LIGHT FIXTURE SCHEDULE FOR DETAILS.
5. FIXTURE TO BE CONTROLLED BY PHOTOCELL. SEE SHT. E13 FOR MOUNTING DETAIL.

   CONTRACTOR SHALL INSTALL TWO NEW PRIMARY FEEDS. POUR NEW CONCRETE SLAB TO MATCH EXISTING SLAB FOR MOUNTING OF NEW SWITCH GEAR. SEE SHT. E13 FOR DETAIL.
6. EXISTING CHLORINE BUILDING.

   3/4"C WITH #16 STP TO CHLORINATOR FROM RAS/WAS ELECTRICAL ROOM.
7. SEE SHT. C-23 FOR MOUNTING OF ELECTRICAL EQUIPMENT.
8. NEW CONDUITS FOR EQUALIZATION BASIN BLOWER CONTROLS. 2-3/4" CONDUITS WITH 2 FLOAT CABLES IN EACH CONDUIT.
9.
10.

ELECTRICAL SITE PLAN

SCALE: 30'=1"

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW PROJECT NO. 7601-10

ELECTRICAL SITE PLAN

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

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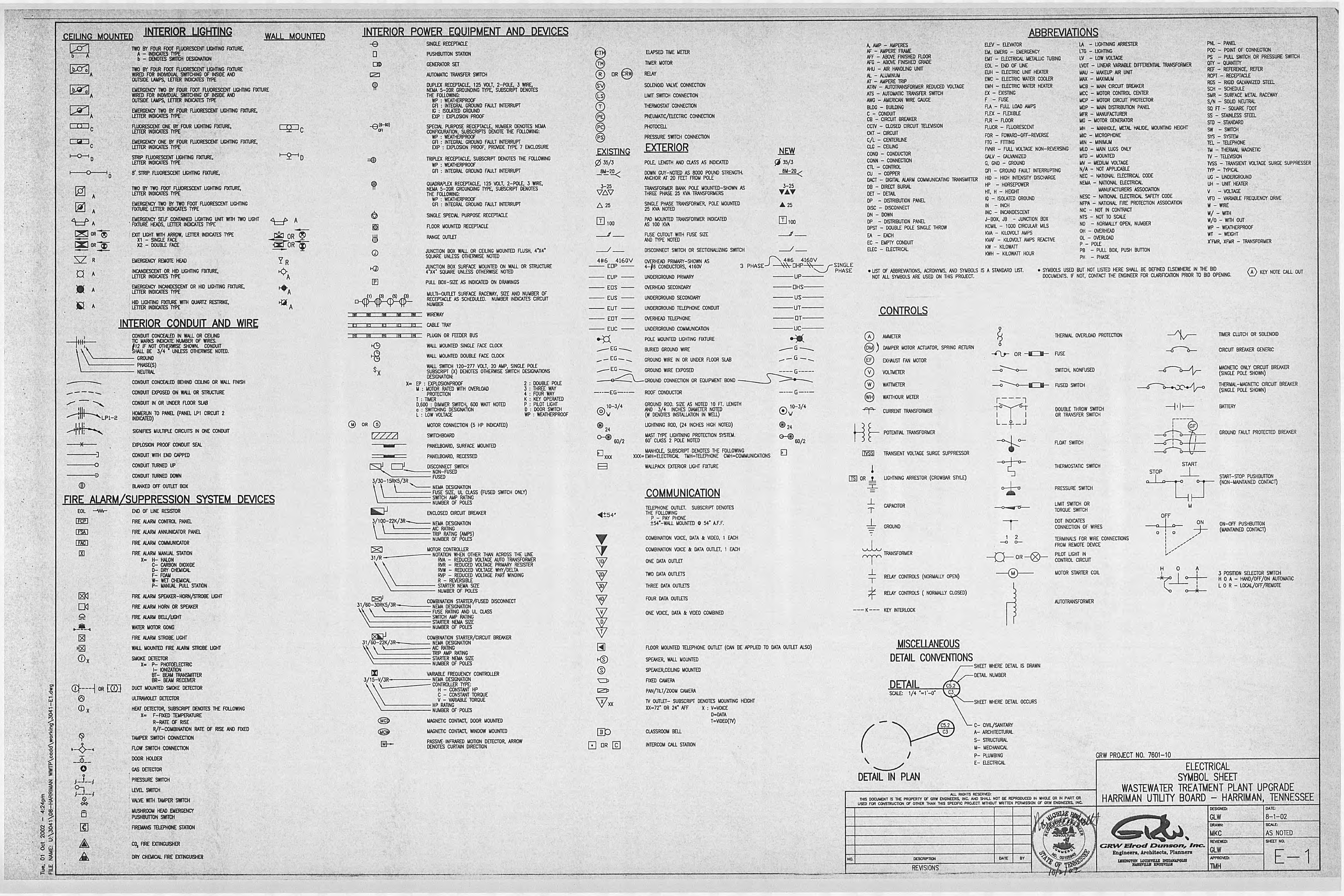

INTERIOR LIGHTING
CEILING MOUNTED
WALL MOUNTED
TWO BY FOUR FOOT FLUORESCENT LIGHTING FIXTURE, A – INDICATES TYPE b – DENOTES SWITCH DESIGNATION
TWO BY FOUR FOOT FLUORESCENT LIGHTING FIXTURE WIRED FOR INDIVIDUAL SWITCHING OF INSIDE AND OUTSIDE LAMPS, LETTER INDICATES TYPE
EMERGENCY TWO BY FOUR FOOT FLUORESCENT LIGHTING FIXTURE WIRED FOR INDIVIDUAL SWITCHING OF INSIDE AND OUTSIDE LAMPS, LETTER INDICATES TYPE
EMERGENCY TWO BY FOUR FLUORESCENT LIGHTING FIXTURE, LETTER INDICATES TYPE
FLUORESCENT ONE BY FOUR LIGHTING FIXTURE, LETTER INDICATES TYPE
EMERGENCY ONE BY FOUR FLUORESCENT LIGHTING FIXTURE, LETTER INDICATES TYPE
STRIP FLUORESCENT LIGHTING FIXTURE, LETTER INDICATES TYPE
8' STRIP FLUORESCENT LIGHTING FIXTURE,
TWO BY TWO FOOT FLUORESCENT LIGHTING FIXTURE, LETTER INDICATES TYPE
EMERGENCY TWO BY TWO FOOT FLUORESCENT LIGHTING FIXTURE LETTER INDICATES TYPE
EMERGENCY SELF CONTAINED LIGHTING UNIT WITH TWO LIGHT FIXTURE HEADS, LETTER INDICATES TYPE
EXIT LIGHT WITH ARROW, LETTER INDICATES TYPE X1 – SINGLE FACE X2 – DOUBLE FACE
EMERGENCY REMOTE HEAD
INCANDESCENT OR HID LIGHTING FIXTURE, LETTER INDICATES TYPE
EMERGENCY INCANDESCENT OR HID LIGHTING FIXTURE, LETTER INDICATES TYPE
HID LIGHTING FIXTURE WITH QUARTZ RESTRIKE, LETTER INDICATES TYPE
INTERIOR CONDUIT AND WIRE
CONDUIT CONCEALED IN WALL OR CEILING TIC MARKS INDICATE NUMBER OF WIRES. #12 IF NOT OTHERWISE SHOWN. CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
GROUND
PHASE(S)
NEUTRAL
CONDUIT CONCEALED BEHIND CEILING OR WALL FINISH
CONDUIT EXPOSED ON WALL OR STRUCTURE
CONDUIT IN OR UNDER FLOOR SLAB
LP1-2
HOMERUN TO PANEL (PANEL LP1 CIRCUIT 2 INDICATED)
SIGNIFIES MULTIPLE CIRCUITS IN ONE CONDUIT
EXPLOSION PROOF CONDUIT SEAL
CONDUIT WITH END CAPPED
CONDUIT TURNED UP
CONDUIT TURNED DOWN
BLANKED OFF OUTLET BOX
FIRE ALARM/SUPPRESSION SYSTEM DEVICES
EOL
END OF LINE RESISTOR
FCP
FIRE ALARM CONTROL PANEL
FSA
FIRE ALARM ANNUNICATOR PANEL
FAC
FIRE ALARM COMMUNICATOR
FIRE ALARM MANUAL STATION X= H– HALON C– CARBON DIOXIDE D– DRY CHEMICAL F– FOAM W– WET CHEMICAL P– MANUAL PULL STATION
FIRE ALARM SPEAKER-HORN/STROBE LIGHT
FIRE ALARM HORN OR SPEAKER
FIRE ALARM BELL/LIGHT
WATER MOTOR GONG
FIRE ALARM STROBE LIGHT
WALL MOUNTED FIRE ALARM STROBE LIGHT
SMOKE DETECTOR X= P– PHOTOELECTRIC I– IONIZATION BT– BEAM TRANSMITTER BR– BEAM RECEIVER
DUCT MOUNTED SMOKE DETECTOR
ULTRAVIOLET DETECTOR
HEAT DETECTOR, SUBSCRIPT DENOTES THE FOLLOWING X= F–FIXED TEMPERATURE R–RATE OF RISE R/F–COMBINATION RATE OF RISE AND FIXED
TAMPER SWITCH CONNECTION
FLOW SWITCH CONNECTION
DOOR HOLDER
GAS DETECTOR
PRESSURE SWITCH
LEVEL SWITCH
VALVE WITH TAMPER SWITCH
MUSHROOM HEAD EMERGENCY PUSHBUTTON SWITCH
FIREMANS TELEPHONE STATION
CO2 FIRE EXTINGUISHER
DRY CHEMICAL FIRE EXTINGUISHER
INTERIOR POWER EQUIPMENT AND DEVICES
SINGLE RECEPTACLE
PUSHBUTTON STATION
GENERATOR SET
AUTOMATIC TRANSFER SWITCH
DUPLEX RECEPTACLE, 125 VOLT, 2-POLE, 3 WIRE, NEMA 5-20R GROUNDING TYPE, SUBSCRIPT DENOTES THE FOLLOWING: WP : WEATHERPROOF GFI : INTEGRAL GROUND FAULT INTERRUPT IG : ISOLATED GROUND EXP : EXPLOSION PROOF
SPECIAL PURPOSE RECEPTACLE, NUMBER DENOTES NEMA CONFIGURATION, SUBSCRIPTS DENOTE THE FOLLOWING: WP : WEATHERPROOF GFI : INTEGRAL GROUND FAULT INTERRUPT EXP : EXPLOSION PROOF, PROVIDE TYPE 7 ENCLOSURE
TRIPLEX RECEPTACLE, SUBSCRIPT DENOTES THE FOLLOWING WP : WEATHERPROOF GFI : INTEGRAL GROUND FAULT INTERRUPT
QUADRAPLEX RECEPTACLE, 125 VOLT, 2-POLE, 3 WIRE, NEMA 5-20R GROUNDING TYPE, SUBSCRIPT DENOTES THE FOLLOWING: WP : WEATHERPROOF GFI : INTEGRAL GROUND FAULT INTERRUPT
SINGLE SPECIAL PURPOSE RECEPTACLE
FLOOR MOUNTED RECEPTACLE
RANGE OUTLET
JUNCTION BOX WALL OR CEILING MOUNTED FLUSH, 4"X4" SQUARE UNLESS OTHERWISE NOTED
JUNCTION BOX SURFACE MOUNTED ON WALL OR STRUCTURE 4"X4" SQUARE UNLESS OTHERWISE NOTED
PULL BOX-SIZE AS INDICATED ON DRAWINGS
MULTI-OUTLET SURFACE RACEWAY, SIZE AND NUMBER OF RECEPTACLE AS SCHEDULED. NUMBER INDICATES CIRCUIT NUMBER
WIREWAY
CABLE TRAY
PLUGIN OR FEEDER BUS
WALL MOUNTED SINGLE FACE CLOCK
WALL MOUNTED DOUBLE FACE CLOCK
WALL SWITCH 120-277 VOLT, 20 AMP, SINGLE POLE SUBSCRIPT (X) DENOTES OTHERWISE SWITCH DESIGNATIONS DESIGNATION:
X= EP : EXPLOSIONPROOF M : MOTOR RATED WITH OVERLOAD PROTECTION T : TIMER D,600 : DIMMER SWITCH, 600 WATT NOTED a : SWITCHING DESIGNATION L : LOW VOLTAGE
2 : DOUBLE POLE 3 : THREE WAY 4 : FOUR WAY K : KEY OPERATED P : PILOT LIGHT D : DOOR SWITCH WP : WEATHERPROOF
MOTOR CONNECTION (5 HP INDICATED)
SWITCHBOARD
PANELBOARD, SURFACE MOUNTED
PANELBOARD, RECESSED
DISCONNECT SWITCH NON-FUSED FUSED
3/30-15RK5/3R NEMA DESIGNATION FUSE SIZE, UL CLASS (FUSED SWITCH ONLY) SWITCH AMP RATING NUMBER OF POLES
ENCLOSED CIRCUIT BREAKER
3/100-22K/3R NEMA DESIGNATION AIC RATING TRIP RATING (AMPS) NUMBER OF POLES
MOTOR CONTROLLER
31/R NOTATION WHEN OTHER THAN ACROSS THE LINE RVA – REDUCED VOLTAGE AUTO TRANSFORMER RVR – REDUCED VOLTAGE PRIMARY RESISTER RVW – REDUCED VOLTAGE WHY/DELTA RVP – REDUCED VOLTAGE PART WINDING R – REVERSIBLE STARTER NEMA SIZE NUMBER OF POLES
COMBINATION STARTER/FUSED DISCONNECT
31/60-30RK5/3R NEMA DESIGNATION FUSE RATING AND UL CLASS SWITCH AMP RATING STARTER NEMA SIZE NUMBER OF POLES
COMBINATION STARTER/CIRCUIT BREAKER
31/60-22K/3R NEMA DESIGNATION AIC RATING TRIP AMP RATING STARTER NEMA SIZE NUMBER OF POLES
VARIABLE FREQUENCY CONTROLLER
3/15-V/3R NEMA DESIGNATION CONTROLLER TYPE: H – CONSTANT HP C – CONSTANT TORQUE V – VARIABLE TORQUE HP RATING NUMBER OF POLES
MCD
MAGNETIC CONTACT, DOOR MOUNTED
MCW
MAGNETIC CONTACT, WINDOW MOUNTED
PASSIVE INFRARED MOTION DETECTOR, ARROW DENOTES CURTAIN DIRECTION
ETM
ELAPSED TIME METER
TM
TIMER MOTOR
R OR CR#
RELAY
SV
SOLENOID VALVE CONNECTION
LS
LIMIT SWITCH CONNECTION
T
THERMOSTAT CONNECTION
PE
PNEUMATIC/ELECTRIC CONNECTION
PC
PHOTOCELL
PS
PRESSURE SWITCH CONNECTION
EXISTING
EXTERIOR
NEW
POLE, LENGTH AND CLASS AS INDICATED
DOWN GUY-NOTED AS 8000 POUND STRENGTH. ANCHOR AT 20 FEET FROM POLE
TRANSFORMER BANK POLE MOUNTED-SHOWN AS THREE PHASE 25 KVA TRANSFORMERS
SINGLE PHASE TRANSFORMER, POLE MOUNTED 25 KVA NOTED
PAD MOUNTED TRANSFORMER INDICATED AS 100 KVA
FUSE CUTOUT WITH FUSE SIZE AND TYPE NOTED
DISCONNECT SWITCH OR SECTIONALIZING SWITCH
OVERHEAD PRIMARY-SHOWN AS 4-#6 CONDUCTORS, 4160V
3 PHASE
SINGLE PHASE
UNDERGROUND PRIMARY
OVERHEAD SECONDARY
UNDERGROUND SECONDARY
UNDERGROUND TELEPHONE CONDUIT
OVERHEAD TELEPHONE
UNDERGROUND COMMUNICATION
POLE MOUNTED LIGHTING FIXTURE
BURIED GROUND WIRE
GROUND WIRE IN OR UNDER FLOOR SLAB
GROUND WIRE EXPOSED
GROUND CONNECTION OR EQUIPMENT BOND
ROOF CONDUCTOR
GROUND ROD. SIZE AS NOTED 10 FT. LENGTH AND 3/4 INCHES DIAMETER NOTED (W DENOTES INSTALLATION IN WELL)
LIGHTNING ROD, (24 INCHES HIGH NOTED)
MAST TYPE LIGHTNING PROTECTION SYSTEM. 60' CLASS 2 POLE NOTED
MANHOLE, SUBSCRIPT DENOTES THE FOLLOWING XXX= EMH=ELECTRICAL TMH=TELEPHONE CMH=COMMUNICATIONS
WALLPACK EXTERIOR LIGHT FIXTURE
COMMUNICATION
TELEPHONE OUTLET. SUBSCRIPT DENOTES THE FOLLOWING P – PAY PHONE ±54"-WALL MOUNTED @ 54" A.F.F.
COMBINATION VOICE, DATA & VIDEO, 1 EACH
COMBINATION VOICE & DATA OUTLET, 1 EACH
ONE DATA OUTLET
TWO DATA OUTLETS
THREE DATA OUTLETS
FOUR DATA OUTLETS
ONE VOICE, DATA & VIDEO COMBINED
FLOOR MOUNTED TELEPHONE OUTLET (CAN BE APPLIED TO DATA OUTLET ALSO)
SPEAKER, WALL MOUNTED
SPEAKER,CEILING MOUNTED
FIXED CAMERA
PAN/TILT/ZOOM CAMERA
TV OUTLET– SUBSCRIPT DENOTES MOUNTING HEIGHT XX=72" OR 24" AFF X : V=VOICE D=DATA T=VIDEO(TV)
CLASSROOM BELL
INTERCOM CALL STATION
ABBREVIATIONS
A, AMP – AMPERES
AF – AMPERE FRAME
AFF – ABOVE FINISHED FLOOR
AFG – ABOVE FINISHED GRADE
AHU – AIR HANDLING UNIT
AL – ALUMINUM
AT – AMPERE TRIP
ATRV – AUTOTRANSFORMER REDUCED VOLTAGE
ATS – AUTOMATIC TRANSFER SWITCH
AWG – AMERICAN WIRE GAUGE
BLDG – BUILDING
C – CONDUIT
CB – CIRCUIT BREAKER
CCTV – CLOSED CIRCUIT TELEVISION
CKT – CIRCUIT
C/L – CENTERLINE
CLG – CEILING
COND – CONDUCTOR
CONN – CONNECTION
CTL – CONTROL
CU – COPPER
DACT – DIGITAL ALARM COMMUNICATING TRANSMITTER
DB – DIRECT BURIAL
DET – DETAIL
DP – DISTRIBUTION PANEL
DISC – DISCONNECT
DN – DOWN
DP – DISTRIBUTION PANEL
DPST – DOUBLE POLE SINGLE THROW
EA – EACH
EC – EMPTY CONDUIT
ELEC – ELECTRICAL
ELEV – ELEVATOR
EM, EMERG – EMERGENCY
EMT – ELECTRICAL METALLIC TUBING
EOL – END OF LINE
EUH – ELECTRIC UNIT HEATER
EWC – ELECTRIC WATER COOLER
EWH – ELECTRIC WATER HEATER
EX – EXISTING
F – FUSE
FLA – FULL LOAD AMPS
FLEX – FLEXIBLE
FLR – FLOOR
FLUOR – FLUORESCENT
FOR – FOWARD-OFF-REVERSE
FTG – FITTING
FVNR – FULL VOLTAGE NON-REVERSING
GALV – GALVANIZED
G, GND – GROUND
GFI – GROUND FAULT INTERRUPTING
HID – HIGH INTENSITY DISCHARGE
HP – HORSEPOWER
HT, H – HEIGHT
IG – ISOLATED GROUND
IN – INCH
INC – INCANDESCENT
J-BOX, JB – JUNCTION BOX
KCMIL – 1000 CIRCULAR MILS
KVA – KILOVOLT AMPS
KVAF – KILOVOLT AMPS REACTIVE
KW – KILOWATT
KWH – KILOWATT HOUR
LA – LIGHTNING ARRESTER
LTG – LIGHTING
LV – LOW VOLTAGE
LVDT – LINEAR VARIABLE DIFFERENTIAL TRANSFORMER
MAU – MAKEUP AIR UNIT
MAX – MAXIMUM
MCB – MAIN CIRCUIT BREAKER
MCC – MOTOR CONTROL CENTER
MCP – MOTOR CIRCUIT PROTECTOR
MDP – MAIN DISTRIBUTION PANEL
MFR – MANUFACTURER
MG – MOTOR GENERATOR
MH – MANHOLE, METAL HALIDE, MOUNTING HEIGHT
MIC – MICROPHONE
MIN – MINIMUM
MLO – MAIN LUGS ONLY
MTD – MOUNTED
MV – MEDIUM VOLTAGE
N/A – NOT APPLICABLE
NEC – NATIONAL ELECTRICAL CODE
NEMA – NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NESC – NATIONAL ELECTRICAL SAFETY CODE
NFPA – NATIONAL FIRE PROTECTION ASSOCIATION
NIC – NOT IN CONTRACT
NTS – NOT TO SCALE
NO – NORMALLY OPEN, NUMBER
OH – OVERHEAD
OL – OVERLOAD
P – POLE
PB – PULL BOX, PUSH BUTTON
PH – PHASE
PNL – PANEL
POC – POINT OF CONNECTION
PS – PULL SWITCH OR PRESSURE SWITCH
QTY – QUANTITY
REF – REFERENCE, REFER
RCPT – RECEPTACLE
RGS – RIGID GALVANIZED STEEL
SCH – SCHEDULE
SMR – SURFACE METAL RACEWAY
S/N – SOLID NEUTRAL
SQ FT – SQUARE FOOT
SS – STAINLESS STEEL
STD – STANDARD
SW – SWITCH
SYS – SYSTEM
TEL – TELEPHONE
TM – THERMAL MAGNETIC
TV – TELEVISION
TVSS – TRANSIENT VOLTAGE SURGE SUPPRESSER
TYP – TYPICAL
UG – UNDERGROUND
UH – UNIT HEATER
V – VOLTAGE
VFD – VARIABLE FREQUENCY DRIVE
W – WIRE
W/ – WITH
W/O – WITH OUT
WP – WEATHERPROOF
WT – WEIGHT
X'FMR, XFMR – TRANSFORMER
• LIST OF ABBREVIATIONS, ACRONYMS, AND SYMBOLS IS A STANDARD LIST. NOT ALL SYMBOLS ARE USED ON THIS PROJECT.
• SYMBOLS USED BUT NOT LISTED HERE SHALL BE DEFINED ELSEWHERE IN THE BID DOCUMENTS. IF NOT, CONTACT THE ENGINEER FOR CLARIFICATION PRIOR TO BID OPENING.
KEY NOTE CALL OUT
CONTROLS
AMMETER
DAMPER MOTOR ACTUATOR, SPRING RETURN
EXHAUST FAN MOTOR
VOLTMETER
WATTMETER
WATTHOUR METER
CURRENT TRANSFORMER
POTENTIAL TRANSFORMER
TRANSIENT VOLTAGE SURGE SUPPRESSOR
LIGHTNING ARRESTOR (CROWBAR STYLE)
CAPACITOR
GROUND
TRANSFORMER
RELAY CONTROLS (NORMALLY OPEN)
RELAY CONTROLS (NORMALLY CLOSED)
KEY INTERLOCK
THERMAL OVERLOAD PROTECTION
FUSE
SWITCH, NONFUSED
FUSED SWITCH
DOUBLE THROW SWITCH OR TRANSFER SWITCH
FLOAT SWITCH
THERMOSTATIC SWITCH
PRESSURE SWITCH
LIMIT SWITCH OR TORQUE SWITCH
DOT INDICATES CONNECTION OF WIRES
TERMINALS FOR WIRE CONNECTIONS FROM REMOTE DEVICE
PILOT LIGHT IN CONTROL CIRCUIT
MOTOR STARTER COIL
AUTOTRANSFORMER
TIMER CLUTCH OR SOLENOID
CIRCUIT BREAKER GENERIC
MAGNETIC ONLY CIRCUIT BREAKER (SINGLE POLE SHOWN)
THERMAL-MAGNETIC CIRCUIT BREAKER (SINGLE POLE SHOWN)
BATTERY
GROUND FAULT PROTECTED BREAKER
STOP
START
START-STOP PUSHBUTTON (NON-MAINTAINED CONTACT)
OFF
ON
ON-OFF PUSHBUTTON (MAINTAINED CONTACT)
3 POSITION SELECTOR SWITCH H O A – HAND/OFF/ON AUTOMATIC L O R – LOCAL/OFF/REMOTE
MISCELLANEOUS
DETAIL CONVENTIONS
SHEET WHERE DETAIL IS DRAWN
DETAIL NUMBER
DETAIL
SCALE: 1/4 "=1'-0"
SHEET WHERE DETAIL OCCURS
C– CIVIL/SANITARY
A– ARCHITECTURAL
S– STRUCTURAL
M– MECHANICAL
P– PLUMBING
E– ELECTRICAL
DETAIL IN PLAN
GRW PROJECT NO. 7601-10
ELECTRICAL
SYMBOL SHEET
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE
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NO.
DESCRIPTION
DATE
BY
REVISIONS
STATE OF TENNESSEE
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE
DESIGNED: GLW
DRAWN: MKC
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APPROVED: TMH
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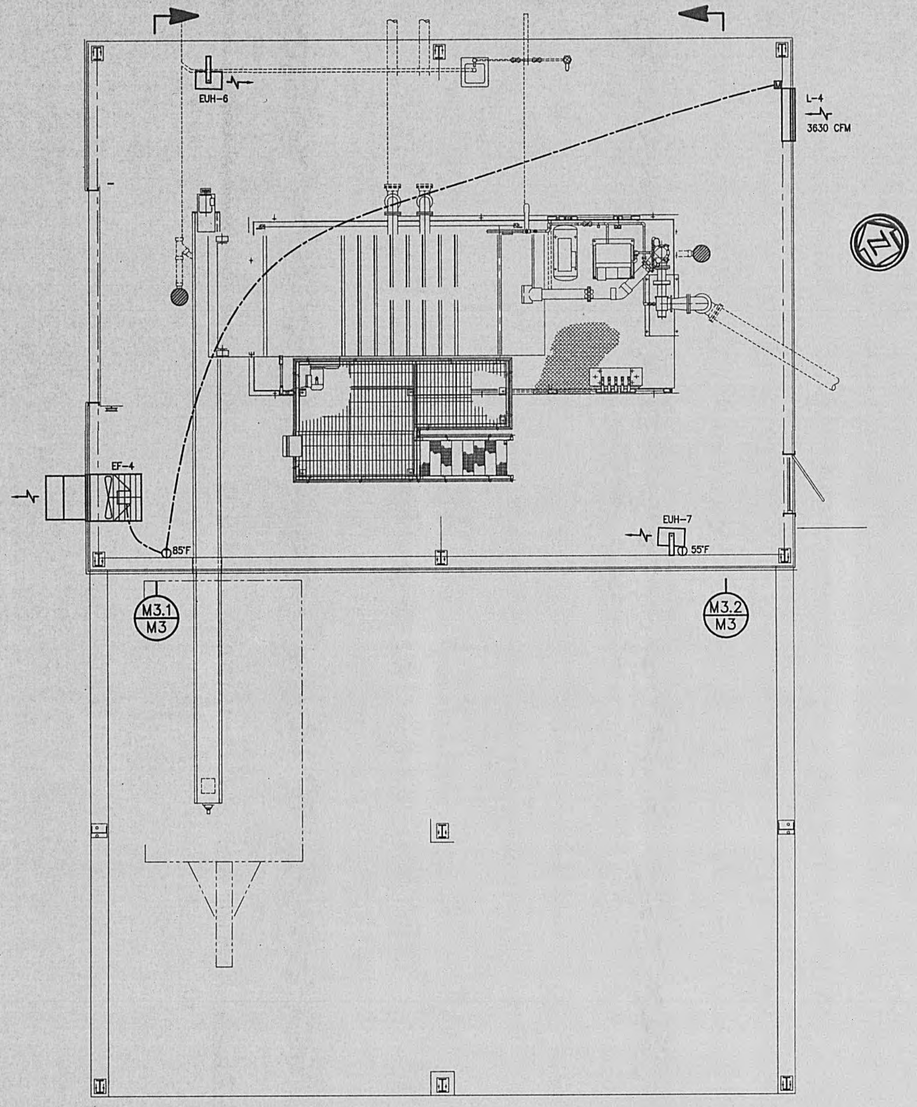
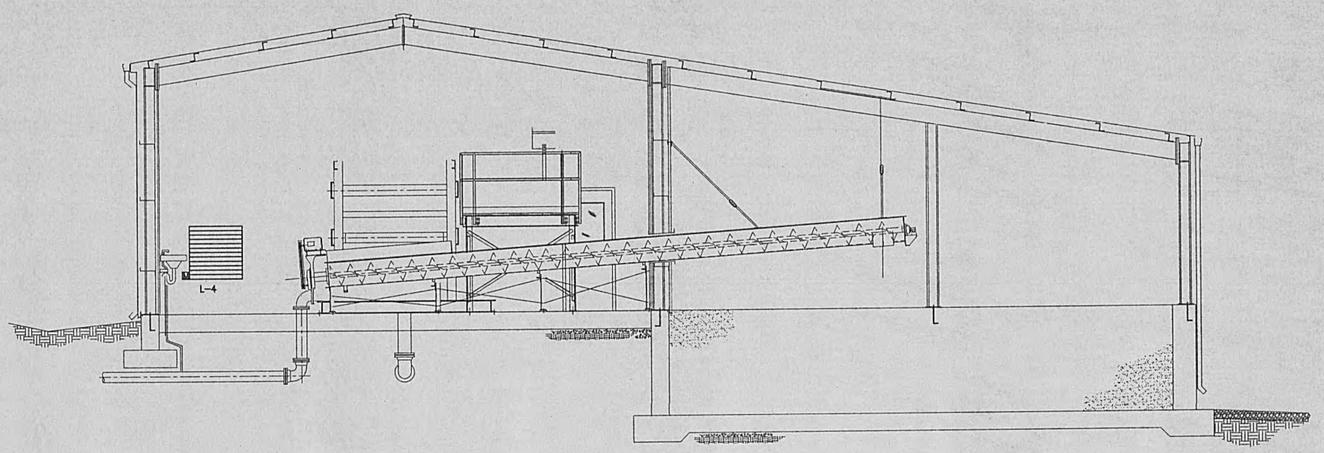


BELT PRESS BUILDING – PLAN
SCALE: 1/4"=1'-0"



SECTION
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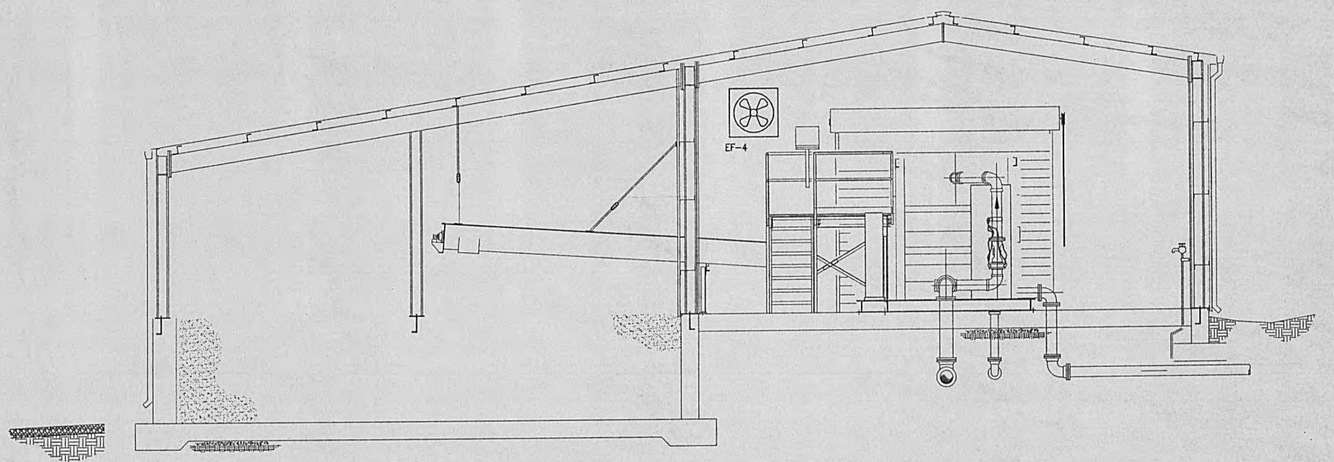
M3.1
M3



SECTION
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M3.2
M3

GRW PROJECT NO. 7601-10

BELT FILTER PRESS BUILDING
MECHANICAL PLAN & SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

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REGISTERED ENGINEER
No. 001022
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DESIGNED: RGE	DATE: 8-1-02
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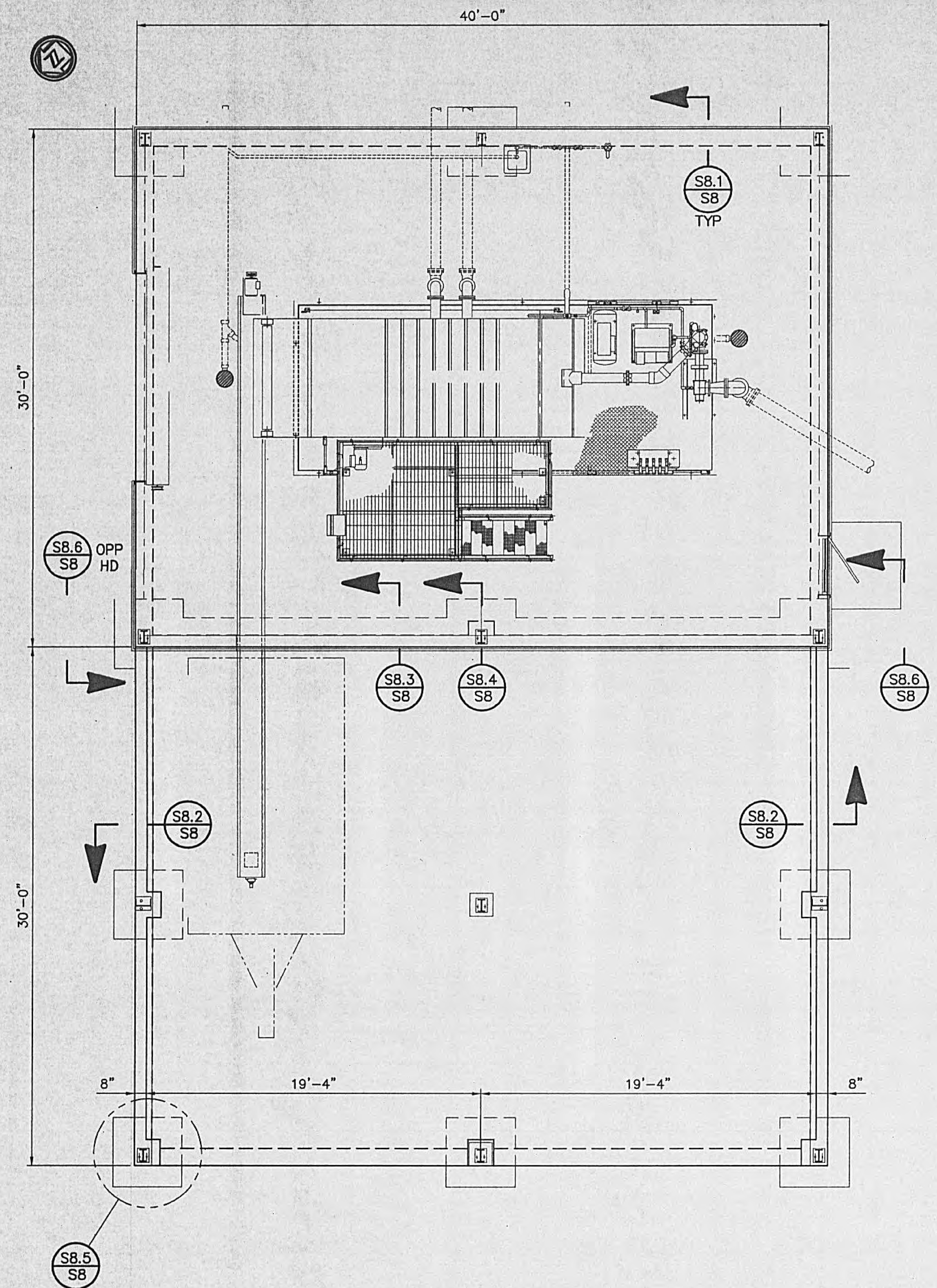
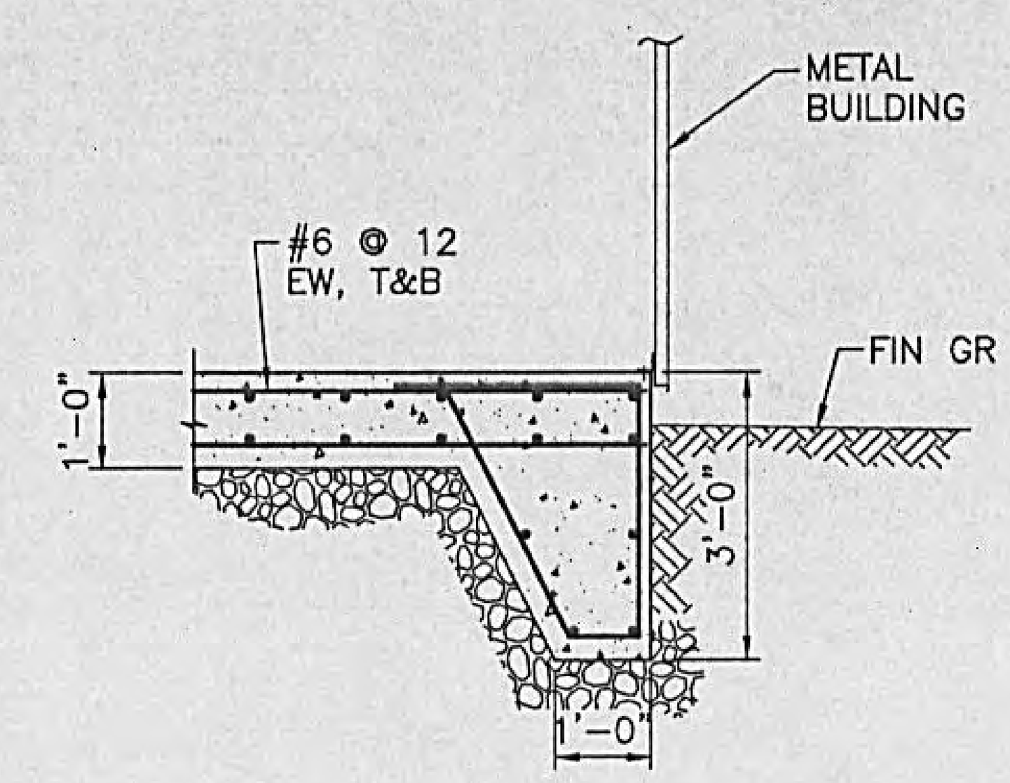


FOUNDATION PLAN

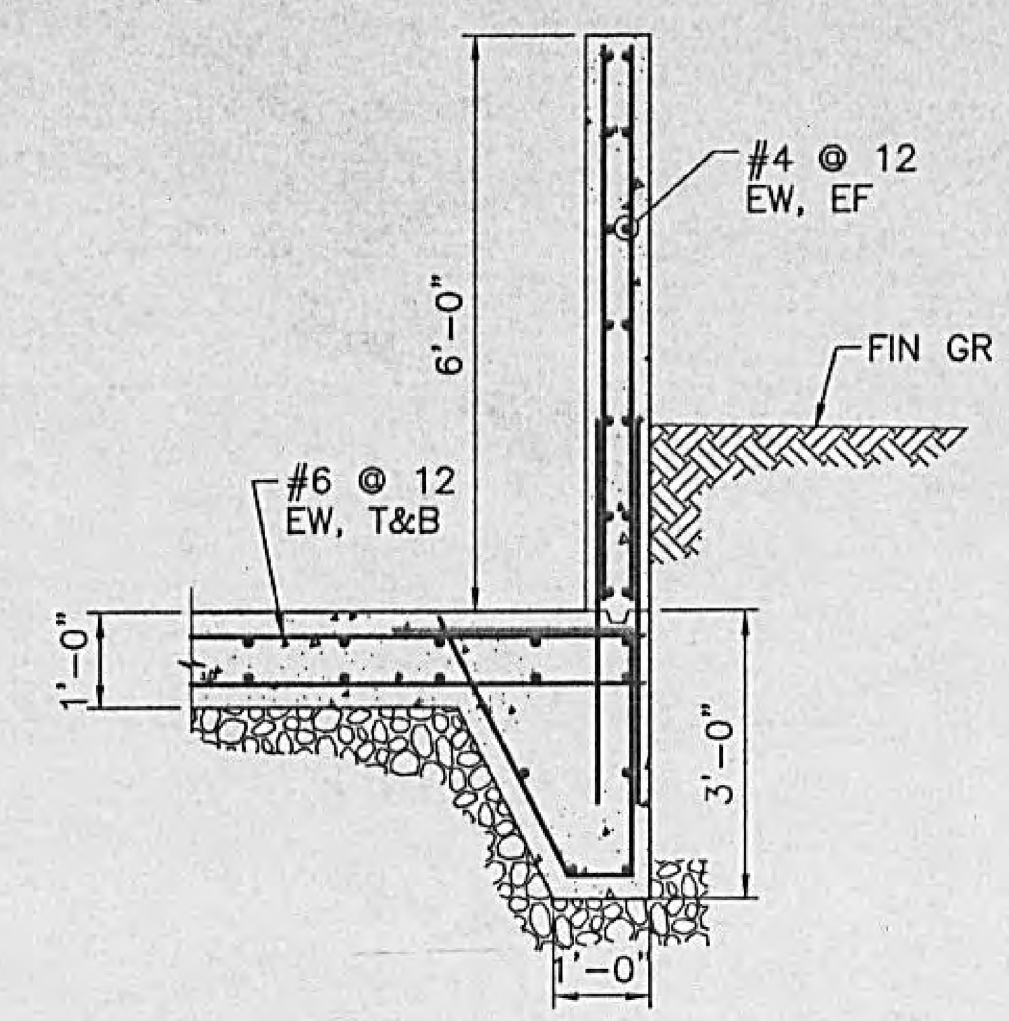
SCALE: 1/4" = 1'-0"

NOTE: FOR LOCATION OF COLUMNS, COORDINATE WITH METAL BUILDING SUPPLIER.



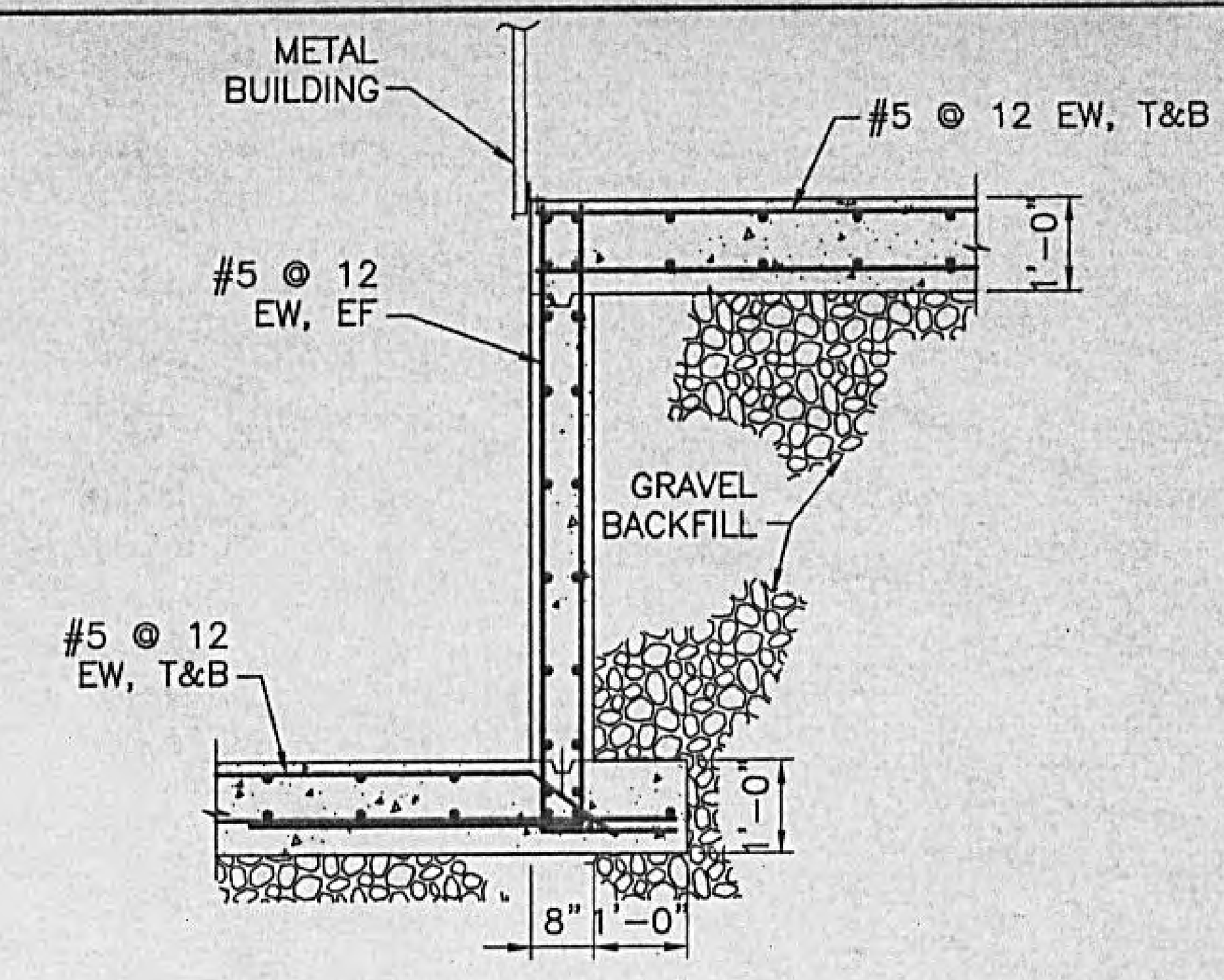
SECTION (S8.1/S8)

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



SECTION (S8.2/S8)

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



SECTION (S8.3/S8)

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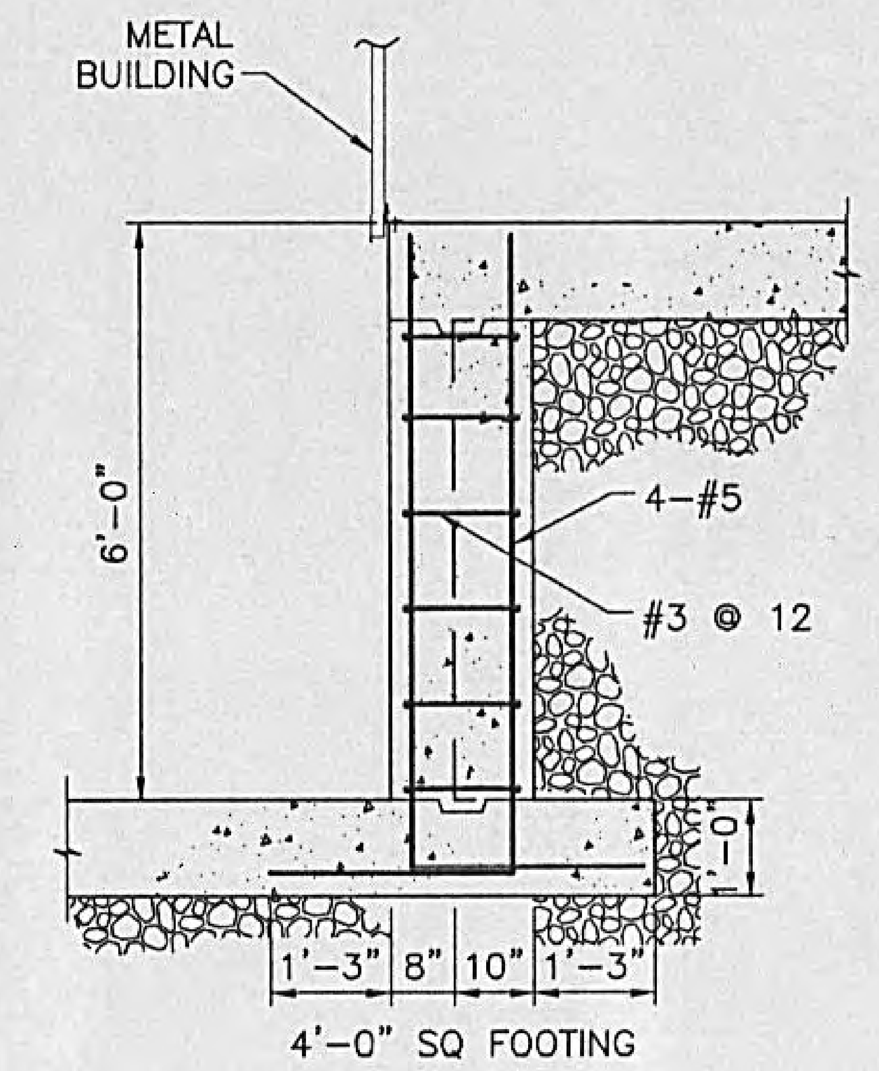
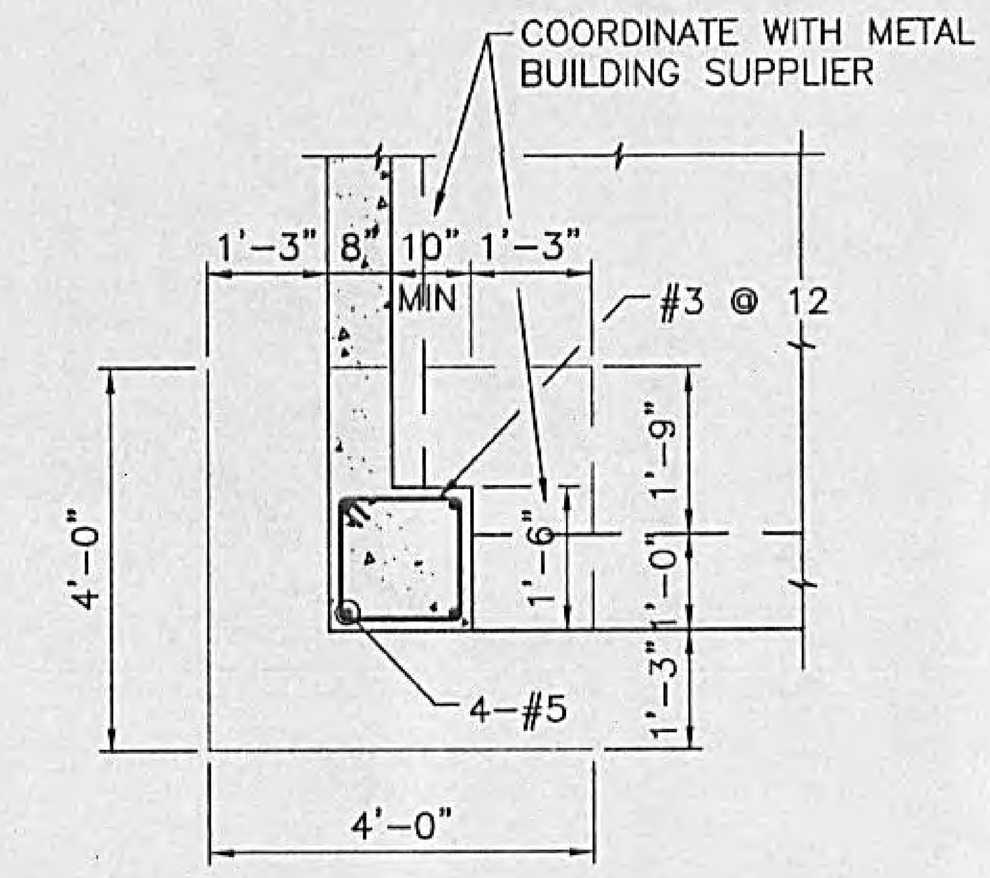


NOTE: WALL AND SLAB REINFORCEMENT NOT SHOWN FOR CLARITY

SECTION (S8.4/S8)

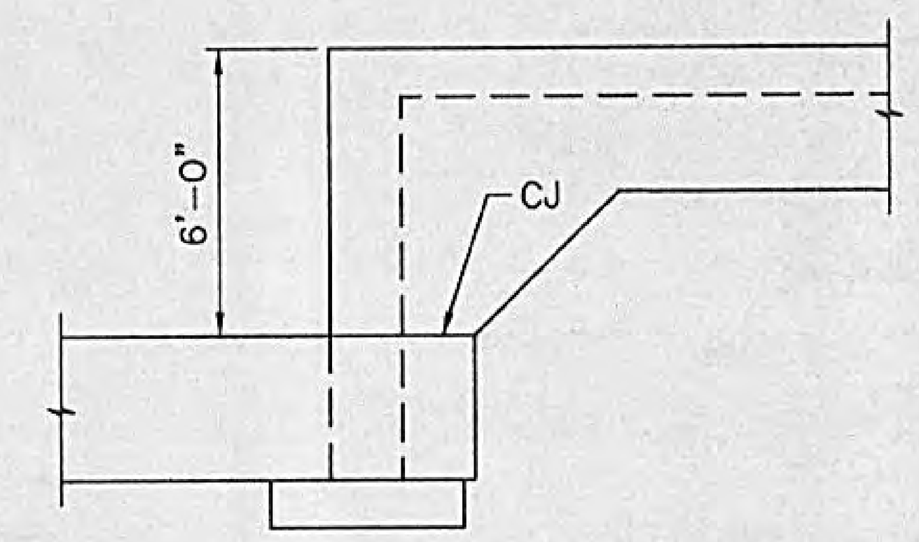
SCALE: 1/2" = 1'-0"



NOTE: TYPICAL ALL COLUMN LOCATIONS

DETAIL (S8.5/S8)

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



ELEVATION (S8.6/S8)

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

GRW PROJECT NO. 7601-10

BELT FILTER PRESS BUILDING
STRUCTURAL PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

KRISHNAMURTHY R. NARAYANAN — REGISTERED ENGINEER — No. 00... — STATE OF TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: 8-1-02
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO.
APPROVED: KRN	S-8

Wed, 02 Oct 2002 - 1:21pm
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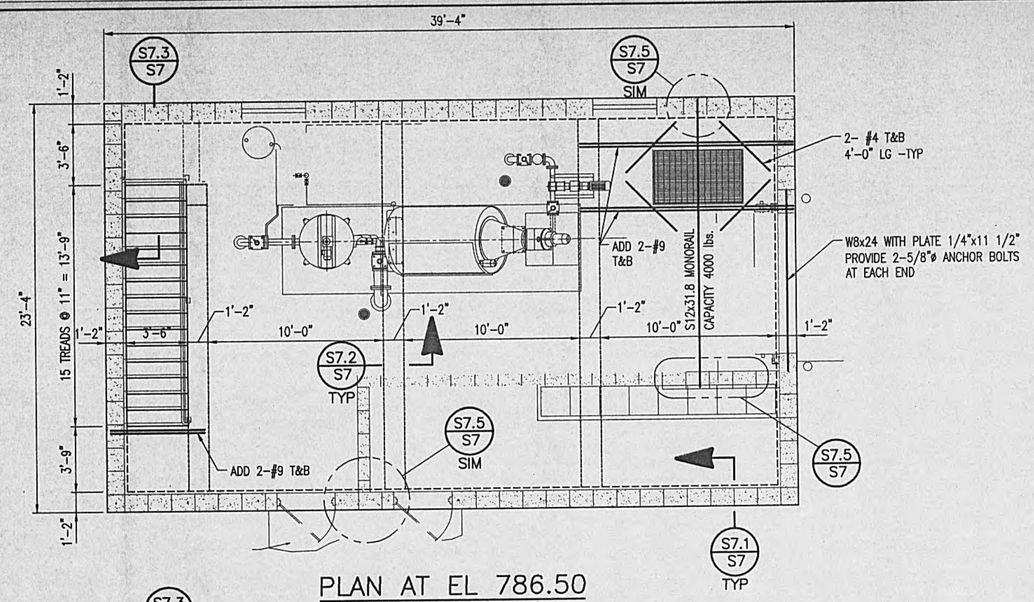
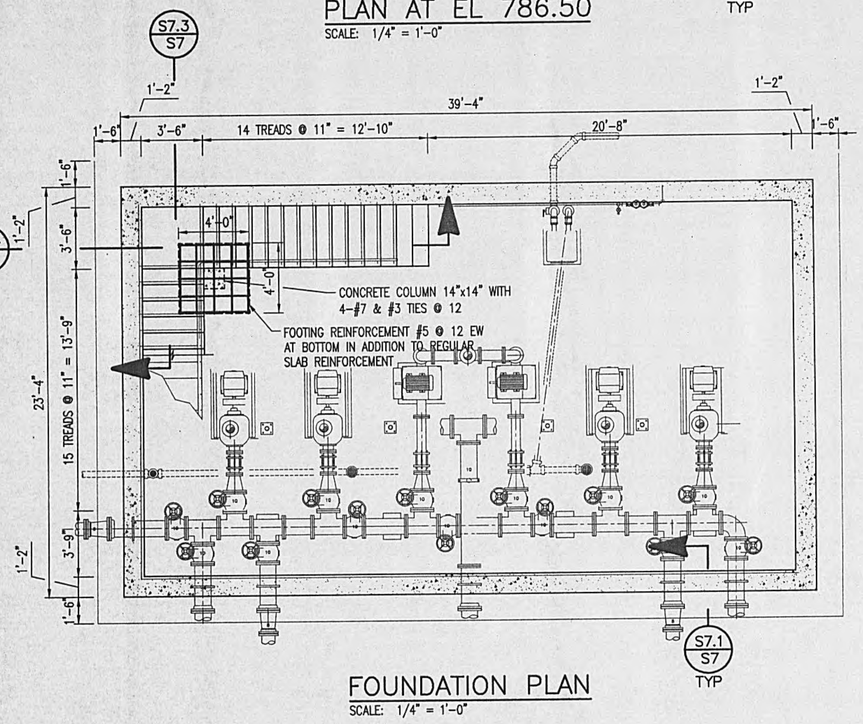


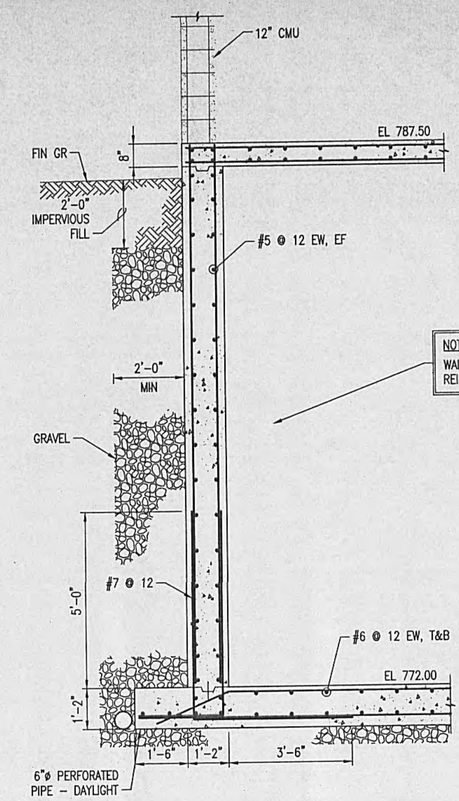
PLAN AT EL 786.50

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



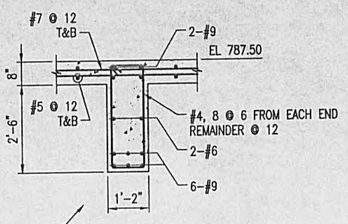
FOUNDATION PLAN

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



SECTION

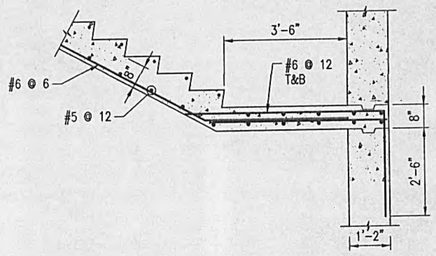
SCALE: 1/2" = 1'-0" (S7.1 S7)



NOTE:
WALL AND BEAM REINFORCEMENT TYPICAL

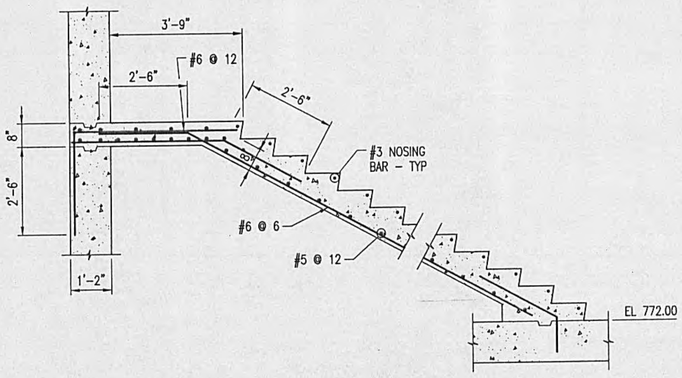
SECTION

SCALE: 1/2" = 1'-0" (S7.2 S7)



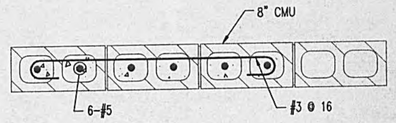
SECTION

SCALE: 1/2" = 1'-0" (S7.3 S7)



SECTION

SCALE: 1/2" = 1'-0" (S7.4 S7)



TYPICAL DETAIL

SCALE: 1" = 1'-0" (S7.5 S7)

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

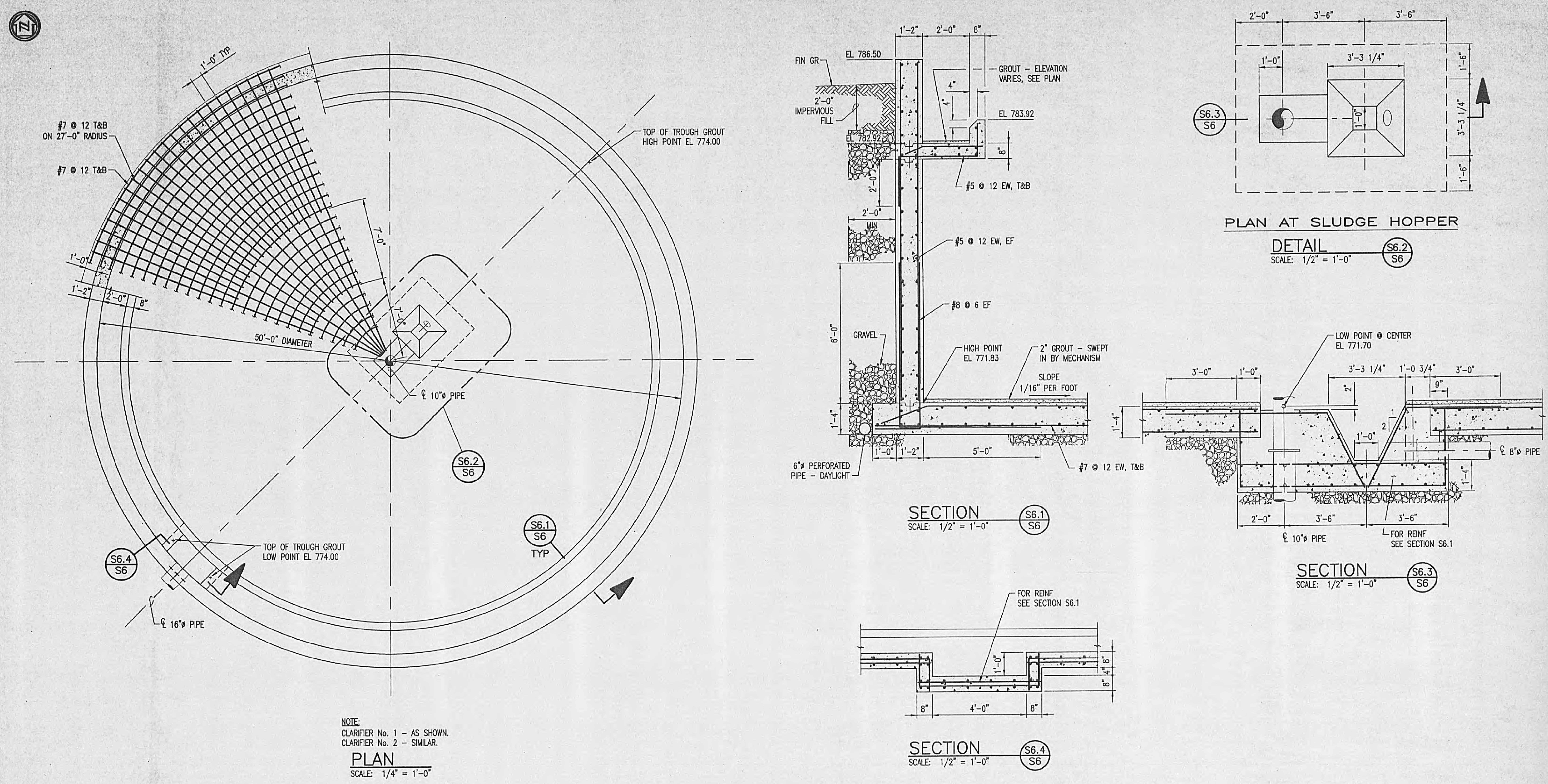
VISWANATHA R. NARAYANAPPA
REGISTERED ENGINEER
No. 022135
STATE OF TENNESSEE
10-2-02

GRW PROJECT NO.7601-10

RETURN / WASTE SLUDGE PUMP BUILDING
STRUCTURAL PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-7
APPROVED: KRN	



GRW PROJECT NO.7601-10

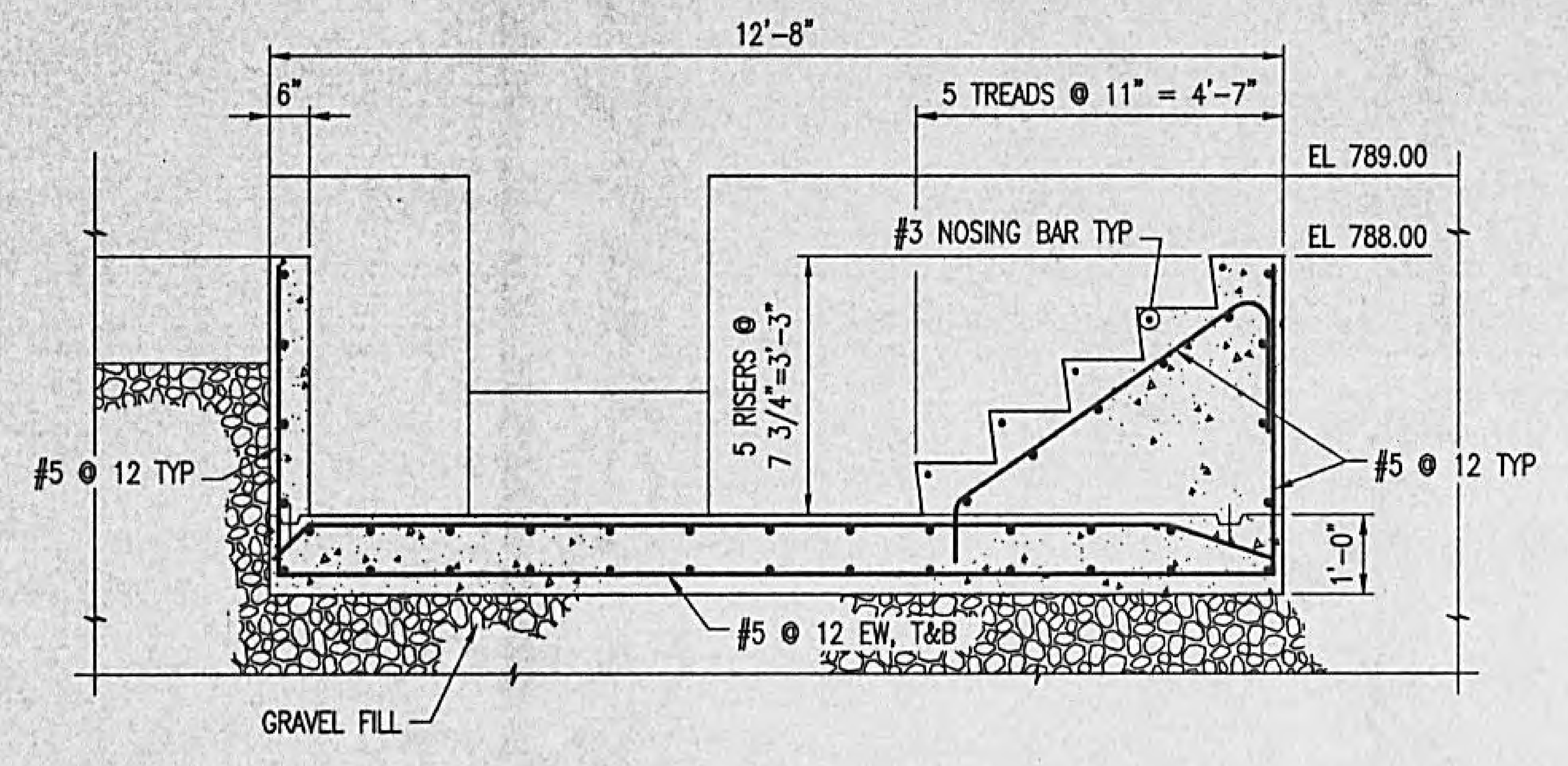
CLARIFIER
STRUCTURAL PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-6
APPROVED: KRN	



SECTION S5.1/S3
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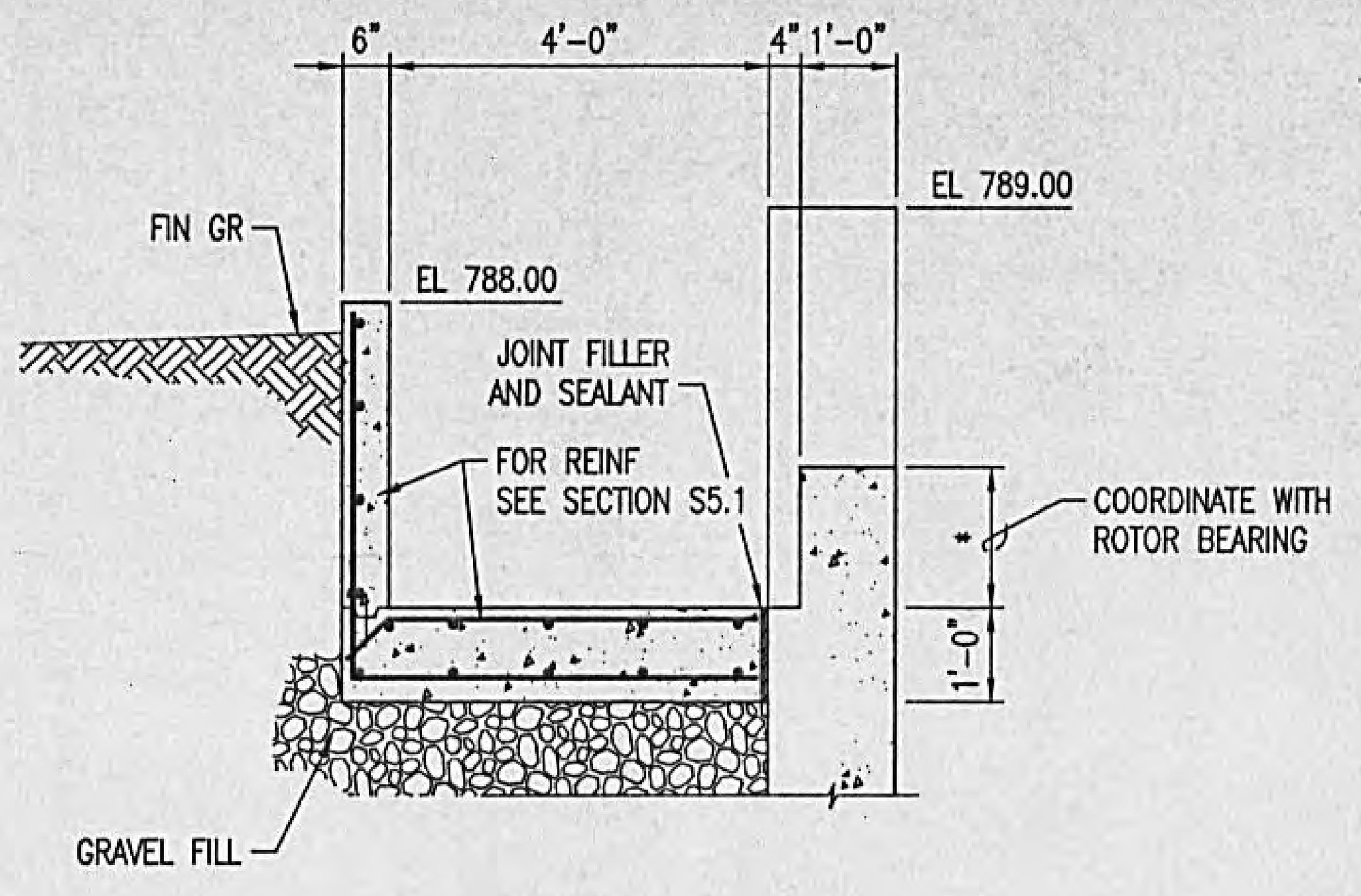
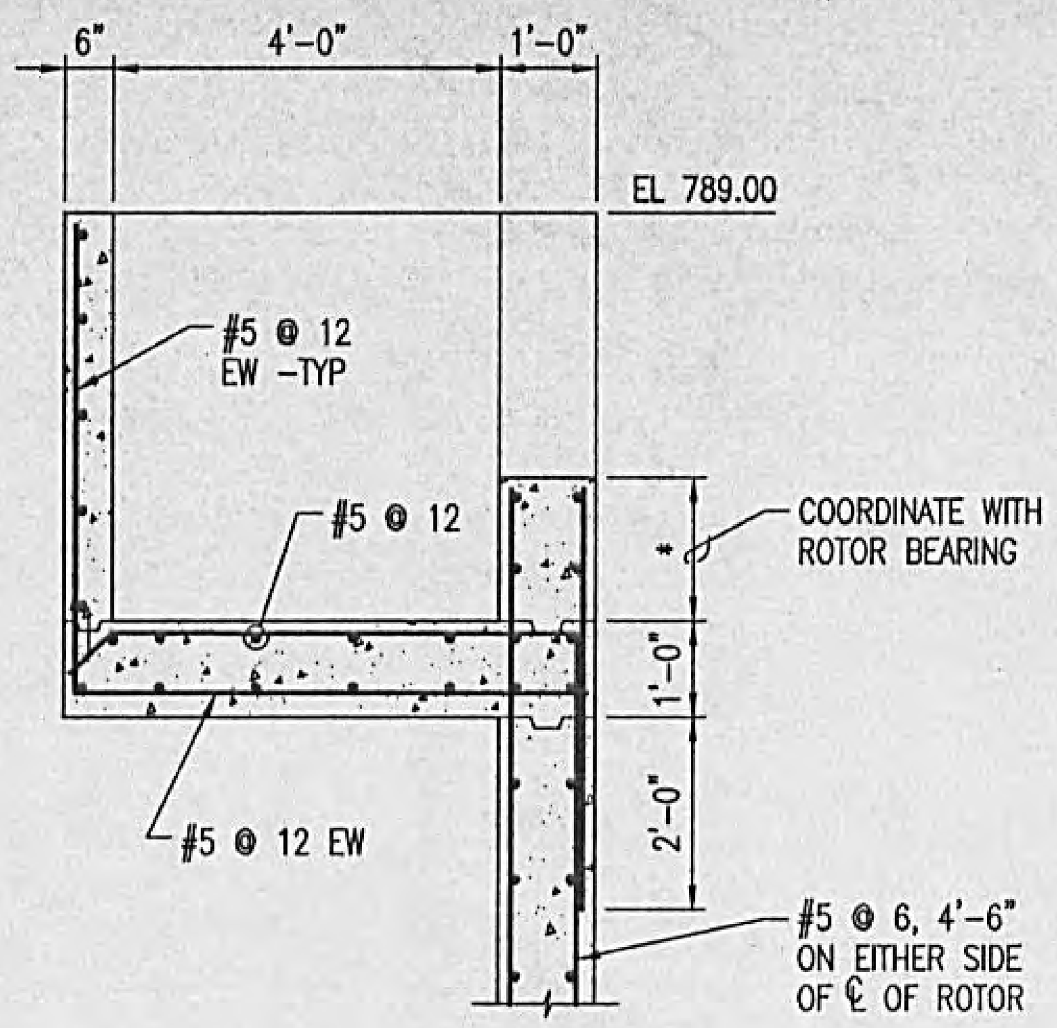
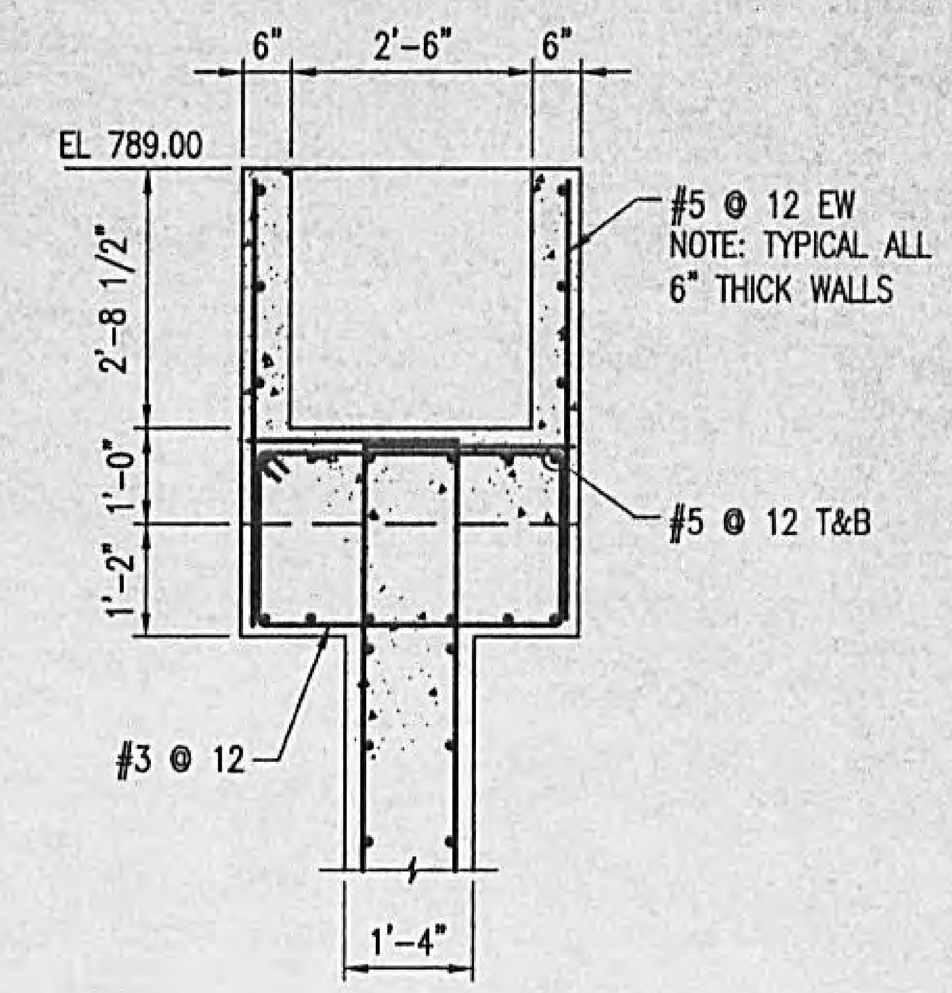


SECTION S5.2/S3
SCALE: 1/2" = 1'-0"



SECTION S5.3/S3
SCALE: 1/2" = 1'-0"



SECTION S5.4/S3
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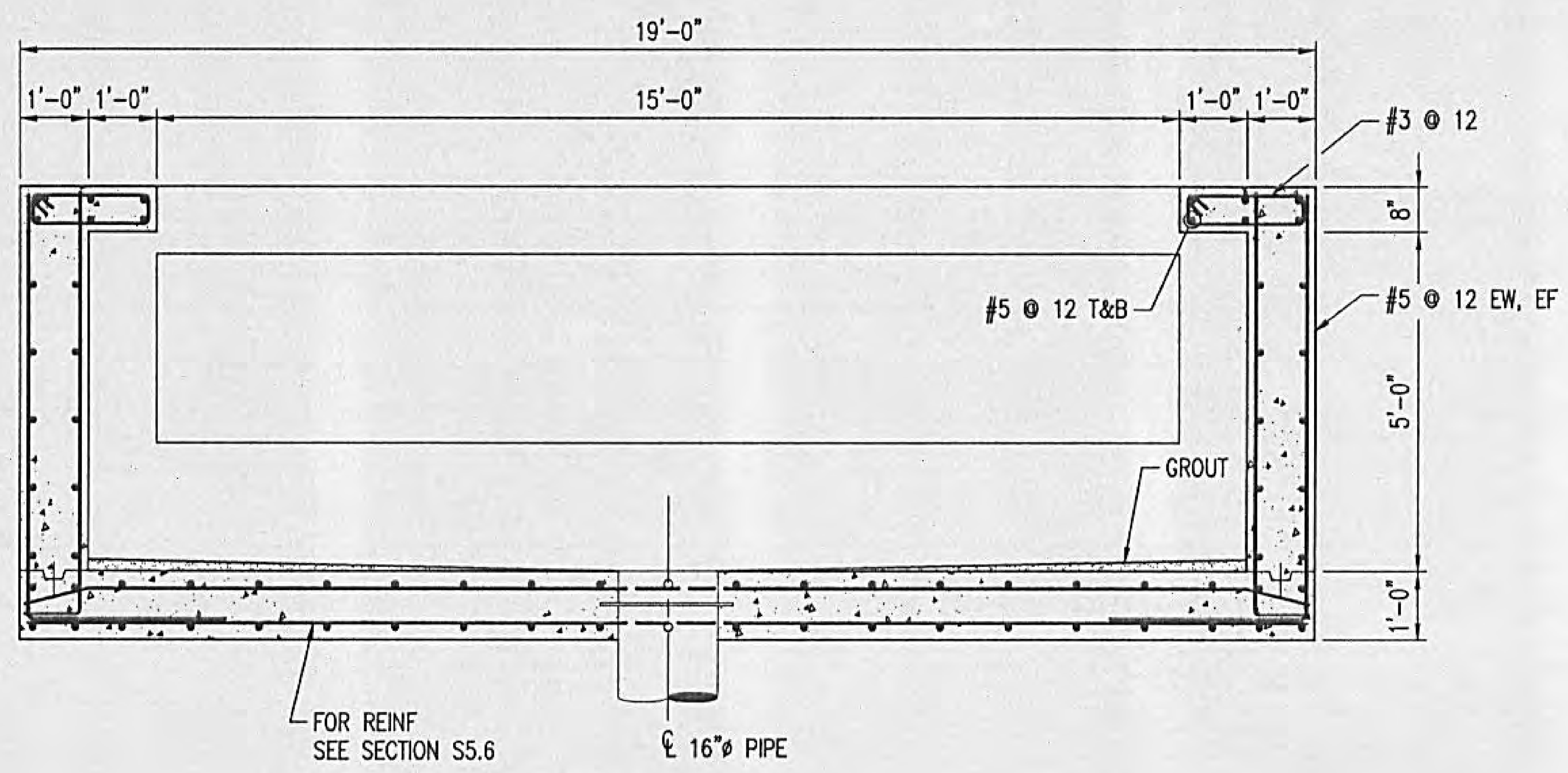
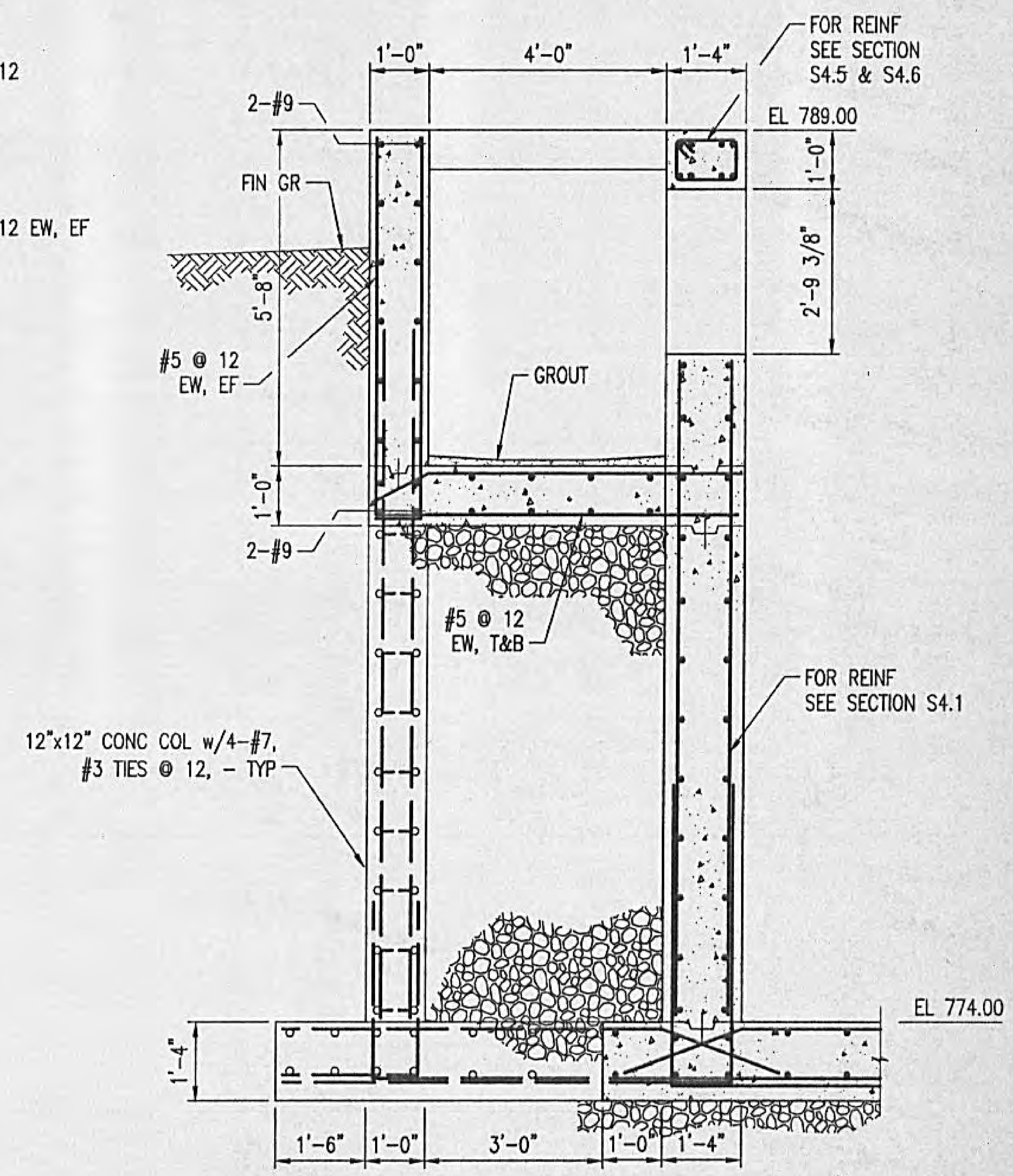


SECTION S5.5/S4
SCALE: 1/2" = 1'-0"



SECTION S5.6/S4
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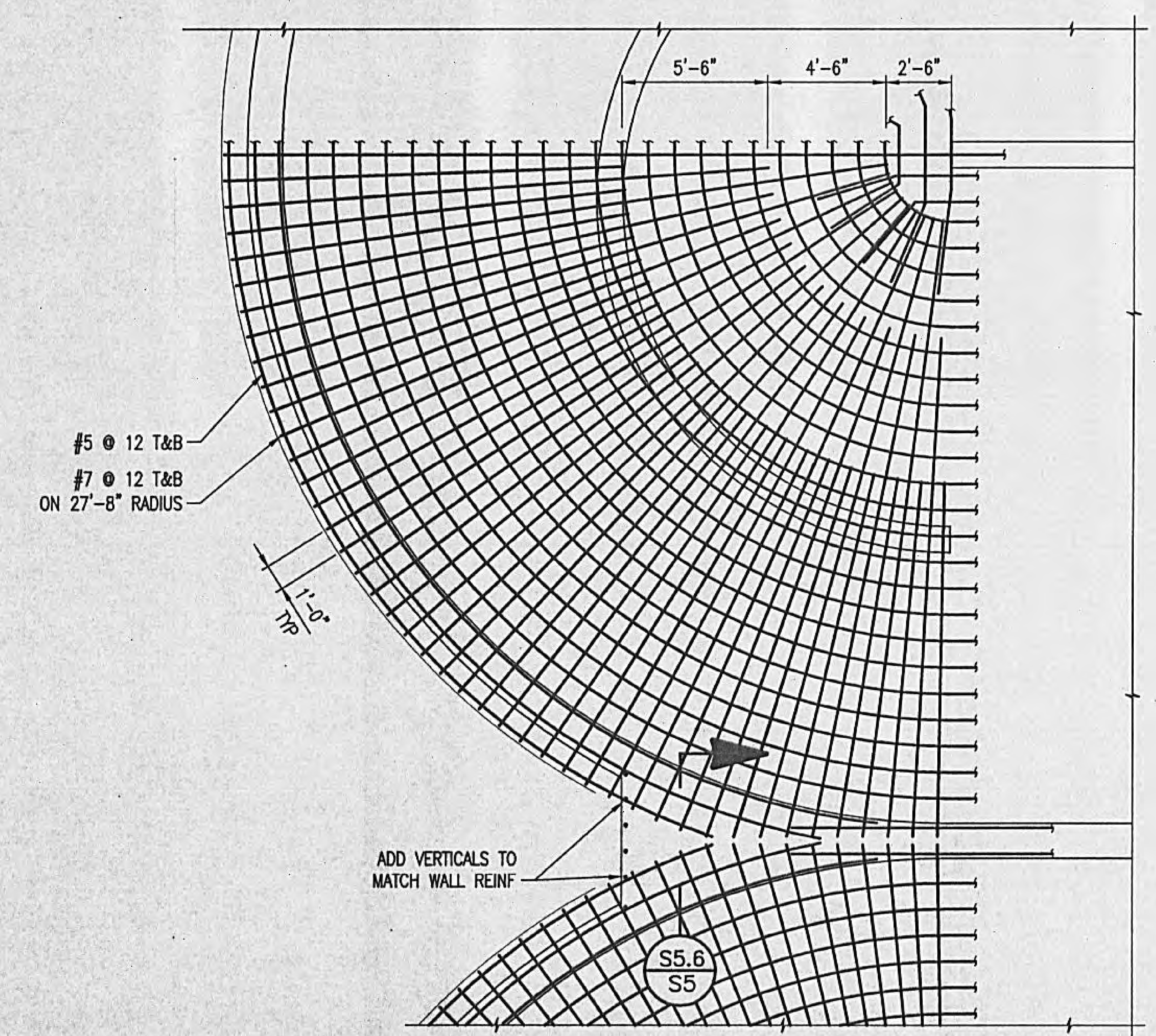
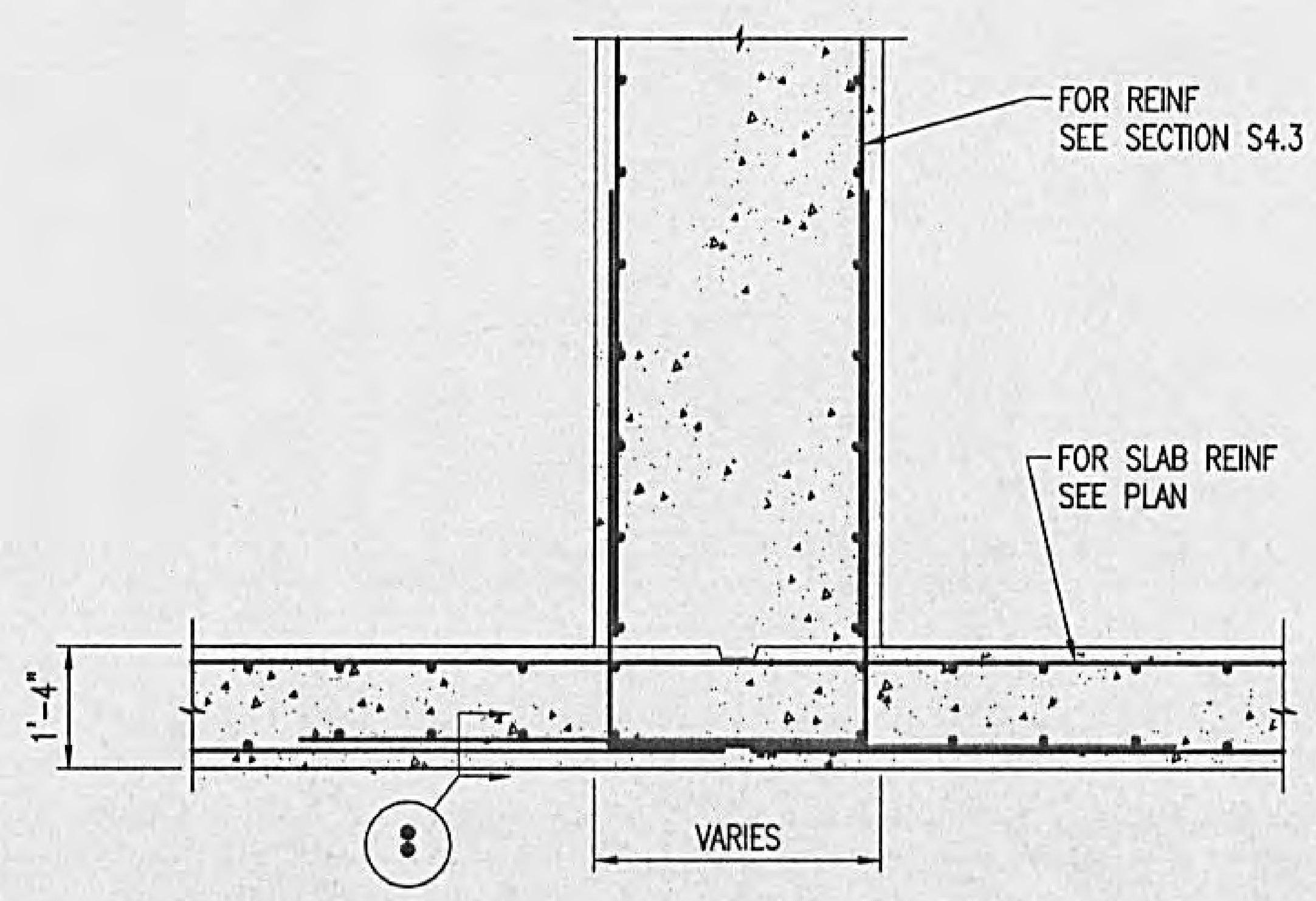


PARTIAL FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



SECTION S5.6/S5
SCALE: 1/2" = 1'-0"

GRW PROJECT NO.7601-10

NO.	DESCRIPTION	DATE	BY

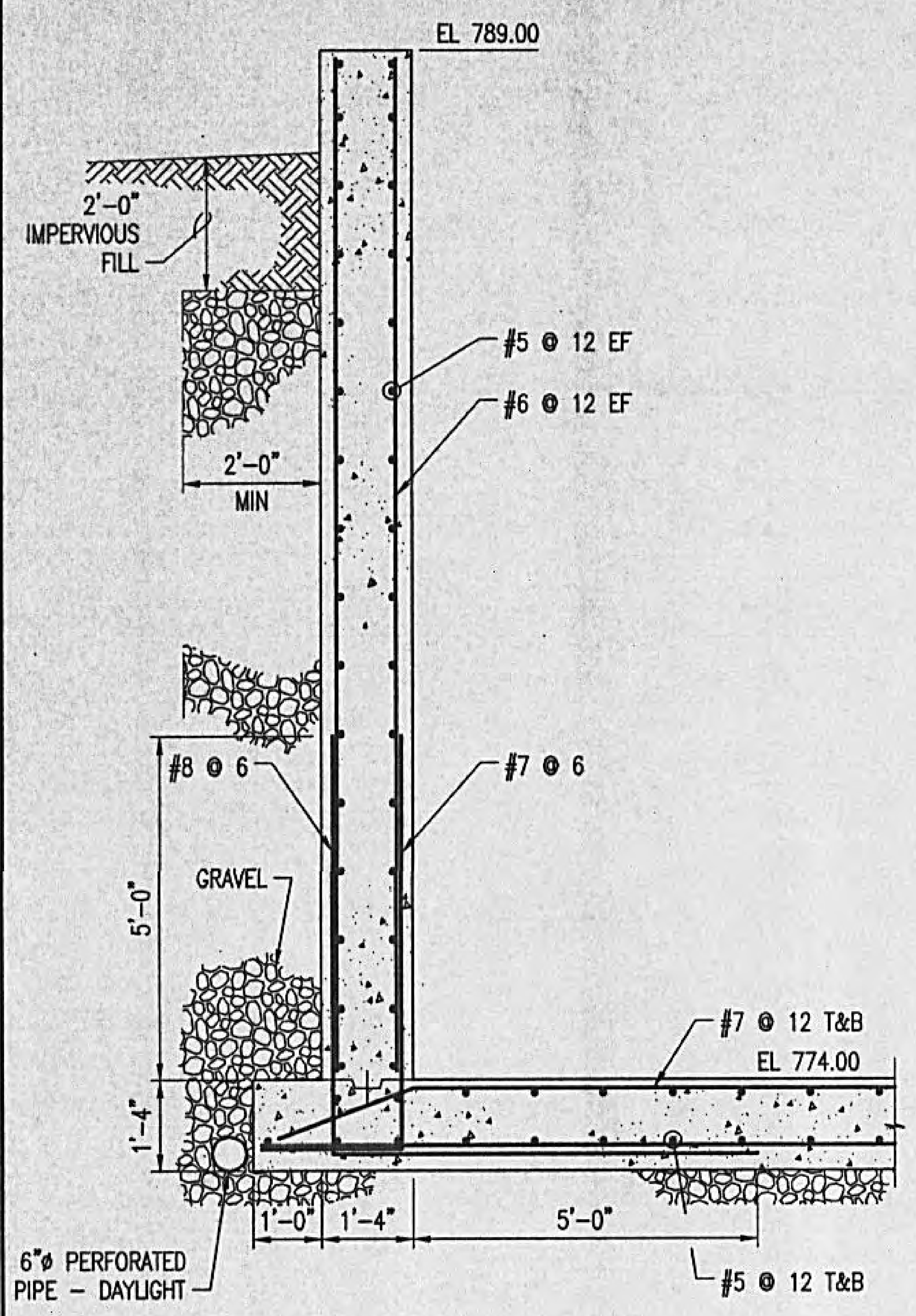
REVISIONS

KRISHNAPURA R. NARAYANAPPA
REGISTERED ENGINEER
STATE OF TENNESSEE
10-2-02

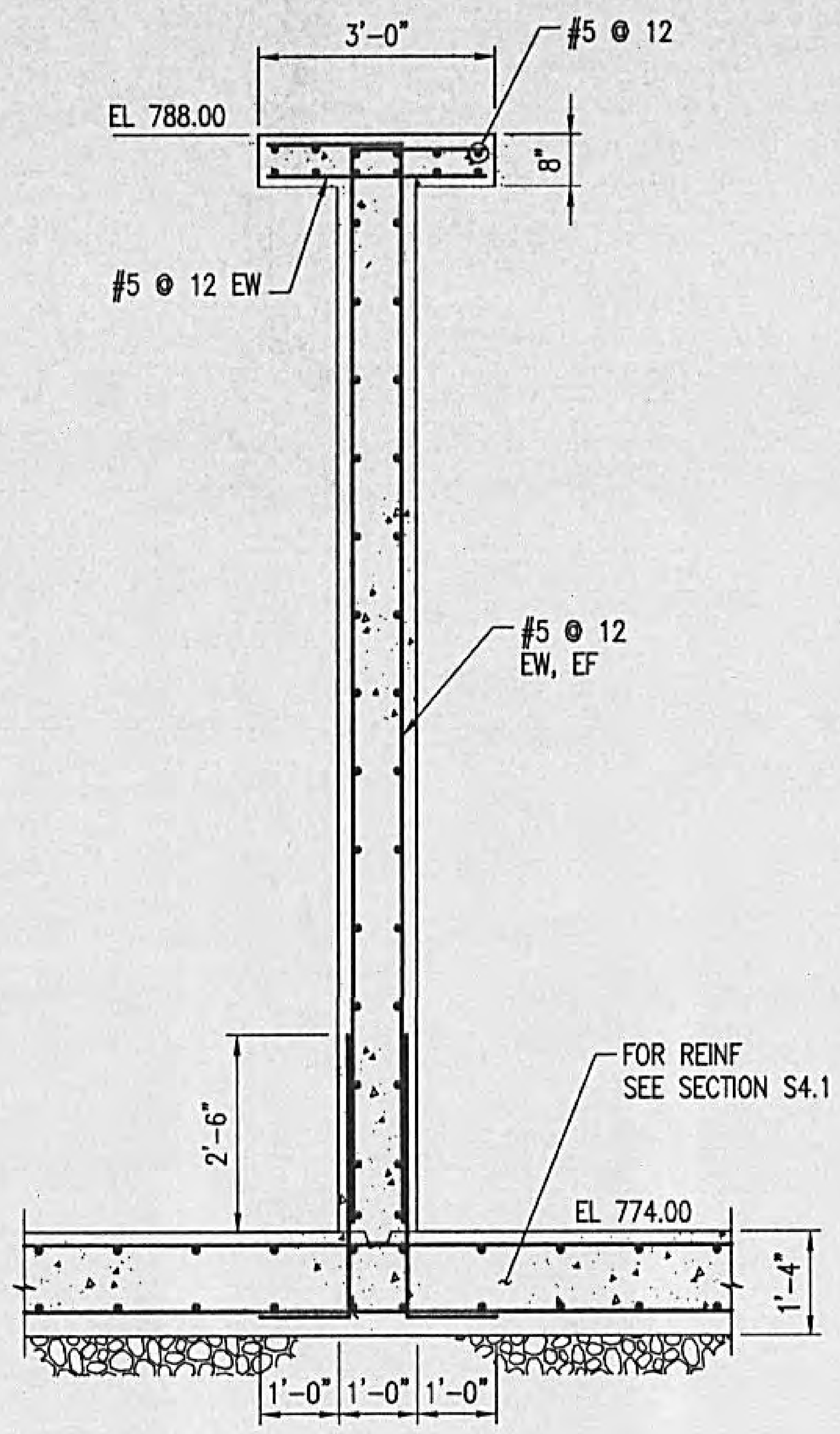
OXIDATION DITCH
SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-5
APPROVED: KRN	



SECTION (S4.1 / S3)
SCALE: 1/2" = 1'-0"



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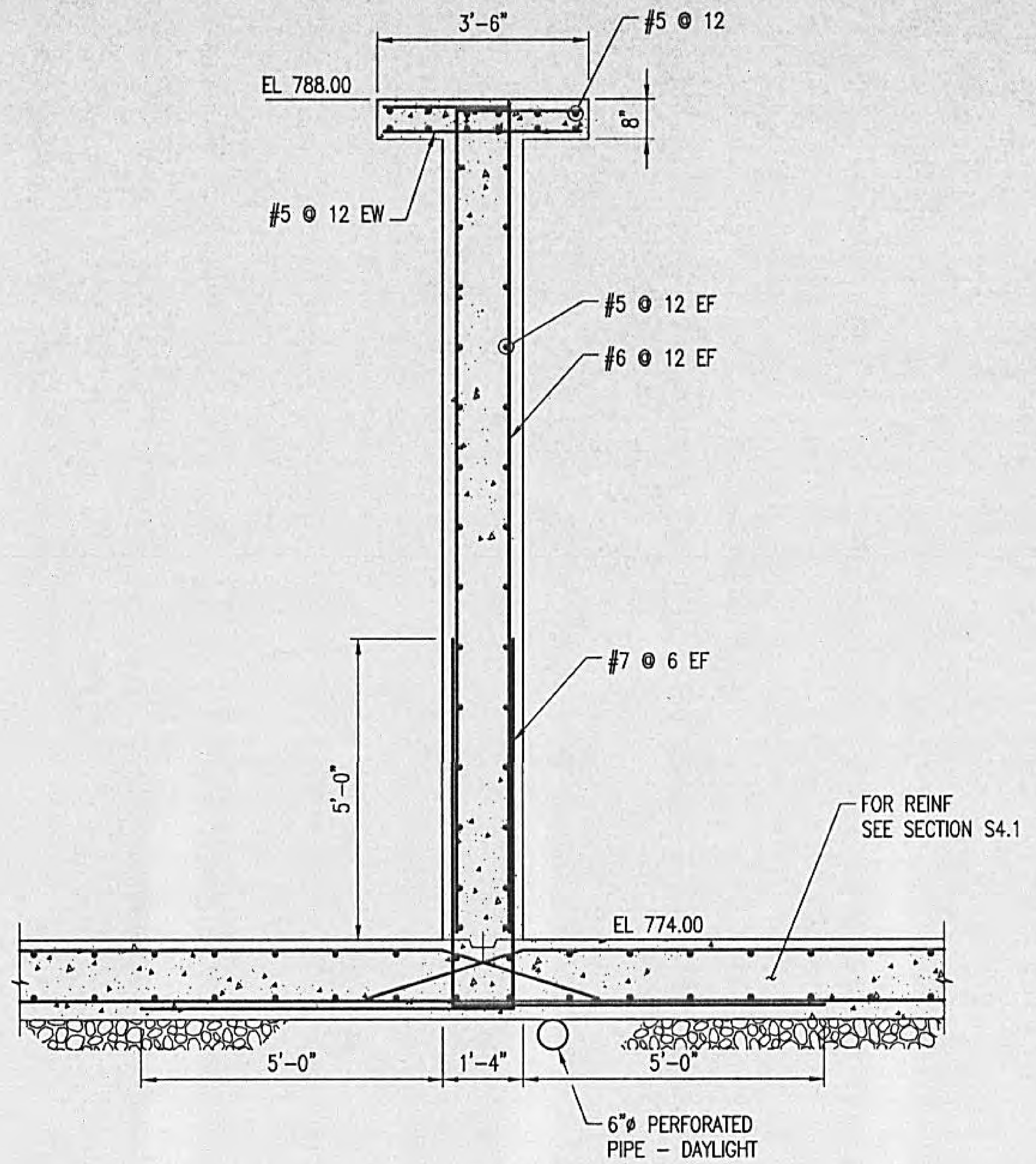

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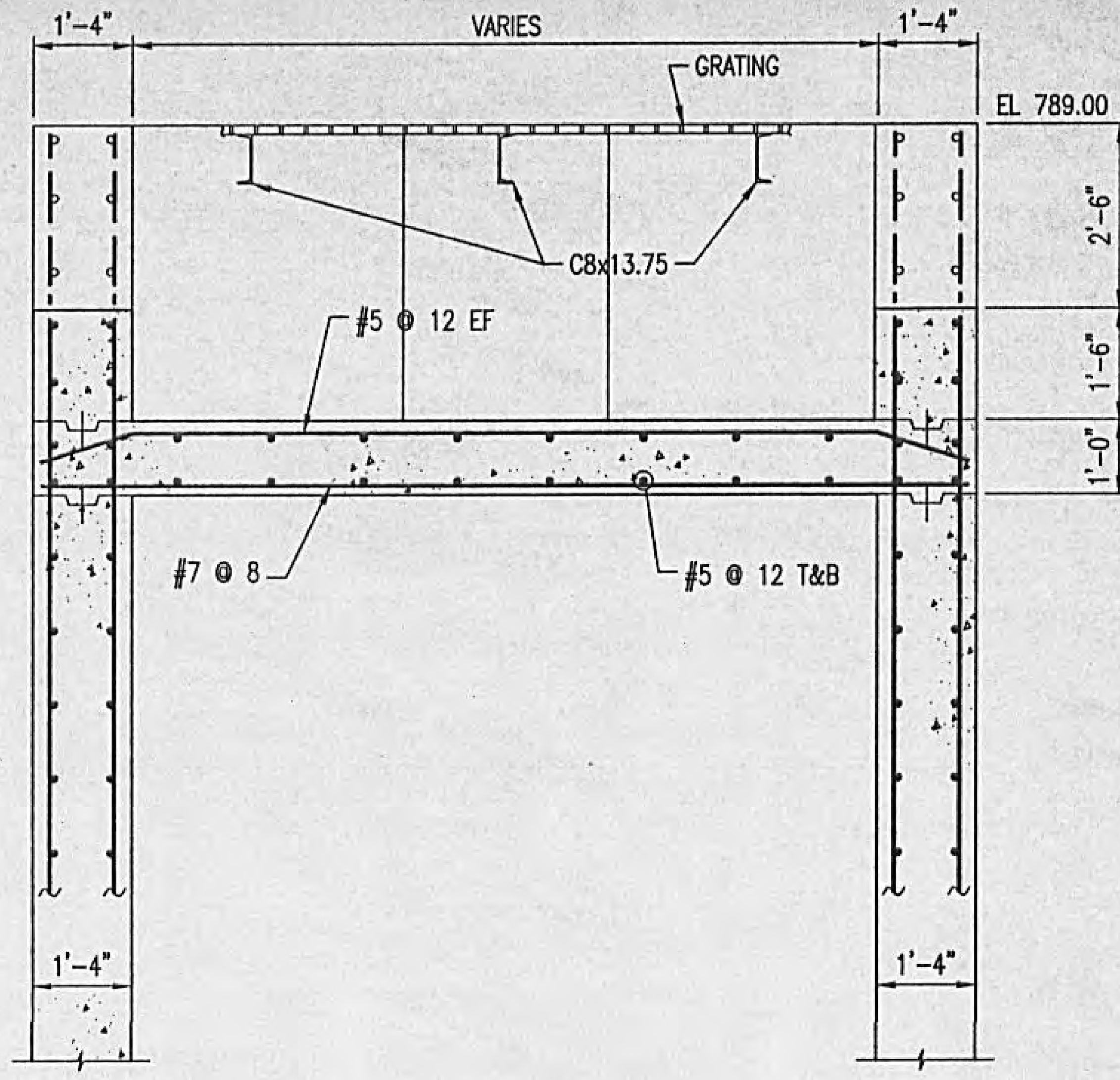

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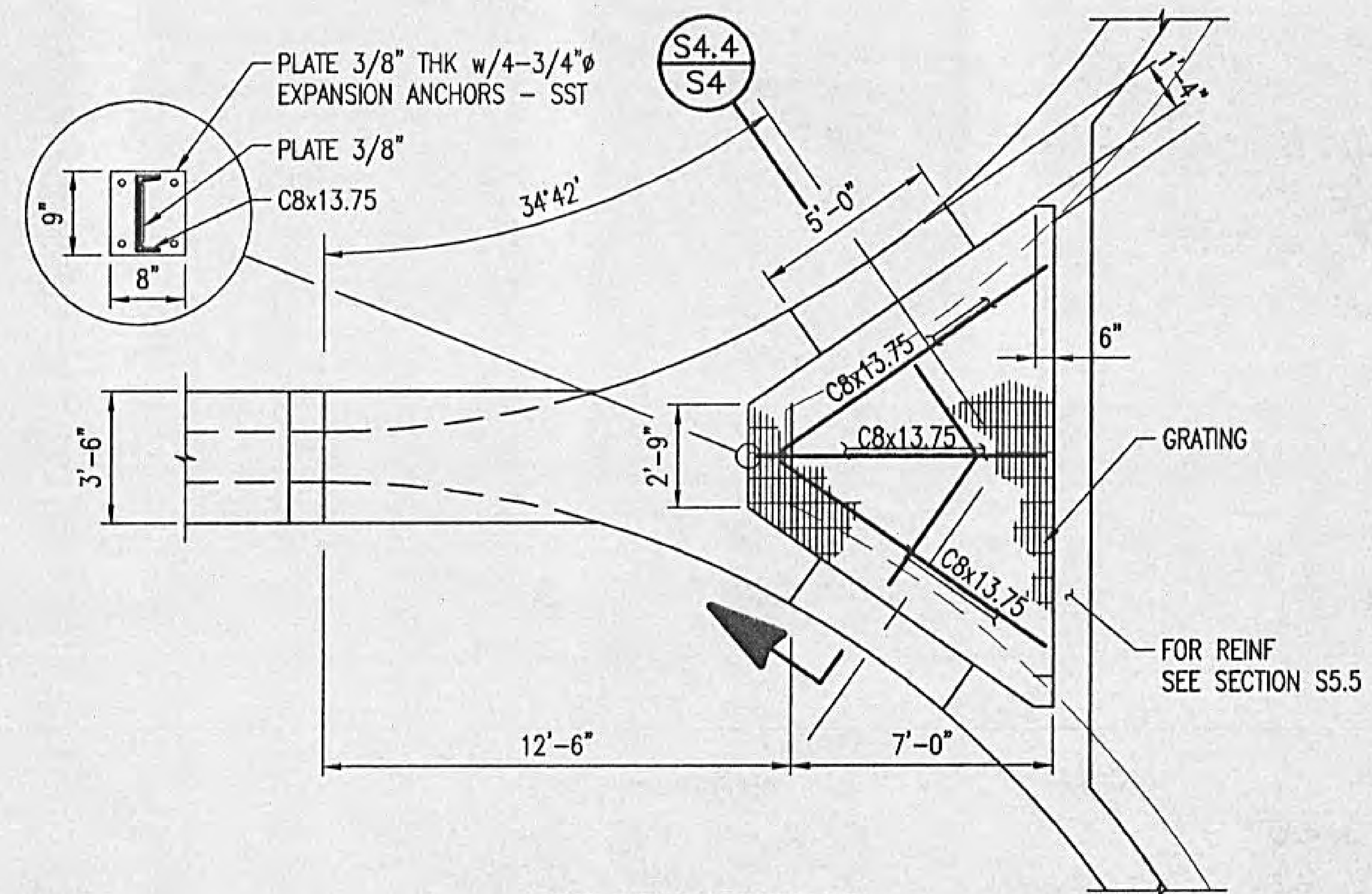
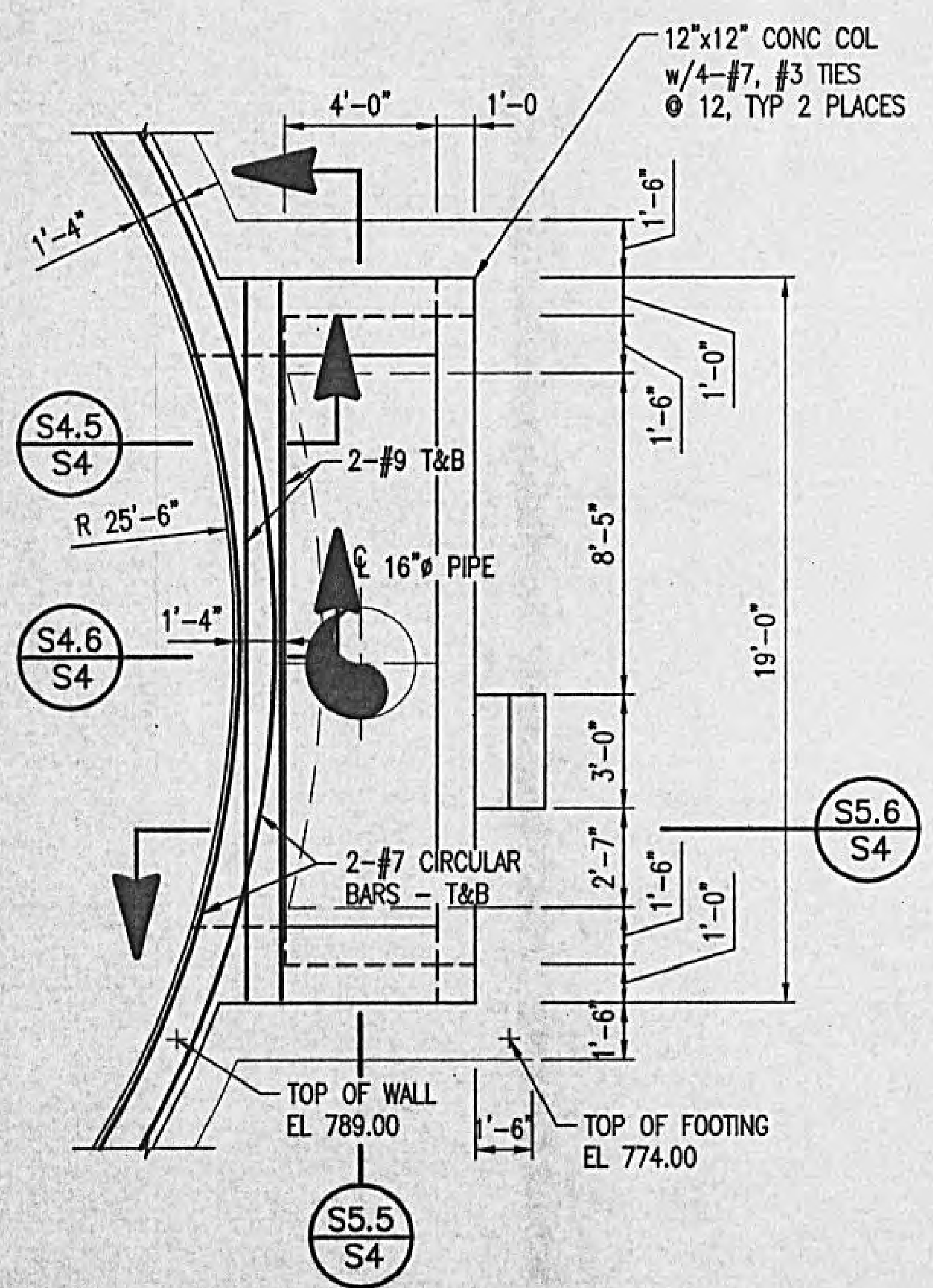


NOTE: TYPICAL OPPOSITE END

DETAIL (S4.9 / S3)
SCALE: 1/4" = 1'-0"



DETAIL (S4.10 / S3)
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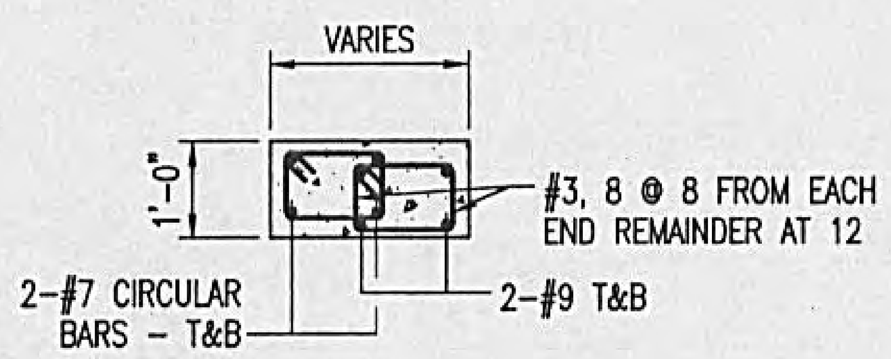

SECTION (S4.5 / S4)
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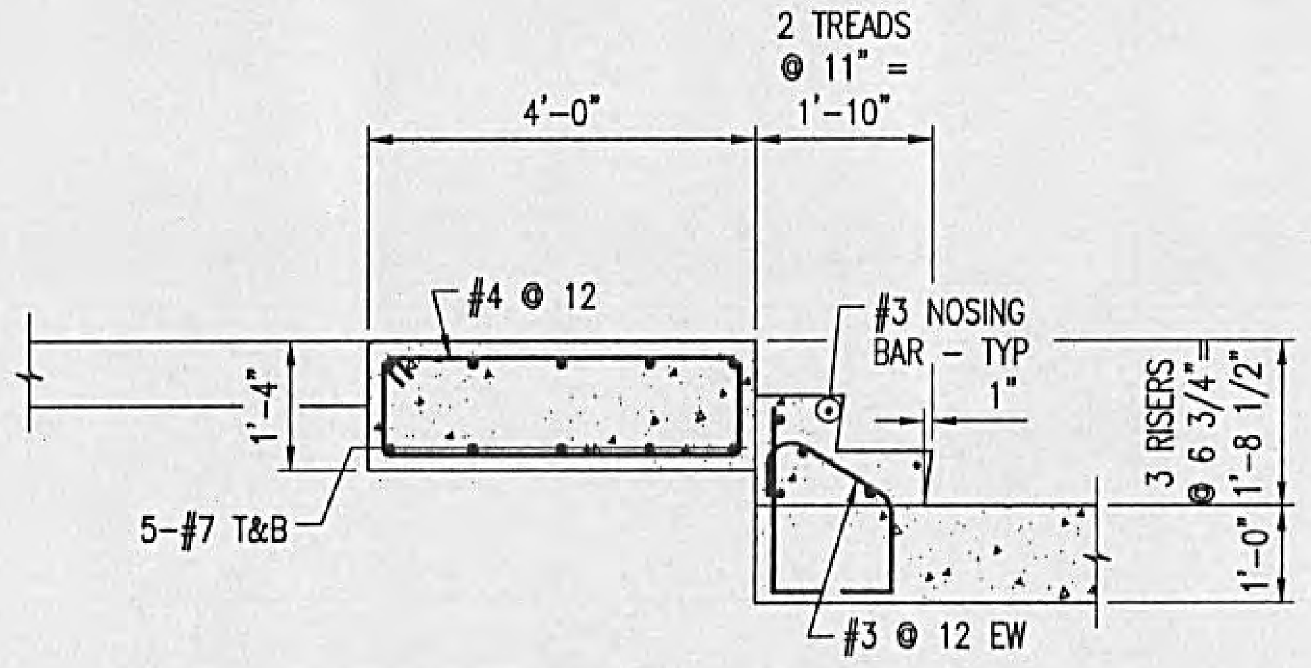

SECTION (S4.7 / S3)
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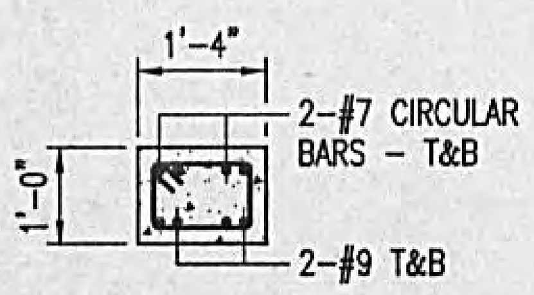
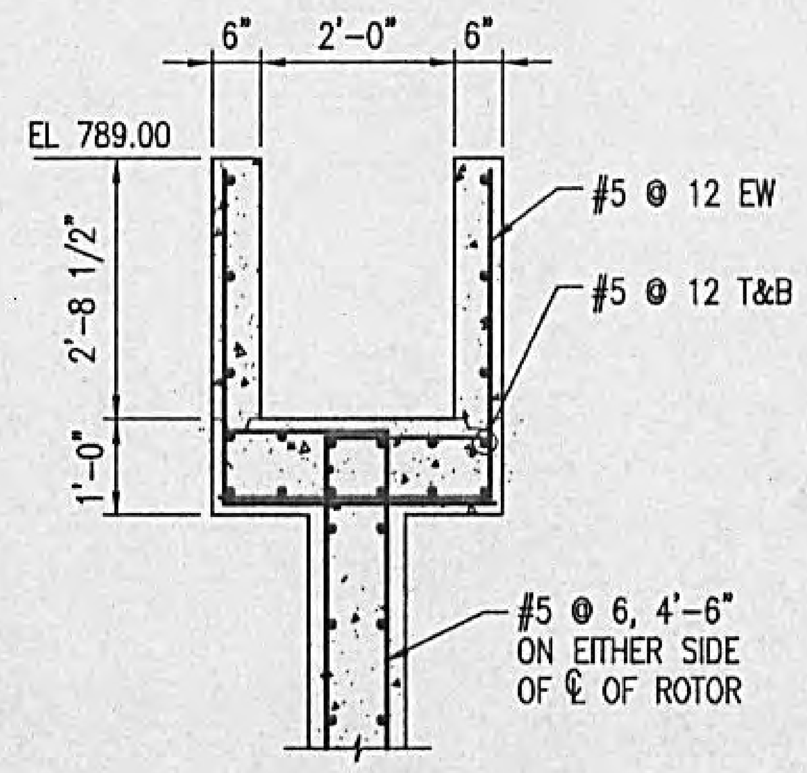


SECTION (S4.6 / S4)
SCALE: 1/2" = 1'-0"



SECTION (S4.8 / S3)
SCALE: 1/2" = 1'-0"

GRW PROJECT NO.7601-10

OXIDATION DITCH
SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO.
APPROVED: KRN	S-4

STRUCTURAL PLAN

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

GRW PROJECT NO.7601-10

OXIDATION DITCH
STRUCTURAL PLAN
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

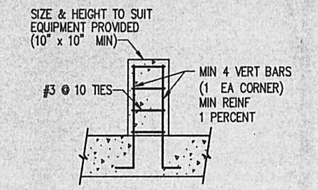
NO.	DESCRIPTION	DATE	BY

REVISIONS

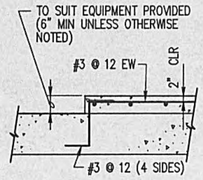
STATE OF TENNESSEE
10-2-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

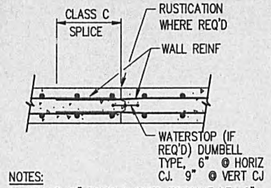
DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-3
APPROVED: KRN	



EQUIPMENT PIER
NTS

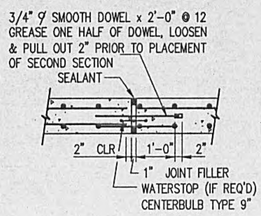


EQUIPMENT PAD
NTS

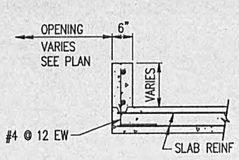


NOTES:
1. WALLS 10" THICK & OVER TO HAVE KEY 2" DEEP BY APPROX 1/3 WIDTH OF WALL.
2. CONSTRUCTION JOINTS IN SLABS SIMILAR.

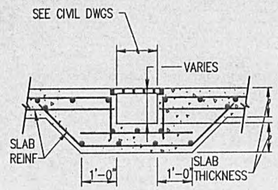
CONSTRUCTION JOINT
NTS



EXPANSION JOINT
NTS

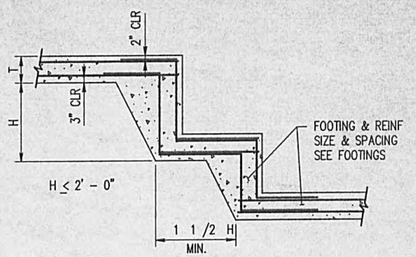


CURB DETAIL
NTS



NOTE: TRENCH DETAIL SIMILAR

SUMP DETAIL
NTS



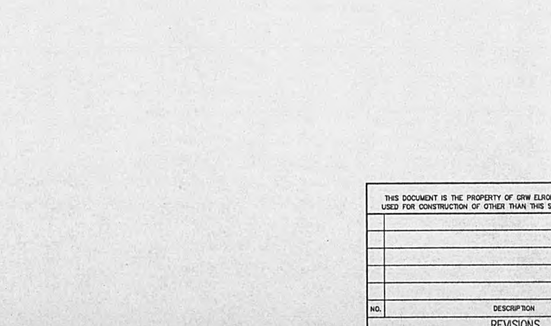
FOOTING STEP
NTS

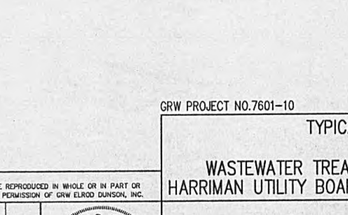
NOTE:
REINF FOR CIRCULAR OPENINGS SIMILAR.

REINF AT OPENINGS IN WALL
NTS

NOTES:
1. REINF FOR CIRCULAR OPENINGS SIMILAR.
2. CUT THE SHRINKAGE & TEMPERATURE REINF AT OPENINGS, EXCEPT IN A TWO WAY SLAB.
3. SPREAD REINF ON EACH SIDE OF OPENINGS IN A TWO WAY SLAB IN BOTH DIRECTIONS, ADD #5 @ 12 T&B IN BETWEEN SPREAD BARS.

REINF AT OPENINGS IN SLAB
NTS





TYPICAL STAIR DETAILS
N.T.S.

GRW PROJECT NO.7601-10

TYPICAL DETAILS

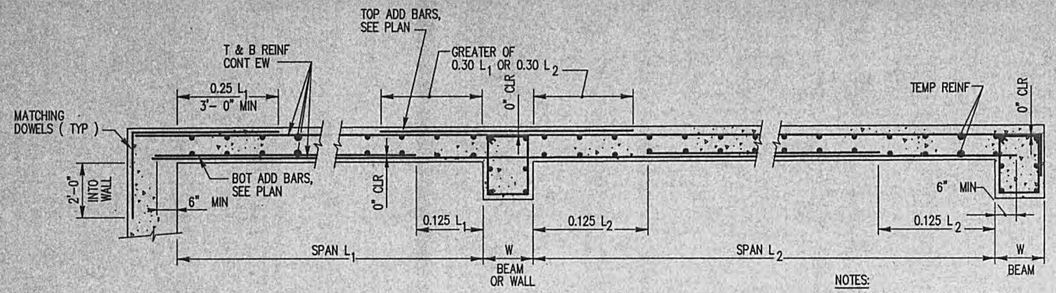
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

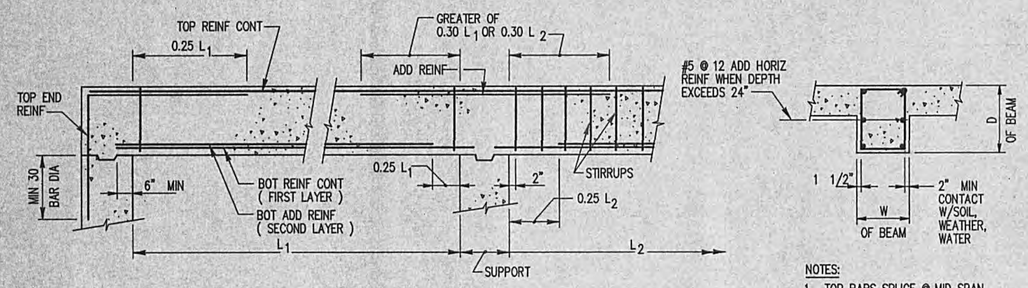
DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-2
APPROVED: KRN	



TYPICAL CONCRETE SLAB DETAIL

NTS

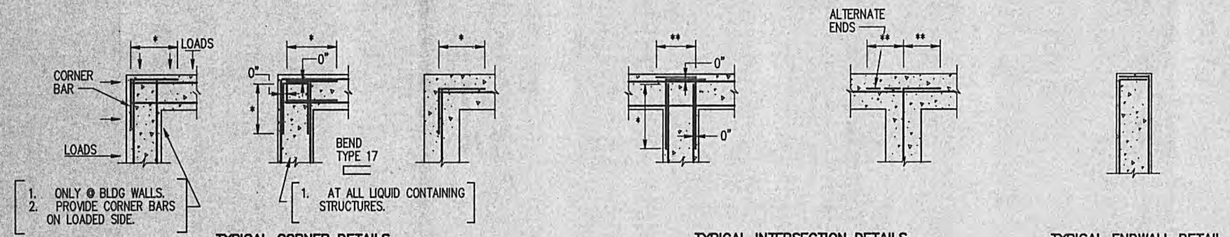
NOTES:
1. TOP BARS SPLICE @ MID SPAN.
2. BOT BARS SPLICE @ SUPPORTS



TYPICAL CONCRETE BEAM DETAIL

NTS

NOTES:
1. TOP BARS SPLICE @ MID SPAN.
2. BOT BARS SPLICE @ SUPPORTS



TYPICAL CORNER DETAILS

TYPICAL INTERSECTION DETAILS

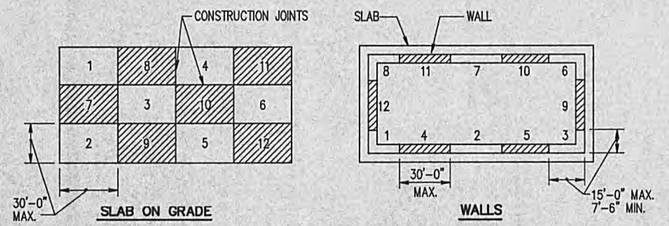
TYPICAL ENDWALL DETAIL

TYPICAL WALL DETAILS – SHOWN IN HORIZONTAL CROSS SECTION

NTS

NOTES:
* – DENOTES CLASS C SPLICE.
** – DENOTES TENSION DEVELOPMENT LENGTH

NOTES:
1. PLACING SEQUENCE FOR OTHER WALLS SIMILAR.
2. FOR ADDITIONAL DETAILS, SEE GENERAL STRUCTURAL NOTES, ITEM 11.



TYPICAL CONCRETE PLACING SEQUENCE DETAILS

NTS

GENERAL STRUCTURAL NOTES

1. DESIGN LIVE LOADS:
   - WORKING ROOFS: 100 psf
   - ALL OTHER ROOFS: 30 psf
   - OFFICES, LABS, STAIRS AND MISC. AREAS: 100 psf

2. MATERIALS
   - CONCRETE CLASS A: f'c = 4,000 psi
   - CLASS B: f'c = 3,000 psi
   - REINFORCING STEEL A615 GRADE 60: fy = 60 ksi
   - STRUCTURAL STEEL A36: Fy = 36 ksi

3. CONCRETE SHALL BE MIXED AND PLACED IN ACCORDANCE WITH ACI 318. USE MIXES WITH MAXIMUM AGGREGATE SIZE APPROPRIATE FOR FORM SPACERS AND REINFORCEMENT PLACEMENT REQUIRED IN THIS PROJECT.

4. CONCRETE PROPORTIONS, INCLUDING WATER CEMENT RATIO, SHALL BE ESTABLISHED IN ACCORDANCE WITH SECTION 5.3 OF ACI–318 ON THE BASIS OF FIELD EXPERIENCE AND/OR TRIAL MIXTURES WITH MATERIALS PROPOSED FOR USE IN THIS PROJECT FOR EACH MIX SPECIFIED, SUBMIT DOCUMENTATION OF CONCRETE PROPORTIONS.

5. DELAYS CAUSED BY FAILURE TO CONFORM TO THE REQUIREMENTS IN ITEM 2, ABOVE, SHALL NOT BE ACCEPTED AS JUSTIFICATION FOR ADDITIONAL COMPENSATION OR EXTENSIONS OF TIME.

6. CONCRETE SHALL BE REINFORCED UNLESS SPECIFICALLY NOTED "NOT REINFORCED".

7. PROVIDE WATERSTOPS IN EXPANSION JOINTS AND CONSTRUCTION JOINTS OF LIQUID CONTAINING STRUCTURES AND WHERE REQUIRED TO PREVENT INFILTRATION OF GROUND WATER.

8. UNLESS OTHERWISE SHOWN, PROVIDE DOWELS TO MATCH VERTICAL BARS IN ALL WALLS AND COLUMNS, AND HORIZONTAL BARS IN ALL BEAMS AND SLABS.

9. UNLESS OTHERWISE DETAILED, SPREAD REINFORCING AT OPENINGS AND SLEEVES. DO NOT CUT REINFORCING BARS. CONTRACTOR SHALL VERIFY SIZE AND LOCATION OF ALL OPENINGS WITH SHOP DRAWINGS FOR EQUIPMENT TO BE INSTALLED.

10. STRUCTURE SHALL NOT BE BACKFILLED UNTIL MEMBERS DESIGNED TO BRACE THE WALLS HAVE ATTAINED THEIR DESIGN COMPRESSIVE STRENGTH.

11. UNLESS OTHERWISE NOTED, PROVIDE 1" CHAMFER ON EXPOSED CONCRETE EDGES.

12. UNLESS OTHERWISE SHOWN, PROVIDE CONCRETE PROTECTION FOR ALL REINFORCING IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318–99).

13. ALL REINFORCEMENT SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACI 315.
    a. TOP BARS ARE HORIZONTAL BARS WHICH HAVE MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BAR (INCLUDES ALL HORIZONTAL WALL REINFORCEMENT).
    b. OTHER BARS INCLUDE ALL VERTICAL REINFORCEMENT AND ALL HORIZONTAL REINFORCEMENT WHICH HAS LESS THAN 12 INCHES OF CONCRETE CAST BELOW THE BAR FOR WHICH BASIC TENSION LAP SPLICES IN NORMAL WEIGHT CONCRETE ARE APPLICABLE.
    c. UNLESS OTHERWISE SHOWN, ALL REINFORCEMENT SHALL BE TREATED AS TENSION REINFORCEMENT.
    d. THE TENSION DEVELOPMENT (EMBEDMENT) LENGTH, Ld OR Ldt, EQUALS A CLASS A SPLICE LENGTH.
    e. IF MORE THAN ONE HALF OF THE TENSION REINFORCING BARS ARE LAP SPLICED WITHIN THE REQUIRED LAP LENGTH, A CLASS C SPLICE SHALL BE USED. UNLESS OTHERWISE SHOWN, ALL OTHER TENSION SPLICES SHALL BE CLASS B.
    f. TENSION SPLICE AND TENSION EMBEDMENT LENGTHS SHALL BE NOT LESS THAN 12 INCHES.

14. UNLESS OTHERWISE SHOWN, REINFORCEMENT AT WALL CORNERS AND INTERSECTIONS SHALL BE IN ACCORDANCE WITH DETAILS SHOWN ON ACI 315.

15. UNLESS OTHERWISE NOTED CONSTRUCTION AND EXPANSION JOINTS SHALL BE AT THE LOCATIONS SHOWN ON THE DRAWINGS. ADDITIONAL CONSTRUCTION JOINTS LOCATED BY THE CONTRACTOR AS FOLLOWS:
    a. FOUNDATION SLABS, SLABS ON GRADE AND SLABS RETAINING LIQUIDS AT A SPACING OF APPROXIMATELY 25 FEET. CONCRETE SHALL BE PLACED IN A CHECKERBOARD PATTERN. FOR DETAIL SEE THIS SHEET.
    b. WALLS AT A SPACING OF APPROXIMATELY 25 FEET, CONCRETE SHALL BE PLACED IN ALTERNATE SECTIONS, WITH CONSTRUCTION JOINTS LOCATED APPROXIMATELY 12 FEET FROM CORNERS. FOR DETAIL SEE THIS SHEET.
    c. FRAMED SLABS AND BEAMS: CONSTRUCTION JOINTS SHALL BE LOCATED AT THE CENTER OF SPANS OF SLABS OR BEAMS.
    d. FOR ADDITIONAL INFORMATION SEE SPECIFICATIONS – SECTION 03300, ITEM 3.03G

    THESE ADDITIONAL CONSTRUCTION JOINTS LOCATIONS SHALL HAVE THE WRITTEN APPROVAL OF THE ENGINEER. CONSTRUCTION AND EXPANSION JOINTS SHALL BE IN ACCORDANCE WITH TYPICAL DETAILS.

12. CONTINUOUS REINFORCING IN WALLS AND SLABS MAY BE SPLICED, AS REQUIRED, PROVIDING BARS ARE OF THE LONGEST PRACTICABLE LENGTH AND ALL SPLICES ARE SHOWN ON REINFORCING SHOP DRAWINGS. WHENEVER POSSIBLE SPLICES SHALL BE STAGGERED.

13. PROVIDE ADEQUATE INSPECTION PANELS IN WALL FORMING TO FACILITATE CONCRETE PLACEMENT, TO INSURE THAT NO VOIDS OCCUR AND THAT ADEQUATE CONSOLIDATION IS OBTAINED.

14. REINFORCE ALL CONCRETE WALLS, NOT OTHERWISE SHOWN, AS FOLLOWS:

a. 8"	#4 @ 8 EW, MIDDLE
10"	#4 @ 12 EW, EF
12"	#4 @ 10 EW, EF
14" & 15"	#4 @ 9 EW, EF
16"	#4 @ 8 EW, EF

    b. ADD 2–#5 CONTINUOUS AT THE TOP OF ALL WALLS.

15. STUD SHEAR CONNECTORS AND CONCRETE ANCHORS SHALL BE AUTOMATICALLY END WELDED HEADED STUDS OF STANDARD MANUFACTURER. WHERE USED AS CONCRETE ANCHORS IN CURB AND EDGE ANGLES ONLY, WELDED FLAT BARS OF EQUAL YIELD LOAD VALUES MAY BE SUBSTITUTED FOR WELDED STUD.

16. SEE EQUIPMENT MANUFACTURERS DRAWINGS FOR SIZES AND/OR LOCATIONS OF EQUIPMENT PIERS & PADS, ANCHOR BOLTS, FRAMES SUPPORTING EQUIPMENT, AND OPENINGS IN SLABS AND GRATING. CONTRACTOR TO VERIFY OPENING SIZES AND LOCATIONS OF SLEEVES, ETC. WITH SHOP DRAWINGS FOR EQUIPMENT.

17. UNLESS OTHERWISE SHOWN OR NOTED, ALL PIERS AND FOOTINGS ARE LOCATED ON COLUMN CENTER LINES.

18. FOR COORDINATES TO LOCATE STRUCTURES, SEE CIVIL DRAWINGS.

19. UNLESS OTHERWISE NOTED, POROUS FILL AND WATERPROOF PAPER SHALL BE PLACED UNDER ALL CONCRETE SLABS ON GRADE, TANK BOTTOMS AND FOUNDATIONS. FOR ADDITIONAL INFORMATION, SEE SPECIFICATION SECTION 03300, ITEMS 2.04H & 3.03B

20. UNLESS OTHERWISE NOTED, ALL CONCRETE COLUMN REINFORCEMENT, TIES AND SPLICES SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACI 315.

21. ALL CONSTRUCTION SHALL CONFORM TO THE PROVISIONS OF THE LATEST AISC CODE. SECTIONS 3.1, 3.4, 3.5, AND 4.2 OF THE AISC CODE OF STANDARD PRACTICE ARE EXCLUDED FROM THIS PROJECT.

22. UNLESS OTHERWISE NOTED, ALL BOLTS FOR BOLTED STRUCTURAL JOINT FASTENERS SHALL BE 3/4" DIAMETER HIGH STRENGTH STRUCTURAL BOLTS, ASTM A–325.

23. CONTRACTOR TO PROVIDE ADEQUATE BRACING FOR STRUCTURE SO THAT IT WILL BE STABLE DURING ALL STAGES OF CONSTRUCTION. THE STRUCTURE AND FOUNDATIONS ARE DESIGNED FOR A COMPLETED CONDITION ONLY AND THEREFORE REQUIRES ADDITIONAL SUPPORT TO MAINTAIN STABILITY BEFORE COMPLETION.

24. GUSSET PLATES SHALL BE?" THICK MINIMUM.

25. WHERE PRACTICAL, UNLESS SHOWN DIFFERENTLY ON DRAWINGS, ALL BRACING CONNECTIONS SHALL BE DESIGNED AND DETAILED SO THAT ALL FORCE COMPONENTS CAN BE DELIVERED DIRECTLY TO THE CENTERLINE OF INTERSECTING MEMBERS.

26 THE CONTRACTOR IS TO COORDINATE THE STRUCTURAL DRAWINGS WITH THE CIVIL, ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS AND MAKE CERTAIN ALL PIPE SLEEVES, DUCTS, INSERTS AND HOLES ARE LOCATED AND IN PLACE BEFORE EACH CONCRETE POUR.

27. OMISSIONS, CONFLICTS OR MISUNDERSTANDINGS BETWEEN THE VARIOUS ELEMENTS OF THE CONTRACT DOCUMENTS, IF ANY, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

28. MEMBERS AND BRACING REQUIRED TO SUPPORT EQUIPMENT FROM (OR ATTACH IT TO) THE STRUCTURAL FRAMING SHOWN ON THE DRAWINGS SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR SUPPLYING THE EQUIPMENT.

29. THE CONNECTION BOLTS SHALL BE TIGHTENED BY THE "SNUG TIGHT" METHOD UNLESS TENSION, BRACING, MOMENT, OR SLIP CRITICAL CONNECTIONS ARE SHOWN, WHICH THEN SHALL BE INSTALLED BY "DIRECT TENSION INDICATORS" METHOD.

NO.	DESCRIPTION	DATE	BY

REVISIONS

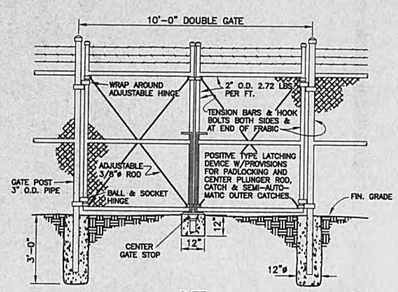
KRISHNAMURA R. NARAYANAN — REGISTERED ENGINEER — No. 092139 — TENNESSEE — STATE OF TENNESSEE

GRW PROJECT NO.7601–10

TYPICAL DETAILS AND GENERAL STRUCTURAL NOTES
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

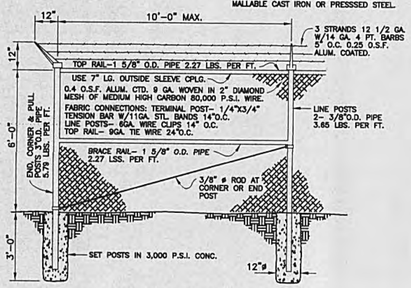
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: DGE	DATE: SEPTEMBER, 2002
DRAWN: DGE	SCALE: AS NOTED
REVIEWED: KRN	SHEET NO. S-1
APPROVED: KRN	



GATE

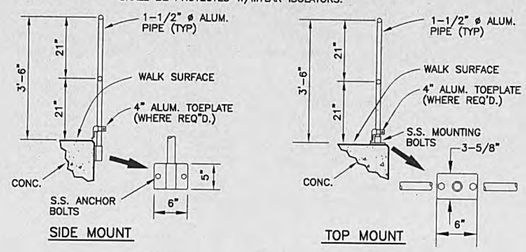
ALL POSTS & OTHER APPURTENANCES SHALL BE HOT DIP GALVANIZED W/MIN. 2.0 O.S.F. ZINC. ALL FITTINGS SHALL BE MALLABLE CAST IRON OR PRESSSED STEEL.



FENCE DETAIL

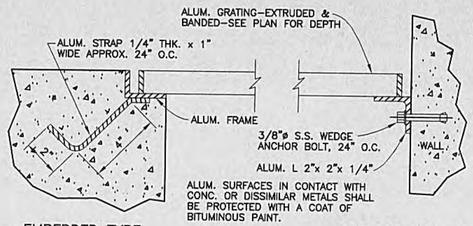
NOT TO SCALE

NOTE: MAXIMUM SPACING BETWEEN POST SHALL BE 7'-0"
ALUM. SURFACES IN CONTACT W/DISSIMILAR MATERIALS SHALL BE PROTECTED W/MYLAR ISOLATORS.



TYPICAL HANDRAIL DETAIL

NOT TO SCALE



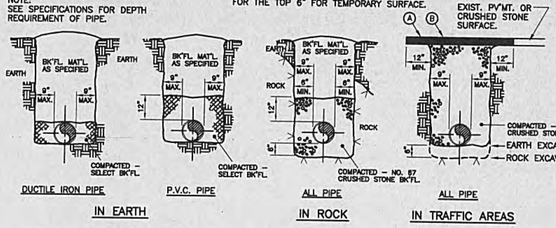
TYPICAL GRATING DETAIL

NOT TO SCALE

NOTE: SEE SPECIFICATIONS FOR DEPTH REQUIREMENT OF PIPE.

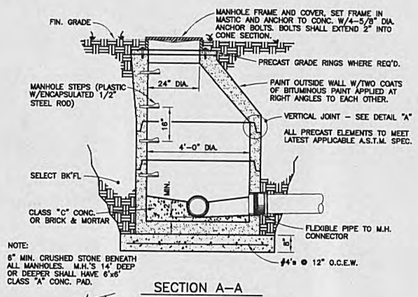
Ⓐ CRUSHED STONE SURFACE EQUAL TO EXISTING SURFACE OR 6" MIN.

Ⓑ SUB-BASE & PVMT. EQUAL OR BETTER THAN EXISTING SURFACING. UNTIL REPAVING IS COMPLETED USE A DENSE GRADED STONE FOR THE TOP 6" FOR TEMPORARY SURFACE.



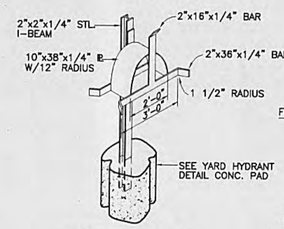
STANDARD WATER LINE BEDDING AND BACKFILLING

NOT TO SCALE

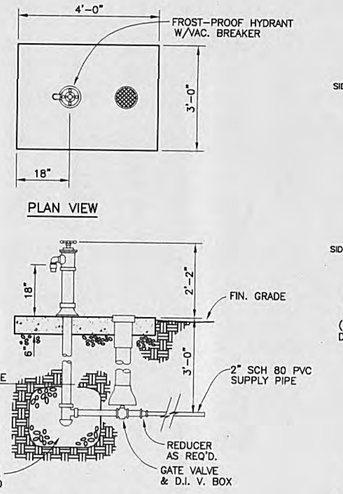


STANDARD MANHOLE

NOT TO SCALE

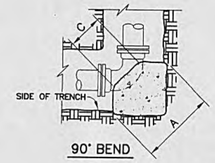


ISOMETRIC VIEW HOSE RACK



YARD HYDRANT DETAIL

NOT TO SCALE



(16" AND LARGER 11 1/4° BENDS DO NOT REQUIRE RESTRAINED JOINTS)

NOTES:

1. THRUST BLOCKS ON 12" AND SMALLER PIPE DESIGNED FOR 100 PSI PRESSURE AND 1000 PSF SOIL BEARING. THRUST BLOCKS FOR 16" AND LARGER PIPE DESIGNED FOR 100 PSI PRESSURE AND 3000 PSF SOIL BEARING. FOR GREATER PRESSURE OR LESS SOIL BEARING, QUANTITIES WILL HAVE TO BE RECALCULATED.
2. THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
3. IF EXACT SIZE PIPE BLOCKING IS NOT SHOWN, USE NEXT LARGER SIZE.
4. THRUST BLOCKING TO BE POURED IN PLACE WITH CLASS C CONCRETE.
5. THRUST BLOCKS FOR 16" AND LARGER PIPE SHALL BE USED IN CONJUNCTION WITH RESTRAINED JOINT PIPING FOR ALL FITTINGS UNLESS OTHERWISE NOTED.

90° BEND							
SIZE	24"	16"	12"	10"	8"	6"	4"	2"
A	81	54	50	42	34	26	18	16
B	40	27	50	42	34	26	18	16
C	32	21	16	15	12	12	9	9
D	20	14	25	21	17	13	9	9

45° BEND							
SIZE	24"	16"	12"	10"	8"	6"	4"	2"
A	60	40	37	31	25	18	12	12
B	30	20	37	31	25	18	12	12
C	21	16	16	14	12	12	8	8
D	15	10	18	15	12	9	6	6

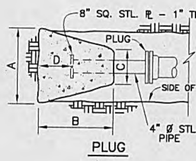
22 1/2° BEND							
SIZE	24"	16"	12"	10"	8"	6"	4"	2"
A	42	28	26	23	18	13	9	9
B	21	14	26	23	18	13	9	9
C	21	16	16	14	12	10	8	8
D	11	7	13	11	9	6	4	4

11 1/4° BEND							
SIZE	24"	16"	12"	10"	8"	6"	4"	2"
A	30	20	19	16	13	11	9	9
B	15	10	19	16	13	11	9	9
C	20	15	16	14	12	10	8	8
D	8	5	9	8	6	5	4	4

PLUG/DEAD END							
SIZE	24"	16"	12"	10"	8"	6"	4"	2"
A	66	46	52	43	34	26	26	26
B	34	23	52	43	34	26	26	26
C	36	26	12	12	12	12	12	12
D	17	11	32	22	15	11	11	11

TEE												
SIZE	MAIN	24"	24"	12"	12"	12"	10"	10"	8"	8"	6"	6"
	BRANCH	24"	16"	12"	10"	8"	10"	8"	8"	6"	6"	4"
A		66	46	52	42	28	43	26	26	26	26	26
B		34	23	52	43	28	43	26	26	26	26	26
C		44	32	12	12	12	12	12	12	12	12	12
D		17	11	26	21	14	21	13	13	13	13	13

DIMENSIONS ARE IN INCHES



THRUST BLOCKING DETAIL

NOT TO SCALE

NOTES:

1. RESTRAINED JOINT PIPING TO BE USED IN CONJUNCTION WITH THRUST BLOCKS FOR FITTINGS & VALVES UNLESS OTHERWISE INDICATED.
2. VERTICAL DOWNWARD FITTINGS WILL NOT BE ACCEPTABLE.
3. RESTRAINED JOINT PIPING WILL NOT BE REQUIRED ON 11 1/4° BENDS.

90° BEND		
SIZE	24"	16"	12"
	100	72	54

45° BEND			
SIZE	24"	16"	12"
	40	36	20

22 1/2° BEND			
SIZE	24"	16"	12"
	18	18	18

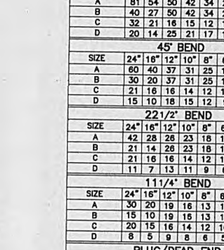
DEAD ENDS/VALVES			
SIZE	24"	16"	12"
	90	54	54

TEE				
SIZE	MAIN	24"	24"	24"
	BRANCH	24"	16"	12"
		80	54	36

DIMINSIONS ARE IN FEET & ARE REQUIRED ON EACH SIDE OF OF THE FITTING.

RESTRAINED JOINT PIPING REQUIREMENTS

NOT TO SCALE



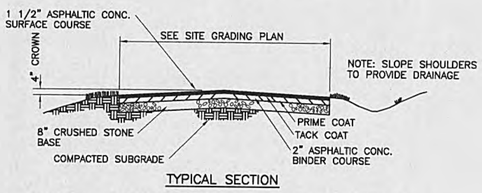
BUMPER DETAIL

NOT TO SCALE

BALES ARE TO BE INSTALLED AS NOTED ON THE EROSION CONTROL PLAN PREPARED BY THE CONTRACTOR BEFORE COMMENCING GRADING OPERATIONS AND BE LEFT IN PLACE UNTIL A GOOD STAND OF GRASS IS ESTABLISHED OVER ALL DISTURBED AREAS.

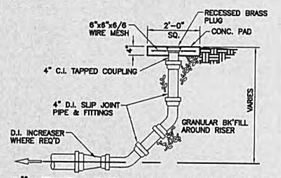
EROSION/SILTATION BARRIER

NOT TO SCALE



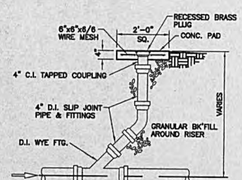
PAVED PARKING AREA & DRIVE DETAIL

NOT TO SCALE



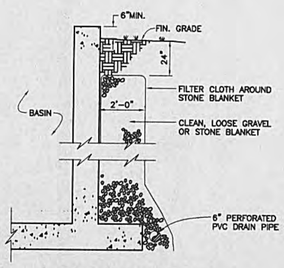
4" END-OF-LINE CLEANOUT

NOT TO SCALE



4" IN-LINE CLEANOUT

NOT TO SCALE



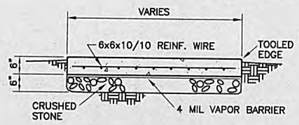
FRENCH DRAIN W/GRAVEL BLANKET DETAIL

NOT TO SCALE

NOTES:

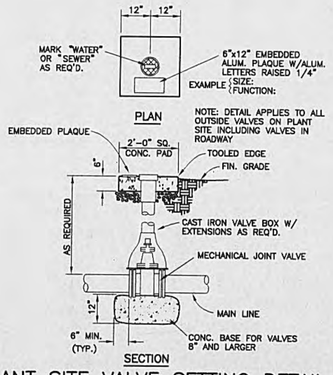
GROOVED 1/4" CONTRACTION JOINTS SHALL BE EQUALLY SPACED AT 5' MAX. CENTERS.

MAX. SIDEWALK SLOPE SHALL BE 5%



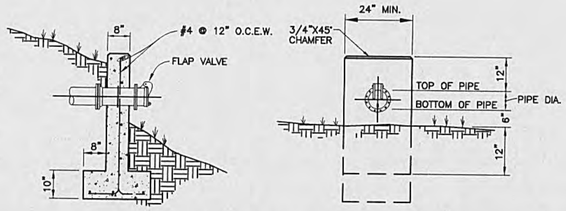
TYPICAL SIDEWALK DETAIL

NOT TO SCALE



PLANT SITE VALVE SETTING DETAIL

NOT TO SCALE



HEADWALL DETAIL

NOT TO SCALE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

GRW PROJECT NO. 7601-10

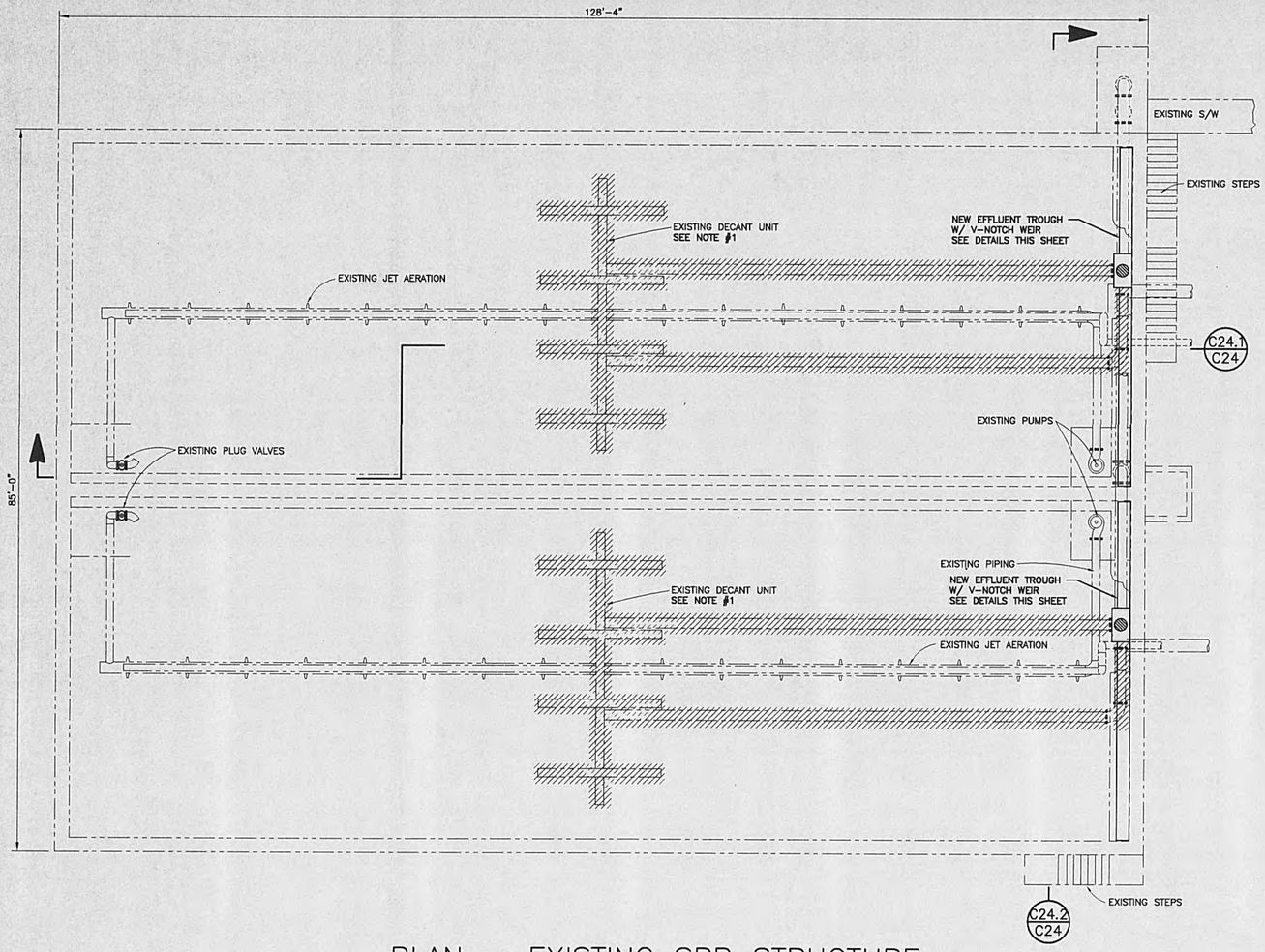
MISCELLANEOUS CONSTRUCTION DETAILS
WASTEWATER TREATMENT PLANT
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

ROBERT G. THREADGILL JR. REGISTERED ENGINEER NO. 013269 STATE OF TENNESSEE

9-30-02

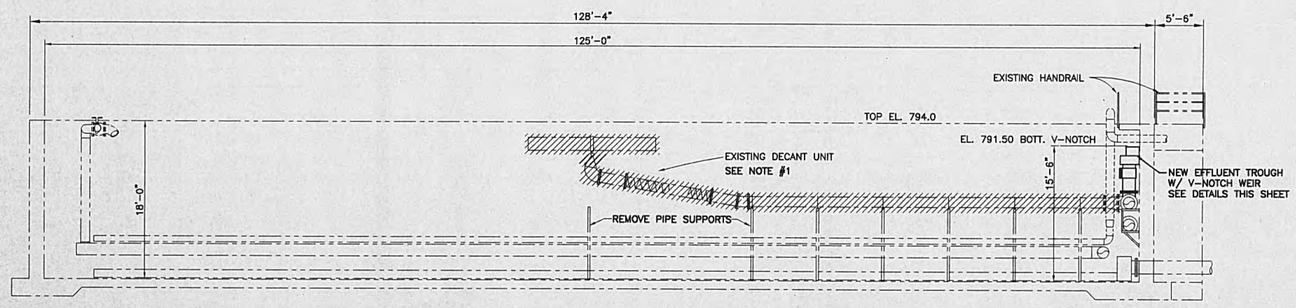
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: NONE
REVIEWED: RGO	SHEET NO. C-25
APPROVED: RGT	



PLAN – EXISTING SBR STRUCTURE

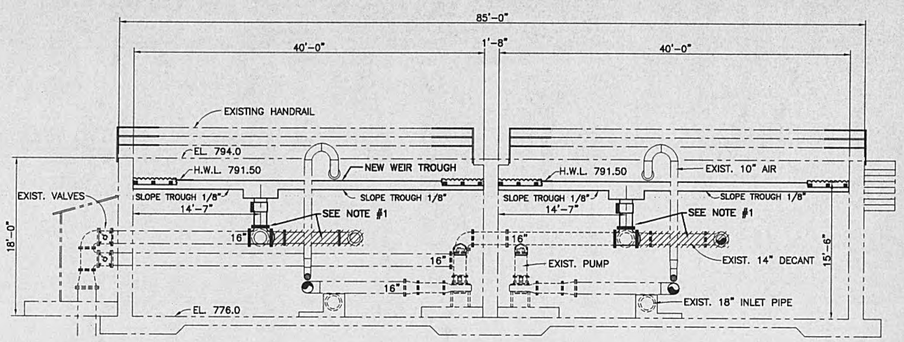
SCALE: 1/8" = 1'-0"



SECTION

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

C24.1 / C24



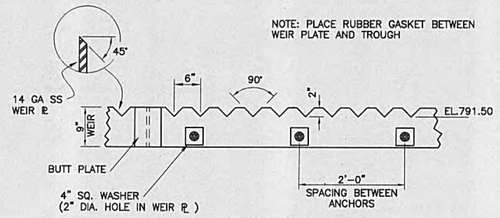
SECTION

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

C24.2 / C24

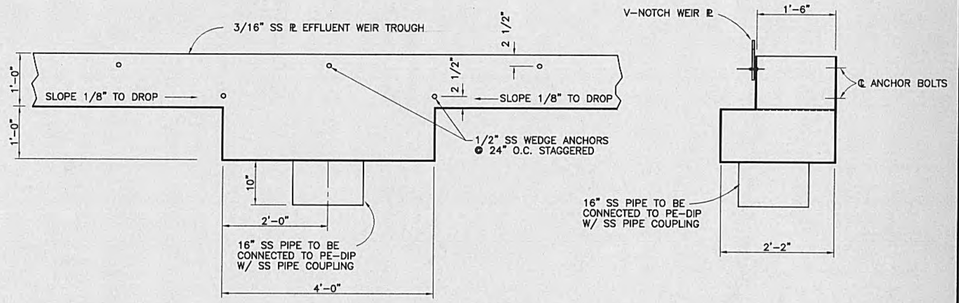
NOTES:

1. CONTRACTOR TO REMOVE EXISTING DECANT PIPING WHERE INDICATED. EXISTING TEES SHALL BE ROTATED AS SHOWN WITH PIPING EXTENDED UP TO NEW EFFLUENT WEIR BOX.



EFFLUENT WEIR DETAIL

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



EFFLUENT TROUGH DETAIL

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

GRW PROJECT NO.7601-10

EXISTING SBR RENOVATION – PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

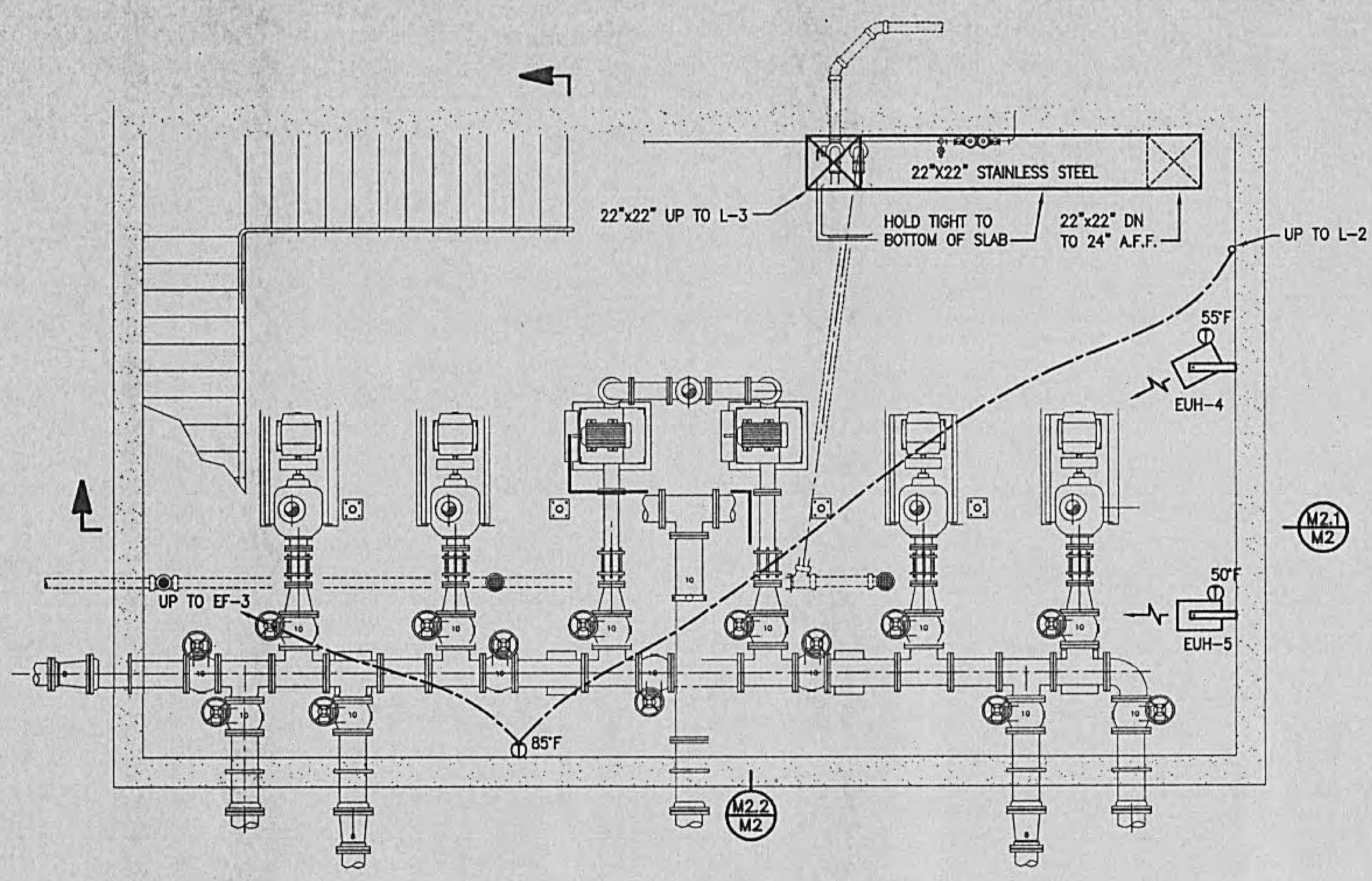
NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL JR. REGISTERED ENGINEER NO. 017845 STATE OF TENNESSEE

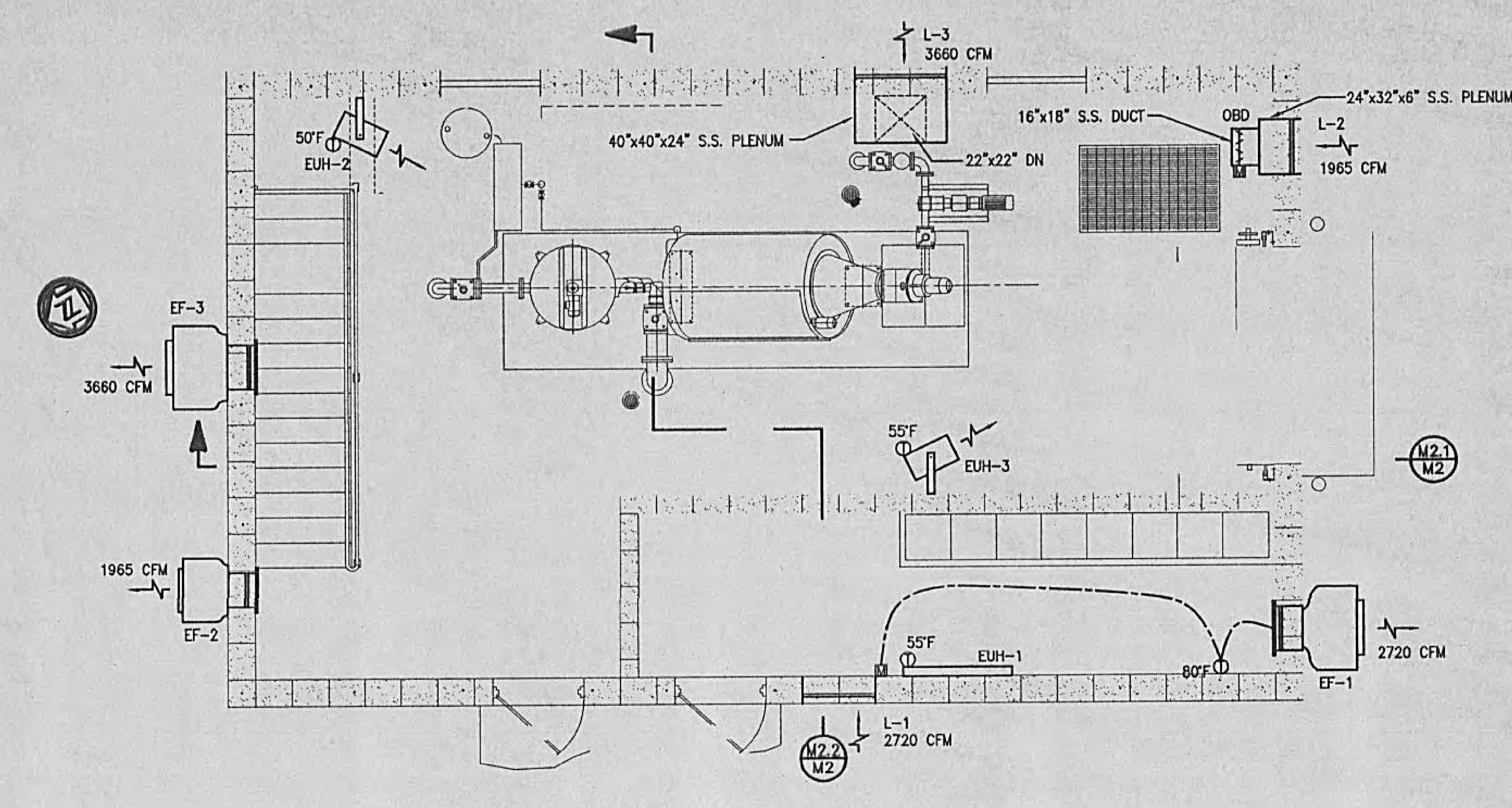
9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-24
APPROVED: RGT	



MECHANICAL PLAN – EL. 772.00
SCALE: 1/4"=1'-0"



MECHANICAL PLAN – EL. 786.50
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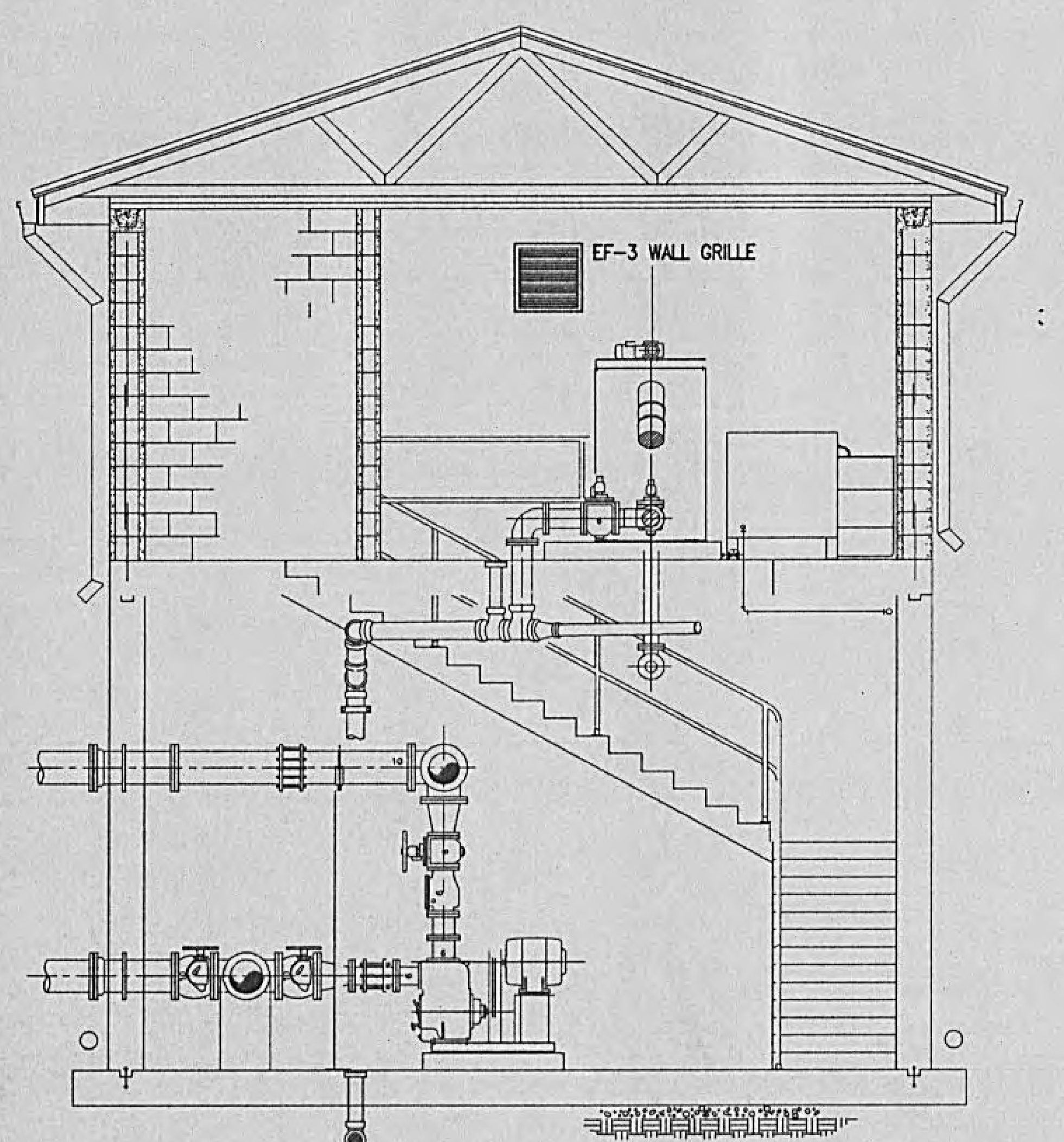
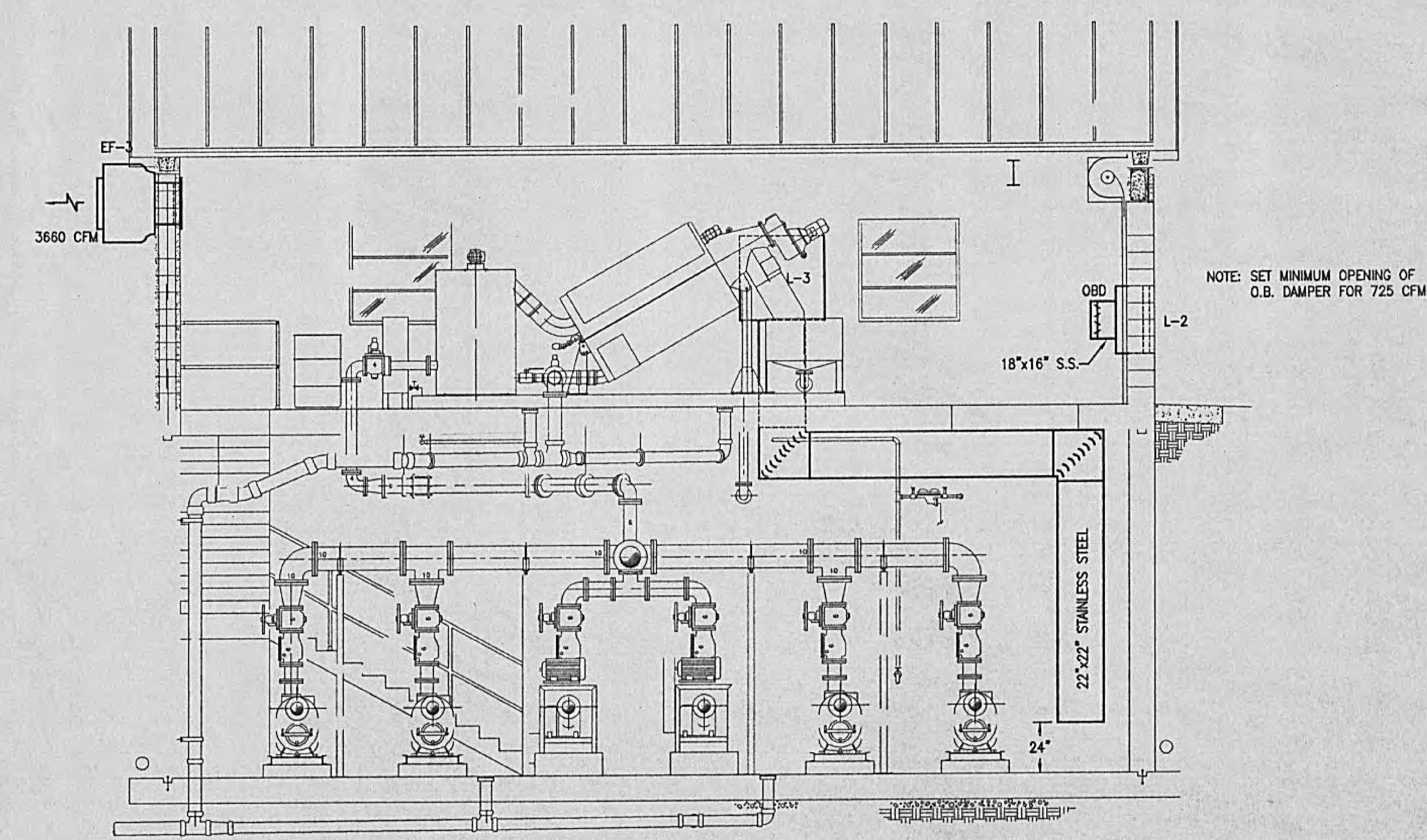


SECTION
SCALE: 1/4"=1'-0"
M2.2 M2



SECTION
SCALE: 1/4"=1'-0"
M2.1 M2

GRW PROJECT NO. 7601-10

RETURN/WASTE SLUDGE PUMP BUILDING
MECHANICAL PLAN & SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. ELY
REGISTERED ENGINEER
AGRICULTURE COMMERCE
NO. 00102520
STATE OF TENNESSEE
10-2-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS
NASHVILLE KNOXVILLE

DESIGNED: RGE	DATE: 8-1-02
DRAWN: JMG	SCALE: AS NOTED
REVIEWED: RGE	SHEET NO.
APPROVED: RGE	M-2

Wed, 02 Oct 2002 – 9:37am
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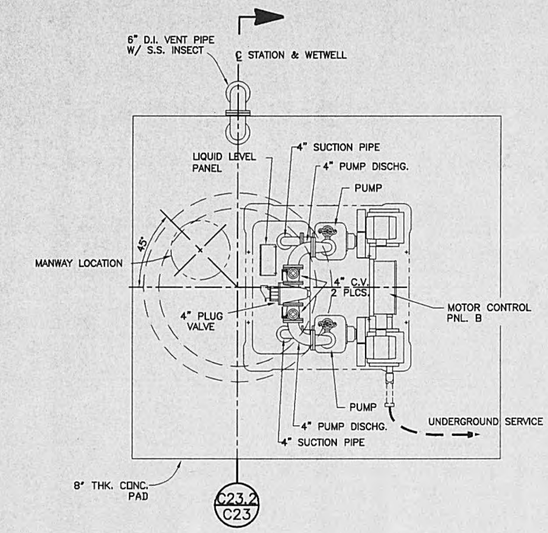
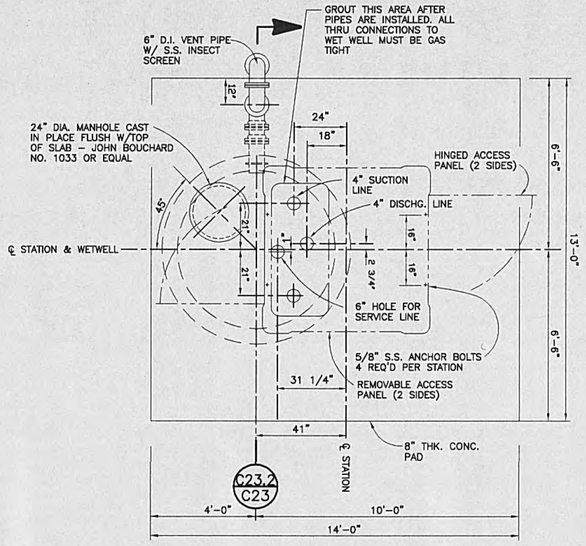


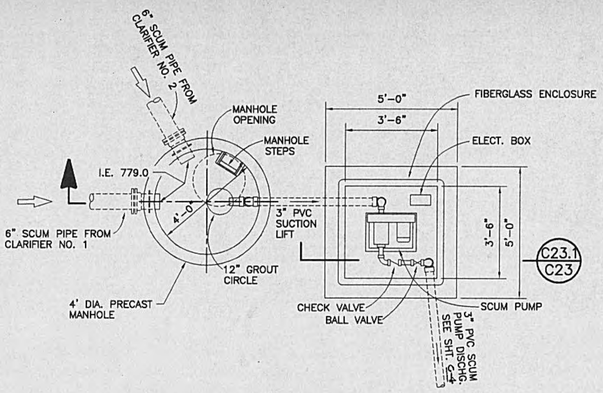
PLAN VIEW–UTILITY PUMP STATION

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



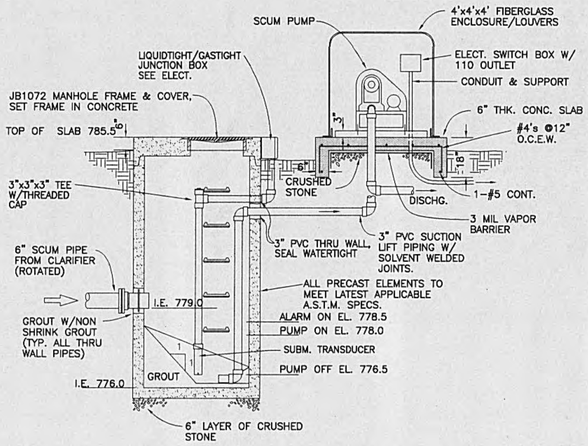
PLAN LAYOUT–UTILITY PUMP STATION

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



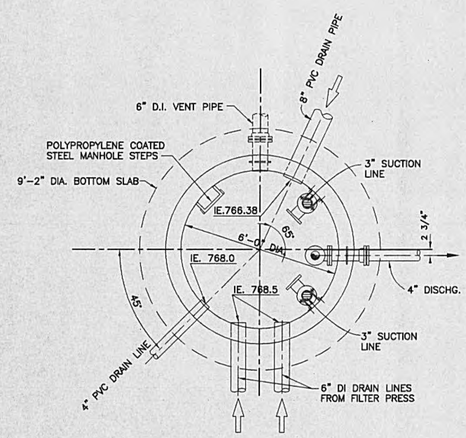
PLAN – SCUM PUMP/WETWELL

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



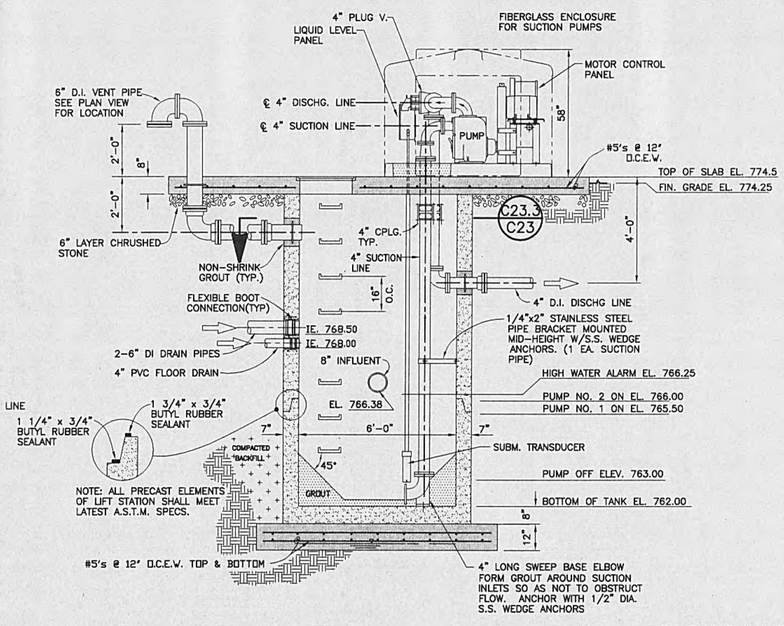
SECTION

SCALE: 3/8" = 1'-0" (C23.1 / C23)



SECTION

SCALE: 3/8" = 1'-0" (C23.3 / C23)



SECTION

SCALE: 3/8" = 1'-0" (C23.2 / C23)

EQUIPMENT IN WETWELL HAS BEEN ROTATED FOR CLARITY

GRW PROJECT NO. 7601-10

SCUM PUMP AND UTILITY PUMP STATION PLAN AND SECTIONS WASTEWATER TREATMENT PLANT UPGRADE HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

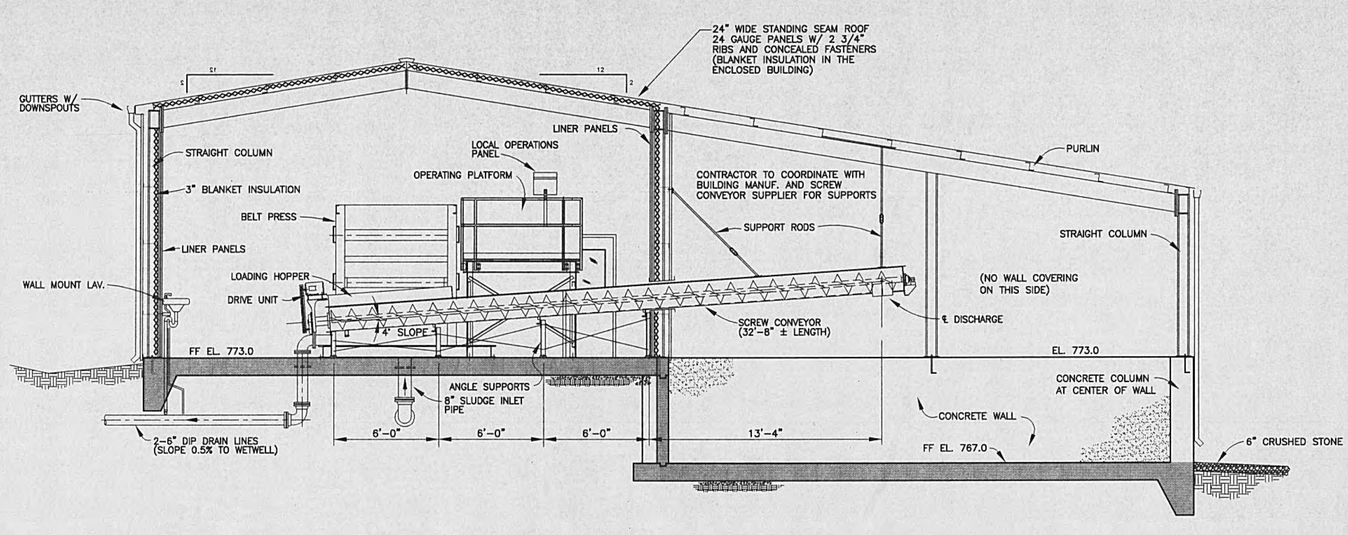
NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL JR. REGISTERED ENGINEER No. 012647 STATE OF TENNESSEE

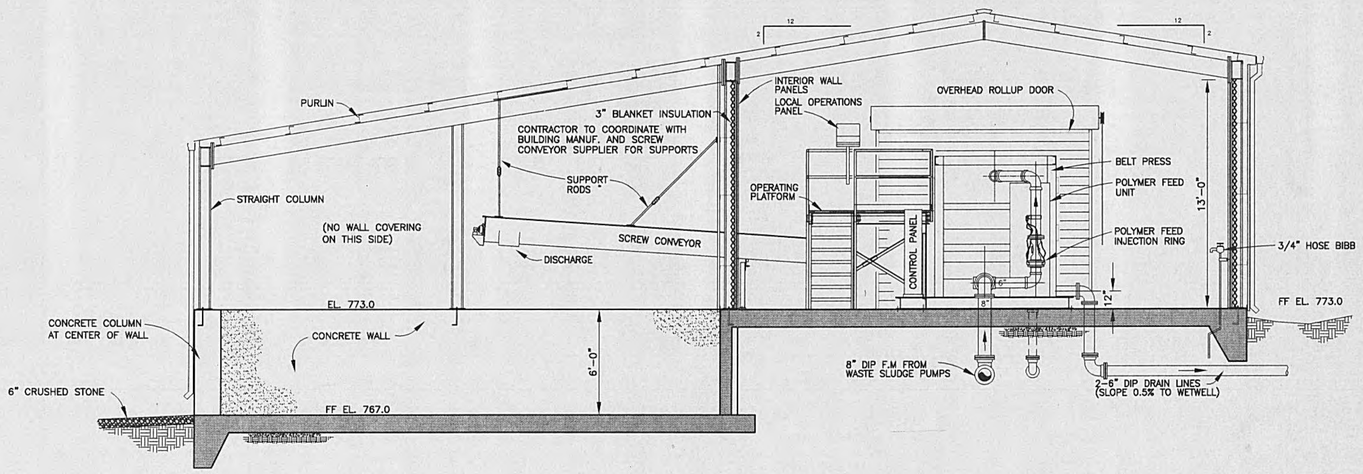
9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-23
APPROVED: RGT	



SECTION (C22.1 / C21)
SCALE: 1/4" = 1'-0"



SECTION (C22.2 / C21)
SCALE: 1/4" = 1'-0"

GRW PROJECT NO. 7601-10

BELT FILTER PRESS BUILDING SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

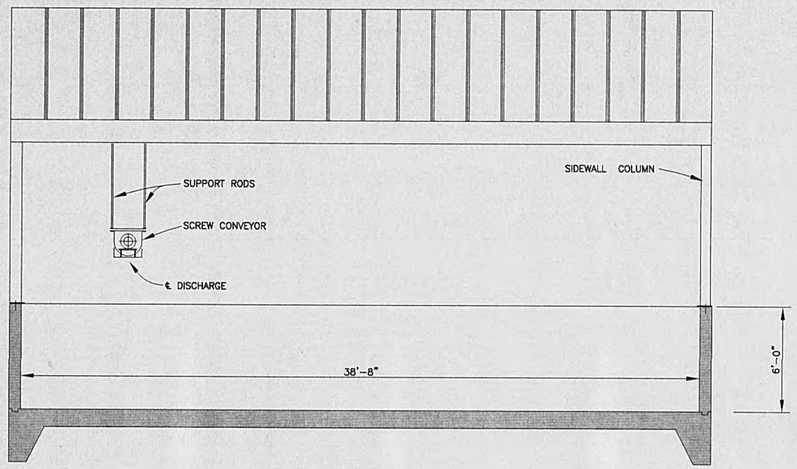
NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT C. THREADGILL JR. REGISTERED ENGINEER No. 01288 STATE OF TENNESSEE

9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS
NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-22
APPROVED: RGT	



SECTION (C21.1 / C21)
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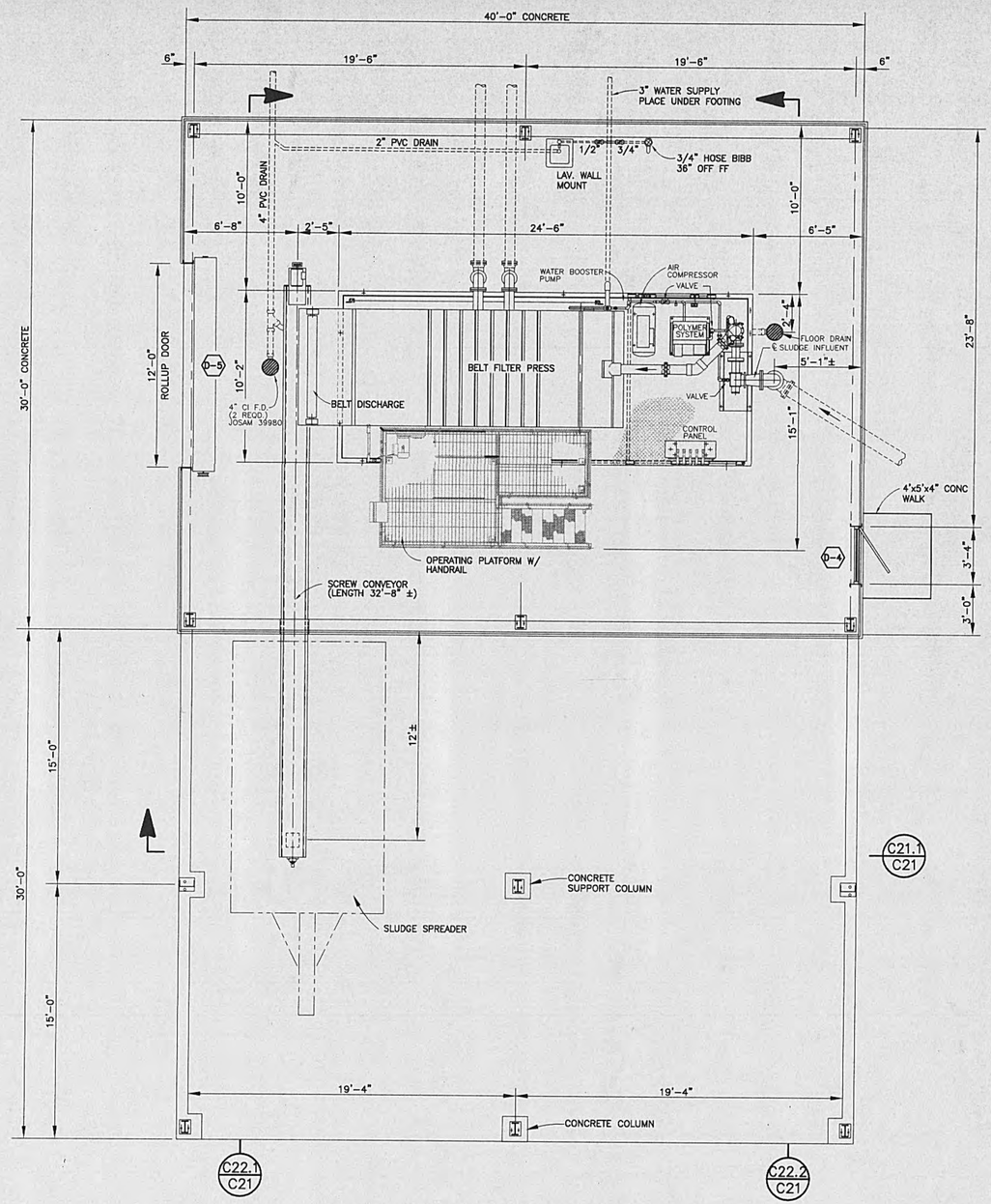


BELT PRESS BUILDING – PLAN
SCALE: 1/4" = 1'-0"

GRW PROJECT NO. 7601-10

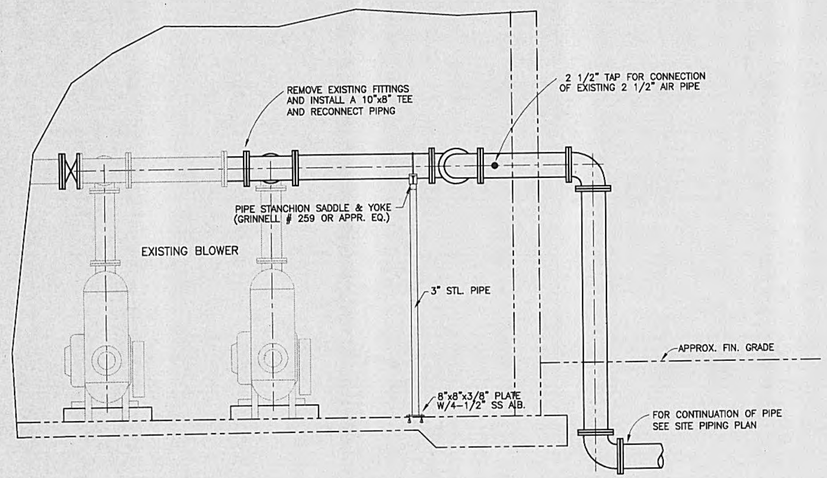
BELT FILTER PRESS BUILDING
PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER 013843 STATE OF TENNESSEE
9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-21
APPROVED: RGT	



SECTION C20.1/C20

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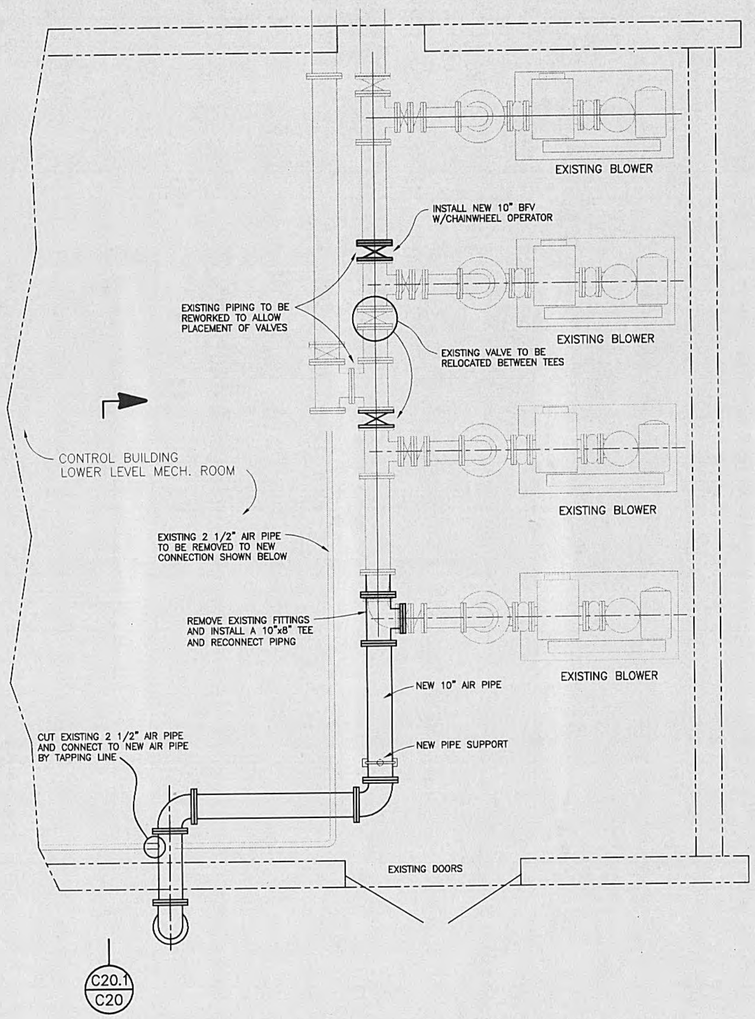
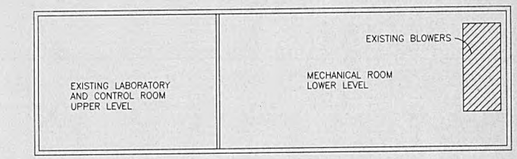


C20.1/C20

PLAN – EXISTING BLOWERS

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



PLAN – EXISTING CONTROL BUILDING

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

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL REGISTERED ENGINEER NO. 017841 STATE OF TENNESSEE

9-30-02

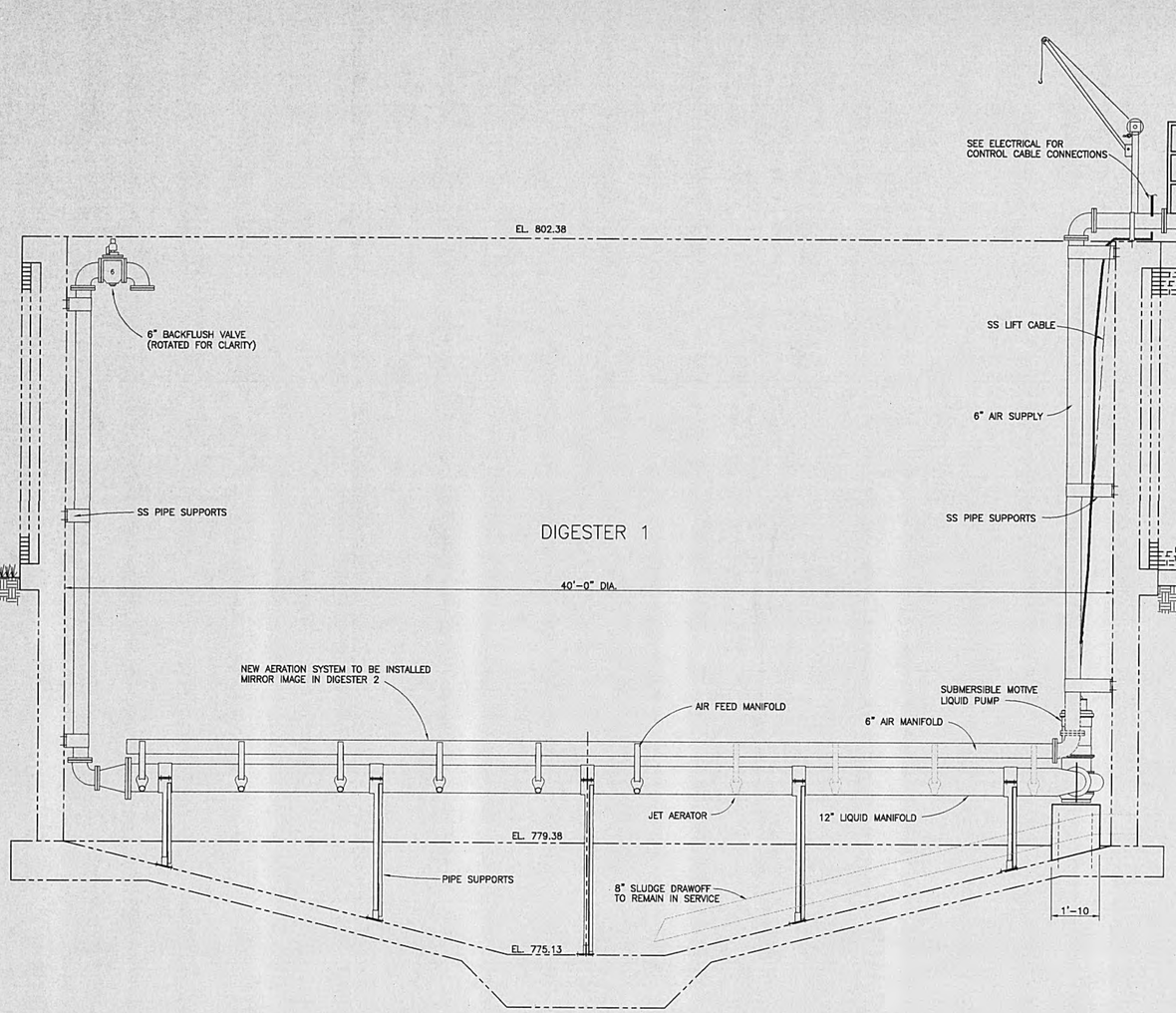
GRW PROJECT NO. 7601-10

RENOVATION EXISTING BLOWERS
PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

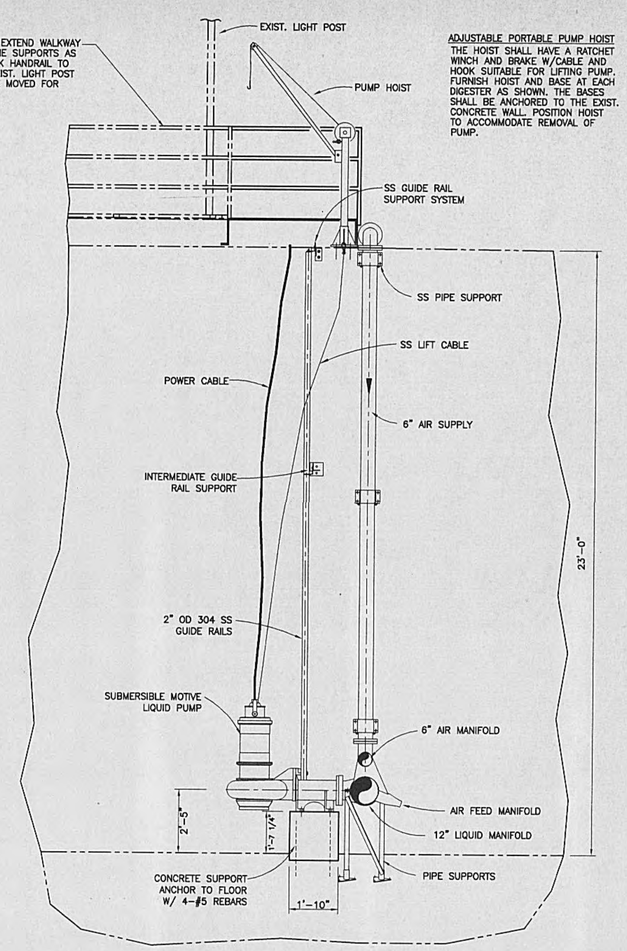
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-20
APPROVED: RGT	

FILE NAME:



SECTION
SCALE: 3/8" = 1'-0"
C19.1
C18



SECTION
SCALE: 3/8" = 1'-0"
C19.2
C18

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL JR. REGISTERED ENGINEER STATE OF TENNESSEE NO. 013965

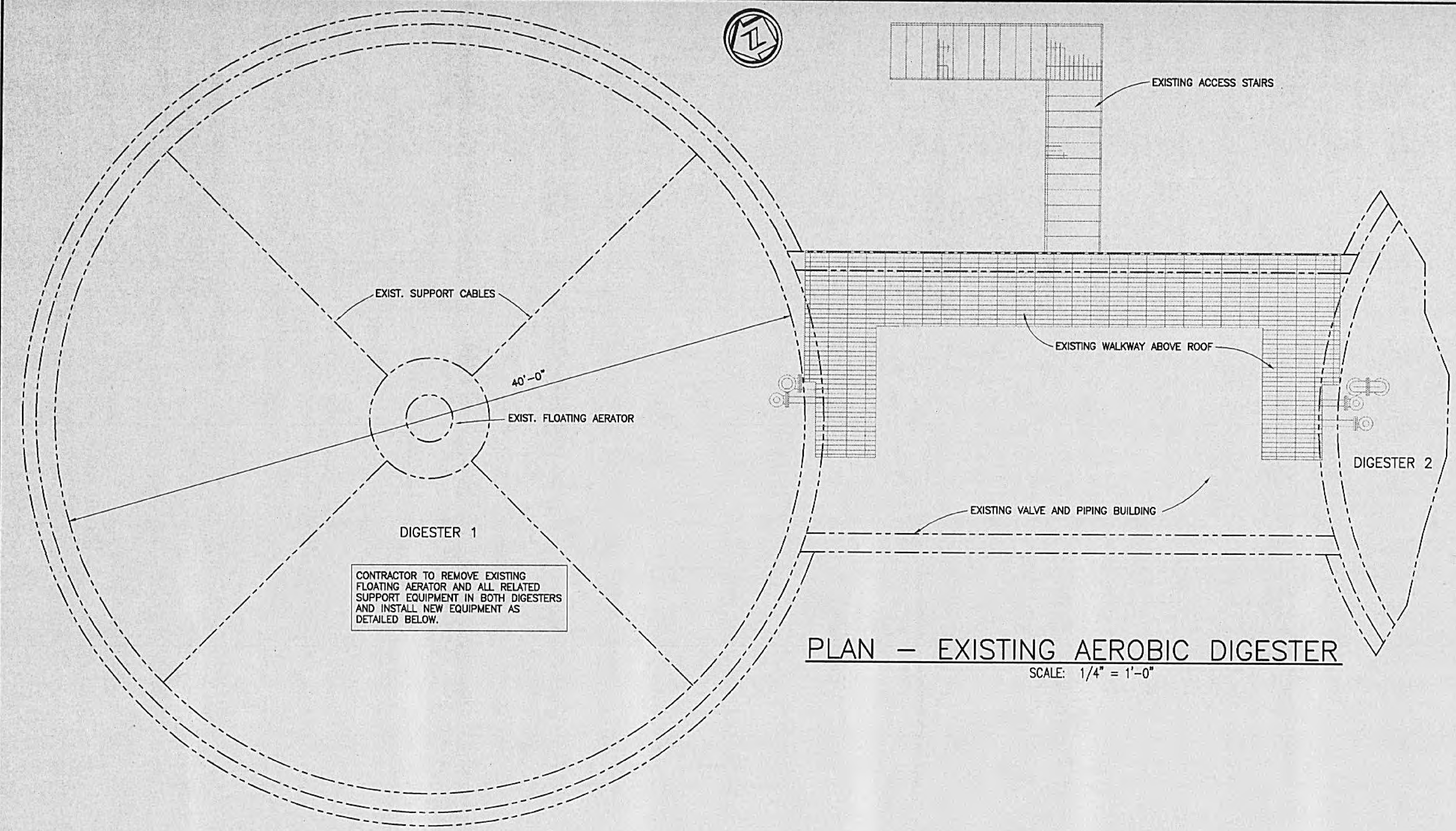
9-30-02

GRW PROJECT NO. 7601-10

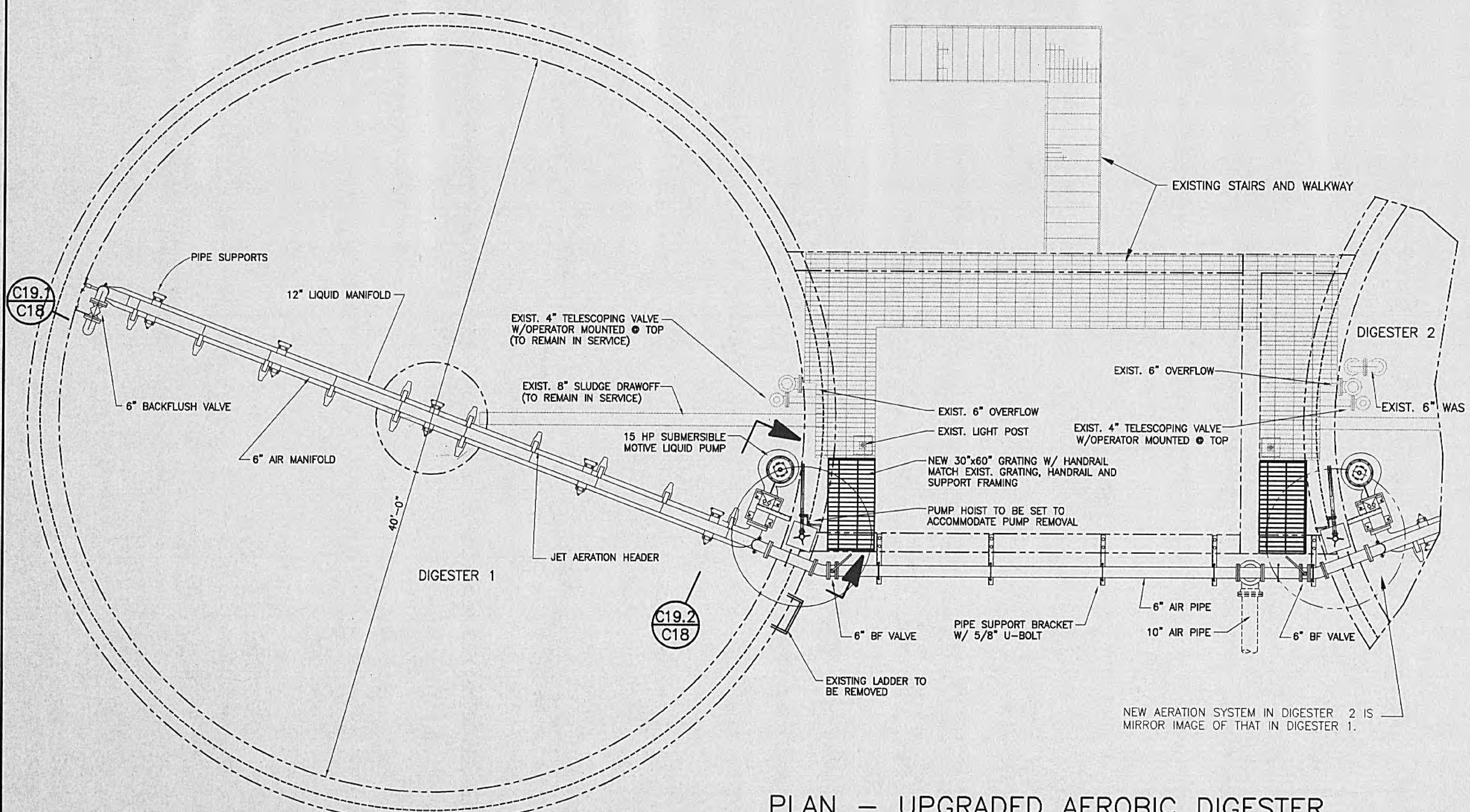
EXISTING AEROBIC DIGESTER SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-19
APPROVED: RGT	



PLAN – EXISTING AEROBIC DIGESTER
SCALE: 1/4" = 1'-0"



PLAN – UPGRADED AEROBIC DIGESTER
SCALE: 1/4" = 1'-0"

GRW PROJECT NO. 7601-10

EXISTING AEROBIC DIGESTERS
PLAN AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

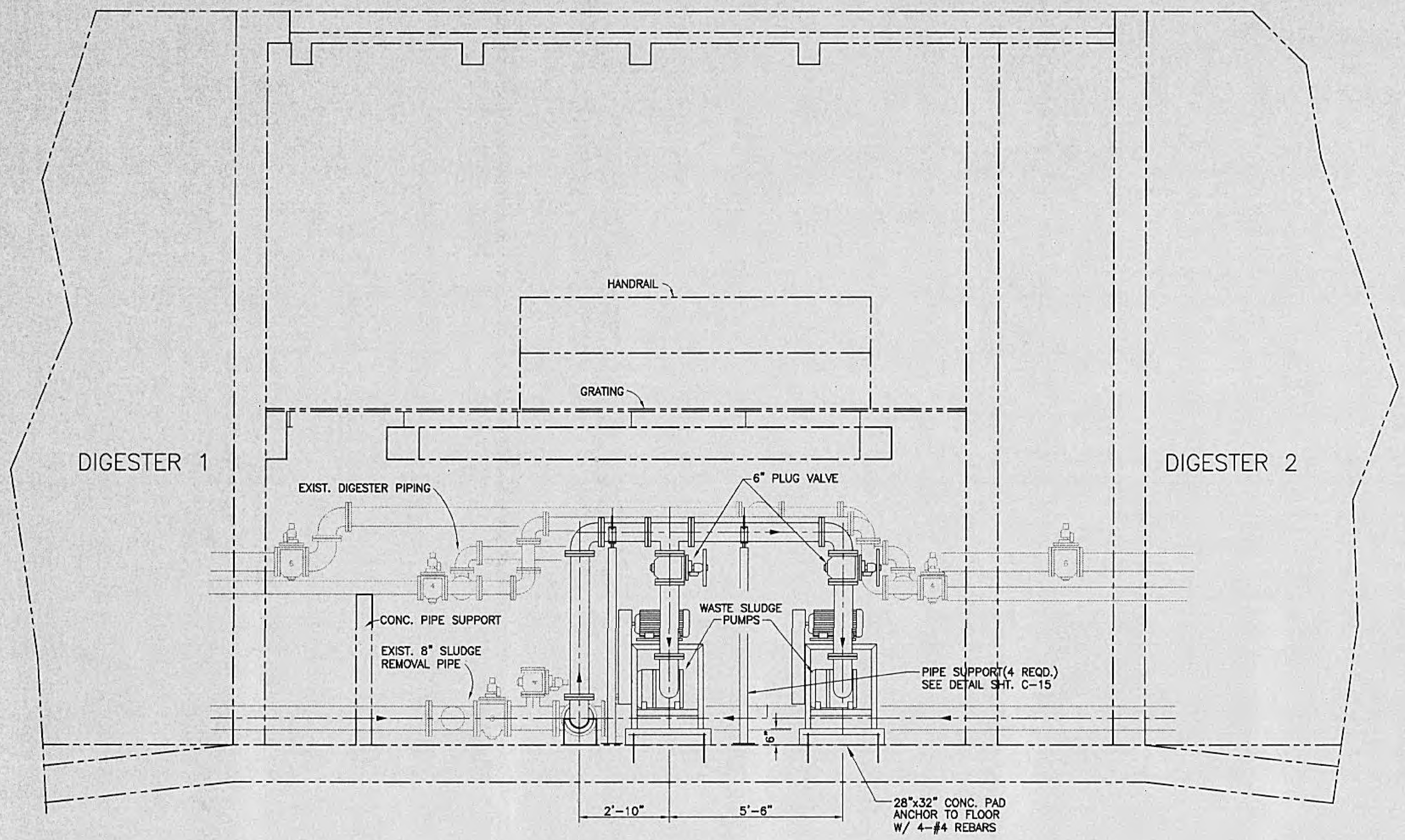
NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER NO. 012646 STATE OF TENNESSEE
9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS
NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-18
APPROVED: RGT	



SECTION (C17.1 / C17)
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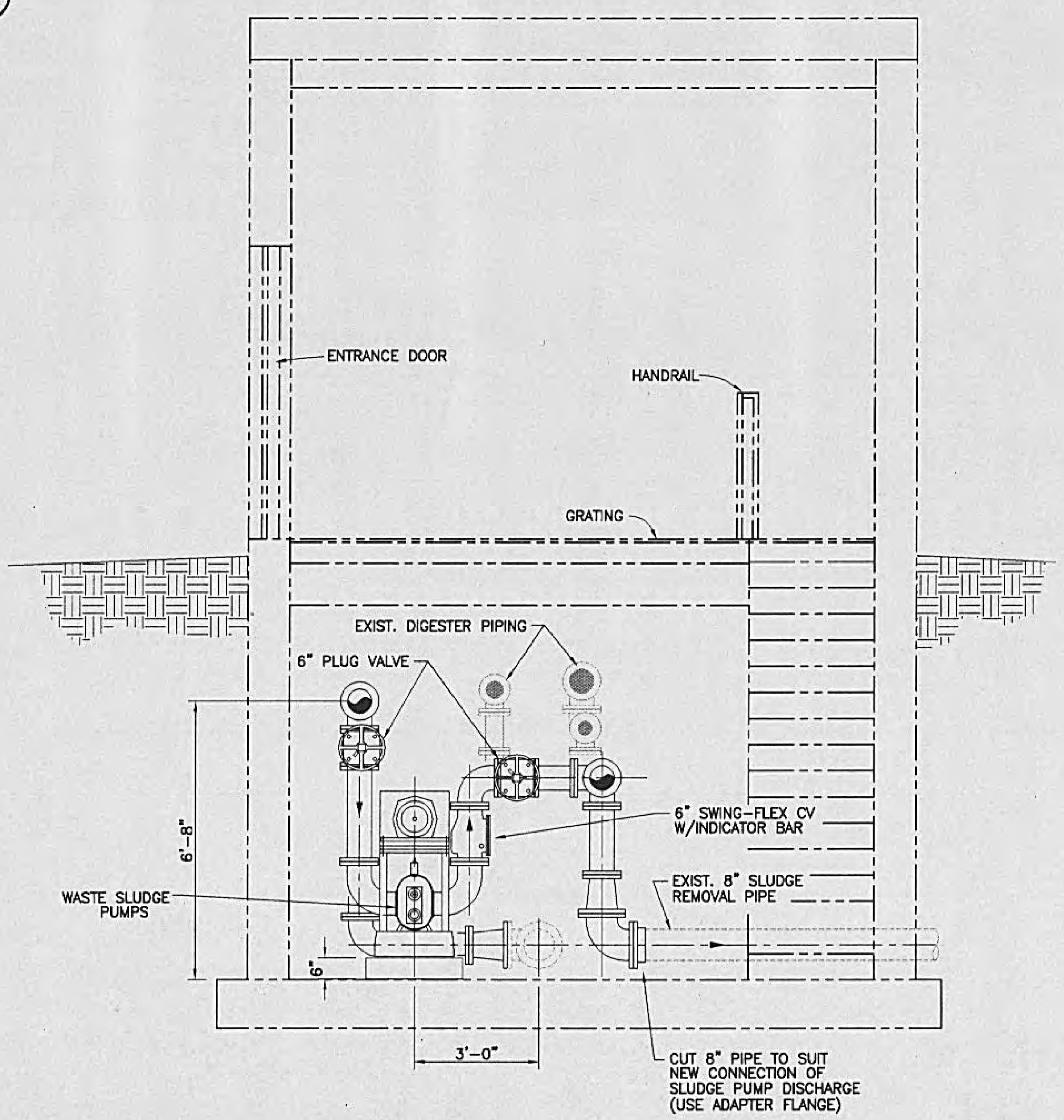

SECTION (C17.2 / C17)
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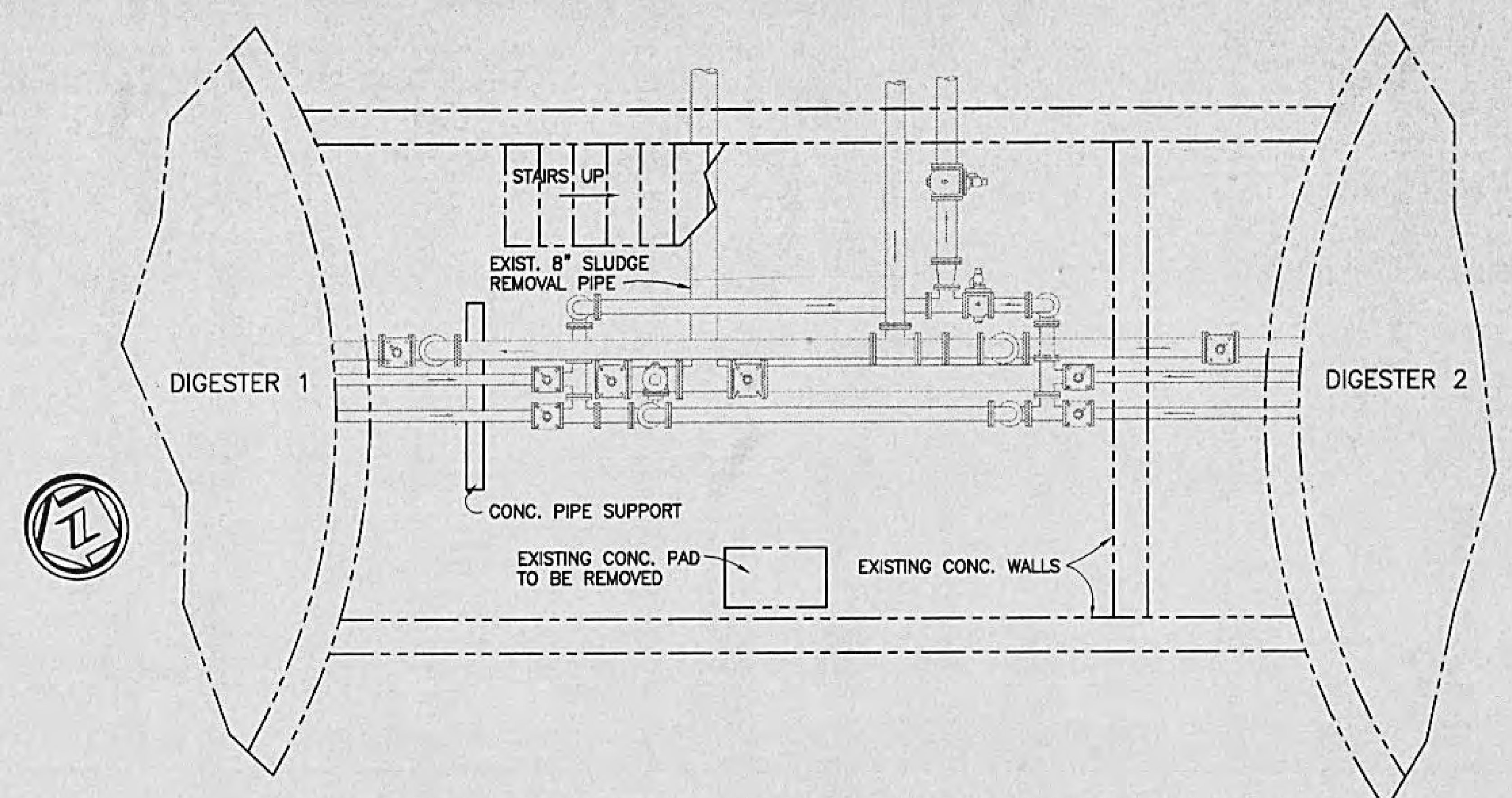
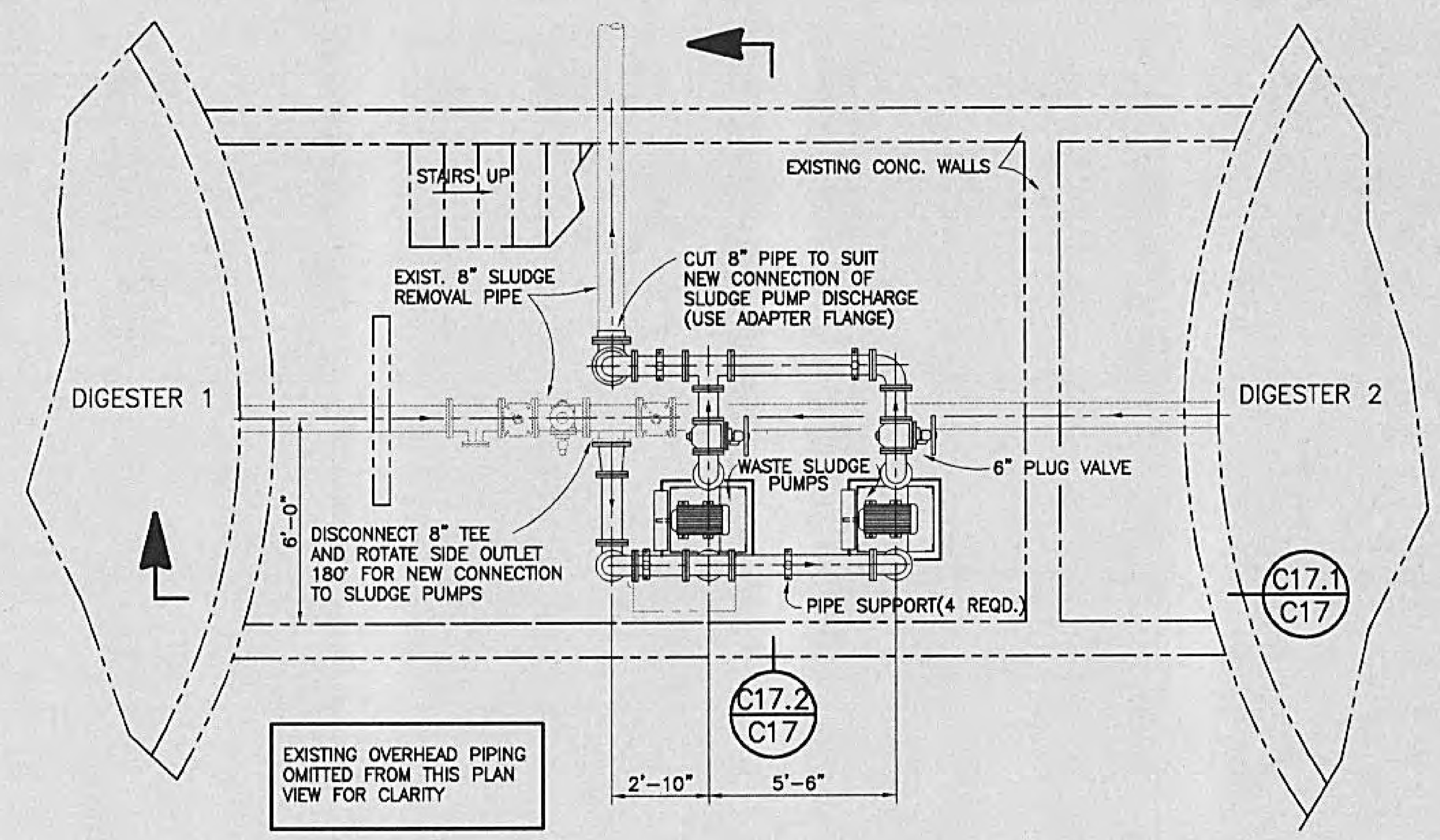


PLAN – EXISTING DIGESTER PIPING ROOM
SCALE: 1/4" = 1'-0"



PLAN – NEW WASTE SLUDGE PUMPS
SCALE: 1/4" = 1'-0"

GRW PROJECT NO. 7601-10

EXISTING AEROBIC DIGESTERS PIPE ROOM
PLAN, SECTIONS AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

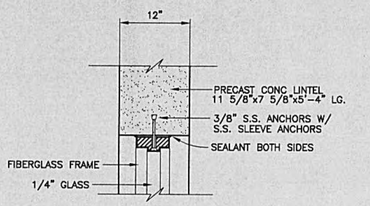
NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER STATE OF TENNESSEE NO. 012645
9-30-02

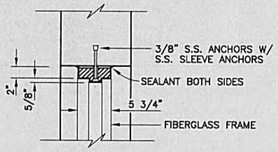
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO.
APPROVED: RGT	C-17

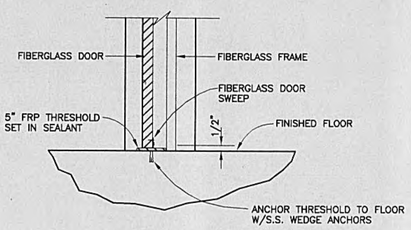


HEAD A

NOTE: ANCHOR FRAME AS PER MANUFACTURERS INSTRUCTIONS



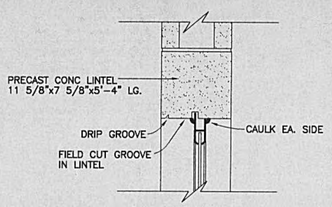
JAMB A



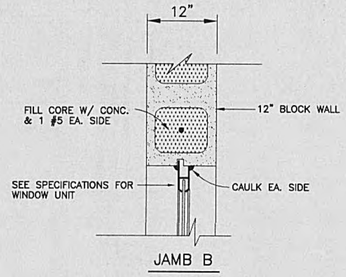
THRESHOLD DETAIL

TYPICAL DOOR DETAILS

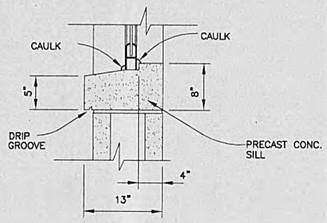
SCALE: 1"=1'-0"



HEAD B



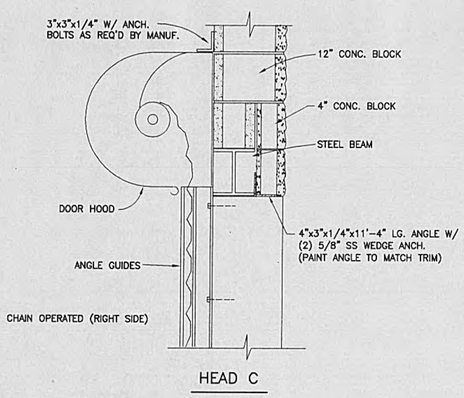
JAMB B



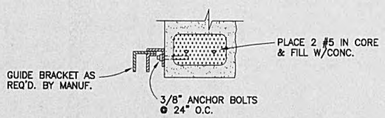
SILL B

TYPICAL WINDOW DETAILS

SCALE: 1"=1'-0"



HEAD C



JAMB C

OVERHEAD DOOR DETAILS

SCALE: 1"=1'-0"

DOOR SCHEDULE

MARK	LOCATION	HAND	DOOR TYPE	FRAME TYPE	DOOR SIZE	HDW	THRES-HOLD	JAMB	HEAD	REMARKS
D-1	OUTSIDE-RET/WASTE SLUDGE ROOM	LHRB	A	A	3'-0" x 7'-2"	1	YES	A	A	WEATHERSTRIPPING
D-2	OUTSIDE-ELECTRICAL ROOM	LHRB	A	A	3'-0" x 7'-2"	1	YES	A	A	WEATHERSTRIPPING
D-3	OUTSIDE-RET/WASTE SLUDGE ROOM	ROLLUP	B	NONE	8'-0" x 8'-0"	*	NO	C	C	INSULATED WITH WEATHERSTRIPPING
D-4	OUTSIDE-BELT FILTER PRESS BLDG.	RHR	A	A	3'-0" x 7'-2"	1	YES	**	**	WEATHERSTRIPPING
D-5	OUTSIDE-BELT FILTER PRESS BLDG.	ROLLUP	C	NONE	12'-0" x 10'-0"	*	NO	**	**	INSULATED WITH WEATHERSTRIPPING

* HARDWARE FURNISHED BY DOOR MANUF.
** STEEL FRAME FOR ROLLUP DOOR FURNISHED BY METAL BLDG. MANUFACTURER

HARDWARE SCHEDULE

NO.	BUTTS	DOOR STOPS /HOLDERS	LOCKSET	LATCHSET	CLOSER	REMARKS
1	1-1/2 PAIR	YES	KEY-BUTTON	KNOB-KNOB	YES	

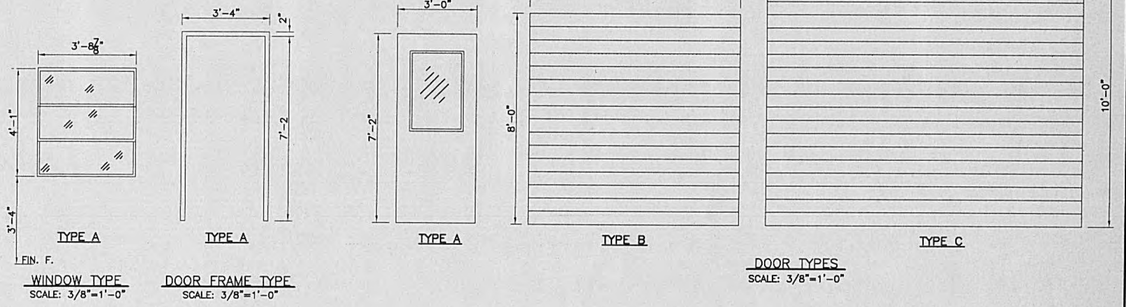
WINDOW SCHEDULE

MARK	TYPE	LOCATION	MASONRY OPENING	SILL	HEAD	JAMB	REMARKS
W-1	A	RET/WASTE SLUDGE BLDG.	3'-8-7/8" x 4'-1"	B	B	B	PROJECT OUT w/SCREEN

NOTE 1 - WINDOWS TO BE FURNISHED WITH ALL ITEMS NECESSARY FOR PROPER INSTALLATION.

FINISH SCHEDULE

ROOM	WALL	FLOOR	CEILING
RET/WASTE SLUDGE BLDG. UPPER FLOOR	PAINTED CONC. BLOCK	HARDENED CONC.	PAINTED WOOD
ELECTRICAL ROOM	PAINTED CONC. BLOCK	HARDENED CONC.	PAINTED WOOD
RET/WASTE SLUDGE BLDG. LOWER FLOOR	FINISHED CONCRETE	HARDENED CONC.	FINISHED CONC.
BELT FILTER PRESS BLDG. INTERIOR	METAL LINERS	HARDENED CONC.	METAL LINERS
BELT FILTER PRESS BLDG. EXTERIOR	METAL PANELS	N/A	N/A



NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER No. 017643 STATE OF TENNESSEE

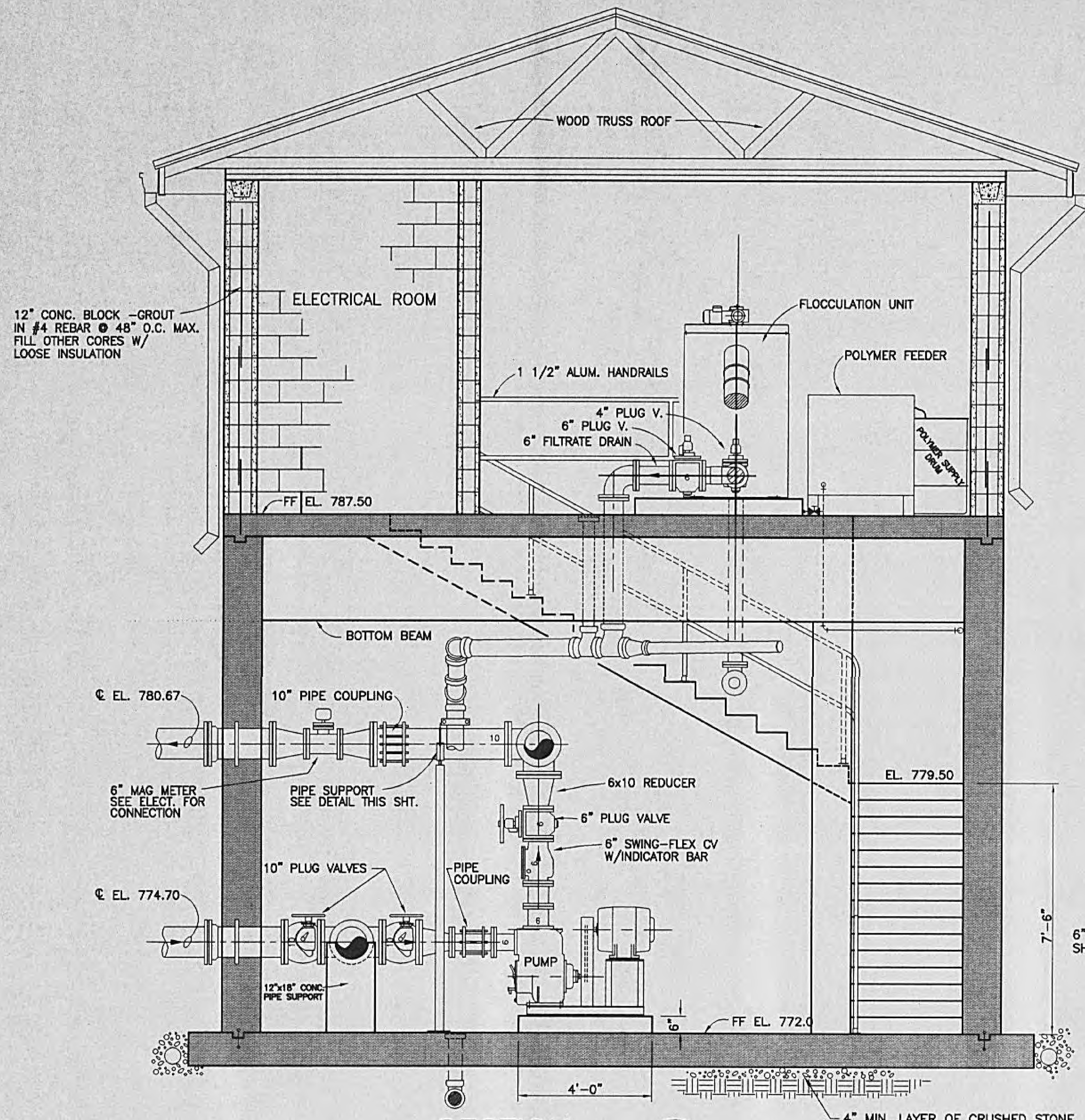
9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

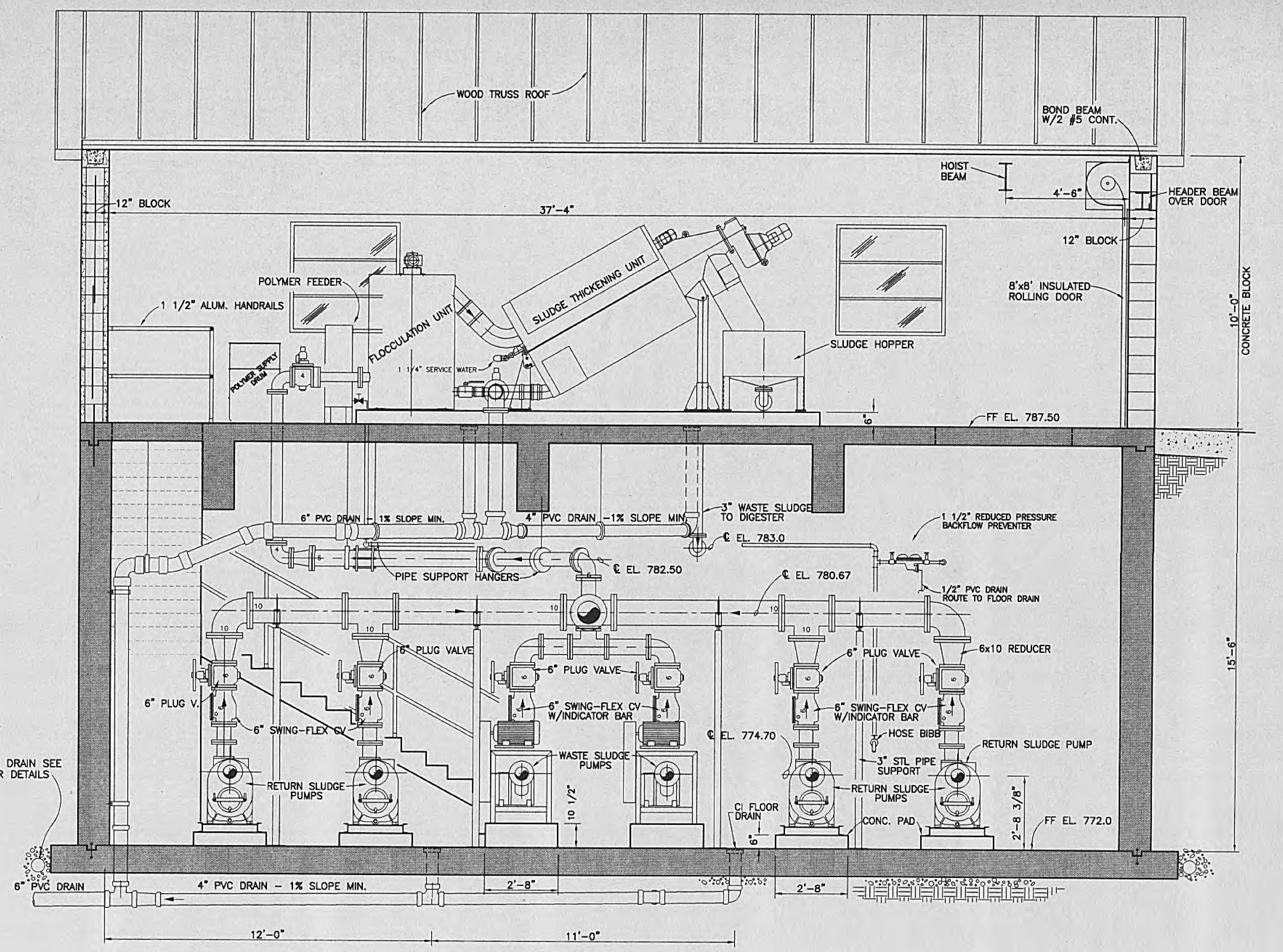
GRW PROJECT NO. 7601-10

RETURN/WASTE SLUDGE PUMP BUILDING
DOOR AND WINDOW SCHEDULE
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

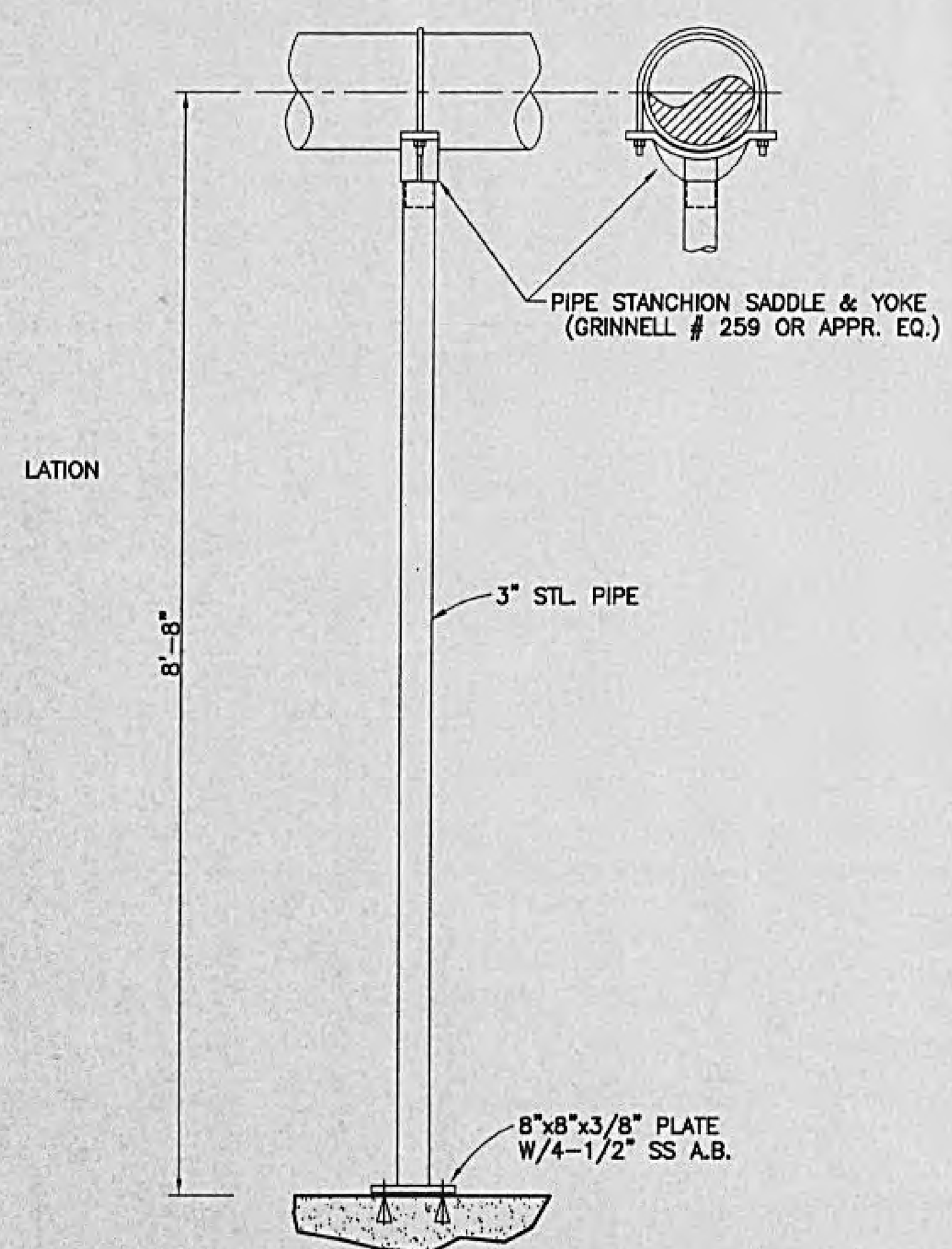
DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-16
APPROVED: RGT	



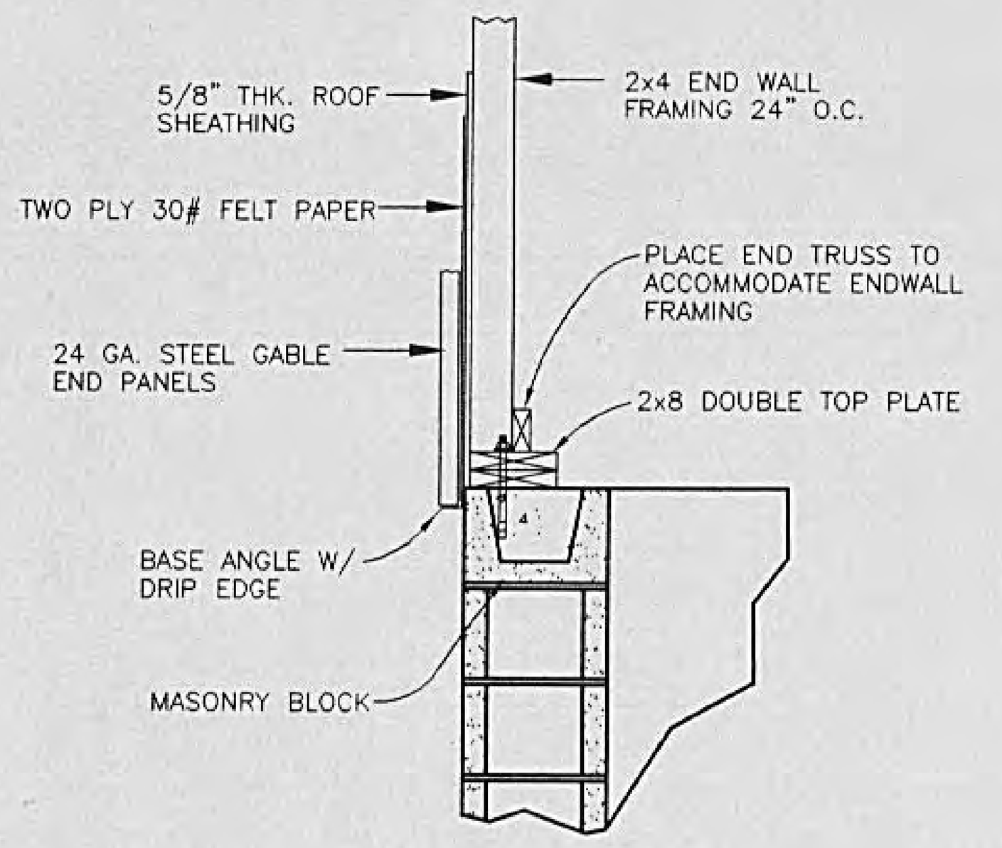
SECTION C15.1/C14
SCALE: 3/8" = 1'-0"



SECTION C15.2/C14
SCALE: 3/8" = 1'-0"



TYPICAL PIPE SUPPORT
SCALE: 3/4" = 1'-0"



ENDWALL DETAIL
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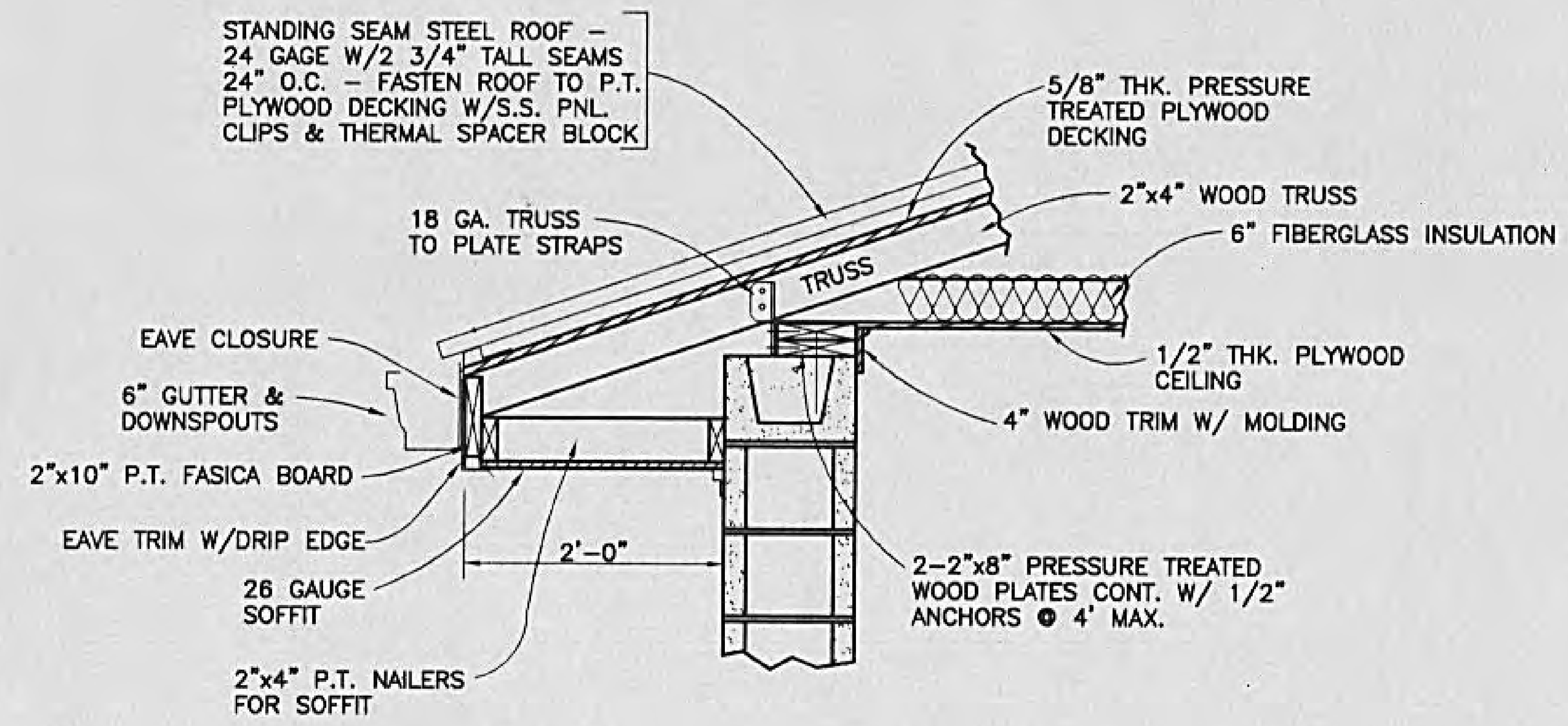
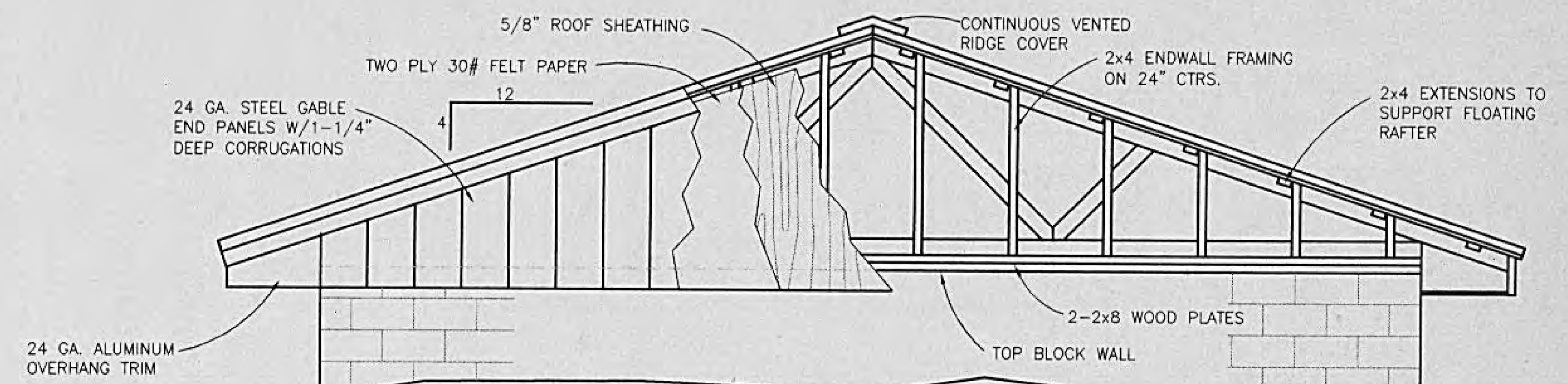


TYPICAL EAVE DETAIL
SCALE: 3/4" = 1'-0"



GABLE CONSTRUCTION DETAIL
SCALE: 3/8" = 1'-0"

GRW PROJECT NO. 7601-10

RETURN/WASTE SLUDGE PUMP BUILDING
SECTIONS AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

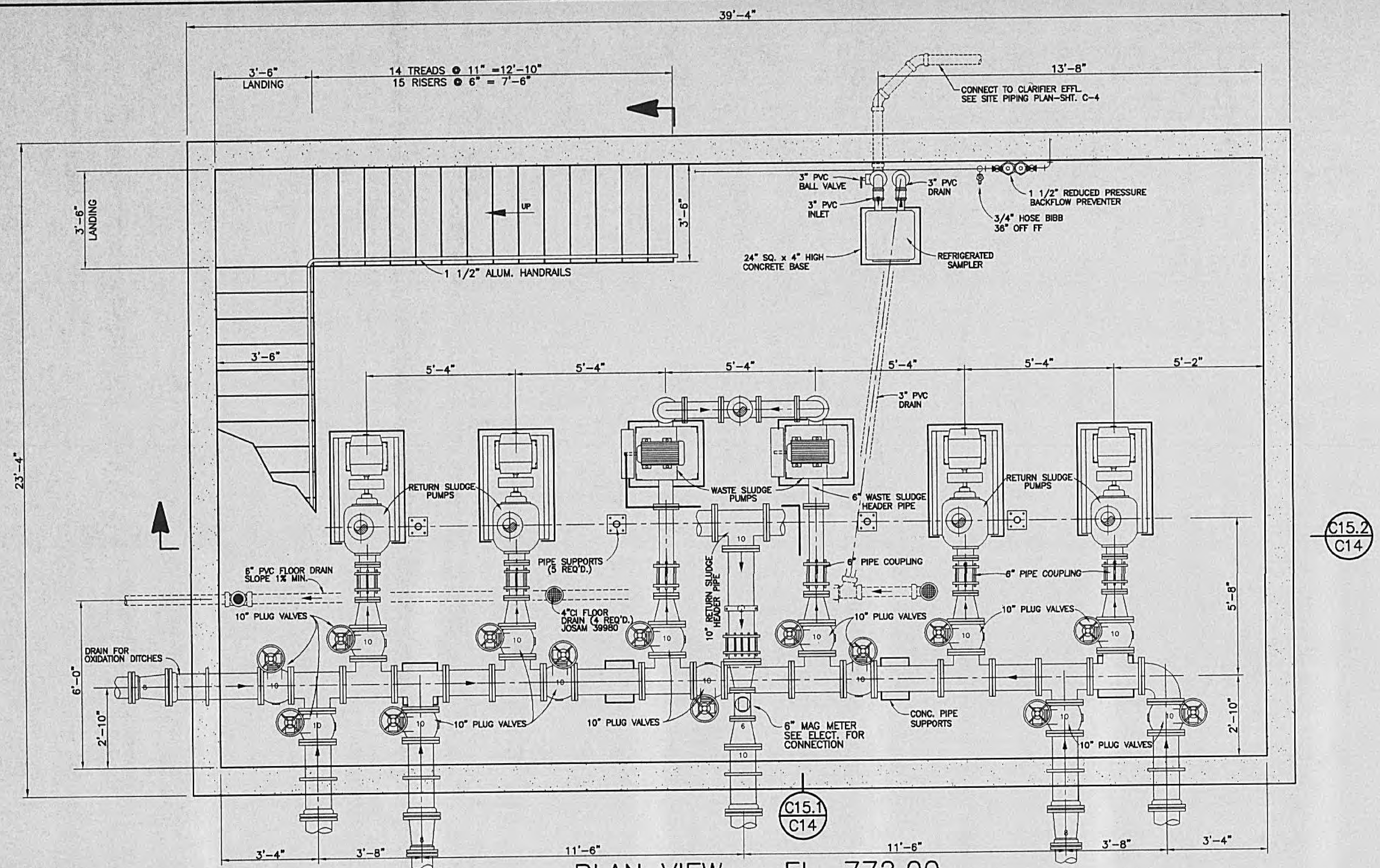
NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL, JR. — STATE OF TENNESSEE — NO. 013846

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

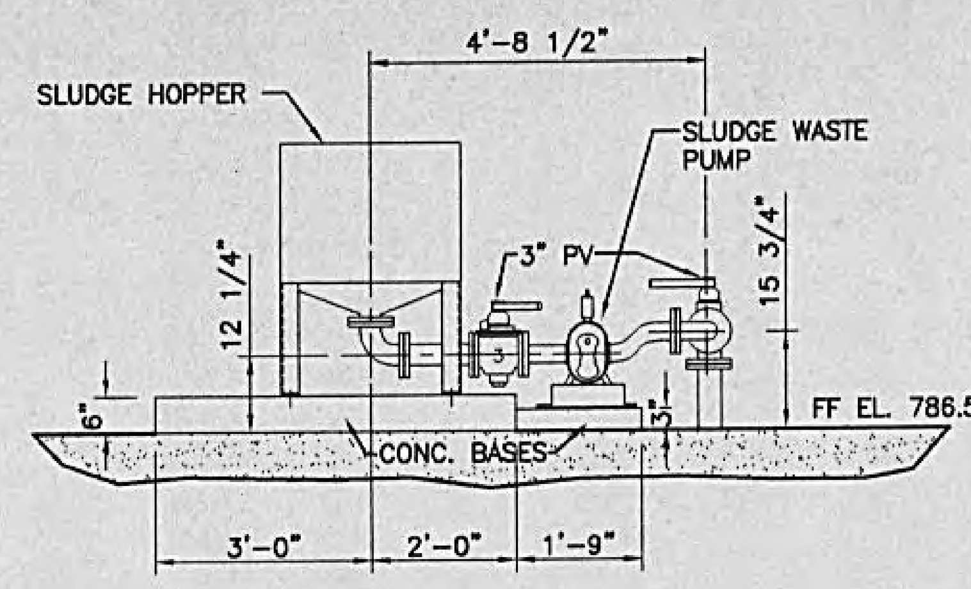
DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO.
APPROVED: RGT	C-15

9-30-02



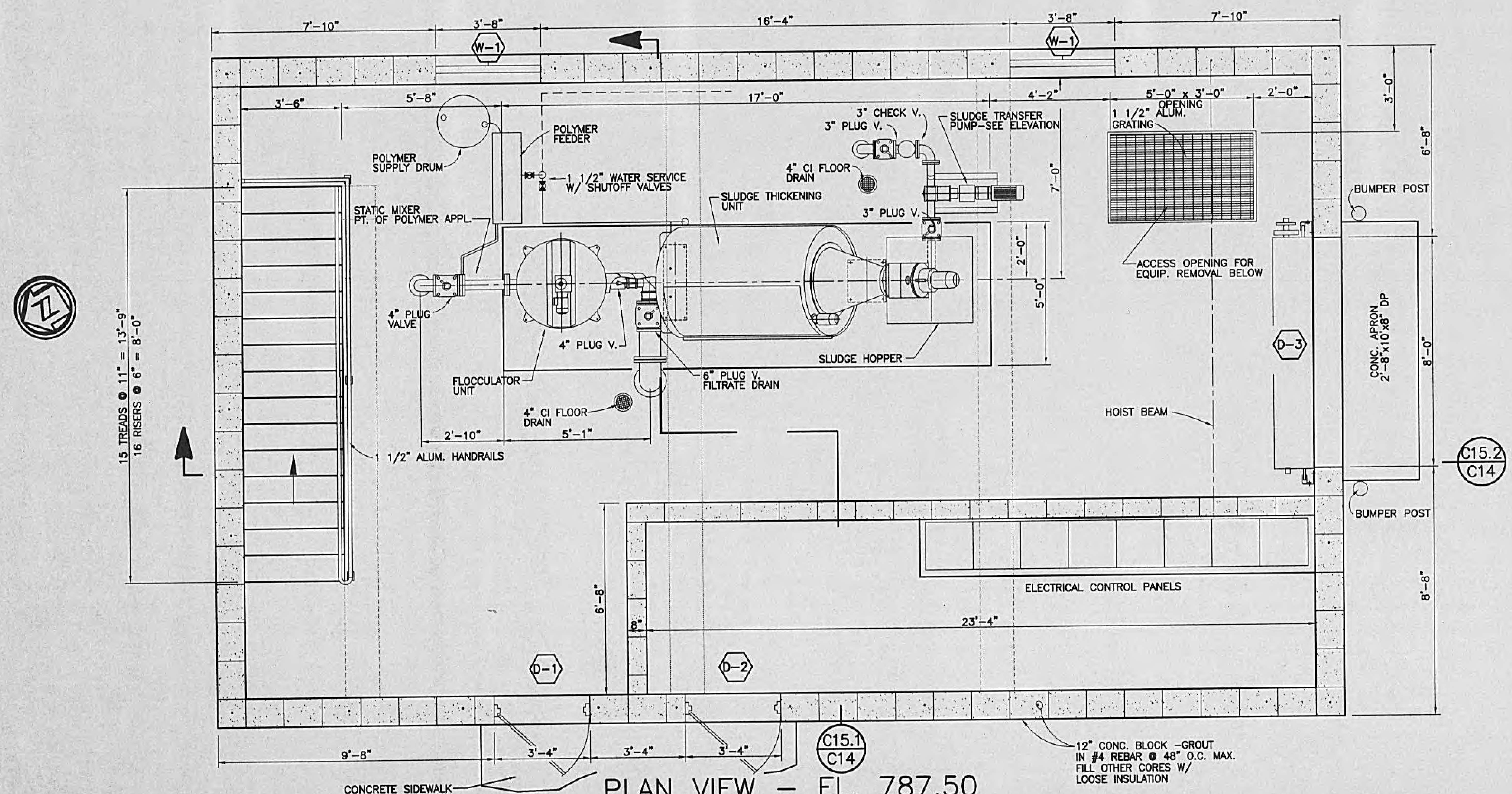
PLAN VIEW – EL. 772.00

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



ELEVATION SLUDGE TRANSFER PUMP

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



PLAN VIEW – EL. 787.50

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

GRW PROJECT NO. 7601-10

RETURN/WASTE SLUDGE PUMP BUILDING
PLAN AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL, JR. — STATE OF TENNESSEE

9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO.
APPROVED: RGT	C-14

SUPPLY/EXHAUST FAN SCHEDULE

MARK	LOCATION	TYPE FAN	CFM	S.P. IN W.C.	RPM	DRIVE	HP OR WATTS	VOLTS/ PHASE	REMARKS
EF-1	RETURN/WASTE SLUDGE BLDG. ELECTRICAL RM.	CENTRIFUGAL SIDEWALL EXHAUSTER	2,720	0.25	811	BELT	1/3	120/1	GREENHECK, OR EQUAL, MODEL GWB-18-3 W/WALL GRILLE & GRAVITY BACKDRAFT DAMPER. MOUNT 7'-4" A.F.F.
EF-2	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	CENTRIFUGAL SIDEWALL EXHAUSTER	1,965	0.25	1190	BELT	1/3	120/1	GREENHECK, OR EQUAL, MODEL GWB-14-3 W/WALL GRILLE & GRAVITY BACKDRAFT DAMPER. MOUNT 7'-4" A.F.F.
EF-3	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	CENTRIFUGAL SIDEWALL EXHAUSTER	3,660	0.25	751	BELT	1/2	120/1	GREENHECK, OR EQUAL, MODEL GWB-21-5 W/WALL GRILLE & GRAVITY BACKDRAFT DAMPER. MOUNT 7'-4" A.F.F.
EF-4	BELT FILTER PRESS BLDG.	SIDEWALL PROPELLER	3,630	0.25	934	BELT	1/2	120/1	GREENHECK, OR EQUAL, MODEL SBE-IH24-5 W/WALL COLLAR, MOTOR SIDE GUARD, BACKDRAFT DAMPER & WEATHERHOOD. MOUNT 10' A.F.F.

LOUVER SCHEDULE

MARK	LOCATION	SIZE-INCHES WxHxD	FREE AREA SQ. FT.	CFM	VELOCITY FPM	HEAD LOSS IN W.G.	REMARKS
L-1	RETURN/WASTE SLUDGE BLDG. ELECTRICAL RM.	32x32x6	2.91	2720	935	0.11	RUSKIN, OR EQUAL, MODEL ELC6375DAF COMBINATION LOUVER W/MOTOR OPERATOR & KYNAR FINISH. MOUNT 2' A.F.F. INTERLOCK W/EF-1.
L-2	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	32x24x4	2.39	1965	822	0.08	RUSKIN, OR EQUAL, MODEL ELF375D STATIONARY LOUVER W/KYNAR FINISH. MOUNT 2' A.F.F. INTERLOCK DUCT OBD W/EF-3.
L-3	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	40x32x4	4.39	3660	833	0.08	RUSKIN, OR EQUAL, MODEL ELF375D STATIONARY LOUVER W/KYNAR FINISH. MOUNT 4' A.F.F.
L-4	BELT FILTER PRESS BLDG.	36x36x6	3.68	3630	986	0.13	RUSKIN, OR EQUAL, MODEL ELC6375DAF COMBINATION LOUVER W/MOTOR OPERATOR & KYNAR FINISH. MOUNT 3' A.F.F. INTERLOCK W/EF-4.

ELECTRIC HEATER SCHEDULE

MARK	LOCATION	UNIT TYPE	MIN. BTUH.	KW	CFM	THROW FT.	°F TEMP. RISE	VOLTS/ PHASE	REMARKS
EUH-1	RETURN/WASTE SLUDGE BLDG. ELECTRICAL RM.	ELECTRIC WALL FIN	3,413	1.0	-	-	-	120/1	TRANE, OR EQUAL, MODEL EWFB, TYPE DBT, SINGEL ELEMENT, 250 WATTS/FT; 4' LONG W/BUILT-IN T-STAT, DISCONNECT & END CAPS
EUH-2	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	HOSE-DOWN UNIT HEATER	11,200	3.3	400	20	26	480/3	TRANE, OR EQUAL, MODEL UHRA-033DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.
EUH-3	RETURN/WASTE SLUDGE BLDG. FIRST FLOOR	HOSE-DOWN UNIT HEATER	34,130	10.0	700	28	45	480/3	TRANE, OR EQUAL, MODEL UHRA-103DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.
EUH-4	RETURN/WASTE SLUDGE BLDG. BASEMENT	HOSE-DOWN UNIT HEATER	51,200	15.0	700	28	68	480/3	TRANE, OR EQUAL, MODEL UHRA-153DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.
EUH-5	RETURN/WASTE SLUDGE BLDG. BASEMENT	HOSE-DOWN UNIT HEATER	25,600	7.5	400	20	60	480/3	TRANE, OR EQUAL, MODEL UHRA-073DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.
EUH-6	BELT FILTER PRESS BLDG.	HOSE-DOWN UNIT HEATER	25,600	7.5	400	20	60	480/3	TRANE, OR EQUAL, MODEL UHRA-073DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.
EUH-7	BELT FILTER PRESS BLDG.	HOSE-DOWN UNIT HEATER	25,600	7.5	400	20	60	480/3	TRANE, OR EQUAL, MODEL UHRA-073DAAT W/BUILT-IN THERMOSTAT & STAINLESS STEEL MOUNTING BRACKET. MOUNT 6' A.F.F.

GENERAL LEGEND

- APPEARS ON SHEET WHERE SECTION IS CUT
  - SECTION IDENTIFICATION LETTER
  - SHEET WHERE SECTION IS DRAWN
- APPEARS ON THE SHEET WHERE SECTION IS DRAWN
  - SECTION OR DETAIL IDENTIFICATION LETTER
  - SHEET WHERE DRAWN
- ENLARGED AREA OR PARTIAL PLAN SYMBOL (ON SHEET WHERE INDICATED AND SHEET WHERE DRAWN)
  - IDENTIFICATION LETTER
  - SHEET WHERE DRAWN
- PLAN MATCH LINE SYMBOL
- CONNECTION OF NEW WORK TO EXISTING
- LINE OR EQUIPMENT TO BE REMOVED
- 123 — ROOM NUMBER
- 9'-6" — CEILING HEIGHT

AFF	ABOVE FINISHED FLOOR
TOS, BOS	TOP OF STEEL, BOTTOM
TOB, BOB	TOP OF BEAM, BOTTOM
TOJ, BOJ	TOP OF JOIST, BOTTOM
TOC, BOC	TOP OF CONCRETE, BOTTOM
TOP, BOP	TOP OF PIPE, BOTTOM
BOD	BOTTOM OF DECK
OBD	OPPOSED BLADE DAMPER
SS	STAINLESS STEEL

MECHANICAL LEGEND

- 20x16 — NEW DUCT - 1ST FIGURE IS DIMENSION SHOWN
- SUPPLY OR OUTSIDE AIR DUCTWORK; PLAN, UP & DOWN
- RETURN OR EXHAUST DUCTWORK
- ROUND DUCTWORK; PLAN, UP AND DOWN
- AIR FLOW; DIRECTION
- MOTOR OPERATED DAMPER; PLAN, ONE LINE DIAGRAM
- AIR TURNING VANES; PLAN, ONE LINE DIAGRAM
- DUCT TRANSITION; PLAN, ONE LINE DIAGRAM
- FLEXIBLE DUCT CONNECTOR; PLAN
- T — THERMOSTAT, OR TEMP. CONTROLLER
- HORIZONTAL UNIT HEATER
- ROOF EXHAUST HOOD, EXHAUST FAN
- ROOF INTAKE HOOD, SUPPLY FAN

GENERAL NOTES

1. GENERAL NOTES, WHEREVER THEY ARE FOUND, APPLY TO ALL WORK IN THE PROJECT, UNLESS OTHERWISE INDICATED. SHEET NOTES, UTILIZING NOTE SYMBOLS, APPLY ONLY TO THE SHEET ON WHICH THEY ARE FOUND, UNLESS OTHERWISE STATED. THE MEANING OF NOTE SYMBOLS AND NUMBERS VARIES FROM SHEET TO SHEET.
2. CONTRACTOR SHALL UTILIZE ALL INFORMATION IN THE CONTRACT DOCUMENTS FOR PROVIDING THE WORK. CONTRACTOR SHALL UTILIZE DETAILS AND FLOW DIAGRAMS FOR THE WORK WHERE APPROPRIATE, WHETHER OR NOT THEY ARE SPECIFICALLY REFERENCED ON THE PLANS OR SUPPORTING DRAWINGS.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONTRACT DOCUMENTS ARE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE ANY WORK RELATING TO THOSE CONDITIONS IS PERFORMED.
4. LEGENDS OR LISTS OF SYMBOLS AND ABBREVIATIONS ARE GENERAL IN NATURE AND MAY CONTAIN ITEMS NOT USED IN THE CONTRACT DOCUMENTS. IF ANY SUCH ITEMS ARE FOUND WHICH ARE NOT DEFINED ON THE PLANS OR IN THE SPECIFICATIONS, THE ENGINEER SHALL BE CONTACTED FOR CLARIFICATION BEFORE THE BID.
5. CONTRACTOR SHALL MAINTAIN A SET OF PROJECT RECORD DRAWINGS AT THE JOB SITE AND SHALL BE RESPONSIBLE FOR MAKING CLEAR, NEAT CHANGES TO THE DRAWINGS, REFLECTING CHANGES TO THE WORK AND VARIANCE IN EXISTING CONDITIONS.
6. PROVIDE ALL MISCELLANEOUS STEEL, AS REQUIRED, TO SUPPORT ALL MECHANICAL DUCT AND PIPING SYSTEMS AND EQUIPMENT. HANG ALL EQUIPMENT FROM STRUCTURE WITH MINIMUM OF TWO TRAPEZE ASSEMBLIES OR FOUR INTEGRAL MOUNTING POINTS WITH VIBRATION ISOLATORS ON ALL FOUR SUPPORTS. DO NOT HANG ANYTHING FROM STEEL, COMPOSITION OR WOODEN DECKS. NON-ROOF CONCRETE DECKS MAY BE USED ONLY WITH PERMISSION OF THE ENGINEER. DO NOT HANG ANYTHING FROM MECHANICAL OR ELECTRICAL ITEMS.
7. NO CONCRETE RIBS OR JOISTS SHALL BE CUT WITHOUT SPECIFIC PERMISSION FROM THE ENGINEER. ALL ROOF OR FLOOR DECK PENETRATIONS IN WAFFLE STRUCTURE SHALL BE IN THE THIN-SLAB DEPRESSIONS IN THE STRUCTURE UNLESS OTHERWISE SHOWN.
8. NO STEEL STRUCTURAL MEMBERS SHALL BE CUT, BURNED, WELDED OR DRILLED WITHOUT SPECIFIC PERMISSION OF THE ENGINEER.
9. NO WOODEN STRUCTURAL MEMBERS SHALL BE CUT OR DRILLED EXCEPT AS INDICATED IN THE CONTRACT DOCUMENTS OR AS APPROVED BY THE ENGINEER.
10. CONSULT ROOF PLAN AND STRUCTURAL DRAWINGS FOR PLACEMENT OF ROOF MOUNTED EQUIPMENT. PROVIDE ALL NECESSARY ROOF CURBS, EQUIPMENT RAILS AND BASES AND ANY ADDITIONAL REQUIRED FRAMING IN COORDINATION WITH STRUCTURAL AND ROOFING WORK.
11. ALL EQUIPMENT, DUCT, PIPING AND ACCESSORIES INSTALLED OUTSIDE OR OTHERWISE EXPOSED TO THE ELEMENTS SHALL BE ADEQUATELY WEATHERPROOFED, IN KEEPING WITH THE SPECIFICATIONS. ALL FERROUS METAL FRAMING COMPONENTS SHALL BE STAINLESS STEEL OR HOT-DIP GALVANIZED.
12. DO NOT CHANGE PATH OF PIPING OR DUCT RUNS, ADD TURNS OR OFFSETS OR CHANGE DUCT DIMENSIONS OR PIPE SIZE WITHOUT FIRST CONSULTING THE ENGINEER. PIPE SIZES SHOWN ON DRAWINGS ARE NOMINAL UNLESS OTHERWISE INDICATED. ALL DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE DIMENSIONS FOR SHOP OR FIELD-FABRICATED DUCT AND NOMINAL SIZES FOR FACTORY FABRICATED DUCT.
13. CONTRACTOR SHALL CERTIFY AT THE TIME OF OWNER OCCUPANCY THAT ALL BELT-DRIVEN EQUIPMENT HAS BEEN CHECKED FOR BELT TIGHTNESS AFTER WEAR-IN PERIOD.
14. ALL EXISTING EQUIPMENT SHUTDOWNS OR INTERRUPTIONS OF UTILITY SERVICE REQUIRED FOR COMPLETION OF THE WORK SHALL BE SCHEDULED IN ADVANCE, AS REQUIRED BY THE OWNER.
15. COORDINATE ALL PIPING AND DUCTWORK WITH BOTH NEW AND EXISTING MECHANICAL AND ELECTRICAL WORK, INCLUDING HVAC, PLUMBING, ELECTRICAL, FIRE ALARM AND COMMUNICATIONS.
16. CONTRACTOR IS RESPONSIBLE FOR MAKING ALL REQUIRED CONNECTIONS FOR A COMPLETE SYSTEM. CONNECTIONS OF NEW WORK TO EXISTING IS USUALLY INDICATED BY SPECIAL SYMBOL (SEE LEGEND). SYMBOLS MISSING FROM THE DRAWINGS DO NOT EXCUSE THE CONTRACTOR FROM PROVIDING THE WORK.
17. ALL DUCTWORK AND SHEET METAL SHALL BE PROVIDED AS INDICATED AND SHALL BE MANUFACTURED AND SHOP- OR FIELD-FABRICATED, AS A MINIMUM, IN ACCORDANCE WITH THE RECOMMENDATIONS AND DETAILS OF SMACNA, UNLESS SPECIFICALLY INDICATED OTHERWISE.
18. FANS SHALL BE PROVIDED AS INDICATED BY GREENHECK, CARNES, COOK OR APPROVED EQUAL. GRILLES, REGISTERS AND DIFFUSERS SHALL BE PROVIDED AS INDICATED BY TITUS, TUTTLE AND BAILEY, CARNES OR APPROVED EQUAL. LOUVERS, HOODS AND PENTHOUSES SHALL BE PROVIDED AS INDICATED BY GREENHECK, AIRSTREAM, LOUVERS AND DAMPERS, CARNES, RUSKIN OR APPROVED EQUAL. PROVIDE FIRE AND SMOKE DAMPERS IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA AND THE TENNESSEE BUILDING CODE.
19. USE TURNING VANES, PER SMACNA CONSTRUCTION GUIDELINES, FOR ALL MITERED RECTANGULAR TURNS OF 45 DEGREES OR MORE.
20. PROVIDE ALL CONTROLS NECESSARY TO OPERATE EQUIPMENT AS SHOWN OR DESCRIBED, INCLUDING VALVES, ACTUATORS, THERMOSTATS, DAMPERS, ALL ACCESSORY DEVICES, POWER AND/OR PNEUMATIC SERVICE.
21. PROVIDE DISCONNECTS AND MAGNETIC STARTERS (OR RELAYS WITH OVERLOAD PROTECTION FOR SINGLE PHASE) FOR ALL EQUIPMENT SUPPLIED UNDER DIVISION 15 WHICH IS SPECIFIED TO HAVE FACTORY CONTROL PANEL. POWER WIRING AND CONDUIT TO THESE DEVICES AND BETWEEN THESE DEVICES AND MECHANICAL EQUIPMENT, IF REQUIRED, SHALL BE SUPPLIED UNDER DIVISION 16.

GRW PROJECT NO. 7601-10

MECHANICAL LEGEND
GENERAL NOTES, AND SCHEDULES
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. ELY REGISTERED ENGINEER AGRICULTURAL & BIOLOGICAL ENGINEERING No. 001050 STATE OF TENNESSEE 10-2-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGE	DATE: 8-1-02
DRAWN: JMG	SCALE: AS NOTED
REVIEWED: RGE	SHEET NO. M-1
APPROVED: RGE	

Wed, 02 Oct 2002 - 9:37am
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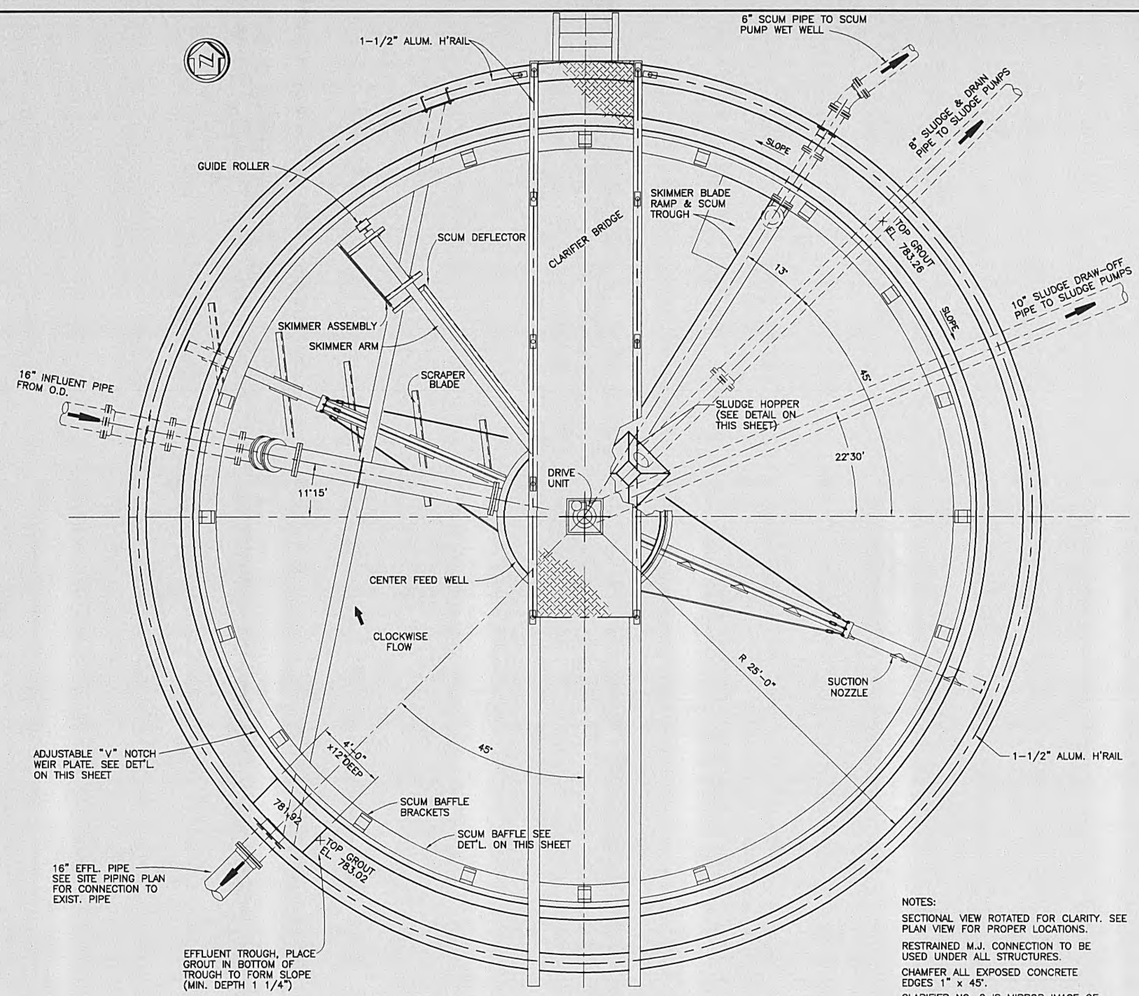


PLAN VIEW – CLARIFIER NO. 1

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

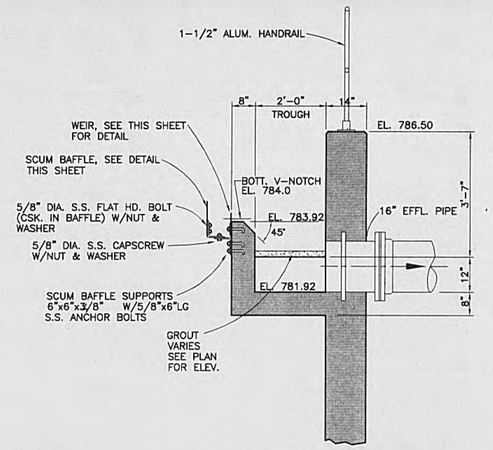
NOTES:

SECTIONAL VIEW ROTATED FOR CLARITY. SEE PLAN VIEW FOR PROPER LOCATIONS.

RESTRAINED M.J. CONNECTION TO BE USED UNDER ALL STRUCTURES.

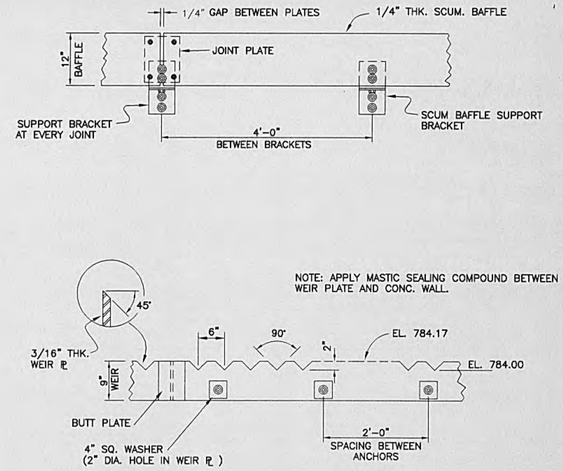
CHAMFER ALL EXPOSED CONCRETE EDGES 1" x 45'.

CLARIFIER NO. 2 IS MIRROR IMAGE OF CLARIFIER NO. 1 EXCEPT FOR EFFLUENT PIPE (SEE PIPING PLAN ON SHEET C-4).



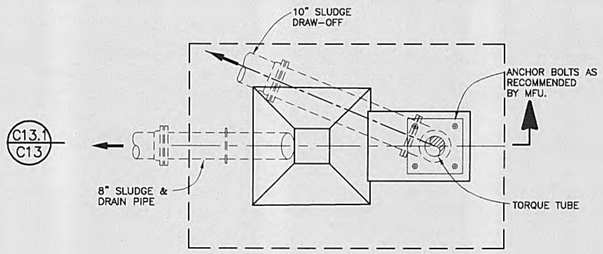
EFFLUENT WEIR AND BAFFLE DETAIL

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



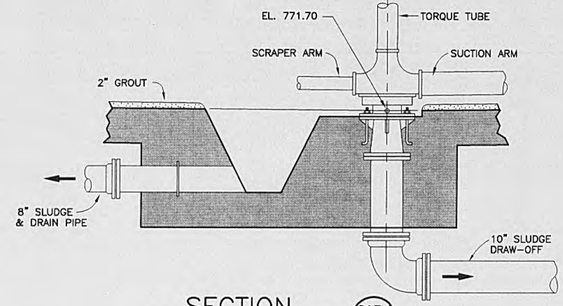
EFFLUENT WEIR AND BAFFLE DETAIL

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



PLAN – SLUDGE HOPPER

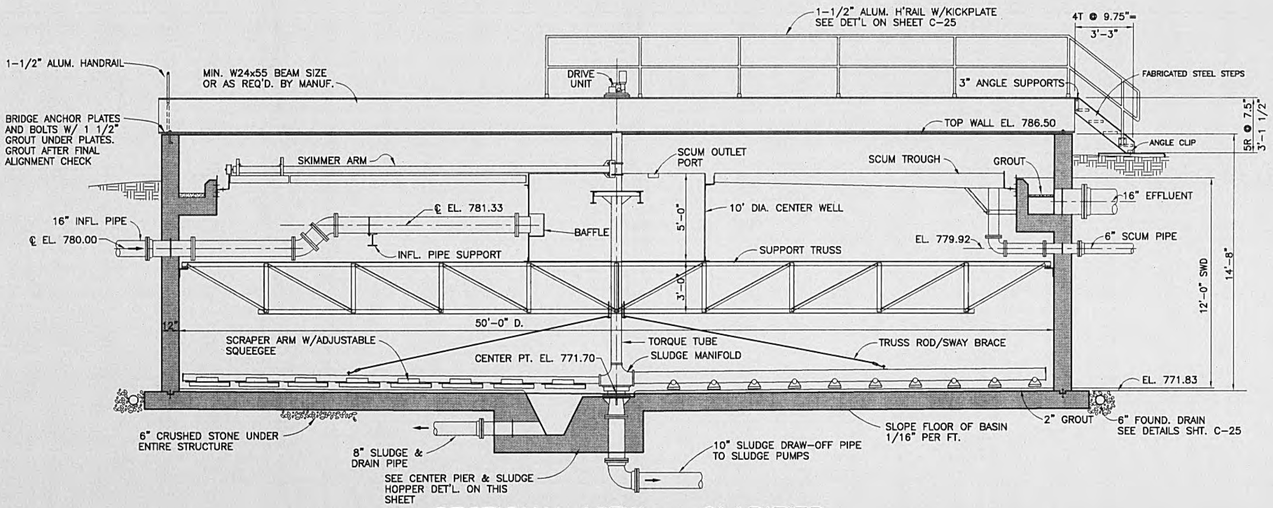
SCALE: 1/2"=1'-0"



SECTION

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

C13.1
C13



SECTIONAL VIEW – CLARIFIER

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

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL REGISTERED ENGINEER No. 011881 STATE OF TENNESSEE

9-30-02

GRW PROJECT NO.7601-10

CLARIFIERS – PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
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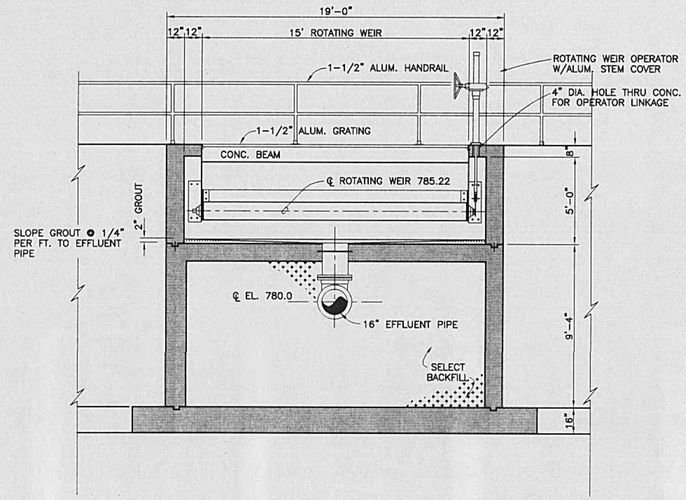
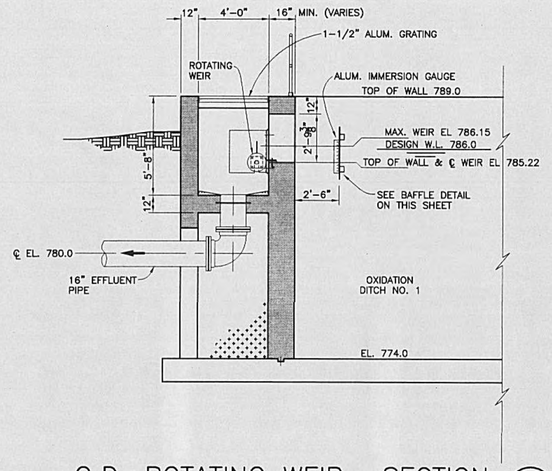
APPROVED: RGT	



O.D. ROTATING WEIR –SECTION

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

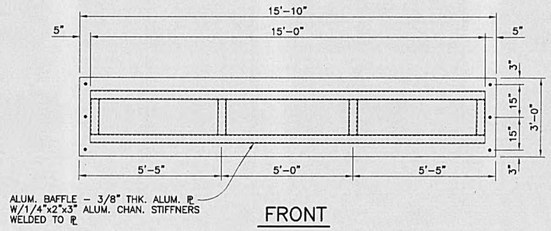
C12.1
C9



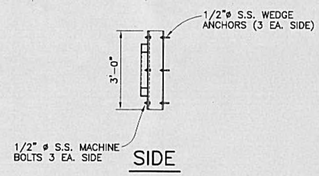
O.D. ROTATING WEIR –SECTION

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

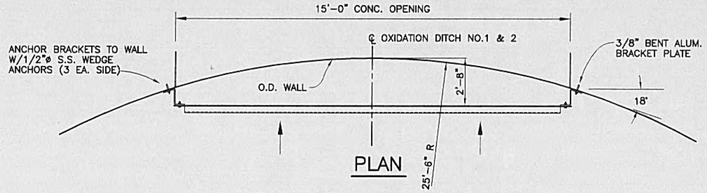
C12.2
C9



FRONT



SIDE



PLAN

EFFLUENT BAFFLE DETAIL

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

GRW PROJECT NO.7601-10

EFFLUENT ROTATING WEIR – SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER STATE OF TENNESSEE NO. 012645

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
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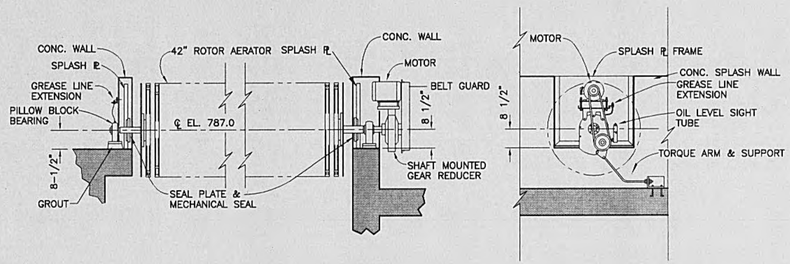
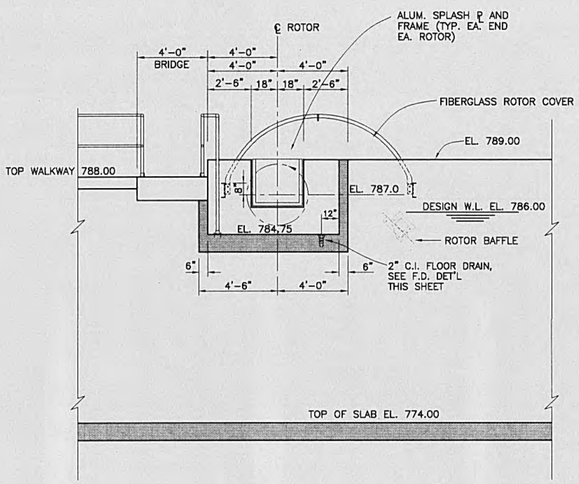


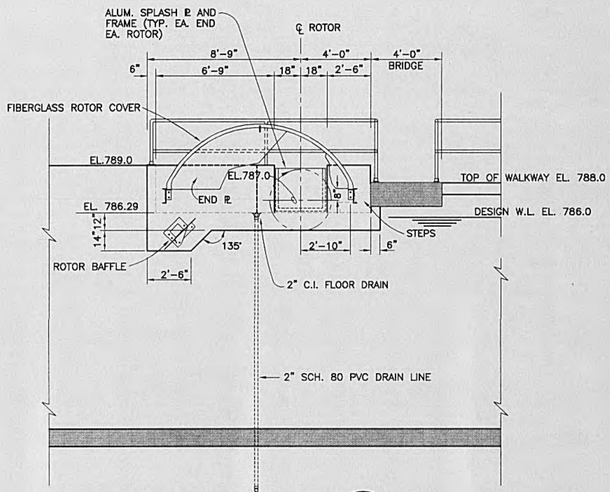
ROTOR DRIVE MECHANISM DETAIL

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



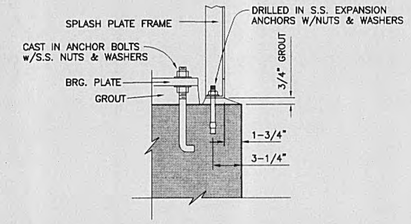
SECTION C11.1 / C8

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



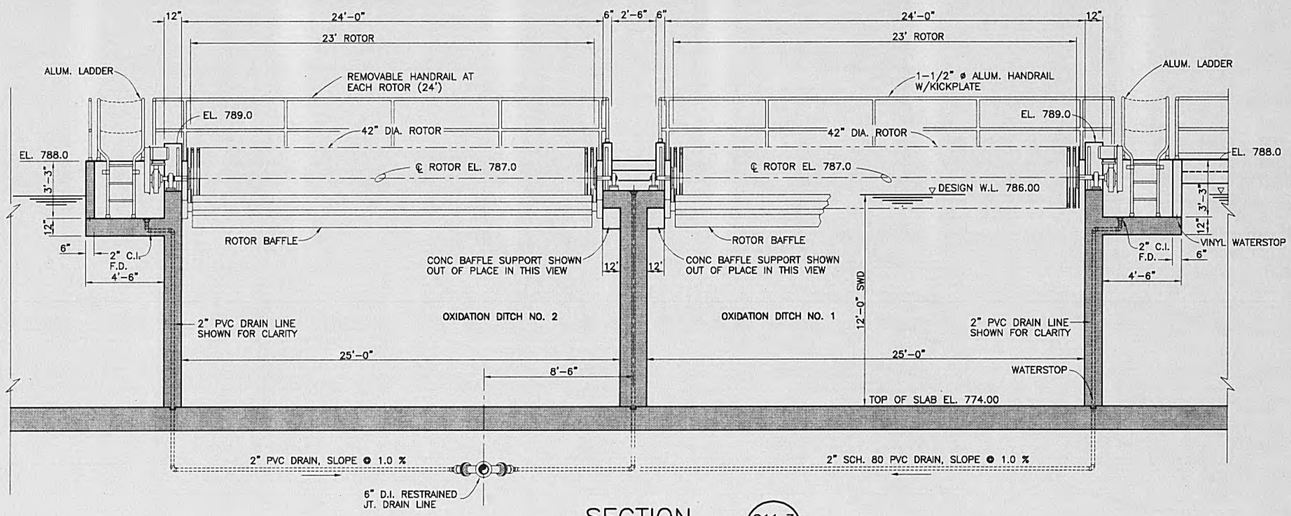
SECTION C11.2 / C8

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



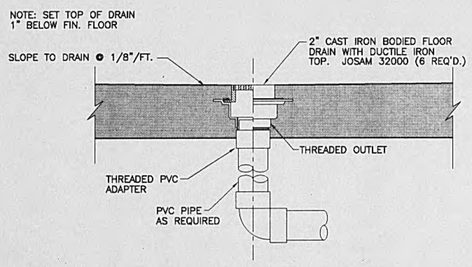
BEARING/SPLASH PLATE MOUNTING DETAIL

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



SECTION C11.3 / C8

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



FLOOR DRAIN INSTALLATION DETAIL

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

GRW PROJECT NO.7601-10

OXIDATION DITCH – SECTIONS AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

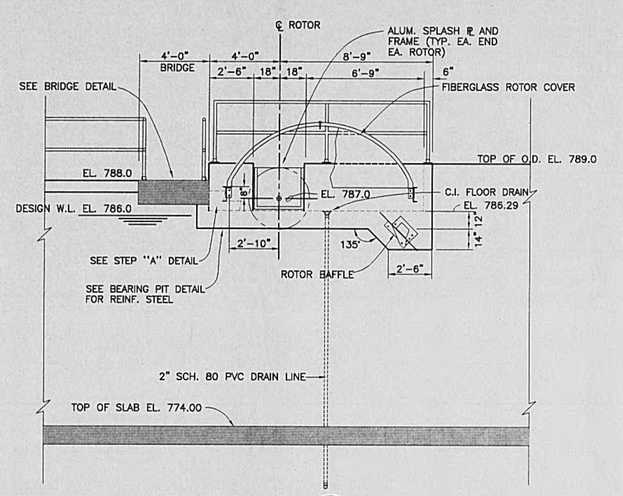
REVISIONS

ROBERT G. THREADGILL REGISTERED ENGINEER 012641 STATE OF TENNESSEE

9-30-02

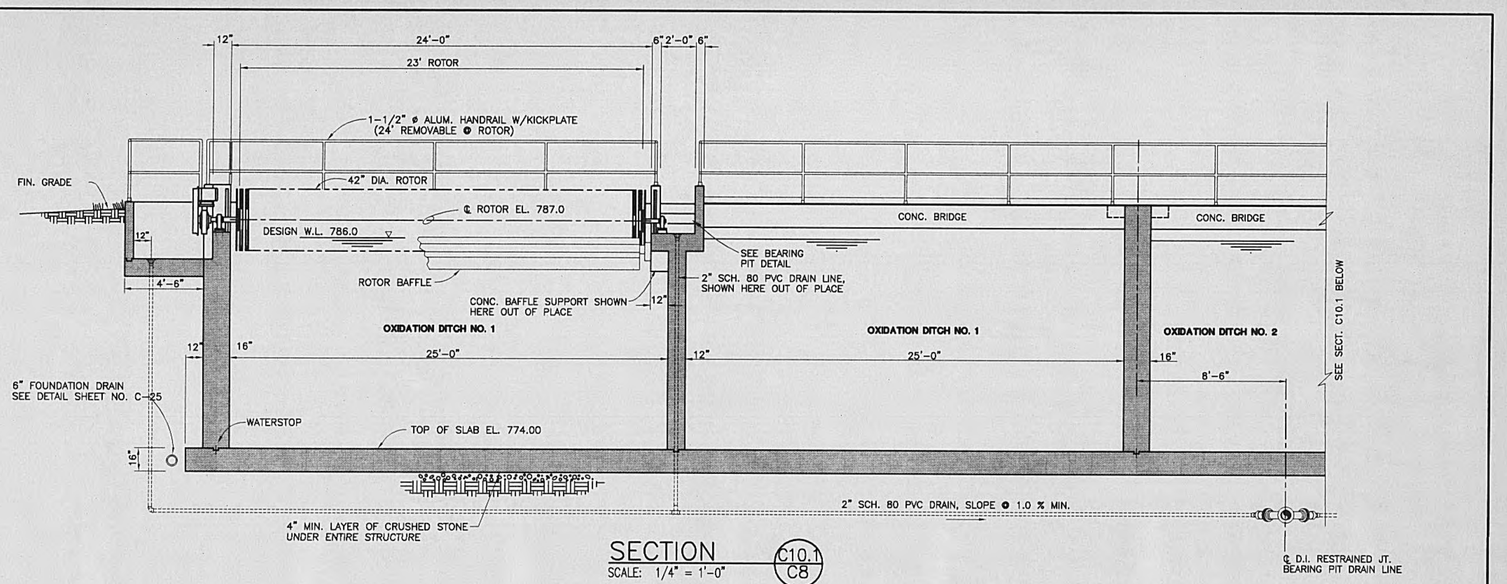
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-11
APPROVED: RGT	

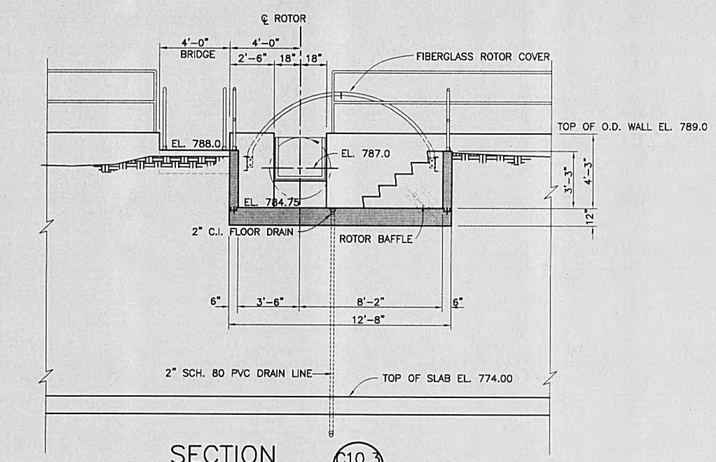


SECTION C10.2 / C8
SCALE: 1/4" = 1'-0"

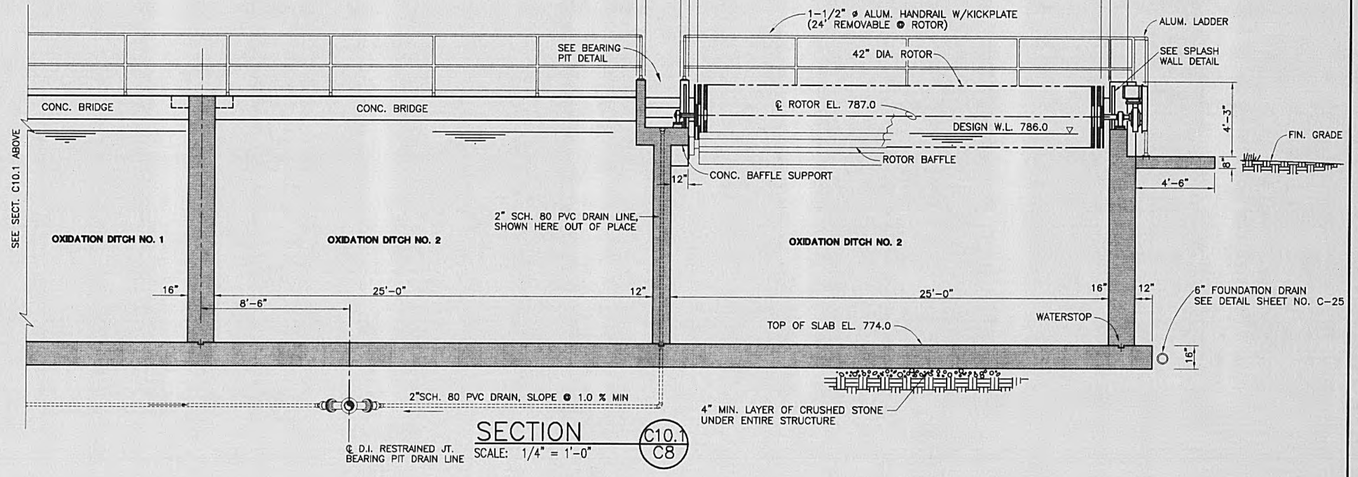
SECT. C10.2 @ DITCH NO. 2 IS MIRROR IMAGE OF SECT. C10.2 @ DITCH NO. 1



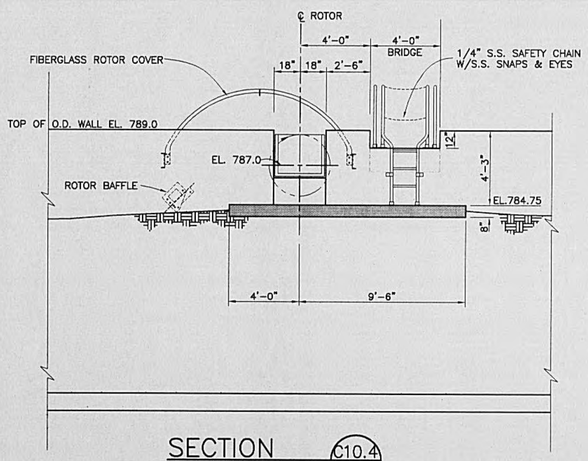
SECTION C10.1 / C8
SCALE: 1/4" = 1'-0"



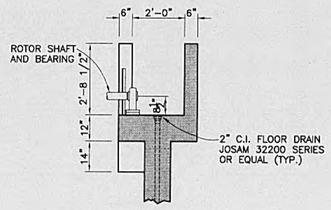
SECTION C10.3 / C8
SCALE: 1/4" = 1'-0"



SECTION C10.1 / C8
SCALE: 1/4" = 1'-0"



SECTION C10.4 / C8
SCALE: 1/4" = 1'-0"



BEARING PIT DETAIL
SCALE 3/8"= 1'-0"

GRW PROJECT NO.7601-10

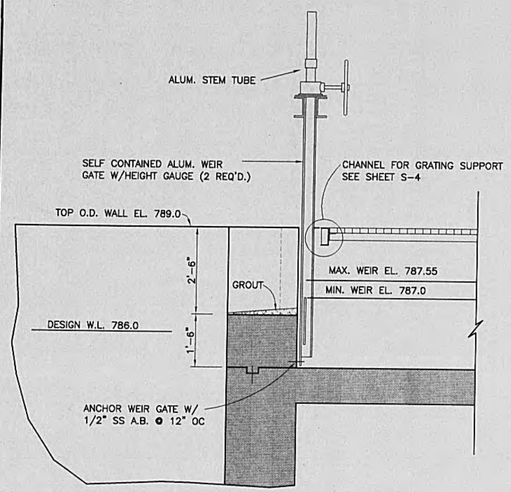
OXIDATION DITCH – SECTIONS AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL — REGISTERED ENGINEER — STATE OF TENNESSEE
9-30-02

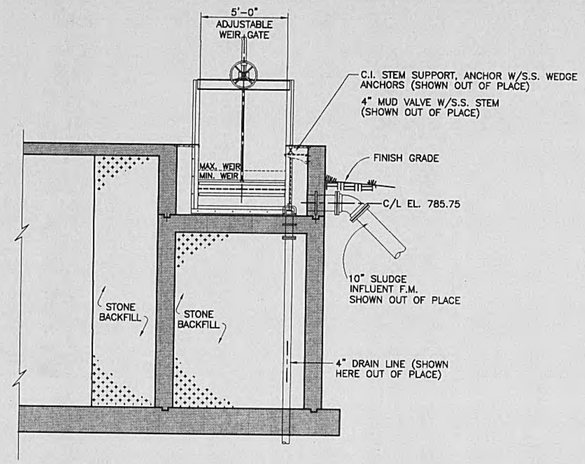
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-10
APPROVED: RGT	



WEIR GATE DETAIL

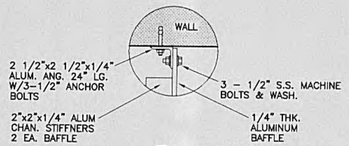
SCALE: 1/2" = 1'-0"



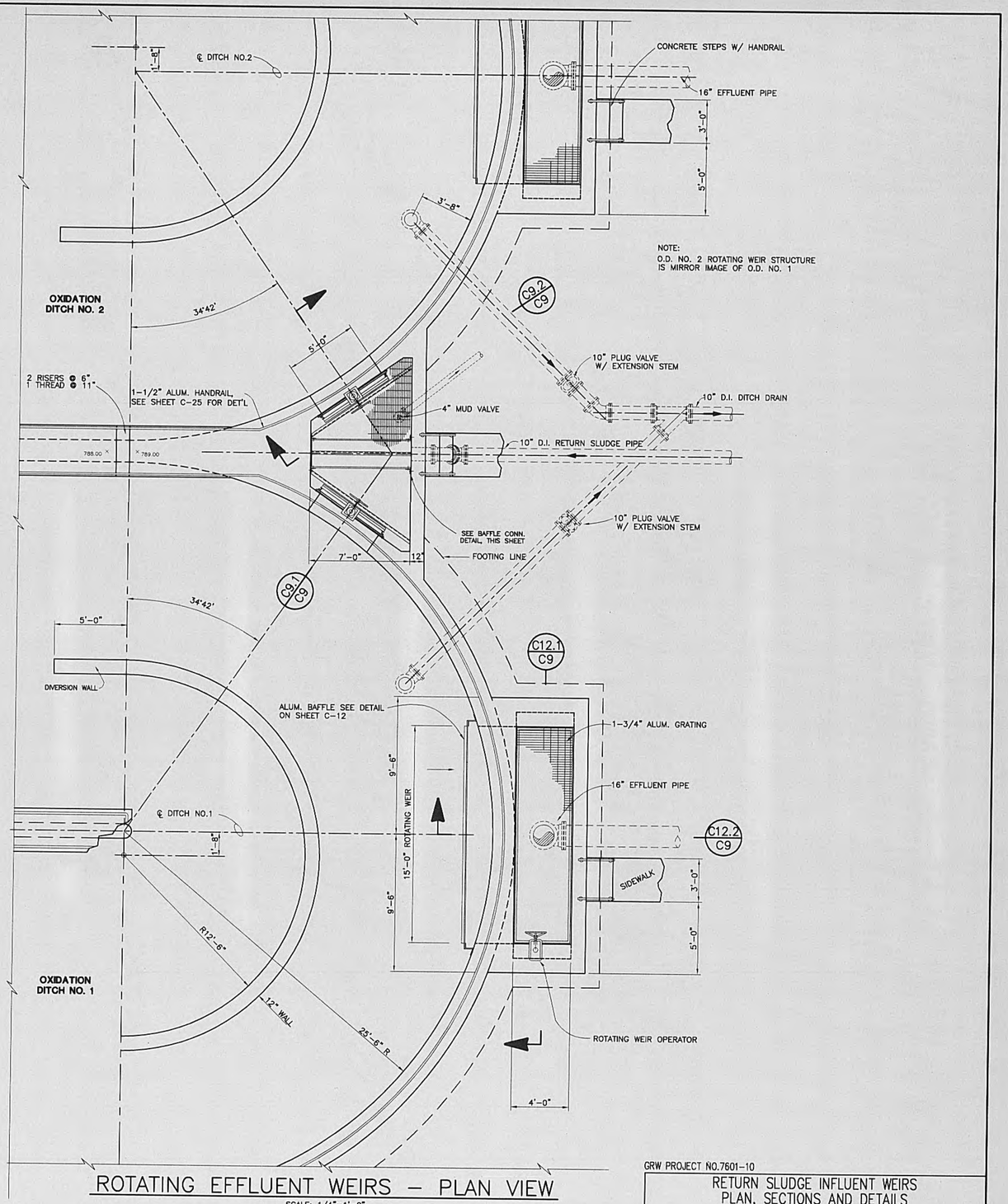
SLUDGE INFL. WEIRS – SECTION

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

C9.2 / C9

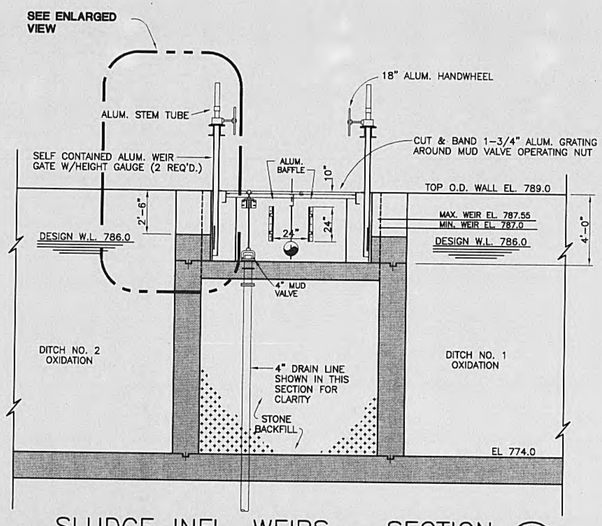


PLAN
BAFFLE CONNECTION



ROTATING EFFLUENT WEIRS – PLAN VIEW

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



SLUDGE INFL. WEIRS – SECTION

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

C9.1 / C9

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

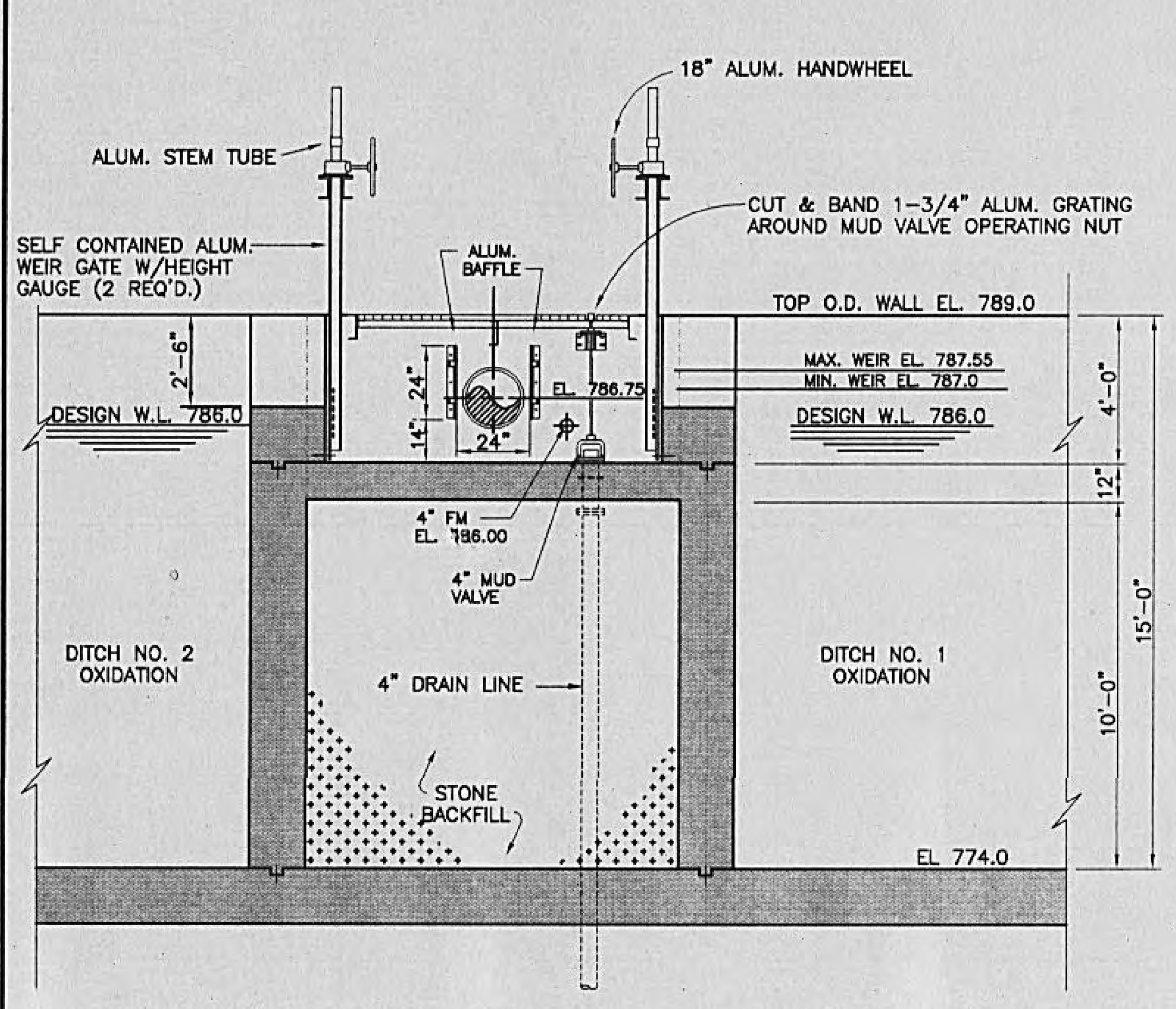
ROBERT G. THREADGILL JR. REGISTERED ENGINEER NO. 012869 STATE OF TENNESSEE

GRW PROJECT NO.7601-10

RETURN SLUDGE INFLUENT WEIRS
PLAN, SECTIONS AND DETAILS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

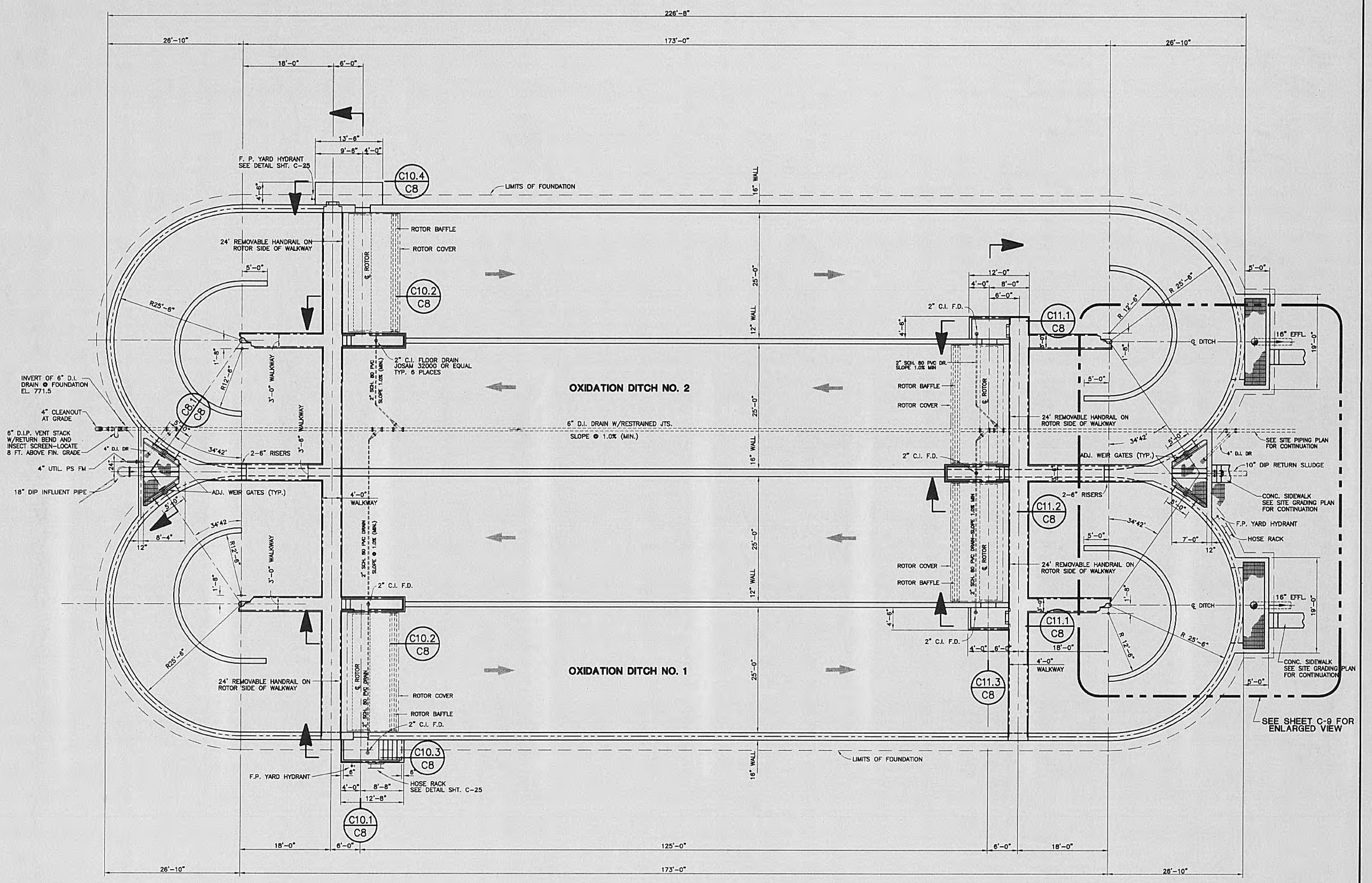
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-9
APPROVED: RGT	



O.D. INFLUENT WEIRS – SECTION (C8.1 / C8)

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



PLAN – OXIDATION DITCH

SCALE: 3/32"=1'-0"

USE RESTRAINED JOINT D.I.P. AND FITTINGS UNDER STRUCTURE EXCEPT WHERE NOTED

GRW PROJECT NO.7601-10

OXIDATION DITCHES
PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

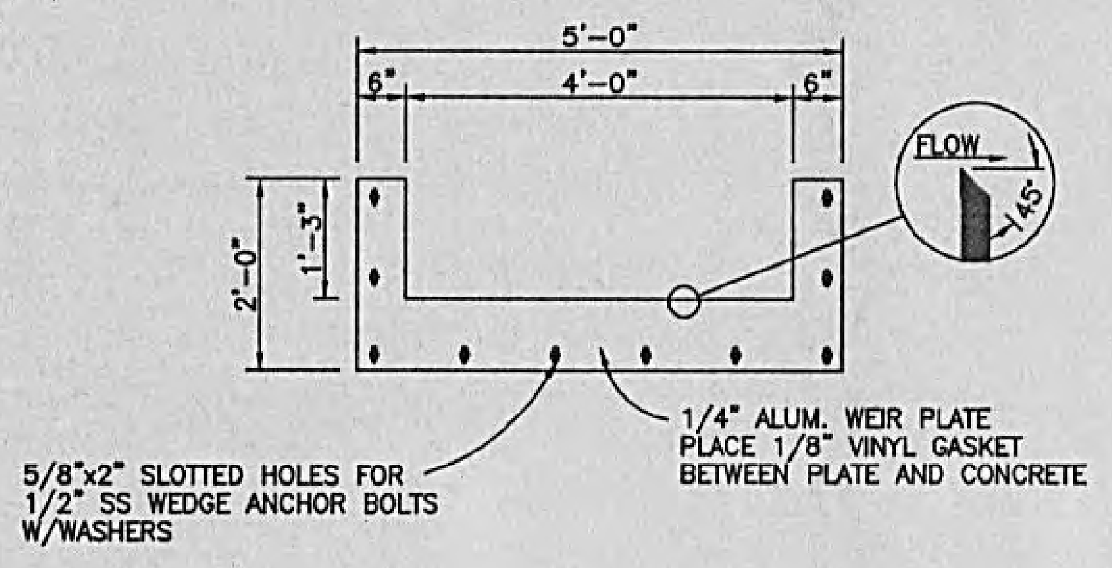
REVISIONS

ROBERT G. THREADGILL, JR. REGISTERED ENGINEER NO. 012646 STATE OF TENNESSEE

9-30-02

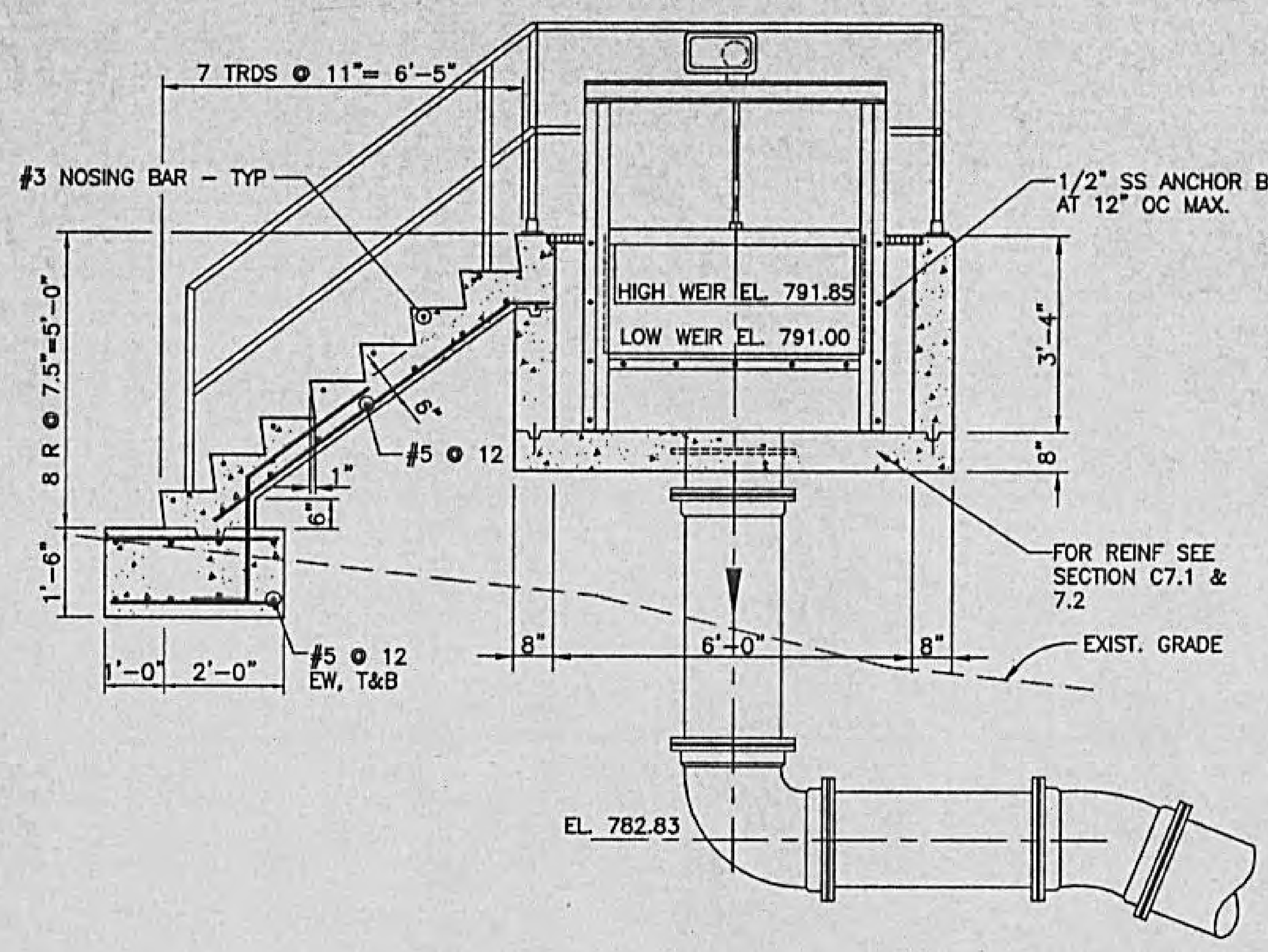
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-8
APPROVED: RGT	



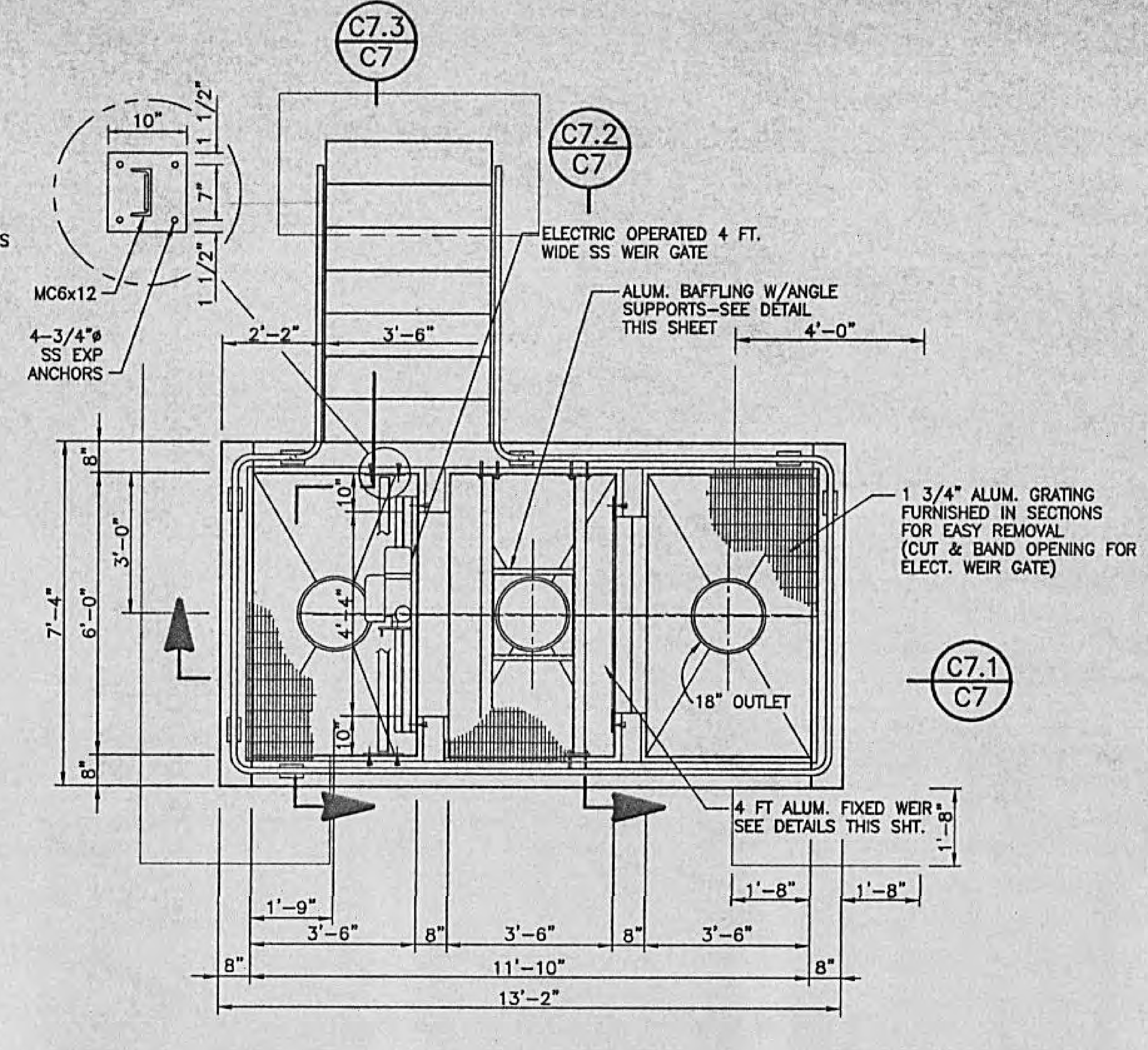
RECTANGULAR WEIR PLATE DETAIL

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



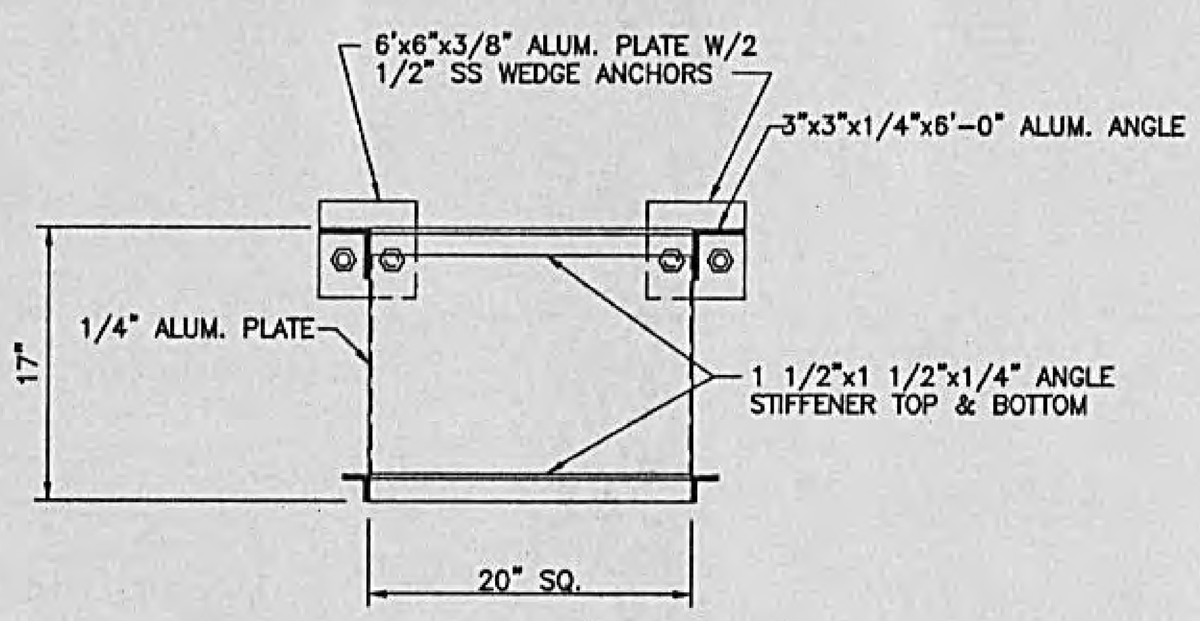
SECTION (C7.3 / C7)

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



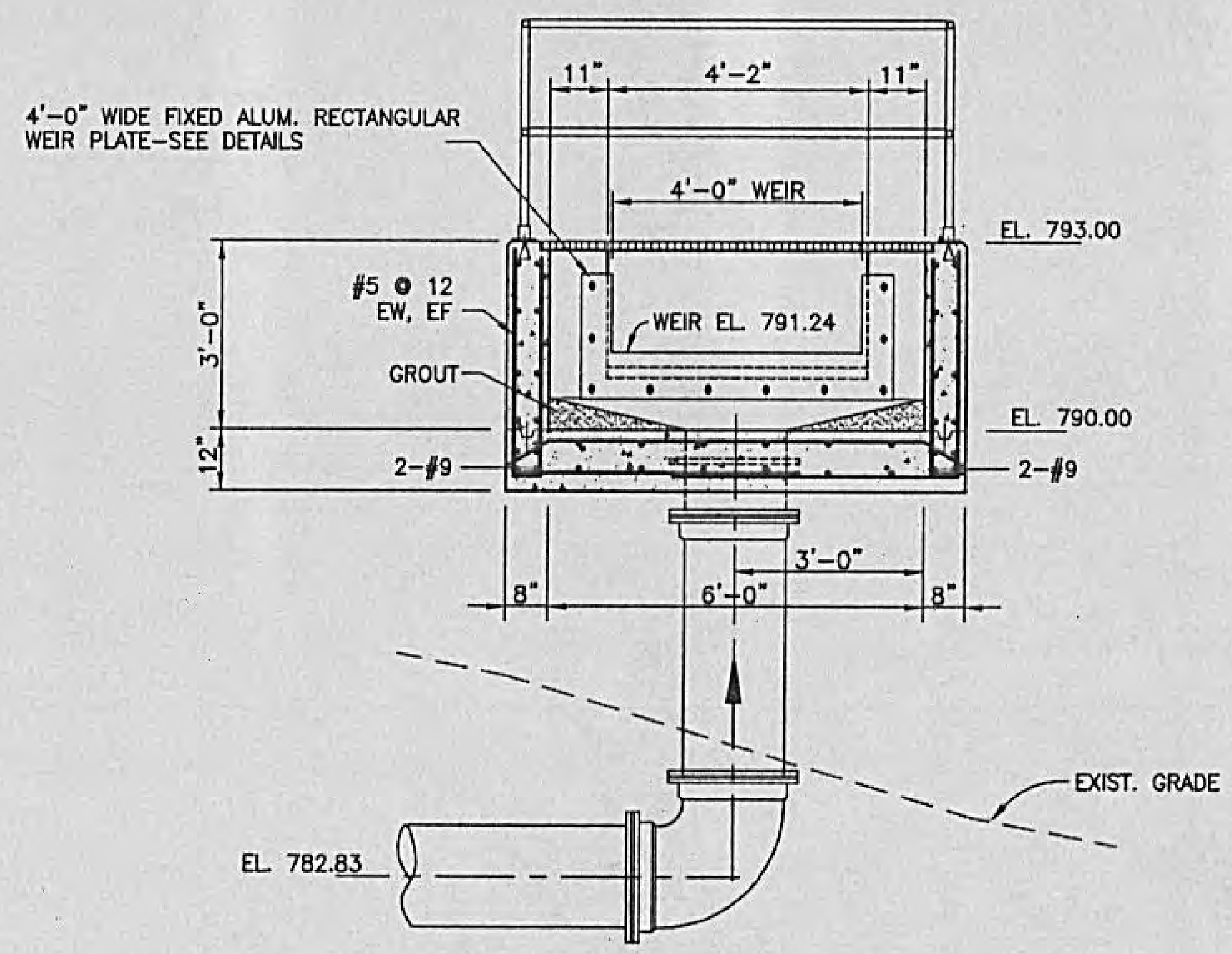
FLOW SPLITTER STRUCTURE-PLAN

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



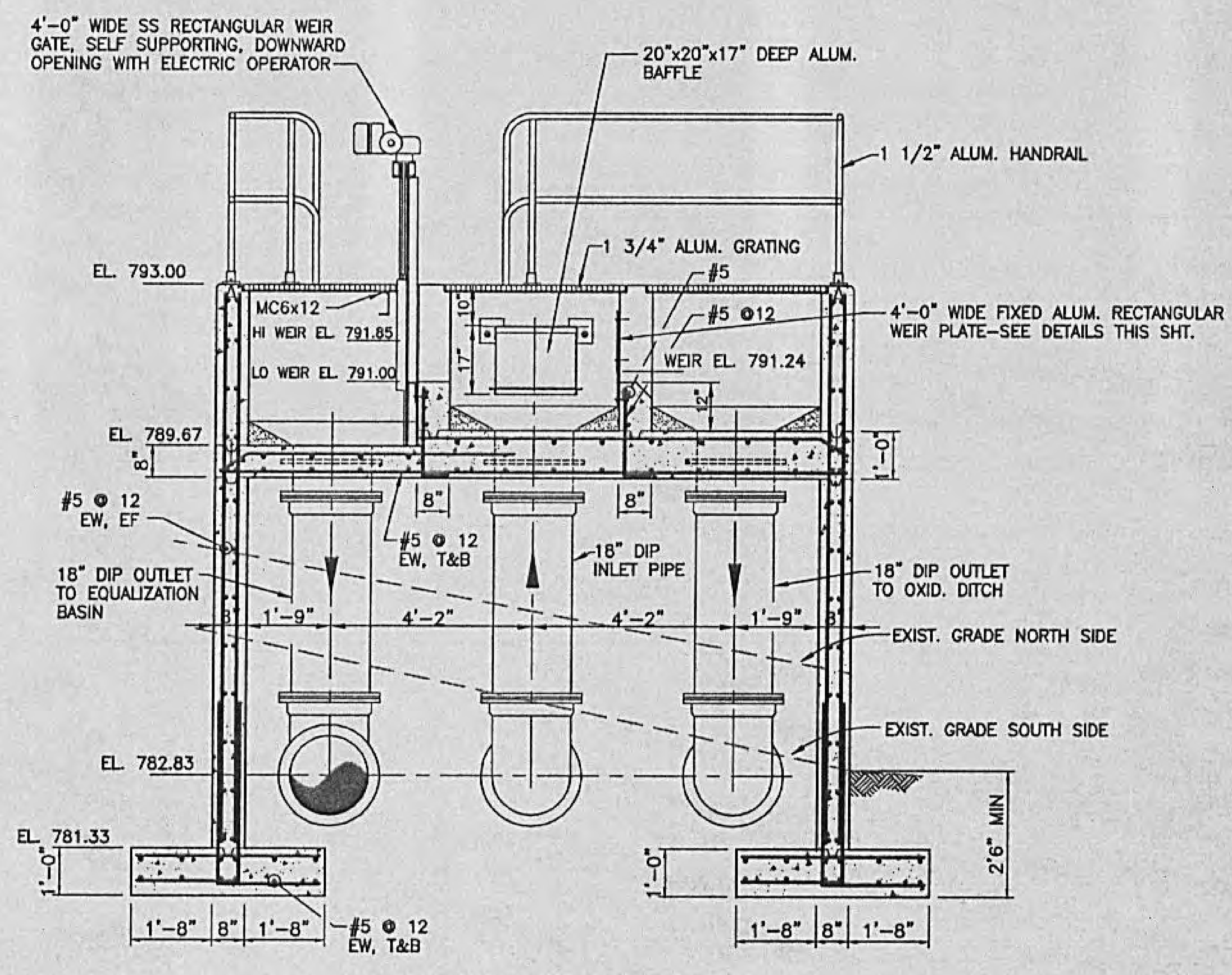
BAFFLE DETAIL

SCALE: 1"=1'-0"



SECTION (C7.2 / C7)

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



SECTION (C7.1 / C7)

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

GRW PROJECT NO.7601-10

FLOW SPLITTER STRUCTURE
PLAN AND SECTIONS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

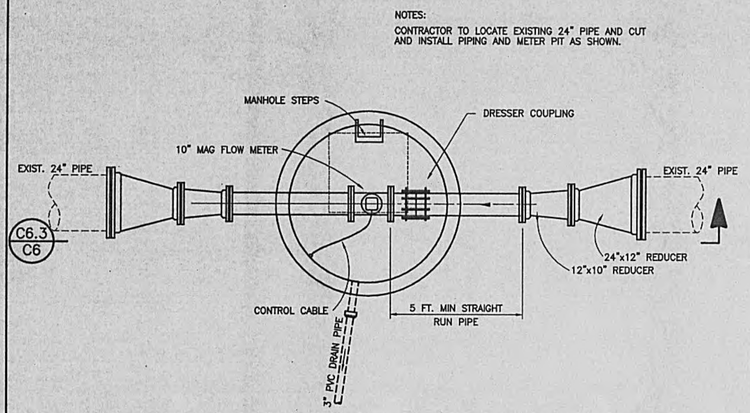
NO.	DESCRIPTION	DATE	BY
	REVISIONS		

STATE OF TENNESSEE — REGISTERED ENGINEER — NO. 00... — 10-2-02

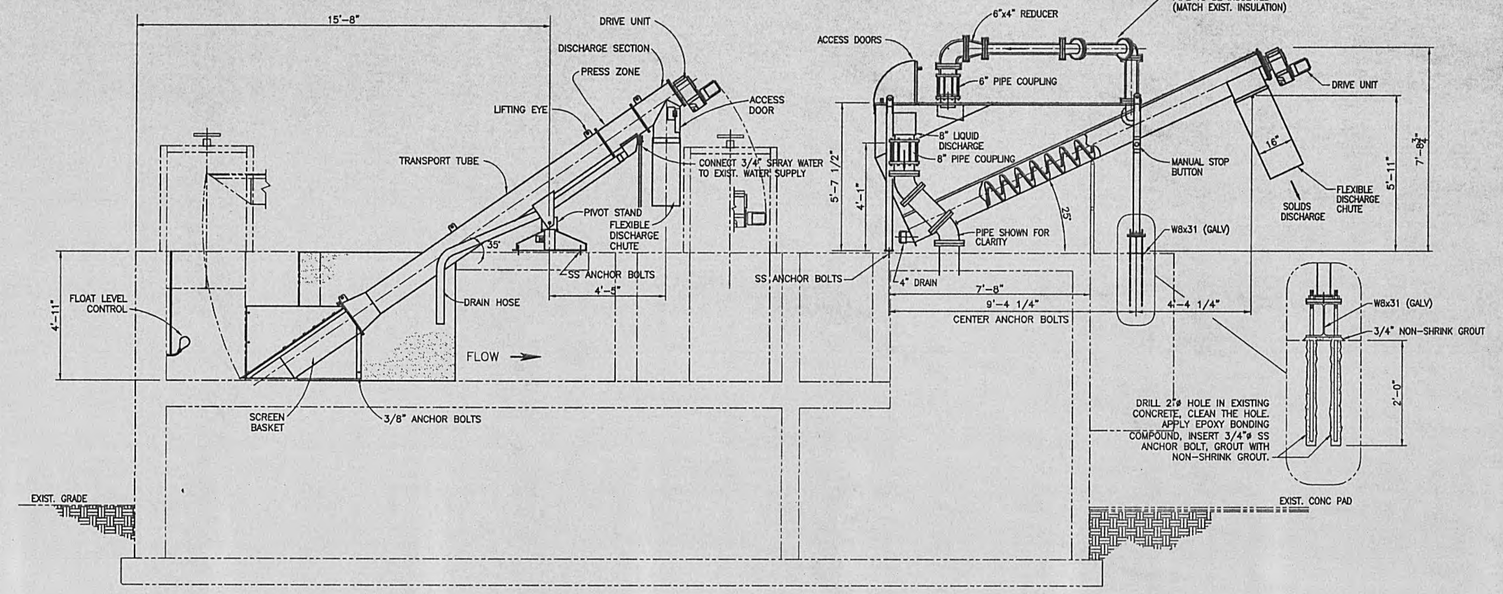
ROBERT G. THREADGILL, JR. — REGISTERED ENGINEER — NO. 012545 — STATE OF TENNESSEE — 9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

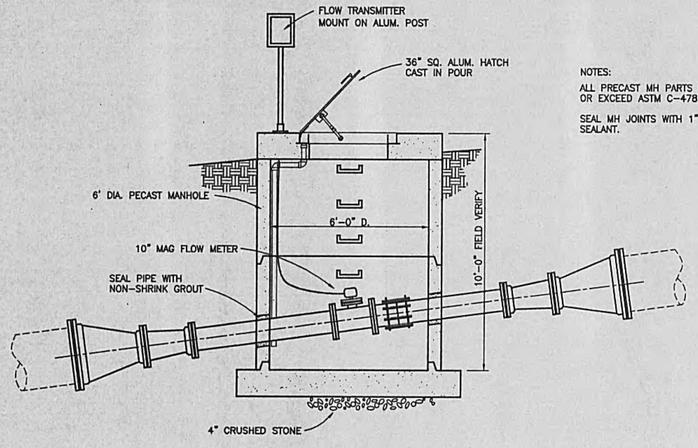
DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO.
APPROVED: RGT	C-7



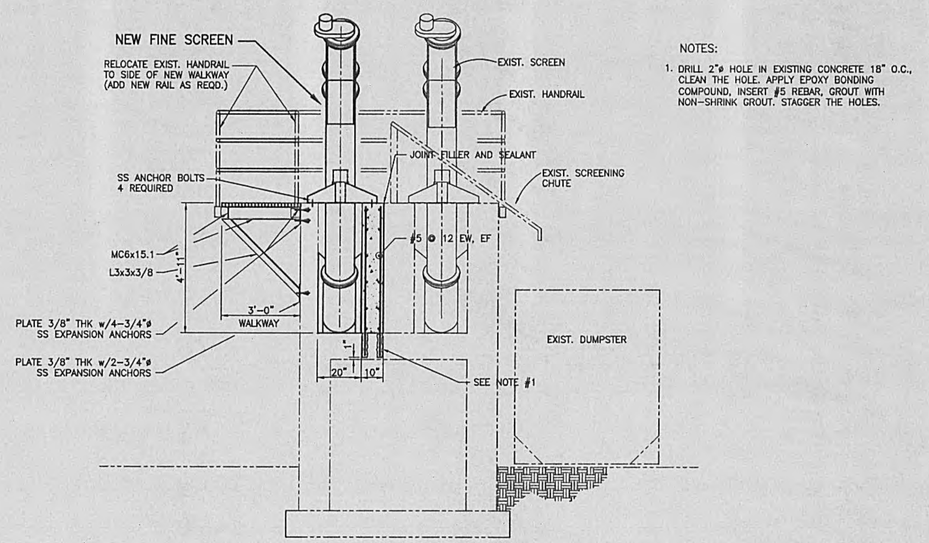
PLAN – INTERMEDIATE FLOW METER PIT
SCALE: 3/8=1'-0"



SECTION
SCALE: 3/8=1'-0"
C6.1
C5



SECTION
SCALE: 3/8=1'-0"
C6.3
C6



NOTES:
1. DRILL 2"ø HOLE IN EXISTING CONCRETE 18" O.C., CLEAN THE HOLE. APPLY EPOXY BONDING COMPOUND, INSERT #5 REBAR, GROUT WITH NON-SHRINK GROUT. STAGGER THE HOLES.

SECTION
SCALE: 3/8=1'-0"
C6.2
C5

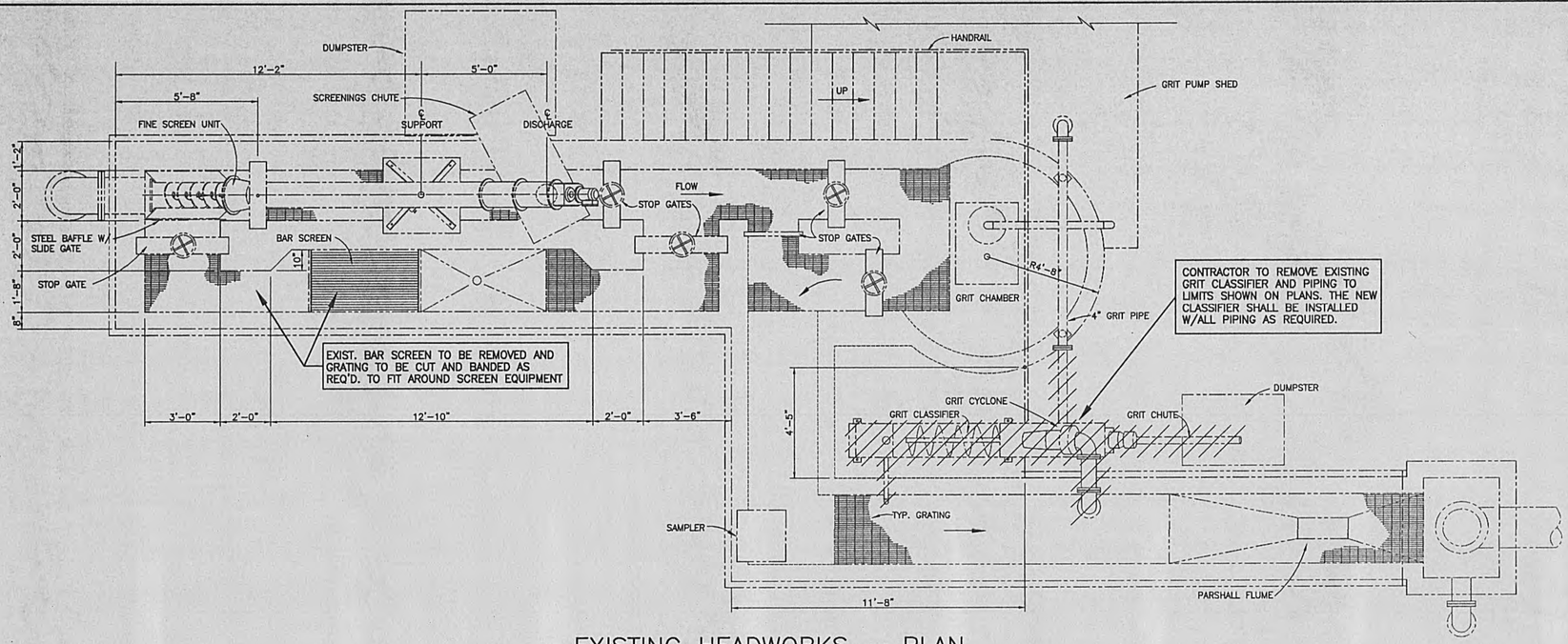
GRW PROJECT NO.7601-10

EXISTING HEADWORKS – SECTIONS
INTERMEDIATE FLOW METER PIT – PLAN & SECTION
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

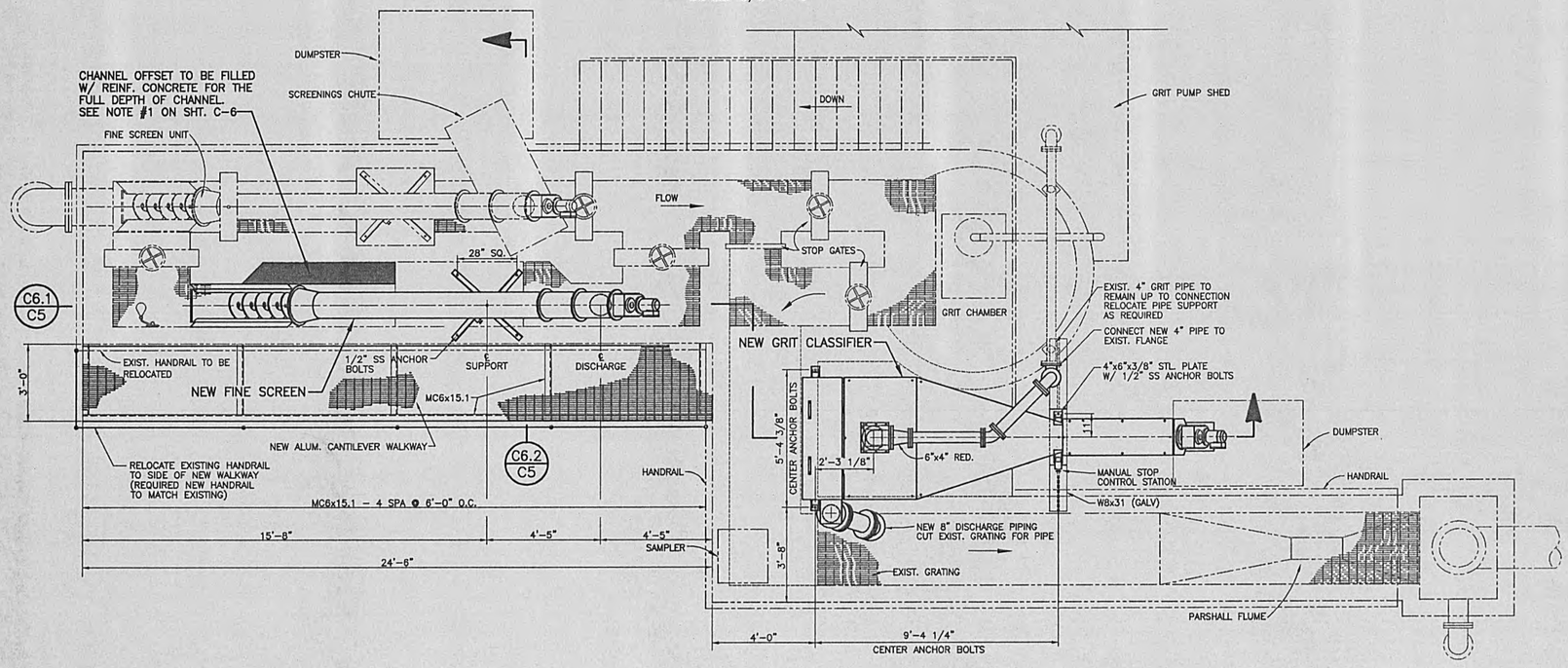
GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-6
APPROVED: RGT	



EXISTING HEADWORKS – PLAN

SCALE: 3/8=1'-0"



UPGRADED HEADWORKS – PLAN

SCALE: 3/8=1'-0"

GRW PROJECT NO.7601-10

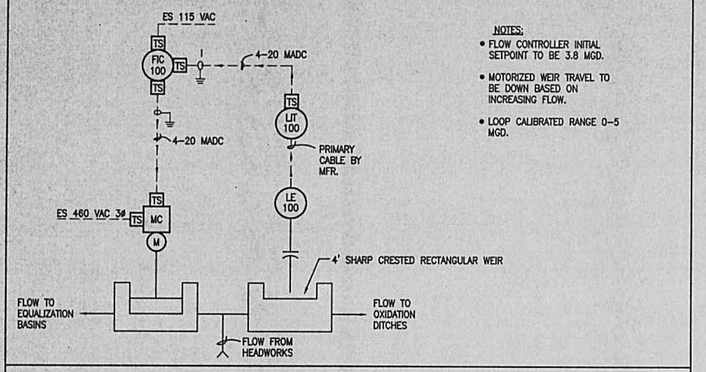
EXISTING HEADWORKS – PLAN
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-5
APPROVED: RGT	

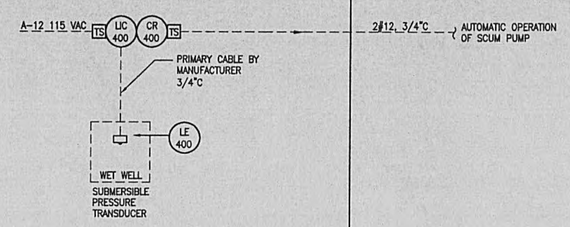
FIELD INSTRUMENTS



NOTES:
- FLOW CONTROLLER INITIAL SETPOINT TO BE 3.8 MGD.
- MOTORIZED WEIR TRAVEL TO BE DOWN BASED ON INCREASING FLOW.
- LOOP CALIBRATED RANGE 0-5 MGD.

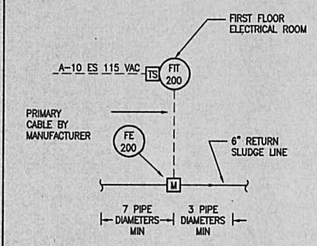
LOOP 100 –ADJUSTABLE WEIR FLOW CONTROLS
1 SYSTEM REQUIRED

ELECTRICAL ROOM–RAS/WAS BUILDING | MCC–RWB



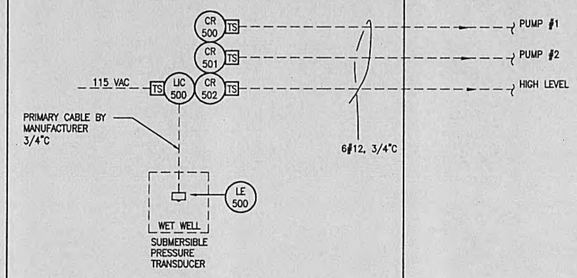
LOOP 400 – SCUM PUMP WET WELL LEVEL
• 1 SYSTEM REQUIRED

FIELD INSTRUMENTS



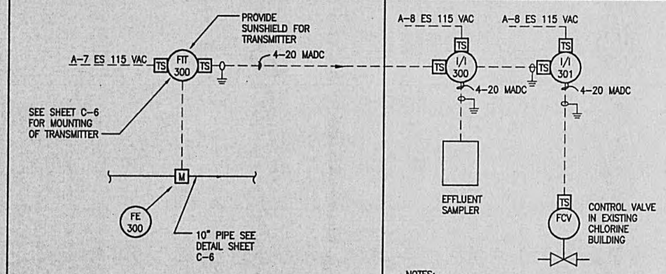
LOOP 200 – RETURN SLUDGE FLOW
• 1 SYSTEM REQUIRED

UTILITY PUMP STATION | UTILITY PUMP CP



LOOP 500 – UTILITY PUMP STATION
• 1 SYSTEM REQUIRED

FIELD INSTRUMENTS | RAS/WAS /CHLORINE BUILDING



NOTES:
- LOOP ISOLATORS TO BE LOCATED IN A NEMA 1 ENCLOSURE INSIDE THE RAS/WAS ELECTRICAL ROOM.

LOOP 300 – INTERMEDIATE FLOW MONITORING
• 1 SYSTEM REQUIRED

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

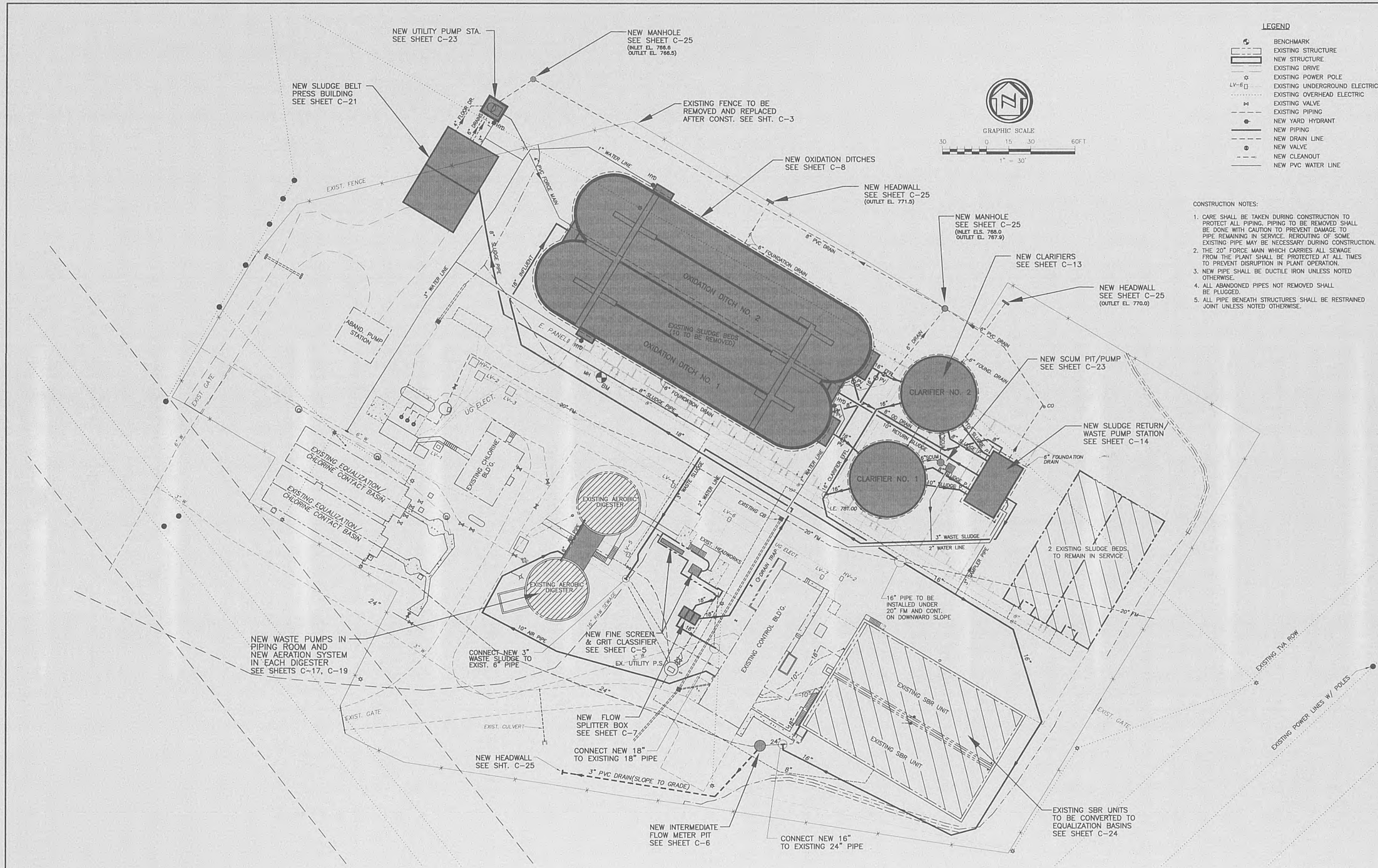
GRW PROJECT NO. 7601-10

LOOP DIAGRAMS

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: JMG	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO. ICS-2
APPROVED: TMH	

Tue, 01 Oct 2002 - 4:27pm
FILE NAME: U:\3041\08-HARRIMAN WWTP\cadd\working\3041-ICS2.dwg



BASE MAP SURVEY PROVIDED BY:
LACKEY AND ASSOCIATES, INC
OLIVER SPRINGS, TENNESSEE
PH. 865-435-7663

GRW PROJECT NO.7601-10

SITE PIPING PLAN
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT C. THREADGILL REGISTERED LANDSCAPE ARCHITECT 01784 STATE OF TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-4
APPROVED: RGT	

9-30-02

CONSTRUCTION NOTES:

1. CAUTION, CONTRACTOR SHALL PROTECT EXISTING 20" FORCE MAIN DURING CONSTRUCTION TO PREVENT DAMAGE.

ELEVATIONS AND TOPOGRAPHIC SURVEY BY:
LACKEY AND ASSOCIATES, INC
OLIVER SPRINGS, TENNESSEE
PH. 865-435-7663

SURVEYOR NOTE:

BENCHMARK IS TOP OF CASTING OF EXISTING MANHOLE, ELEVATION OF 788.50
REFERENCE FORMER PROJECT DRAWINGS BY CH2MHILL SHEET C2, DATED MAY 1986.
THIS BENCHMARK ASSUMED FOR CURRENT LACKEY AND ASSOCIATES SURVEY.

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL — REGISTERED ENGINEER — No. 013845 — STATE OF TENNESSEE

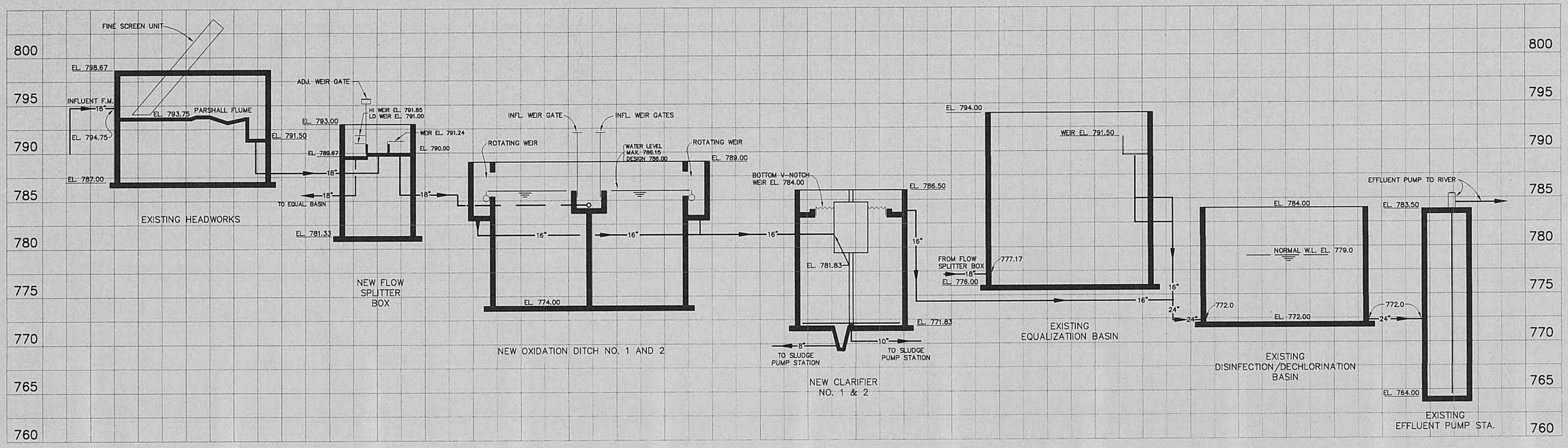
9-30-02

GRW PROJECT NO.7601-10

SITE GRADING PLAN
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-3
APPROVED: RGT	



HYDRAULIC PROFILE

SCALE: VERT. – 1" = 5'-0"
HORZ. – NONE

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

ROBERT G. THREADGILL JR. REGISTERED ENGINEER NO. 013845 STATE OF TENNESSEE

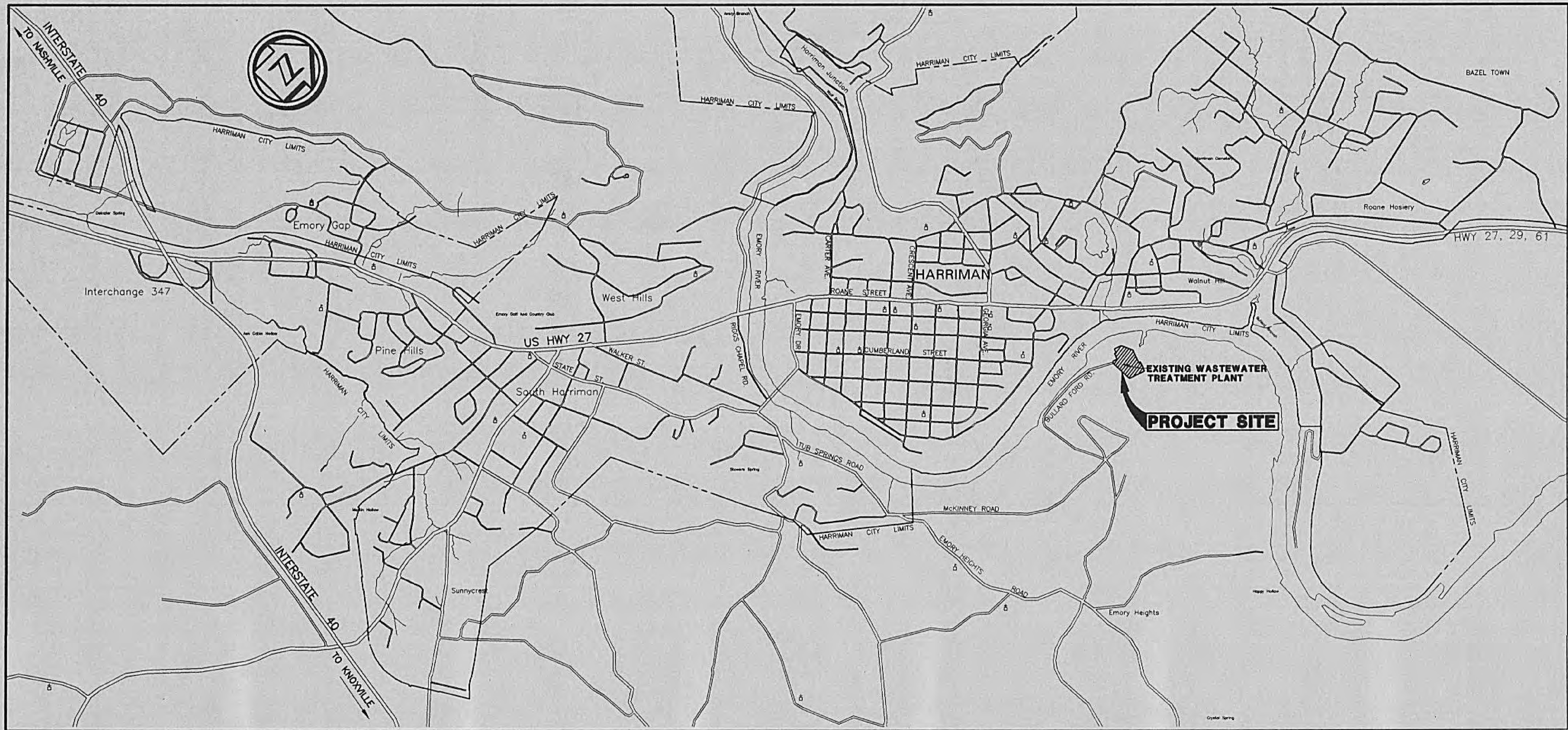
9-30-02

GRW PROJECT NO. 7601-10

HYDRAULIC PROFILE
WASTWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
DRAWN: DGR	SCALE: AS NOTED
REVIEWED: RGO	SHEET NO. C-2
APPROVED: RGT	



LOCATION MAP

SCALE: 1" = 1500'

VICINITY MAP

NOT TO SCALE

INDEX OF SHEETS

C-1 LOCATION MAP, VICINITY MAP AND INDEX OF SHEETS
C-2 HYDRAULIC PROFILE
C-3 SITE GRADING PLAN
C-4 SITE PIPING PLAN
C-5 EXISTING HEADWORKS – PLAN
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C-8 OXIDATION DITCHES – PLAN
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C-12 EFFLUENT ROTATING WEIR – SECTIONS
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C-14 RETURN/WASTE SLUDGE PUMP BUILDING – PLAN AND DETAILS
C-15 RETURN/WASTE SLUDGE PUMP BUILDING – SECTIONS AND DETAILS
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C-17 EXISTING AEROBIC DIGESTERS PIPE ROOM – PLAN, SECTION AND DETAILS
C-18 EXISTING AEROBIC DIGESTERS – PLAN AND DETAILS
C-19 EXISTING DIGESTERS – SECTIONS
C-20 RENOVATION EXISTING BLOWERS – PLAN AND SECTIONS
C-21 BELT FILTER PRESS BUILDING – PLAN AND SECTIONS
C-22 BELT FILTER PRESS BUILDING – SECTIONS
C-23 SCUM PUMP AND UTILITY PUMP STATIONS –PLAN AND SECTIONS
C-24 EXISTING SBR RENOVATION – PLAN AND SECTIONS
C-25 MISCELLANEOUS CONSTRUCTION DETAILS

S-1 TYPICAL DETAILS AND GENERAL STRUCTURAL NOTES
S-2 TYPICAL DETAILS
S-3 OXIDATION DITCH – STRUCTURAL PLAN AND SECTIONS
S-4 OXIDATION DITCH – SECTIONS
S-5 OXIDATION DITCH – SECTIONS
S-6 CLARIFIER – STRUCTURAL PLAN
S-7 RETURN/WASTE SLUDGE PUMP BUILDING – STRUCTURAL PLAN AND SECTIONS
S-8 BELT FILTER PRESS BUILDING – STRUCTURAL PLAN AND SECTIONS
NOTE- SEE C-5, C-6 AND C-7 FOR STRUCTURAL DESIGN

E-1 SYMBOL SHEET
E-2 ELECTRICAL SITE PLAN
E-3 NEW HEADWORKS FLOOR PLAN AND SPLITTER STRUCTURE
E-4 OXIDATION DITCH PLAN ELECTRICAL PLAN
E-5 CLARIFIER 1 & 2, DIGESTER ELECTRICAL PLAN
E-6 RETURN AND WASTE SLUDGE PUMP BUILDING
E-7 DIGESTER PUMP ROOM AND BELT FILTER PRESS BUILDING
E-8 CONTROL CIRCUITS AND ONE LINE DIAGRAMS
E-9 CONTROL CIRCUITS
E-10 CONTROL CIRCUITS
E-11 CONTROL CIRCUITS
E-12 PANEL SCHEDULES, LIGHT FIXTURE SCHEDULE
E-13 MISCELLANEOUS DETAILS

ICS-1 SYMBOL SHEET
ICS-2 LOOP DIAGRAMS

M-1 MECHANICAL LEGEND, GENERAL NOTES AND SCHEDULES
M-2 RETURN/WASTE SLUDGE PUMP BUILDING – MECHANICAL PLAN AND SECTIONS
M-3 BELT FILTER PRESS BUILDING – MECHANICAL PLAN AND SECTIONS

GRW PROJECT NO. 7601-10

LOCATION PLAN, VICINITY MAP
INDEX OF DRAWINGS
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

ROBERT G. THREADGILL, JR. — REGISTERED ENGINEER — NO. 012645 — STATE OF TENNESSEE

9-30-02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: RGT	DATE: SEPTEMBER, 2002
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INSTRUMENT SYMBOL IDENTIFICATION LETTERS TABLE

	FIRST-LETTER		SUCCEEDING-LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION			CLOSE, STOP, DECREASE	
C	CONTROL			CONTROL	
D		DIFFERENTIAL	SENSOR (PRIMARY ELEMENT)	OPEN, START, INCREASE	
E	VOLTAGE				
F	FLOW RATE	RATIO (FRACTION)			FAIL
G			GLASS, VIEWING DEVICE		
H	HAND				HIGH OR OPEN
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW OR CLOSE
M	MOTOR, MOTION	MOMENTARY		MOTOR	MIDDLE INTERMEDIATE
N					STATUS (ON-OFF)
O			ORIFICE, RESTRICTION		OVERLOAD
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION	PUMP	
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		RELAY
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS	VELOCITY		VALVE, DAMPER LOUVER	
W	WEIGHT, FORCE		WELL		
X		X AXIS			
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR FINAL CONTROL ELEMENT	

EXPLANATORY NOTATIONS

SIGNAL CONVERTERS

NOTE 1: PROCESS OR INITIATING VARIABLE

2:

A = ANALOG	M = MOTOR
D = DIGITAL	O = ELECTROMAGNETIC, SONIC
E = VOLTAGE	P = PNEUMATIC
F = FREQUENCY	PF = PULSE FREQUENCY
H = HYDRAULIC	PD = PULSE DURATION
I = CURRENT	R = RESISTANCE

SMALL CIRCLE SIGNIFIES SIGNAL INVERSION

HAND SWITCHES

SELECTOR SWITCH (MAINTAINED CONTACT)

SPRING RETURN SWITCH OR PUSHBUTTONS (MOMENTARY CONTACT)

NOTE XXX:

AM = AUTO/MANUAL	CM = COMPUTER/MANUAL
CAM = COMPUTER/AUTO/MANUAL	CL = COMPUTER/LOCAL
FR = FOWARD/REVERSE	FOR = FOWARD/OFF/REVERSE
FS = FAST/SLOW	FOS = FAST/OFF/SLOW
HO = HAND/OFF	LR = LOCAL/REMOTE
LOS = LOCKOUT/STOP	MFS = MODULATE FASTER/SLOWER
MOC = MODULATE OPEN/CLOSE	OC = OPEN/CLOSE
OO = ON/OFF	OSC = OPEN/STOP/CLOSE
SS = START/STOP	

1. "A", WHEN ADDED TO NOTATION, INDICATES AUTO. EXAMPLE: HOA = HAND/OFF/AUTO
2. "R", WHEN ADDED TO NOTATION, INDICATES REMOTE. EXAMPLE: HOR = HAND/OFF/REMOTE

ANALYSIS INSTRUMENTS

EXPOSED PROBE OR GAS DETECTOR

TAPPED OR SAMPLED

IN-LINE (FLOW THROUGH)

NOTE XXX:

COL = COLOR	CDG = CARBON DIOXIDE GAS
CG = COMBUSTIBLE GAS	CH4 = METHANE
CLG = CHLORINE GAS	CLR = CHLORINE RESIDUAL
COG = CARBON MONOXIDE GAS	DO = DISSOLVED OXYGEN
HC = HYDROCARBONS	HUM = HUMIDITY
H2S = HYDROGEN SULFIDE	MHO = CONDUCTIVITY
NH4 = AMMONIA	N2G = NITROGEN GAS
OG = OXYGEN GAS	OZG = OZONE GAS
PH = pH	SD = SOLIDS DENSITY
SO2 = SULPHUR DIOXIDE GAS	SS = SUSPENDED SOLIDS
TOC = TOTAL ORGANIC CARBON	TRB = TURBIDITY

EQUIPMENT SYMBOLS

- CENTRIFUGAL PUMP (DRY PIT)
- CENTRIFUGAL COMPRESSOR OR BLOWER
- RECIPROCATING PUMP (PD)
- RECIPROCATING COMPRESSOR (PD)
- ROTARY PUMP (PD)
- ROTARY COMPRESSOR (PD)
- CENTRIFUGAL PUMP (WET PIT)
- MOTOR
- SCREW PUMP
- MIXER
- HEAT EXCHANGER
- EJECTOR

NOTE XX: BLANK = CONSTANT SPEED; 2S = TWO SPEED; VS = VARIABLE SPEED

INSTRUMENT TAGGING

LLLL = FUNCTIONAL INSTRUMENT IDENTIFICATION FROM TABLE

NNNN = LOOP NUMBER

COMMONLY USED INSTRUMENT IDENTIFICATION LETTER COMBINATIONS DEVELOPED FROM CHART AT LEFT (UNLESS NOTED AS CUSTOM SYMBOL):

COMBINATION	DESCRIPTION
AE	ANALYZER PRIMARY ELEMENT
FE	FLOW PRIMARY ELEMENT
LE	LEVEL PRIMARY ELEMENT
PE	PRESSURE PRIMARY ELEMENT
FCV	FLOW CONTROL VALVE (FINAL ELEMENT)
FIT	FLOW INDICATING TRANSMITTER
LIT	LEVEL INDICATING TRANSMITTER
AIT	ANALYSIS INDICATING TRANSMITTER
PIT	PRESSURE INDICATING TRANSMITTER
FAL	FLOW ALARM LOW
LAH	LEVEL ALARM HIGH
FI	FLOW INDICATOR
PI	PRESSURE INDICATOR
LI	LEVEL INDICATOR
FIR	FLOW INDICATING RECORDER
FIRQ	FLOW INDICATING RECORDER WITH TOTALIZER
FIC	FLOW INDICATING CONTROLLER
KC	TIMER
CR	CONTROL RELAY
I/I	CURRENT TO CURRENT CONVERTER (LOOP ISOLATOR)
FY	FLOW COMPUTING RELAY
UT	TELEPHONE DIALER
MN	MOTOR STATUS
MO	MOTOR OVERLOAD
FMR	FM RADIO (CUSTOM SYMBOL)
RTU	REMOTE TERMINAL UNIT (CUSTOM SYMBOL)
MTU	MASTER TERMINAL UNIT (CUSTOM SYMBOL)
PS	POWER SUPPLY (CUSTOM SYMBOL)
I/O	INPUT/OUTPUT MODULE (CUSTOM SYMBOL)
PT	PRESSURE TRANSDUCER (CUSTOM SYMBOL)
A/D	ANALOG TO DIGITAL CONVERTER (CUSTOM SYMBOL)
D/A	DIGITAL TO ANALOG CONVERTER (CUSTOM SYMBOL)
PCM	PUMP CONTROL MODULE (CUSTOM SYMBOL)
TSG	THUMBWHEEL SETPOINT GENERATOR (CUSTOM SYMBOL)
MNC	MOTOR CALLED FOR
MNF	MOTOR FAILED
DFA	DATA FAIL ALARM

MISCELLANEOUS SYMBOLS

- DIAPHRAGM SEAL
- TRANSIENT SUPPRESSOR
- RUPTURE DISK (PRESSURE RELIEF)
- SIGHT GLASS NOTE: X W = WATER A = AIR
- RUPTURE DISK (VACUUM RELIEF)
- FLOW STRAIGHTENER
- (REGULATED SIDE) PRESSURE REGULATOR
- DIFFERENTIAL PRESSURE REGULATOR
- PRESSURE GAUGE
- ANTENNA (GENERIC)
- VENT TO ATMOSPHERE
- INTERLOCK LOGIC
- RESET
- AIR GAP
- SQUARE ROOT EXTRACTOR
- SIGNAL CONTINUATION WHERE X = 1,2,3,ETC.
- SNUBBER

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	DISCRETE INSTRUMENT	SHARED DISPLAY/ SHARED CONTROL	COMPUTER FUNCTION
FIELD MOUNTED	○	□	⬡
FRONT OF PANEL MOUNTED	⊖	⊟	⬭
INTERIOR OF PANEL MOUNTED	⊖	⊟	⬭
MOTOR CONTROL CENTER MOUNTED	⊖	⊟	⬭
INSTRUMENTS SHARING A COMMON HOUSING	○○	□□	⬡⬡
ANNUNCIATOR	⌑	□	⊟

PRIMARY ELEMENT SYMBOLS

FLOW

- ELECTROMAGNETIC
- ULTRASONIC IN-LINE
- ULTRASONIC CLAMP-ON OR DOPPLER
- VENTURI
- ORIFICE PLATE
- PROPELLER OR TURBINE
- VORTEX SHEDDING
- TARGET
- PITOT TUBE
- ROTAMETER
- FLUME
- WEIR
- UNCLASSIFIED FLOW ELEMENT: X = E SWITCH: X = S

LEVEL

- BUBBLE TUBE
- ULTRASONIC
- CAPACITANCE
- ELECTRODES (WITH HOLDER)
- FLOAT
- UNCLASSIFIED LEVEL ELEMENT: X = E SWITCH: X = S

TEMPERATURE

- TEMPERATURE WITH WELL

ACTUATOR SYMBOLS

- PNUEMATIC
- ELECTROPNEUMATIC
- HYDRAULIC
- ELECTROHYDRAULIC
- ELECTRIC NOTE XX = PZ, HZ OR MZ INDICATES ACTUATOR WITH POSITIONER
- PRESSURE OR VACUUM RELIEF SPRING OR WEIGHT LOADED
- MANUAL
- SOLENOID

NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)

XX:FO = FAIL OPEN
FC = FAIL CLOSED
FI = FAIL TO INTERMEDIATE POSITION
BLANK = FAIL TO LAST POSITION

VALVE & GATE SYMBOLS

- BUTTERFLY VALVE, DAMPER OR LOUVER
- CHECK VALVE
- GLOBE, GATE, PINCH OR OTHER IN-LINE VALVE
- BALL VALVE
- THREE WAY VALVE (ARROWS INDICATE FLOW PATTERN)
- TELESCOPING VALVE
- SLUICE GATE
- PREFABRICATED SLIDE GATE

INSTRUMENT LINE SYMBOLS

(LINES TO BE DRAWN FINE IN RELATION TO PROCESS PIPING LINES)

- CONNECTION TO PROCESS
- PNEUMATIC SIGNAL
- ELECTRIC
- HYDRAULIC SIGNAL
- CAPILLARY TUBE
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
- MECHANICAL LINK

ABREVIATIONS/ACRONYMS

AS	AIR SUPPLY	ES	ELECTRIC SUPPLY
GS	GAS SUPPLY	HS	HYDRAULIC SUPPLY
WS	WATER SUPPLY	CO	CONTACT OUTPUT
CI	CONTACT INPUT	PD	POSITIVE DISPLACEMENT
FMR	FM RADIO	MTU	MASTER TERMINAL UNIT
RTU	REMOTE TERMINAL UNIT		

GENERAL NOTES:

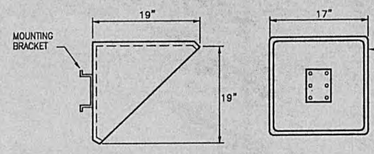
SEE DIVISION 13, 14 OF THE SPECIFICATIONS FOR FURTHER INSTRUMENTATION REQUIREMENTS.

THIS IS A GUIDE TO READING INSTRUMENT SOCIETY OF AMERICA (ISA) FORMAT P&ID OR LOOP DIAGRAMS. THESE SYMBOLS AND TECHNIQUES ARE MOSTLY EXTRACTED FROM ISA STANDARD S5.1. THIS IS NOT HOWEVER, A COMPLETE OR EXACT DUPLICATION OF S5.1. NOT ALL SYMBOLS SHOWN ARE USED ON THIS PROJECT. SOME SYMBOLS MAY BE USED THAT ARE NOT SHOWN. CONTACT THE ENGINEER OR THE ISA STANDARD S5.1 FOR CLARIFICATIONS.

PROJECT NOTE:

POWER SUPPLIES SHALL BE PROVIDED AS REQUIRED FOR PROPER LOOP OPERATION WITH 2 WIRE TRANSMITTERS.

- FLOW STREAM CONNECTION NOT SHOWN ON OTHER DRAWINGS
- XXXX FLOW STREAM CONNECTION SHOWN ON ANOTHER DRAWING. XXXX IS SHEET NUMBER WHERE SHOWN.
- DIGITAL INPUT (DISCRETE)
- DIGITAL OUTPUT (DISCRETE)
- PULSE TRAIN INPUT
- PULSE OUTPUT (MOMLENTARY UNLESS F IS PRESENT - F MEANS PULSE TRAIN OUTPUT)
- ANALOG INPUT
- ANALOG OUTPUT

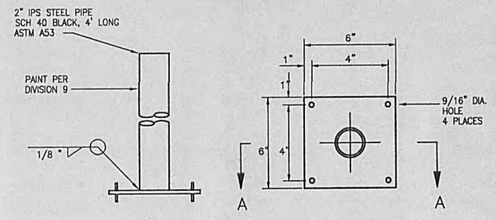


SIDE VIEW FRONT VIEW

SUNSHADE DETAIL (ICS1.1 (TYP.))

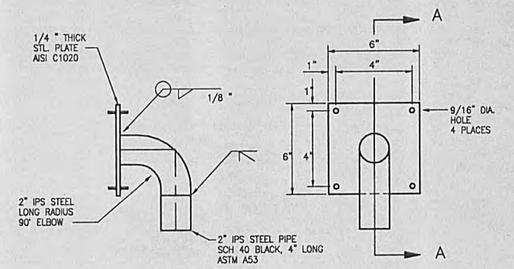
NOT TO SCALE

- REQUIRED FOR ALL OUTSIDE MOUNTED TRANSMITTERS.
- DIMENSIONS SHOWN ARE MINIMUM. SUPPLIER SHALL COORDINATE WITH EQUIPMENT PROVIDED TO ASSURE PROPER SIZE AT NO EXTRA COST.



SECTION A PLAN

FLOOR STAND



SECTION A PLAN

WALL BRACKET

INSTRUMENT MOUNTING BRACKETS (ICS1.4 (TYP.))

NOT TO SCALE

- MOUNT BRACKETS USING NON MAGNETIC STAINLESS STEEL ANCHOR BOLTS.
- PAINT ENTIRE BRACKET PRIOR TO INSTALLATION, INCLUDING CONCEALED SURFACES.

GRW PROJECT NO. 7601-10

SYMBOL SHEET

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD - HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: JMG	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO. ICS-1
APPROVED: TMH	

Tue, 01 Oct 2002 - 4:27pm
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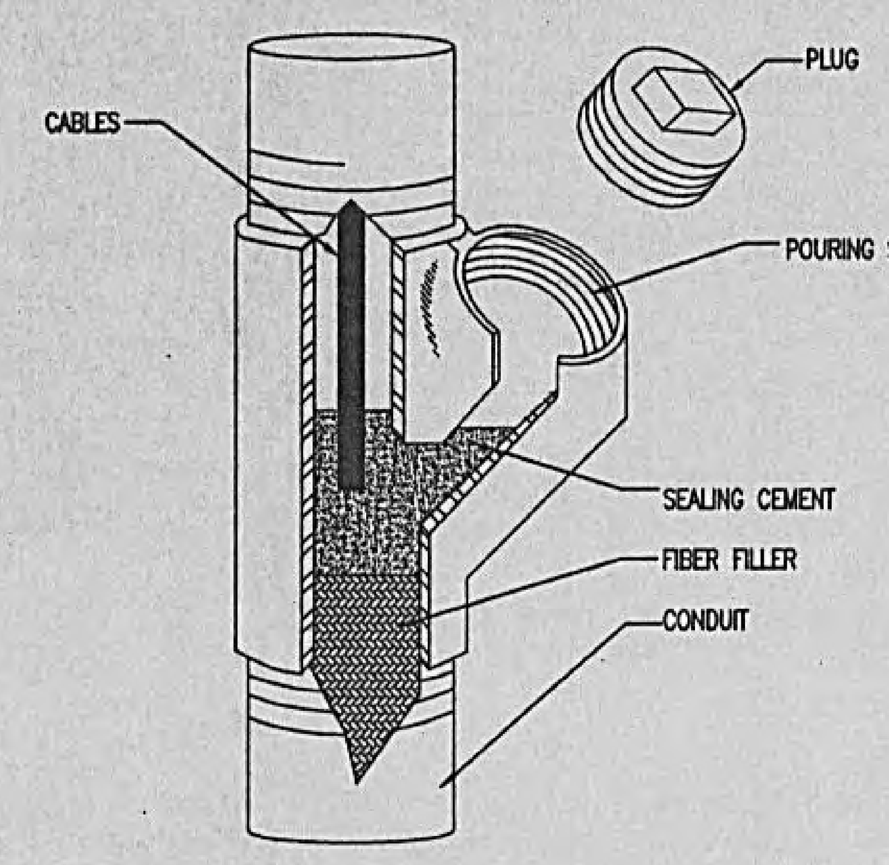
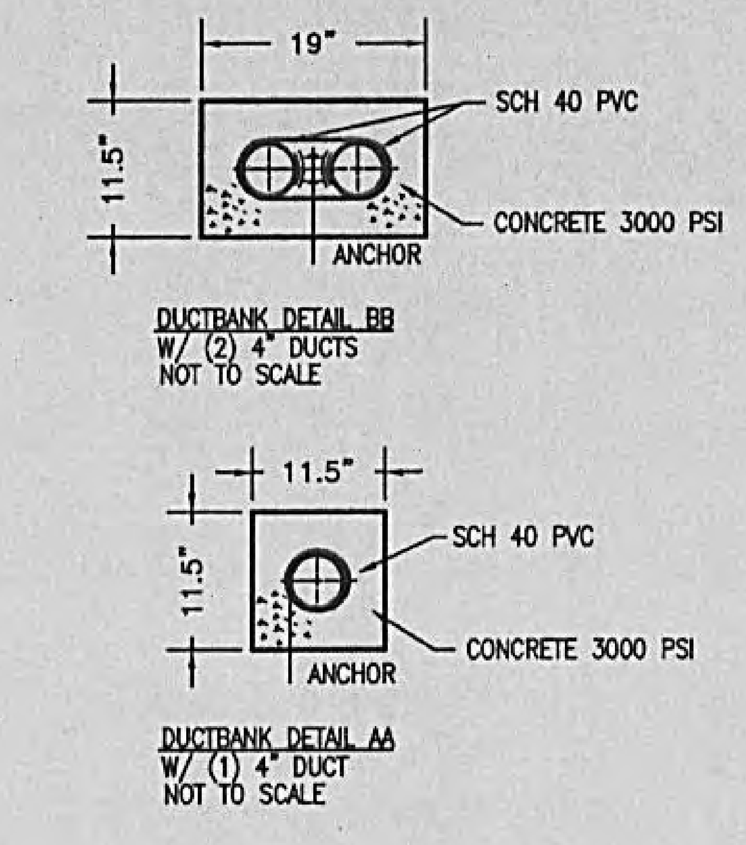
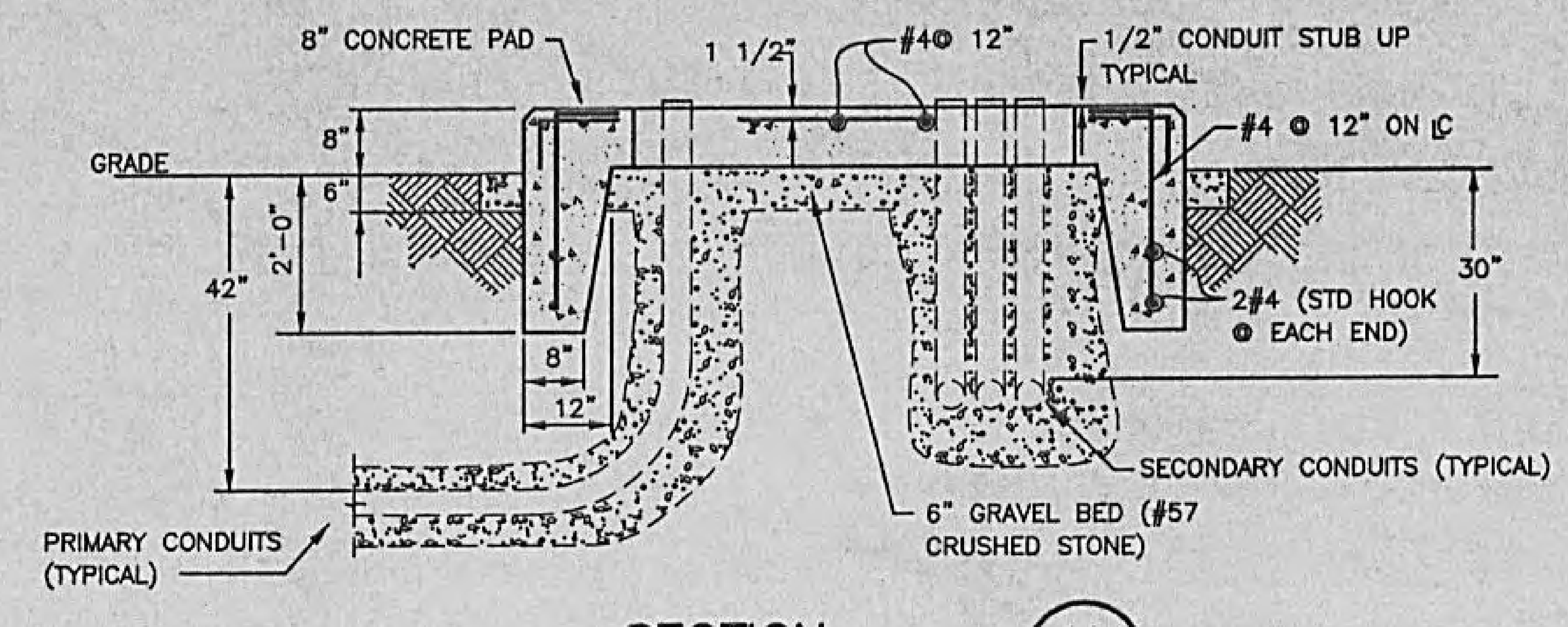


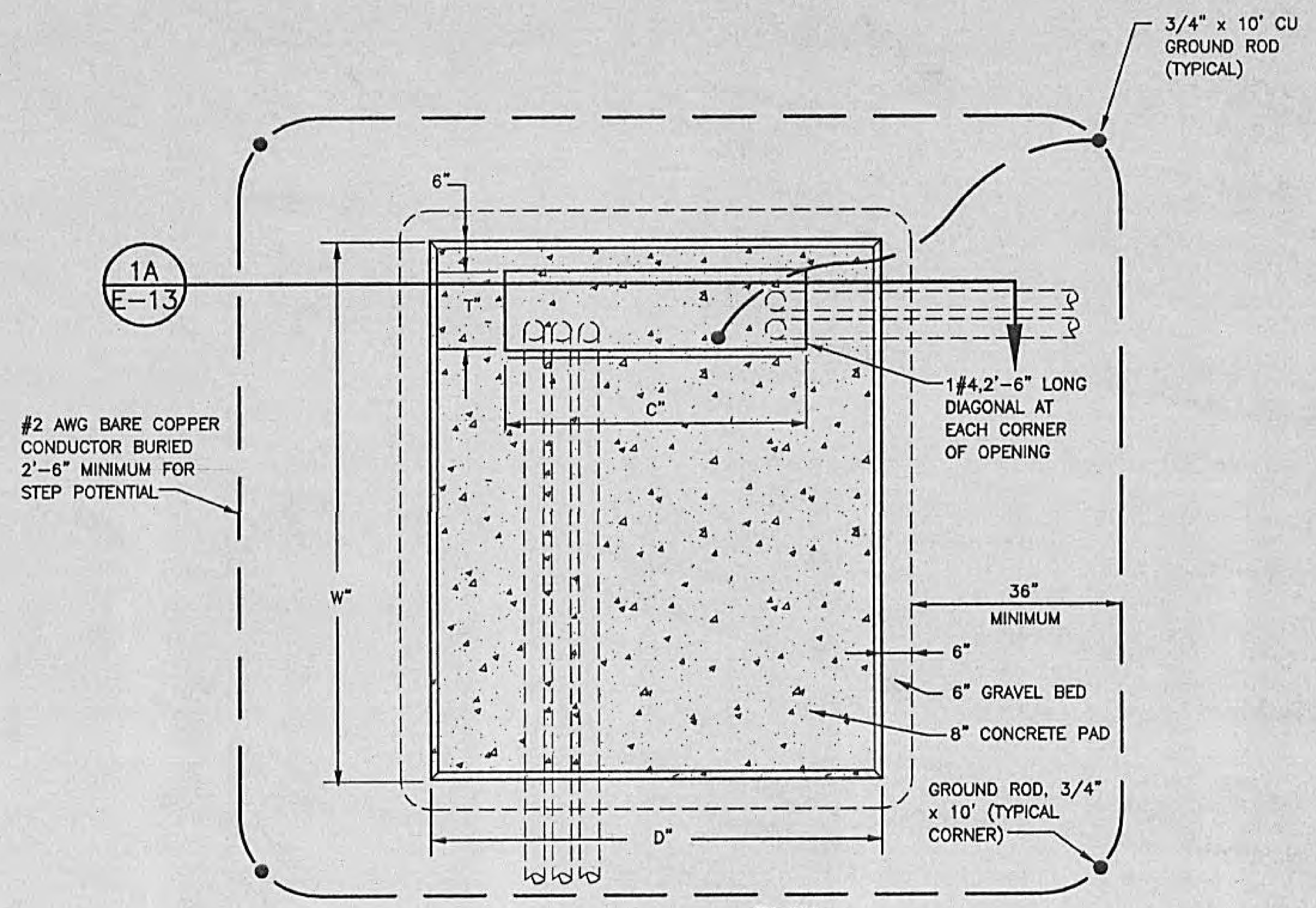
CONDUIT SEALING FITTING
NOT TO SCALE



DUCT BANK DETAILS
NOT TO SCALE



SECTION 1A E-13
NOT TO SCALE



PLAN

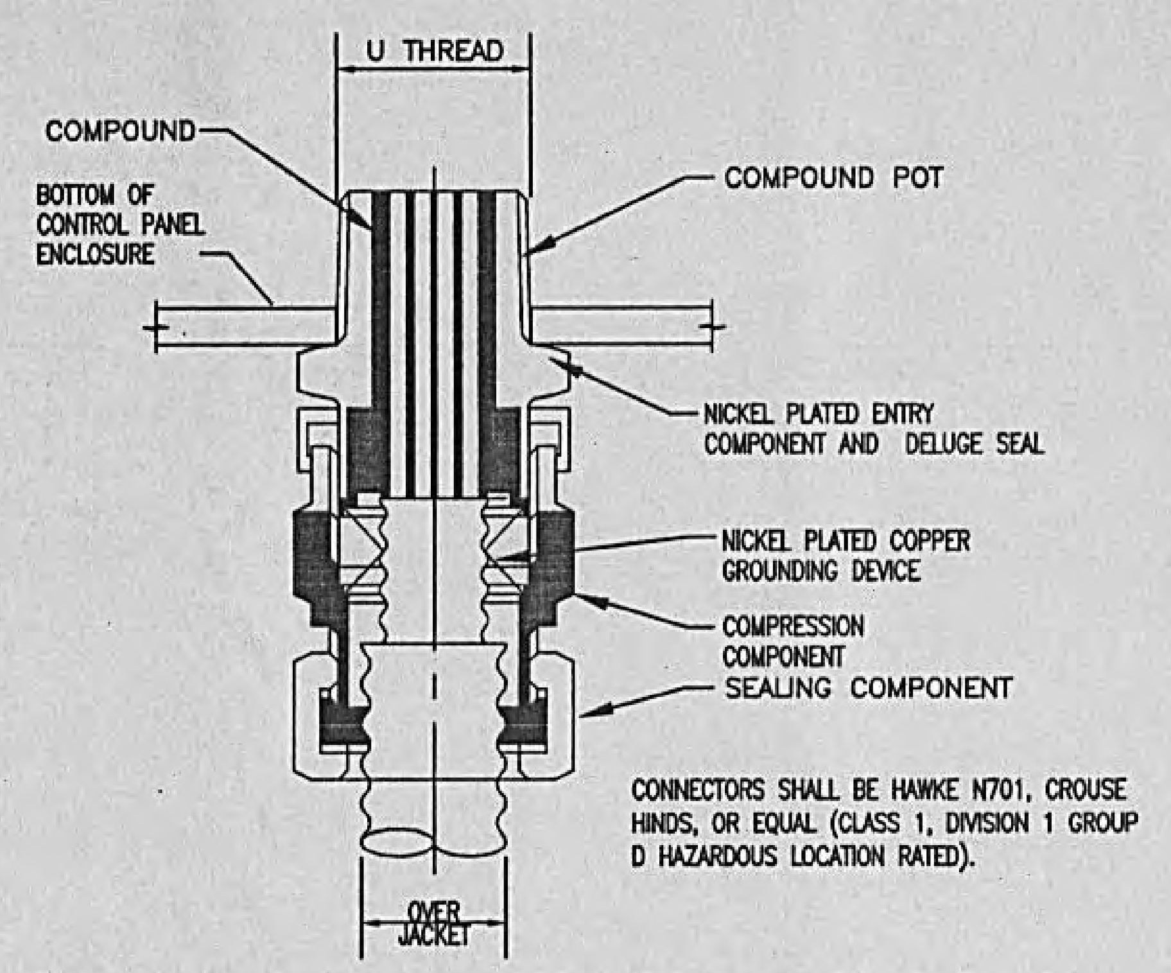
NOTES:

- TRANSFORMER PAD WILL BE A SOLID BLOCK OF CONCRETE WITH DIMENSIONS AS SHOWN, REINFORCED WITH STEEL RODS OR EQUIVALENT, ALL OF WHICH SHALL BE SOLIDLY WELDED TOGETHER FOR A FIRM AND STRUCTURAL FOUNDATION. PAD SHALL BE POURED ENTIRELY ON SITE, USING CONCRETE OF 1-2-4 MIX OR 3000 P.S.I. STRENGTH (6 BAG MIX). TOP OUTSIDE EDGES OF PAD WILL HAVE 1/2" BEVEL, AND ALL SURFACES WILL BE TROWLED TO A SEMI-SMOOTH FINISH. POURING OR PLACING OF THE PAD WILL BE DONE AFTER THE NECESSARY CONDUITS ARE IN PLACE AND GROUND HAS BEEN MECHANICALLY TAMPED.
- ANCHOR TRANSFORMER TO PAD WITH 3/8" DIAMETER STAINLESS STEEL ANCHOR BOLTS.
- ALL GROUNDING CONNECTIONS EXTERNAL TO TRANSFORMER ENCLOSURE SHALL BE EXOTHERMIC WELD.
- DIMENSIONS ARE INTENDED TO BE 12" LARGER THAN TRANSFORMER IN BOTH DIRECTIONS.

TRANSFORMER PAD FOUNDATION DIMENSIONS

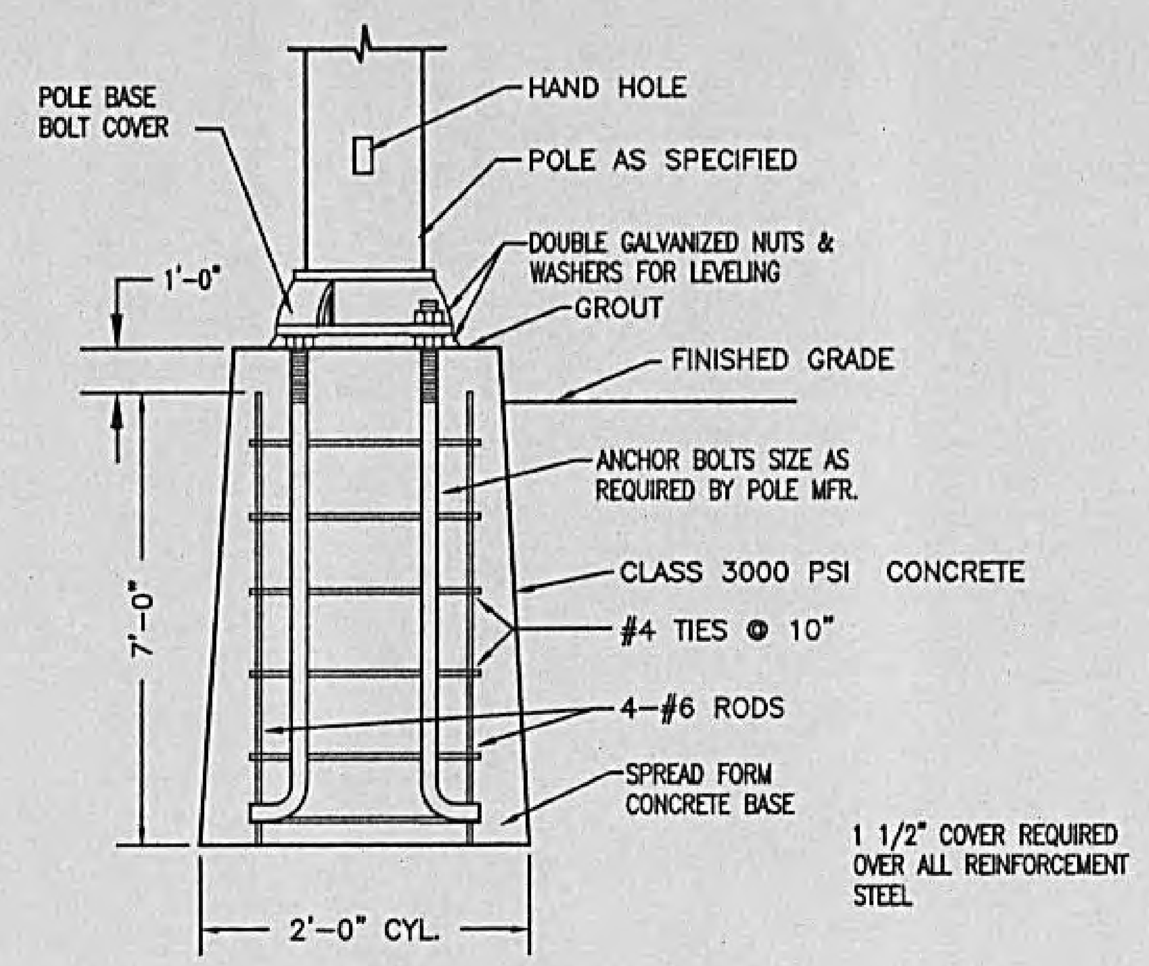
KVA	W	D	C	T
500	7'-0"	7'-6"	4'-6"	16"

1A E-13 TRANSFORMER PAD DETAIL



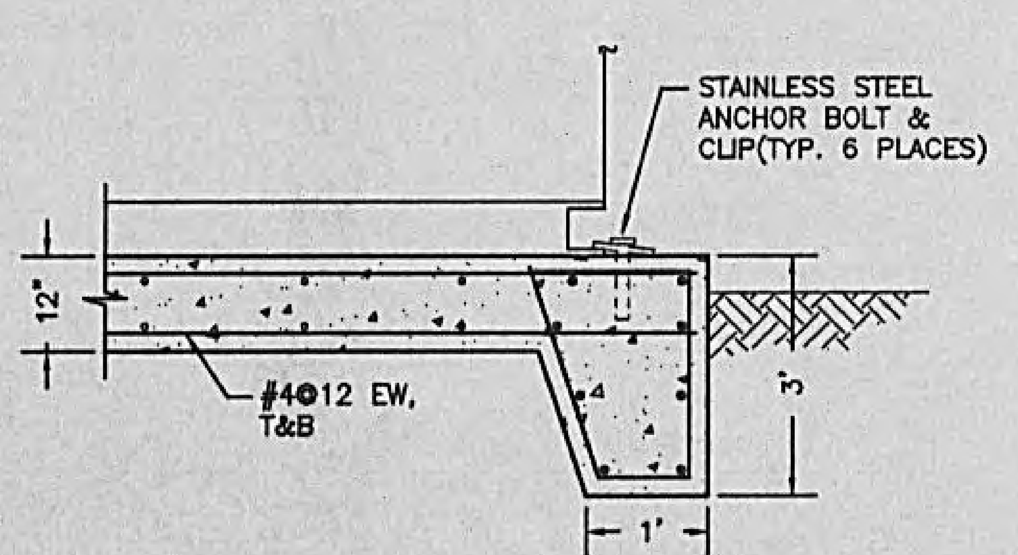
CONNECTORS SHALL BE HAWKE N701, CROUSE HINDS, OR EQUAL (CLASS 1, DIVISION 1 GROUP D HAZARDOUS LOCATION RATED).

PUMP & PRESSURE SWITCH CABLE GLAND CONNECTION
NOT TO SCALE

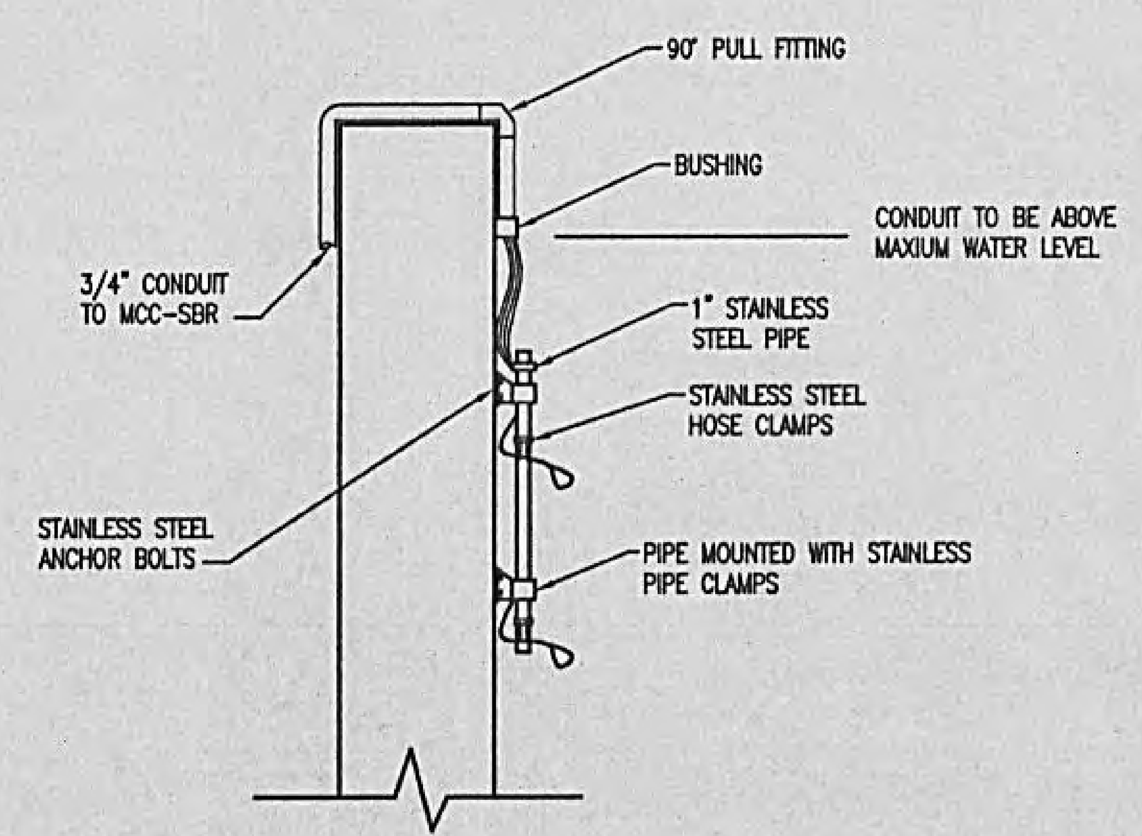


1 1/2" COVER REQUIRED OVER ALL REINFORCEMENT STEEL

TYPICAL LIGHT POLE BASE DETAIL
NOT TO SCALE
2 REQUIRED



MEDIUM VOLTAGE SWITCHGEAR – FOUNDATION
NOT TO SCALE



EQUALIZATION FLOAT MOUNTING BRACKET
NOT TO SCALE
2 REQUIRED

GRW PROJECT NO. 7601-10

MISC. DETAILS

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO.
APPROVED: TMH	E-13

STATE OF TENNESSEE

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PANEL SCHEDULE	PANELBOARD A
LOCATION	RAS/WAS
ENCLOSURE	NEMA 1
SURFACE, FLUSH, OR MCC	FLUSH

VOLTAGE	120/208 VOLT, 3-PHASE, 4 WIRE
MAINS AMPACITY	225 AMP
MAIN C.B. SIZE	100 AMP
TOTAL SPACES	30

DESCRIPTION	VA	#P	BKR	FEEDER	NO	-A- VA	-B- VA	-C- VA	NO.	FEEDER	BKR	#P	VA	DESCRIPTION
LIGHTING 1ST FLOOR	800	1	20A	3#12, 3/4"C	1	2000			2	3#12, 3/4"C	20A	1	1200	LIGHTING BASEMENT
RECEPTACLES	540	1	20A	3#12, 3/4"C	3		1260		4	3#12, 3/4"C	20A	1	720	RECEPTACLES
SAMPLER RECEPT	500	1	20A	3#12, 3/4"C	5			1300	6	3#10, 3/4"C	20A	1	800	ADJUST. WEIR LEVEL INDIC.
INTERMEDIATE FLOW METER	1000	1	20A	3#10, 3/4"C	7	1600			8	3#12, 3/4"C	20A	1	600	LIGHTING ELECTRICAL ROOM
LOOP ISOLATORS	600	1	20A	3#12, 3/4"C	9		1200		10	3#12, 3/4"C	20A	1	600	RAS SLUDGE FLOW
EF-3	1176	1	20A	3#12, 3/4"C	11			1776	12	3#12, 3/4"C	20A	1	600	SCUM WETWELL LEVEL
EF-2	864	1	20A	3#12, 3/4"C	13	864			14					
EF-1	864	1	20A	3#12, 3/4"C	15		864		16					
					17			0	18					
					19	0			20					
					21		0		22					
					23			0	24					
					25	0			26					
					27		0		28					
					29			0	30					
TOTAL VOLT-AMPERES PER PHASE						4464	3324	3076						
TOTAL AMPERES PER PHASE						37.2	27.7	25.6						

PANEL SCHEDULE	PANELBOARD C
LOCATION	BELT FILTER
ENCLOSURE	NEMA 3R
SURFACE, FLUSH, OR MCC	SURFACE

VOLTAGE	480 VOLT, 3-PHASE, 3-WIRE
MAINS AMPACITY	225A
MAIN C.B. SIZE	200AMP
TOTAL SPACES	30

DESCRIPTION	VA	#P	BKR	FEEDER	NO	-A- VA	-B- VA	-C- VA	NO.	FEEDER	BKR	#P	VA	DESCRIPTION
EUH-7	2500	3	20A	4#12, 3/4"C	1	5000			2	4#12, 3/4"C	20A	3	2500	EUH-6
	2500				3		5000		4				2500	
	2500				5			5000	6				2500	
BELT FILTER PRESS	12465	3	60A	3#6, 1#10, 1"C	7	26315			8	3#6, 1#10, 1"C	60A	3	13850	Utility Pump Station
	12465				9		26315		10				13850	
	12465				11			26315	12				13850	
					13	3828			14	4#6, 1"C	60	2	3828	Mini Power Zone
					15		3126		16				3126	
					17			0	18					
					19	0			20					
					21		0		22					
					23			0	24					
					25	0			26					
					27		0		28					
					29			0	30					
TOTAL VOLT-AMPERES PER PHASE						35143	34441	31315						
TOTAL AMPERES PER PHASE						126.9	124.3	113.1						

PANEL SCHEDULE	PANELBOARD B
LOCATION	RAS/WAS
ENCLOSURE	NEMA 1
SURFACE, FLUSH, OR MCC	MCC

VOLTAGE	480 VOLT, 3-PHASE, 4-WIRE
MAINS AMPACITY	100 AMP
MAIN C.B. SIZE	MLO
TOTAL SPACES	30

DESCRIPTION	VA	#P	BKR	FEEDER	NO	-A- VA	-B- VA	-C- VA	NO.	FEEDER	BKR	#P	VA	DESCRIPTION
CLARIFIER 1	5540	3	30	3#8, 1#10, 3/4"C	1	5570			2	3#8, 1#10, 3/4"C	5540	3	30	CLARIFIER 2
	5540				3		5540		4		5540			
	5540				5			5540	6		5540			
TWIN CONFIG. OUTDOOR LIGHT	900	1	20A	3#12, 3/4"C	7	3670			8	3#10, 1#12, 3/4"C	20A	3	2770	ADJUSTABLE WEIR MOTOR
EUH-2	1100	3	20A	4#12, 3/4"C	9		3870		10				2770	
	1100				11			3870	12				2770	
	1100				13	6100			14	4#10, 3/4"C	30A	3	5000	EUH-4
EUH-3	3333	3	20A	4#12, 3/4"C	15		8333		16				5000	
	3333				17			8333	18				5000	
	3333				19	5833			20	4#12, 3/4"C	20A	3	2500	EUH-5
SLUDGE THICKENER CP	3333	3	20A	4#12, 3/4"C	21		5833		22				2500	
	3333				23			5833	24				2500	
	3333				25	3333			26					
					27		0		28					
					29			0	30					
TOTAL VOLT-AMPERES PER PHASE						24506	23576	23576						
TOTAL AMPERES PER PHASE						88.5	85.1	85.1						

PANEL SCHEDULE	PANELBOARD D
LOCATION	BELT FILTER
ENCLOSURE	NEMA 3R
SURFACE, FLUSH, OR MCC	SURFACE

VOLTAGE	120/240 VOLT, 1-PHASE
MAINS AMPACITY	
MAIN C.B. SIZE	80 AMP
TOTAL SPACES	16

DESCRIPTION	VA	#P	BKR	FEEDER	NO	-A- VA	-B- VA	NO.	FEEDER	BKR	#P	VA	DESCRIPTION
OUTDOOR LIGHTING	225	2	20A	3#12, 3/4"C	1	1538		2	3#12, 3/4"C	20A	1	1313	LIGHTING
	225				3		1590	4	3#12, 3/4"C	20A	1	1365	LIGHTING
RECEPTACLES	540	1	20A	3#12, 3/4"C	5	2290		6	3#12, 3/4"C	20A	1	1750	LIGHTING
OUTDOOR RECEPTACLES	360	1	20A	3#12, 3/4"C	7		1536	8	3#12, 3/4"C	20	1	1176	EF-4
POLYMER SYSTEM	1200	1	20A	3#12, 3/4"C	9	1200		10					
					11		0	12					
					13	0		14					
SPARE		1	20A		15		0	16		20A	1		SPARE
TOTAL VOLT-AMPERES PER PHASE						5028	3126						
TOTAL AMPERES PER PHASE						41.9	26.1						

LIGHT FIXTURE SCHEDULE

MARK	DESCRIPTION	LAMPS	MFR.	MODEL NUMBER
LF-1	INDUSTRIAL FLUORESCENT w/ WG	3-32W T8	HOLOPHANE	IW T 04 D N WG 043 EP 120
LF-2	INDUSTRIAL FLUORESCENT w/ WG	2-32W T8	HOLOPHANE	IW T 04 D N WG 042 EP 1 120
LF-3	INDUSTRIAL "PETROLUX"	175W MH	HOLOPHANE	PTA 175MH 24 P 25C
LF-3A	INDUSTRIAL "PETROLUX"	175W MH	HOLOPHANE	PTA 175MH 24 P 25C
LF-4	OUTDOOR WALL PAKS	100 W MH	LITHONIA	TWH 100M 120 PE
LF-5	EMERGENCY LIGHTING UNIT	6W HALO	LITHONIA	ELM2 SSB DL
LF-6	OUTDOOR AREA POLE MOUNT 40 FT	400W HPS	HOLOPHANE	MS 2 A 400HP 24 H3 w/ PHOTOCEL
LF-6,LF-7	ROUND, TAPERED STEEL POLE	40 FT	HOLOPHANE	HOT DIP GALVANIZED
LF-7	OUTDOOR AREA TWIN CONFIG. 40 FT	400W HPS	HOLOPHANE	MS 2 A 400HP 27 H3 w/ PHOTOCEL

GRW PROJECT NO. 7601-10

PANEL SCHEDULES
LIGHT FIXTURE SCHEDULE
WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

NO.	DESCRIPTION	DATE	BY

REVISIONS

MICHELLE HOWLEY REGISTERED ENGINEER AGRICULTURE COMMERCE NO. 00105845 STATE OF TENNESSEE
10/2/02

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO. E-12
APPROVED: TMH	

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NO.	DESCRIPTION	DATE	BY

REVISIONS

GRW PROJECT NO. 7601-10

CONTROL CIRCUITS

WASTEWATER TREATMENT PLANT UPGRADE
HARRIMAN UTILITY BOARD – HARRIMAN, TENNESSEE

GRW Elrod Dunson, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE INDIANAPOLIS NASHVILLE KNOXVILLE

DESIGNED: GLW	DATE: 8-1-02
DRAWN: MKC	SCALE: AS NOTED
REVIEWED: GLW	SHEET NO.
APPROVED: TMH	E-11

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