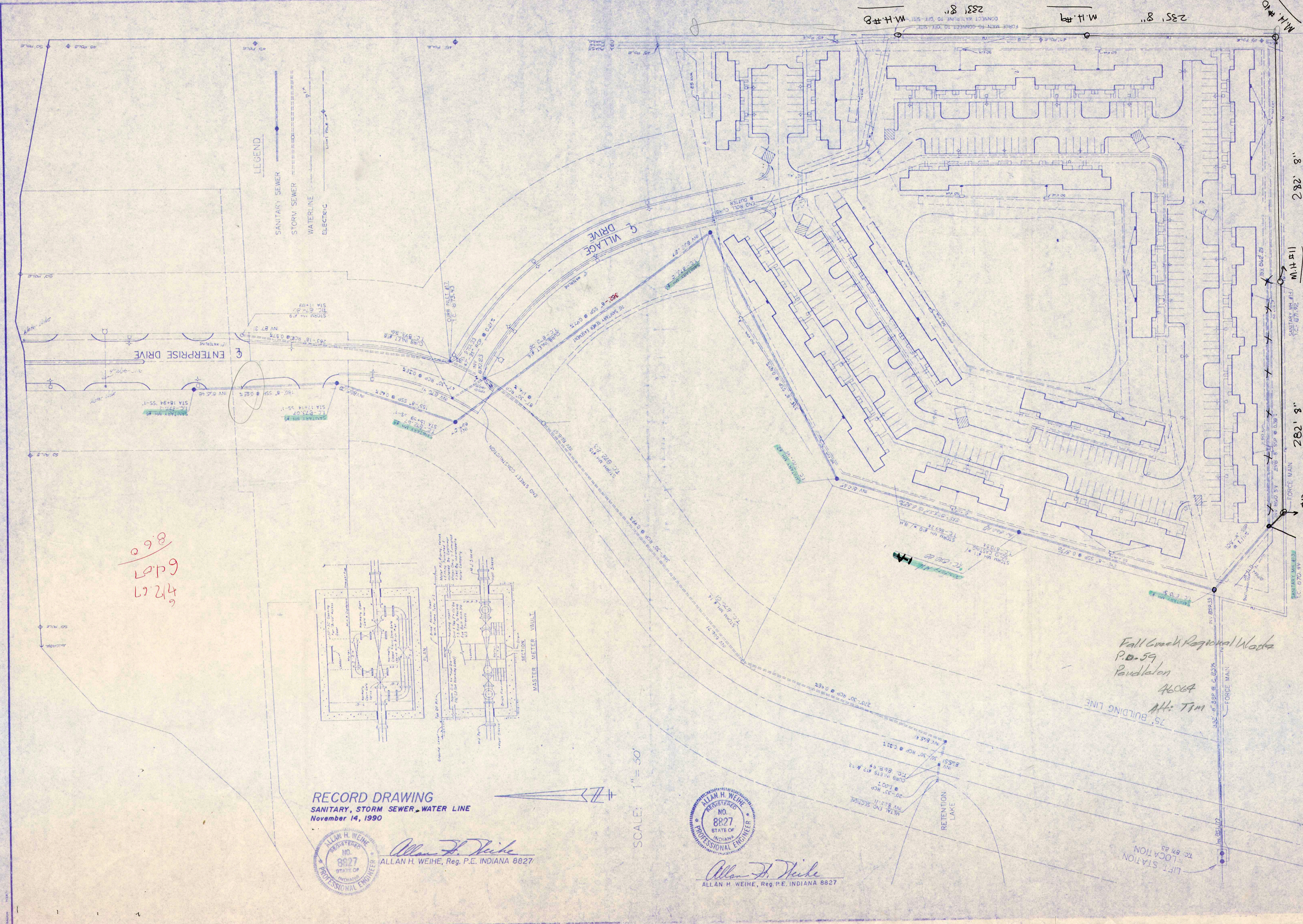

RECORD DRAWING
SANITARY, STORM SEWER, WATER LINE
November 14, 1990

ALLAN H. WEIHE
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PROFESSIONAL ENGINEER

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Fall Creek Regional Waste
P.O. 59
Pendleton
46064
Att: Tim

WEIHE ENGINEERS INC.

10505 NORTH COLLEGE AVENUE
INDIANAPOLIS, INDIANA 46280
(317) 846-6611

ALLAN H. WEIHE P.E. L.S.
PRESIDENT

CIVIL ENGINEERS LAND SURVEYORS LAND PLANNERS

JOB NO.	DRAWN BY	CHECKED BY	DATE
89-148	M.T.		11-17-89

REVISIONS

PREPARED FOR:

UTILITIES PLAN - PENDLETON VILLAGE APARTMENTS

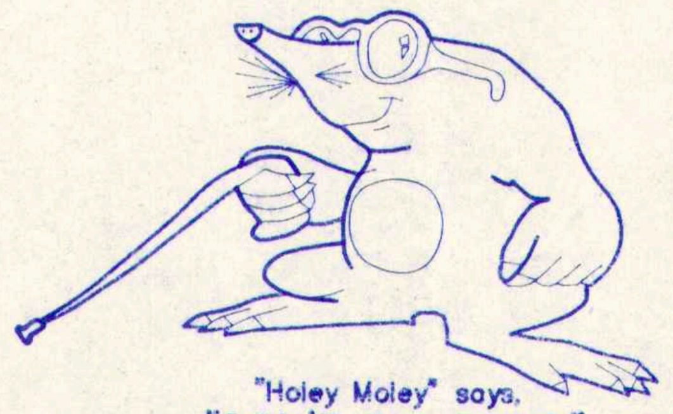
F.B. PAGE

SHEET NO. 4
OF

CONSTRUCTION PLANS FOR

PAUL'S FIRST ADDITION TO THE TOWN OF PENDLETON

LIFT STATION AND FORCE MAIN



"Holey Moley" says,
"DON'T DIG BLIND"
Call Monday through Friday–7 AM to 6 PM
1–800 382–5544 Within Indiana
1–800 428–5200 Outside Indiana

GENERAL NOTES:

All sanitary sewer construction on this project may be of P.V.C. sewer pipe conforming to A.S.T.M. Specification C-700-71T. At owner's option Type P.S.M. polyvinylchloride sewer pipe and fittings Type 1, Grade conforming to A.S.T.M. Specification D-3033 and D-3034 or Acrylonitrile-Butadiene-Styrene (ABS) sewer pipe conforming to A.S.T.M. D-2680-79A may be substituted. Joints in all pipe shall conform to A.S.T.M. Specification C-425-71. All subsequent A.S.T.M. revisions shall apply.

All sanitary sewer lines upon completion will be required to pass a low pressure air test, unless otherwise directed by the City Engineer. Said test shall be conducted according to NCPI Standard Method, and shall be witnessed by the City Inspector. Infiltration under test shall not exceed 200 gallons per inch of inside diameter of sewer pipe per mile of sewer in 24 hours and inclusive of all appurtenances within the section being tested such as manholes, house connections, etc.

All pipe or drainage structures in trenches under paved surfaces and 10 feet beyond shall be backfilled with granular material and compacted by approved methods.

No roof drains, footing drains and / or surface water drains may be connected to the sanitary sewer system, including temporary connections during construction.

Sewers crossing mains shall be laid to provide minimum distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to water pipe and shall be pressure tested to assure watertightness prior to backfilling.

A temporary seeding mixture in the areas where stripping of fills have been graded shall be seeded for silt and erosion protection. After grading all construction areas are to be seeded as follows:

A. Swale seeding - seed and fertilize within construction limits with 5#/acre "Redtop" grass, 20#/acre "Rye Grass", 20#/acre "Blue Grass", 25#/acre "Tall Fescue" grass, and 600#/acre 12-12-12 fertilizer.

B. Cut/Fill Seeding Along Paved Areas - seed and fertilize with 25#/acre "Tall Fescue" grass, 20#/acre "Rye Grass", 15#/acre "Blue Grass" and 600#/acre 12-12-12 fertilizer.

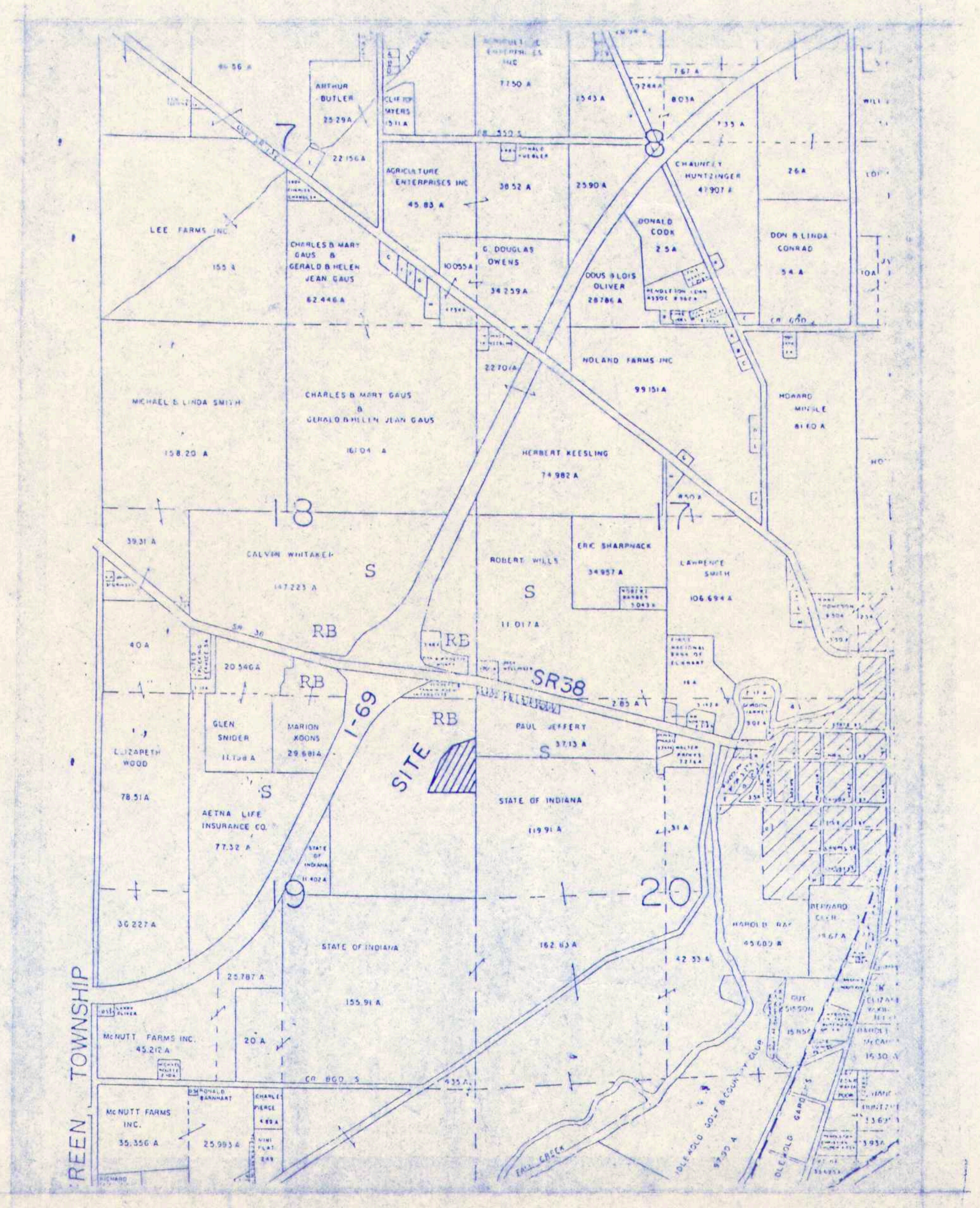
It shall be the responsibility of each contractor to verify all existing utilities and conditions pertaining to his phase of the work. It shall also be the contractors responsibility to contact the owners of the various utilities before work is started. The contractor shall notify in writing the owners and/or the engineers of any changes, errors, or omissions found on these plans or in the field before work is started or resumed.

Horizontal seperation between water mains and sanitary sewers shall maintain ten (10) feet.

All Construction shall be in accordance with the Standard Specifications of the Town of Pendleton.

Erosion Control measures shall be implemented during all phases of construction and permanent control measures at completion of construction. At completion of construction all disturbed areas shall be replaced to that of existing conditions or better.

The Contractor shall be responsible for obtaining all State, City and County permits



SITE LOCATION

INDEX

SHEET #	DESCRIPTION
1	TITLE SHEET
2	ON SITE FORCE MAIN
3-6	OFF SITE FORCE MAIN
7	LIFT STATION DETAILS
8	LIFT STATION SPECIFICATIONS

PLANS PREPARED FOR:

MR. C. STEVE PAUL
P.O. BOX 594
CARMEL, INDIANA 46032
TELEPHONE: (317) 842-1994

PLANS PREPARED BY:

WEIHE ENGINEERS, INC.
10505 N. COLLEGE
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TELEPHONE: (317) 846-6611

CERTIFIED BY:

ALLAN H. WEIHE
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CIVIL ENGINEERS LAND SURVEYORS LAND PLANNERS

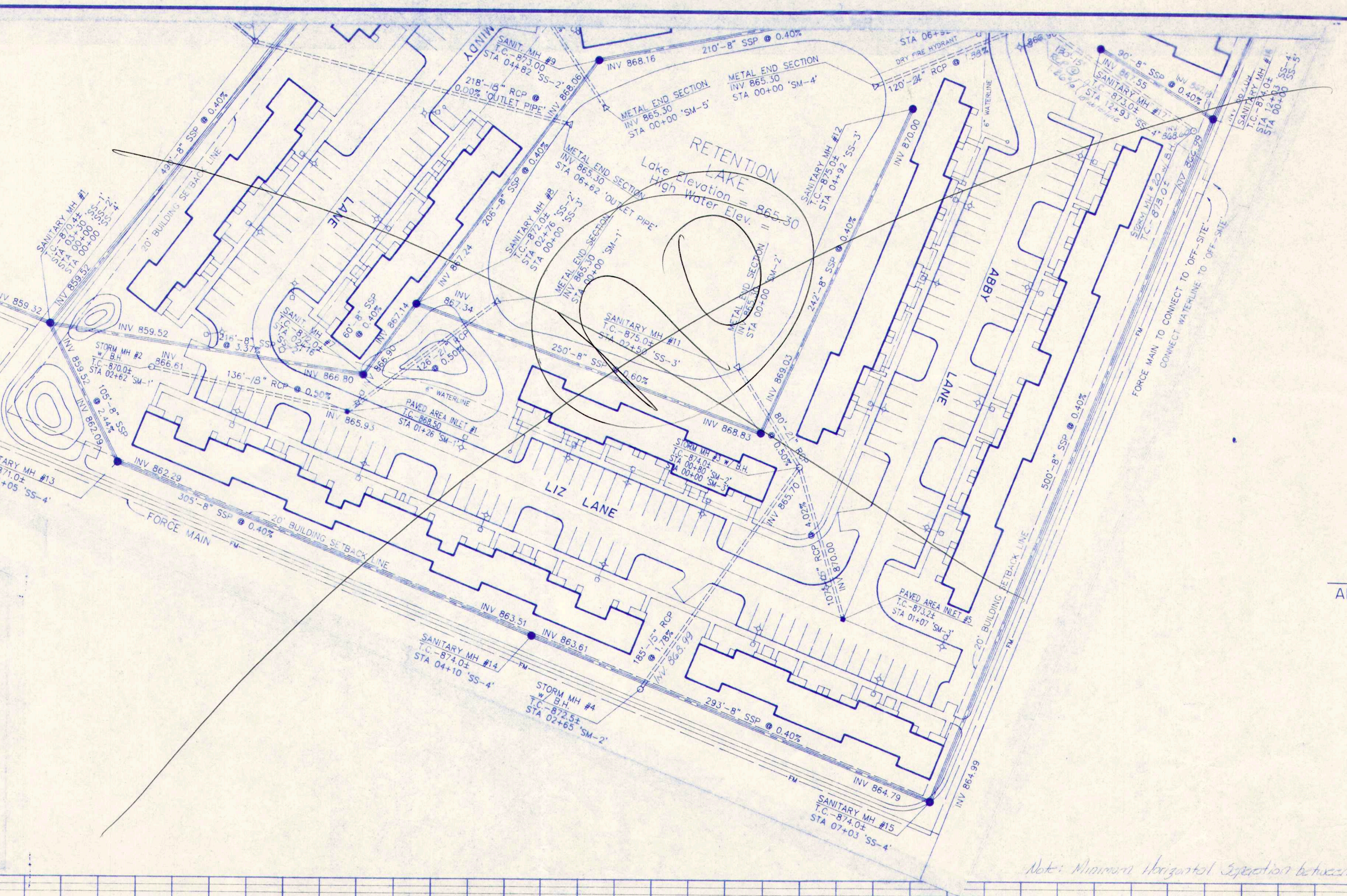
JOB NO 89-143
DRAWN BY D.B.
CHECKED BY
DATE 1-12-90

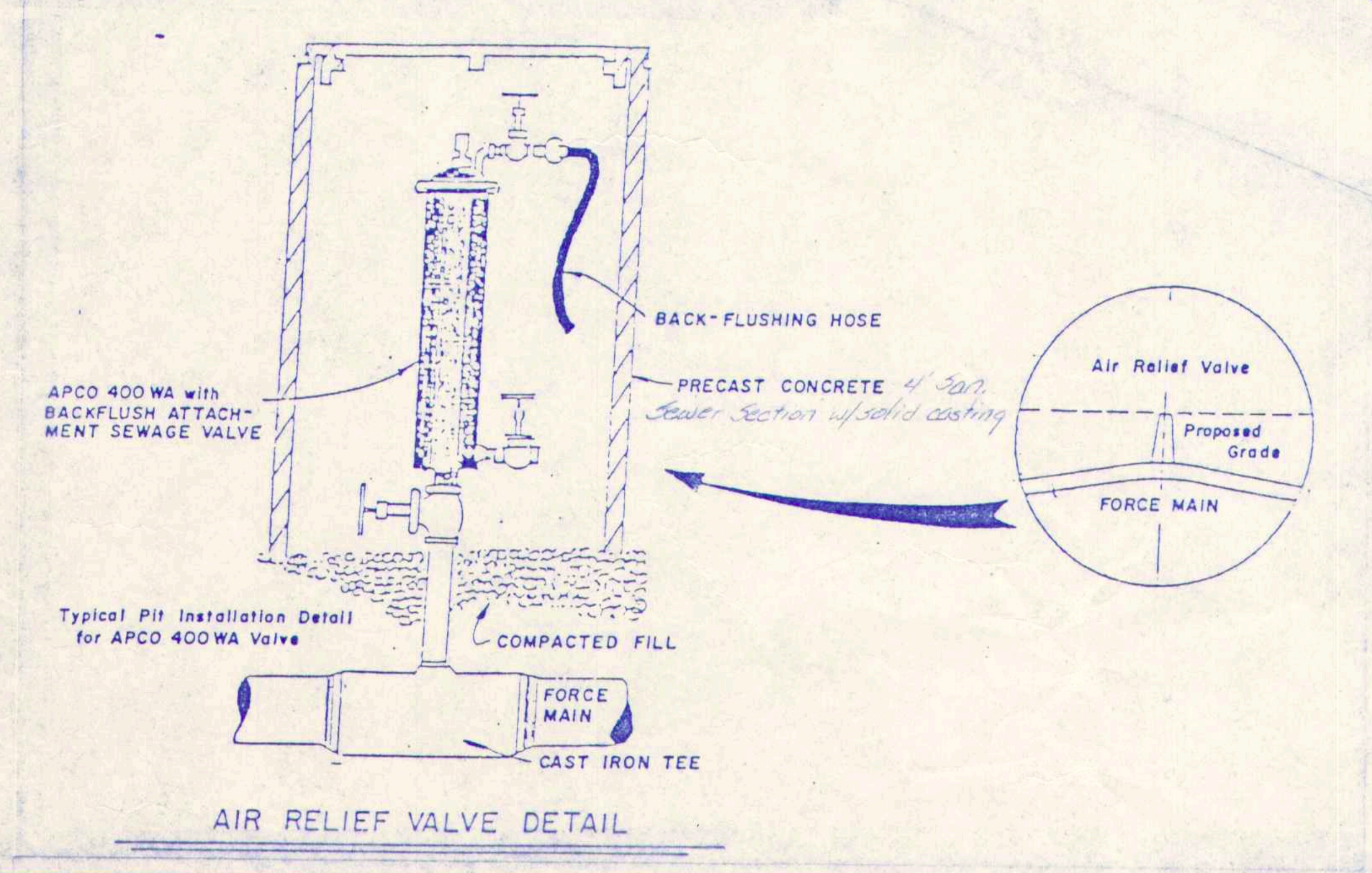
REVISIONS | DATE | BY
F.B. | PAGE | #

PREPARED FOR: MR STEVE PAUL

TITLE SHEET – PAUL'S FIRST ADDITION TO THE TOWN OF PENDLETON – LIFT STA.

SHEET NO 1
OF 8



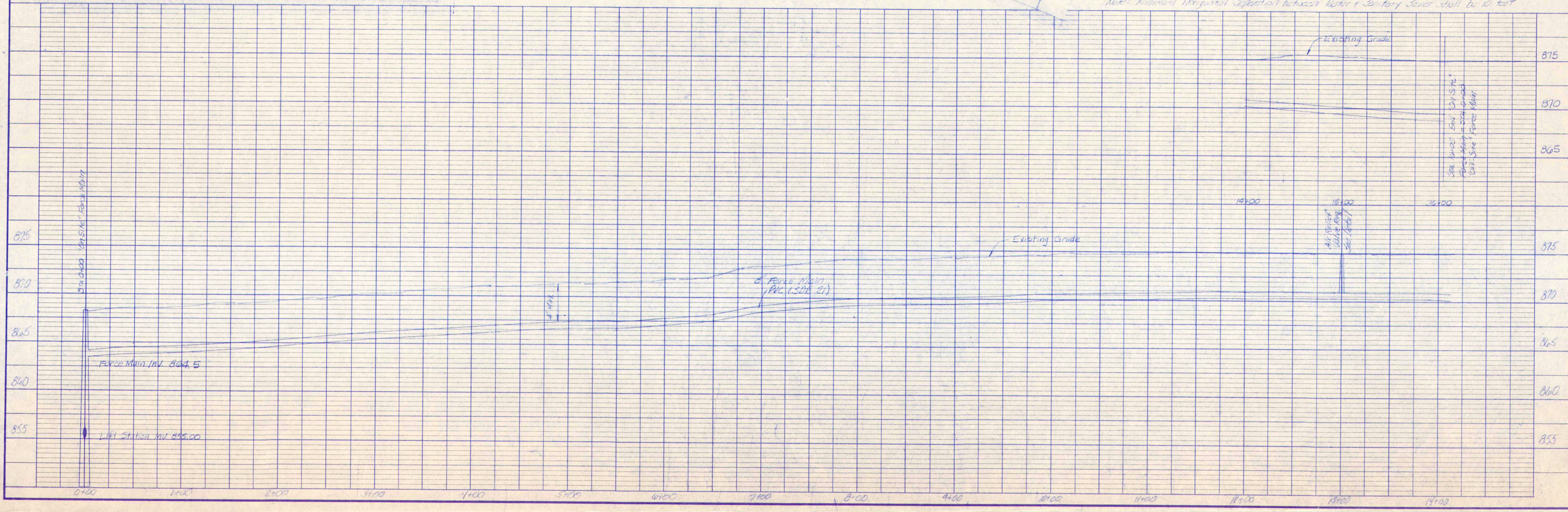

BACK-FLUSHING HOSE
APCO 400 WA with BACKFLUSH ATTACHMENT SEWAGE VALVE
PRECAST CONCRETE 4' San. Sewer Section w/solid casting
Air Relief Valve
Proposed Grade
FORCE MAIN
Typical Pit Installation Detail for APCO 400 WA Valve
COMPACTED FILL
FORCE MAIN
CAST IRON TEE

AIR RELIEF VALVE DETAIL

Allan H. Weihe
ALLAN H. WEIHE, Reg. P.E.,INDIANA #8827

NO. 8827

Note: Minimum Horizontal Separation between Water & Sanitary Sewer shall be 10 feet



REVISIONS	DATE	BY
Add SDR# to PVC	2-6-90	DB
Raise Air Relief Valve Detail	3/19/90	DB

F.B.	PAGE	#

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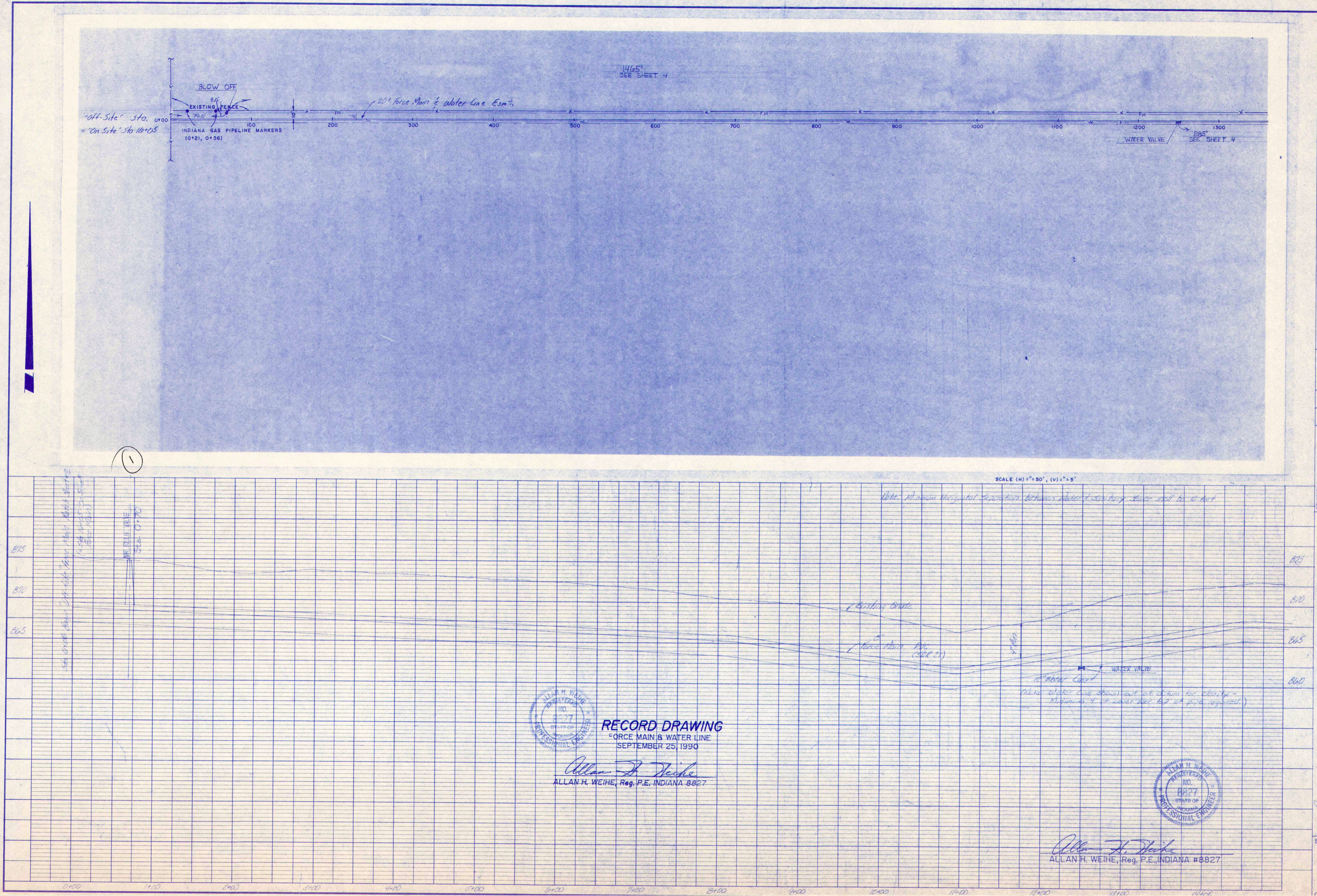
CIVIL ENGINEERS LAND SURVEYORS LAND PLANNERS

Prepared For: Mr. Steve Paul

ON-SITE FORCE MAIN - PENDLETON

SHEET NO 2
OF 8

MARBAUGH N12364



SCALE (H) 1" = 50', (V) 1" = 5'

Note: Minimum Horizontal Separation between Water & Sanitary Sewer shall be 10 feet

(Note: Water Line shown out of datum for clarity – Minimum 4' of cover over top of pipe required.)

ALLAN H. WEIHE
NO. 8827

RECORD DRAWING
FORCE MAIN & WATER LINE
SEPTEMBER 25, 1990

Allan H. Weihe
ALLAN H. WEIHE, Reg. P.E. INDIANA 8827

ALLAN H. WEIHE
NO. 8827

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LAND PLANNERS

REVISIONS	DATE	BY
Add 30R # to WL	2-6-90	DB
F.M.&W. RECORD DRAWING	9-25-90	C.R.K.

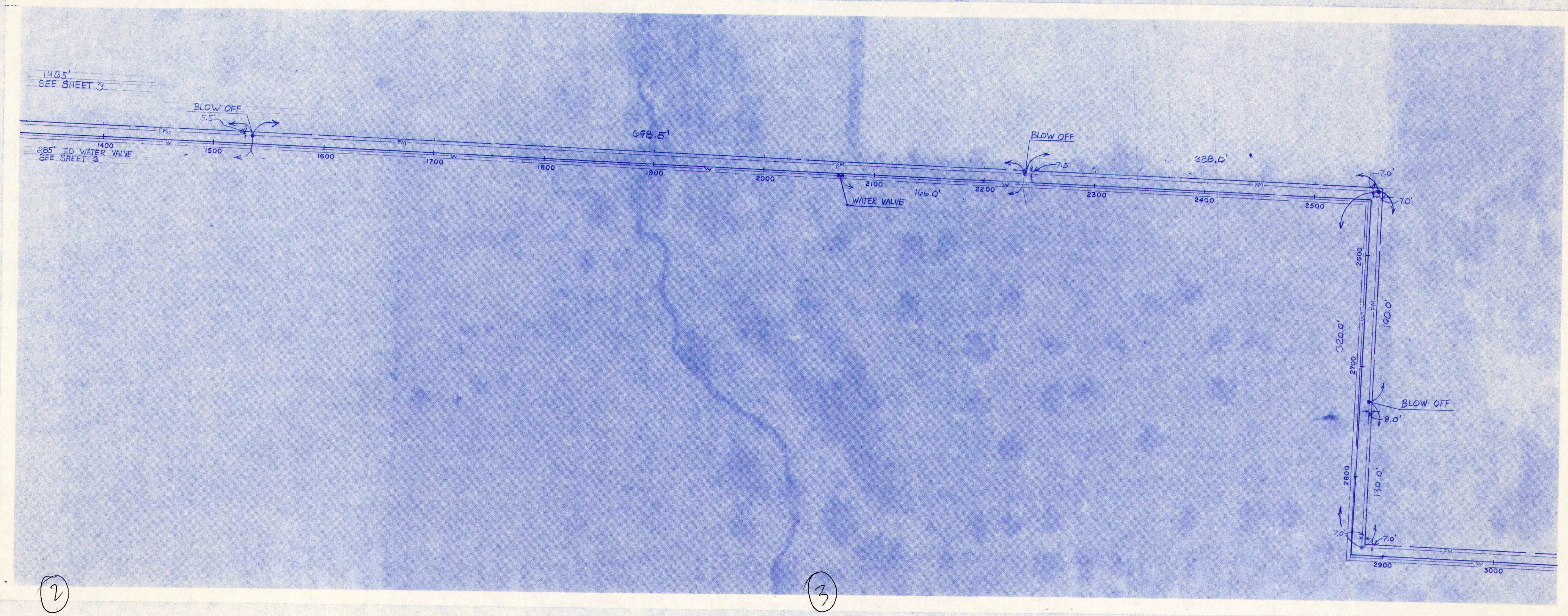
JOB NO. 89-143
DRAWN BY DB
CHECKED BY
DATE 9-5-89

F. B.
PAGE
#

Prepared For
Mr. Steve Paul

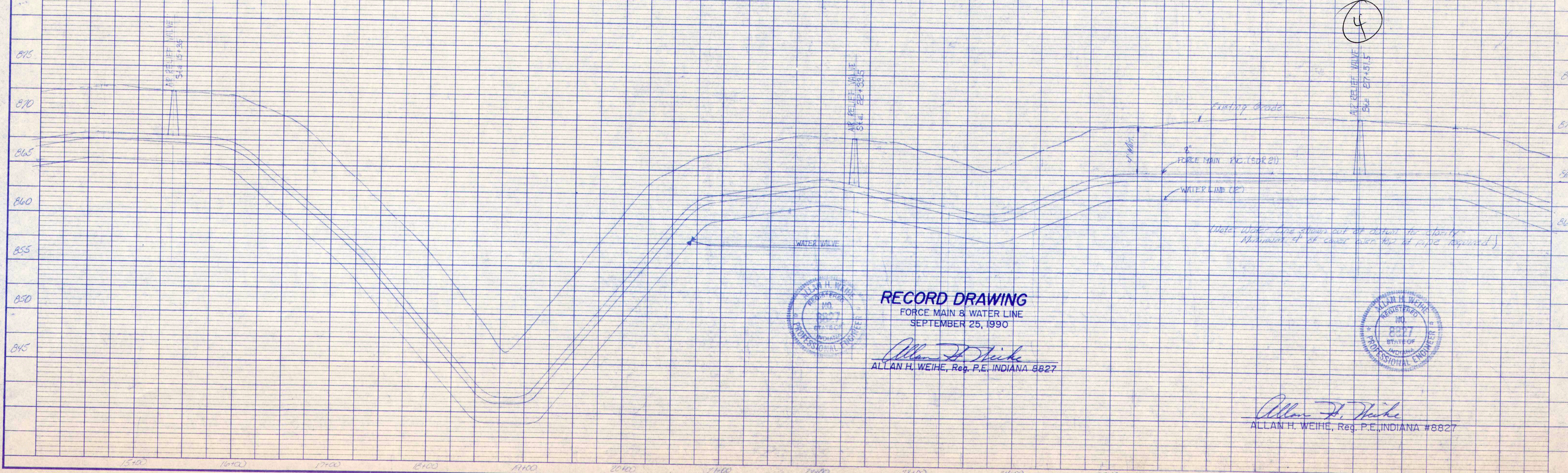
Pendleton Force Main & Water Line Profile

SHEET NO
3
OF 8



SCALE (H) 1" = 50', (V) 1" = 5'

Note: Minimum Horizontal Separation between Water & Sanitary Sewer shall be 10 feet



(Note: Water Line shown out of datum for clarity - Minimum 4' of cover over top of pipe required)

RECORD DRAWING
FORCE MAIN & WATER LINE
SEPTEMBER 25, 1990

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LAND SURVEYORS
LAND PLANNERS

REVISIONS	DATE	BY
Add SDR # to PVC	2-6-90	DB
FM. & W. RECORD DRAWING	9-25-90	C.A.R.

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CHECKED BY
DATE 9-5-89

F. B.
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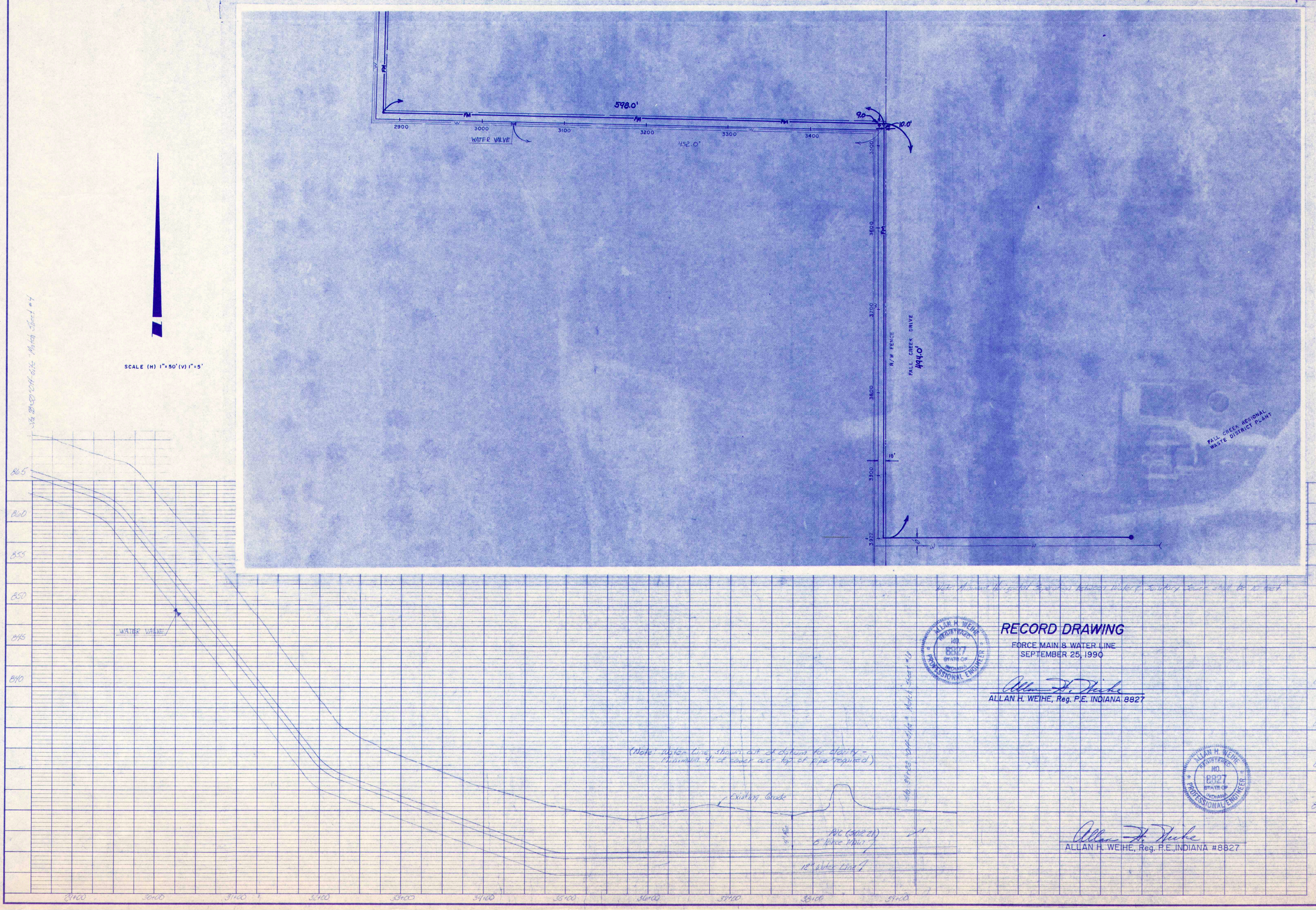
Prepared For Mr. Steve Paul

Pendleton Force Main & Water Line Profile

SHEET NO
4



Note: Minimum Horizontal Separation between Water & Sanitary Sewer shall be 10 feet

(Note: Water Line shown out of datum for clarity - Minimum 4' of cover over top of pipe required)

RECORD DRAWING

FORCE MAIN & WATER LINE
SEPTEMBER 25, 1990

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CIVIL ENGINEERS LAND SURVEYORS LAND PLANNERS

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2nd SET # to NC	2-6-90	JB
F.M. & W. RECORD DRAWING	9-25-90	C.B.H.

JOB NO. 89-148
DRAWN BY J.B.
CHECKED BY
DATE 9-5-89

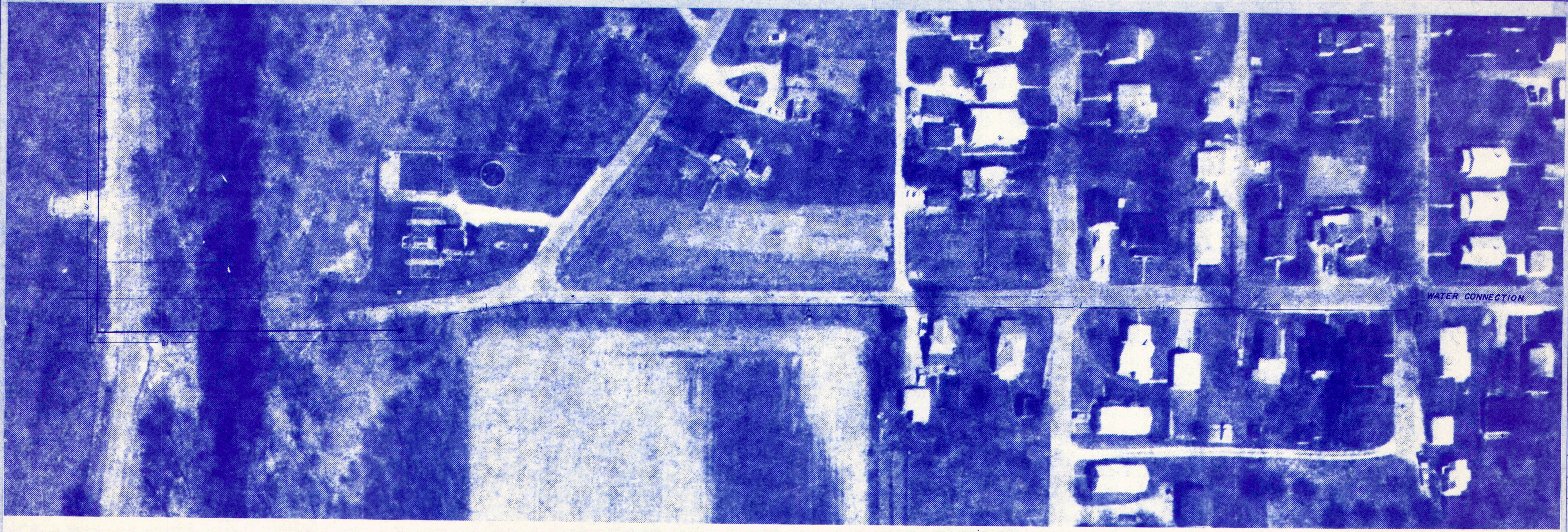
F.B. PAGE #

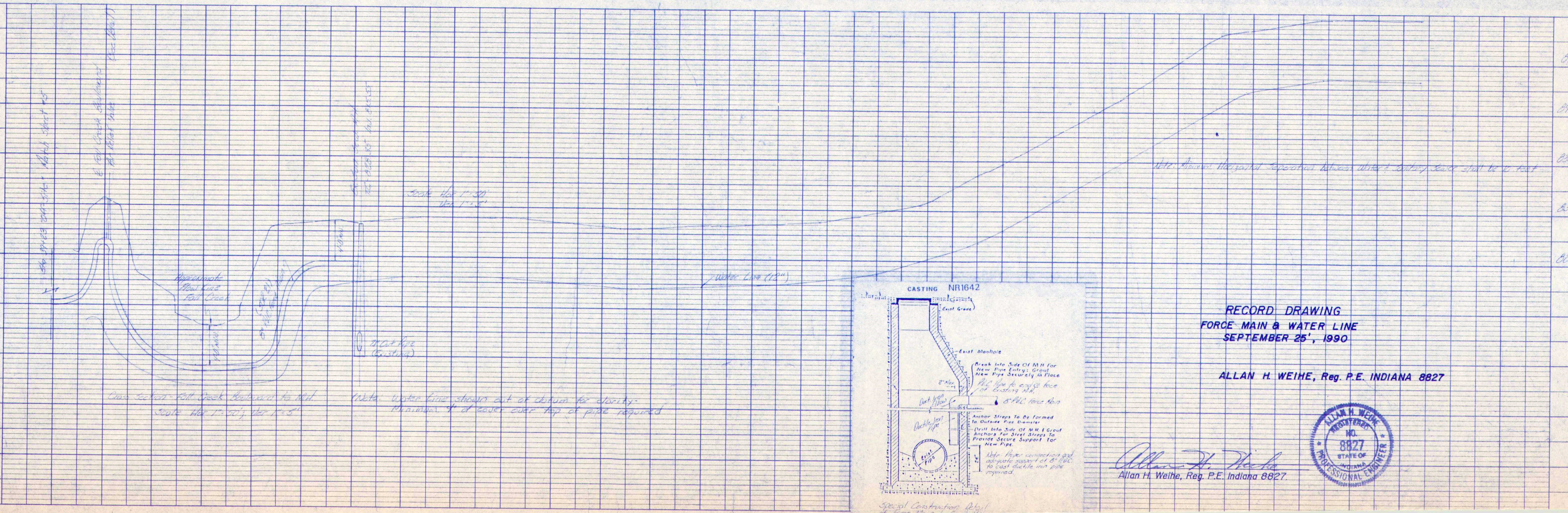
Prepared for Mr. Steve Paul

Pendleton Force Main & Water Line Profile

SHEET NO 5 OF 8

MARBAUGH N12364





Cross Section - Fall Creek Boulevard to M.H.
Scale Hor 1"=50'; Ver 1"=5'

(Note: Water Line shown out of datum for clarity-
Minimum 4' of cover over top of pipe required

Note: Minimum Horizontal Seperation between Water & Sanitary Sewer shall be 10 feet

Break Into Side Of M.H. For New Pipe Entry: Grout New Pipe Securely In Place

P.V.C. Pipe to end @ face of Existing M.H.

8" P.V.C. Force Main

Anchor Straps To Be Formed To Outside Pipe Diameter

Drill Into Side Of M.H. & Grout Anchors For Steel Straps To Provide Secure Support For New Pipe.

Note: Proper connection and adequate support of 8" P.V.C. to cast ductile iron pipe required.

Special Construction Detail

RECORD DRAWING
FORCE MAIN & WATER LINE
SEPTEMBER 25', 1990

ALLAN H. WEIHE, Reg. P.E. INDIANA 8827

Allan H. Weihe
Allan H. Weihe, Reg. P.E. Indiana 8827.

ALLAN H. WEIHE
REGISTERED
NO. 8827
STATE OF INDIANA
PROFESSIONAL ENGINEER

REVISIONS	DATE	BY
Add Special M.H. Conn. Detail	2-5-90	D.B.
Add SDR # to PVC	3-6-90	D.B.

JOB NO.	89-148
DRAWN BY	D.B.
CHECKED BY	
DATE	6-16-89
F. B.	
PAGE	

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CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

Prepared For:
Fall Creek Regional Waste District
Sanitary Sewer Plan & Profile Sheet / Creek Cross Section

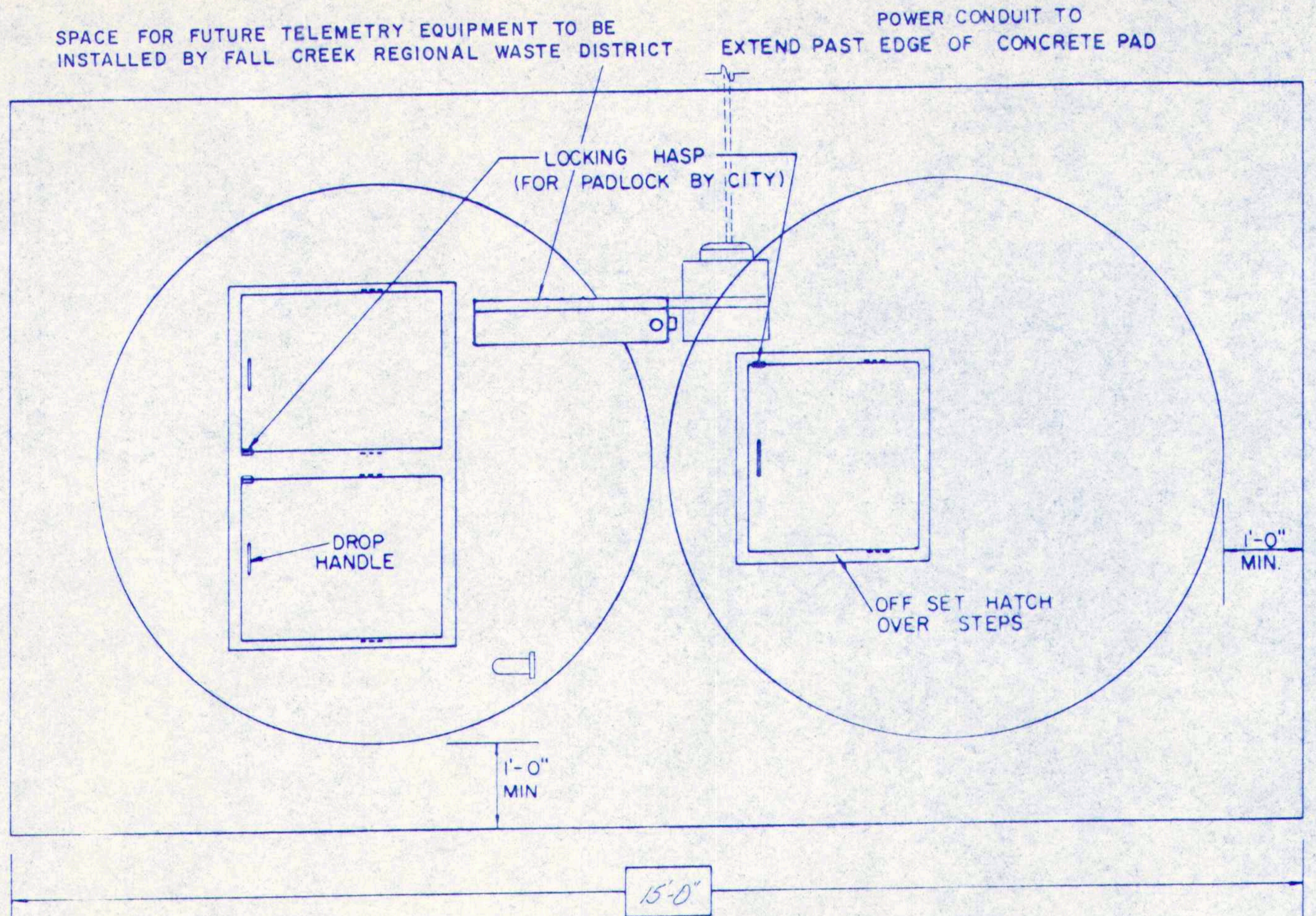
SHEET NO
6

N12364

Township: Fall Creek Township
Section 19 Twp. 18 Range 7E
Project: Pauls First Addition to Pendleton
Location: Pendleton, Indiana

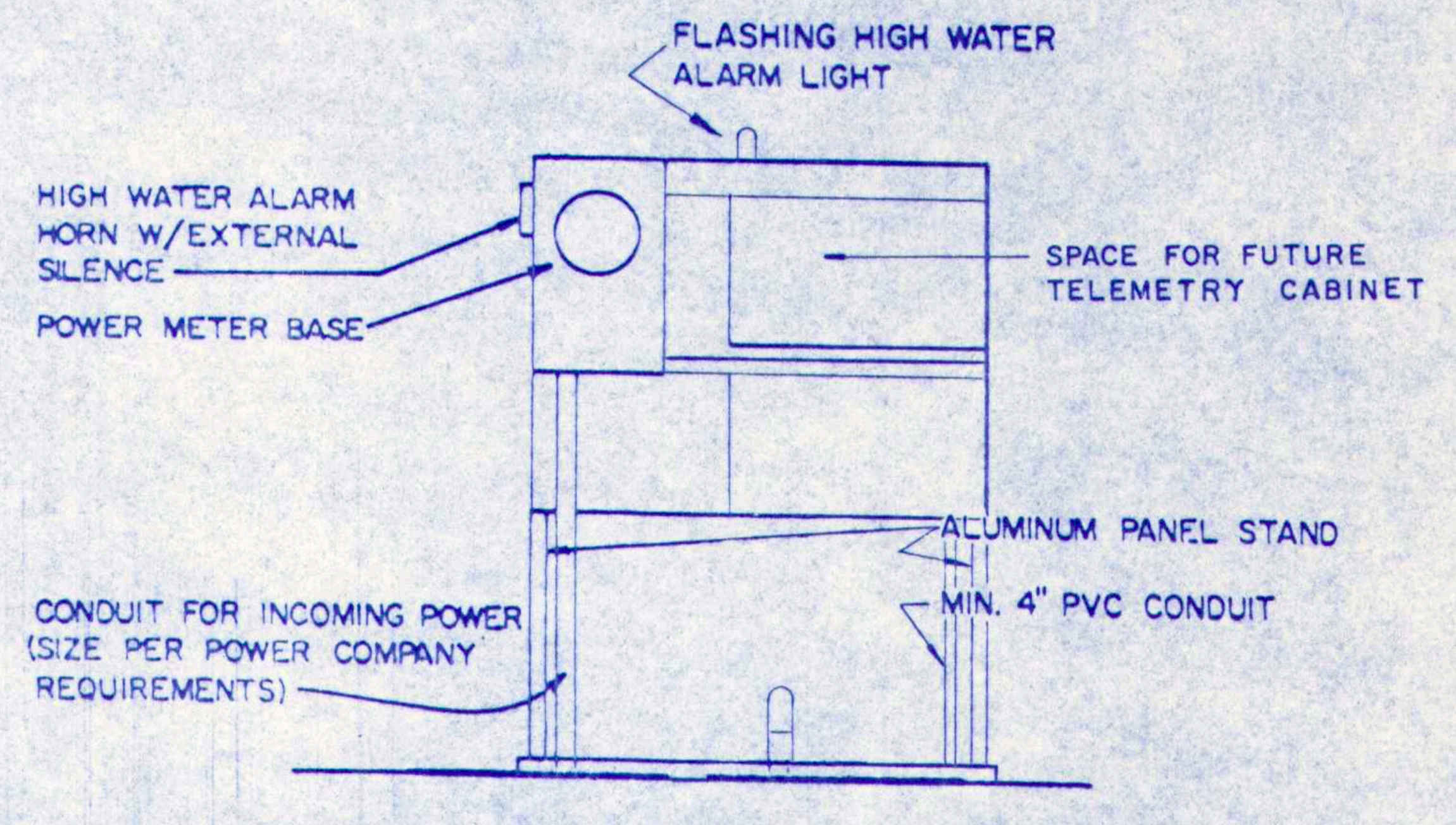
Pump Data:	
Discharge Size	4"
GPM	330
TDH	38.5
HP (Min.)	7.5
RPM (Max.)	1750
Voltage	230
Phase	Three

Station Pipe Size: 6"
Force Main Size 8" Type PVC



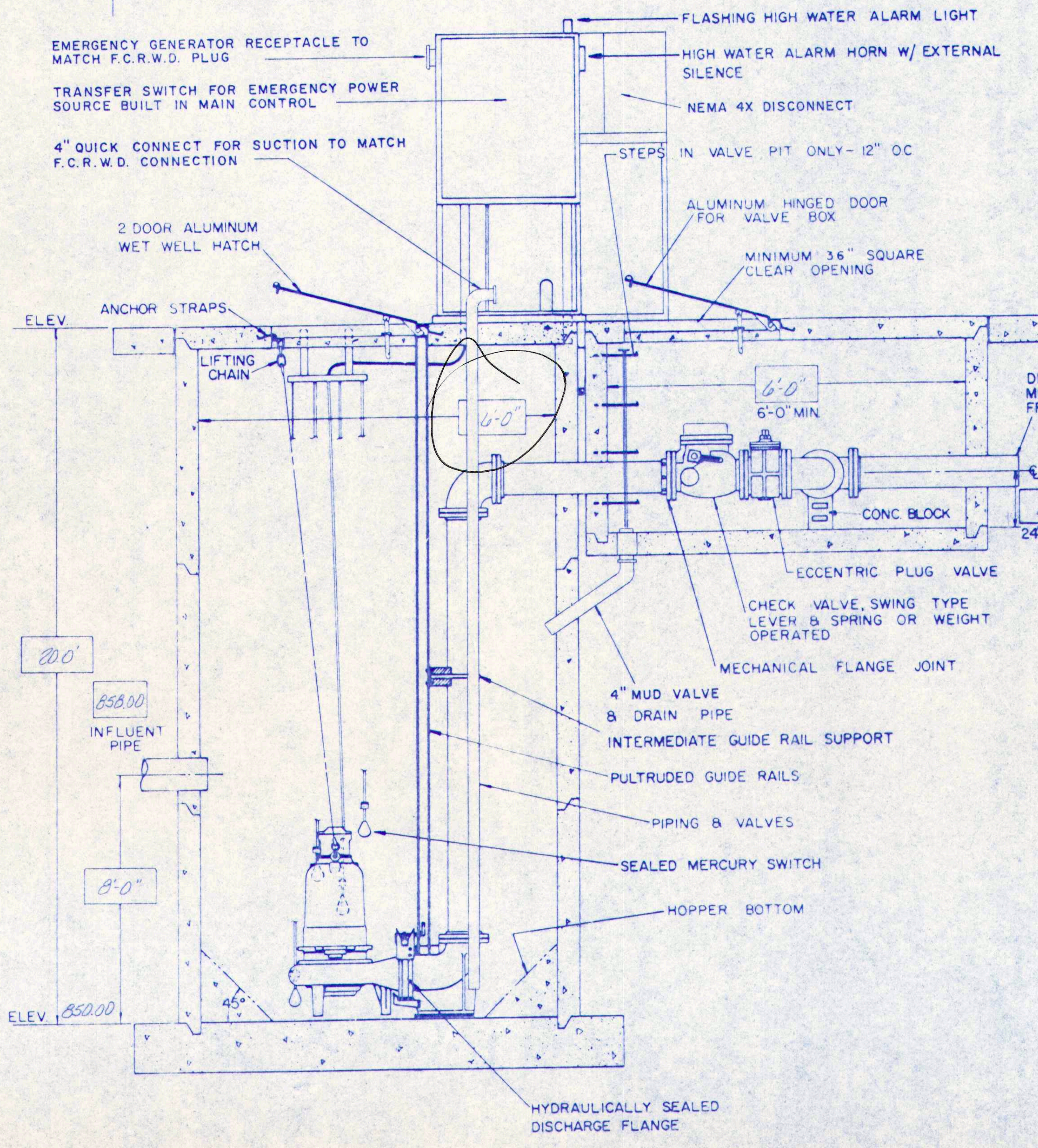
SPACE FOR FUTURE TELEMETRY EQUIPMENT TO BE INSTALLED BY FALL CREEK REGIONAL WASTE DISTRICT
POWER CONDUIT TO EXTEND PAST EDGE OF CONCRETE PAD
LOCKING HASP (FOR PADLOCK BY CITY)
DROP HANDLE
OFF SET HATCH OVER STEPS
8'-0"
1'-0" MIN.
1'-0" MIN
15'-0"

NOTES:
1. SEE FALL CREEK REGIONAL WASTE DISTRICT SUBMERSIBLE LIFT STATION STANDARD FOR DETAILS OF EQUIPMENT.
2. ACCESS DRIVE FROM NEAREST PUBLIC RIGHT OF WAY TO LIFT STATION PAD TO BE PROVIDED.
3. THIS PLAN IS FOR DESIGN PURPOSES ONLY. SHOP DRAWINGS TO BE PROVIDED BY LIFT STATION MANUFACTUER.
FINAL SHOP DRAWINGS TO BE APPROVED BY PROJECT ENGINEER & APPLICABLE GOVERNMENTAL AGENCIES.

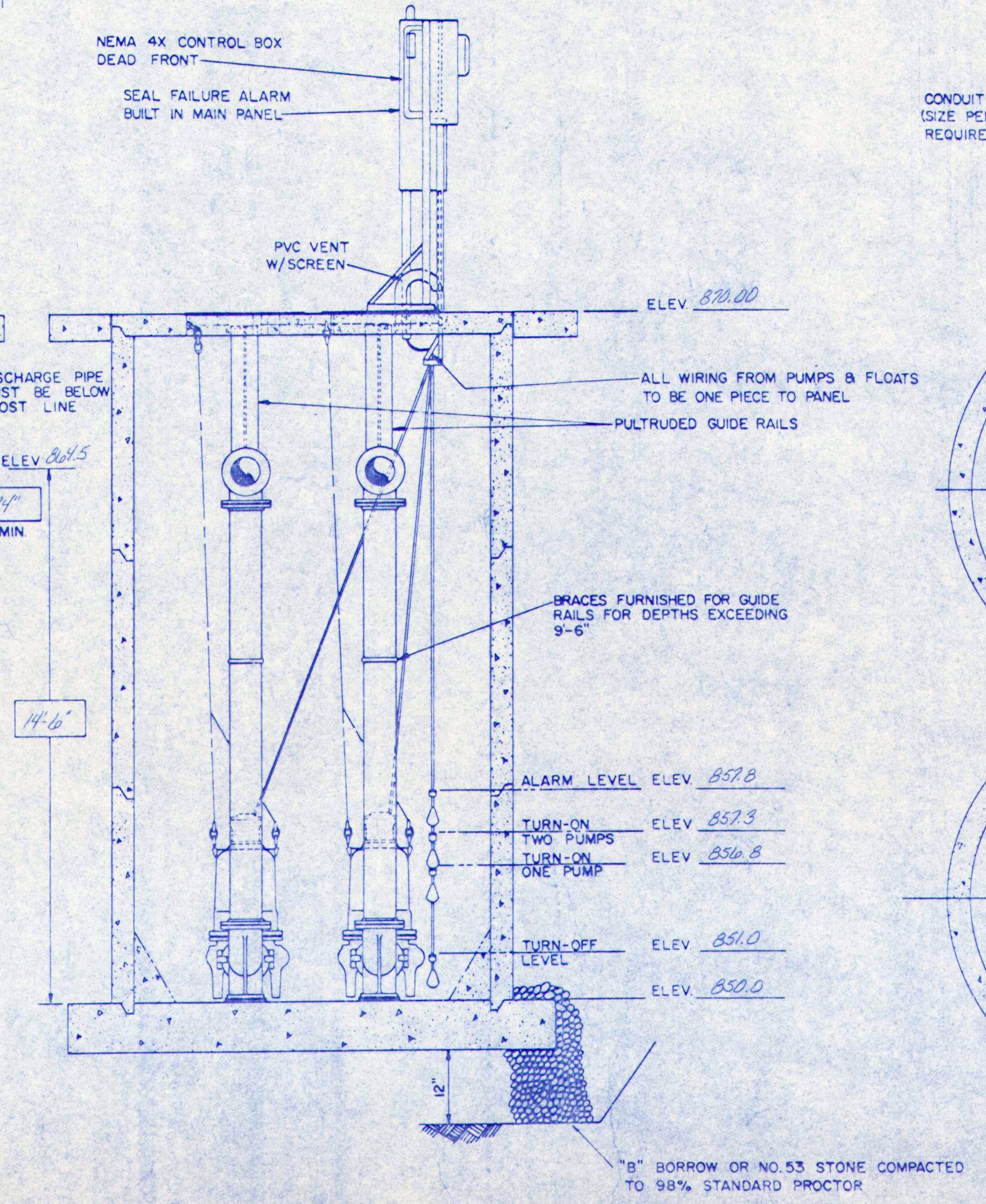


FLASHING HIGH WATER ALARM LIGHT
HIGH WATER ALARM HORN W/EXTERNAL SILENCE
POWER METER BASE
SPACE FOR FUTURE TELEMETRY CABINET
ALUMINUM PANEL STAND
CONDUIT FOR INCOMING POWER (SIZE PER POWER COMPANY REQUIREMENTS)
MIN. 4" PVC CONDUIT

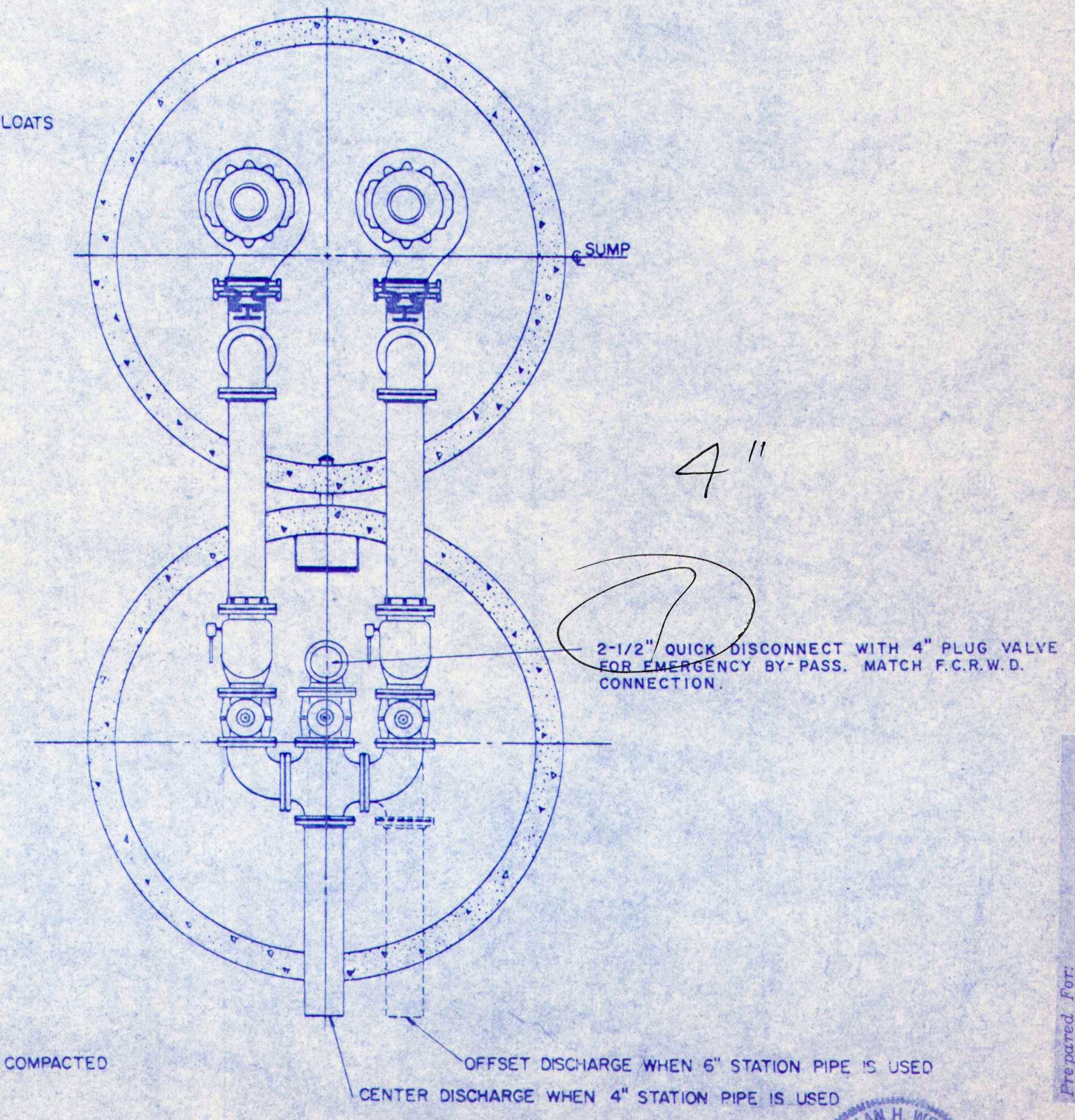
REAR VIEW OF CONTROL PANEL



FLASHING HIGH WATER ALARM LIGHT
EMERGENCY GENERATOR RECEPTACLE TO MATCH F.C.R.W.D. PLUG
HIGH WATER ALARM HORN W/ EXTERNAL SILENCE
TRANSFER SWITCH FOR EMERGENCY POWER SOURCE BUILT IN MAIN CONTROL
NEMA 4X DISCONNECT
4" QUICK CONNECT FOR SUCTION TO MATCH F.C.R.W.D. CONNECTION
STEPS IN VALVE PIT ONLY - 12" OC
ALUMINUM HINGED DOOR FOR VALVE BOX
2 DOOR ALUMINUM WET WELL HATCH
MINIMUM 36" SQUARE CLEAR OPENING
ELEV
ANCHOR STRAPS
LIFTING CHAIN
6'-0"
6'-0"
6'-0" MIN
DISCHARGE PIPE MUST BE BELOW FROST LINE
ELEV 864.5
24"
24" MIN
CONC. BLOCK
ECCENTRIC PLUG VALVE
CHECK VALVE, SWING TYPE LEVER & SPRING OR WEIGHT OPERATED
MECHANICAL FLANGE JOINT
4" MUD VALVE & DRAIN PIPE
INTERMEDIATE GUIDE RAIL SUPPORT
PULTRUDED GUIDE RAILS
PIPING & VALVES
SEALED MERCURY SWITCH
HOPPER BOTTOM
20.0'
858.00
INFLUENT PIPE
8'-0"
45°
ELEV 850.00
HYDRAULICALLY SEALED DISCHARGE FLANGE



NEMA 4X CONTROL BOX DEAD FRONT
SEAL FAILURE ALARM BUILT IN MAIN PANEL
PVC VENT W/SCREEN
ELEV 870.00
ALL WIRING FROM PUMPS & FLOATS TO BE ONE PIECE TO PANEL
PULTRUDED GUIDE RAILS
BRACES FURNISHED FOR GUIDE RAILS FOR DEPTHS EXCEEDING 9'-6"
14'-6"
ALARM LEVEL ELEV 857.8
TURN-ON TWO PUMPS ELEV 857.3
TURN-ON ONE PUMP ELEV 856.8
TURN-OFF LEVEL ELEV 851.0
ELEV. 850.0
12"
"B" BORROW OR NO.53 STONE COMPACTED TO 98% STANDARD PROCTOR



SUMP
4"
2-1/2" QUICK DISCONNECT WITH 4" PLUG VALVE FOR EMERGENCY BY-PASS. MATCH F.C.R.W.D. CONNECTION.
OFFSET DISCHARGE WHEN 6" STATION PIPE IS USED
CENTER DISCHARGE WHEN 4" STATION PIPE IS USED

Allan H. Weihe
Allan H. Weihe, Reg. P.E. - Indiana # 8827

NO. 8827

Prepared For: STEVE PAUL

Lift Station Detail Sheet

7
OF 8

SUBMERSIBLE LIFT STATION

GENERAL SPECIFICATION GUIDE

Fall Creek Regional Waste District

Duplex Non-clog Sewage Lift Station - Concrete Wet Well

A. Scope of Work:

1. Furnish all labor, equipment and material to construct one duplex submersible pumping station consisting of pumps, motors, wet basin, separate valve pit, valves, piping, hatches, guide rails, pump removal components, control center, mercury float switches, remote monitor, interconnecting electrical wiring, incoming power supply and all other features regularly and normally required as a part of a complete and functional facility. All work to be in accordance with site requirements, details in the plans, these specifications and the manufacturers recommendations.

B. General Requirements:

1. All of the mechanical and electrical equipment shall be an integral package supplied by the pump manufacturer with local representation so as to provide undivided responsibility. The package shall be equal in construction and performance to Hydromatic Pump equipment.

2. The contractor is to submit to the Project Engineer for review and approval five (5) sets of shop drawings, detailed specifications, pump warranty and performance characteristics for all of the equipment and fixtures to be furnished and installed. The Project Engineer will review the submittal and render a decision in writing as to the acceptablity of the equipment. Without prior approval, the item of work may not be accepted.

3. Any exceptions to this specification or associated plans must be submitted in writing and clearly stated. The exceptions would then be considered and must be approved by the Project Engineer.

4. All components of the lift station that are exposed to weather and internal to the wet well basin must be constructed of material that is resistant to corrosion and will require miminum maintenance throughout the expected life of the lift station.

C. Operating Conditions:

1. Each pump shall have a capacity of 330 gallons per minute at a total dynamic head of 38.5 feet when operating at 1750 RPM. The pump motor shall be minimum 7-1/2 horsepower, 1750 RPM, 230 volt, 3 phase, 60 cycle. Each pump shall be provided with 30 feet of power and sensor cable. The pump shall be equal to a Hydromatic model S4M750M3-4.

D. Pumping Equipment:

1. Pumps shall be of the submersible type for handling raw unscreened sewage. Pump volute, motor and seal housing are to be high quality gray cast iron. Impeller shall be cast iron of a non-clog design capable of handling minimum 3" sphere solids, fibrous material, heavy sludge and other matter found in normal sewage applications. Impeller shall have pump our vanes on the back shroud of the impeller to keep pumped material away from the seal area and increase operating life. Impeller shall be either slip fit or taper fit with key to securely lock the impeller to the driving shaft. The pump volute shall be fit with a replaceable bronze wear ring to minimize wear on the impeller and help achieve longer balanced operating life. All fasteners shall be of stainless steel.

2. All mating surfaces where water tight sealing is required shall be machined and fitted with nitrile rubber o-rings. Sealing shall be accomplished when metal-to-metal contact is made, resulting in controlled compression of the rubber o-rings without requirement of a specific torque limit.

3. The pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall consist of one stationary seat and one rotating ring held in place by its own spring. The lower seal shall be removeable without disassembling the seal chamber. The upper seal between the motor and the seal chamber shall be of the same design with its own separate spring system. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals with conventional double seal utilizing a single spring between the two seals and requiring a pressure differential to offset external pressure shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to pressures equivalent to 200 feet. No seal damage shall result from operating the pump unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

   The seal chamber shall also be equipped with a seal failure sensor probe which will sense water intrusion through the lower seal. This sensor is to be connected to an alarm in the control panel to indicate lower seal failure.

4. The stator winding, rotor and bearings are to be mounted in a sealed submersible type housing. Insulation utilized in the stator windings shall be class F with maximum temperature capability of 155 degree C. Motor housing shall be filled with a high-dielectric oil to give superior heat transfer and allow the bearings to run in a clean well lubricated environment. The pump and motor are to be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped. The pump should not require cooling water jackets. Stators shall be securely held in place with a removable end ring and threaded fasteners so that it may be easily removed in the field without use of heat or a press. Shaft shall be of stainless steel and supported by ball bearings. Canned type motors are not acceptable.

   Motor shall also be prodided with heat sensing units attached to the motor windings which shall be connected to the control panel to shut down pump if overheating occurs.

5. Pump motor cable and heat sensor/seal failure sensor cable shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size to allow motor voltage conversion without replacing the cable. Cable of the proper length shall be provided to eliminate need for splices or junction boxes between pump and 'Control Center'. The cable shall enter the motor through a cord cap assembly which is double-sealed allowing disassembly and disconnect of the wires at the motor and still not damage the sealed characteristics of the motor housing.

6. The pump mounting base shall include adjustable guide rail supports and a discharge connection with a 125 lb. standard flange. The base and the discharge piping shall be permanently mounted in place.

7. A rail system shall be provided for easy removal of the pump and motor assembly for inspection and service. The system shall not require a man to enter the wet well to remove the pump and motor assembly. One H type fiberglass reinforced plastic (FRP) pultruded guide rail with stainless steel fasteners shall be provided for each pump.

   The guide rails shall be positioned and supported at the bottom by the pump mounting base. The guide rails shall be aligned vertically and supported at the top by attachment to the access hatch frame. One intermediate guide rail support is required for each 9' of guide rail length.

8. The pumps shall be equipped with sliding brackets or rail guides. A galvanized steel lifting chain of adequate length for the basin depth shall be provided for each pump.

9. The rails and the rail guides shall function to allow the complete weight of the pumping unit to be lifted on dead center without binding and stressing the pump housing. The rail system shall function to automatically align the pumping unit to the discharge connection by a simple downward movement of the pump. No twising or angle approach will be considered acceptable. The actual sealing of the discharge interface will be of the hydraulically sealing diaphragm type assembly with removable Buna-N diaphragm as supplied by Hydromatic Pump.

10. Pump warranty shall be provided by the pump manufacturer and shall warrant the units being supplied to the Owner against defect in workmanship and materials for a period of five (5) years under normal use, operation and service. The warranty shall be in printed form and apply to all similar units. A copy of the warranty statement shall be submitted with the approval drawings.

E. Basin, Valve Pit and Accessories:

1. The basin and valve pit are to be constructed of pre-cast concrete. The actual size and arrangement of the structures are to be as shown in the plans. The wet well basin top shall be provided with a 4" vent having a downward pointing inlet and screen over the inlet opening.
2. The chambers are to be constructed of pre-cast reinforced concrete manhole sections conforming to ASTM C-478. Joints are to be of the expansion type conforming to ASTM C-443. In addition, the outside wall below grade is to be coated with bituminous waterproofing material. The top and bottom of the chambers shall be pre-cast or may be poured-in-place concrete if approved by the Project Engineer. See details in the plans.

3. The pump supplier is to provide an aluminum two-door access hatch frame and door assembly to be installed in the concrete basin top. This door assembly shall provide access for removal of the pumps and shall support the guide rails. The doors shall be provided with lifting handle, safety latch to hold door in the open position and a hasp suitable for padlock. The doors shall have a non-skid finish.

4. An aluminum single door access hatch frame and door assembly similar to the one described above shall be provided for use as entry to the valve pit. Minimum opening for the valve box entry shall be 36" by 36".

5. A swing check valve with external swing arm and an eccentric plug valve shall be installed in the valve pit in each pump's discharge piping. A 4" drain pipe and mud valve with extension handle shall be installed to drain the valve pit back to the wet basin but not allow the wet basin liquid to enter the valve pit.

6. A 4" ductile iron pump suction line shall be provided from within 12" of the basin floor up through the basin top casting for use as an emergency pump suction connection as shown on the plans. The suction line shall terminate 12" above the top of casting with a 90 degree elbow and quick disconnect flange matching the Fall Creek Regional District portable pumping equipment. The quick disconnect shall also be provided with an air tight cap.

7. The discharge piping in the valve pit shall be provided with a 4" plug valve and a 2-1/2" 'kam-lok' quick disconnect fitting in the common discharge pipe after the individual pump plug valves for use as an emergency pump discharge connection as shown on the plans. The quick disconnect fitting shall match the Fall Creek Regional Waste District portable pumping equipment.

F. Disconnect Switch:

1. A single main disconnect switch of adequate size to provide power for the 'Control Center' and its related components shall be provided by the Contractor.

2. The disconnect switch shall be built in a NEMA 4X stainless steel enclosure.

G. Transfer Switch:

1. A manual transfer switch of adequate size to provide power via incoming electrical service or emergency generator power shall be provided.

2. The transfer switch shall be built in the same enclosure as the main control center.

3. A receptacle shall be provided to fit the Fall Creek Regional Waste District generator.

H. Control Center:

1. The control center shall be built in a NEMA 4X stainless steel enclosure and shall be suitable for the specified horsepower and voltage for the pumping equipment. The outer door of the panel shall be hinged dead front with provisions for locking with a padlock. Inside shall be a separate hinged panel to protect all electrical components.

2. A circuit breaker and magnetic starter with 3 leg overload protection (2 leg overload protection on single phase applications) and manual reset shall be provided for each pump. Starters shall have auxiliary contacts, on three phase applications, to operate both pumps on override condition. A separate circuit breaker shall be supplied for power to the control circuit. The control center shall include a control voltage transformer to reduce supply voltage to a suitable control voltage such as 115 volt, 1 phase. An alternating relay shall be provided to alternate pumps on each sucessive cycle of operation. A green run light and H-O-A switch shall be provided for each pump. A terminal strip shall be provided to make field connections of pump power leads, float switches, seal sensor leads and heat sensor leads.

3. A time delay relay shall be provided to delay start of second pump should power outage occur.

4. The control center shall incorporate connections for heat sensors which are installed in the pumps. The connection shall disconnect the starter upon high temperature signal and will automatically reconnect when condition has corrected. The panel shall have a heat sensor alarm light for each pump.

5. The control center shall incorporate connections for seal failure sensors which are installed in the pumps. The panel will have a seal failure alarm light for each pump. This alarm indicates failure of the lower mechanical seal in the pump. This will be an alarm light only and will not shut down the pump.

6. The control center shall include an hour meter for each pump to register the elapsed operating time of each pump.

7. The control center shall have a high water alarm built-in the main enclosure. The high water alarm shall consist of a flashing alarm light with red Lexan plastic cover or red glass globe with metal guard mounted on top of the enclosure such that it is visible from all directions. An alarm horn shall be mounted on the side of the enclosure. A push to test horn and light button shall be mounted on the inside of the enclosure and a push to silence horn button shall be provided and mounted on the side of the enclosure.

8. The control center shall include a condensate heater to protect against condensation inside the enclosure.

9. The control center shall include lightning protection.

10. The control center shall include a phase monitor relay to shut down the control circuit and protect the equipment due to loss of phase or phase reversal.

11. The control center shall include a 20 AMP circuit breaker and GFI convenience outlet. Should 120 volt, 1 phase not be available, a transformer of suitable size shall be provided to power the convenience outlet.

12. The control center shall be suitable for connection to a remote monitor package as described in the section titled 'Remote Monitor Package'. The main control must include the following interconnection capability:

    a. Circuit breaker to power remote monitor panel.
    b. Relay contact to signal high water alarm.
    c. Relay contact to signal pump #1 call.
    d. Relay contact to signal pump #2 call.
    e. Relay contact to transmit signal of seal failure trip of either pump.
    f. Current transformer to provide amperage reading to signal pump #1 run.
    g. Current transformer tp provide amperage reading to signal pump #2 run.

13. A minimum 4" schedule 40 wall conduit shall be provided from the wet well basin to the control center which will allow the pump power cables, sensor cables and float switch cables to be pulled through without difficulty and allows the use of one piece cables from the pumps and float switches to the control center. The conduit shall be sealed at the control center to avoid entrance of sewer gases into the control panel.

14. The control center and associated components shall be mounted on an aluminum panel stand. The panel stand shall be large enough to also mount the disconnect switch, meter base and remote monitor.

15. All components of the control center shall be American made and available from local sources. In particular items such as circuit breakers, overload protection, relays, etc. shall be available and in stock by local sources.

16. In order to maintain unit responsibility and warranty on the pumping equipment and control center, the control center must be accepted in writing by the pump manufacturer as suitable for operation with the pumping equipment.

I. Mercury Float Switches:

1. Sealed float type mercury switches shall be supplied to control sump level and alarm signal. The mercury tube switches shall be sealed in a solid polyurethan float or polypropelene float for corrosion and shock resistance. The support wire shall have a heavy neoprene jacket and a weight shall be attached to the cord above the float to hold the float in place in the sump. The floats shall also be capable of supporting themselves from a wiring channel support bar.

J. Operation of System:

1. On sump level rise, the lower mercury switch shall first be energized then the upper level switch shall next energize and start the lead pump. With the lead pump operating, sump level shall lower to lowest switch and turn off the pump. The alternating relay in the 'Control Center' shall index on stopping of the pump so that the lag pump will start on the next operation. If sump level continues to rise when lead pump is operating, the override switch shall energize and start the lag pump. Both lead and lag pumps shall operate together until low level switch turns off both pumps. If level continues to rise when both pumps are operating, alarm level switch shall energize and signal the alarm. If one pump should fail for any reason, the second pump shall operate on the override switch. All level switches shall be adjustable for level setting from the surface.

K. Remote Monitor Package:

1. The Fall Creek Regional Waste District will supply a Remote Monitor capable of monitoring the status of the lift station and communicating with the Department's existing Aquatrol Alarm System housed at the Sewer Maintenance Control Center. The monitor shall include a radio communicator, a terminal strip for connection to lift station 'Control Center' circuits, a thermostatically controlled heater and provisions for connection to AC power. The monitor package is to be built in a NEMA 3R steel enclosure.

2. The Remote Monitor shall monitor:

    a. Signal high water alarm.
    b. Signal pump call for each pump.
    c. Signal common signal for seal failure of either pump.
    d. Signal pump run for each pump.
    e. Signal pump fail for each pump.

L. Manuals:

1. Four (4) manuals shall be presented to the Owner.

2. Manual shall include, at a minimum:

    a. Operation Instructions
    b. Maintenance Instructions
    c. Recommended Spare Parts List
    d. Lubrication Schedules
    e. Structural Diaphragms
    f. As-built wiring diagrams
    g. Bill of Materials

M. Spare Parts:

1. The contractor shall supply one set of spare parts for each station and shall at lease include:

    a. Impeller
    b. Upper seal assembly
    c. Lower seal assembly
    d. Upper bearing assembly
    e. Lower bearing assembly
    f. Wear rings
    g. Set of 'O' rings and gaskets.

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Prepared For: STEVE PAUL
Specification Sheet

SHEET NO. 8
OF 8