

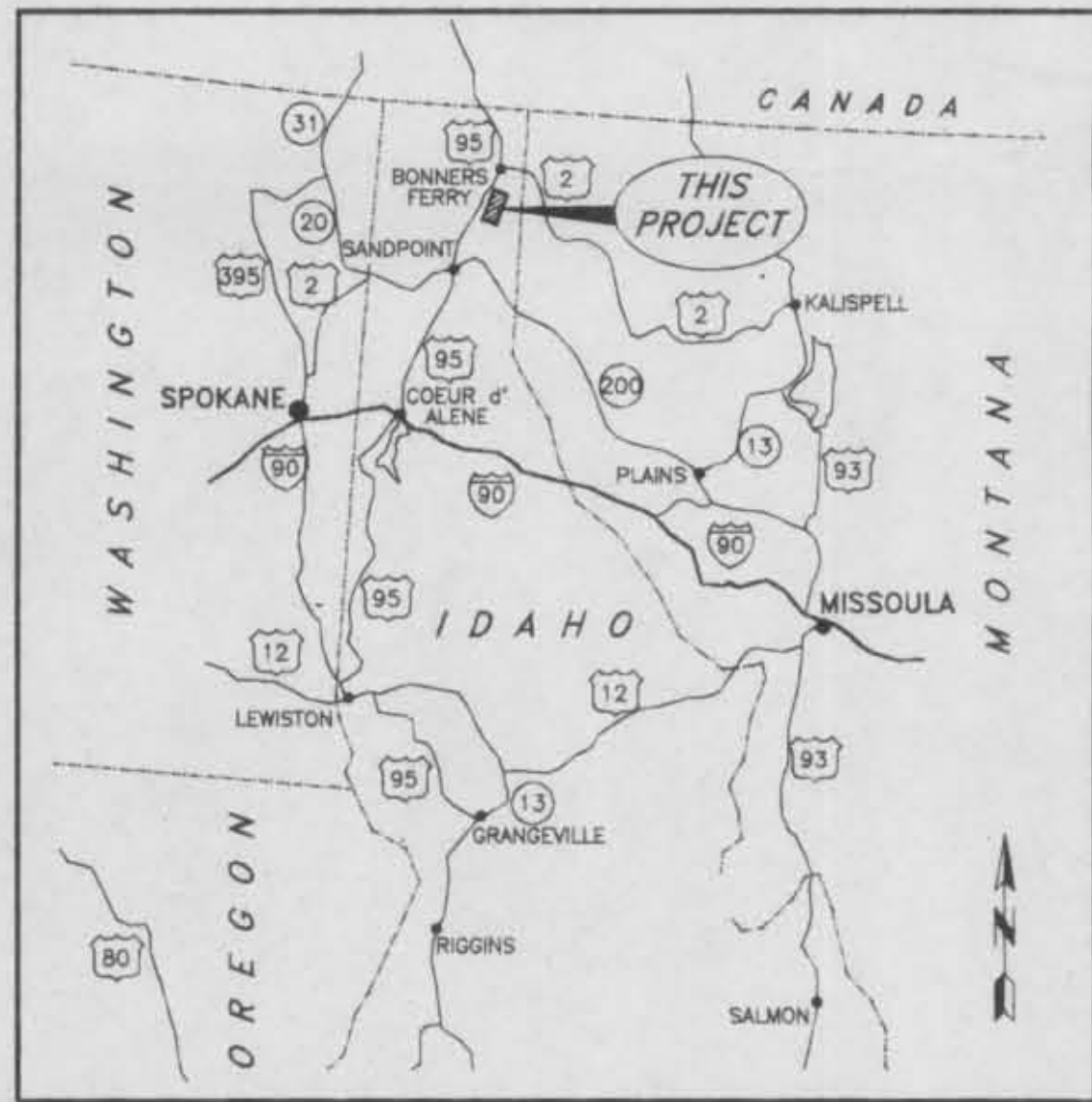
GROUSE CREEK SEED ORCHARD

IRRIGATION PROJECT

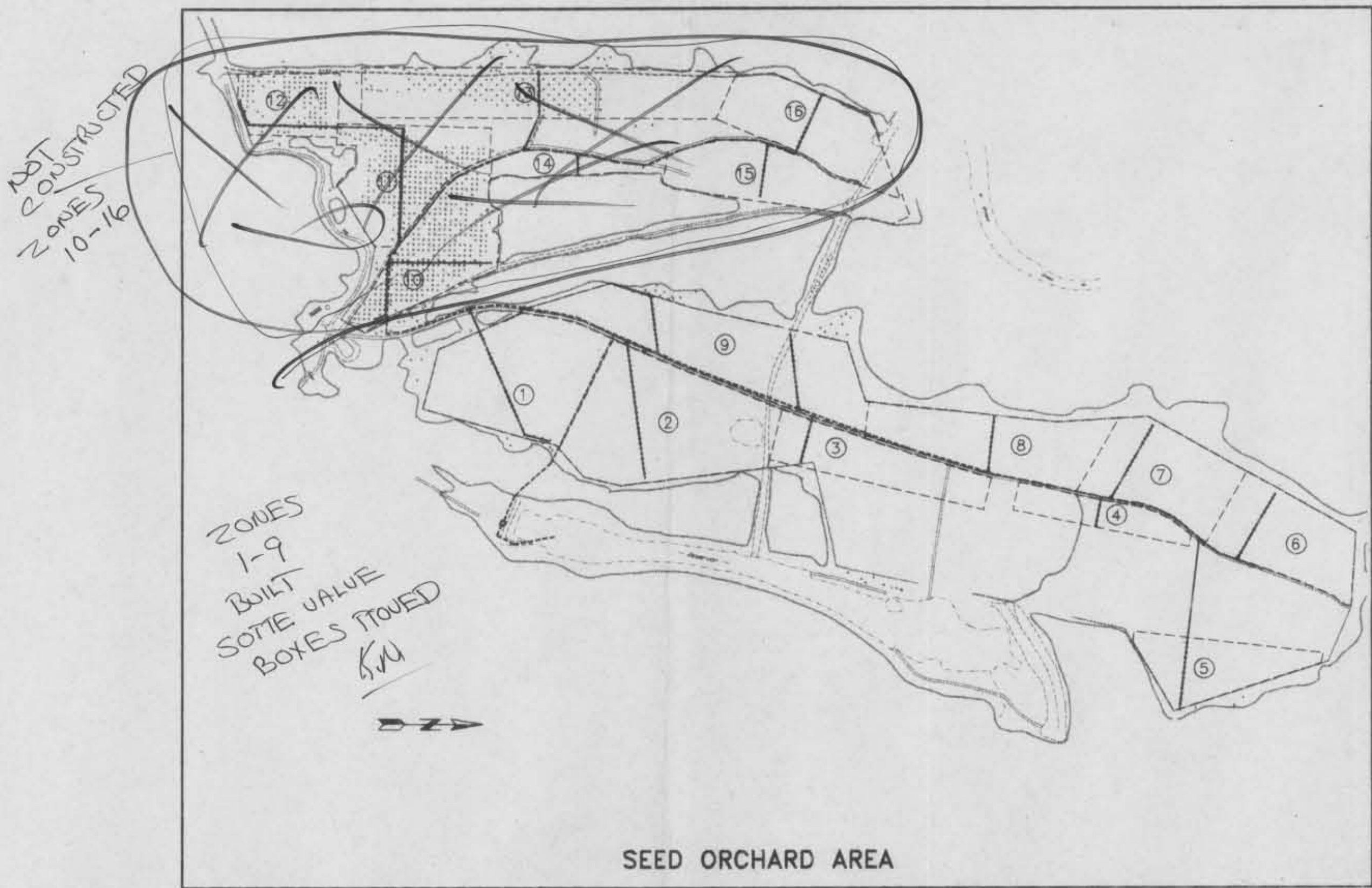
NOT AS BUILT
AS PLANNED
Kw



IDAHO PANHANDLE NATIONAL FOREST SANDPOINT RANGER DISTRICT



VICINITY MAP
NO SCALE

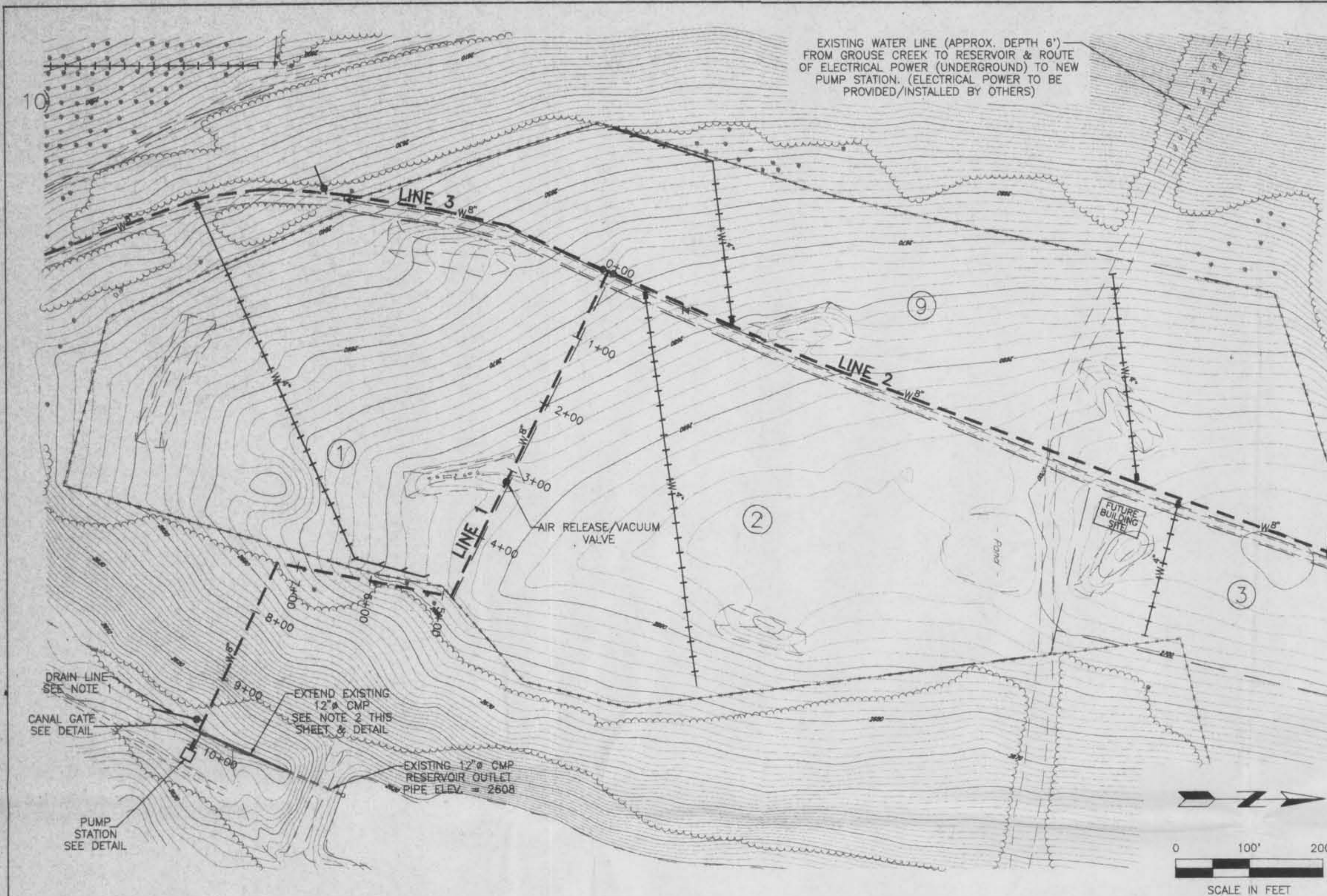


SEED ORCHARD AREA

SHEET NO.	CONTENTS
1	COVER SHEET
2	IRRIGATION MAINLINE PIPING (LINE 1) - PLAN & PROFILE
3	UPPER IRRIGATION AREA MAINLINE PIPING (LINE 2) - PLAN & PROFILE
4	LOWER IRRIGATION AREA MAINLINE PIPING (LINE 3) - PLAN & PROFILE
5	PIPING DETAILS
6	PUMP STATION PIPING & MISC. DETAILS
7	PUMP STATION BUILDING DETAILS
E1	PUMP STATION ELECTRICAL PLAN AND ELECTRICAL DETAILS
E2	PUMP STATION ELECTRICAL DETAILS AND SCHEDULES

PREPARED BY :

DJA DRUYVESTEIN JOHNSON & ANDERSON
CONSULTING ENGINEERS & LAND SURVEYORS
3201 RUSSELL ST. MISSOULA, MONTANA



GENERAL NOTES :

- 2" DRIP LINE W/ 1/4" STAINLESS STEEL SCREEN & CLAMP TO DAYLIGHT. PIPE OUTLET TO BE SURROUNDED BY 3" TO 6" DIA. ROCK (4'x2'x2').
- EXTEND EXISTING 12" CMP 160' AT A MINIMUM S=0.5%. BACKFILL A MINIMUM OF 1' ABOVE THE NEW 12" CMP EXTENSION PIPE. THE EXISTING OUTLET ENERGY DISSIPATOR MATERIAL (APPROX. 23 CY) SHALL BE REMOVED AND PLACED AT THE SOUTH END OF THE OUTLET PIPE EXTENSION. THE GENERAL SHAPE OF THE ENERGY DISSIPATOR MATERIAL SHALL BE 1' THICK x 15' WIDE x 40' LONG. PLACE 6" TO 12" RIP RAP 12" WIDE AND 12" DEEP ABOVE THE NEW 12" CMP EXTENSION PIPE. SEE DETAIL. THE NEW 12" CMP RESERVOIR OUTLET EXTENSION PIPE SHALL BE 12" 16 GAUGE HELICAL WELDED LOCK SEAM PIPE AS MANUFACTURED BY ROSCOE STEEL CO. MISSOULA, MT. OR APPROVED EQUAL. THE CONNECTION BETWEEN THE NEW AND EXISTING PIPES, CANAL GATE SHALL USE A TRANSITION COUPLER AND RESULT IN A WATER TIGHT CONNECTION. THE 12"x12"x8" CMP TEE SHALL BE 16 GAUGE STANDARD CORRUGATED PIPE STOCK WITH EACH LEG A MINIMUM OF 1' LONG.
- AT PIPE CROSSINGS MINIMUM SEPARATION SHALL BE 6".
- ALL TRENCHING SHALL COMPLY WITH METHODS DESCRIBED IN THE CURRENTLY OSHA REGULATIONS.
- THE CANAL GATE ON THE SOUTH END OF THE NEW 12" CMP SHALL BE WATERMAN MODEL C-10 SB SPIGOTBACK OR APPROVED EQUAL.
- ELECTRICAL POWER SERVICE LINE IN ADJACENT/SAME TRENCH STA. 5+00 (LINE 1) TO PUMP HOUSE. COORDINATE EXACT LOCATION WITH NORTHERN LIGHTS COOPERATIVE. THE NEW

LEGEND

- 8" MAINLINE
- 6" TEE FOR FUTURE OVERHEAD SYSTEM AND/OR FIRE HYDRANT ASSEMBLY
- 4" DRIP MANIFOLD LINE W/ 1" TEES AT 20'
- GATE VALVE
- DRIP SYSTEM VALVE BOX
- FIRE HYDRANT ASSEMBLY
- IRRIGATION ZONE
- EXISTING FENCE
- EXISTING CONTOUR
- EXISTING TREES
- EXISTING ACCESS ROAD
- EXISTING ROCK/SLOSH PILE
- EXISTING TREE BOUNDARY LINE

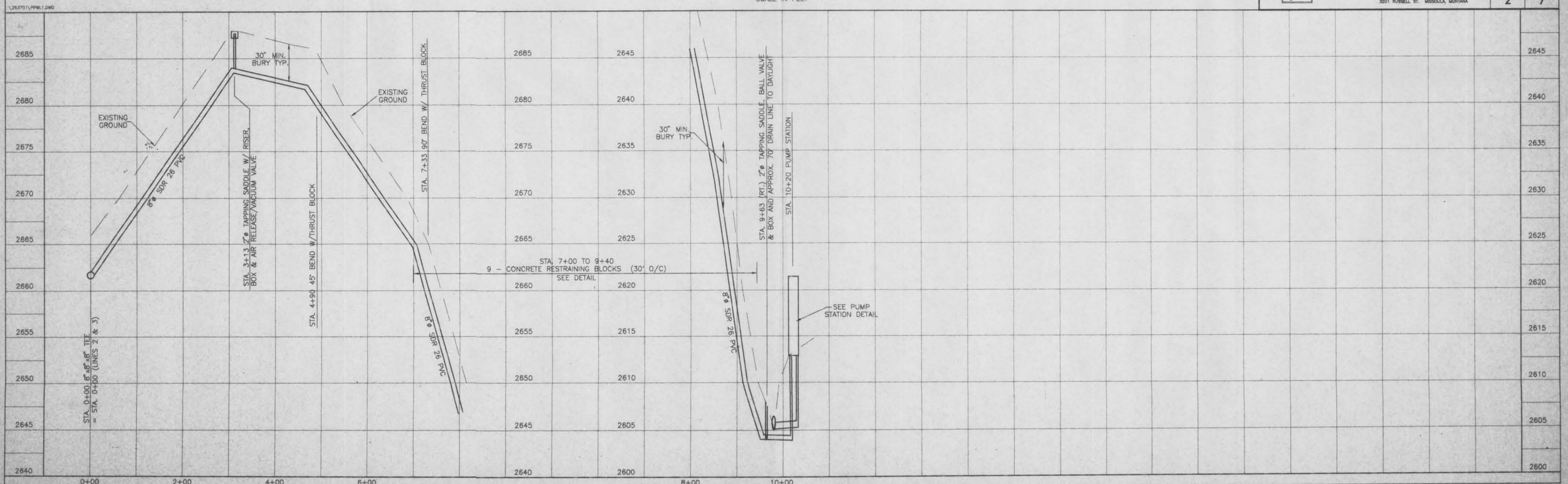
GROUSE CREEK IRRIGATION PROJECT

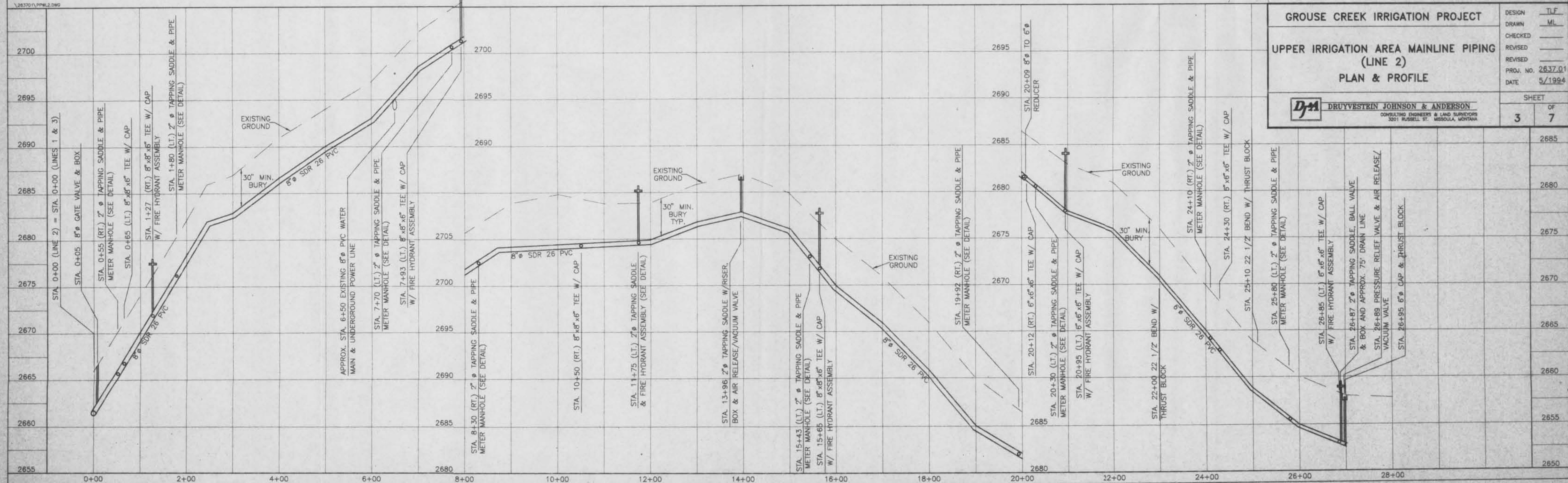
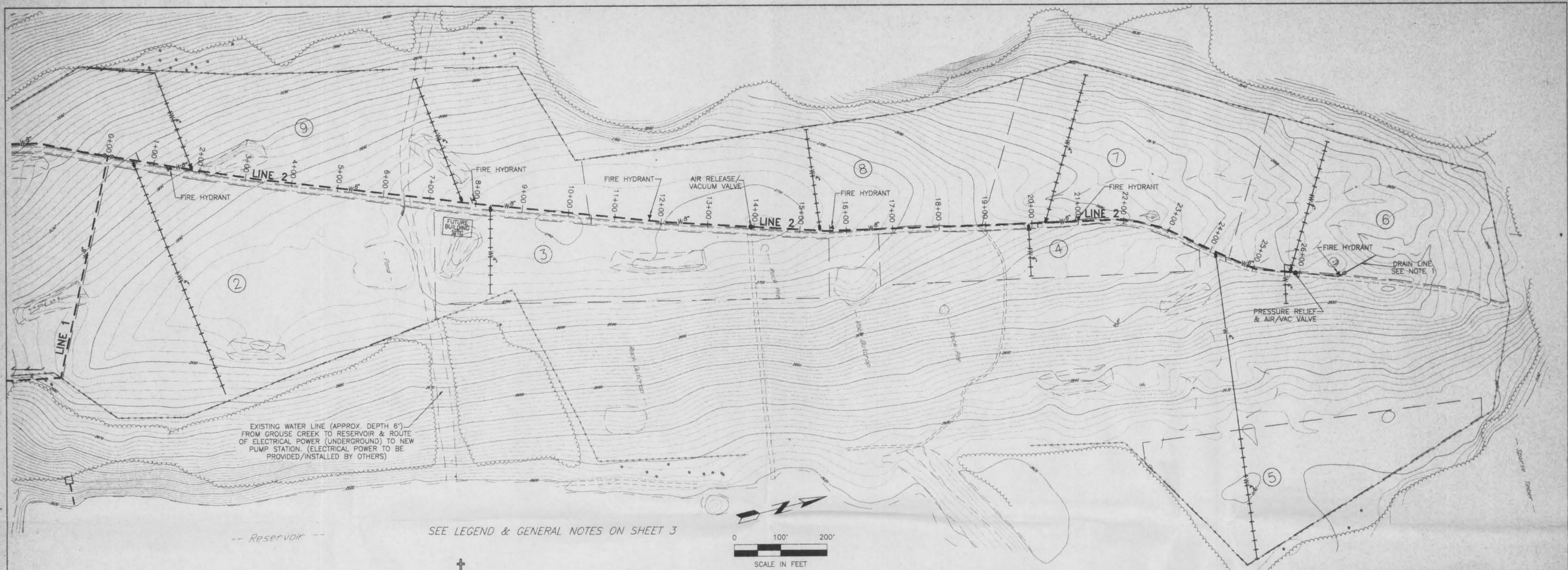
IRRIGATION MAINLINE PIPING (LINE 1) PLAN & PROFILE

DRUYVESTEIN JOHNSON & ANDERSON
CONSULTING ENGINEERS & LAND SURVEYORS
3201 RUSSELL ST. MISSOULA, MONTANA

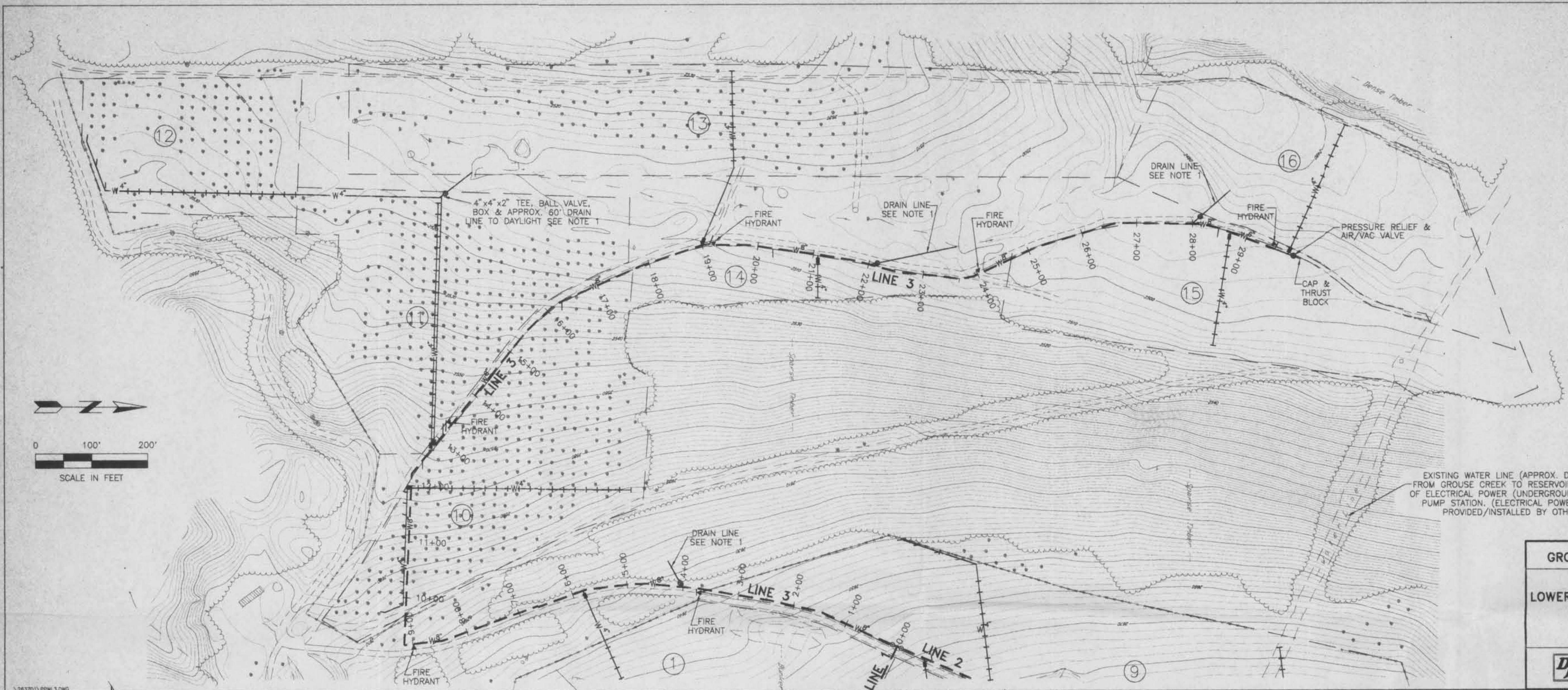
DESIGN TLF
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PROJ. NO. 2637.01
DATE 5/1994

SHEET
OF
2 7





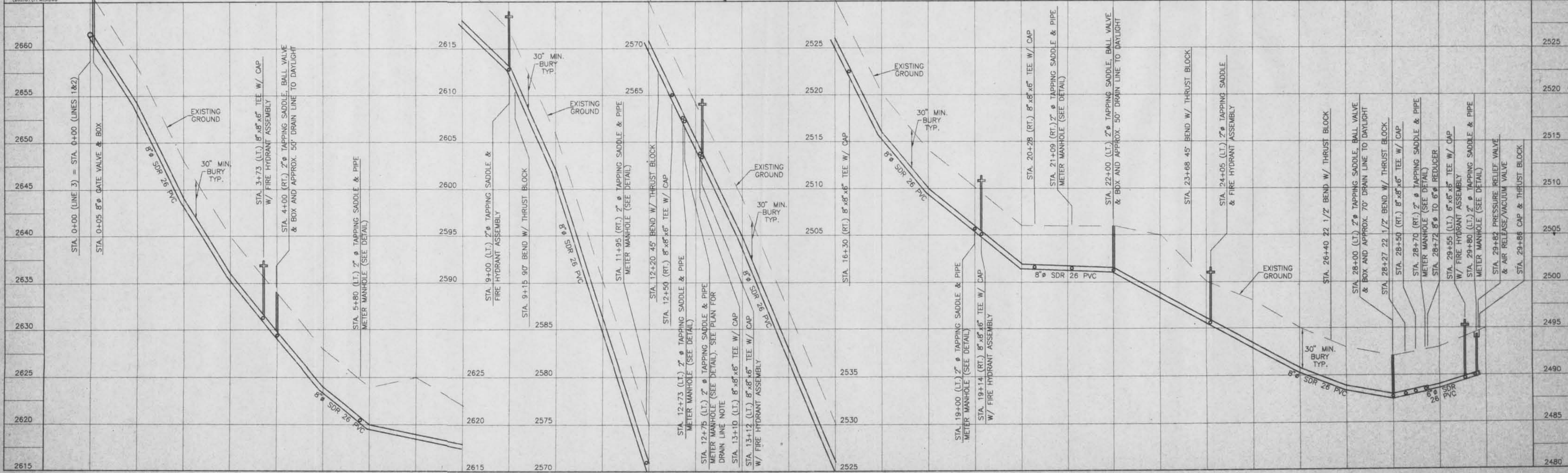
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UPPER IRRIGATION AREA MAINLINE PIPING (LINE 2)		DRAWN	ML
PLAN & PROFILE		CHECKED	
		REVISED	
		REVISED	
		PROJ. NO.	2637.01
		DATE	5/1994
		SHEET	3 OF 7
DRUYVESTEIN JOHNSON & ANDERSON CONSULTING ENGINEERS & LAND SURVEYORS 3301 RUSSELL ST. MISSOULA, MONTANA			

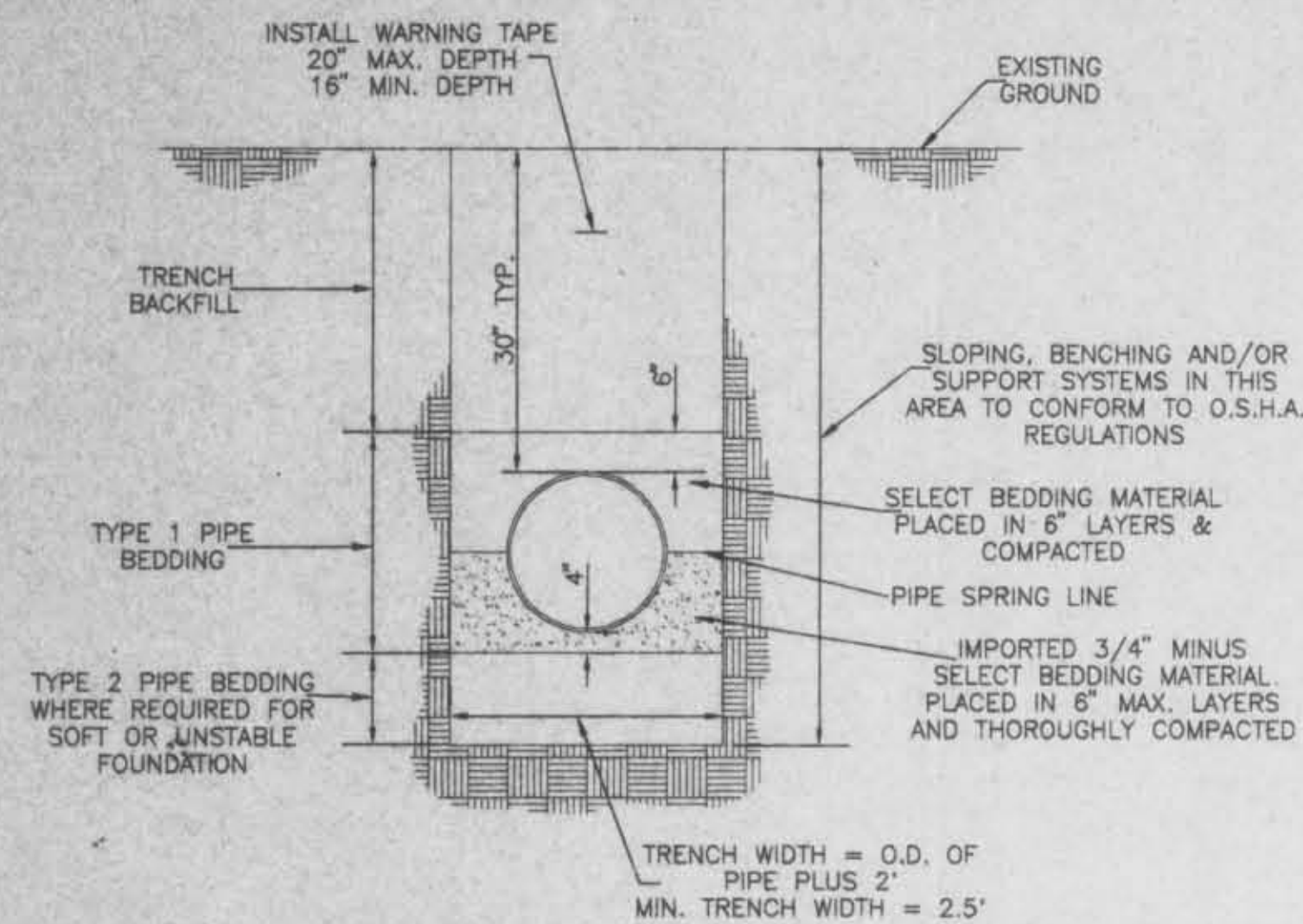


- LEGEND**
- 8" MAINLINE
 - 6" TEE FOR FUTURE OVERHEAD SYSTEM AND/OR FIRE HYDRANT ASSEMBLY
 - 4" DRIP MANIFOLD LINE W/ 1/2" TEES AT 20'
 - GATE VALVE
 - DRIP SYSTEM CONTROL BOX
 - FIRE HYDRANT ASSEMBLY
 - IRRIGATION ZONE
 - EXISTING FENCE
 - EXISTING CONTOUR
 - EXISTING TREES
 - EXISTING ACCESS ROAD
 - EXISTING ROCK/SLOSH PILE
 - EXISTING TREE BOUNDARY LINE

EXISTING WATER LINE (APPROX. DEPTH 6") FROM GROUSE CREEK TO RESERVOIR & ROUTE OF ELECTRICAL POWER (UNDERGROUND) TO NEW PUMP STATION. (ELECTRICAL POWER TO BE PROVIDED/INSTALLED BY OTHERS)

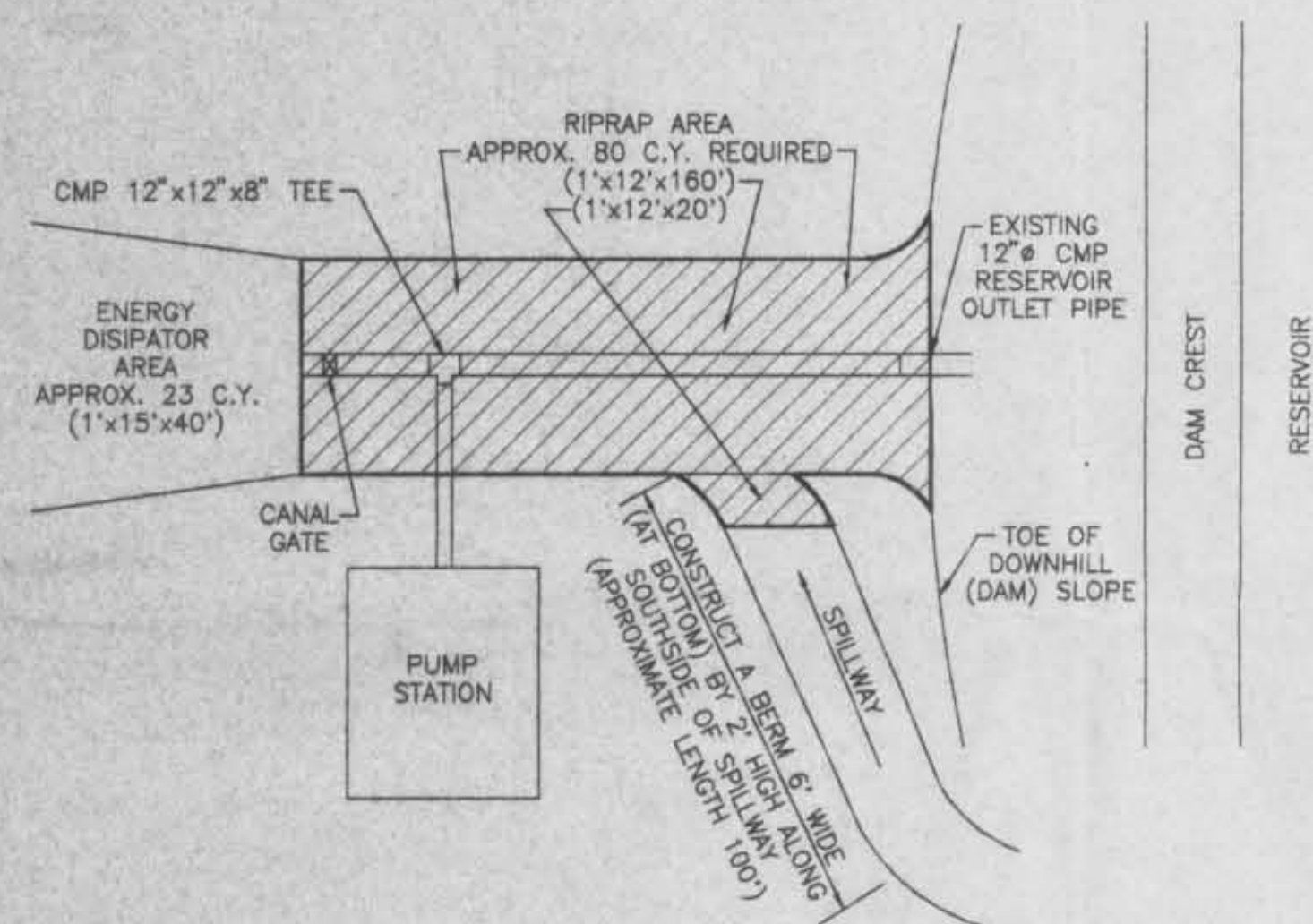
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		DRAWN	ML
		CHECKED	
		REVISED	
		PROJ. NO.	2637.01
		DATE	5/1994
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		OF	7
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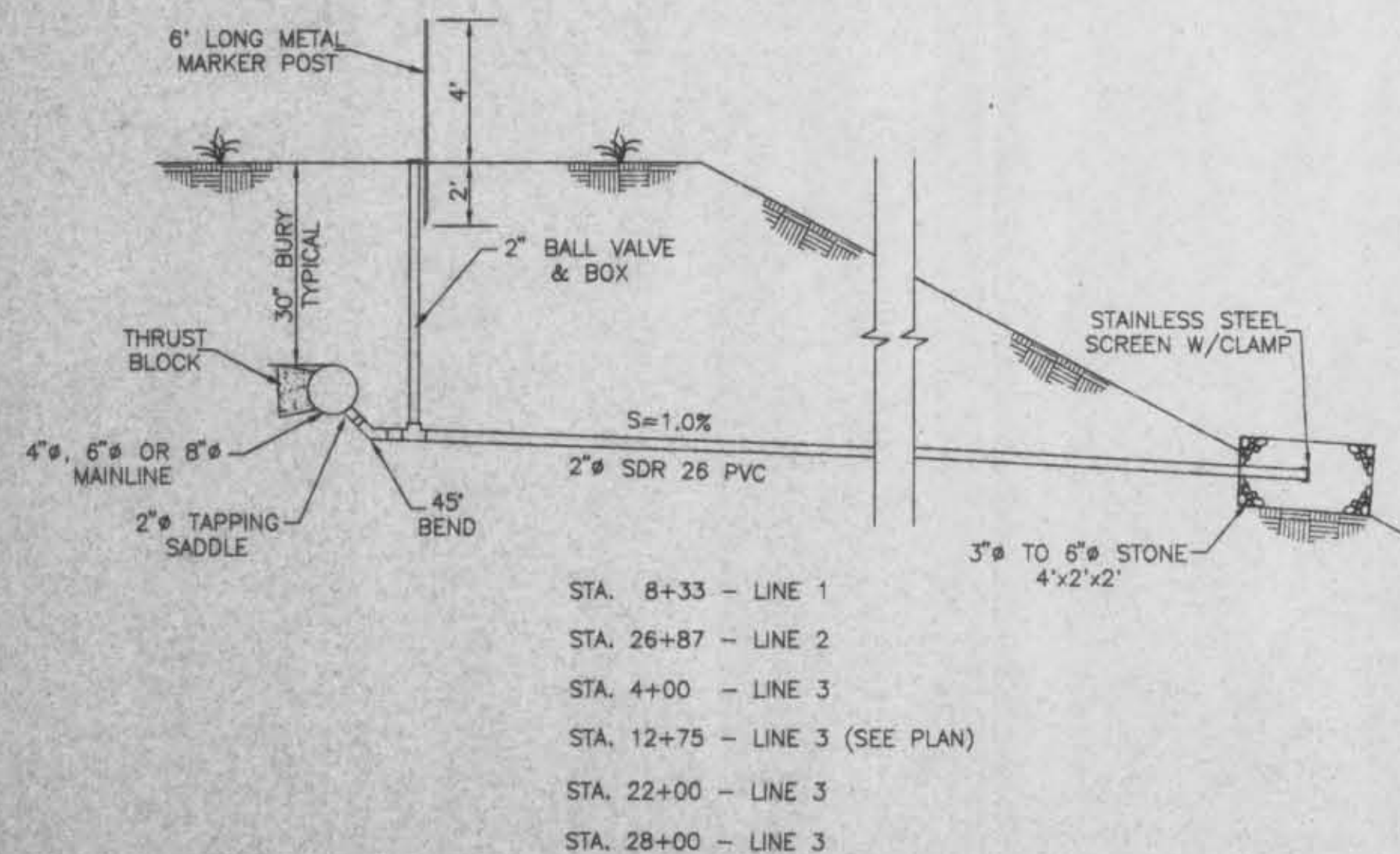
TYPICAL MAINLINE PIPE TRENCH DETAIL

NO SCALE



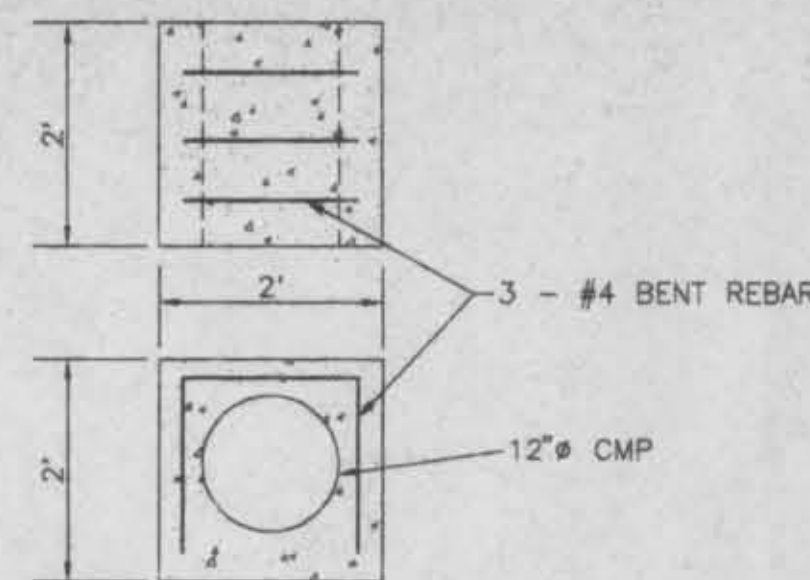
12" CMP EXTENSION PIPE & RIPRAP DETAIL

NO SCALE



DRAIN LINE DETAIL

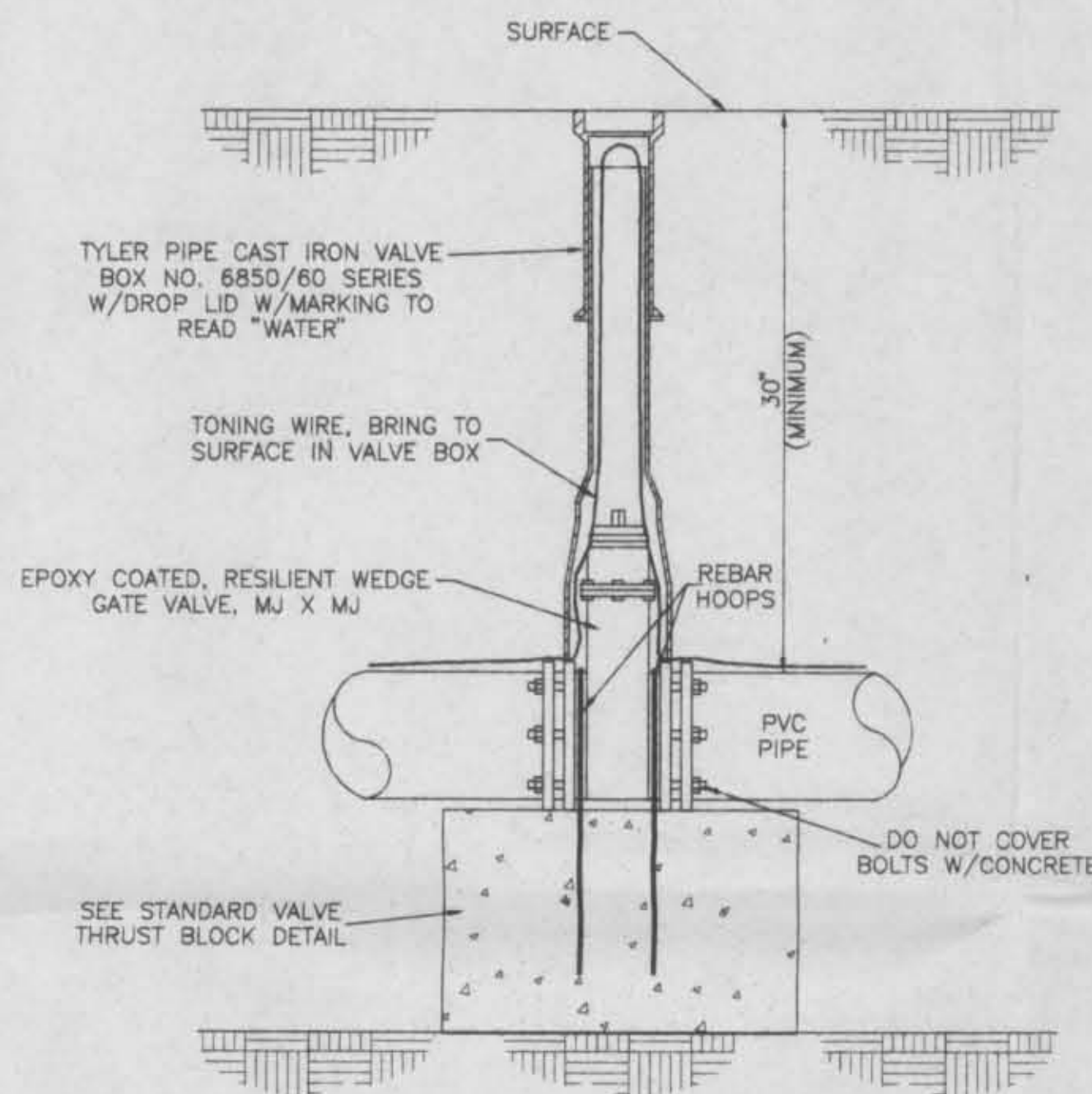
NO SCALE



NOTE: 4 CONCRETE ANCHOR BLOCK TO BE LOCATED 40' O/C ON NEW 12" CMP RESERVOIR OUTLET EXTENSION PIPE.

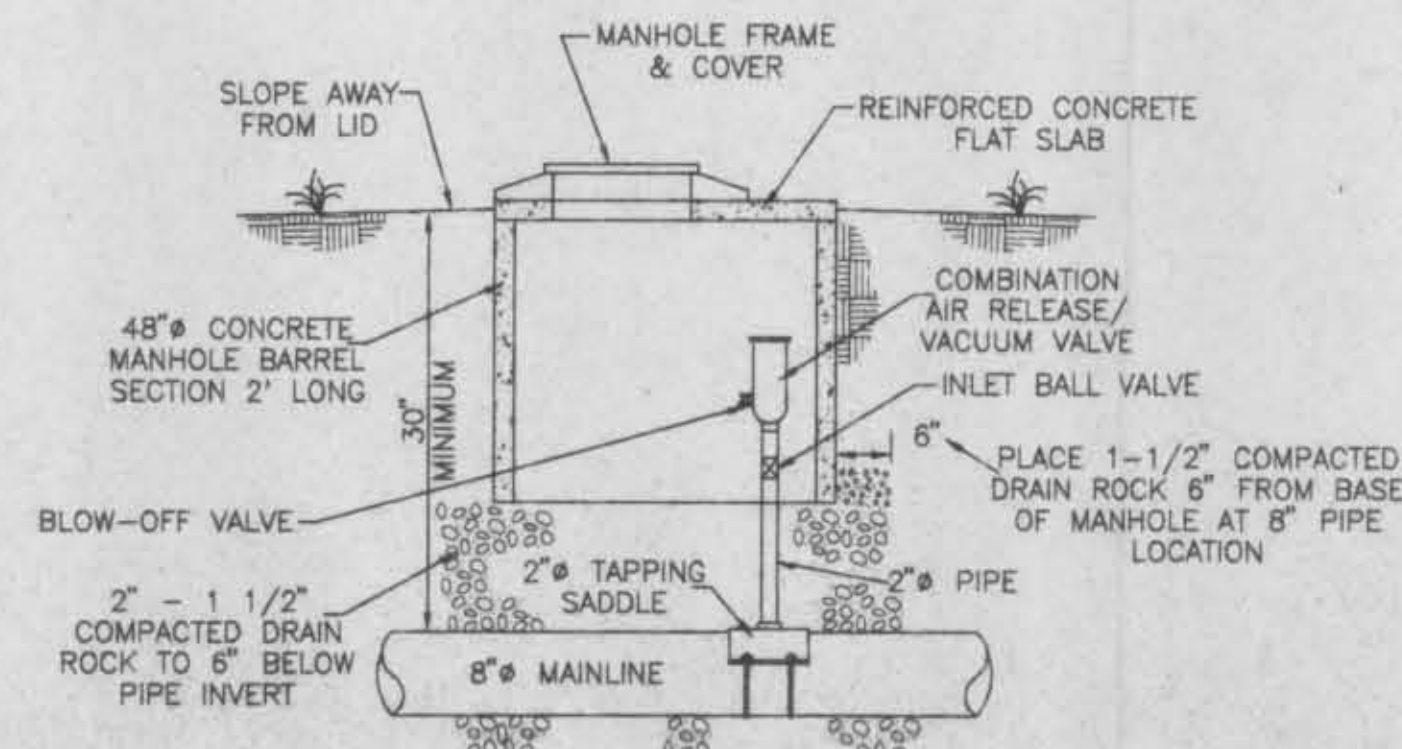
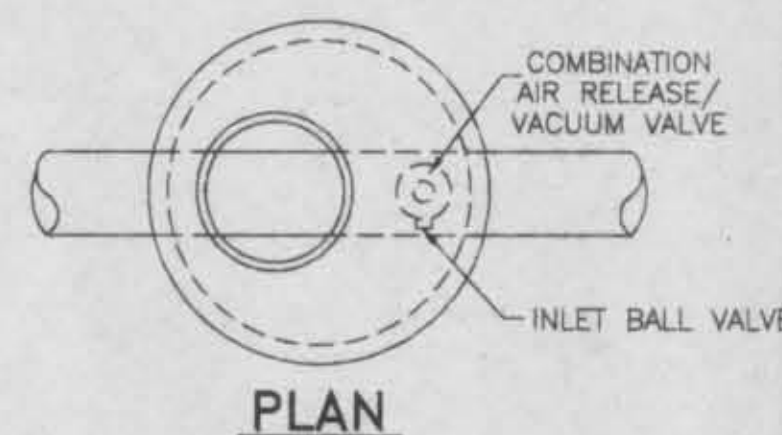
CONCRETE ANCHOR BLOCK

NO SCALE



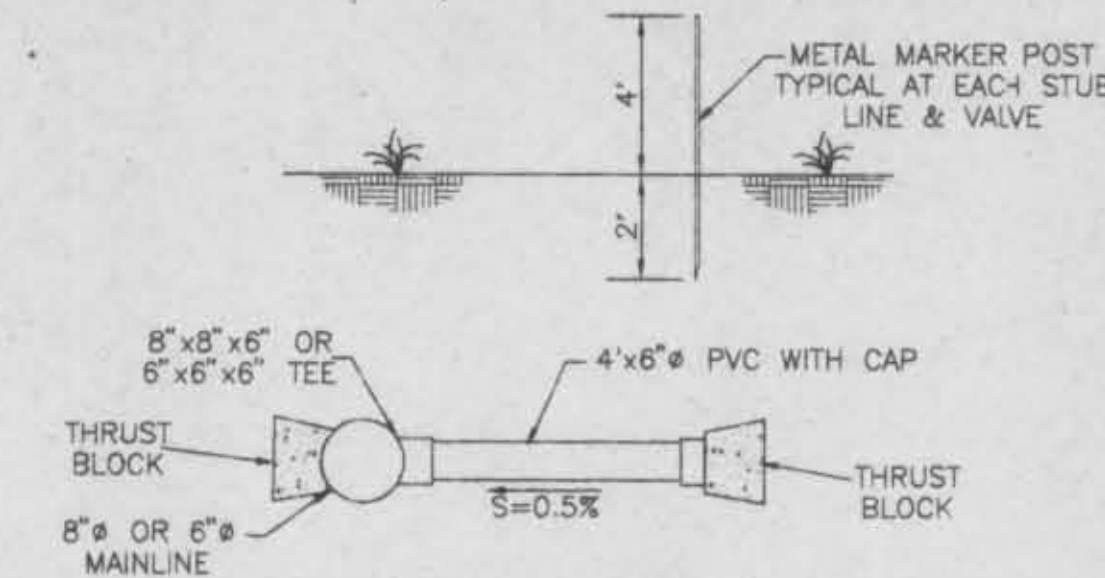
GATE VALVE DETAIL

NO SCALE



AIR RELEASE/VACUUM VALVE

NO SCALE



6" MAINLINE EXTENSION AT STA. 0+65 - LINE 2

10+50 - LINE 2

20+12 - LINE 2

24+30 - LINE 2

12+50 - LINE 3

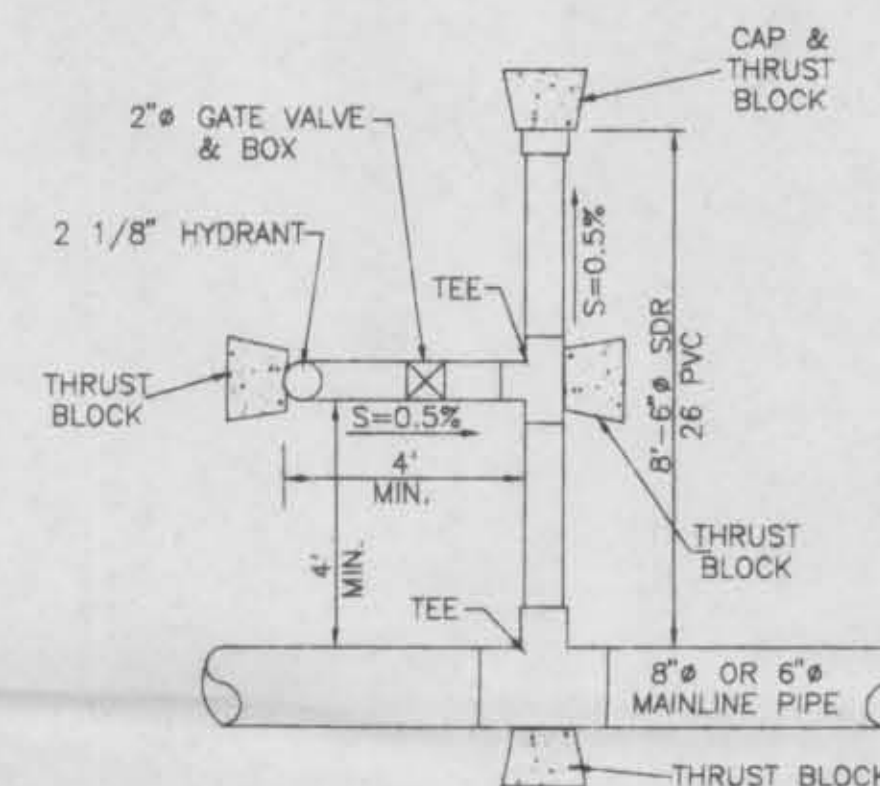
13+10 - LINE 3

20+28 - LINE 3

28+50 - LINE 3

6" MAINLINE EXTENSION

(FUTURE OVERHEAD SYSTEM MANIFOLD LINE)



FIRE HYDRANT AT STA. 8+10 - LINE 1 - REQUIRES 8" x 8" x 6" TEE

1+27 - LINE 2 - REQUIRES 8" x 8" x 6" TEE

7+93 - LINE 2 - REQUIRES 8" x 8" x 6" TEE

15+65 - LINE 2 - REQUIRES 8" x 8" x 6" TEE

20+95 - LINE 2 - REQUIRES 6" x 6" x 6" TEE

26+85 - LINE 2 - REQUIRES 6" x 6" x 6" TEE

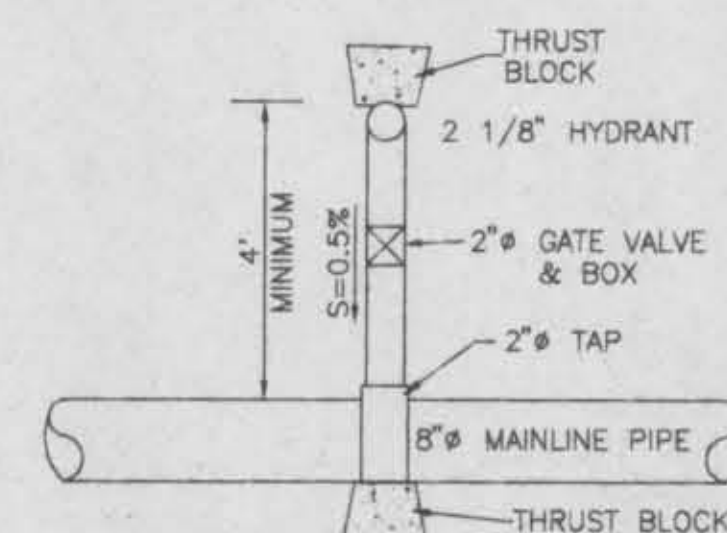
3+73 - LINE 3 - REQUIRES 8" x 8" x 6" TEE

13+12 - LINE 3 - REQUIRES 8" x 8" x 6" TEE

19+14 - LINE 3 - REQUIRES 8" x 8" x 6" TEE

29+55 - LINE 3 - REQUIRES 6" x 6" x 6" TEE

FIRE HYDRANT DETAIL NO. 1



FIRE HYDRANT AT STA. 11+75 - LINE 2 - REQUIRES 8" x 8" x 6" TEE

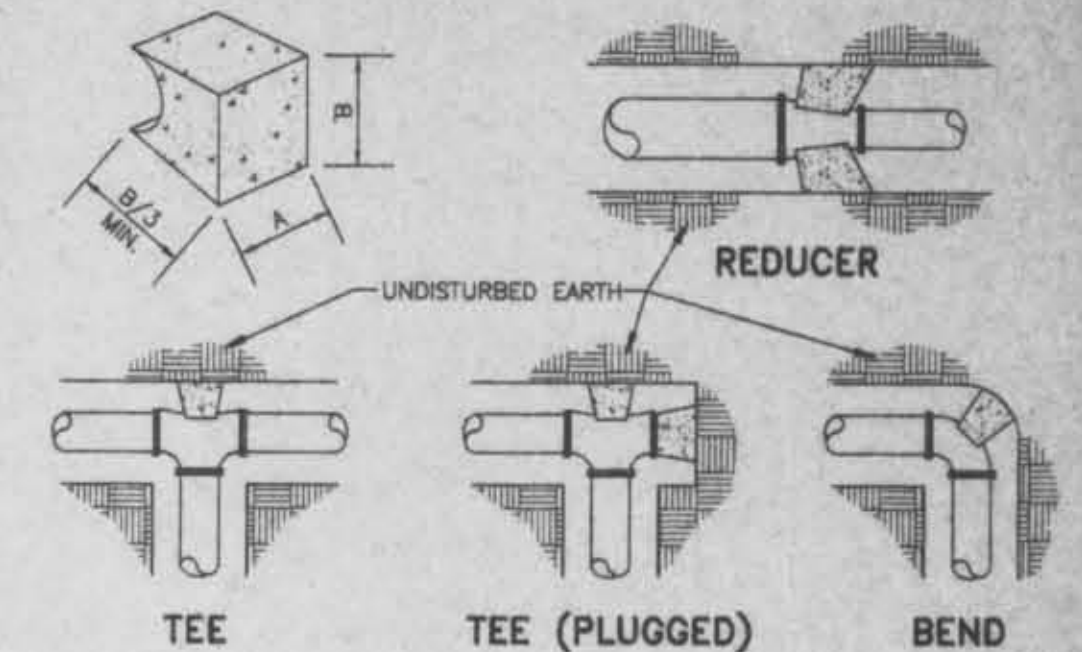
9+00 - LINE 3 - REQUIRES 8" x 8" x 6" TEE

24+05 - LINE 3 - REQUIRES 8" x 8" x 6" TEE

FIRE HYDRANT DETAIL NO. 2

FIRE HYDRANT CONNECTION DETAILS

NO SCALE

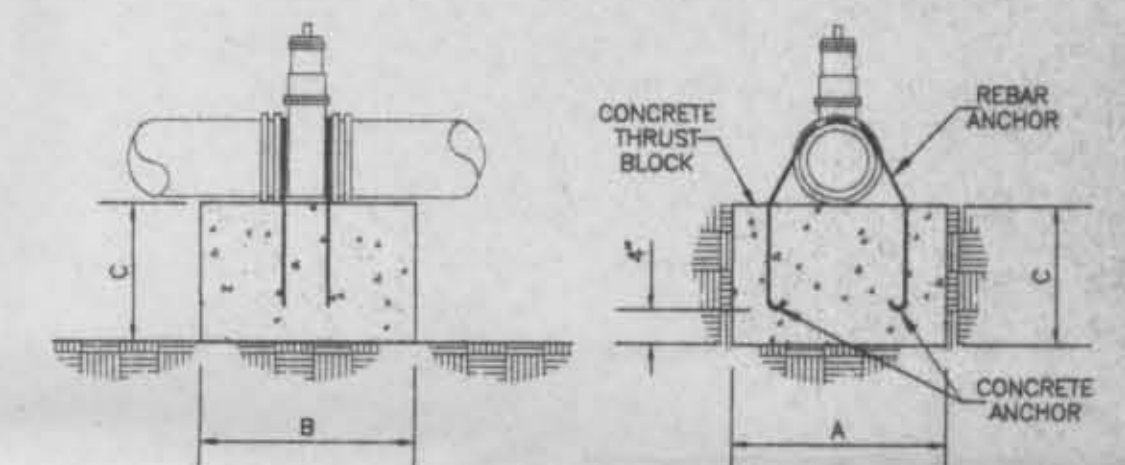


DIMENSIONS FOR HORIZONTAL THRUST BLOCKING

FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 1 1/4" & 2 1/2" BEND	
	A	B	A	B	A	B	A	B
2"	1'-0"	0'-6"	1'-4"	0'-6"	0'-9"	0'-6"	0'-6"	0'-6"
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	3'-4"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"

- NOTES: 1) THIS TABLE IS BASED ON 150 PSI MAIN PRESSURE 2000 PSDF SOIL BEARING PRESSURE
2) WRAP ALL FITTINGS WITH POLYETHYLENE
3) VERTICAL "UP" BENDS BEARING AREA EQUAL TO HORIZONTAL BENDS
4) VERTICAL "DOWN" BENDS 6" & 8" FITTINGS (1 1/4") SHALL BE 2.5' x 2.5' x 2.5'
5) ALL THRUST BLOCKS SHALL CONSIST OF 3000 PSI CONCRETE

THRUST BLOCKING FOR WATER MAIN FITTINGS

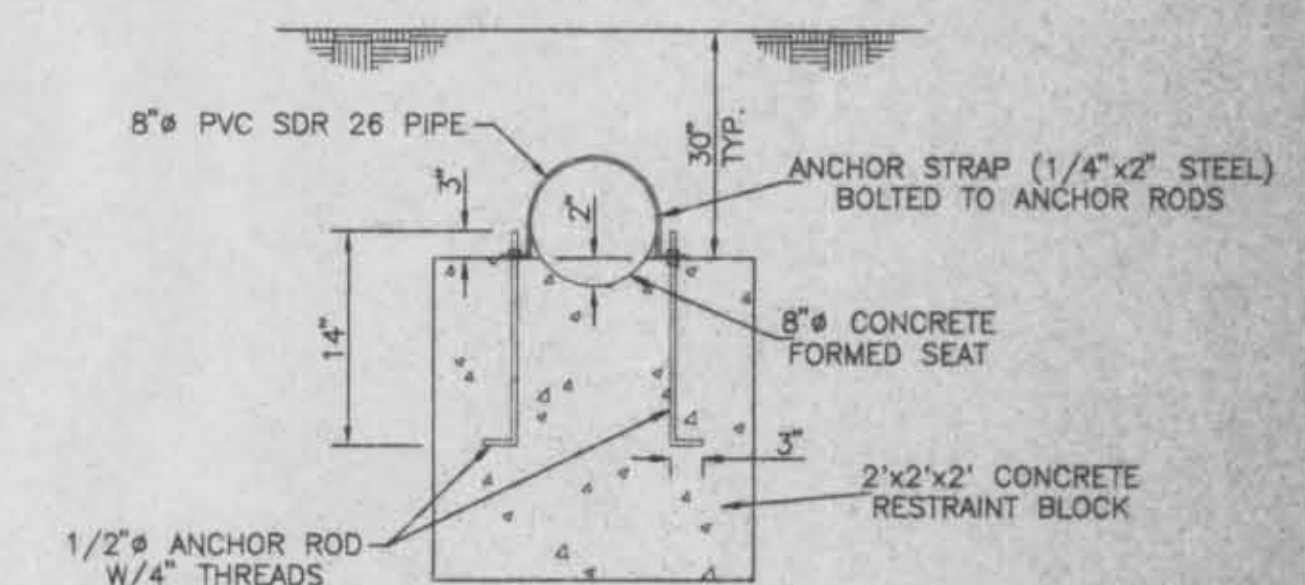


- NOTES: 1) COAT RODS WITH "KOPPER'S" BITUMASTIC NO. 50 OR EQUAL
2) WRAP VALVES WITH POLYETHYLENE
3) THRUST BLOCKING AND ANCHORS ARE REQUIRED ON VALVES OUTSIDE OF THE PUMP STATION. DRAIN LINE 2" VALVES DO NOT REQUIRE THRUST BLOCKING.
4) ALL THRUST BLOCKS SHALL CONSIST OF 3000 PSI CONCRETE

THRUST BLOCK DIMENSIONS

ANCHOR ROD SIZE	VALVE SIZE	DIMENSIONS		
		A	B	C
1/2"	2" & 4"	1'-0"	1'-0"	1'-0"
3/4"	6" & 8"	2'-0"	2'-0"	2'-0"
3/4"	10"	2'-9"	2'-6"	2'-6"

THRUST BLOCKING FOR VALVES

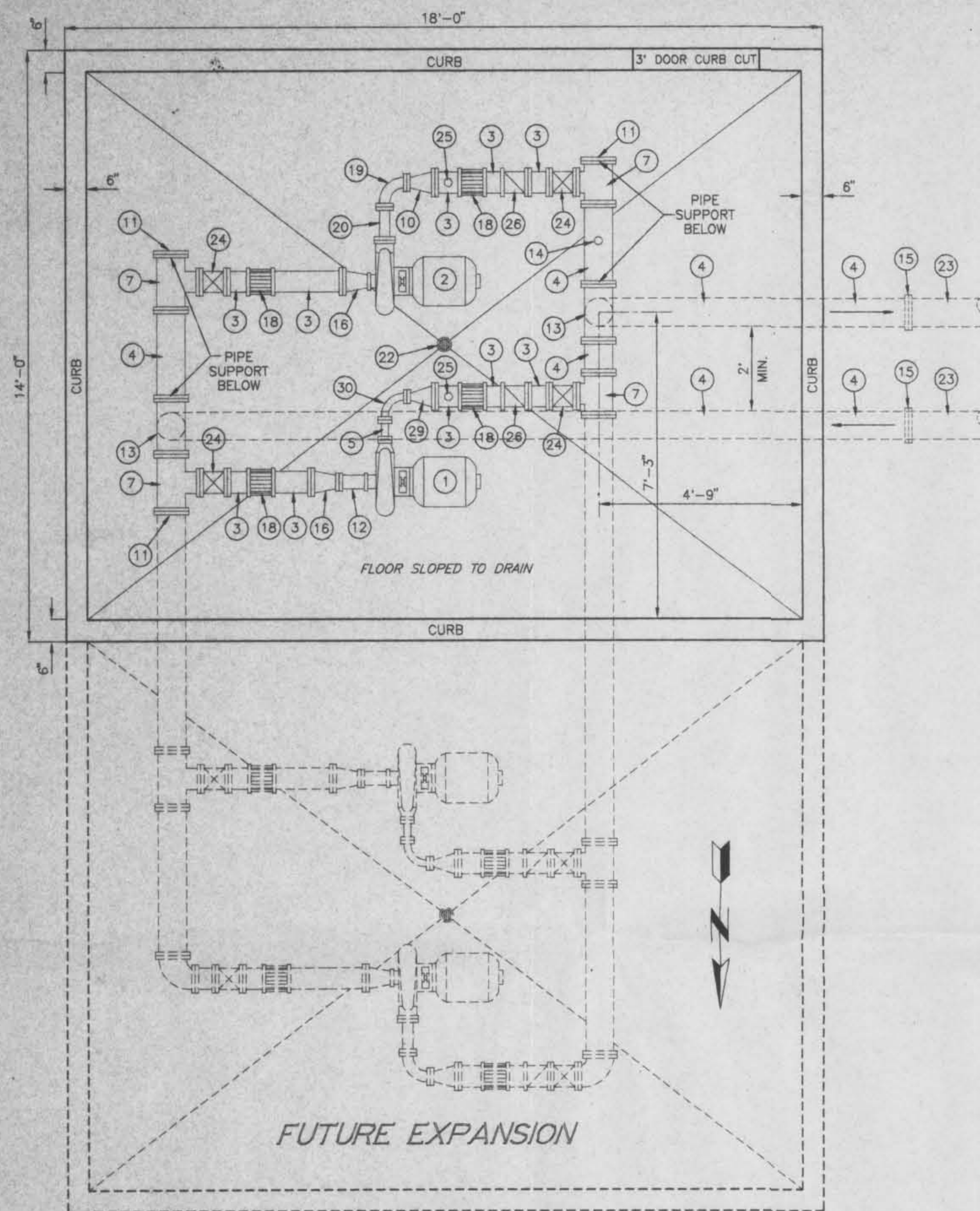


CONCRETE RESTRAINT BLOCK

NO SCALE

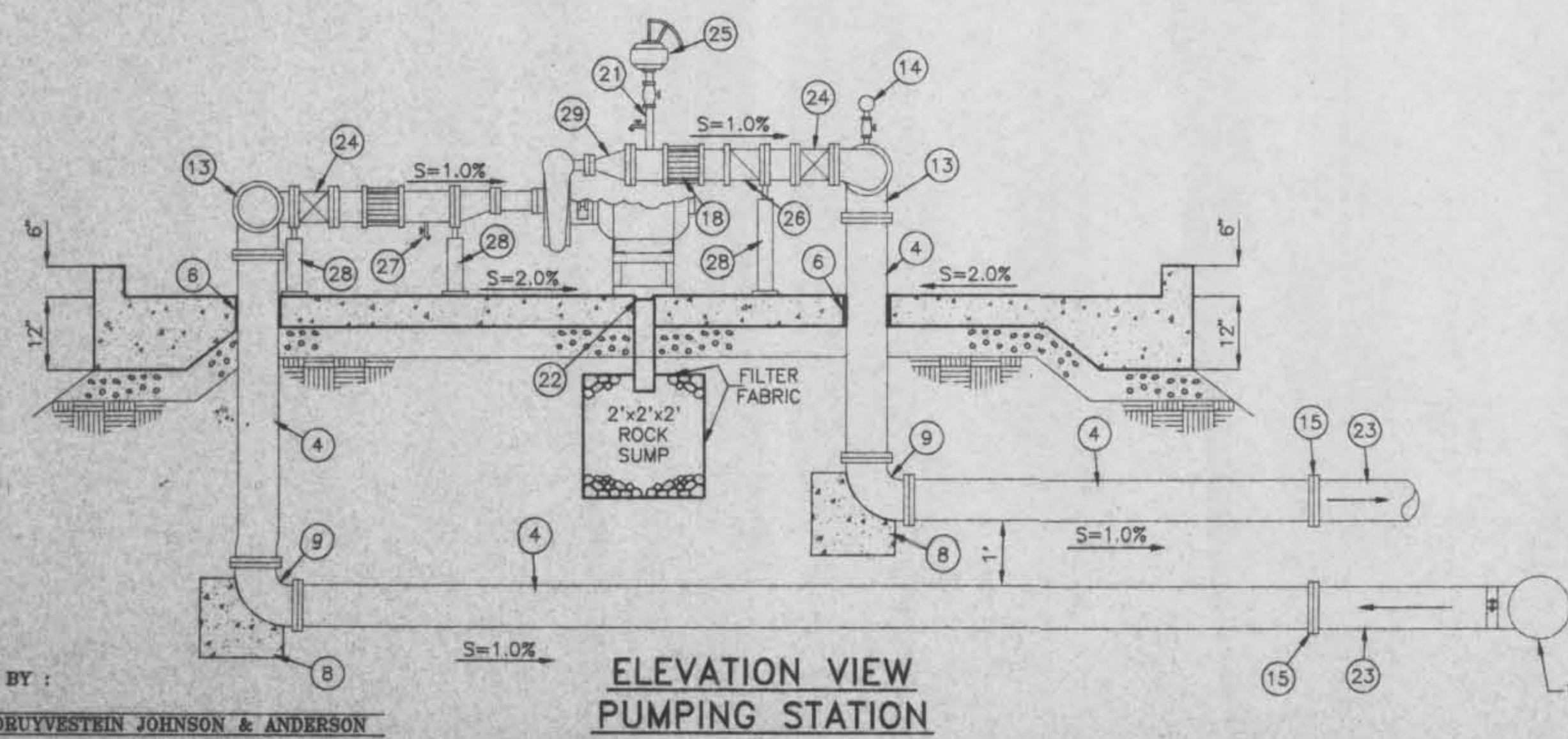
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		DRAWN	ML
		CHECKED	
		REVISED	
		PROJ. NO.	2637.01
		DATE	5/1994
		SHEET NO.	41
		OF	7

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CONSULTING ENGINEERS & LAND SURVEYORS
3031 RUSSELL ST. MISSOULA, MONTANA



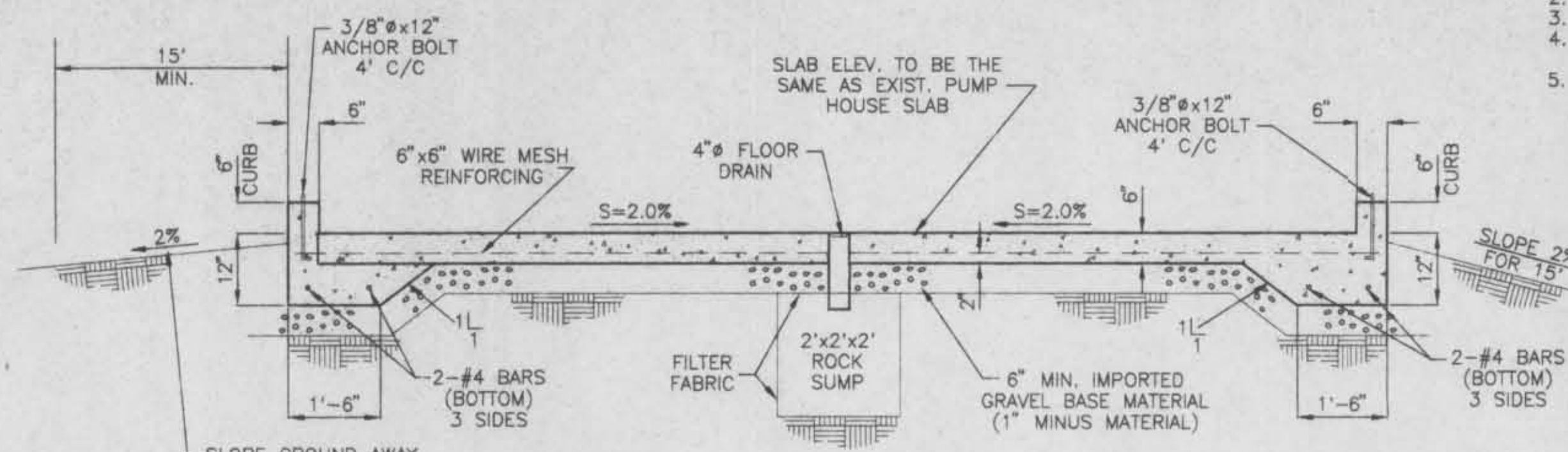
**PLAN VIEW
PUMPING STATION**

SCALE : 1/2" = 1'



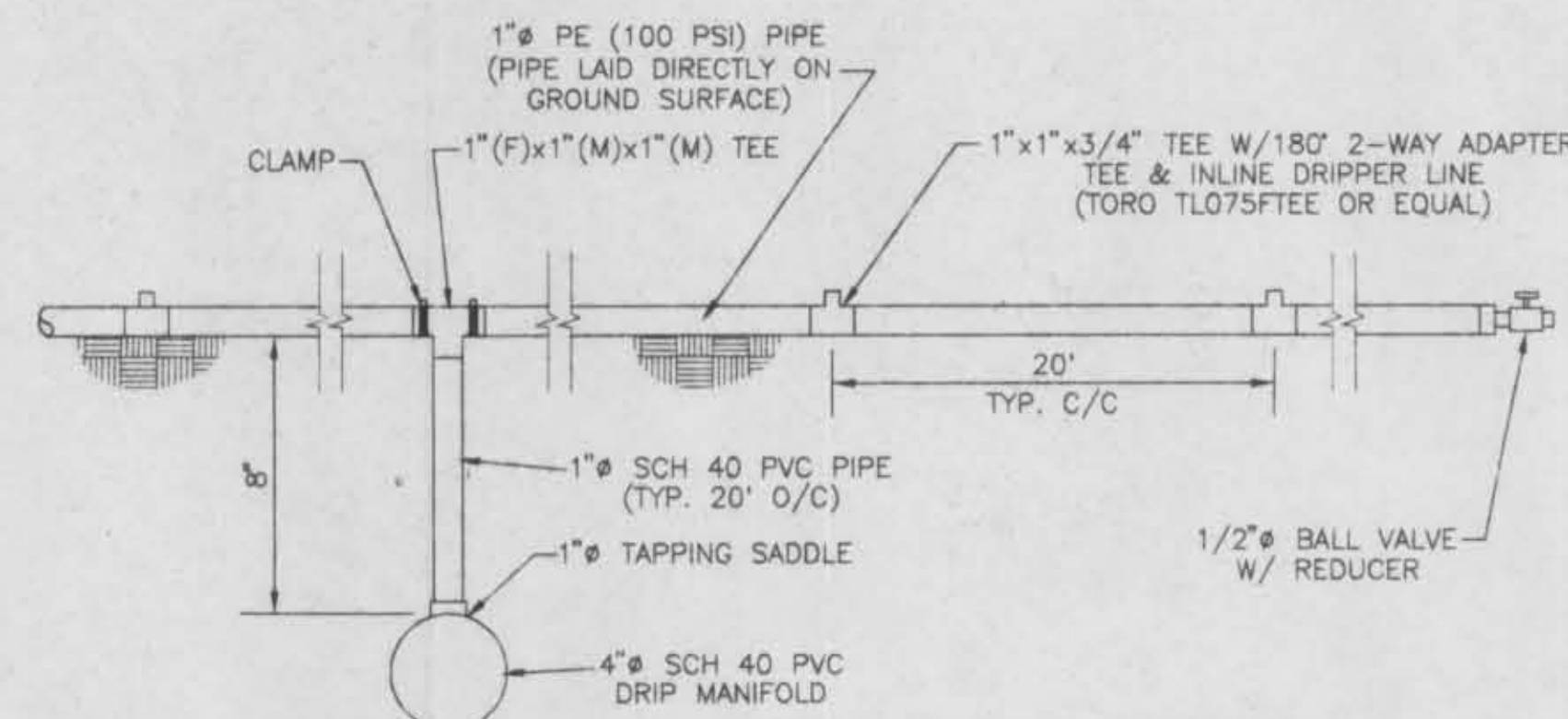
**ELEVATION VIEW
PUMPING STATION**

SCALE : 1/2" = 1'



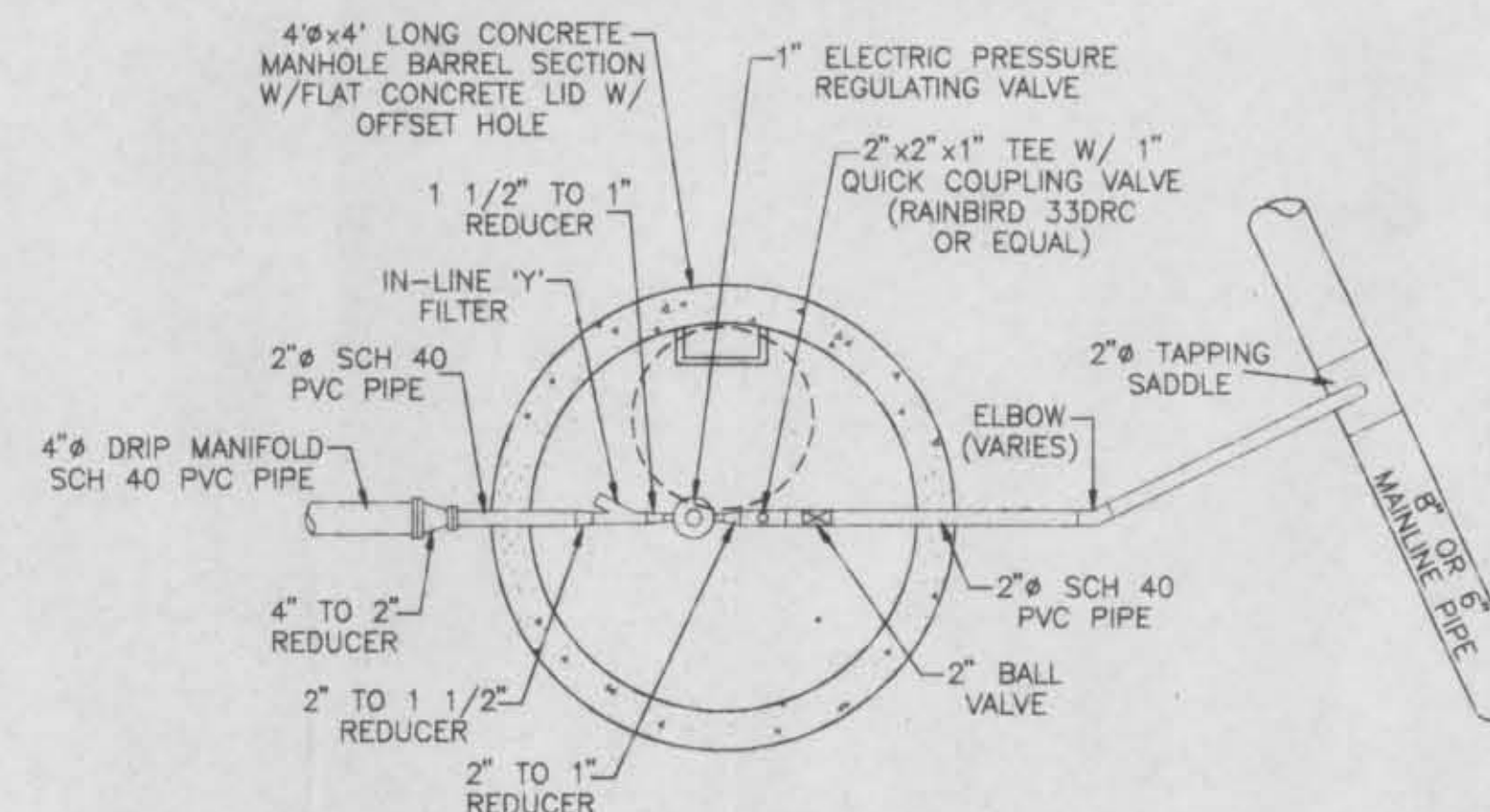
**SLAB & FOOTING DETAIL
PUMPING STATION**

SCALE : 1/2" = 1'



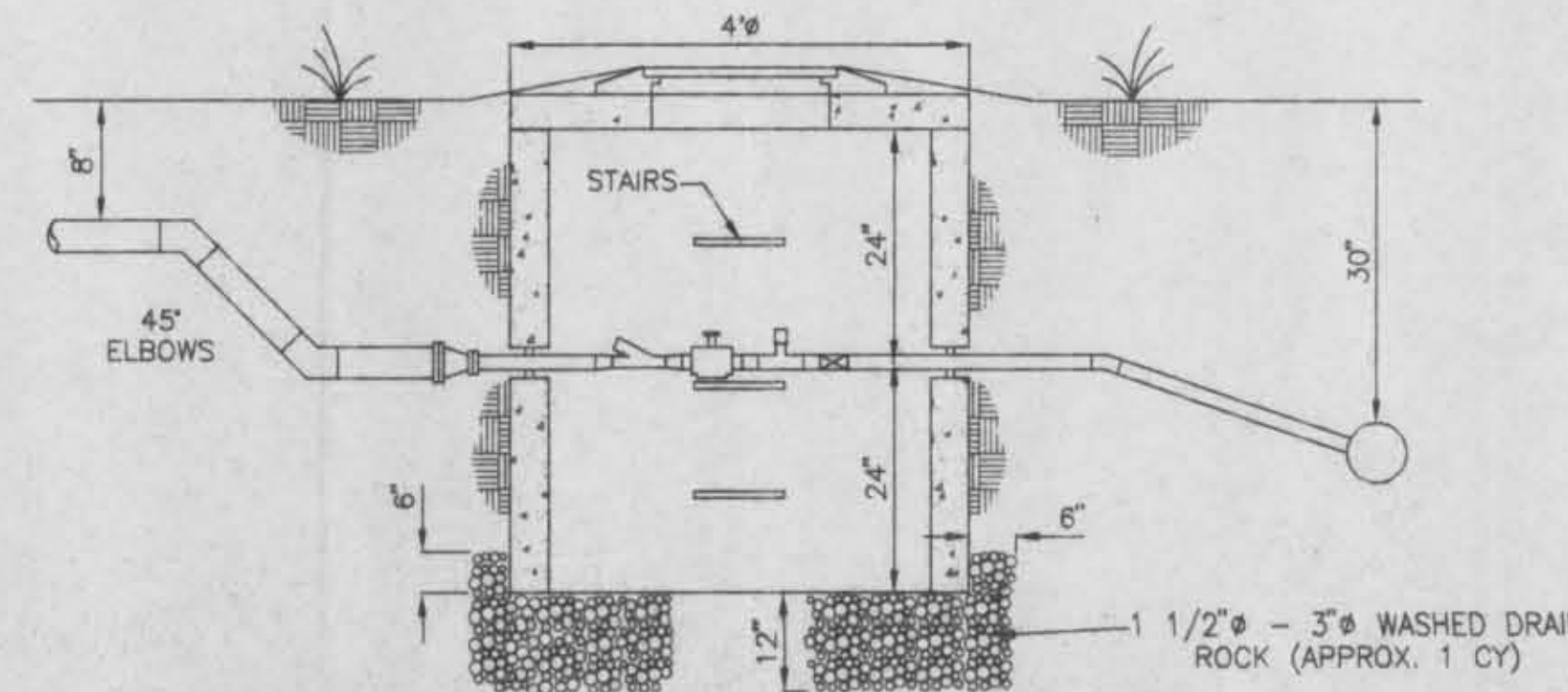
DRIP LATERAL LINE DETAIL

NO SCALE



PLAN

NO SCALE



ELEVATION

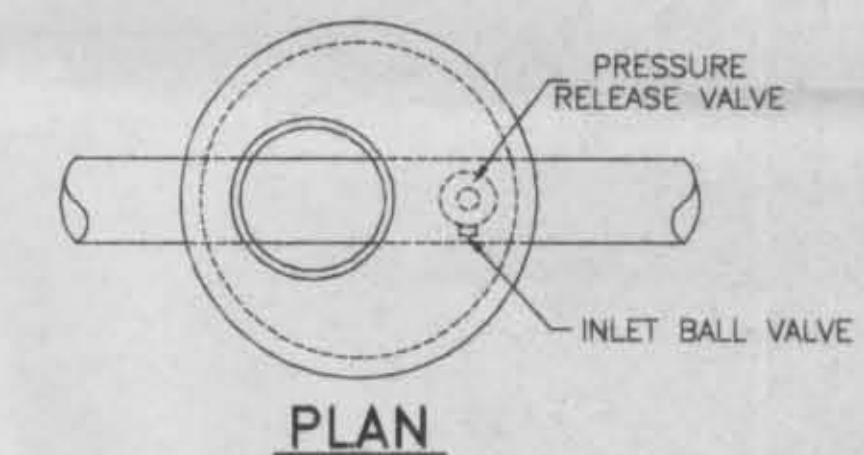
NO SCALE

METER MANHOLE

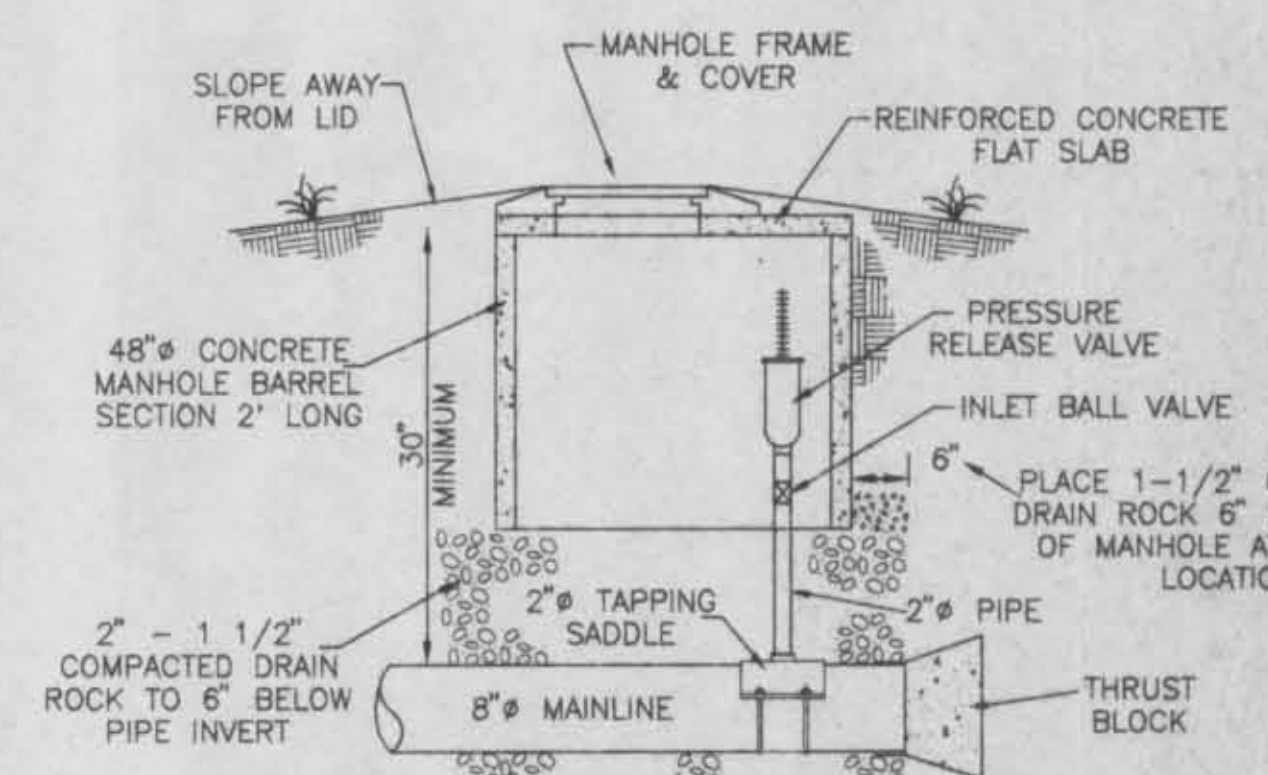
NOTES:

1. CONCRETE CONTRACTOR TO COORDINATE CONCRETE ENCASED ELECTRODE INSTALLATION WITH ELECTRICAL CONTRACTOR. SEE SHEET E-2.
2. OFFSET DRESSER COUPLING TO ENSURE EASY REMOVAL.
3. PIPE SUPPORTS TO BE MODEL S-89 AS MFG. BY MATERIAL RESOURCES OR APPROVED EQUAL.
4. ONE BERKELEY, MODEL 6D WITH 1 1/4" INLET PUMP PRIMER OR EQUAL IS REQUIRED FOR EACH NEW PUMP.
5. MOTOR MOUNTS AND PIPE SUPPORTS TO BE FIRMLY BOLTED TO THE CONCRETE FLOOR SLAB.

PIPE FITTING SCHEDULE	
1.	10 HP Centrifugal Pump
2.	30 HP Centrifugal Pump
3.	6" Ductile Iron Flanged Pipe
4.	8" Ductile Iron Flanged Pipe
5.	1 1/2" Ductile Iron Flanged Pipe
6.	10" Sleeve
7.	8" x 6" Tee
8.	Thrust Block
9.	8" 90° DI Elbow
10.	6" x 3" Flanged Concentric Reducer
11.	8" Blind Flange
12.	2" Ductile Iron Flanged Pipe Spool
13.	8" x 8" x 8" DI Tee
14.	Pressure Gauge w/ Top Elbow & Petcock
15.	8" Flanged DI to PVC Adaptor
16.	6" x 2" Flanged Eccentric Reducer
17.	6" to 8" 90° Elbow
18.	6" Dresser Coupling
19.	3" Flange 90° Elbow
20.	3" Ductile Iron Flanged Pipe Spool
21.	1 1/4" Riser w/ Shut-Off Valve & 5/8" Hose Bib
22.	4" Floor Drain & 2' x 2' x 2" Rock Sump (Bross w/Grate)
23.	8" SDR 26 PVC Pipe
24.	6" Gate Valve
25.	Pump Primer
26.	6" Non-Slam Check Valve
27.	5/8" Tap & Hose Bib
28.	Pipe Supports
29.	6" x 1 1/2" Concentric Reducer
30.	1 1/2" Flanged 90° Elbow

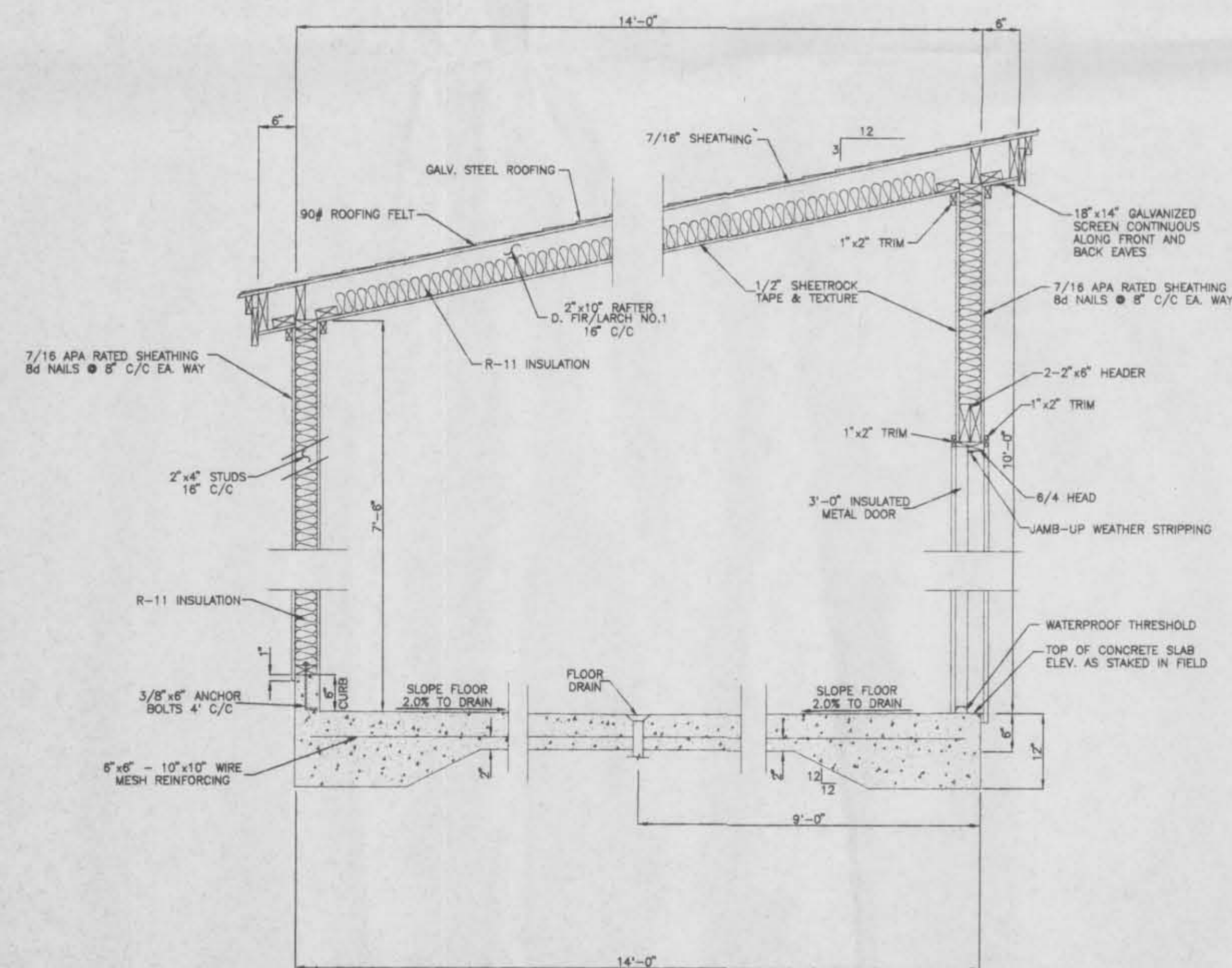
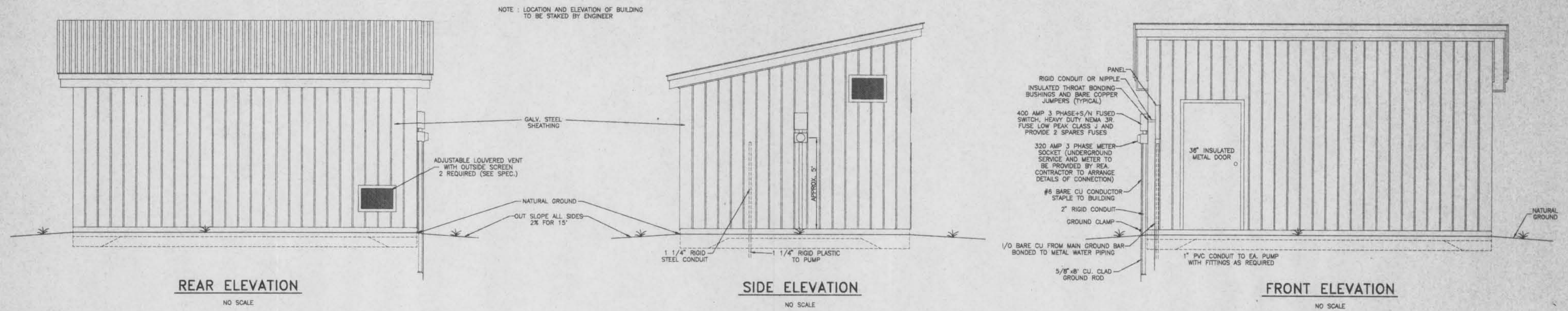


PLAN



PRESSURE RELEASE VALVE

NO SCALE



- NOTE: 1) CONTRACTOR TO SUBMIT SHOP DRAWINGS OF BUILDING AND VERIFY SIZE OF LOAD BEARING COMPONENTS.
- 2) ROOF AND WALLS TO BE COVERED WITH DELTA RIB (30g) GALV. STEEL SHEATHING OR APPROVED EQUAL. COR TO PICK COLOR AT THE TIME OF CONTRACTOR SUBMITTAL.
- 3) THE EXTERIOR OF ENTIRE STRUCTURE TO BE COVERED WITH GALV. STEEL SHEATHING.

PREPARED BY:

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3201 RUSSELL ST. MISSOULA, MONTANA

253701\01\3.0WG

GROUSE CREEK IRRIGATION PROJECT

PUMP STATION BUILDING
DETAILS

DESIGN TLF
DRAWN ML
CHECKED
REVISED
PROJ. NO. 253701
DATE 5/1994

DJA DRUYVESTEIN JOHNSON & ANDERSON
CONSULTING ENGINEERS & LAND SURVEYORS
3201 RUSSELL ST. MISSOULA, MONTANA

SHEET
7 OF 7

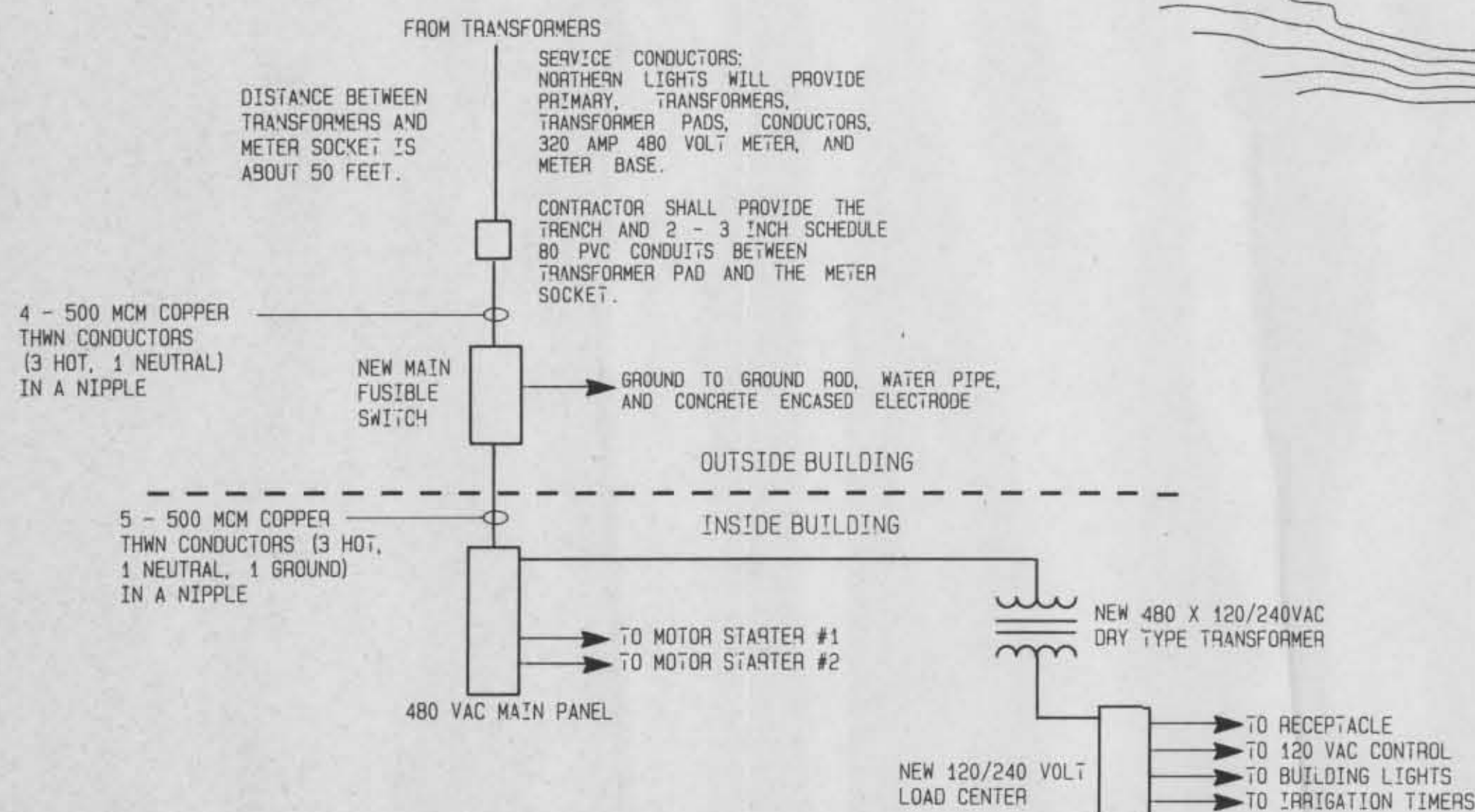
CONTROL CONDUCTORS:
SIZE CONTROL CONDUCTORS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ZONE VALVE CONTROL CONDUCTORS SHALL BE AT LEAST #14 COPPER. NOTE THAT THIS IRRIGATION SYSTEM IS A DRIP TYPE SYSTEM WHICH MAY REQUIRE MULTIPLE ZONE VALVES TO OPERATE AT THE SAME TIME. MULTIPLE ZONE VALVE OPERATION WILL IMPACT THE SIZING OF THE RETURN CONDUCTOR AS IT WILL BE CARRYING SIGNIFICANTLY LARGER CURRENTS THAN INDIVIDUAL ZONE VALVE SUPPLY CONDUCTORS.

MULTIPLE CABLE ASSEMBLIES ARE ACCEPTABLE. INSTALL IN SCHEDULE 80 PVC CONDUIT BURIED IN ACCORDANCE WITH THE TRENCHING DETAILS. CONTROL CONDUCTOR CONDUIT CAN BE LOCATED IN THE SAME TRENCH AS WATER PIPING PROVIDED THAT THE CONTROL CONDUCTOR CONDUITS ARE OFFSET 2 FEET FROM THE PIPING TO ALLOW ACCESS TO THE PIPING WITHOUT DISTURBING THE CONTROL CONDUCTOR CONDUIT. MORE THAN ONE CABLE ASSEMBLY CAN BE LOCATED IN THE CONDUIT.

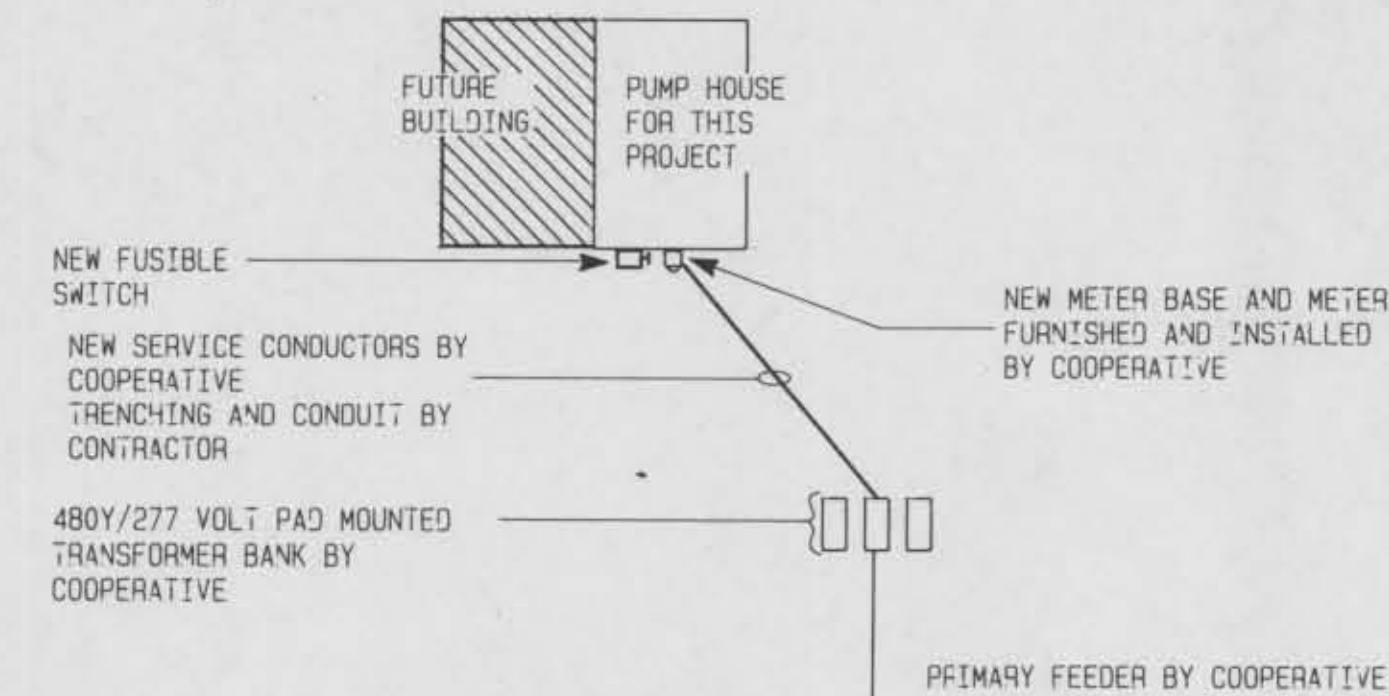
LOCATE PULL BOXES, AS NEEDED, ADJACENT TO ZONE VALVE LOCATIONS OR PIPING FITTINGS NORMALLY ACCESSIBLE FROM THE SURFACE.

THE CONTRACTOR SHALL FURNISH 1 SPARE CONTROL CONDUCTOR FOR EACH 3 ZONE VALVES SERVED ON A LATERAL. IF THE RETURN CONDUCTORS ARE THE SAME SIZE AS THE SUPPLY CONDUCTORS, THE SPARE CONDUCTOR REQUIREMENT DOES NOT APPLY TO RETURN CONDUCTORS SINCE A SPARE SUPPLY CONDUCTOR COULD ALSO BE USED FOR AS A REPLACEMENT RETURN CONDUCTOR. IF THE CONTRACTOR USES A LARGER SIZED RETURN CONDUCTOR, ONE SPARE CONDUCTOR WILL BE REQUIRED FOR EACH LARGER SIZED CONDUCTOR.

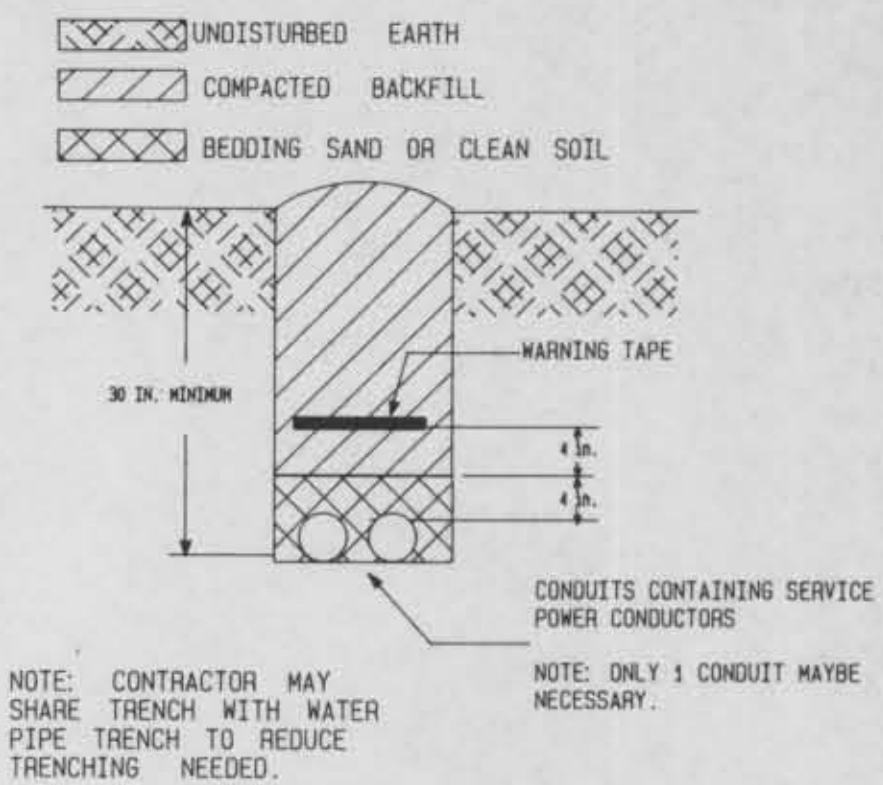
THE ENGINEER ESTIMATES THAT #14 CONDUCTORS SHOULD BE ADEQUATE. THIS ESTIMATE MUST BE CONFIRMED BY THE MANUFACTURER OF THE CONTROLLERS AND ZONE VALVES AS ZONE VALVE CURRENT DRAWS VARIES BY MANUFACTURER AND MODEL. CALCULATIONS MADE ABOVE ARE BASED ON CATALOG INFORMATION IN THE TORG CATALOG.



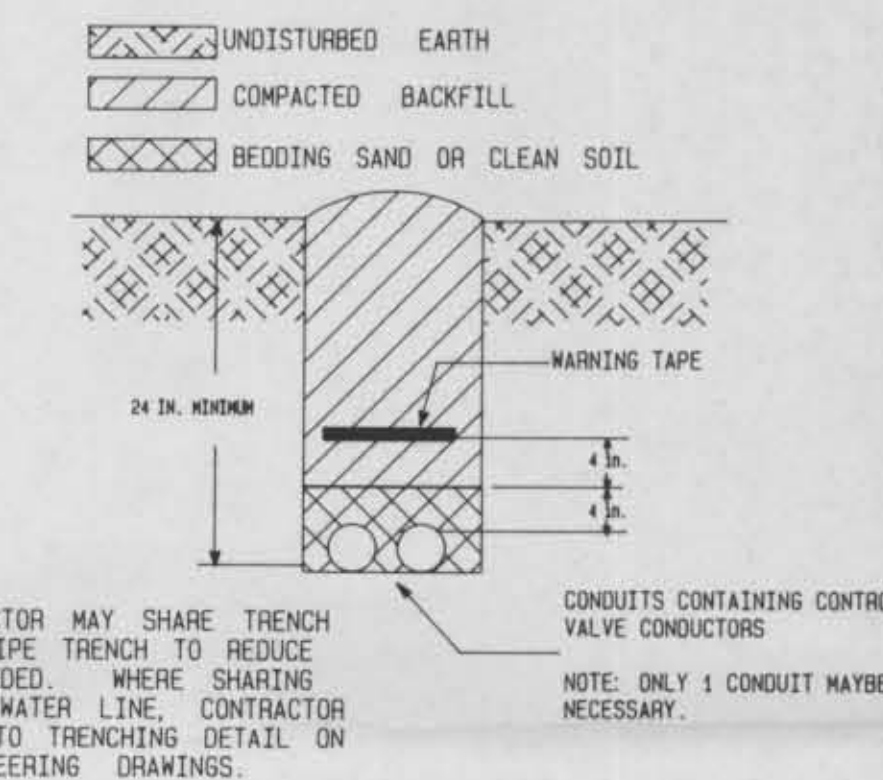
3 ONE LINE DIAGRAM
E-1 NOT TO SCALE



4 SERVICE PLAN
E-1 NOT TO SCALE



2 TRENCHING DETAIL-SERVICE
E-1 NOT TO SCALE



5 TRENCHING DETAIL-CONTROL
E-1 NOT TO SCALE

LEGEND

- 6 #12 HOME RUN BACK TO PANEL TO INDICATED CIRCUIT. HATCH MARKS INDICATE THE NUMBER OF HOT CIRCUITS. THE SIZE OF THE WIRE IS ALSO INDICATED.
- ⊕ COMMERCIAL GRADE 5-20A DUPLEX RECEPTACLE
- \$ SNAP SWITCH
- ⊗ IRRIGATION ZONE VALVE (BY OTHERS)
- ++++ DRIP SYSTEM PIPING (BY OTHERS)

PREPARED BY:
FUSSELL ENGINEERING
131 W. MAIN SUITE B
MISSOULA, MT. 59802
(406) 721-5998

7/18/94 4:21 PM

GROUSE CREEK IRRIGATION PROJECT		DESIGN	MTF
		DRAWN	SAC
		CHECKED	MTF
		REVISED	
		REVISED	
		PROJ. #	2837.01
		DATE	5/94
		SHEET	
		E1	2

DJA DRUYVESTEIN JOHNSON & ANDERSON
CONSULTING ENGINEERS & LAND SURVEYORS
301 RUSSELL ST. MISSOULA, MONTANA

MAIN: 400 AMP LUGS
BUS: 400 AMPS

480 VOLT MAIN PANEL 'A'
SQUARE D # NEHB IN A NEMA 3R ENCLOSURE

SLOT	WKT.	SERVICE	AMPS	BREAKER	WIRE	USE	PHS	USE	WIRE	BREAKER	AMPS	SERVICE	CKT.	SLOT	#
1	A1	10 HP MOTOR STARTER #1	60	EH-HACR	#6	3H,6	A							2	
3	A1	10 HP MOTOR STARTER #1	60	EH-HACR	#6	3H,6	B							4	
5	A1	10 HP MOTOR STARTER #1	60	EH-HACR	#6	3H,6	C							6	
7	A2	30 HP MOTOR STARTER #2	100	EH-HACR	#2	3H,6	A							8	
9	A2	30 HP MOTOR STARTER #2	100	EH-HACR	#2	3H,6	B							10	
11	A2	30 HP MOTOR STARTER #2	100	EH-HACR	#2	3H,6	C							12	
13	A3	STEP DOWN TRANSFORMER	30	EH	#10	2H,6	A							14	
15	A3	STEP DOWN TRANSFORMER	30	EH	#10	2H,6	B							16	
17	A4	UNIT HEATER	20	EH-HACR	#12	3H,6	A							18	
19	A4	UNIT HEATER	20	EH-HACR	#12	3H,6	B							20	
21	A4	UNIT HEATER	20	EH-HACR	#12	3H,6	C							22	
23														24	
25														26	
27														28	
29														30	

- NOTES:
- 2H,N,G MEANS RUN 2 HOT, 1 NEUTRAL, AND ONE GROUND CONDUCTOR
 - CONDUCTOR SIZING BASED ON COPPER THWN CONDUCTORS.

MAIN: 125 AMP LUGS
BUS: 125 AMPS

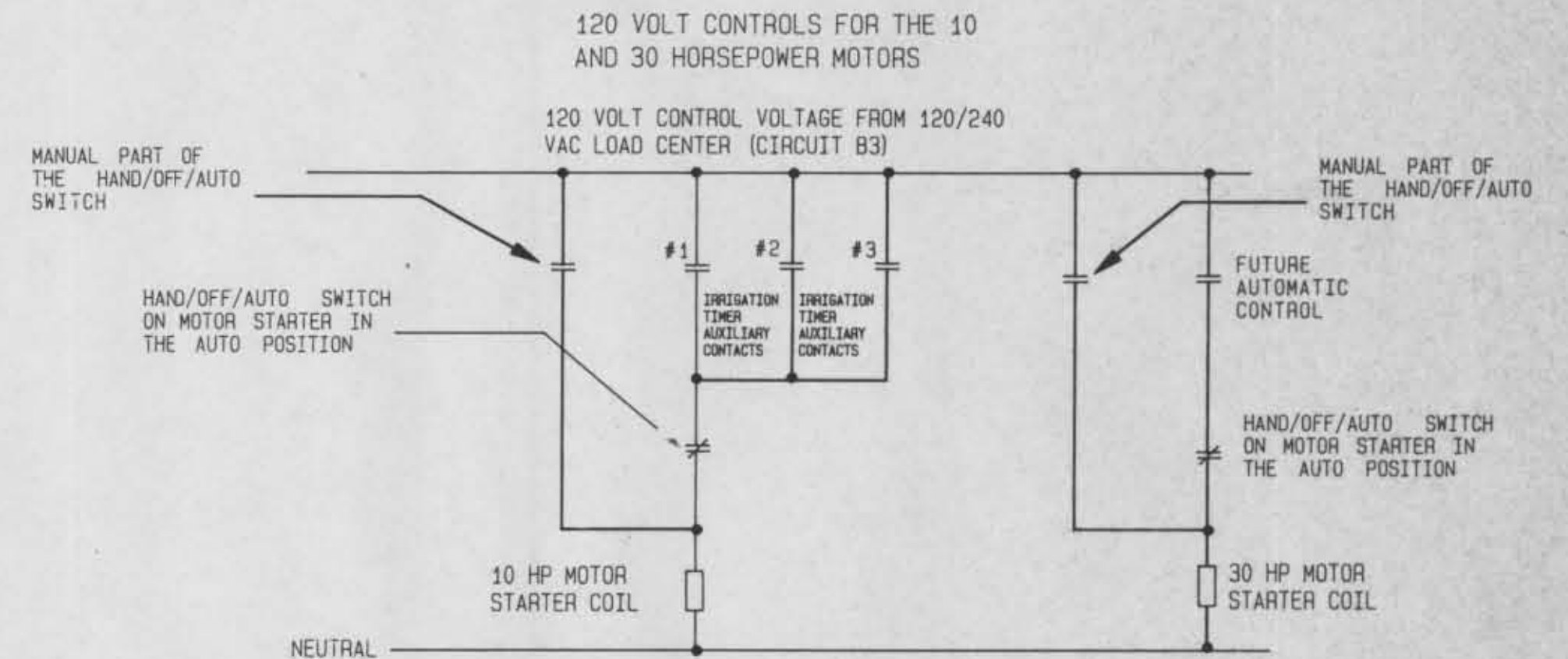
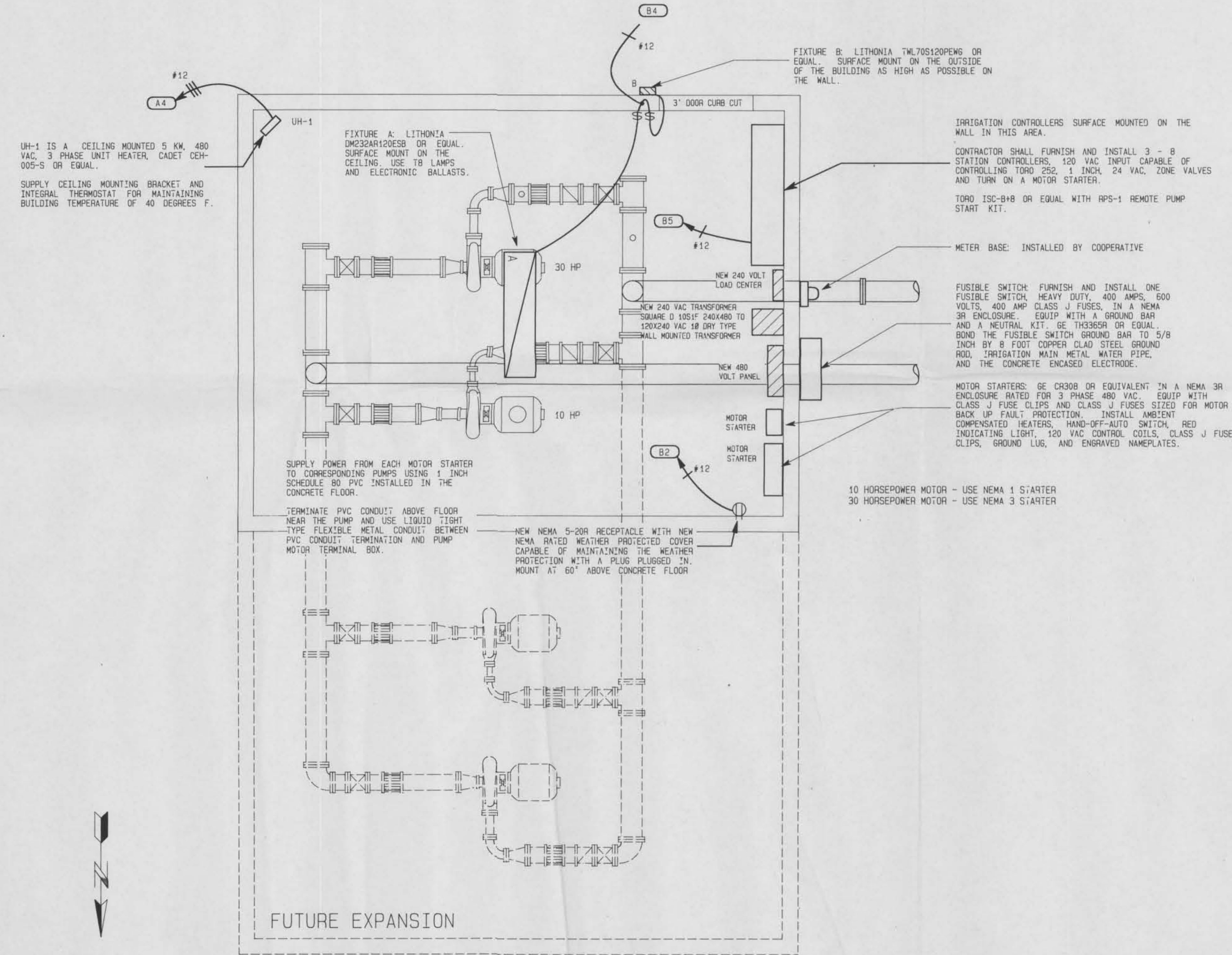
120/240V LOAD CENTER 'B'
GE # TLM1212R

SLOT	WKT.	SERVICE	AMPS	BREAKER	WIRE	USE	PHS	USE	WIRE	BREAKER	AMPS	SERVICE	CKT.	SLOT	#
1	B1	MAIN BREAKER	50	THQ	#6	2H,N,G	1							2	
3	B1	MAIN BREAKER	50	THQ	#6	2H,N,G	2							4	
5	B2	RECEPTACLE	20	THQ-6FI	#12	H,N,G	1							6	
7	B3	120 VAC CONTROL POWER	20	THQ	#12	H,N,G	2							8	
9	B4	BUILDING LIGHTS	20	THQ	#12	H,N,G	1							10	
11	B5	IRRIGATION TIMERS	20	THQ	#12	H,N,G	2							12	

- NOTES:
- 2H,N,G MEANS RUN 2 HOT, 1 NEUTRAL, AND ONE GROUND CONDUCTOR
 - CONDUCTOR SIZING BASED ON COPPER THWN CONDUCTORS.
 - BACKFEED MAIN BREAKER

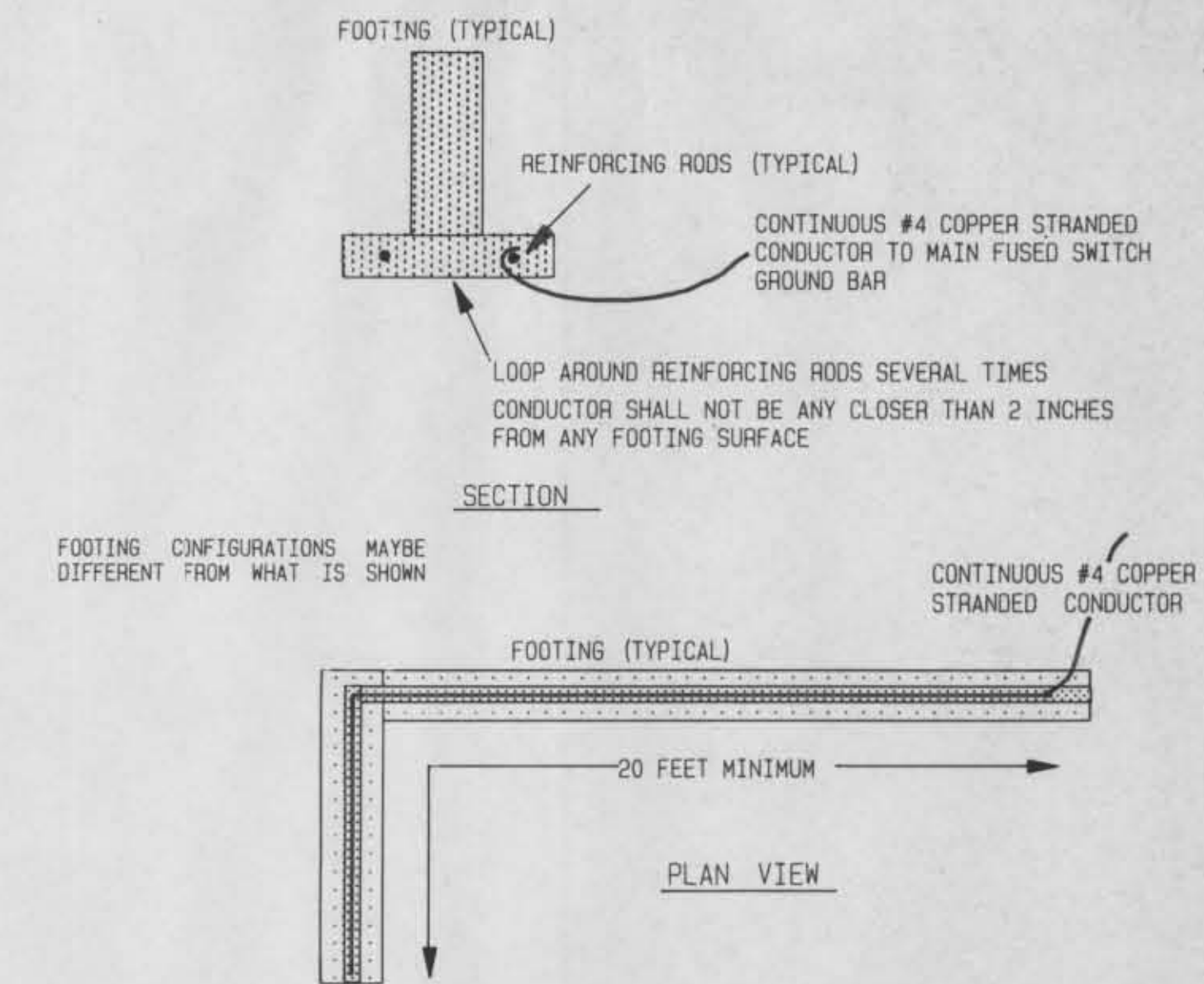
LEGEND

- 6 #12 HOME RUN BACK TO PANEL TO INDICATED CIRCUIT. HATCH MARKS INDICATE THE NUMBER OF HOT CIRCUITS. THE SIZE OF THE WIRE IS ALSO INDICATED.
- ⊙ COMMERCIAL GRADE 5-20R DUPLEX RECEPTACLE
- \$ SNAP SWITCH
- ⊗ IRRIGATION ZONE VALVE (BY OTHERS)
- ++++ DRIP SYSTEM PIPING (BY OTHERS)



3 CONTROL DETAILS

E-2 NOT TO SCALE



2 CONCRETE ENCASED ELECTRODE

E-2 NOT TO SCALE