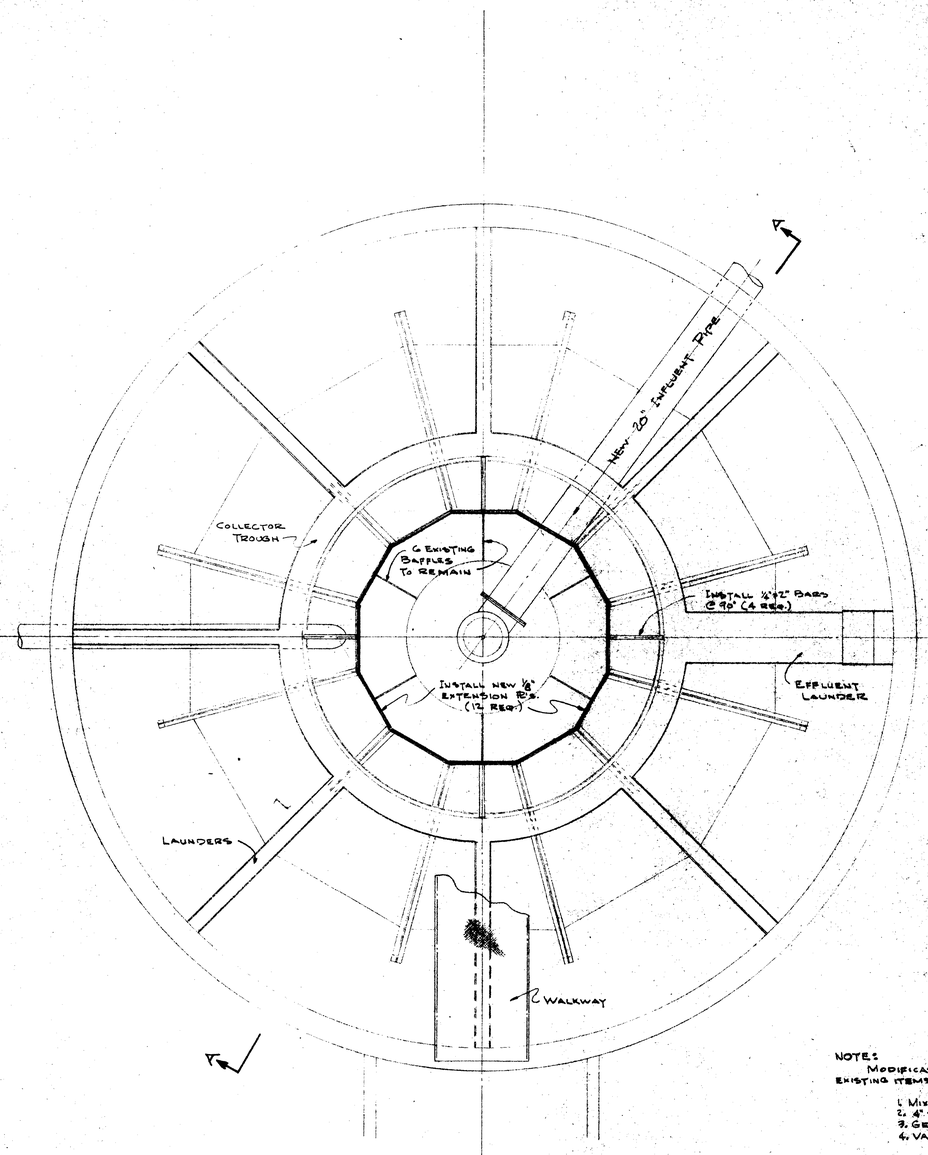
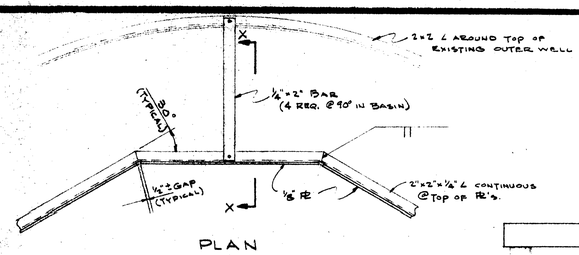
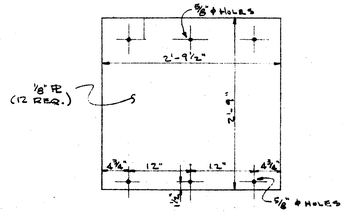


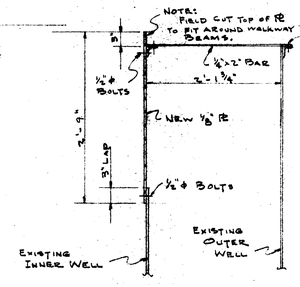
PLAN OF BASIN
SCALE 3/8"=1'-0"



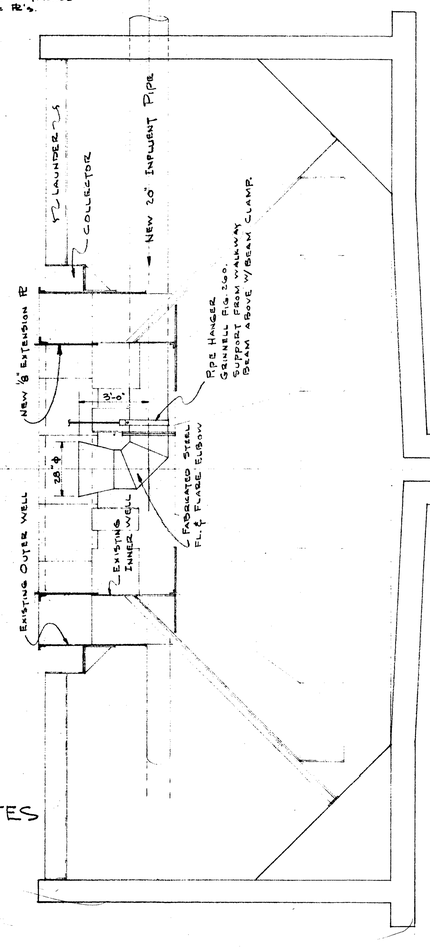
PLAN



ELEVATION



SECTION X-X



SECTION A-A
SCALE ⅜"=1'-0"

DETAILS
INNER WELL EXTENSION PLATES
SCALE 1"=1'-0"

NOTES:
Modification work to include the removal of the following existing items not shown on this drawing:

1. Mixer Impeller & Band
2. 4" Pipe Shaft Impeller Drive
3. Gear Reducer
4. Variable Speed Drive Motor.

1-2-1

REVISIONS					
BY	DATE	DESCR.	DATE Feb. 1966	DRAWN dt	PROJECT NO. 6514
BY	DATE	DESCR.	SCALE As Shown	CHECKED	
BY	DATE	DESCR.		APPROVED	

NELSON - HALEY - PATTERSON AND QUIRK
ENGINEERING CONSULTANTS
GREELEY COLORADO

CITY OF THORNTON, COLORADO — WATER SYSTEM IMPROVEMENTS

MODIFICATION OF EXISTING ACCELATOR UNIT

SHEET 1 of SHEETS 1

5-15

DRAWING NUMBER

PLANT-OLOGY CORPORATION • IRVINE, CALIFORNIA

13.2 KV

500 KVA NAME PLATE RATING OF (3) 167 KVA SINGLE PHASE TRANSFORMERS

POLE #10

POLE #9

POLE #8

POLE #7

13.2 KV FROM PUBLIC SERVICE POLE TA 1152

500 KVA NAME PLATE RATING OF (3) 167 KVA SINGLE PHASE TRANSFORMERS

8-#4/0

4-#4/0

3-#4/0

3-#750 MCM

3-#750 MCM 1-#2

3-#4/0 1-#2

400 A DISC

400 AMP DISC. INSTALLED W/D. IN POLE #8

OUTDOOR W/ CAP

3-#1, 1-#6

3-#6

400 AT

FRS 400

EQUIPMENT #3610

3-#300 MCM, 1-#1

150 HP #1

NORTH-GLENN MONITOR PUMPS

300-AT

400 A DISC

FRS 225

EQUIPMENT #3605

150 HP

CLEARWELL MAIN PUMPS

3-#4/0

3-#1

3-#1/0

3-#2

3-#2/0

3-#1

100 AT

3-#2 N.M.C.

30 A DISC

FRS 30

600 A DISC

FRS 300

EQUIPMENT #3720

400 A DISC

FRS 250

EQUIPMENT #3610

400 A DISC

FRS 200

EQUIPMENT #3605

150 AT

EQUIPMENT #3610

30 A DISC

100 A DISC

30 HP #3

100 HP #2

150 HP

100 HP

150 HP

15 HP

TO TELEMETRY CONTROL PANEL

NORTH-GLENN MONITOR PUMPS

CLEARWELL MAIN PUMPS

3-#10

15 KVA 480/120/240

DISC FUSES

LOCATED AT SOUTH CLARIFIER

3-#3/0

RECYCLE PUMP

LOCATED AT SOUTH CLARIFIER

3-#4/0 & 1-#6 GRD.

3-#10

3-#12

2 KVA 480/120/240

225A FRS

EQUIPMENT #3720

120 V PNL

225A FRS

EQUIVALENT #3740

3-#4/0 & 1-#6 GRD.

150 HP

N.G. STANDBY PRIMER IN VAULT

150 HP

POWER DISTRIBUTION PANEL IN ACR

30 A

30 A DISC

FUSES

3-#10

SPARE

3-#1

3-#4

3-#10

3-#10

30 AT

IN HALLWAY 480/120/240

20 AT

20 AT

20 AT

IN HALLWAY 480/120/240

TO LIGHTING PANEL

TO TELEMETRY PANEL

2 HP

1½ HP

1½ HP

2 HP

2 HP

2 HP

EQUIP. #3120

EQUIP. #3120

CLARIFIER #2

CLARIFIER #1

CLARIFIER #3

LEGEND

1. LOCATED IN CLEARWELL VAULT AT POLE #8
1-A. BACKWASH RECYCLE PUMP
2. LOCATED IN NORTH-GLENN TREATMENT PLANT
3. LOCATED AT SOUTH CLARIFIER
4. LOCATED AT MIDDLE CLARIFIER
5. LOCATED AT NORTH CLARIFIER
6. LOCATED IN NORTH-GLENN MAIN PUMP ROOM
7. LOCATED IN INSTRUMENT NO VAULT AT TOP OF HILL
8. LOCATED ON POLE #8
9. LOCATED IN ACR AT POLE #7
○ INDICATES PHYSICAL LOCATION ON SITE PLAN

NOTES

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]

CLARIFIER

(INCOMING SERVICE)

CLEARWELL PUMP VAULT

3MG TK.

3MG TK.

SITE PLAN FOR POWER ONE LINE DIAGRAM NO SCALE N

LOCATED AT SOUTH CLARIFIER

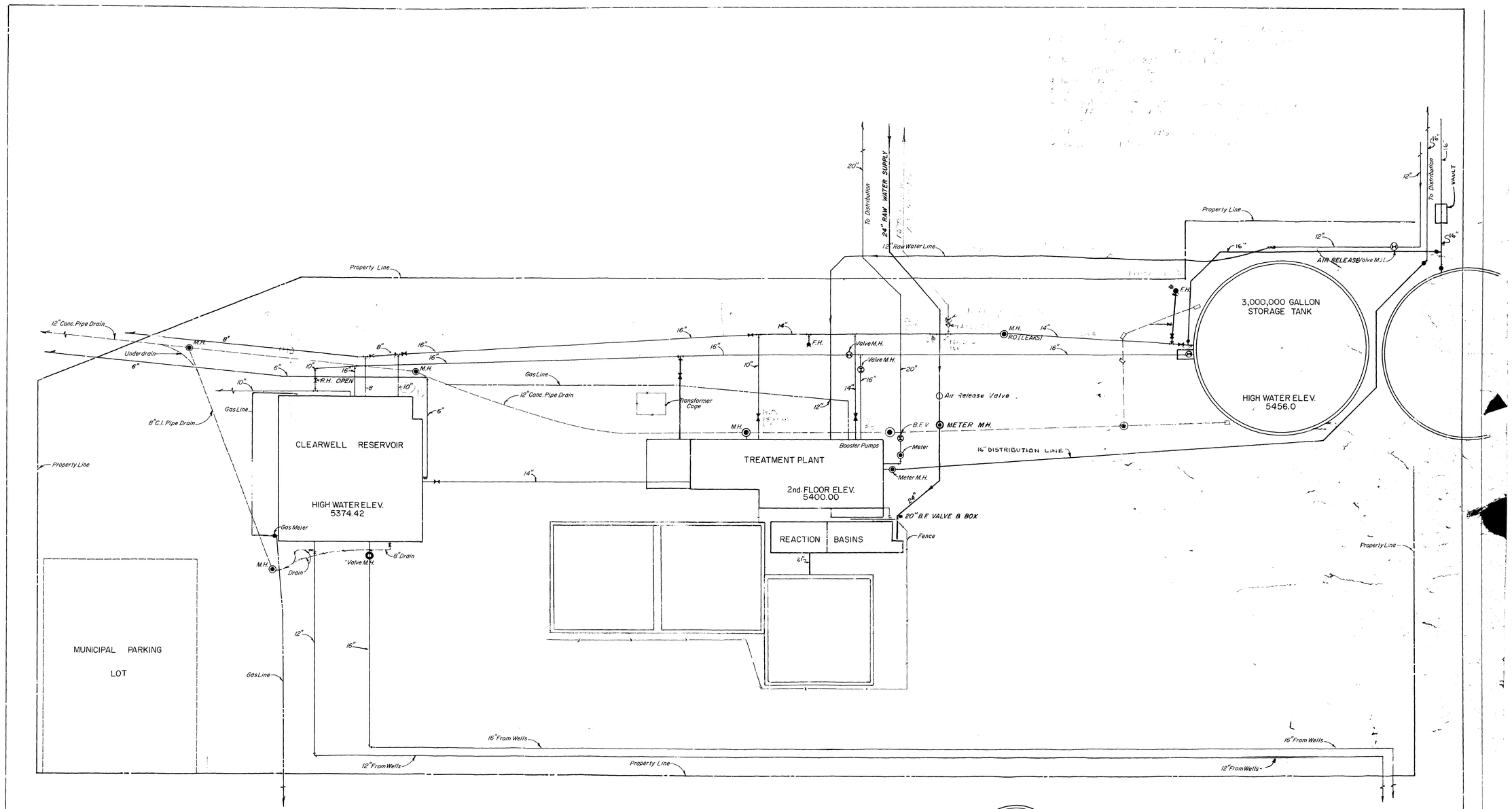
RECYCLE PUMP

			LINE	DLN	THORNTON TREATMENT PLANT POWER DISTRIBUTION ONE LINE DIAGRAM
			80254		
			DLN/JJ		
			11-71		

Swanson-Rink and Associates
CONSULTING ENGINEERS
1560 Boulder Street
Denver, Colorado
80211
Phone:
(303) 433-6721

3-1-71 | 80254-E-1

1-2-2



THORNTON, COLORADO.
OFFICE OF THE CITY ENGINEER

DRAWN BY: R.V.G. TRACED BY: C. MEEHAN	WATER TREATMENT FACILITY PLOT PLAN
CHECKED BY: R.V.G.	
ENGINEERING SECTION CHECKED BY:	
SUBMITTED BY:	

APPROVED:	APPROVED:	SCALE: 1 INCH = 30 FEET
CITY ENGINEER	DIRECTOR OF UTILITIES	SPECIFICATION NO.
		DATE MAY 31, 1967
CITY MANAGER		SHEET NO. 1 OF 1
DATE		FILE NO ~~10-1~~ 1-2-2

PLANS FOR

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS

THORNTON, COLORADO

CONTRACT NO. 1

PROJECT NO. 3956

1	GENERAL LAYOUT	
2	FILTER BUILDING	BUILDING ELEVATIONS
3	FILTER BUILDING	EXISTING OPERATING FLOOR PLAN
4	FILTER BUILDING	HEATING PLAN - OPERATING FLOOR
5	FILTER BUILDING	ARCHITECTURAL SECTIONS
6	FILTER BUILDING	ARCHITECTURAL DETAILS
7	FILTER BUILDING	WALL AND DOOR DETAILS
8	FILTER BUILDING	ROOF PLANS
9	FILTER BUILDING	CHEMICAL FLOOR PLAN
10	FILTER BUILDING	BUILDING SECTIONS
11	FILTER BUILDING	MISCELLANEOUS DETAILS
12	FILTER BUILDING	CHEMICAL SCHEMATICS
13	FILTER BUILDING	NEW OPERATING FLOOR PLAN
14	FILTER BUILDING	PIPE GALLERY FLOOR PLAN
15	FILTER BUILDING	PIER LAYOUT
16	FILTER BUILDING	CONCRETE SECTIONS
17	FILTER BUILDING	CONCRETE SECTIONS
18	FILTER BUILDING	CONCRETE SECTIONS
19	FILTER BUILDING	CONCRETE SECTIONS
20	REACTION BASIN	PLAN & SECTIONS
21	REACTION BASIN	CONCRETE SECTIONS & DETAILS
22	FLOCCULATOR CLARIFIERS	BASIN PLAN
23	FLOCCULATOR CLARIFIERS	SECTIONS & DETAILS
24	FLOCCULATOR CLARIFIERS	BAFFLE STRUCTURE SECTIONS
25	FLOCCULATOR CLARIFIERS	PIER PLAN & DETAILS
26	SANITARY SEWER & YARD MAIN	
27	STANDARD CONCRETE DETAILS	
28	DETAILS OF STANDARD MANHOLES	
29	FILTER BUILDING	HEATING, VENTILATING - PLAN OF
30	FILTER BUILDING	HEATING, VENTILATING, PLUMBING
31	FILTER BUILDING	ELECTRICAL
32	FILTER BUILDING	ELECTRICAL

BLACK & VEATCH, CONSULTING ENGINEERS

KANSAS CITY, MISSOURI - DENVER, COLORADO

1967

1-2-3

~~5 1 9~~

SCALE : 1" = 20'

NOTES:

1. For yard piping not shown, see Sheet 22.
2. See Sheet 22 for limits of perforated C.M.P. drain.
3. Buried electrical conduits are located between the exist. Filter Bldg. and the Clear Well. These conduits are to be field located and routed as required, by the contractor.
4. Dimensions shown are to the outside top of the substructure walls unless otherwise shown.
5. All pipes shall be laid of uniform grade between elevations given unless otherwise shown.
6. All items existing unless otherwise shown.
7. Bench Mark El. 390.00 (B.M.) Operating floor @ center of south double door - east side of exist. Water Treatment Plant.
8. W.W. Sewer's overflow north of M.H. "6 to be R.C.P.P. South of M.H. "6 to be R.C.P. or V.C.P.

LEGEND

- Exist piping smaller than 16"
- Exist piping 16" and larger
- New piping smaller than 16"
- New piping 16" and larger
- Exist. structures
- New structures
- Future structures
- Exist. contours
- New contours
- pp — Power pole
- T.P. — Telephone pole
- M.H. — Manhole
- V.B. — Valve box
- F.H. — Fire hydrant
- T.H. — Test hole
- Limits of gravel surfacing

GENERAL NOTES:

1. All notes given here applies to all sheets.
2. All openings, pipe sleeves, conduits, inserts and other embedded items to be placed before concrete is poured.
3. Floor elevations are given to high point except as otherwise noted, and except in floor drainage plans and details.
4. The specified clearance for reinforcing in suspended slabs in areas sloped to floor drains is to be measured from the low points in the top surface of structural slabs and the reinforcing maybe placed in a level plane in these areas.
5. C.I.M.H. Steps to be Neenah R-1980-J @ 1'-4" ctrs.
6. All pipe hangers, braces, or inserts are not shown on plans. See specifications for support requirements not covered by plans.
7. Place compacted granular fill under all lines entering structures, to 3' ea. side of pipe in all areas where trench bottom has been excavated.
8. Concrete walks shall be not less than 4" thick.
9. Section designation for all sheets.
   (5/3) — 5 = Section number; 3 = Sheet number on which section is shown.

STANDARD ABBREVIATIONS - Abbreviations shown here apply to all Sh.

C.I.P.	Denotes cast iron pipe		C.I.M.H.	Steps denotes cast iron manhole steps	
C.I.S.P.	" cast iron soil pipe		M.H.	Denotes manhole	
C.W.	" cold water sup. piping (potable)		P.S.	" pipe support	
H.W.	" hot " " "		P.H.	" pipe hanger	
R.C.P.	" reinforced concrete pipe		G.C.	" gage cock	
V.C.P.	" vitrified clay pipe		C.O.	" cleanout	
R.C.P.P.	" reinf. conc. pressure pipe		B.F.	" blind flange	
G.V.	" gate valve		P.R.V.	" power roof vent.	
C.V.	" check valve		B.U.	" bell-up, pipe embed. in floor slab and projecting 1"	
B.F.V.	" butterfly valve		M.J.C.	" mechanical joint coupling	
P.V.	" plug valve		H.B.	" hose bibb or faucet	
H.V.	" hose valve		V.B.	" valve box	
F.D.	" floor drain				
R.D.	" roof drain				
C.M.P.	" corrugated metal pipe				

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS

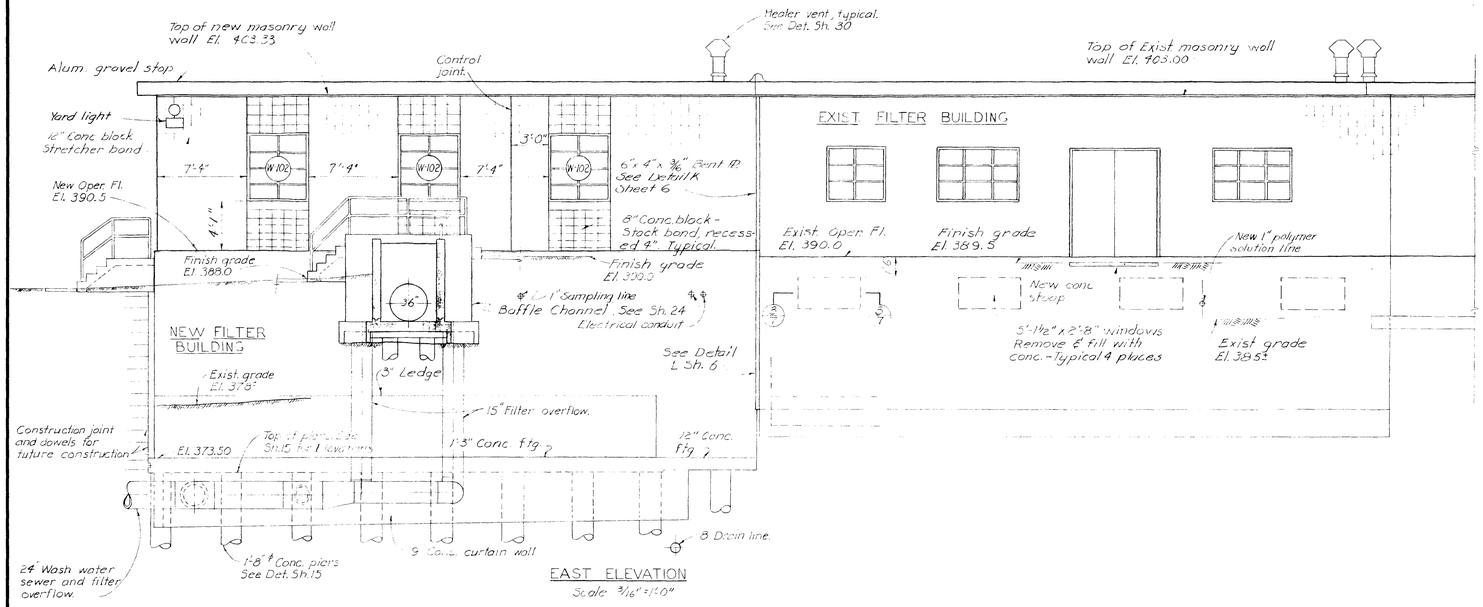
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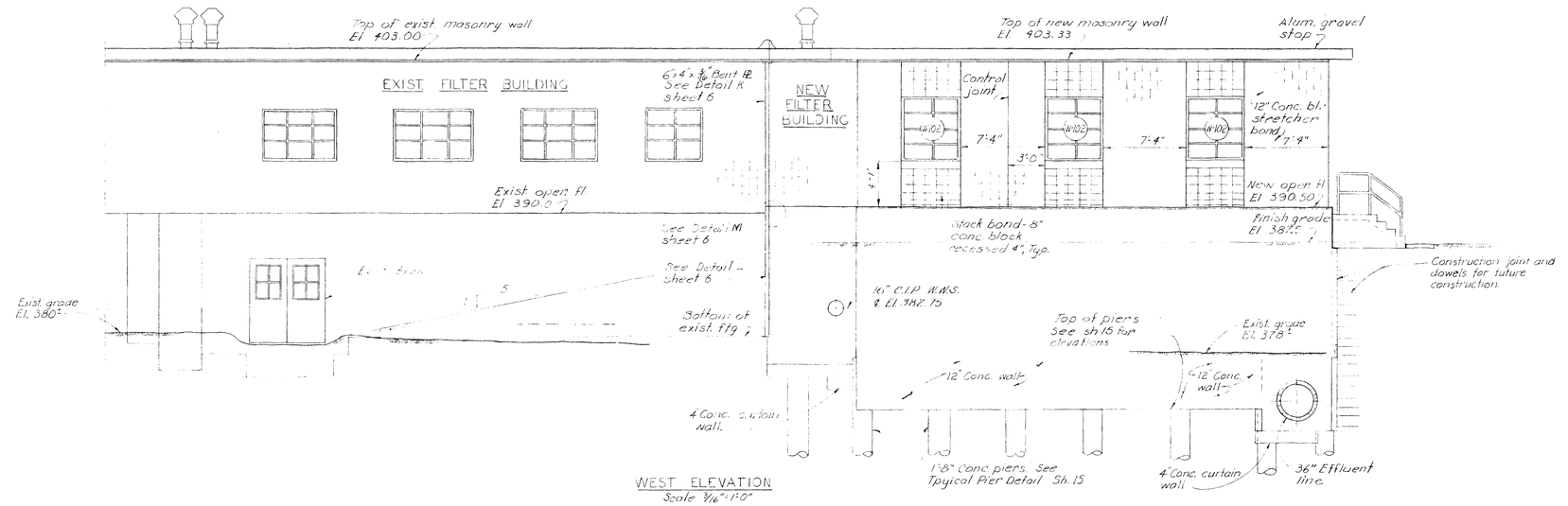
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED EWK — CHECKED EFW
DETAILED ELW — APPROVED
DATE 6/21/67

SHEET 1 OF 32

1-2-3





MATERIAL LEGEND

Concrete	
Exist. concrete	
Glazed tile	
Concrete block	

Note:
Underdrain piping not shown this sheet.

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

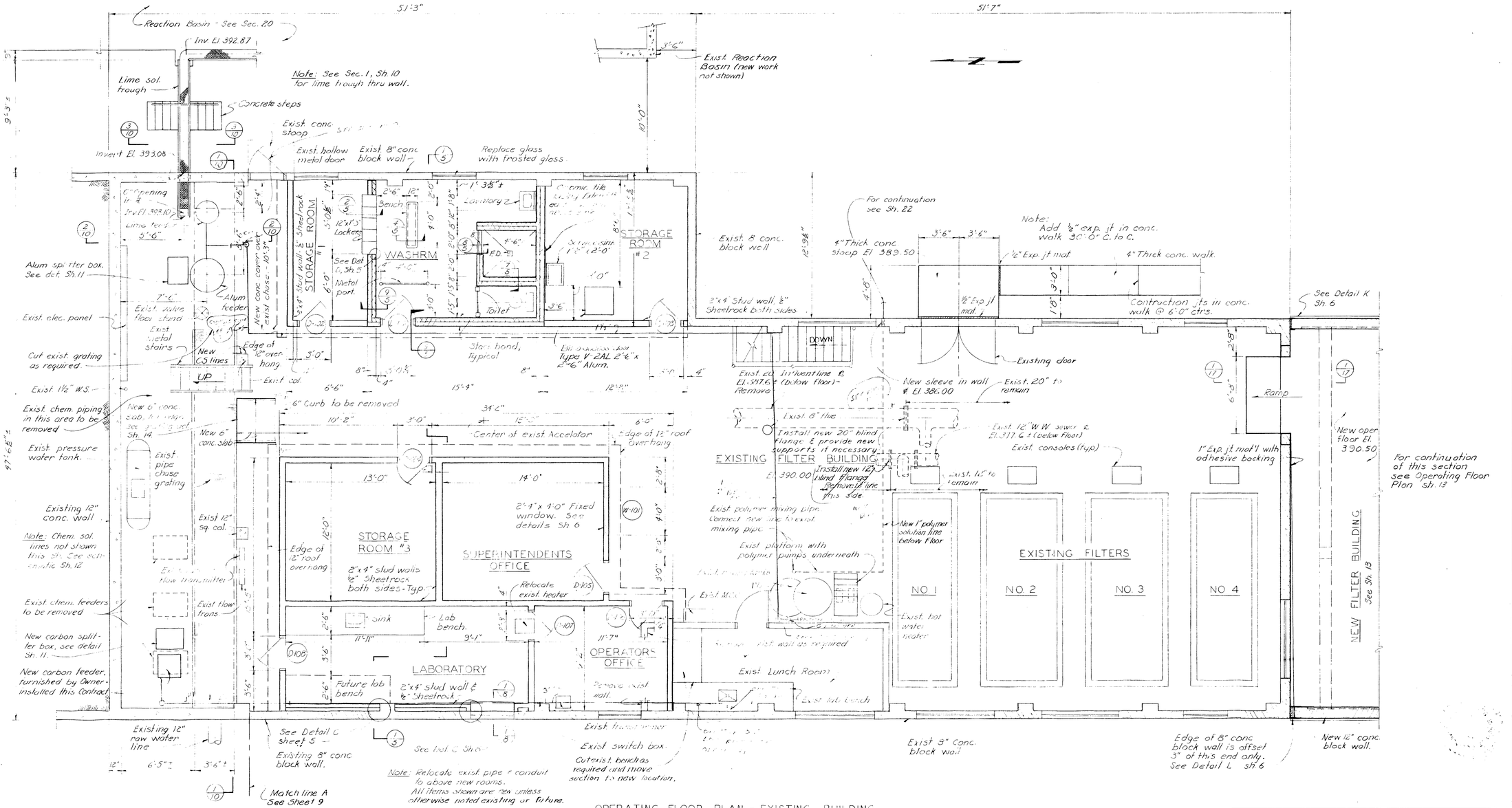
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
BUILDING ELEVATIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED FGP CHECKED LGW
DETAILED FGP APPROVED
DATE 8/24/81

SHEET 2 OF 32

1-2-3



OPERATING FLOOR PLAN - EXISTING BUILDING
Scale ¼"=1'-0"

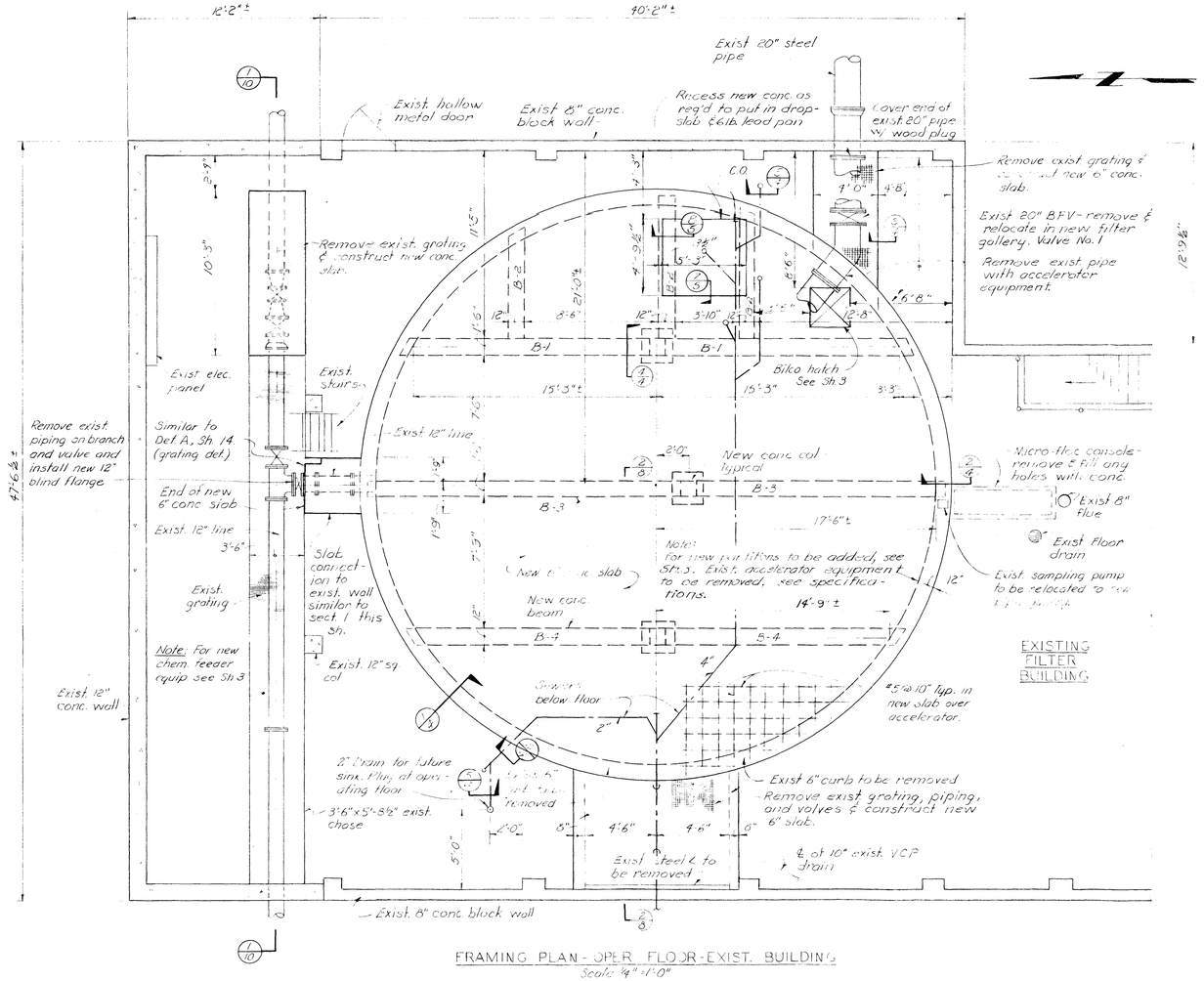
THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
EXISTING OPERATING FLOOR PLAN

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

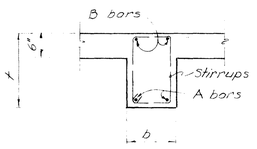
DESIGNED TGR CHECKED LEW
DETAILED TGR APPROVED [signature]
DATE 8/21/67

SHEET 3 OF 32

1-2-3



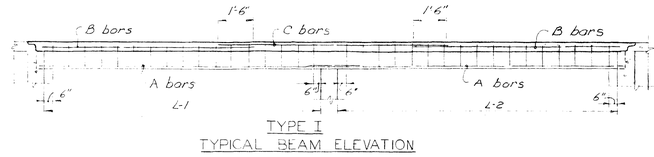
FRAMING PLAN - OPER. FLOOR - EXIST. BUILDING
Scale: ¼" = 1'-0"



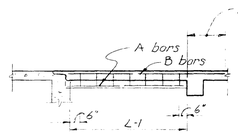
TYPICAL BEAM DETAIL

OPER. FLOOR - EXIST BUILDING - BEAM SCHEDULE

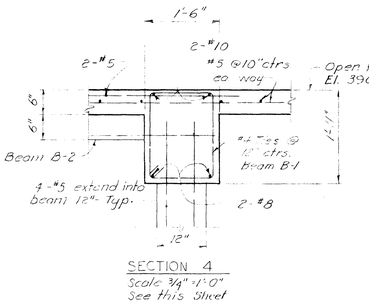
MARK	TYPE	b	t	A BAR	B BAR	C BAR	STIRRUPS	REMARKS
B-1	I	18"	23"	2-#8	2-#5	2-#10	#4 @ 12"	C bars 14'-0" long - ctr over col.
B-2	II	12"	12"	2-#6	2-#5	—	#3 @ 12"	
B-3	I	18"	24"	2-#9	2-#5	2-#11	#4 @ 12"	C bar - 14'-0" long - ctr over col.
B-4	I	12"	24"	2-#7	2-#5	2-#9	#3 @ 12"	C-bar - 14'-0" long - ctr over col.



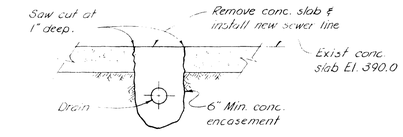
TYPE I
TYPICAL BEAM ELEVATION



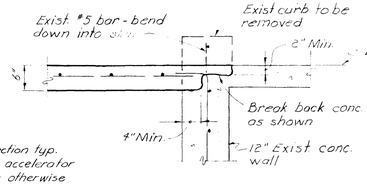
TYPE II
TYPICAL BEAM ELEVATION



SECTION 4
Scale: ¾" = 1'-0"
See this Sheet

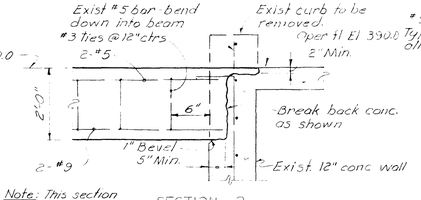


SECTION 5
Scale: ¾" = 1'-0"
See this Sheet



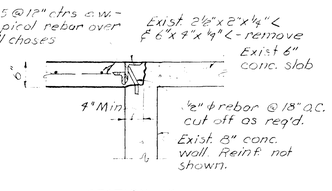
SECTION 1
Scale: ¾" = 1'-0"
See this Sheet

Note: This section typ. around exist. accelerator except where otherwise shown.



Note: This section typ. at ends of new beams

SECTION 2
Scale: ¾" = 1'-0"
See this Sheet



SECTION 3
Scale: ¾" = 1'-0"
See this Sheet

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS

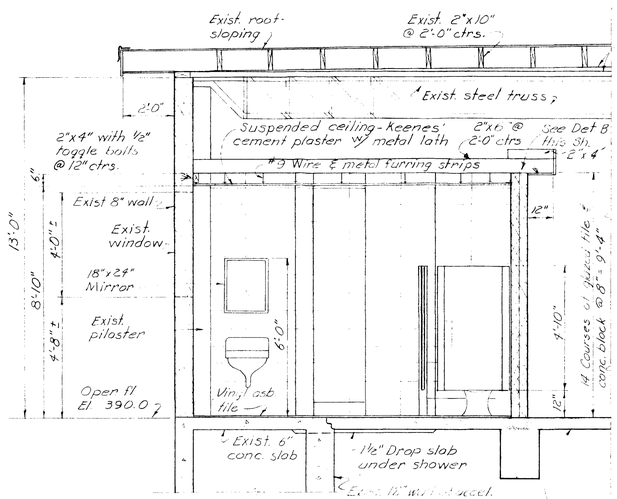
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
FRAMING PLAN — OPERATING FLOOR

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

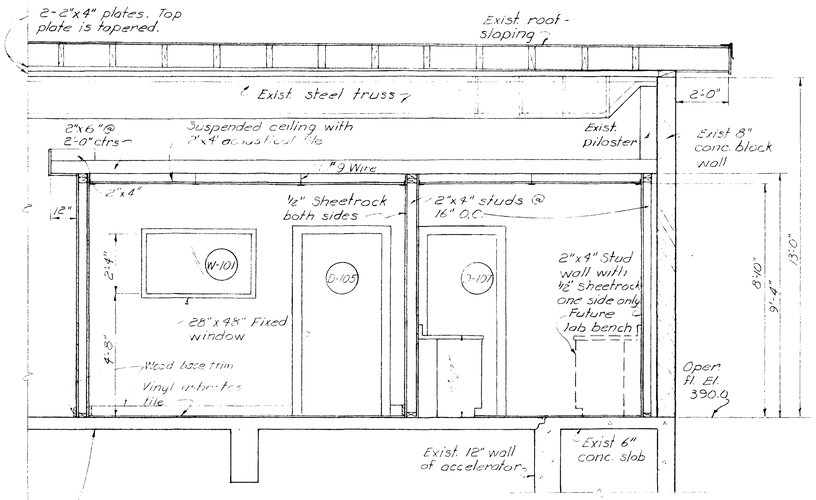
DESIGNED TGR CHECKED GEW
DETAILED TGR APPROVED E.R. Jaraback
DATE 8/21/67

SHEET 4 OF 32

1-2-3

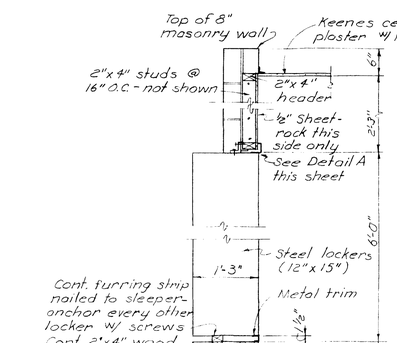


WASHROOM

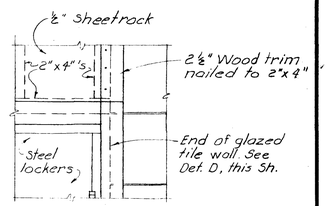


OFFICE LAB

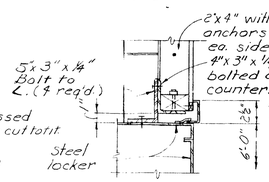
SECTION 1
Scale 3/4"=1'-0"
See Sheet 3



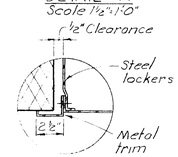
SECTION 2
Scale 3/4"=1'-0"
See Sh. 3



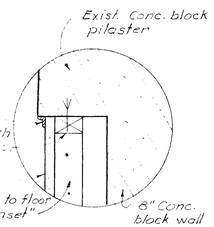
DETAIL OF LOCKER CORNER
Scale 1 1/2"=1'-0"



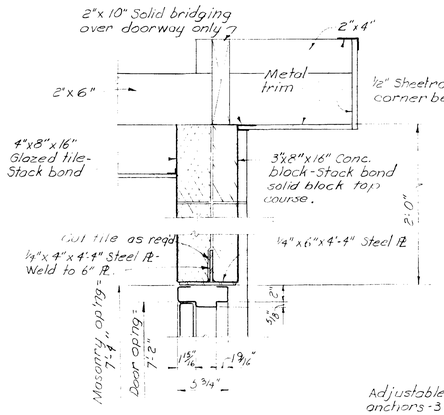
DETAIL A
Scale 1 1/2"=1'-0"



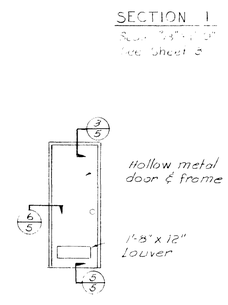
DETAIL D
Scale 1 1/2"=1'-0"
See this Sheet



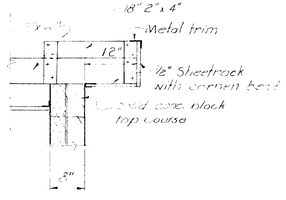
DETAIL C
Scale 1 1/2"=1'-0"
See sheet 3



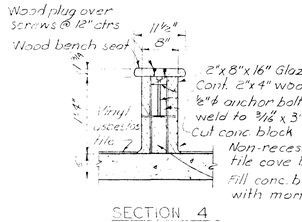
SECTION 3
Scale 1 1/2"=1'-0"
See this Sh. & Sh. 8



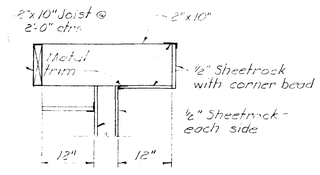
DOOR D-101 ELEV
No Scale



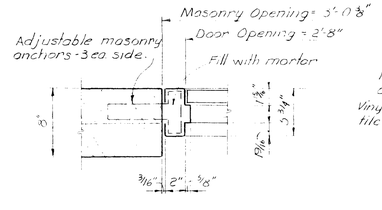
DETAIL B
Scale 3/4"=1'-0"
See Sect 1 this sh.



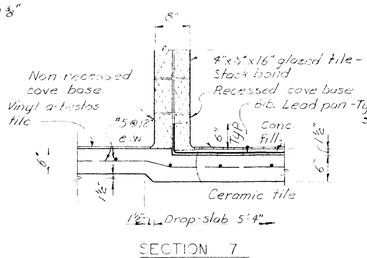
SECTION 4
Scale 3/4"=1'-0"
See Sheet 3



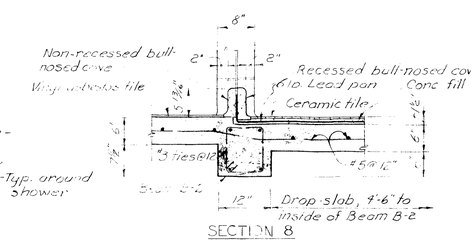
DETAIL F
Scale 3/4"=1'-0"
See sheet 3



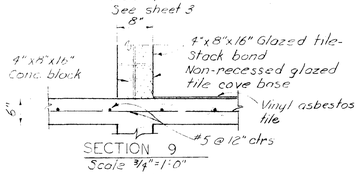
DOOR D-101 SECTION 6
Scale 1 1/2"=1'-0"
See this Sheet



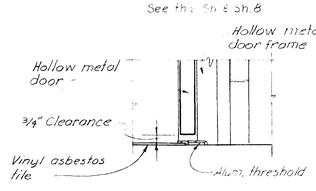
SECTION 7
Scale 3/4"=1'-0"
See sheet 3



SECTION 8
Scale 3/4"=1'-0"
See sheet 3



SECTION 9
Scale 3/4"=1'-0"
See Sheet 3



DOOR D-101 SECTION 5
Scale 1 1/2"=1'-0"
See this Sh. & Sh. 3

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

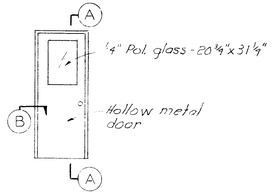
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
ARCHITECTURAL SECTIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

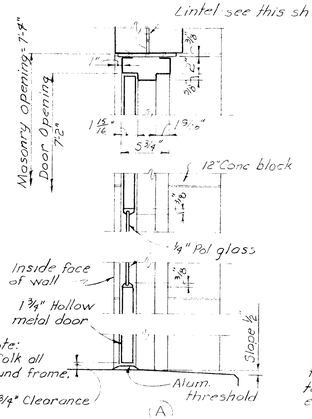
DESIGNED T&R CHECKED LEW
DETAILED T&R APPROVED K.R. Zarebok
DATE 8/21/67

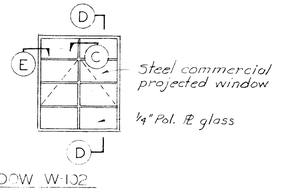
SHEET 5 OF 32

1-2-3.

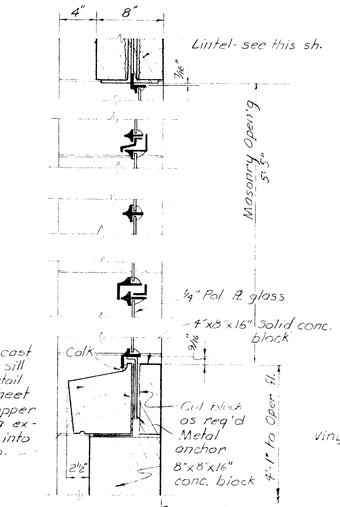


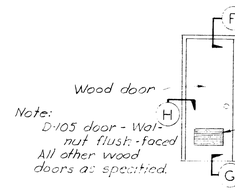
DOOR D-109



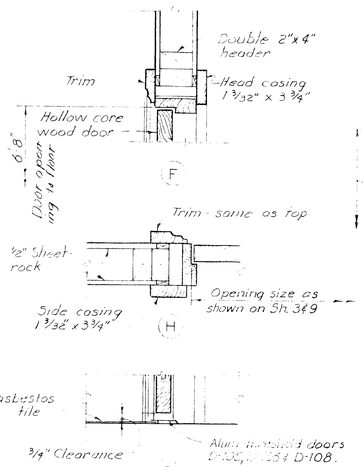


WINDOW W-102

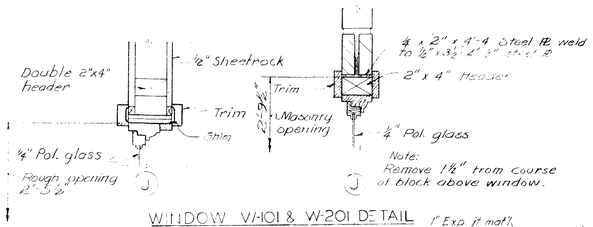




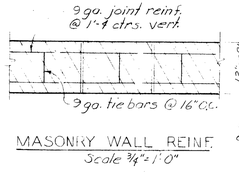
DOOR D-102 THRU D-108



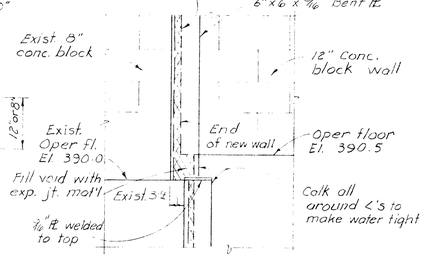
WINDOW W-101 & W-201



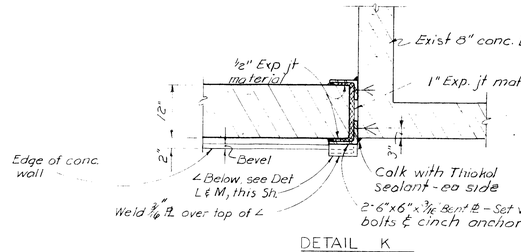
WINDOW W-101 & W-201 DETAIL
Scale 1 1/2" = 1'-0"



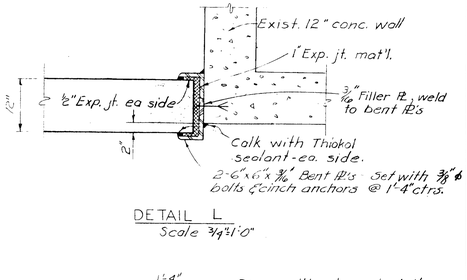
MASONRY WALL REINF.
Scale 3/4" = 1'-0"



DETAIL M
Scale 3/4" = 1'-0"



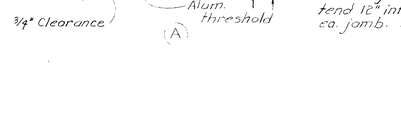
DETAIL K
Scale 3/4" = 1'-0"



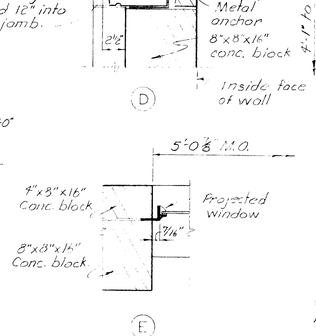
DETAIL L
Scale 3/4" = 1'-0"

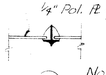
Piers without control jt. - use 12" conc. block instead of 9" & 8" conc. block.

PILASTER CONTROL JOINT
Scale 3/4" = 1'-0"



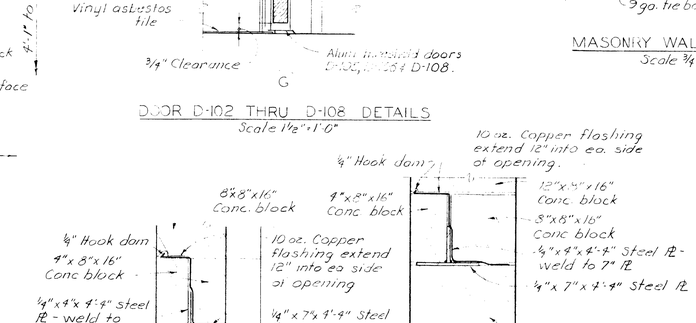
DOOR D-109 DETAIL
Scale 1 1/2" = 1'-0





Note: Min. thickness of any section of window is 1/8".

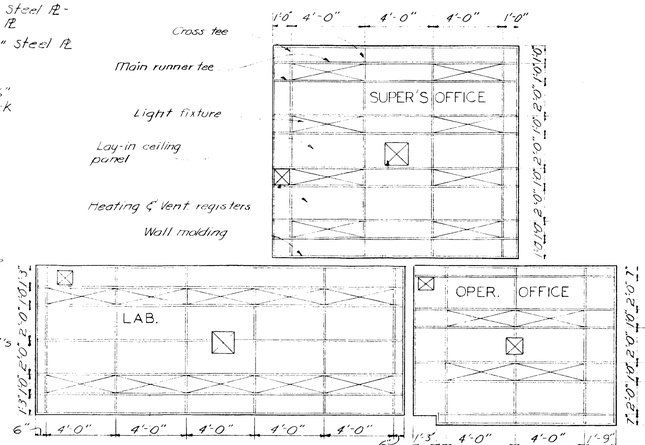
WINDOW W-102 DETAILS



WINDOW LINTELS W-102
Scale 1 1/2" = 1'-0"

DOOR LINTELS - D-109
Scale 1 1/2" = 1'-0"

WINDOW SILL DETAIL
Scale: 1 1/2" = 1'-0"



REFLECTED CEILING PLANS
Scale 1/4" = 1'-0"

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

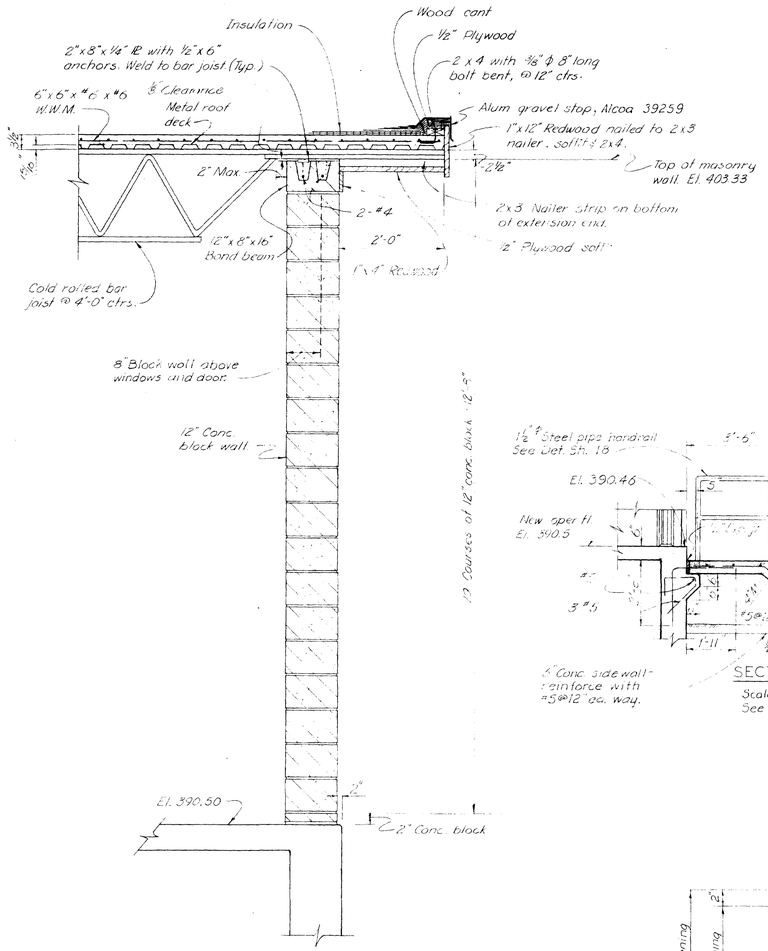
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
ARCHITECTURAL DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED TGR
DETAILED TGR
CHECKED LEW
APPROVED R.R. Yarabek
DATE 5/21/67

SHEET 6 OF 3

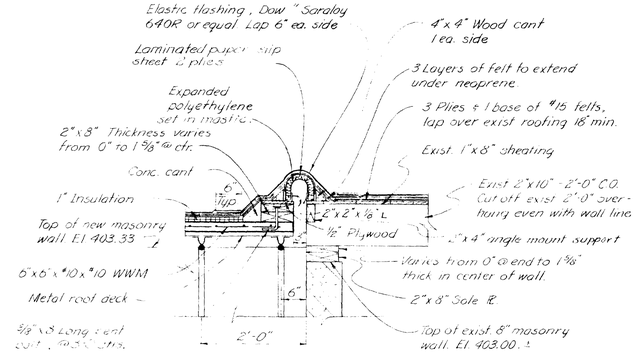
1-2-



SECTION 1

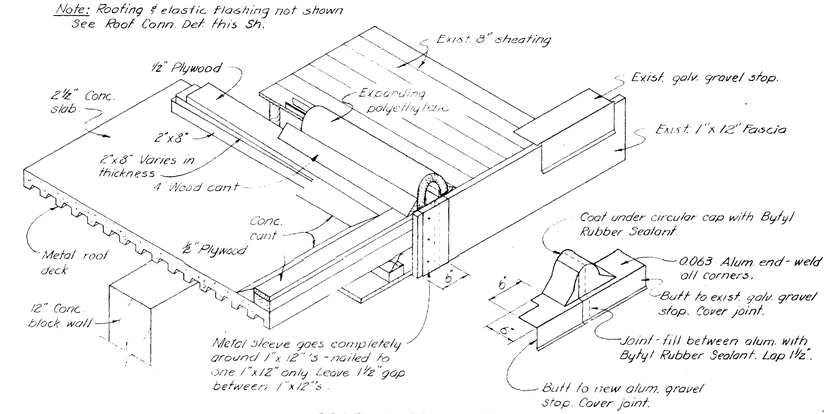
Scale: ¾"=1'-0"

See Sheets 8, 10 & 13



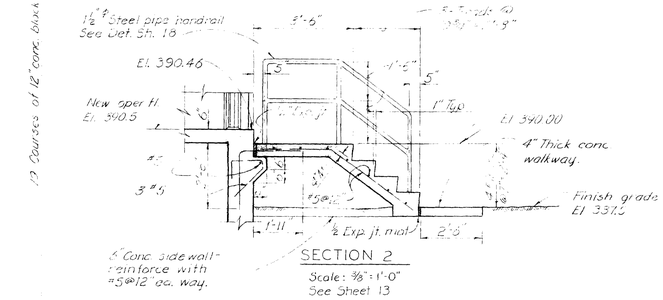
ROOFING CONNECTION TO EXIST. BLDG.

Scale: ¾"=1'-0"



ROOFING CONN. DETAIL

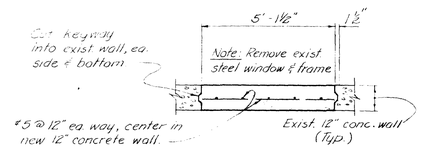
No Scale



SECTION 2

Scale: ⅜"=1'-0"

See Sheet 13



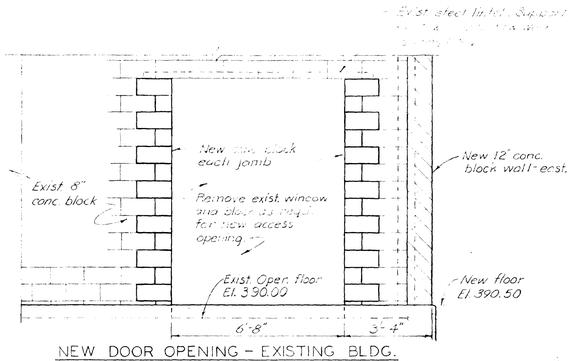
SECTION 3

Scale: ⅜"=1'-0"

See Sheet 2

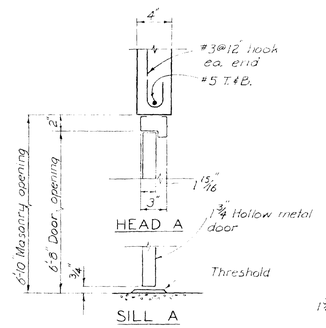
ROOM FINISH SCHEDULE

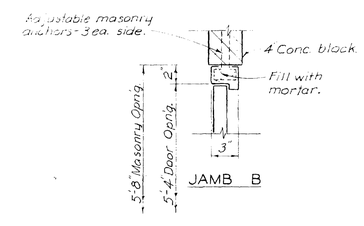
ROOM	FLOOR						WALL						BASE			CEILING		
	Monolithic concrete	Vinyl asbestos tile	Ceramic tile	Concrete block	8"x16" Glazed tile	Sheet rock	Exposed 2"x4" stud wall	Wall material	4" Vinyl base	Glazed tile, cove base	Exposed construction	Acoustical exposed grid	Suspended, Keenes cement plast.	Gypsum board				
EXISTING BUILDING																		
Shower Area			○		○					○				○				
Operators Office		○				○			○			○						
Storage Room #1		○				○			○									○
Storage Room #2		○				○			○									○
Storage Room #3		○				○			○									○
Wash Room			○		○	○				○				○				
Superintendents Office		○				○			○			○						
Laboratory		○				○			○			○						
Chlorine Room		○			○				○									○
Carbon Feed Room		○			○				○									○
NEW BUILDING																		
Operating Floor	○			○					○			○						



NEW DOOR OPENING - EXISTING BLDG.

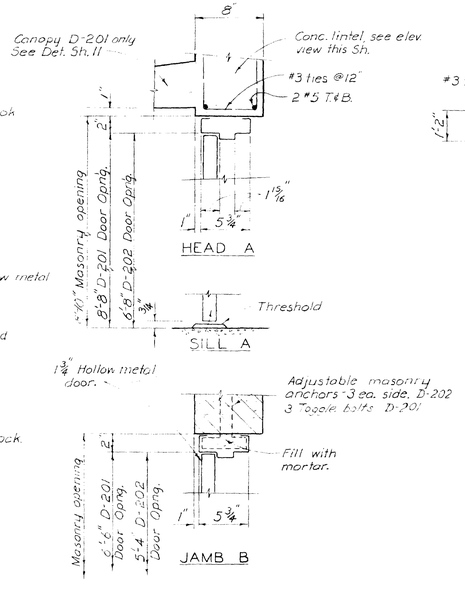
Scale: ⅜"=1'-0"





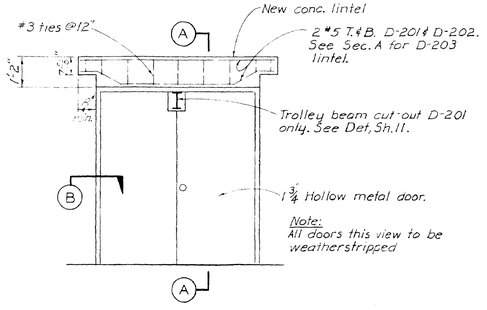
DOOR D-203 DETAILS

Scale: 1½"=1'-0"



DOOR D-201 & D-202 DETAILS

Scale: 1½"=1'-0"



DOOR D-201, D-202 & D-203

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

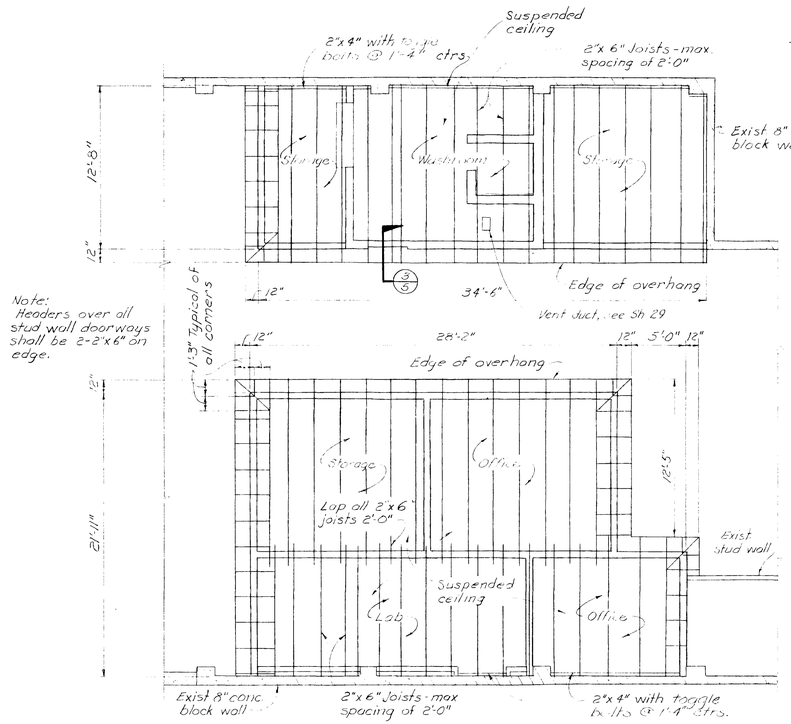
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
WALL AND DOOR DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED TGR, AWK — CHECKED [illegible]
DETAILED GLW, AWK — APPROVED [illegible]
DATE 8/2/67

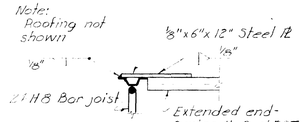
SHEET 7 OF 32

1-2-3

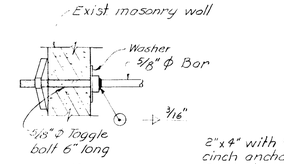


CEILING PLAN - INTERIOR ROOMS
Scale 3/16"=1'-0"

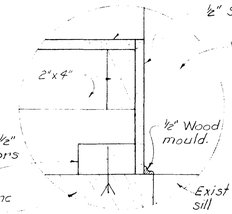
Note: Roofing not shown



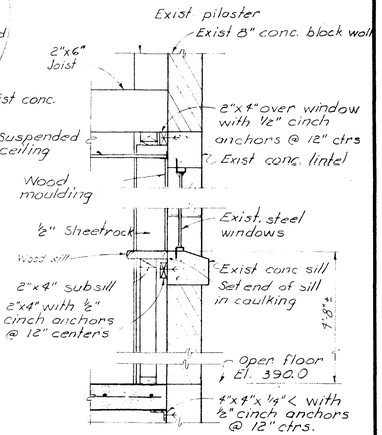
DETAIL A
Scale 1"=1'-0"
See this sheet



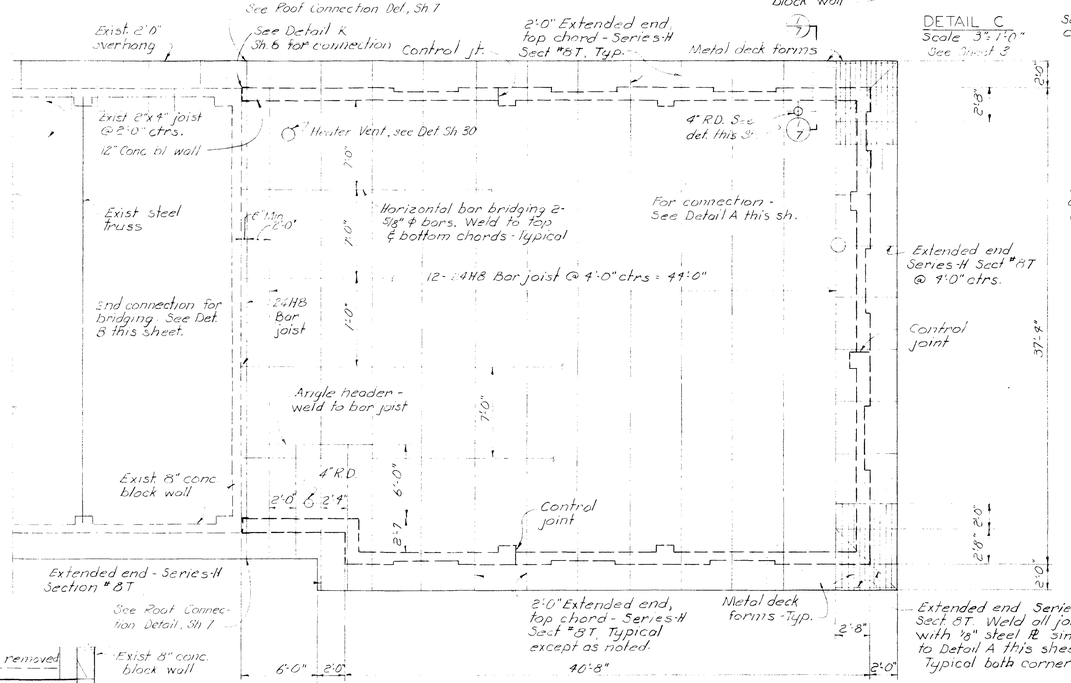
DETAIL B
No Scale
See this sheet



DETAIL C
Scale 3"=1'-0"
See Sheet 3

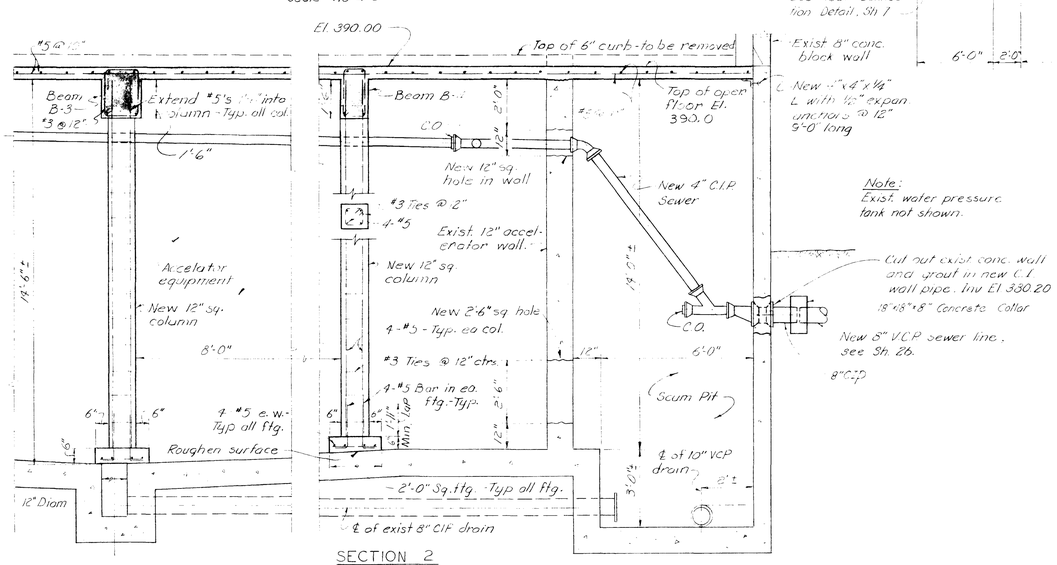


SECTION 1
Scale 3/4"=1'-0"
See Sheet 3

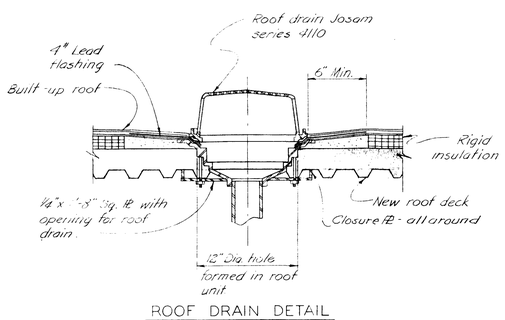


ROOF PLAN - NEW BUILDING
Scale 3/16"=1'-0"

Note: New walls not shown.



SECTION 2
Scale 3/8"=1'-0"
See Sheet 4



ROOF DRAIN DETAIL
No Scale

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
ROOF PLANS

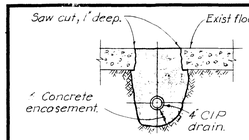
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED TGR CHECKED LEW
DETAILED TGR APPROVED R.R. Garabrant
DATE 8/21/67

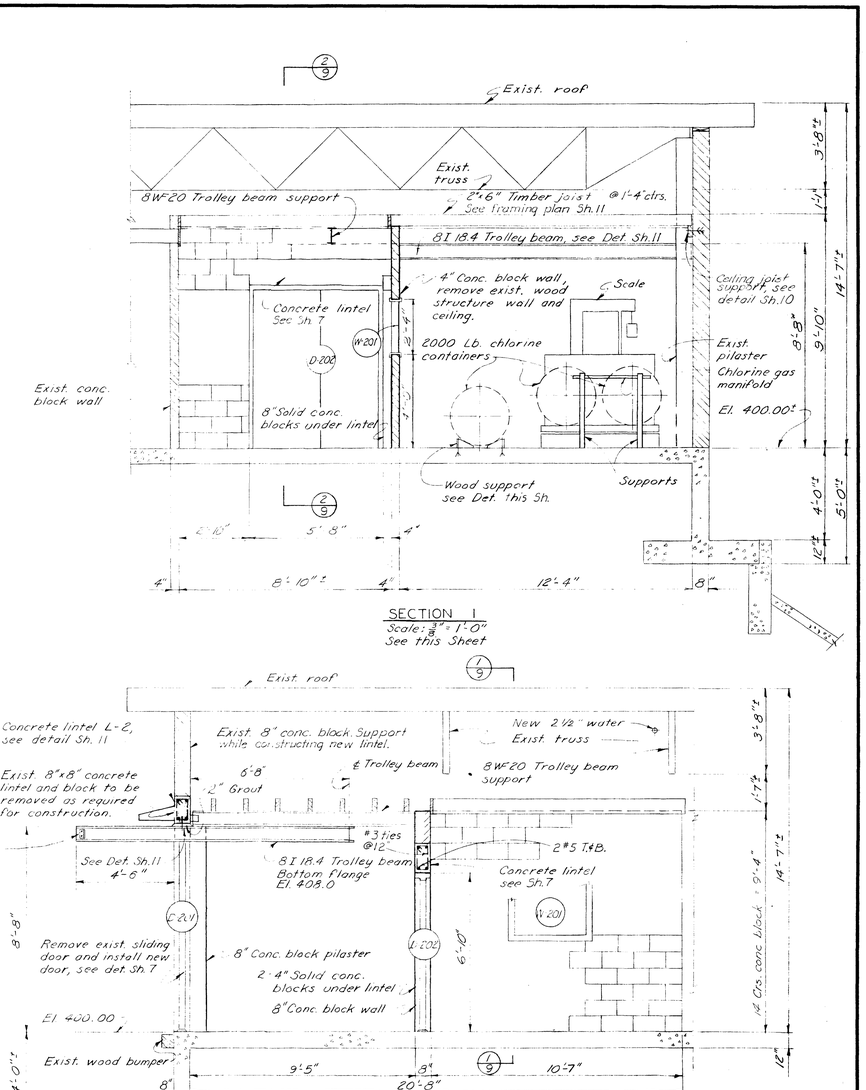
SHEET 8 OF 32

1-2-3

Note:
All items new unless shown otherwise.



SECTION 3
Scale: ½"=1'-0"
See This Sheet

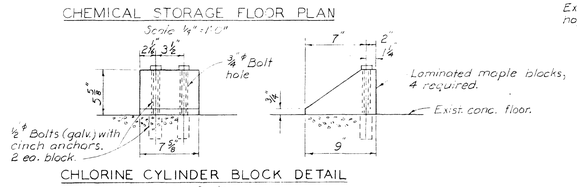


SECTION 1
Scale: ⅜"=1'-0"
See this Sheet

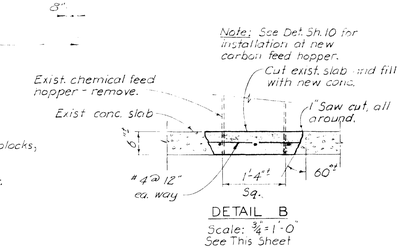
SECTION 2
Scale: ⅜"=1'-0"
See this Sheet

Note: All items new unless otherwise noted

CHEMICAL STORAGE FLOOR PLAN
Scale ¼"=1'-0"



CHLORINE CYLINDER BLOCK DETAIL
No Scale



DETAIL B
Scale: ¾"=1'-0"
See This Sheet

THORNTON, COLORADO

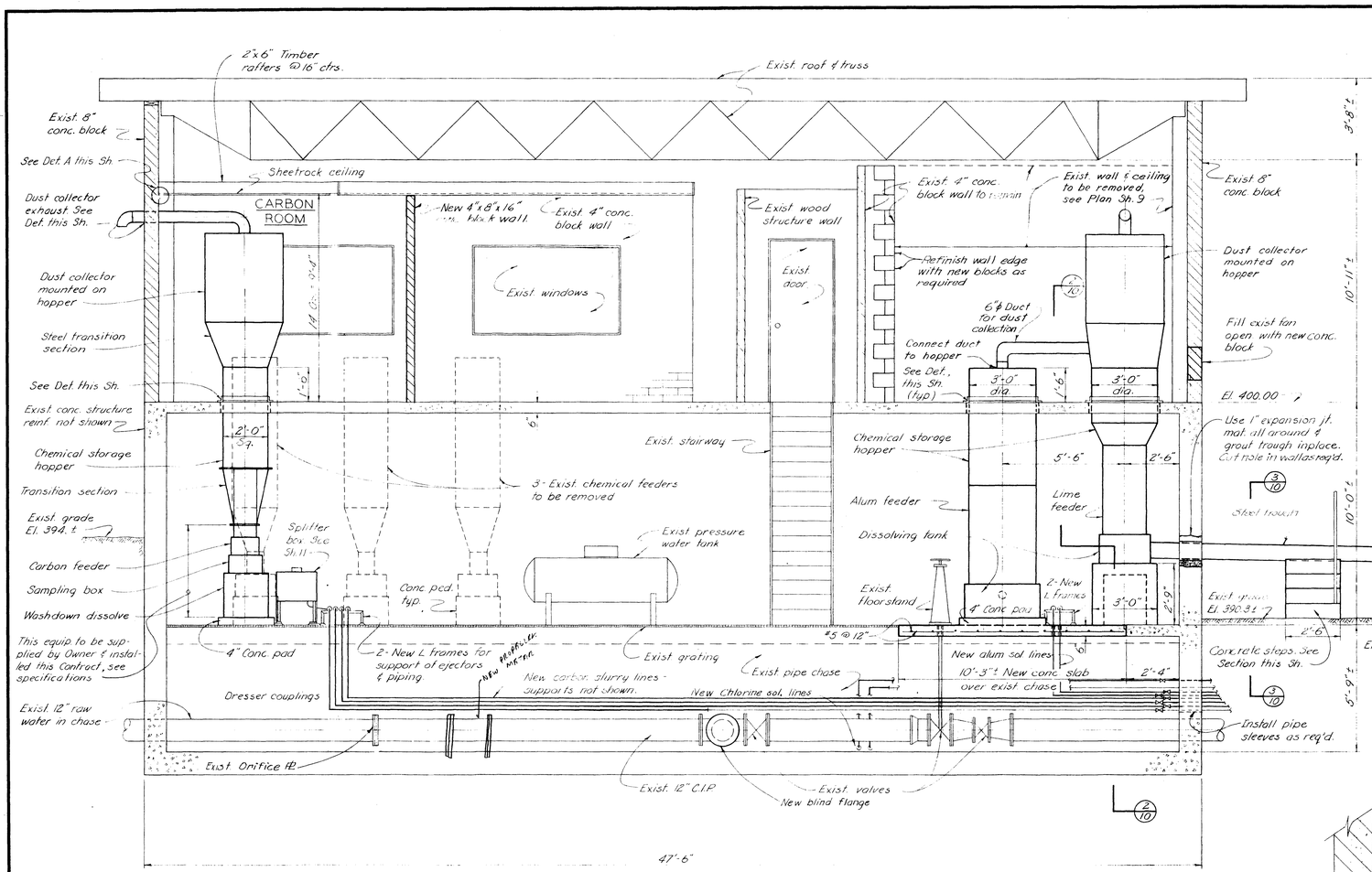
WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
CHEMICAL FLOOR PLAN

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWK	CHECKED LEW		SHEET 9 OF 32
DETAILED TGR MLJ	APPROVED [signature]		
	DATE 5/21/69		

1-2-3



THORNTON, COLORADO

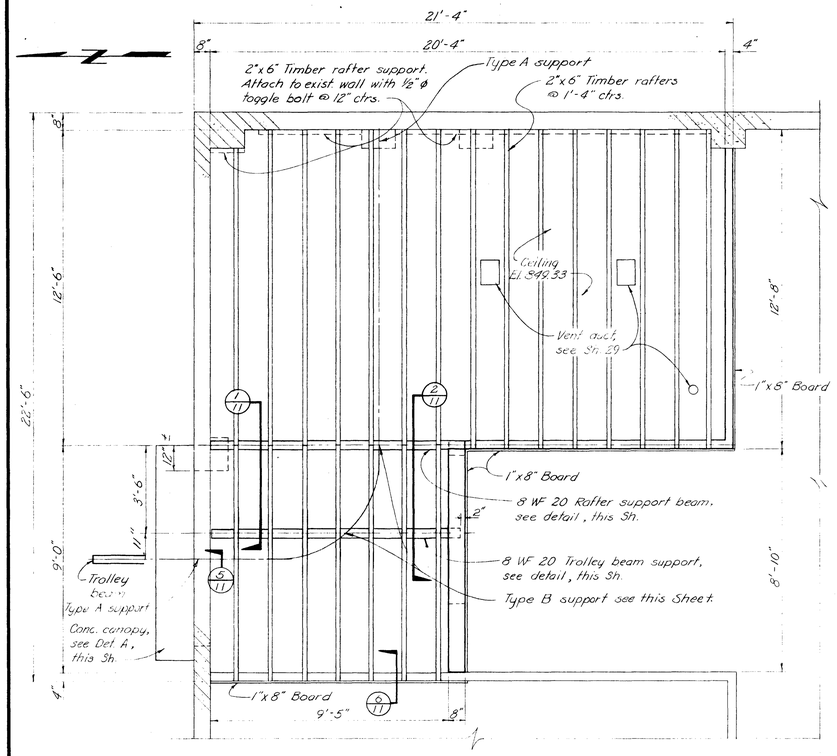
WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
BUILDING SECTIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

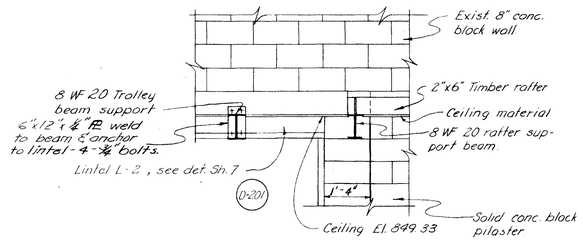
DESIGNED JWR	CHECKED GEW	SHEET 10 OF 32
DETAILED GLW	APPROVED R.R. Yarasheski	
	DATE 1/21/67	

1-2-3



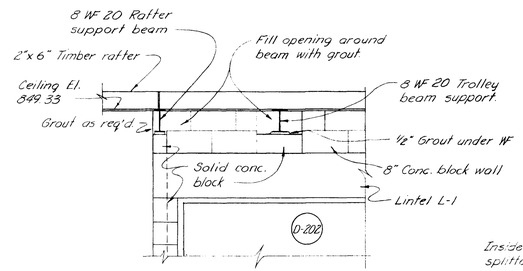
PLAN — CHLORINE ROOM CEILING

Scale: ⅜" = 1'-0"



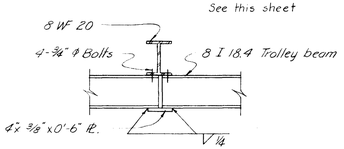
SECTION 1

Scale: ½" = 1'-0"
See this sheet



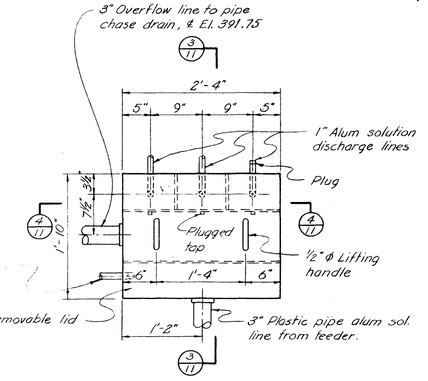
SECTION 2

Scale: ½" = 1'-0"
See this sheet



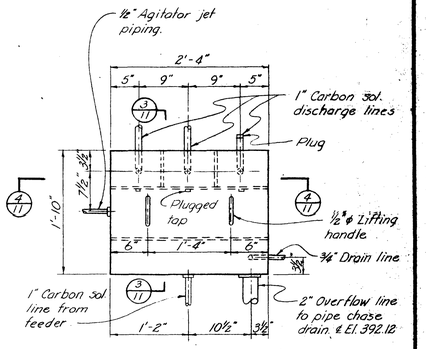
TROLLEY BEAM SPLICE DETAIL

Scale: ¾" = 1'-0"



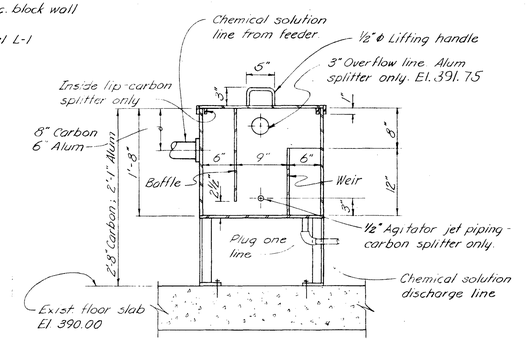
PLAN — ALUM SPLITTER BOX

Scale: 1" = 1'-0"



PLAN — CARBON SPLITTER BOX

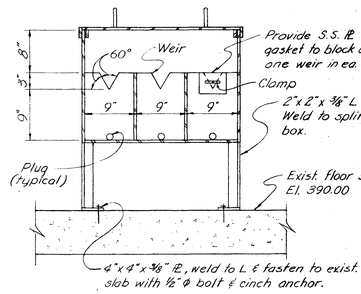
Scale: 1" = 1'-0"



SECTION 3

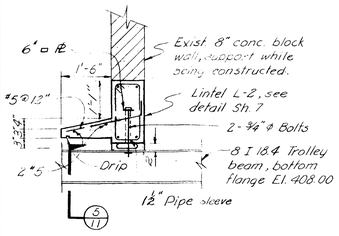
Scale: 1" = 1'-0"
See this sheet

Note: Splitter boxes to be fabricated from 12 ga. stainless steel PL.



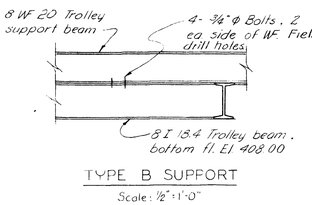
SECTION 4

Scale: 1" = 1'-0"
See this sheet



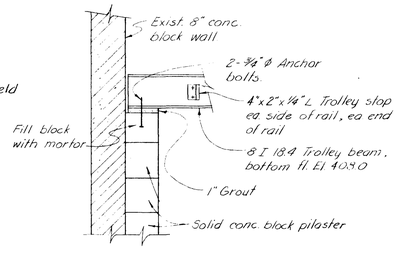
TYPE A SUPPORT

Scale: ½" = 1'-0"



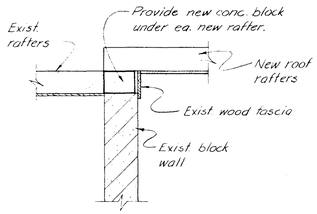
TYPE B SUPPORT

Scale: ½" = 1'-0"



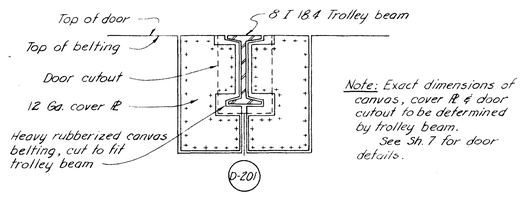
TYPE C SUPPORT

Scale: ½" = 1'-0"



SECTION 6

Scale: ½" = 1'-0"
See this sheet



Note: Exact dimensions of canvas, cover PL & door cutout to be determined by trolley beam. See Sh. 7 for door details.

SECTION 5

Scale: 1½" = 1'-0"
See Sheet 7 & 9 & this Sheet

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

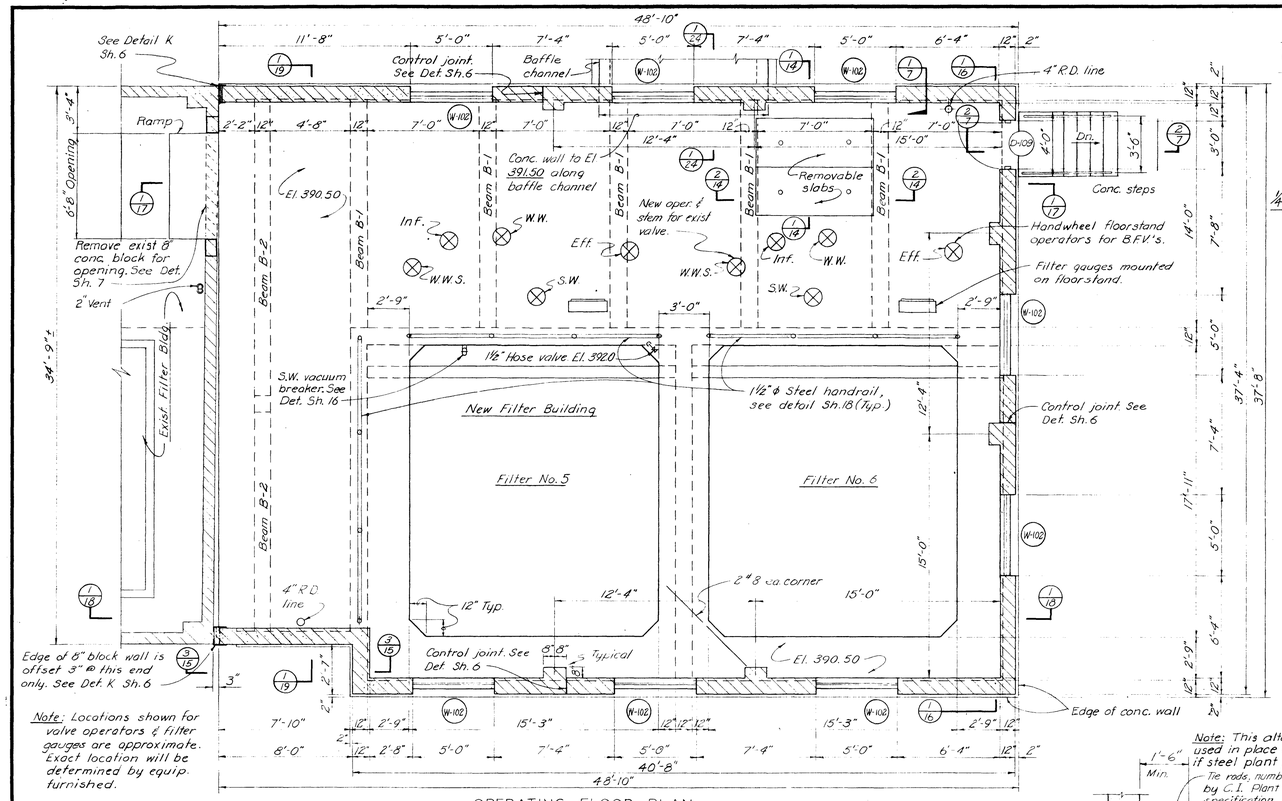
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
MISCELLANEOUS DETAILS

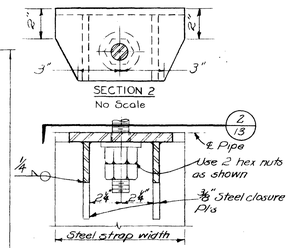
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

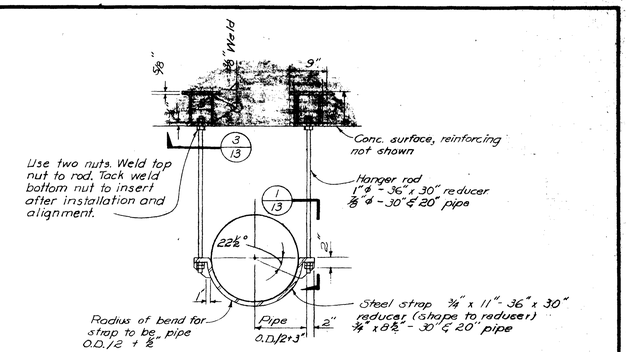
DESIGNED MJL CHECKED LEW
DETAILED GLN APPROVED R.R. Garabedian
DATE 9/21/67

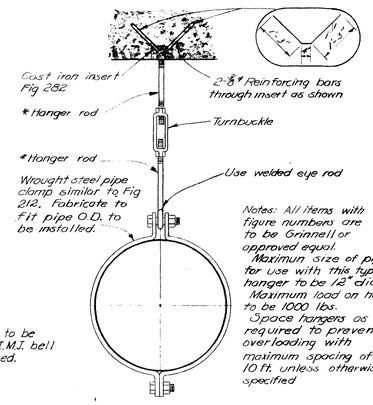
SHEET 11 OF 32

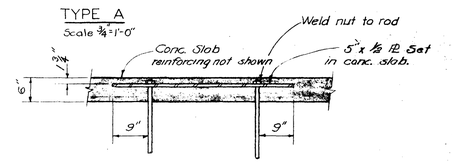
1-2-3



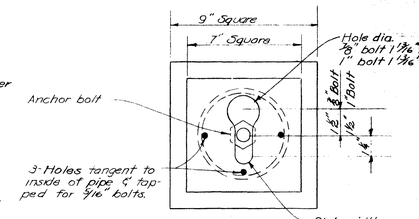


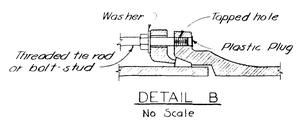




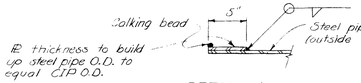


Note: Type B hanger is similar to Type A except for conc. anchorage.

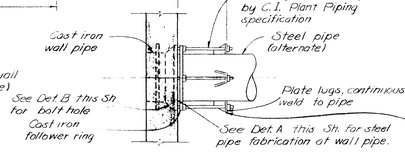




DETAIL B
No Scale



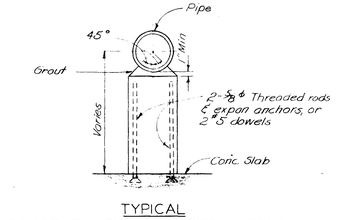
DETAIL A
No Scale



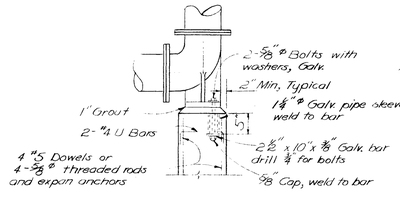
STEEL PIPE TO C.I. WALL PIPE ANCHOR DETAIL
No Scale

TYPE C
Scale 1" = 1'-0"

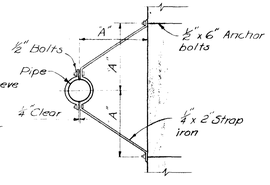
NO.	BOLTS REQ'D
12" Eff.	2
16" W.W.	4
16" Inf.	None
20" W.W.S.	4
36" Inf.	4
4" S.W.	2



TYPICAL CONCRETE PIPE SUPPORT DETAIL
No Scale



TYPICAL PIPE BASE DETAIL
No Scale



PIPE SUPPORT DETAIL D
No Scale

PIPE HANGER DETAILS

LEGEND

Inf.	Influent
S.W.	Surface wash supply
W.W.	Wash water
W.W.S.	Wash water sewer
Eff.	Filter effluent

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
NEW OPERATING FLOOR PLAN

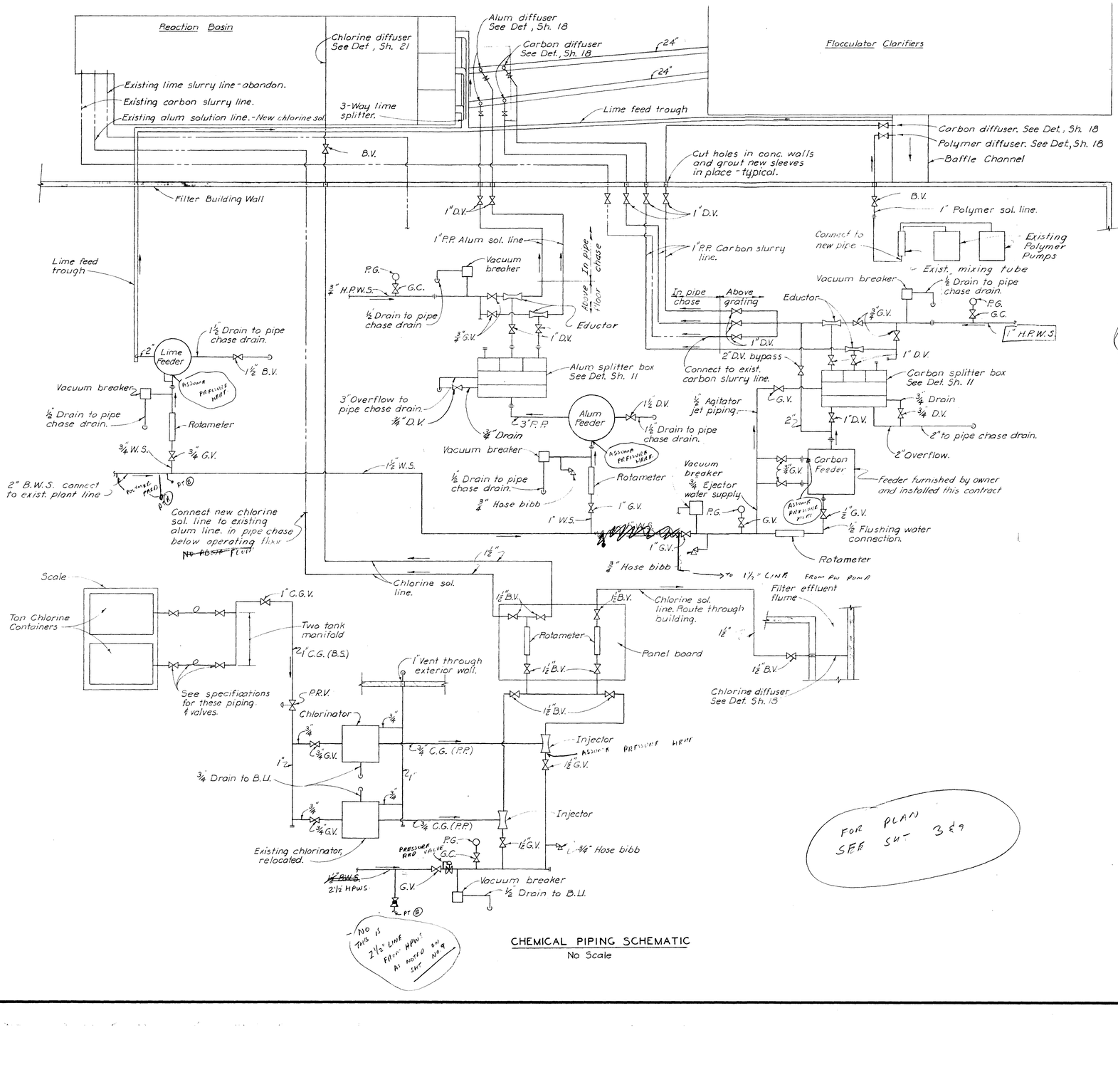
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWK, TGR CHECKED LEW
DETAILED GLW, SKC APPROVED R.K. Garbrick
DATE 8/21/67

SHEET 13 OF 32

THORNTON WATER TREATMENT PLANT ADDITIONS

1-2-3

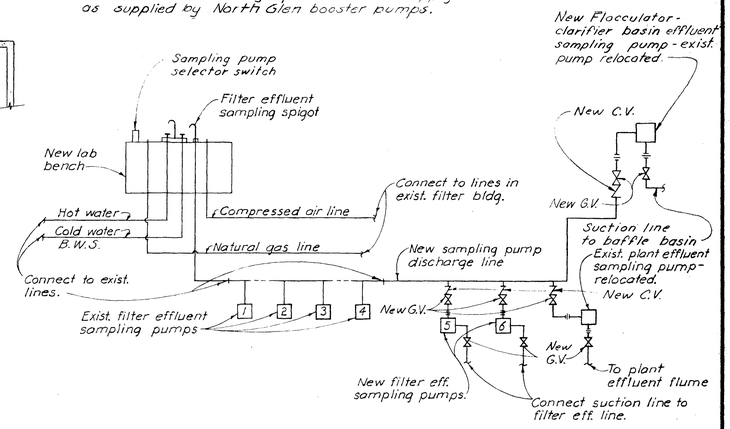


CHEMICAL PIPING SCHEMATIC
No Scale

LEGEND

———	New piping	B.S.	Black steel pipe
- - -	Existing piping	P.P.	Plastic pipe
—‖—	Plug	B.V.	Ball valve
—⊣⊢—	Union	G.V.	Gate valve
C.G.V.	Chlorine gas valve	D.V.	Diaphragm valve
C.G.	Chlorine gas	W.S.	Water supply
G.C.	Gage cock	B.U.	Bell up
P.G.	Pressure gage	P.R.V.	Pressure reducing valve.

B.W.S. - denotes existing filter building water supply as supplied by existing 5000 gallon hydro pneumatic tank.
H.P.W.S. - denotes high pressure water supply as supplied by North Glen booster pumps.



SAMPLING PUMP PIPING SCHEMATIC
No Scale

FOR PLAN SEE SH- 3 & 9

PRINTED COMMENTS - AS BUILT
BY BOD - SEE SHT 3

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
CHEMICAL SCHEMATICS

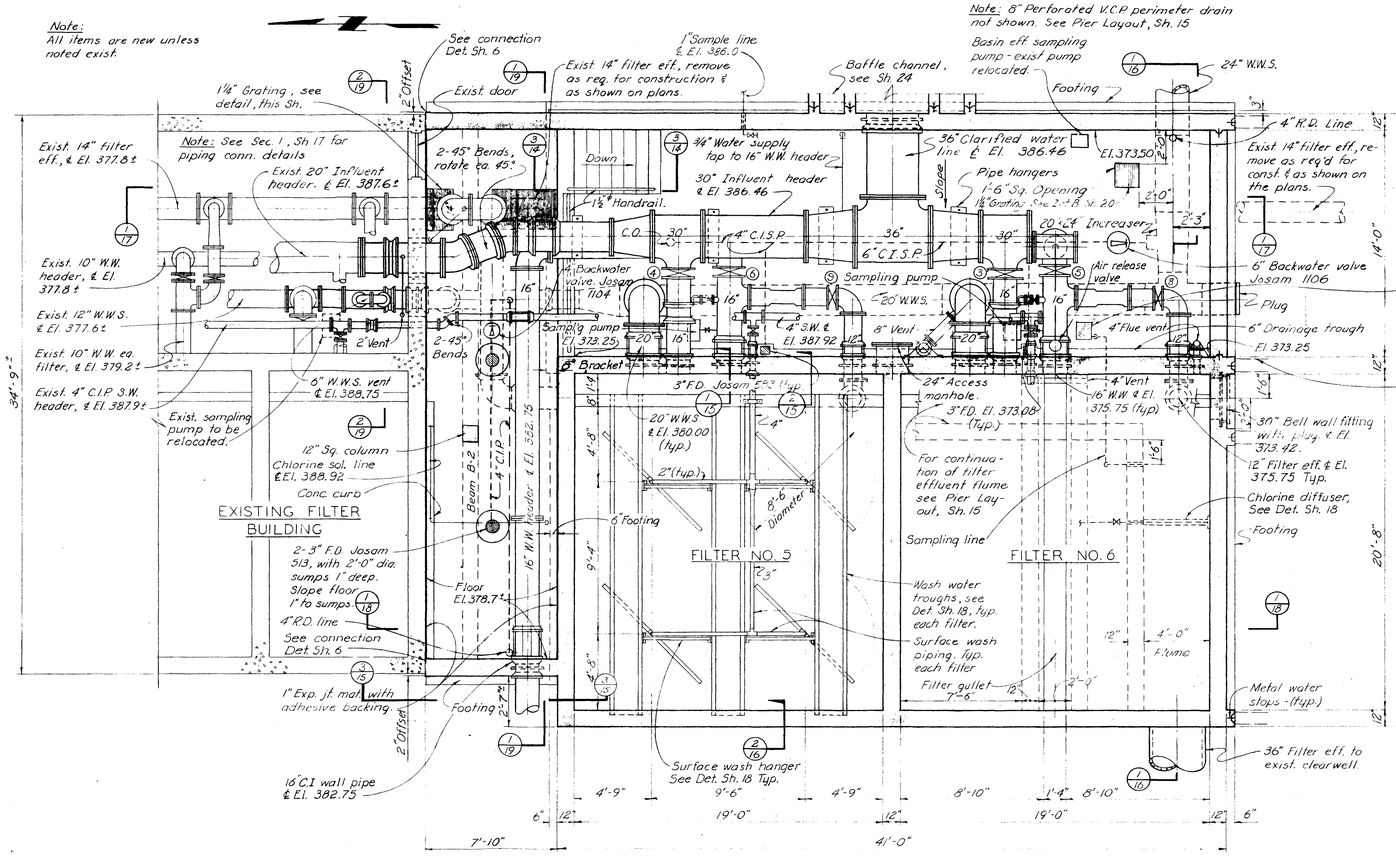
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED JWK, AWK CHECKED LEW
DETAILED AWK APPROVED R.R. Garabrandt
DATE 8/21/67

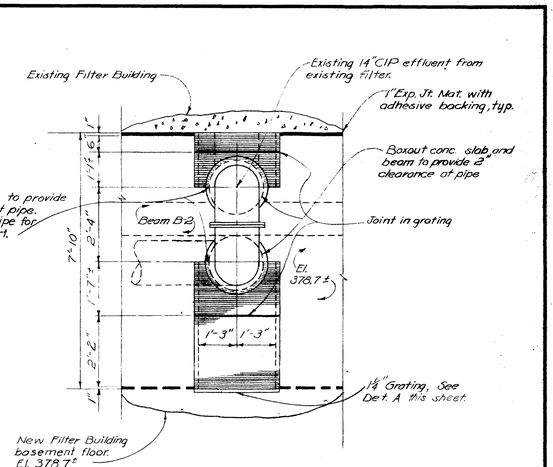
SHEET 12 OF 32

1-2-3

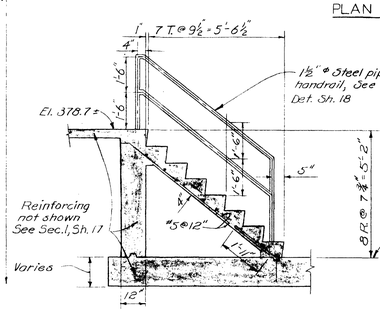
JEFFERSON WATER TREATMENT PLANT ADDITIONS



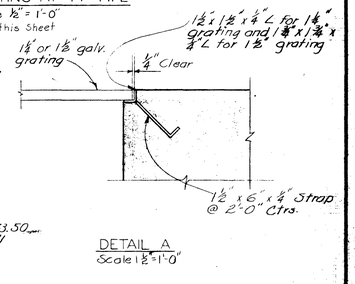
NEW FILTER BUILDING
BASEMENT FLOOR PLAN
Scale: ¼" = 1'-0"



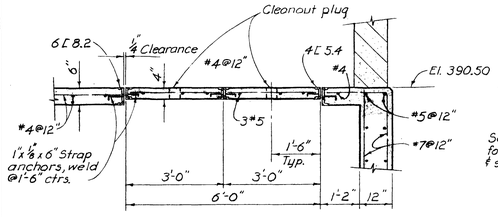
PLAN GRATING AT 14" PIPE
Scale ½" = 1'-0"
See this Sheet



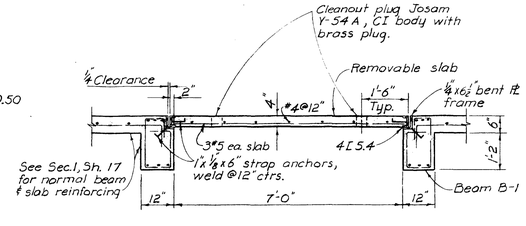
SECTION 3
Scale ⅜" = 1'-0"
See this Sheet



DETAIL A
Scale 1½" = 1'-0"



SECTION 1
Scale: ⅜" = 1'-0"
See Sheet 13



SECTION 2
Scale: ⅜" = 1'-0"
See Sheet 13

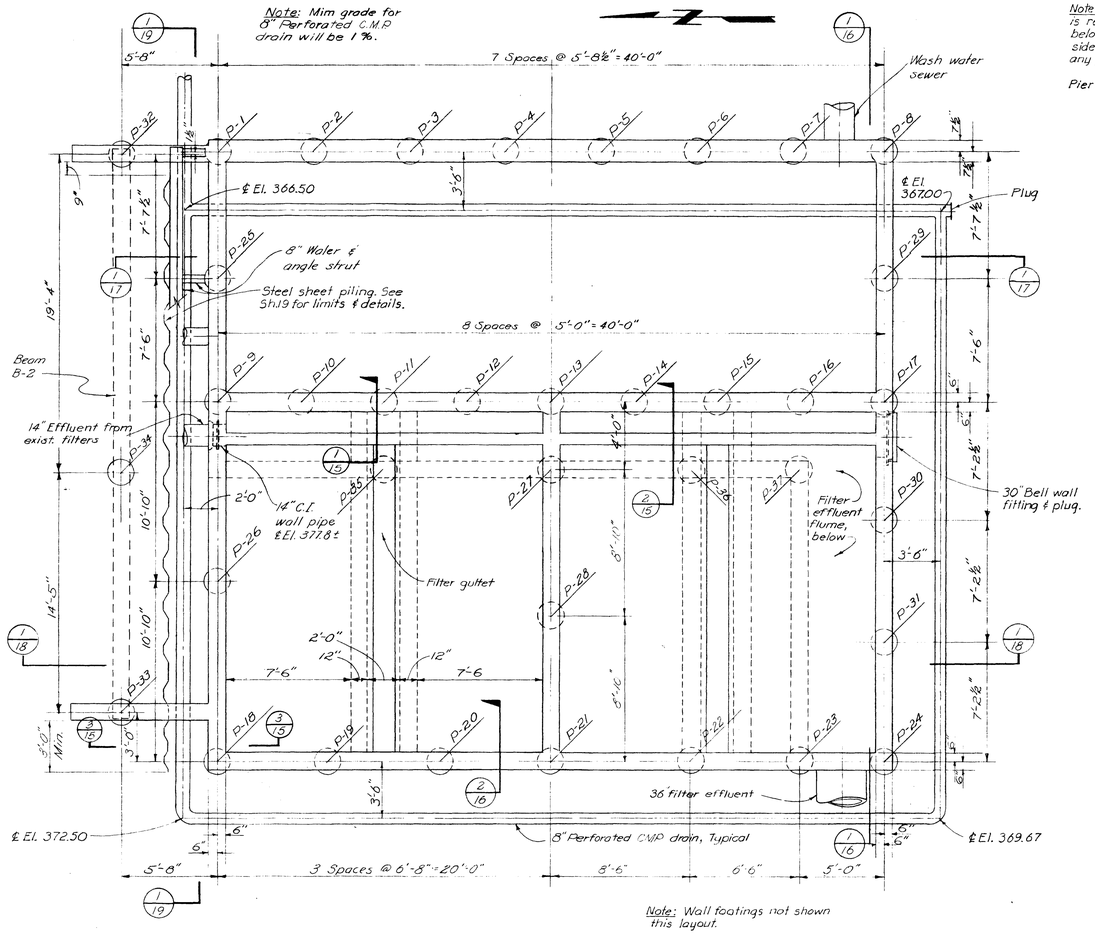
THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
PIPE GALLERY FLOOR PLAN

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWK CHECKED JEW
DETAILED G.L.W. S.R.C. APPROVED
DATE 12/21/62

SHEET 14 OF 32

1-2-3



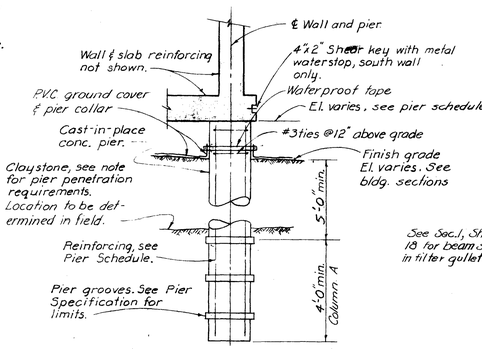
Note: Wall footings not shown this layout.

PIER LAYOUT
Scale ¼"-1'-0"

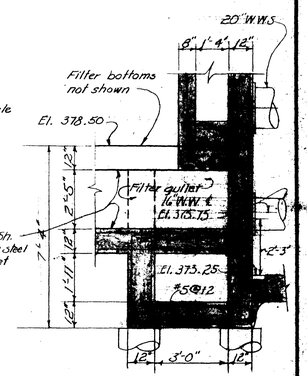
Note: Column A denotes length of pier into claystone that is required to develop side shear. The top 5 feet of pier below finish grade shall not be considered as developing side shear, even if in claystone. The minimum length of any pier below finish subgrade is thus 9 feet.
All piers are 1'-8" in diameter unless noted otherwise. Piers are located on center lines of walls.

PIER SCHEDULE

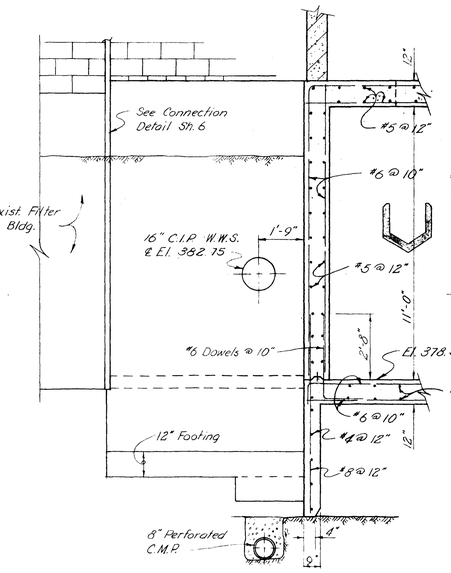
Pier	Top Elev.	Col. A See Note	Reinforcing
P-1	72.25	4 ft.	3 # 5
2	72.25	4	↓
3	72.25	4	
4	72.25	4	
5	72.25	4	
6	72.25	4	
7	72.25	4	
8	72.25	4	
9	71.17	9	
10	71.17	6	
11	71.17	6	
12	71.17	6	
13	71.17	12	
14	71.17	6	
15	71.17	6	
16	71.17	6	
17	71.17	11	
18	73.08	7	
19	73.08	7	
20	73.08	7	
21	73.08	13	
22	73.08	7	
23	73.08	7	↓
24	71.17	8	3 # 5
25	72.25	14	3 # 7
26	77.50	7	3 # 5
27	71.17	10	3 # 5
28	77.50	7	3 # 5
29	72.25	4	3 # 6
30	71.17	9	4 # 5
31	71.17	9	4 # 5
32	72.50	7	4 # 8
33	74.7	7	4 # 8
34	77.3	7	4 # 8
35	71.17	16	3 # 5
36	71.17	10	4 # 5
37	71.17	10	4 # 5



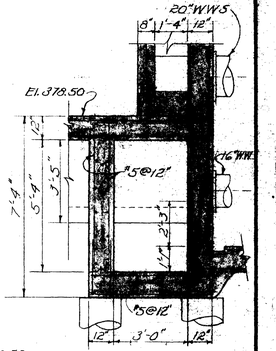
TYPICAL FILTER BUILDING PIER DETAIL
No Scale
See This Sheet



SECTION 1
Scale ⅜" = 1'-0"
See Sheets 14 & 15

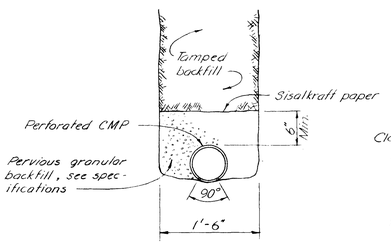


SECTION 3
Scale: ⅜" = 1'-0"
See Sheets 13, 14, & this Sheet

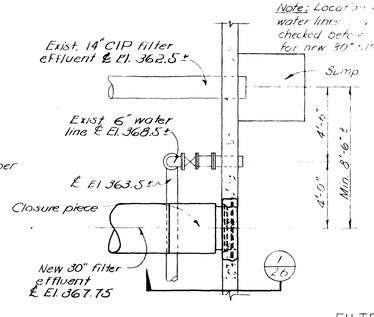


SECTION 2
Scale ⅜" = 1'-0"
See Sheets 14 & 15

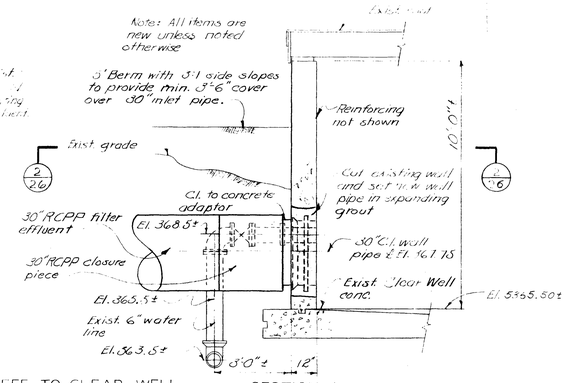
Note: See Sec. I Sh. 16 for reinforcing not noted on Sec. I & 2.



TYPICAL PERFORMED UNDERDRAIN DETAIL
Scale: 1" = 1'-0"



SECTION 2
Scale ⅜" = 1'-0"
See Sheet 26



FILTER EFF. TO CLEAR WELL CONNECTION DETAILS

SECTION 1
Scale ⅜" = 1'-0"
See Sheet 1

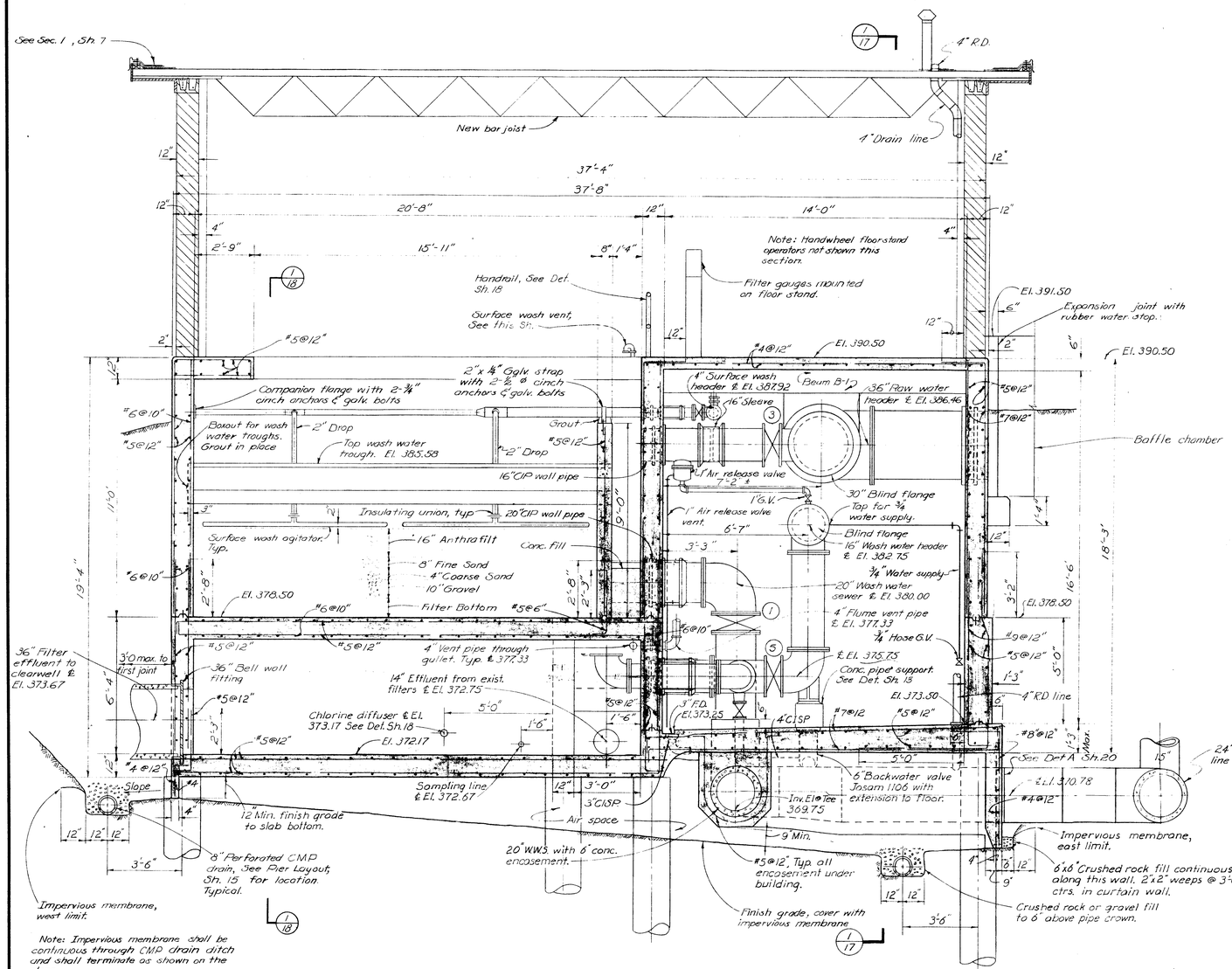
THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
PIER LAYOUT

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

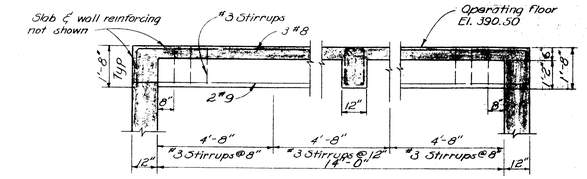
DESIGNED AWR CHECKED LEW
DETAILED SKC, AWR APPROVED ℄ E Gerbrick
DATE 8/21/67

SHEET 15 OF 32

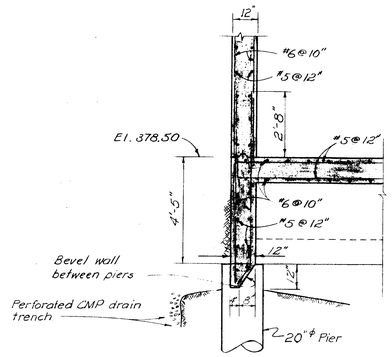
1-2-3



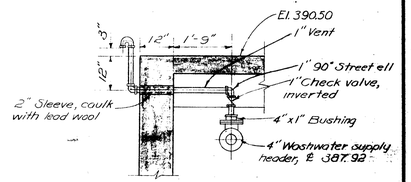
SECTION 1
Scale ⅜"=1'-0"
See Sheets 13, 14, & 15



BEAM B-1 DETAILS
Scale ⅜"=1'-0"
See Sheets 13, 16, & 17



SECTION 2
Scale ⅜"=1'-0"
See Sheets 14 & 15



SURFACE WASH VACUUM BREAKER DETAIL
Scale: ½"=1'-0"
See Sheets 16 & 17

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

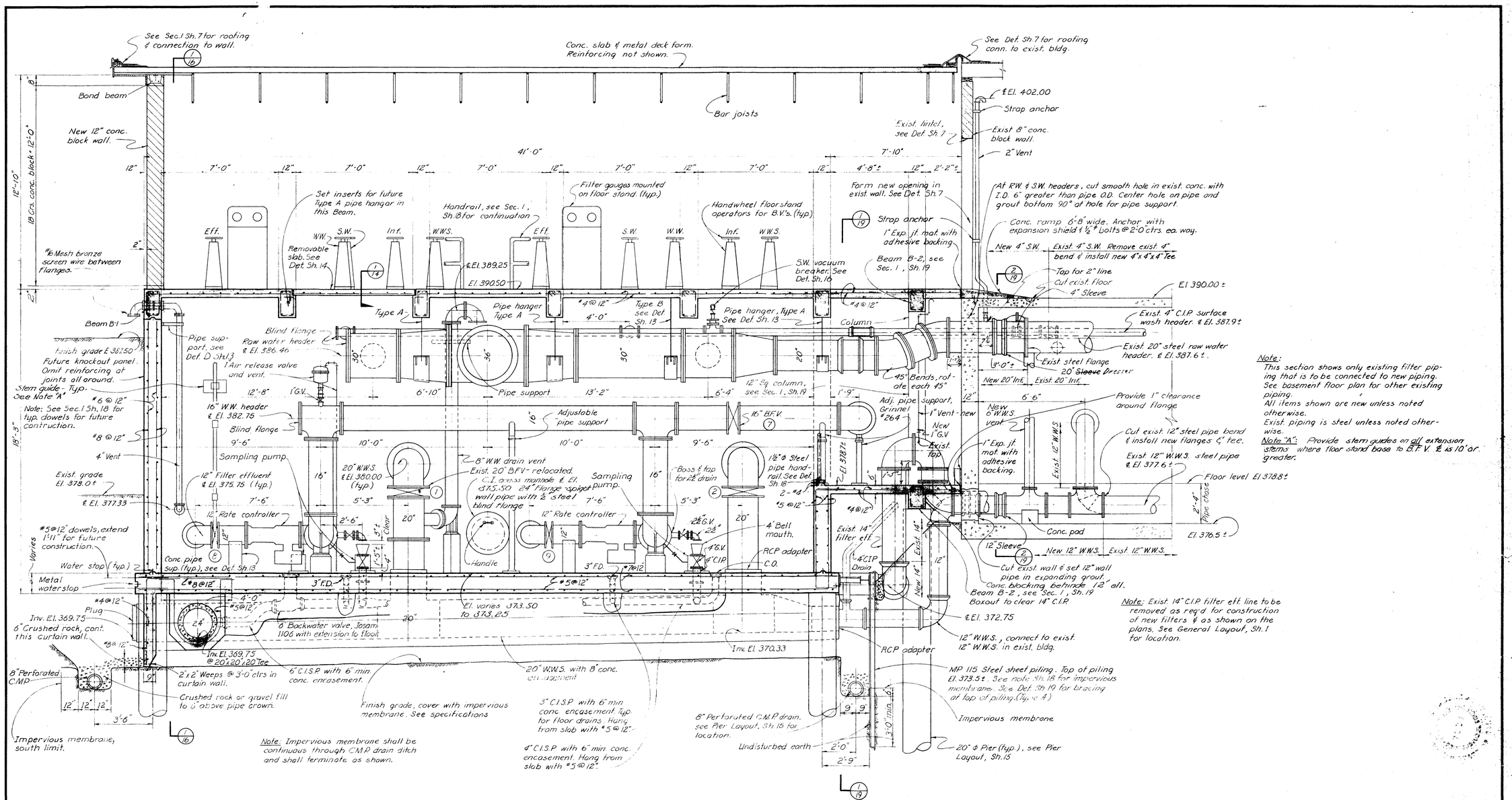
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
CONCRETE SECTIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWH CHECKED
DETAILED SKC APPROVED
DATE 5/21/67

SHEET 16 OF 32

1-2-3



SECTION 1

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

See Sheets 13, 14, & 15

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
CONCRETE SECTIONS

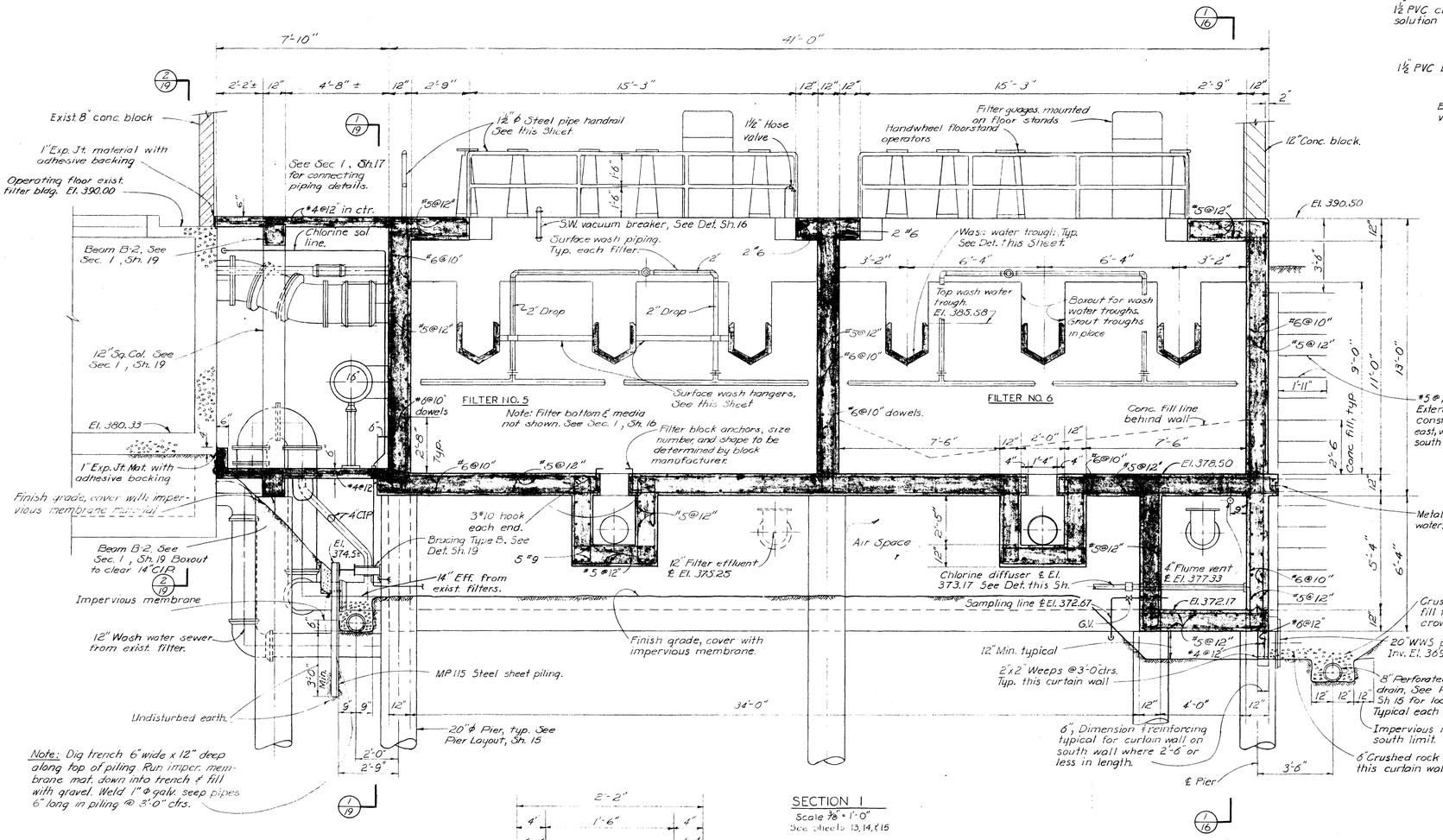
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWK CHECKED LEW
DETAILED G.L.W. APPROVED L.E.W. Jensen
DATE 8/21/67

SHEET 17 OF 32

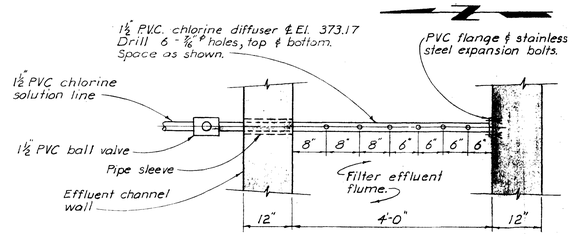
1-23

WATER TREATMENT PLANT ADDITIONS



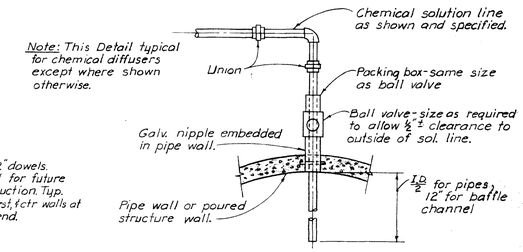
SECTION 1

Scale ⅜" = 1'-0"
See Sheets 13, 14, & 15



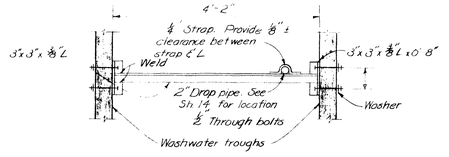
CHLORINE DIFFUSER IN FILTER EFFLUENT FLUME

Scale: ¾"-1'-0"
See Sheets 14, 16, & 18



CHEMICAL SOLUTION DIFFUSER DETAIL

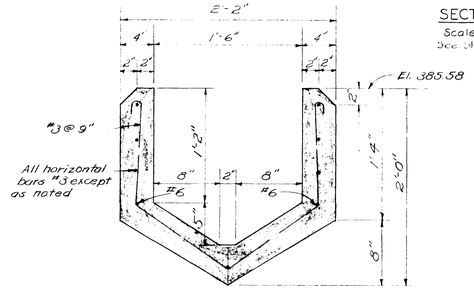
No Scale



PLAN - SURFACE WASH HANGERS

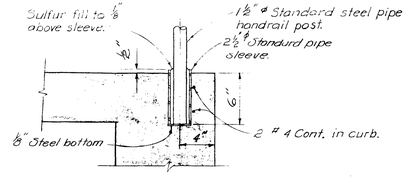
Scale ¾" = 1'-0"
See Sheets 14 & 18

Note
All angles, straps and washers to be Galv. steel. All bolts & nuts to be stainless steel. Holes for bolts to be field drilled.



TYPICAL SECTION WASH WATER TROUGH

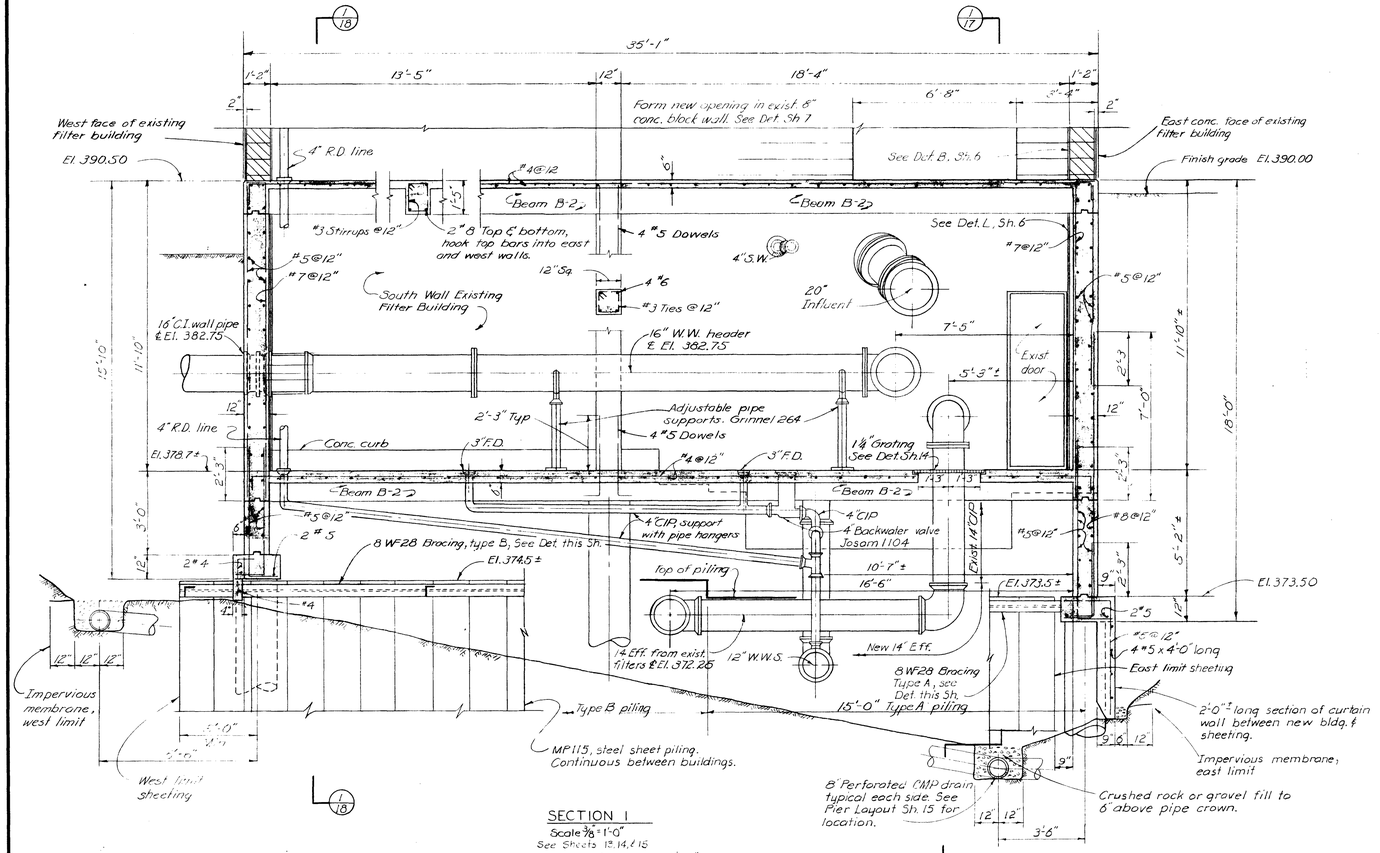
Scale 1½" = 1'-0"
See Sheets 14, 16, & 18

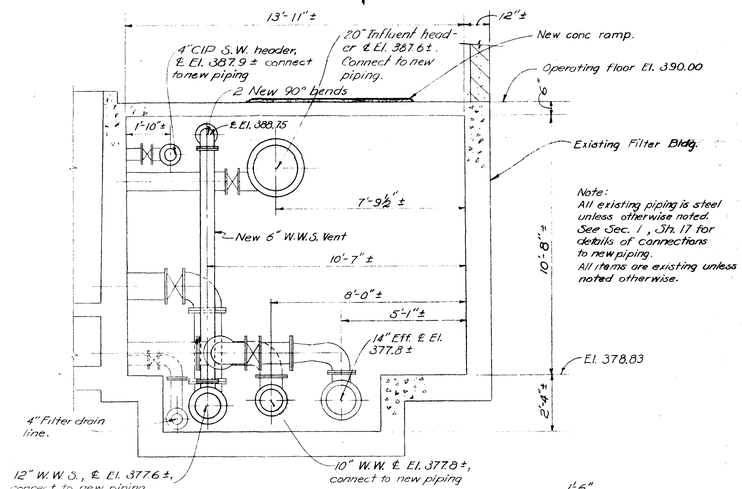


TYPICAL HANDRAIL POST DETAIL

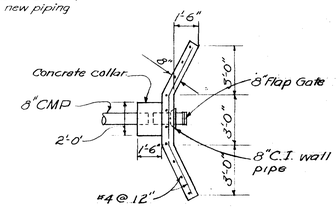
No Scale

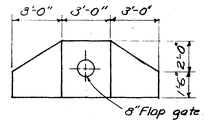
THORNTON, COLORADO	
WATER WORKS IMPROVEMENTS	
WATER TREATMENT PLANT ADDITIONS FILTER BUILDING CONCRETE SECTIONS	
BLACK & VEATCH — CONSULTING ENGINEERS KANSAS CITY, MO. — DENVER, COLO.	
DESIGNED AWK CHECKED LEW DETAILED GKC, AWK APPROVED R.P. Garabedian DATE 8/21/67	SHEET 18 OF 32



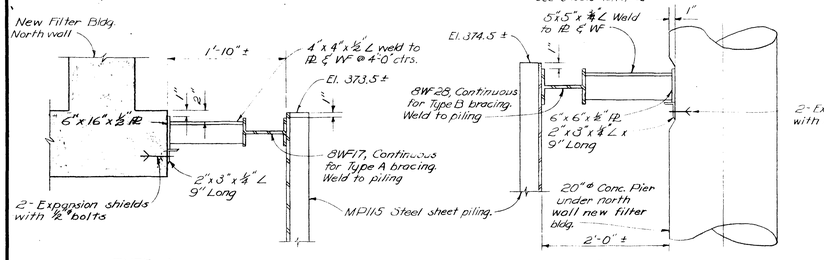


SECTION 2
Scale ⅜"=1'-0"
See Sheet 14





HEAD WALL DETAIL
Scale ¼"=1'-0"
See Sheet 1



TYPE A

TYPE B

Note: Use Type A bracing from pier P-1 to P-9 and Type B from pier P-9 to P-18.

SHEET PILING BRACING DETAILS
Scale 1"=1'-0"
See Sheets 17, 18, & 19

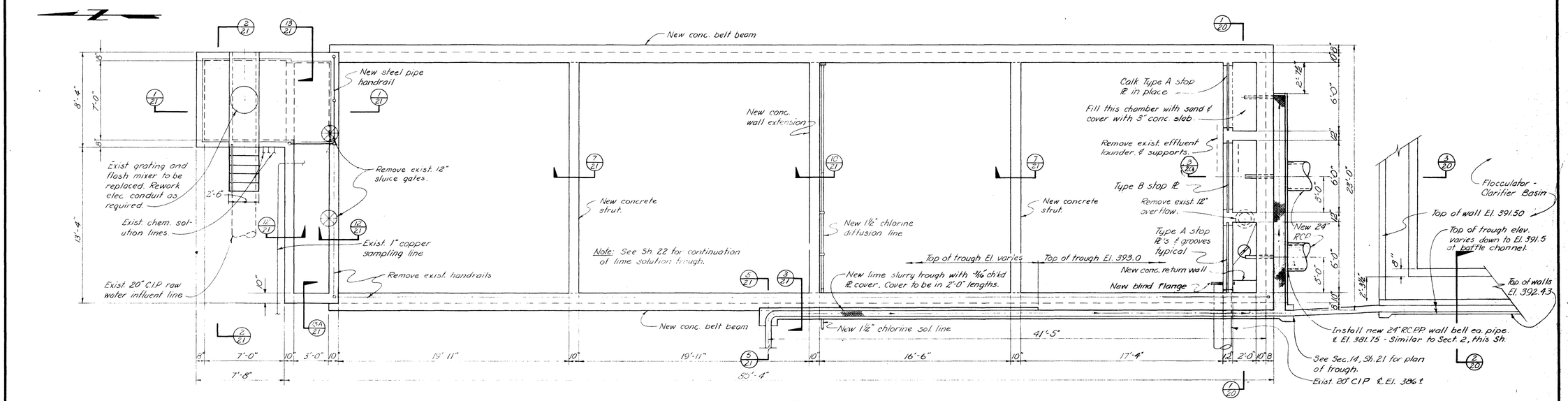
THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
CONCRETE SECTIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED AWK CHECKED CEH
DETAILED DKC APPROVED RC Yarbrough
DATE 8/31/67

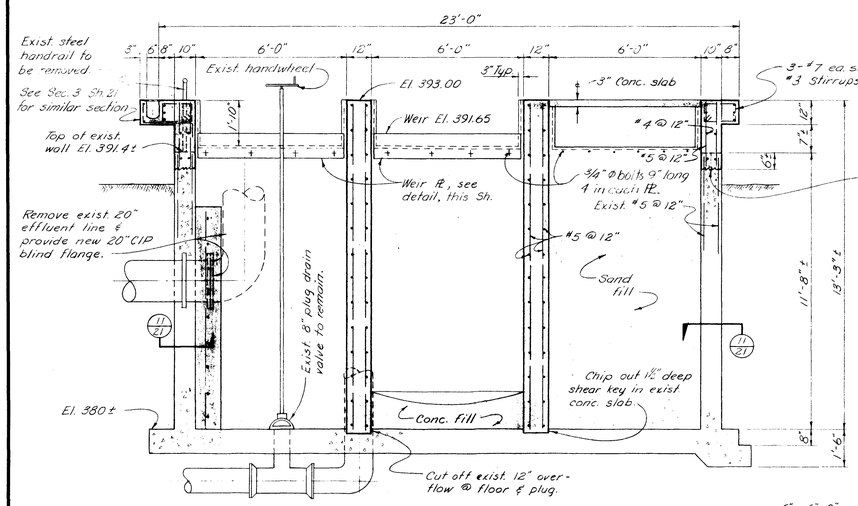
SHEET 19 OF 32

1-2-3



PLAN - REACTION BASIN

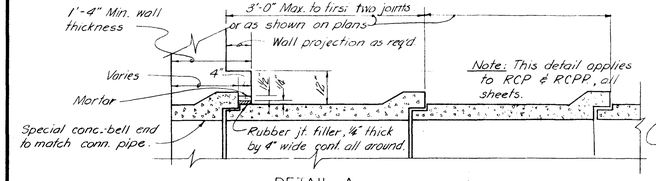
Scale: 1/4" = 1'-0"



SECTION 1

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

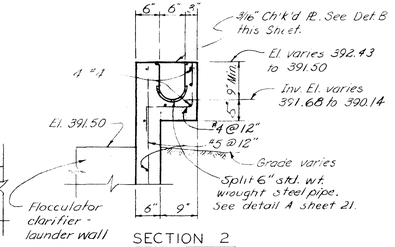
See this Sheet



DETAIL A

TYPICAL CONCRETE PIPE WALL FITTINGS

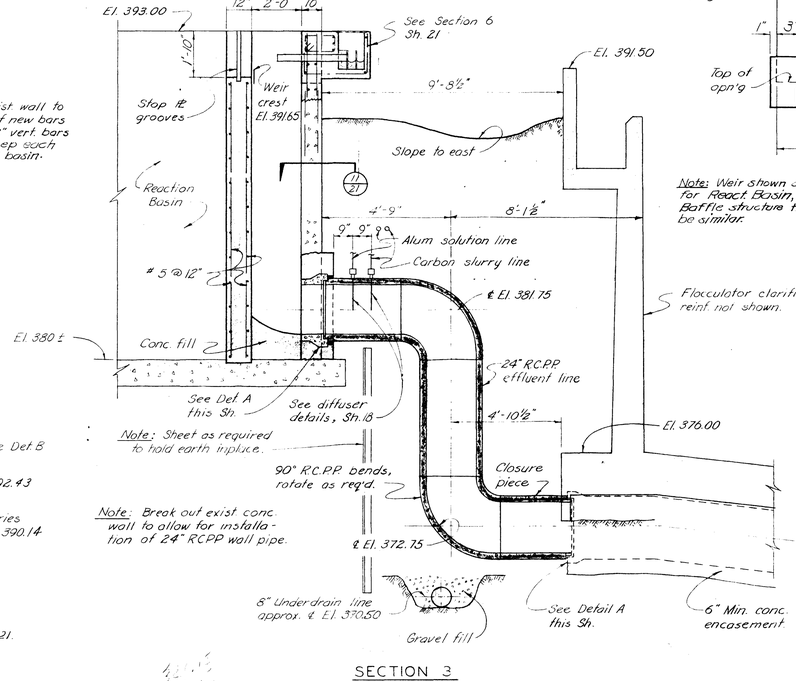
No Scale



SECTION 2

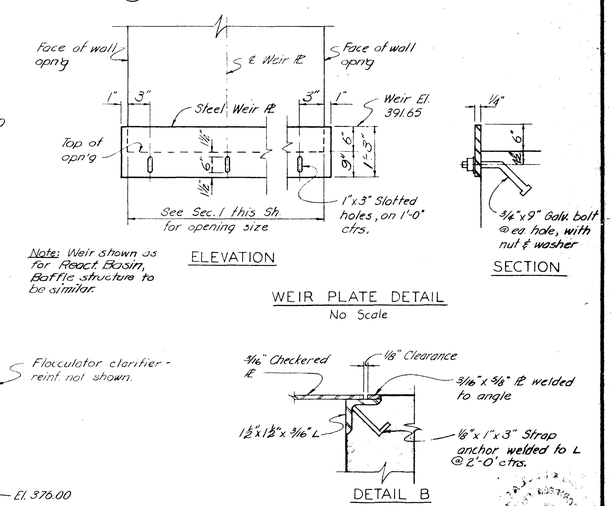
Scale: 3/4" = 1'-0"

See this Sheet & Sheet 21



SECTION 3

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



WEIR PLATE DETAIL

No Scale

DETAIL B

No Scale

Note: For alum. stop PL's see schedule Sh. 23

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
REACTION BASIN
PLAN & SECTIONS

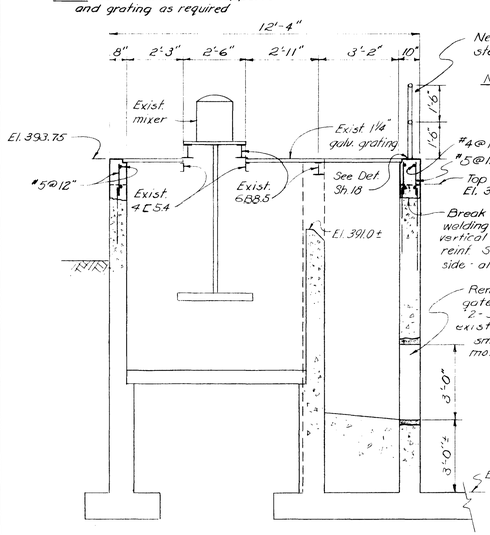
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED MJJ CHECKED LEW
DETAILED GLW APPROVED R.J. Gerardi
DATE 8/21/69

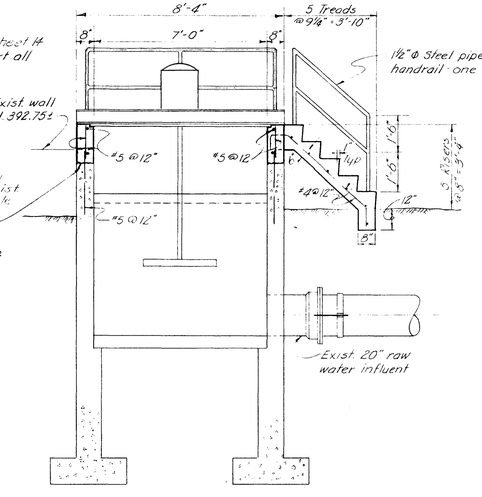
SHEET 20 OF 32

1-2-3

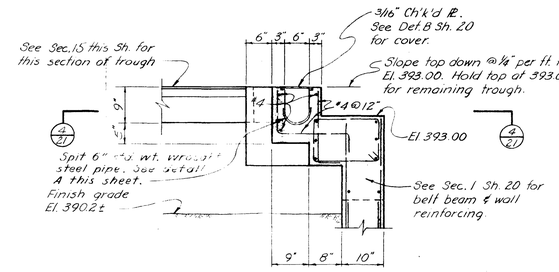
Note: Raise exist. mixer supports and grating as required



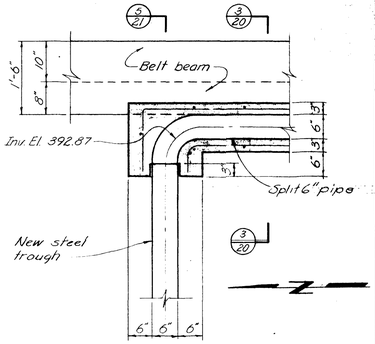
SECTION 1
Scale: ⅜"=1'-0"
See Sheet 20



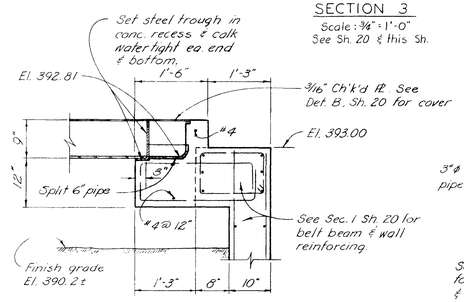
SECTION 2
Scale: ⅜"=1'-0"
See Sheet 20



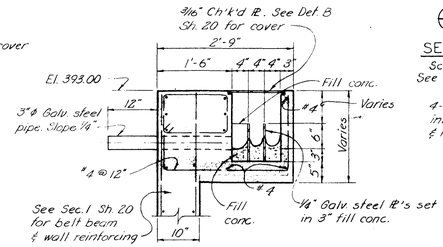
SECTION 3
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.



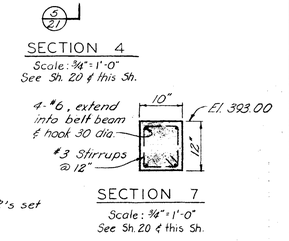
SECTION 4
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.



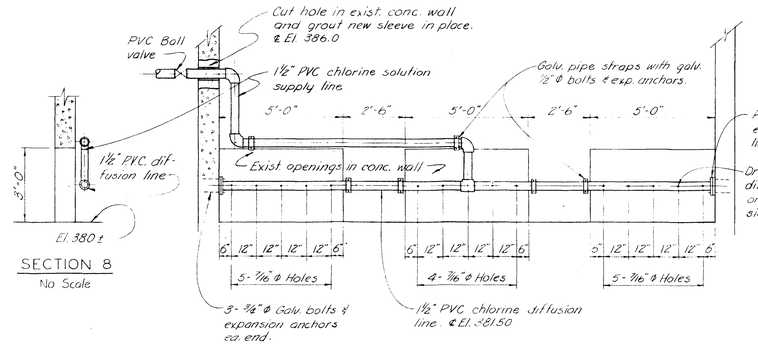
SECTION 5
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.



SECTION 6
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.

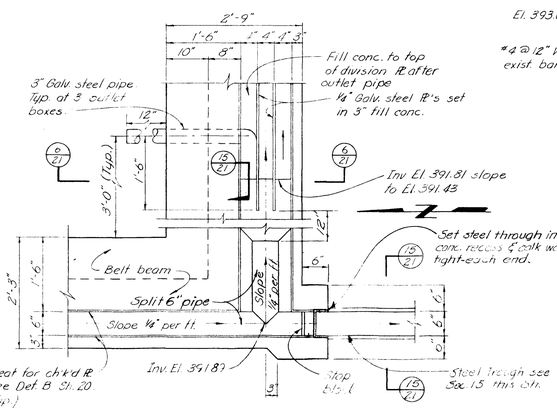


SECTION 7
Scale: ¾"=1'-0"
See Sh. 20 & this Sh.

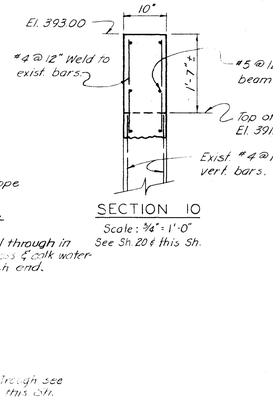


SECTION 8
No Scale

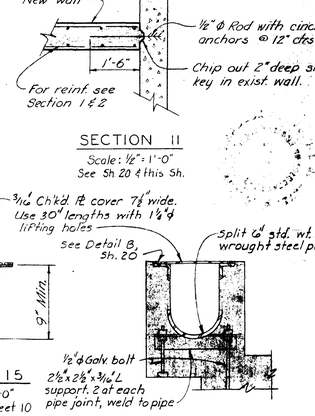
SECTION 9
No Scale



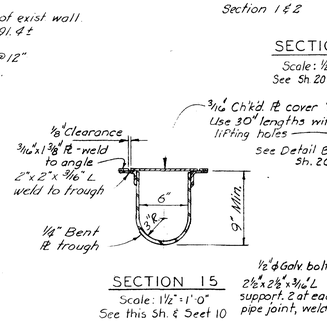
SECTION 14
Scale: ¾"=1'-0"
See Sh. 20 & this Sh.



SECTION 10
Scale: ¾"=1'-0"
See Sh. 20 & this Sh.

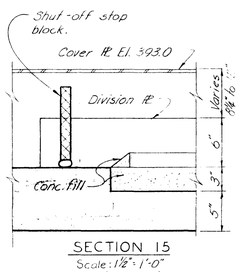


SECTION 11
Scale: ½"=1'-0"
See Sh. 20 & this Sh.

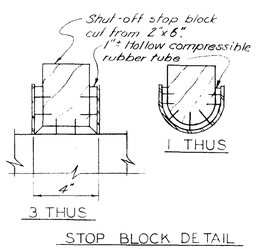


SECTION 15
Scale: 1½"=1'-0"
See this Sh. & Sheet 10

DETAIL A
Scale: 1½"=1'-0"

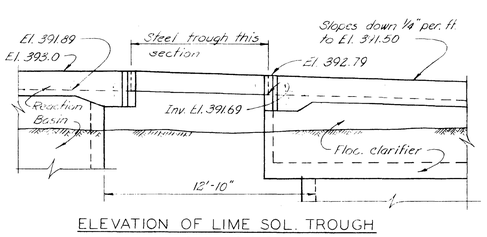


SECTION 15
Scale: 1½"=1'-0"
See this Sheet

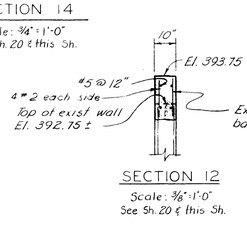


3 THUS

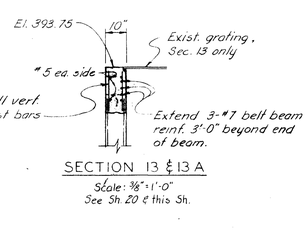
STOP BLOCK DETAIL
No Scale



ELEVATION OF LIME SOL. TROUGH
Scale: ¼"=1'-0"



SECTION 12
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.



SECTION 13 & 13 A
Scale: ⅜"=1'-0"
See Sh. 20 & this Sh.

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
REACTION BASIN
CONCRETE SECTIONS & DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED MLV CHECKED GLW
DETAILED GLW APPROVED R.R. Garabrant
DATE 9/21/67

SHEET 21 OF 32

1-2-3

For Ladder details see Sheet 23

To be adjusted to fit walkway

3'-5" to 1'-12"

El. 390.91 Chem. trough bed (split pipe)

3"

Sim. Bearing & Detail, Sh. 24

El. 391.50

Walkway furn. by equip. mfg.

El. 390.00

6'-10 1/2"

All reinf. #5@12"

3"x 3/8" PL

2'-1"

3/4" Bolts w/expan. anchor

10" Thick slab - 3'-6" long centered under each walkway.

Flocculator - clarifier wall, for reinf. see Sec. 1, Sh. 23

SECTION 1
Scale 1/8" = 1'-0"
See this Sheet

17'-6" Radius

Varies

Horizontal

70'-0" Tank bottom dia.

2' grout

1

1

Fill conc.

Rough slab

12

Metal panform furnished by equip. mfg.

SECTION 2
Scale 1/8" = 1'-0"
See this Sheet

147'-7"

3'-2"

70'-4"

8"

70'-4"

3'-2"

6"

20'-8"

67'-10"

6"

20'-9"

6"

67'-10"

8"

20'-9"

6"

Plug

8" C.M.P.

℄ El. 365.50

Approx. ℄ El. 365.00

8" C.M.P.

For continuation see Sh. 1

Plug

35'-0"

6'-0"

Approx. ℄ El. 364.25

35'-0"

Conc. fill El. 387.75

Finish Gr El. 387.2

1/23

V/N

6'-6"

3'-2"

℄ El. 369.67

Slope fill

Gr. El. 387.2

70'-0" Dia of sloping bottom Separate 2" grout finish

FLOCCULATOR-CLARIFIER NO. 1

FLOCCULATOR-CLARIFIER NO. 2

3/25

8" C.M.P.

Flat area El. 376.00 rough conc. w/separate finish to El. 376.17. Typ. all corners.

3'-6"

8" C.M.P. drain line

Top of wall El. 391.50

Weatherproof

8" C.M.P. ℄ El. 366.00

1/23

2/25

10

LI-30

Sloped area to level curb Elev. 377.00 formed w/metal guide ℄ furnished by equip. manufacturer. Typ. all corners.

Weatherproof

Top of wall El. 391.50

6'-0"

8" C.M.P. drain line

5/23

3'-6"

3/25

Walkway furnished by equip. manufacturer

24" R.C.P.P. influent line w/6" conc. encasement

Walkway furnished by equip. manufacturer

12" C.I.P. sludge drawoff line w/6" min. conc. encasement

Fin. Gr. El. 387.2

70'-0"

76'-4"

Rad. 17'-6"

6" C.M.P. below 12" C.I.P.

9A/25

3/20

Top of trough El. 392.79
Inv. of trough El. 391.68

9'-8 1/2"

Top of trough El. 393.30

Inv. El. of trough 391.89

Top of trough El. 393.62

Top of trough El. 393.00

Top of wall El. 393.00

Ladder

Ladder

Fin. Gr. El. 390.0

℄ El. 370.50

8" C.M.P.

Top of trough El. 391.35
Inv. trough El. 390.14

12" C.I.P.

6" perf. C.M.P.

12" V.C.P. Sludge drawoff line.

Sludge drawoff M.H. see Plan Sh. 23

Edge of roadway

Finish grade El. 388.5

Exist. Mixer

New handrail

EXIST. REACTION BASIN

Exist. 20" raw water line

Existing Sampling line

Exist. conc. stoop

Exist Gr El. 389.0

Exist Gr El. 390.8

Exist. chem. sol. lines

Top of trough El. 393.83

Exist. 12" Raw water line

Exist. 2" Water line

Exist. 20" C.I.P.

Fin. Gr. El. 388.5

3" Conc. wall up to El. 392.79 this side.

℄ El. 370.00

8" Perf. C.M.P.

Baffle channel ℄ overflow boxes see Plan Sh. 24.

Chain link fence

Exist. Gr El. 390.0

Fin. Gr. El. 389.5

Conc. Walkway

Fin. Gr. El. 390.0 Handrail

Fin. Gr. El. 390.0

4'-6"

8"

4'-6"

14'-4"

24"x24"x15" Wye

24" R.C.P.P. overflow line

24" R.C.P.P. W.W.S.

22'-6"

Exist. 12" drain line

French drain w/ 8" perf drain line

51'-8" ℄

Exist. 10" steel pipe

15" R.C.P.P.

Weir El. 389.70

℄ El. 366.50

℄ El. 367.00

Plug

20'-6"

20'-6"

NEW FILTER BLDG

French drain w/8" C.M.P. perf. drain line

34'-9"

36" R.C.P.P.

℄ El. 372.50

7'-10"

41'-0"

℄ El. 369.67

EXISTING FILTER BLDG

BASIN PLAN
Scale 1/8" = 1'-0"

LEGEND

P - Polymer. A - Alum solution. C - Carbon slurry.
CS - Chlorine solution. S - Sampling line.
Note: Yard fence not shown this sheet. See Sh. 1.
All dimensions to structures are to outside of concrete walls at top.
For pipelines not shown, see Sh. 1.
All items are new unless otherwise noted.

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

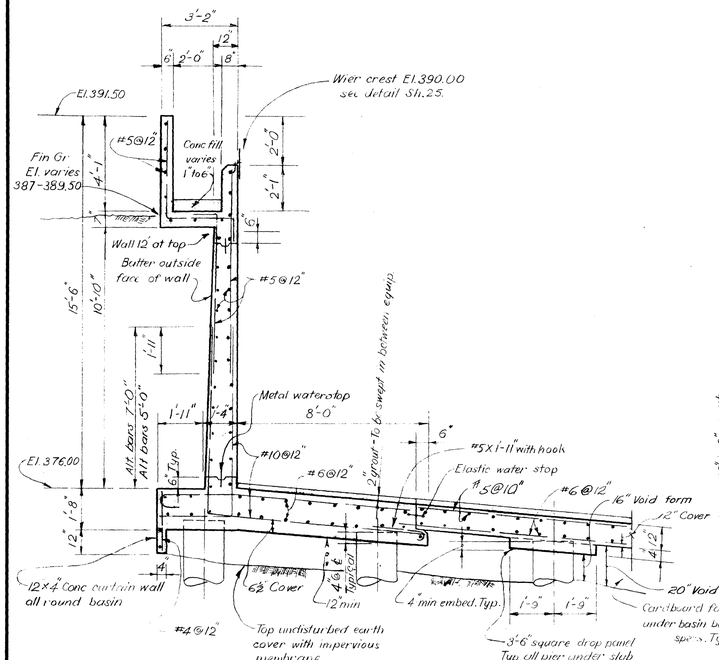
WATER TREATMENT PLANT ADDITIONS
FLOCCULATOR — CLARIFIERS
BASIN PLAN

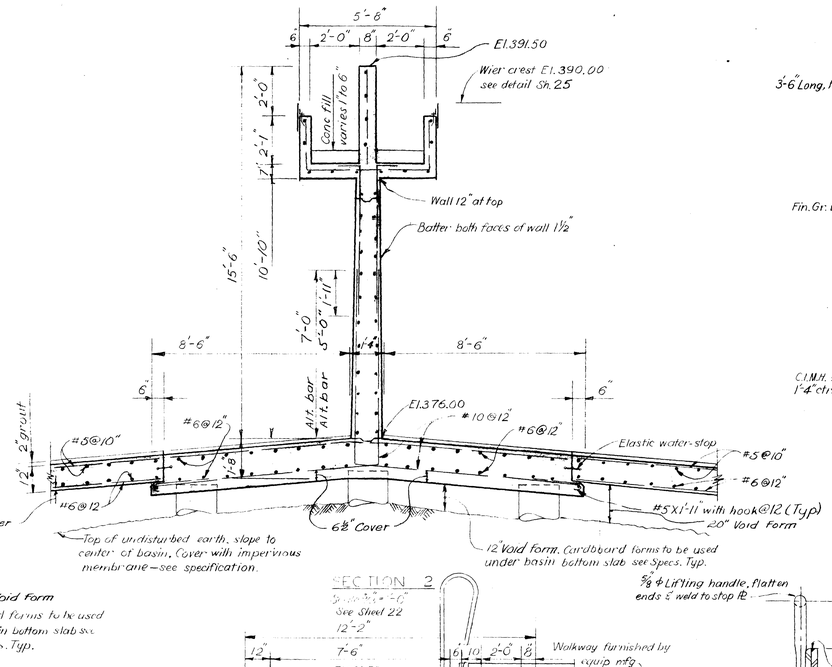
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

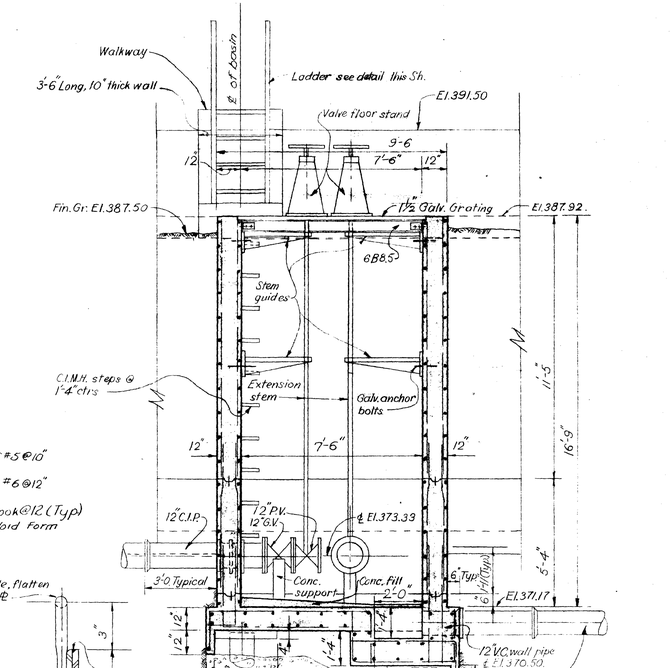
DESIGNED MLJ CHECKED LGW
DETAILED SRG, SPS APPROVED
DATE 8/21/67

SHEET 22 OF 32

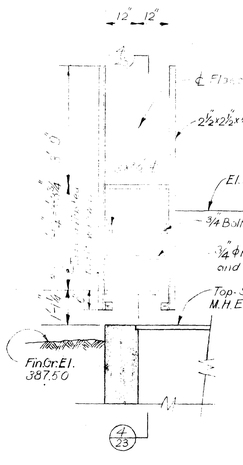
1-2-3



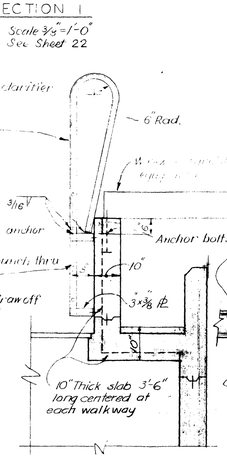




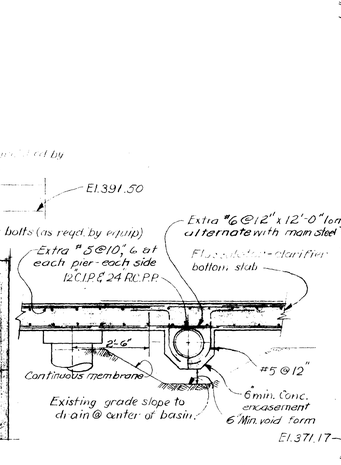
SECTION 1
Scale 3/4"=1'-0"
See Sheet 22



ELEVATION



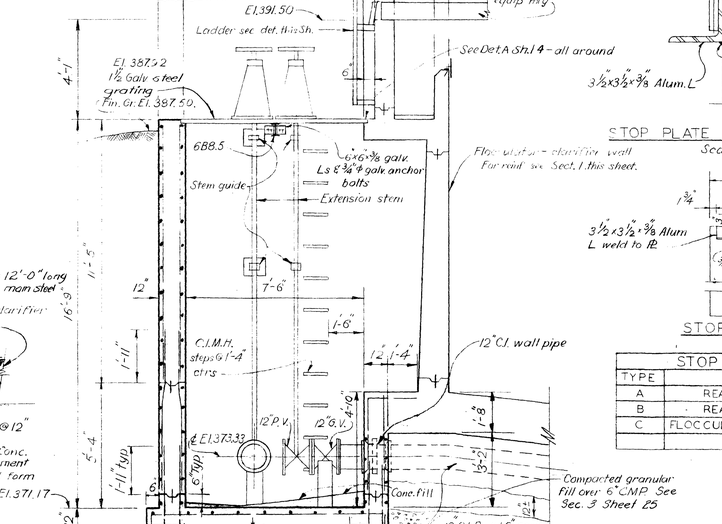
SECTION 4



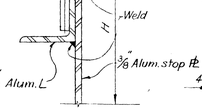
SECTION 5
No Scale
See Sheet 22.

LADDER DETAILS
Scale ½"=1'-0"

SECTION 2
Scale 3/4"=1'-0"
See Sheet 22



SECTION 6
Scale 3/8"=1'-0" See Sh. 25



STOP PLATE HANDLE DETAIL
Scale ¼"=1"

STOP PLATE DETAIL
No Scale

SECTION 3
Scale 3/8"=1'-0"
See Sheet 25

Use two handles on type A & B Stop ℞s. Space @ 12" from edge to ctr. of handle. See detail this Sh.

STOP PLATE SCHEDULE

TYPE	LOCATION	H	W	NO. REQ'D
A	REACTION BASIN	1'-8"	5'-8"	2
B	REACTION BASIN	1'-8"	5'-10"	1
C	FLOCCULATOR-CLARIFIER	3'-11"	2'-1"	2

Note: All reinforcing #5 @ 12" unless otherwise shown.

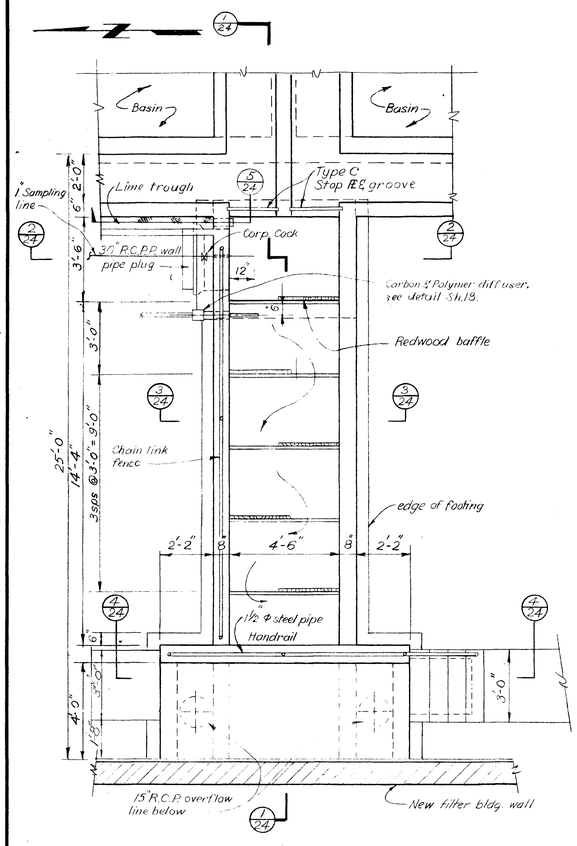
THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FLOCCULATOR — CLARIFIERS
SECTIONS & DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

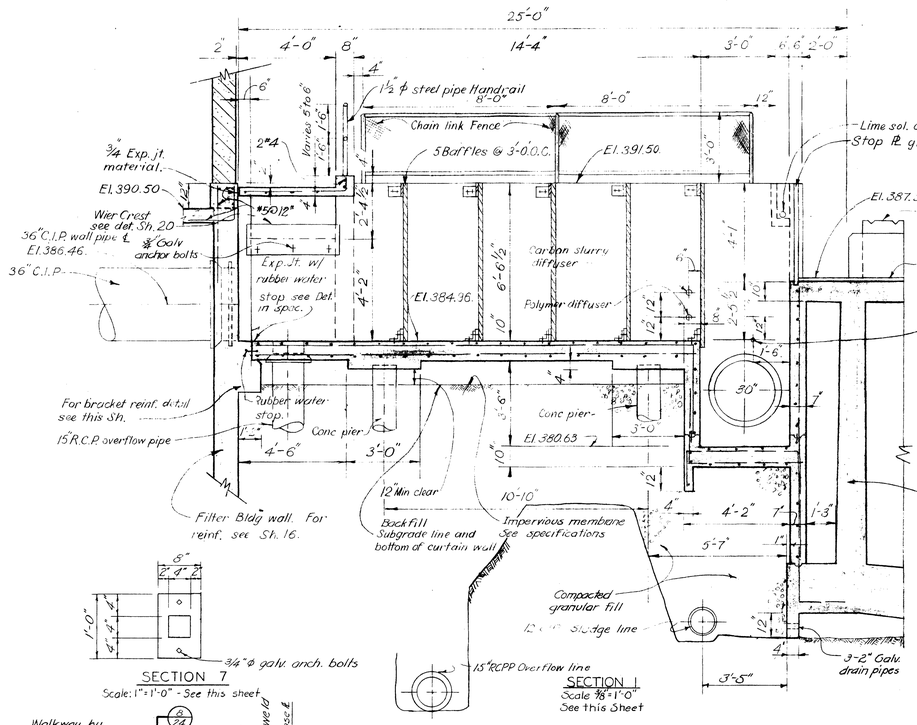
DESIGNED MLJ CHECKED LEW
DETAILED SPS APPROVED KK Garabrant
DATE 2/21/67

SHEET 23 OF 32

1-2-3

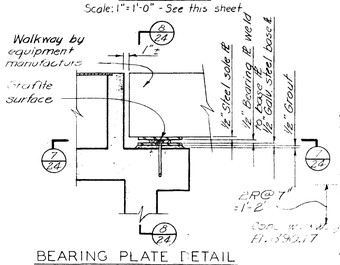


PLAN - BAFFLE STRUCTURE
Scale 3/16"=1'-0"

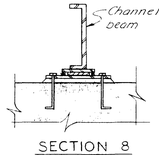


SECTION 1
Scale 3/8"=1'-0"
See this Sheet

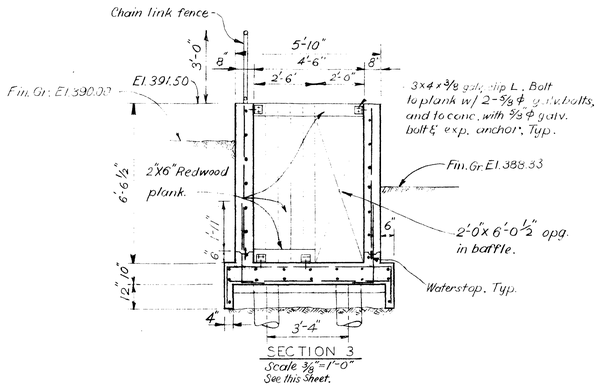
SECTION 7
Scale: 1"=1'-0" See this sheet



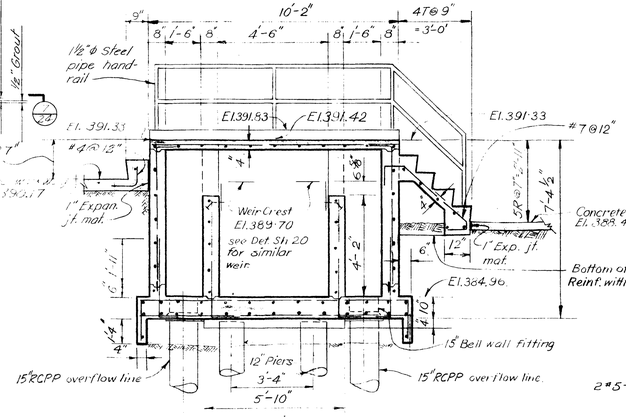
BEARING PLATE DETAIL
Scale: 1"=1'-0"



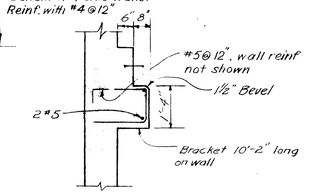
SECTION 8
Scale: 1"=1'-0"
See this sheet



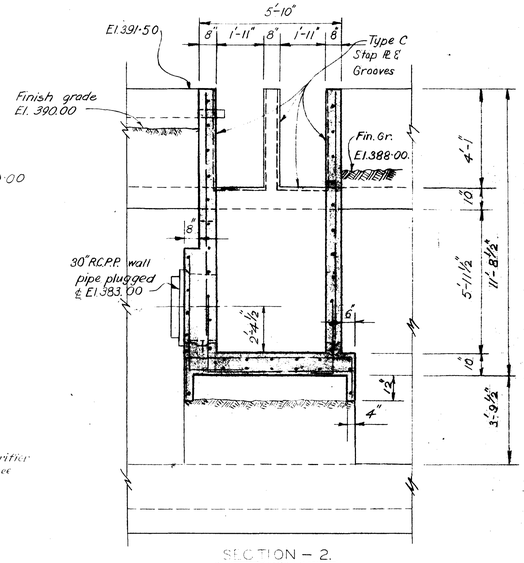
SECTION 3
Scale 3/8"=1'-0"
See this Sheet.



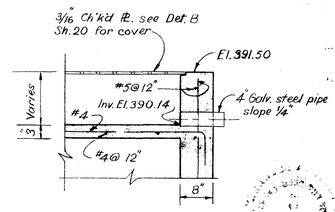
SECTION 4
Scale 3/4"=1'-0"
See this Sheet.



BRACKET DETAIL
Scale 1/2"=1'-0"
See this Sheet



SECTION - 2.
Scale 3/8"=1'-0"
See this Sheet



SECTION 5
Scale 3/4"=1'-0"
See this Sheet

Notes
All reinforing this sheet #5@12" unless otherwise noted.

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS

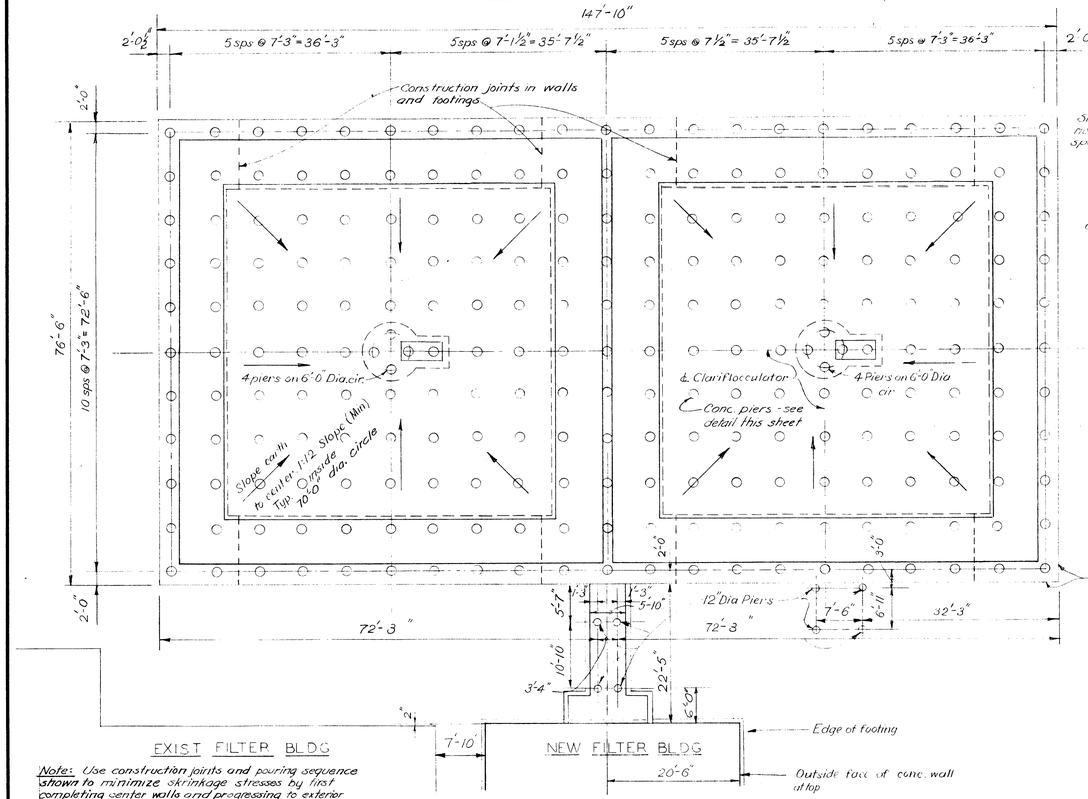
WATER TREATMENT PLANT ADDITIONS
FLOCCULATOR - CLARIFIERS
BAFFLE STRUCTURE SECTIONS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED MLJ CHECKED LEW
DETAILED SPS APPROVED E.R. Jarstrick
DATE 4/21/67

SHEET 24 OF 32

1-2-3

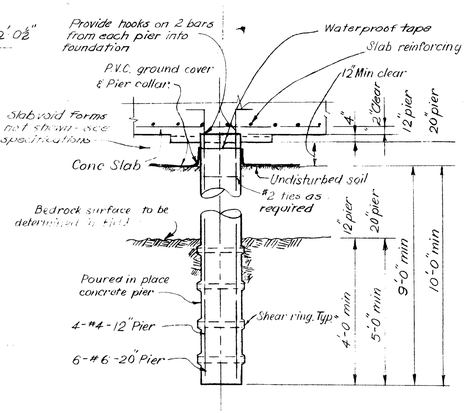


EXIST FILTER BLDG

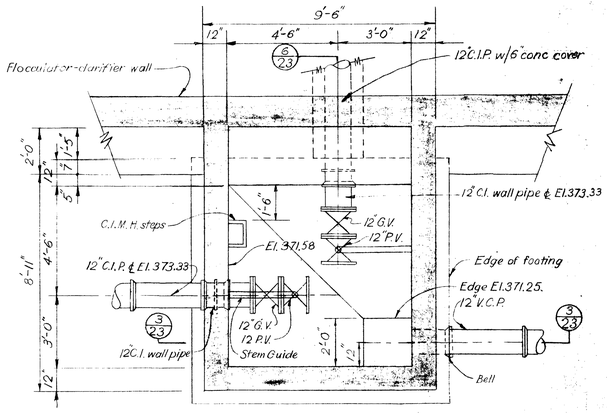
NEW FILTER BLDG

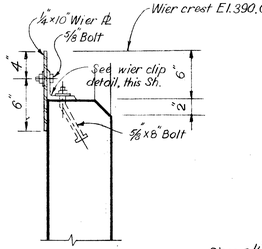
Note: Use construction joints and pouring sequence shown to minimize shrinkage stresses by first completing center walls and progressing to exterior North and South walls after East and West walls are complete. Floor of basin to be poured last after completion of wall footings. All Piers 20" Dia. unless otherwise noted. Piping not shown see Sh. 22.

PIER SETTING PLAN
FLOCCULATOR - CLARIFIERS
Scale 3/32" = 1'-0"



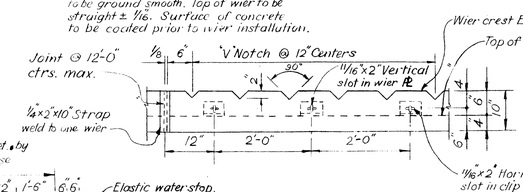
FLOCCULATOR-CLARIFIER
PIER DETAIL
Scale 3/8" = 1'-0"
See this sheet





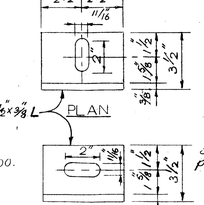
SECTION THRU WIER
Scale: 1½" = 1'-0"

Notes:
All bolts and washers to be hot-dipped galvanized. All bolts to be provided with cut washers.
Top edge of wier ℄ and V-notches to be ground smooth. Top of wier to be straight ± 1/16". Surface of concrete to be coated prior to wier installation.

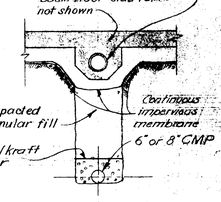


DETAIL OF WIER PLATE
Scale ¾" = 1'-0"

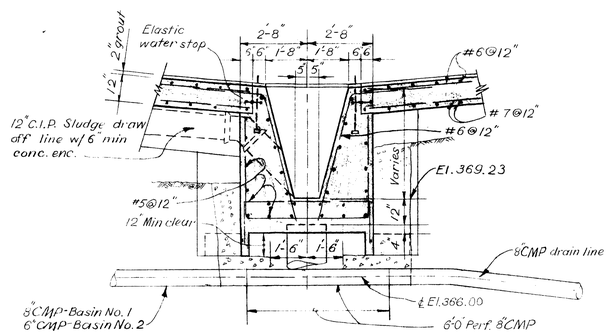
SECTIONAL PLAN - SLUDGE DRAWOFF MANHOLE
Scale ⅜" = 1'-0"



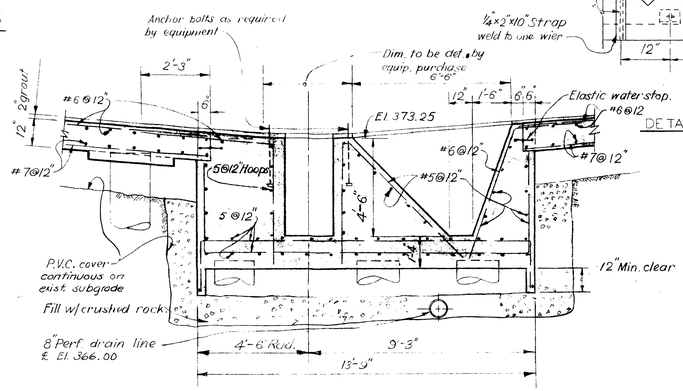
WIER CLIP ANGLES
Scale 3" = 1'-0"



SECTION - 3 & 3A
Scale ⅛" = 1'-0"
See Sheet 22.



SECTION 1
Scale ⅜" = 1'-0"
See Sheet 22.



SECTION 2
Scale ⅜" = 1'-0"
See Sheet 22.

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FLOCCULATOR - CLARIFIERS
PIER PLAN & DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED MLJ CHECKED LEW
DETAILED SPS APPROVED LEW
DATE 2/21/67

SHEET 25 OF 32

1-2-3

LEGEND

Existing sewer	S S
Water line	W W
Gas line	G G
Chain link fence	X X
Steep slope	
Power pole & guy	
Manhole	M.H.
Power pole	p.p.
Fence post	F.P.
Hub & Tack	H.&T.
Point on line	P.O.L.
Nail in bottle cap	N.B.C.

GENERAL NOTES

1. Horizontal stationing shown on the plans is for level line measure. Actual pipe length will depend upon the slope at which the pipe is laid.

2. Asphalt surfacing from shall be City Standard and approved by the Engineer.

3. Where the new 8" sanitary sewer parallels the existing dirt drive from Sta. 3+83± to 7+36±, the trench is not in the road shoulder and does not require tamped backfill.

Note: The exact invert elevation of the existing sewer at M.H. #1 shall be field determined. The exact grade between M.H. #1 and Sta. 2+00 shall be determined by the known invert elevations.

B.M. #1 El. 5349.24 New 15" Wash Water Sewer
N.W. corner conc. pad under Lennox air conditioner at N.W. corner City Hall.

B.M. #2 El. 5396.34
West nut on rim of fire hydrant 15' Lt. Sta. 7+55±

B.M. #3 El. 5390.00
Oper. floor @ ctr. south double door east side filter bldg.

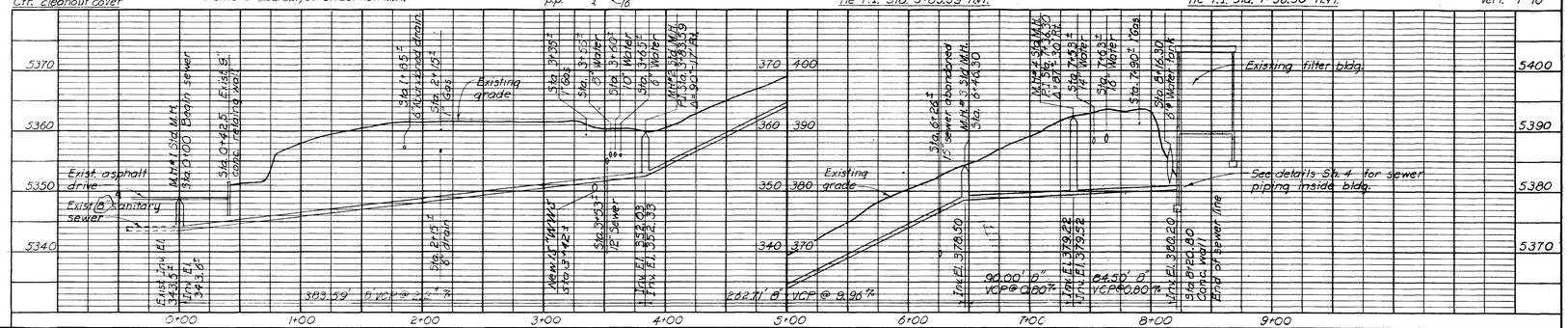
Tie P.O.L. Sta. 7+95.53 H.&T.

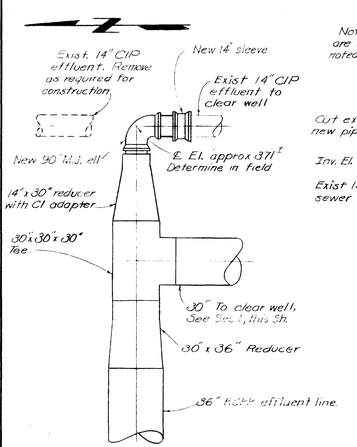
Tie Sta. 0+00 Ctr. cleanout cover

Tie P.I. Sta. 3+83.59 H.&T.

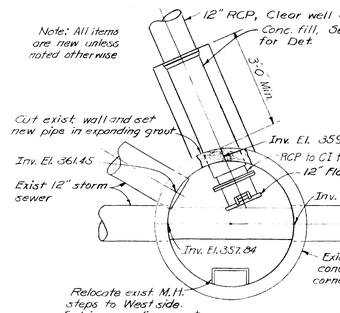
Tie P.I. Sta. 7+36.30 H.&T.

Scale:
Horz. 1"=50'
Vert. 1"=10'

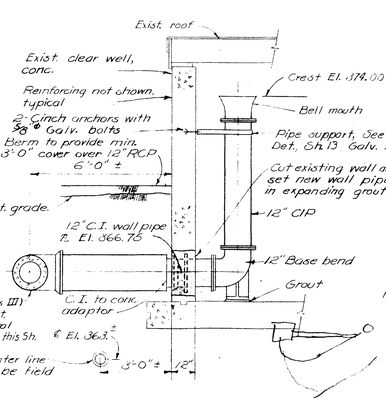




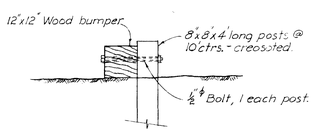
36" TO 14" EFFLUENT CONNECTION DETAIL
Scale ¼"=1'-0"
See Sheet 1



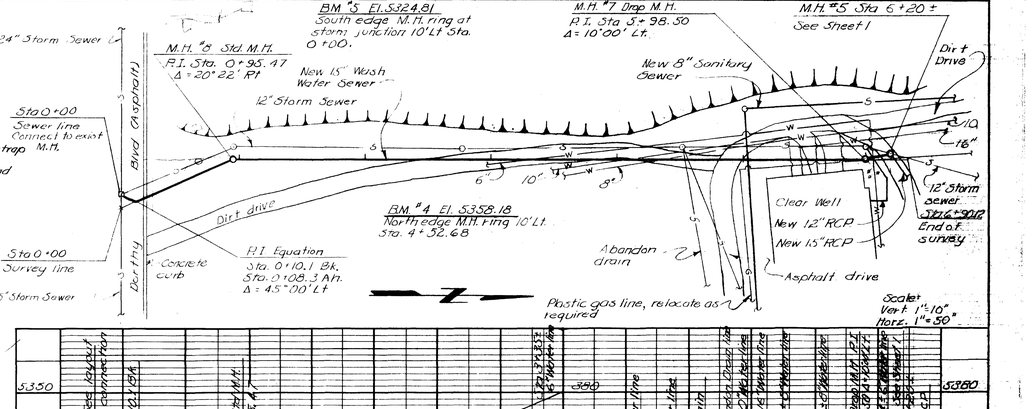
CONNECTION TO EXISTING MANHOLE
Scale ¼"=1'-0"
See Sheet 1

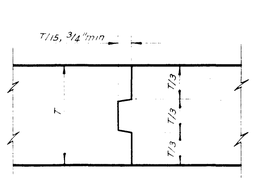


CLEAR WELL OVERFLOW DETAIL
Scale ⅜"=1'-0"
See Sheet 1

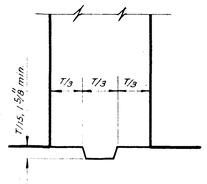


WOOD BUMPER DETAIL
No Scale
See Sheet 1

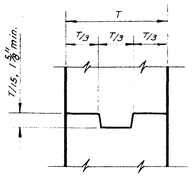

24" Storm Sewer
Blvd. (Asphalt)
Dorthy Blvd.
Sta 0+00 Sewer line Connect to exist M.H.
Sta 0+00 Survey line
15" Storm Sewer
M.H. #8 Std. M.H. P.I. Sta. 0+95.47 Δ=20°22' Rt
R.I. Equation Sta. 0+10.1 Bk. Sta. 0+08.3 Ah. Δ=4.5°00' Lt
Concrete curb
BM #5 El. 5324.81 South edge M.H. ring at storm junction 10' Lt Sta. 0+00.
New 15" Welsh Water Sewer
12" Storm Sewer
M.H. #7 Drop M.H. P.I. Sta 3+98.50 Δ=10°00' Lt.
M.H. #5 Sta 6+20± See Sheet 1
Dirt Drive
New 8" Sanitary Sewer
BM #4 El. 5358.18 North edge M.H. ring 10' Lt. Sta. 4+52.68
Clear Well
New 12" RCP
New 15" RCP
Abandon drain
Asphalt drive
12" Storm sewer Sta. 6+90± End of survey
Plastic gas line, relocate as required
Scale: Vert 1"=10" Horz. 1"=50'
Exist. M.H. See detail
Exist. 15" RCP
Exist. 12" RCP
Exist. 8" RCP
Exist grade
Dorthy Blvd
Proposed 15" RCP
Proposed 12" RCP
Proposed 8" RCP
Proposed 6" RCP
Proposed 4" RCP
Proposed 4" Water line
Proposed 6" Drain
Proposed 8" Water line
Proposed 12" Water line
Proposed 15" Water line
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SLABS

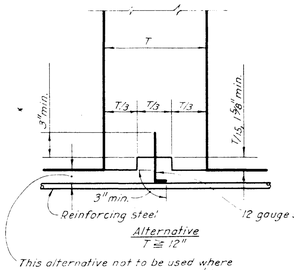


BASE OF WALLS



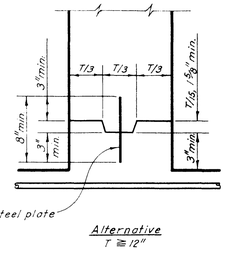
WALLS

JOINTS WITHOUT WATER STOPS



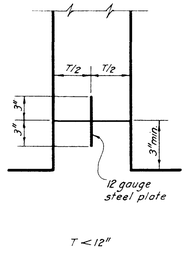
Alternative
T ≦ 12"

This alternative not to be used where required cover is less than 1½".

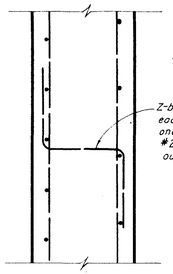


Alternative
T ≧ 12"

BASE OF WALLS



T < 12"



SPACERS FOR WALL REINFORCEMENT

BAR SIZE	LENGTH OF LAPPED SPLICES FOR REINFORCING IN INCHES		LENGTH OF EMBEDMENT FOR END ANCHORAGE OF REINFORCING IN INCHES	
	* TOP BARS	OTHERS	* TOP BARS	OTHERS
3	14	14	12	12
4	18	18	12	12
5	23	23	13	12
6	27	27	18	13
7	33	32	25	18
8	43	36	32	23
9	55	41	41	29
10	69	49	52	37
11	86	60	64	45
14	Not Permitted		88	62
18	Not Permitted		117	82

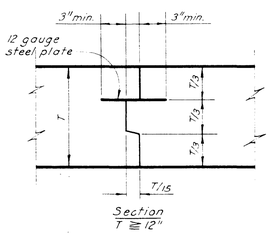
* Top bars are horizontal bars so placed that more than 12" of concrete is cast in the member below the bar. Horizontal bars in walls are to be provided with laps as required for top bars.

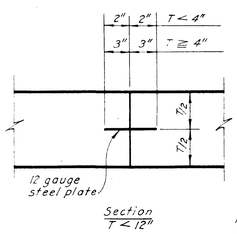
Except as otherwise indicated on the plans, embedment lengths for end anchorage and lapped splices shall be not less than (no minus tolerance) shown above.
Lapped splices shall not be made at points of maximum stress as determined by the Engineer, and shall not be spaced closer than 12 bar diameters. No more than ½ of the bars shall be spliced within a length of 40 bar diameters.

CONCRETE COVER FOR REINFORCEMENT

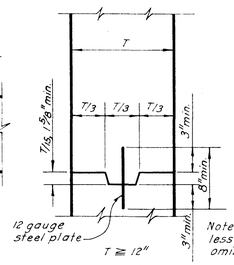
LOCATION	MINIMUM COVER
Unformed surfaces adjacent to excavation	3"
Formed or top surfaces exposed to weather or saturated air, submerged or in contact with earth	
#6 or larger bars	2"
#5 or smaller bars	1½"
Other locations	
Bars in beams or girders, including stirrups	1½"
Column spirals or ties	1½"
Other bars #7 or larger	Bar diameter
Other bars #6 or smaller	¾"

Cover for reinforcing steel shall not be less than the minimum given above (no minus tolerance), and shall not exceed the minimum by more than ½ inch where the concrete thickness is 24 inches or less, or more than ½ inch where the concrete thickness is more than 24 inches.

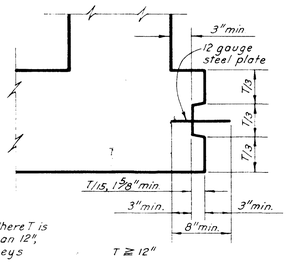




SLABS



WALLS

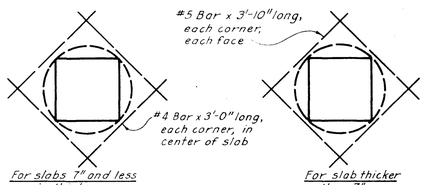


CORNERS

WATERTIGHT JOINTS

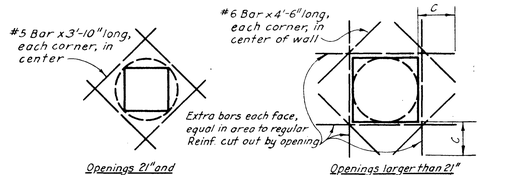
TYPICAL CONSTRUCTION JOINTS

Note: Reinforcing steel is to be carried across all construction joints.



Note: These details apply to openings larger than 18" in Diam. or diagonal.

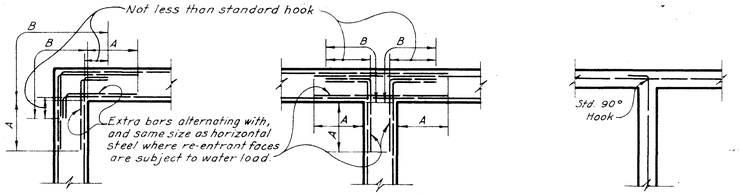
SLABS



C = the required length for lapped splice for top bars as shown on this sheet.

WALLS

TYPICAL EXTRA REINFORCING AT OPENINGS



Note: Vertical reinforcing not shown.

A = ⅓ the clear span distance measured horizontally or vertically, whichever is the smaller; but in no case less than the required length of lapped splices for top bars as shown on this sheet.

B = Sufficient length to permit bars to extend through the wall to the opposite face and terminate in a standard hook but shall not be less than the length required for embedment of top bars, as shown on this sheet.

D = not less than the length required for lapped splices for top bars, as shown on this sheet.

TYPICAL CORNER REINFORCING DETAILS

GENERAL NOTE:

Details on this sheet apply to the entire set of plans except where specifically shown otherwise.

Revised April 15, 1961 Revised March 20, 1964
Revised and Redrawn July 29, 1966

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS

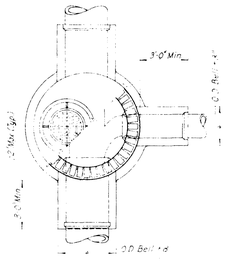
STANDARD CONCRETE DETAILS

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. DENVER, COLO.

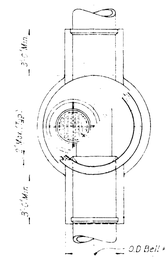
DESIGNED H.H.B-T.M.T-R.E.S. CHECKED H.H.B-T.M.T-R.E.S.
DETAILED J.W.K.-D.L.S. APPROVED [illegible]
TRACED L.S.F. DATE 2/21/67

SHEET 27 OF 32

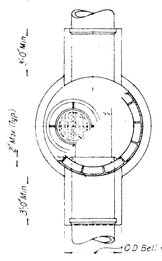
1-2-3



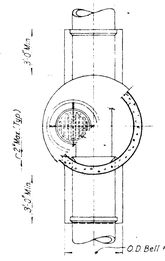
PLAN AND SECTIONAL PLAN



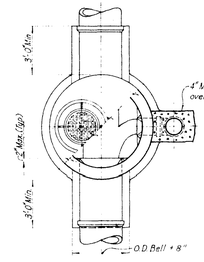
PLAN AND SECTIONAL PLAN



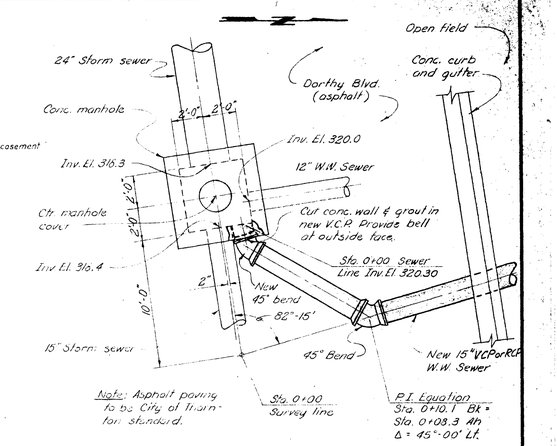
PLAN AND SECTIONAL PLAN



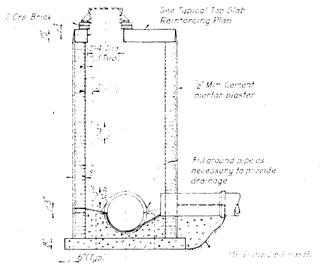
PLAN AND SECTIONAL PLAN



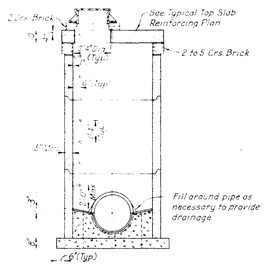
PLAN AND SECTIONAL PLAN



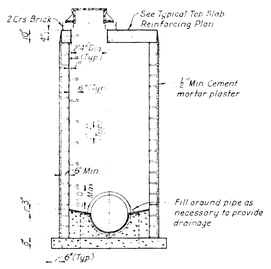
LAYOUT AT STATION 0+00
WASH WATER SEWER
Scale: 1/8" = 1'-0"
See Sheet 26



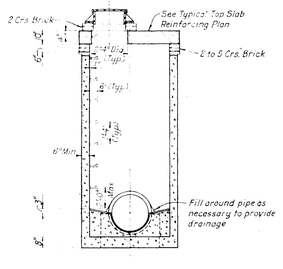
STANDARD SECTION



STANDARD SECTION

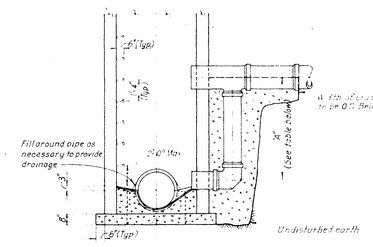


STANDARD SECTION

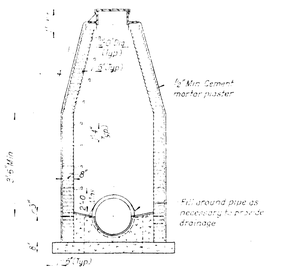


STANDARD SECTION

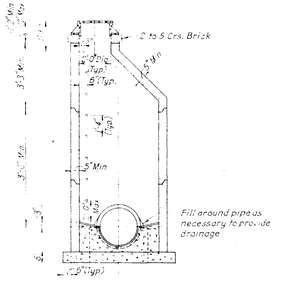
CONCRETE POURED IN PLACE MANHOLE



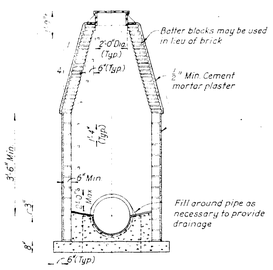
(WITH VITRIFIED CLAY PIPE)
STANDARD SECTION



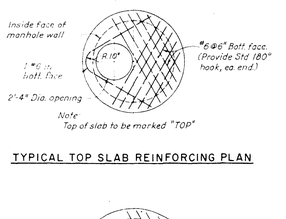
ALTERNATIVE STANDARD SECTION



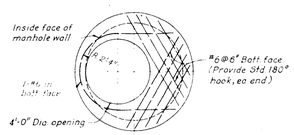
ALTERNATIVE STANDARD SECTION



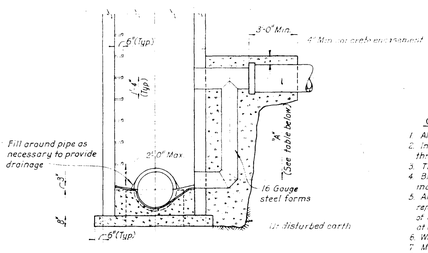
ALTERNATIVE STANDARD SECTION



TYPICAL TOP SLAB REINFORCING PLAN



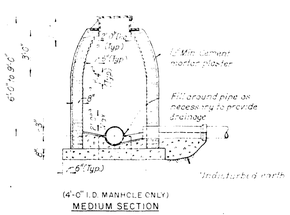
TYPICAL REDUCER SLAB REINFORCING PLAN



(WITH REINFORCED CONCRETE PIPE)
STANDARD SECTION

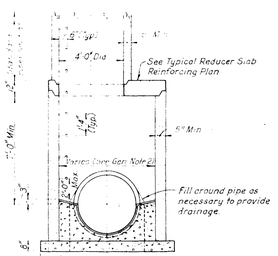
I.D. INCOMING PIPE	I.D. DROP PIPE	"A" MINIMUM
8"	8"	2'-0"
10"	10"	2'-0"
12"	12"	2'-0"
15"	12"	2'-0"
18"	15"	2'-3"
21"	18"	2'-7"
24"	18"	2'-9"
27"	18"	3'-0"
30"	18"	3'-1"
36"	18"	3'-4"
42"	24"	3'-6"
48"	30"	4'-0"

DROP MANHOLE



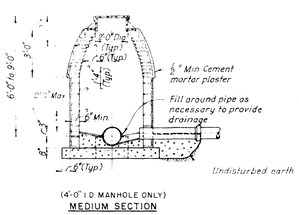
(4'-0" I.D. MANHOLE ONLY)
MEDIUM SECTION

BRICK MANHOLE



ALTERNATIVE BOTTOM SECTION

PRECAST MANHOLE



(4'-0" I.D. MANHOLE ONLY)
MEDIUM SECTION

CONCRETE BLOCK MANHOLE

GENERAL NOTES

1. All manhole rings to be set in mortar.
2. Inside diameter of manholes to be 4'-0" for pipe through 24", 5'-0" for pipe 27" through 36" and 6'-0" for pipe 42" through 48" in size unless otherwise required.
3. This sheet does not apply to sewers over 48" in size.
4. Brick under manhole ring and under top slab of manhole not required unless manhole is located in roadways, parking areas, sidewalks, etc.
5. Any material excavated beneath pipe entering or leaving manholes shall be replaced with concrete; such concrete fill shall extend to the center of the pipe for a distance of at least 3'-0" from face of manhole and shall terminate at a bell.
6. Wall reinforcing in precast manhole circular sections to be A.S.T.M. C-76, Class III.
7. Manhole steps in precast manholes to be grouted in with expanding grout.
8. Manhole inverts shown as poured concrete. At contractors option, inverts may be built up using brick and mortar. Provide 1" minimum cement mortar finish, all inverts.
9. Except for drop assembly, the construction of drop manholes including materials to be similar to that for standard manholes.

LEGEND

- Concrete poured in place
- Precast concrete
- Brick masonry
- Concrete block masonry

REGISTERED ENGINEER
COLORADO
1967

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS

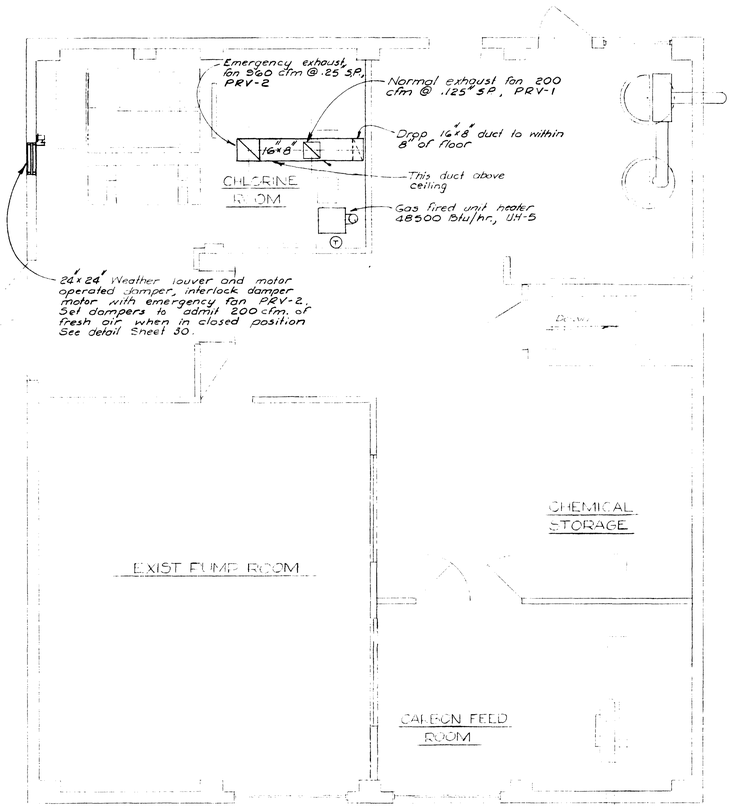
DETAILS OF STANDARD MANHOLES

BLACK & VEATCH, CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED HNB, WEF, LWW, REV, HBB CHECKED WEF, MJG, LEW
DETAILED A.C.W. APPROVED R.K. Gerstner
TRACED A.C.W. DATE 8/21/67

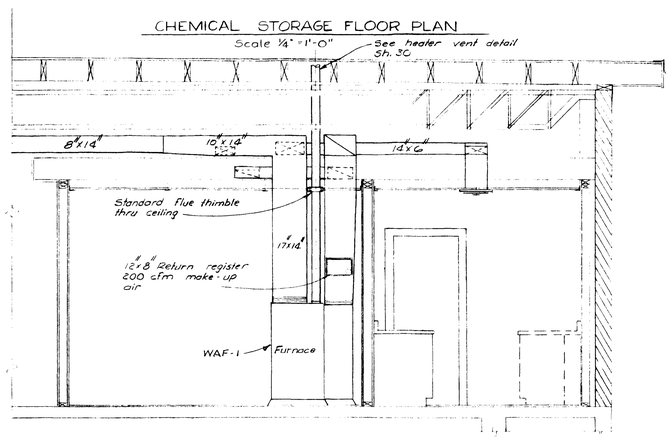
SHEET 28 OF 32

1-2-3



CHEMICAL STORAGE FLOOR PLAN

Scale 1/4" = 1'-0"

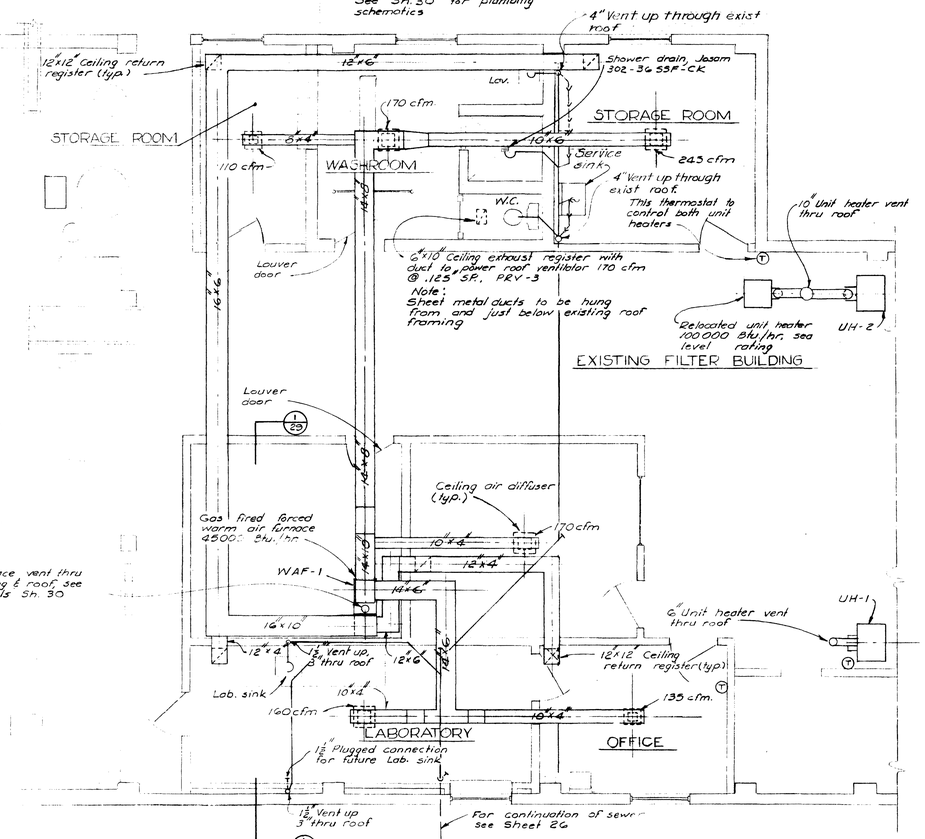


SECTION - 1

Scale 3/8" = 1'-0"

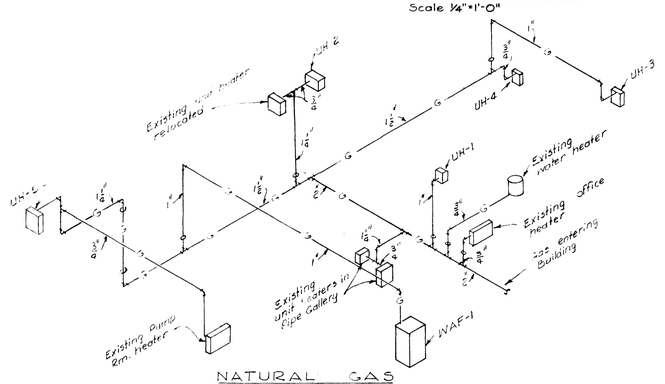
See this Sheet

Note:
See Sh. 30 for plumbing schematics



OPERATING FLOOR PLAN

Scale 1/4" = 1'-0"



NATURAL GAS PIPING SCHEMATIC

No Scale

Note:
See Sh. 30 for PRV curb detail on existing roof.

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

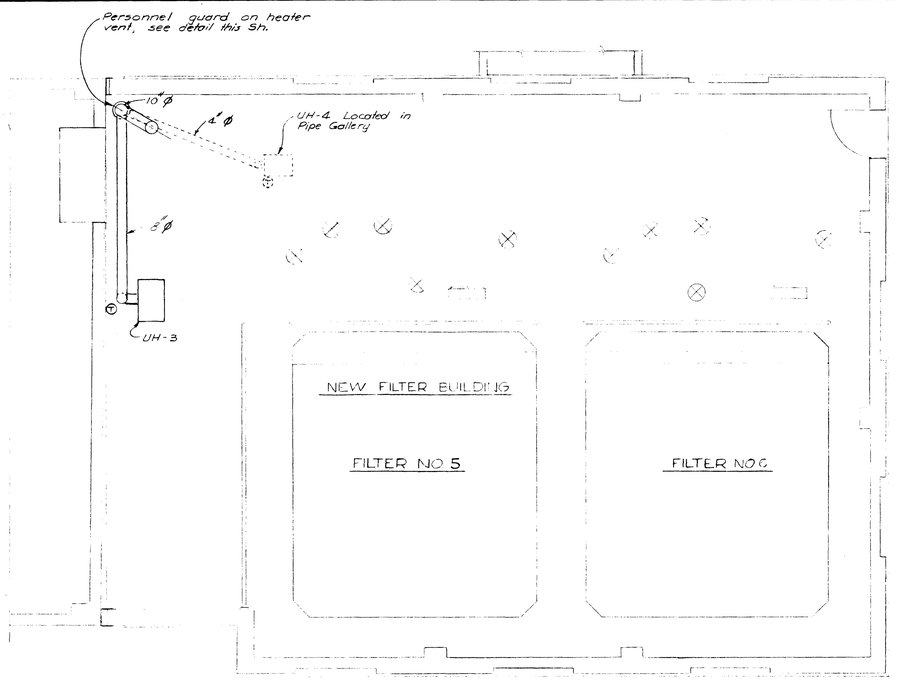
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
HEATING, VENTILATING & PLUMBING

BLACK & VEATCH, CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED R.M.M. CHECKED NWS
DETAILED R.M.M. APPROVED RR Gunther
DATE 8/21/67

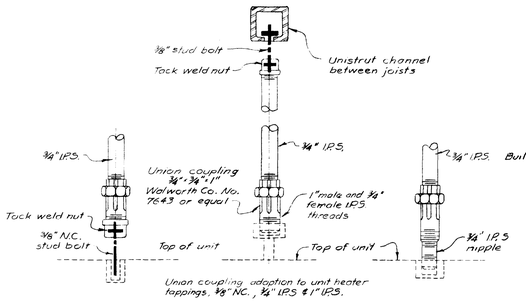
SHEET 29 OF 32

1-2-3



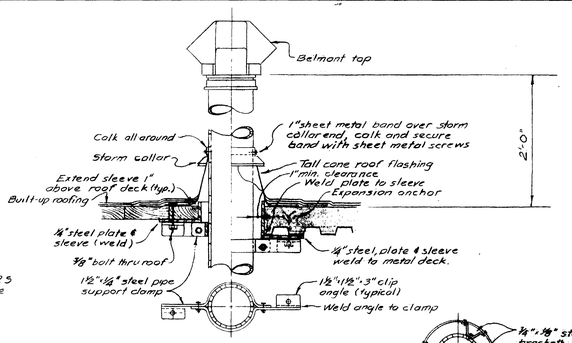
OPERATING FLOOR PLAN

Scale 1/4" = 1'-0"



SUSPENSION DETAIL

No Scale



HEATER VENT DETAIL

No Scale

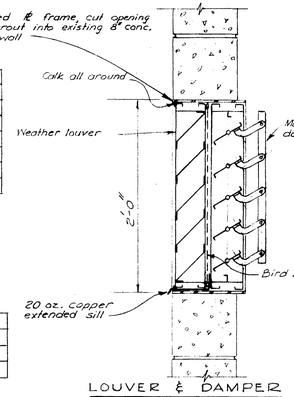
HEATING UNITS

Unit No.	Type Unit	Cap. in Btu/Hr	Location
UH-1	Unit heater	95000	Existing Filter Fl.
UH-2	" "	95000	" " "
UH-3	" "	135000	New Filter Fl.
UH-4	" "	25000	New Pipe Gallery
UH-5	" "	50000	Chlorine Bldg.
WAF-1	Furnace	45000	Existing Chem. Storage

Note:
Heating unit capacities shown above are capacities required at an elevation of 5400 Ft.

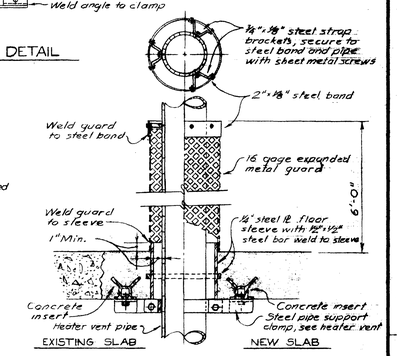
VENTILATING FANS

Unit No	Type	Cfm	S. P.	Location
PRV-1	Power roof vent.	200	.125"	Chlorine Rm.
PRV-2	" " "	960	.125"	" "
PRV-3	" " "	170	.125"	Washroom



LOUVER & DAMPER DETAILS

Scale: 1½" = 1'-0"



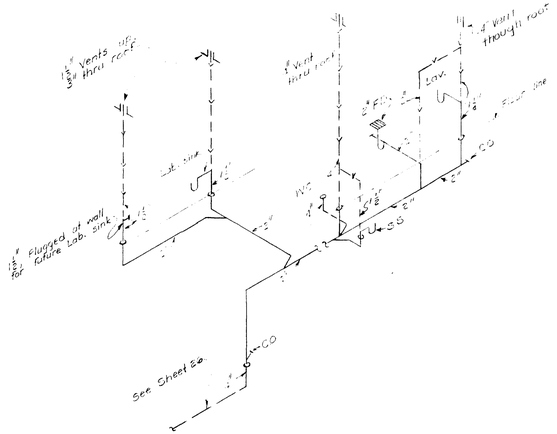
PERSONNEL GUARD

No Scale

LEGEND

HEATING VENTILATING & PLBG.

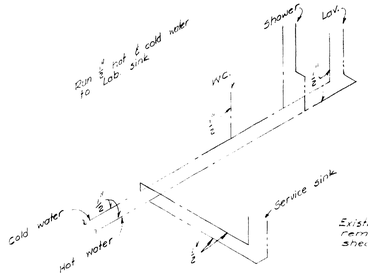
- Supply air duct
- Return or exhaust air duct
- UH. Unit heater
- WAF Warm air furnace
- PRV. Power roof ventilator
- Lav. Lavatory
- W.C. Water closet
- Soil & Waste piping
- Soil & Waste piping below grade
- Sanitary vent piping
- Cold water piping
- Hot water piping
- Sanitary trap
- Thermostat
- F.D. Floor drain
- S.S. Service sink
- G Natural gas piping



WASHROOM

WASTE & VENT SCHEMATIC

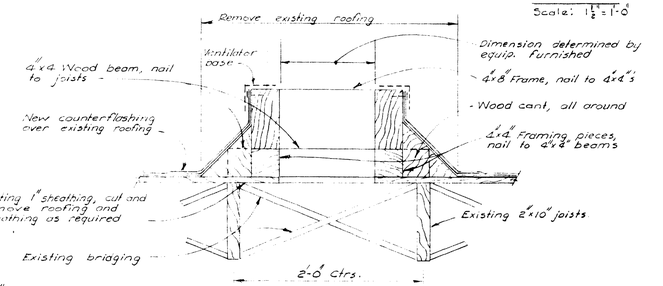
No Scale



WASHROOM

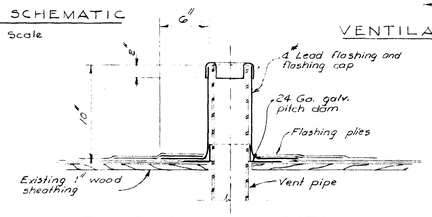
WATER SCHEMATIC

No Scale



VENTILATOR CURB DETAIL

Scale: 1½" = 1'-0"



PLUMBING VENT DETAIL

No Scale

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
HEATING, VENTILATING & PLUMBING

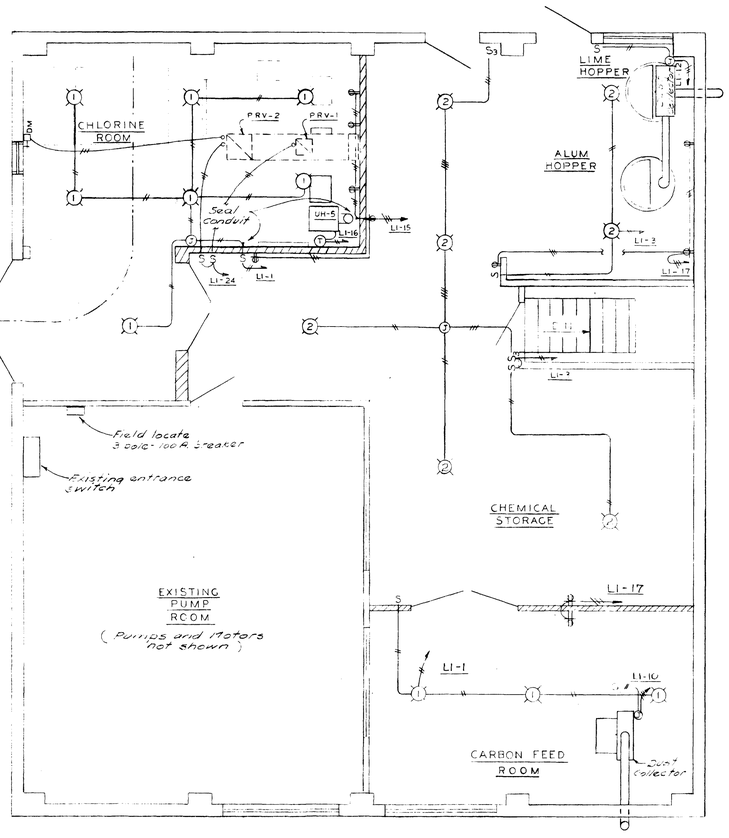
BLACK & VEATCH, CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED R.M.M. CHECKED N.W.S.
DETAILED R.M.M. J.F.K. APPROVED R.R. Gerdsick
DATE 9/1/67

SHEET 30 OF 32

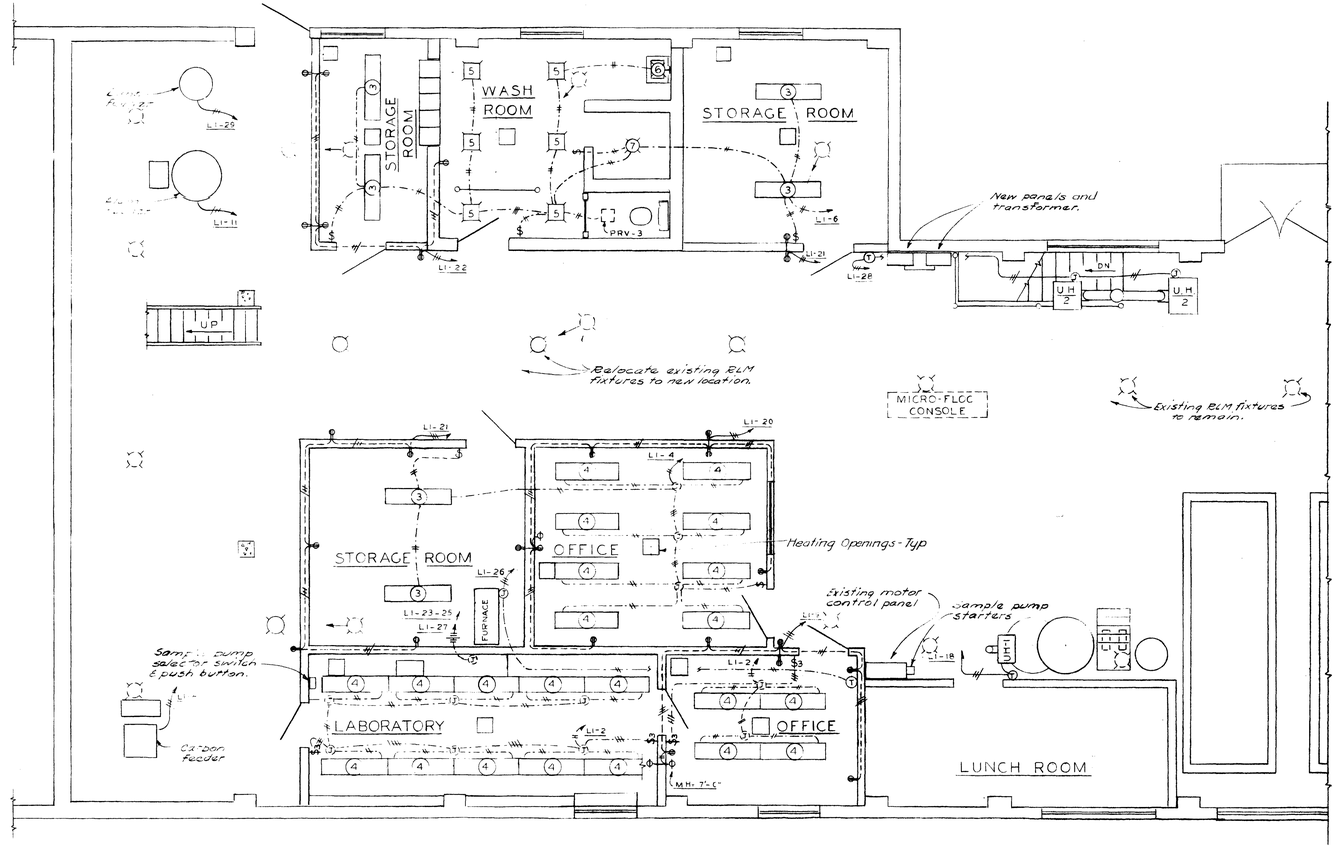
1-2-3

Approved Water Treatment Plant Additions



CHEMICAL STORAGE FLOOR PLAN

SCALE 1/4" = 1'-0"

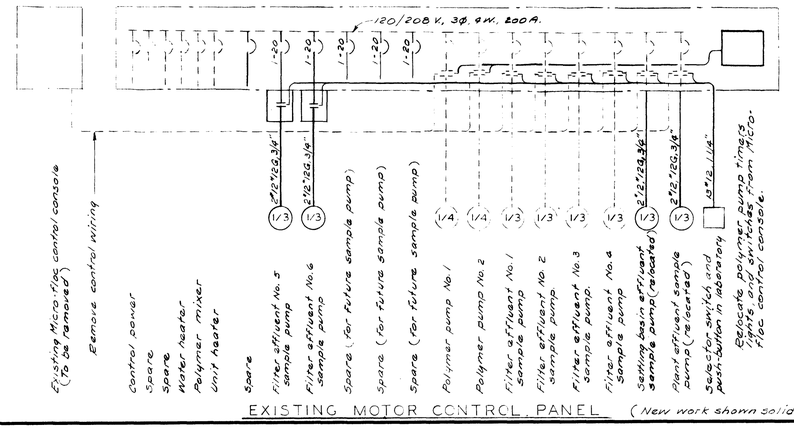


OPERATING FLOOR PLAN

SCALE 1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE

SYM.	LAMP	MTG. HGT.	TYPE	MFR.	FIXTURE
1	100 W.	Mount on ceiling	12" V.T. surface type with globe & guard.	Crouse Hinds Co. # VXH-1546	
2	150 W.	Mount 9'-0 high	Shallow dome pendent type	Sun. Mfg. Co. # 7423	
3	2/40T.12 RS/CW.	On ceiling or 9'-6" up	12" wide to suit enamel reflector	Sun. Mfg. Co. # FTH-1124-A	
4	2/40T.12 RS/CW.	Recessed fixture	12" wide troffer; clear tex plastic.	Day-Brite Co. # 4921-660	
5	100 W.	Recessed unit	Fresnel wide angle dino glass enclosure	Sun Bi-Pin Co. # 2102-74C.	
6	75 W.	above mirror	White glass clear bottom with recp.	Art Metal Co. # 3395	
7	60 W.	Ceiling	Tapered drop white glass	Art Metal Co. # 3356 HH.	
8	200 W	7'-0 above floor	Asymmetric bracket	Holophane Co. # 420	
D	2500 T3/CL	High on wall	Mod. beam floodlight Cat. No. GE12 200, "GE11 cover, Sock. 11 GE19 elbow	Stone Mfg. Co. # 7939 with swivel 1½" arm.	
10	175 W. 120V H17SC3902	12' high. 2½" steel	Mercury vapor lamp with normal P.F. ballast	Stabar Mfg. Co. # P1019-120 N.	



EXISTING MOTOR CONTROL PANEL (New work shown solid)

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

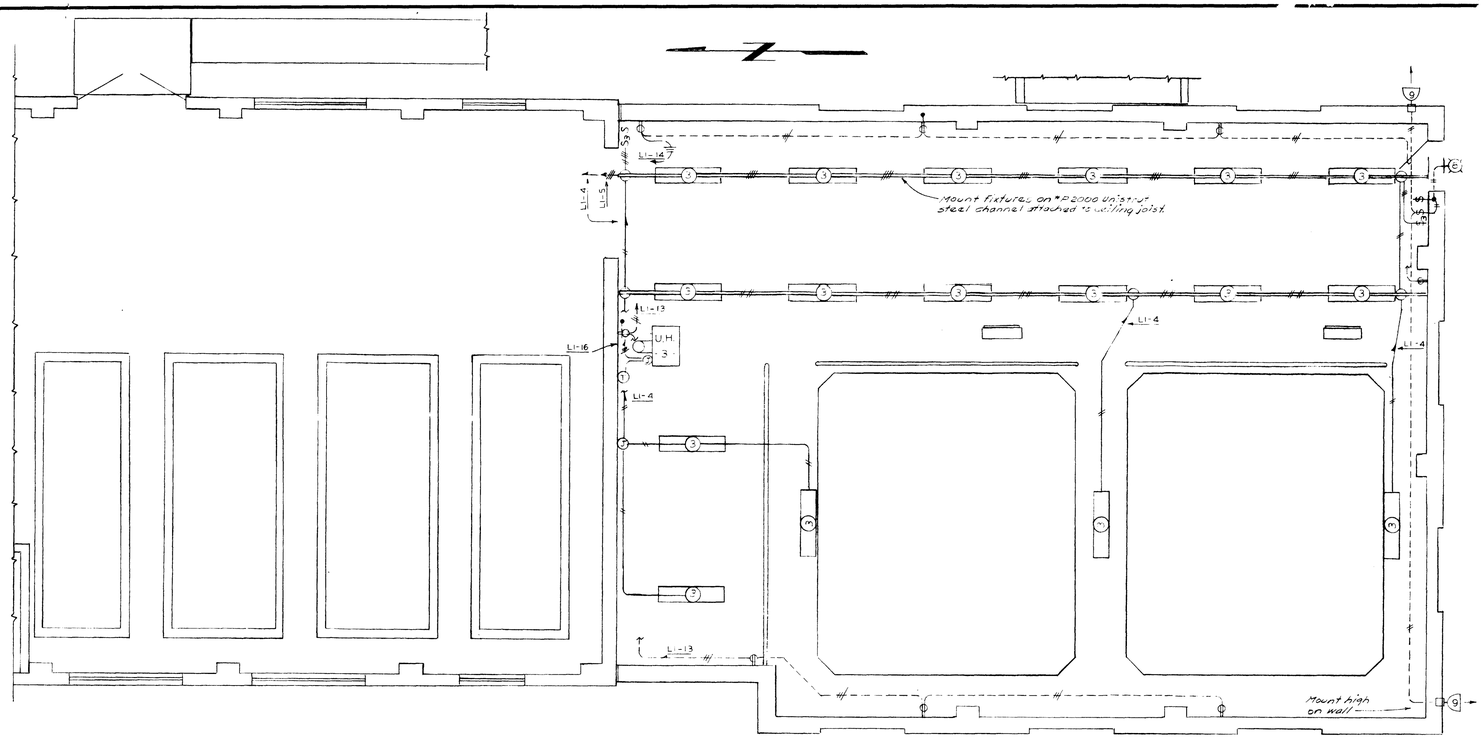
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
ELECTRICAL

BLACK & VEATCH, CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

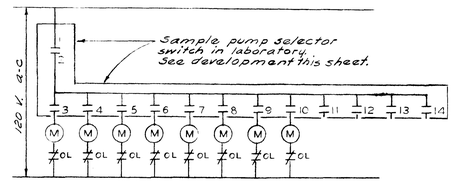
DESIGNED HLD DEC CHECKED DEC
DETAILED HLD APPROVED
DATE 7/3/67

SHEET 31 OF 32

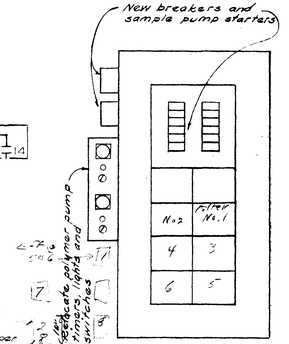
1-2-3



NEW OPERATING FLOOR
FILTER BUILDING
Scale 1/8" = 1'-0"



SAMPLE PUMP CONTROL



EXISTING MOTOR CONTROL PANEL FRONT VIEW

Note: All outlets below grade in wet walls to have 1/4" copper tube drain flush in wall down to approx. 2" above finish floor.

All fluorescent ballasts shall be Dri-Lok thermal type as as manufactured by Jefferson Elec. Co. which carry the "CBM" certified by "ETL" label or approved equal.

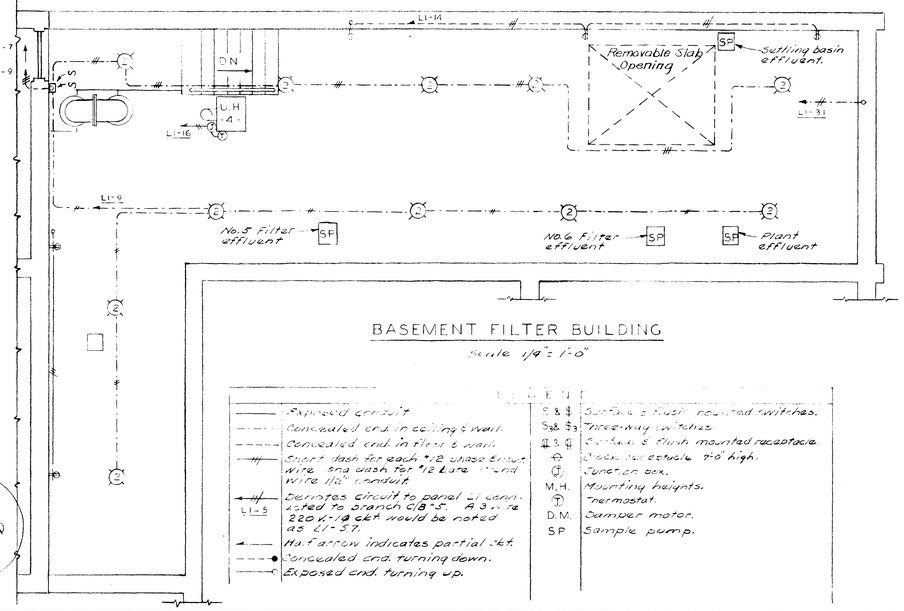
See sheet 22 for electrical work at basins.

Gl Control Duct Line

Watts					Watts
1192	Ltgs.	Chlorine, Carbon Feed Rooms & Lunch Rm.	2	Ltgs. Laboratory & Office	1366
1350	Ltgs.	Chemical Stg. Rm.	3 4	Ltgs. Office, Storage Rm. & New Filters	1440
1152	Ltgs.	Filter Floor	5 6	Ltgs. Wash, Storage Rms & PRV-3	1269
750	Ltgs.	Basement	7 8	Carbon Feeder & Vibrator	800
900	Ltgs.	Basement Filter Bldg.	9 10	Carbon Feed dust collector	1130
1340	Alum feeder & mixer		11 12	Alum & Lime dust collector	1130
900	Recp. (2)	Filter floor & Basement	13 14	Recp. (7) Filter floor & Basement	1650
750	Recp. (3)	Chlorine room	15 16	UH #3, #2, #5	1075
750	Recp. (3)	Alum room & Carbon Feed	17 18	UH #1 & #2	850
1350	Recp. (9)	Lunch room & Office	19 20	Recp. (8) Storage room & Office	1200
1050	Recp. (7)	Storage, rooms & Corridor	21 22	Recp. (4) Storage room & Corridor	900
3000	Recp. (2)	Laboratory 220 V.	23 24	PRV #1 & PRV #2.	1000
1200	Recp. (2)	Laboratory 120V.	25 26	Furnace	900
1340	Lime feeder		27 28	UH #2	850
1200	5 Floodlights & Door light.		29 30	Basin Ltgs. & Recps.	820
	Spare		31 32	Spare	
	Spare		33 34	Spare	
	Spare		35 36	Spare	

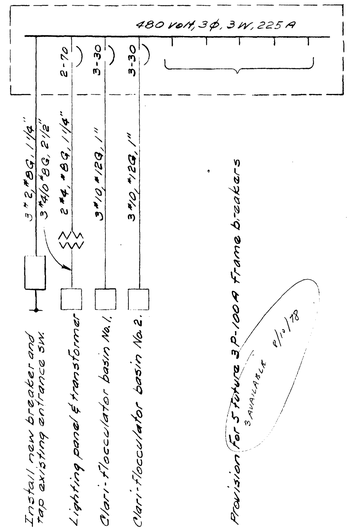
NEUTRAL

LIGHTING PANEL LI
120/240 V., 1Ø, 3W.



BASEMENT FILTER BUILDING
Scale 1/8" = 1'-0"

	Exposed conduit	S & $	Surface & flush mounted switches.
	Concealed ond. in ceiling & wall.	$2 $3	Three-way switches.
	Concealed cnd. in floor & wall.	⇄ ⇄	Surface & flush mounted receptacle.
	Short dash for each #12 phase & neut. wire, long dash for #12 Lute control wire 1/2" conduit.	⊖	Clock hanger outlet 9'-0" high.
LI-5	Denotes circuit to panel LI terminated to branch CB #5. A 3 wire 220 V.-1Ø ckt would be noted as LI-5-7.	(J)	Junction box.
		M.H.	Mounting heights.
	Half arrow indicates partial ckt.	T	Thermostat.
	Concealed end turning down.	D.M.	Damper motor.
	Exposed end turning up.	S.P.	Sample pump.



POWER PANEL BOARD ONE LINE

CONTACTS HANDLE END		POSITIONS 12	11	10	9	8	7	6	5	4	3	2	1
1	2	FOR LATERAL STAGE, SEE BELOW											
3	4												X
5	6											X	
7	8										X		
9	10							X				X	
11	12						X				X		
13	14					X				X			

LATERAL CONTACTS			ROTATING CONTACTS MAINTAINING
HANDLE	NORMALLY	IN	
	LOCKED WHEN MAINTAINING	OUT	
	PULLED IN POS.	ALL	
	CLOSES CONTACTS	1 & 2	

SAMPLE PUMP CONTROL SELECTOR SWITCH

THORNTON, COLORADO
WATER WORKS IMPROVEMENTS
WATER TREATMENT PLANT ADDITIONS
FILTER BUILDING
ELECTRICAL

BLACK & VEATCH, CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

DESIGNED HLD, DEC CHECKED DEC
DETAILED HLD APPROVED
DATE 7/3/67

SHEET 32 OF 32

1-2-3

TO SYSTEM

BACKWASH PUMP HOUSE

TOP OF FOOTING 5364.67'

RESERVOIR

℄ OF RESERVOIR

14" CEMENT ASBESTOS

186'-6"

257'-4"

75'-0"

DISPOSAL BED

GRADE @ .0008

SEPTIC TANK

4"VC TEES

15" & 8" VC WASTE TO CONCRETE LINED DITCH

10" CEMENT ASBESTOS TO BACKWASH WATER RESERVOIR

12" CEMENT ASBESTOS RAW WATER FROM CROKE LAKE

GREASE TRAP

GRADE 0.0017

8" VC SLUDGE SUMP

DRAIN @ 0.004

PRESSURE-PNEUMATIC WATER TANK

8'-0"

FILTERS

PIPE GALLERY BELOW

ELEVATION 5376.5'

34'-9"

6'-2"

8'-8"

37'-6"

16'-10"

ACCELERATOR

W.L. 5390.0

5390.0'

5390.5'

CHEMICAL FEEDING

ELEV 5400.0'

CHEMICAL MIXING FLOOR ELEV 5390.0'

CHEMICAL STORAGE

5400.00

26'-0"

21'-6"

LOADING DOCK

5400.0' 30'-0"

5395.5'

ELEV. TOP RES. ROOF = 5375.92'

ELEV. WATER LEVEL = 5374.92'

ELEV. 5364.67'

ORIGINAL GROUND PROFILE

ELEV 5400.0'

ELEV 5395.5'

ELEV 5390.0'

ELEV 5376.5'

ELEV. 5375.5'

V. A. VASEEN REGISTERED 0711 ENGINEER AND LAND SURVEYOR STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON, COLORADO

GENERAL LAYOUT
WATER TREATMENT PLANT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN JJS	REVISED	1/13
TRACED		
CHECKED BB 2/14/55		

1-1-2

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

Arsenic

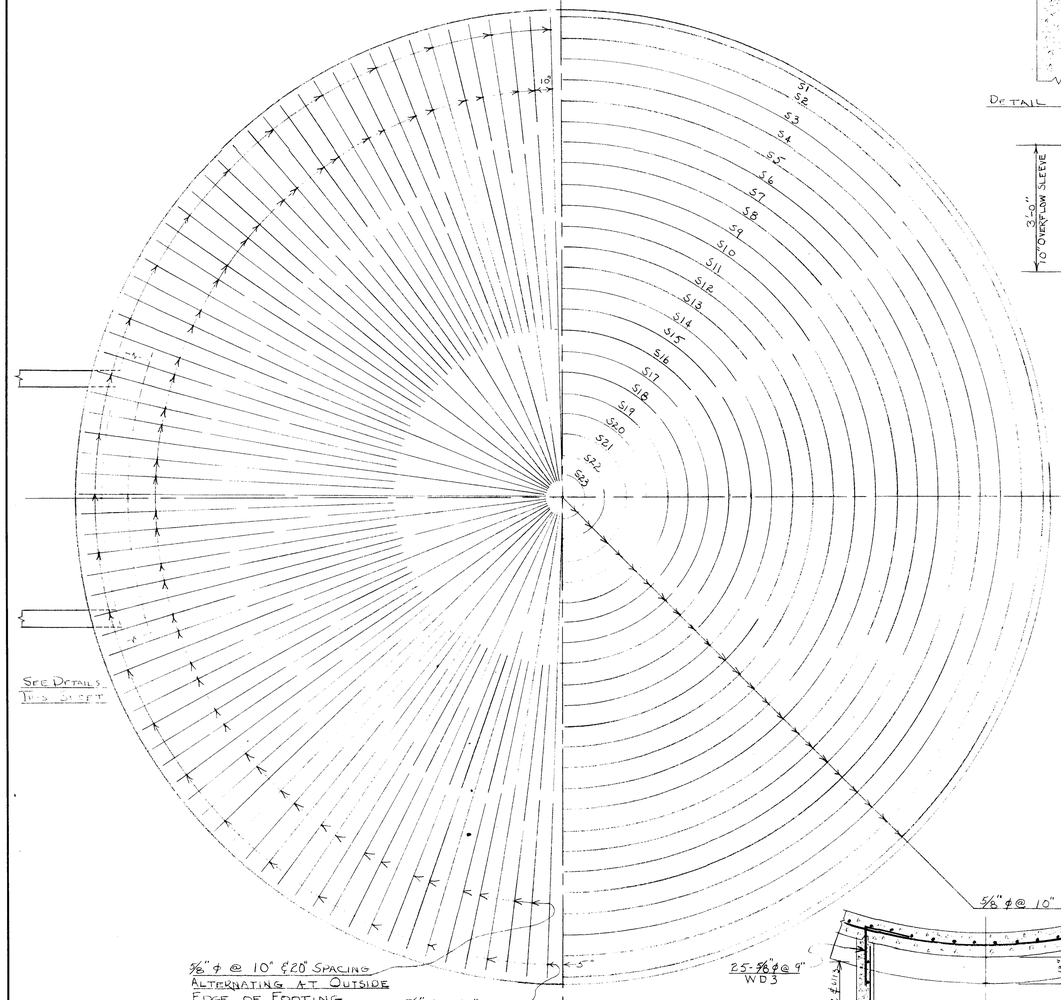
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

Thornton Water Treatment Plant

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

SYMMETRICAL ABOUT ℄

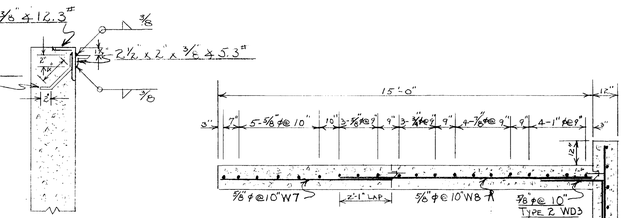


SEE DETAILS THIS SHEET

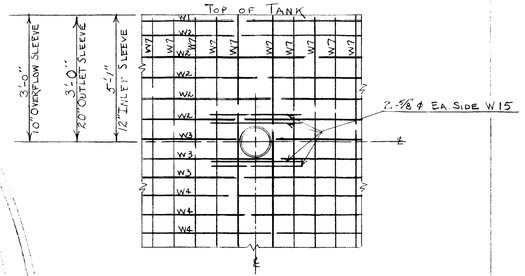
5/8" ϕ @ 10" & 20 SPACING ALTERNATING AT OUTSIDE EDGE OF FOOTING S24

5/8" ϕ @ 30" ON OUTSIDE FOOTING S25

FOOTING STEEL PLACING PLAN
SCALE 3/8" = 1'-0"



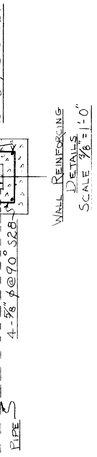
DETAIL OF SKATE SUPPORT



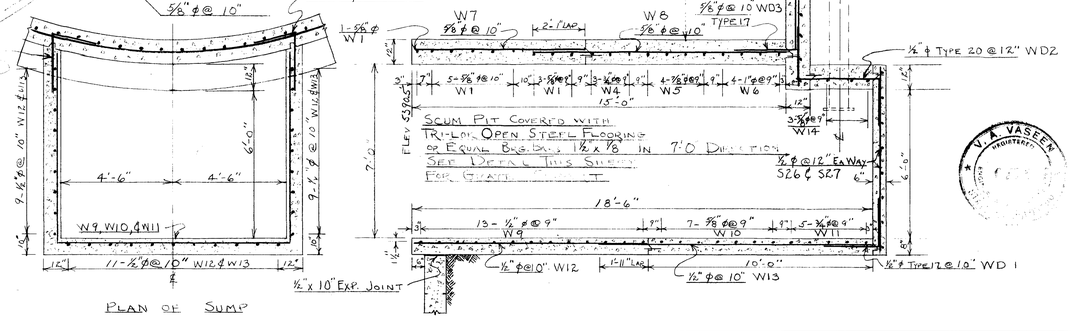
DETAIL OF STEEL AROUND PIPE SLEEVES
SCALE 3/8" = 1'-0"



CONSTRUCTION JOINT DETAIL
SCALE 1" = 1'-0"

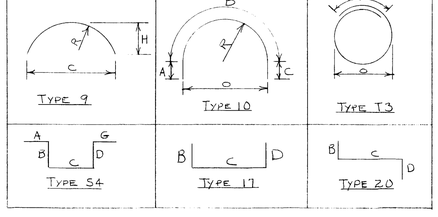


WALL REINFORCING DETAILS
SCALE 3/8" = 1'-0"



PLAN OF SUMP

MARK	NO	SIZE	TYPE	SKETCH	LENGTH	A	B	C	D	G	H	O	R	TOTAL LENGTH
S1	3	5	9		42'-2"			36'-0	LAP 2'-0		10'-5"			126'-6"
S2	3	5	9		40'-6"			32'-10	Do		10'-1"			121'-6"
S3	3	5	9		38'-9"			31'-2"	Do		9'-7"			116'-3"
S4	3	5	9		36'-11"			29'-10	Do		9'-2"			110'-9"
S5	3	5	9		35'-2"			28'-4	Do		8'-9"			105'-6"
S6	3	5	9		33'-5"			26'-11	Do		8'-4"			100'-3"
S7	3	5	9		31'-9"			25'-6"	Do		7'-11"			95'-3"
S8	3	5	9		30'-0"			24'-0	Do		7'-7"			90'-0"
S9	3	5	9		28'-2"			22'-7"	Do		7'-2"			84'-6"
S10	3	5	9		26'-5"			21'-1"	Do		6'-8"			78'-3"
S11	3	5	9		24'-10"			19'-8"	Do		6'-4"			74'-6"
S12	3	5	9		23'-0			18'-3"	Do		5'-11"			69'-0"
S13	3	5	9		21'-2"			16'-10	Do		5'-6"			63'-6"
S14	3	5	9		19'-6"			15'-4	Do		5'-1"			58'-6"
S15	2	5	10		25'-8"	1'-0	23'-8	1'-0	LAP 2'-0"		15'-0			51'-4"
S16	2	5	10		22'-11"	1'-0	20'-11	1'-0	Do		13'-4			45'-10"
S17	2	5	10		20'-4"	1'-0	18'-4	1'-0	Do		11'-8			40'-8"
S18	2	5	10		17'-9"	1'-0	15'-9"	1'-0"	Do		10'-0			35'-6"
S19	2	5	10		15'-1"	1'-0	13'-1"	1'-0"	Do		8'-4			30'-2"
S20	1	5	T3		23'-0"				LAP 2'-1"		6'-8			23'-0"
S21	1	5	T3		17'-9"				Do		5'-0			17'-9"
S22	1	5	T3		12'-7"				Do		3'-4			12'-7"
S23	1	5	T3		7'-4"				Do		1'-8			7'-4"
S24	76	5	STR		12'-8"									1216'-0"
S25	50	5	STR		18'-8"									933'-4"
S26	8	4	STR		7'-4"									58'-8"
S27	9	4	STR		10'-0"									90'-0
S28	4	5	S4		10'-4"	2'-1"	2'-1"	2'-0	2'-1"	2'-1"				41'-4"
S29	2	5	T3		8'-4"				LAP 2'-1"			2'-0	1'-0	16'-8"
W1	27	5	9		39'-9"			32'-2	Do	9'-11"				1073'-3"
W4	9	6	9		40'-2"			32'-5	Do	10'-0"				361'-6"
W5	12	7	9		40'-7"			32'-6	Do	10'-3"				487'-0"
W6	12	8	9		41'-0"			32'-10	Do	10'-7				492'-0"
W7	136	5	STR		6'-8"									906'-8"
W8	136	5	STR		10'-1"									1371'-4"
W9	13	4	17		23'-7"	7'-1½	9'-4"	7'-1½						306'-7"
W10	7	5	17		23'-7"	7'-1½	9'-4"	7'-1½						165'-1"
W11	5	6	17		21'-7"	6'-1½	9'-4"	6'-1½						107'-11"
W12	30	4	STR		8'-4"								.	250'-0"
W13	30	4	STR		11'-11"									357'-6"
WD1	30	4	17		3'-6"	1'-7"	1'-11"							105'-0"
WD2	10	4	2.0		6'-3"	2'-0"	2'-3"	2'-0"						62'-6"
WD3	186	5	17		4'-8"	2'-1"	2'-7"							868'-8"
W14	3	5	STR		9'-4"									28'-0"
W15	12	5	STR		4'-0"									48'-0"



V. A. VASEEN ENGINEER

ACCELERATOR

THORNTON, COLORADO

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

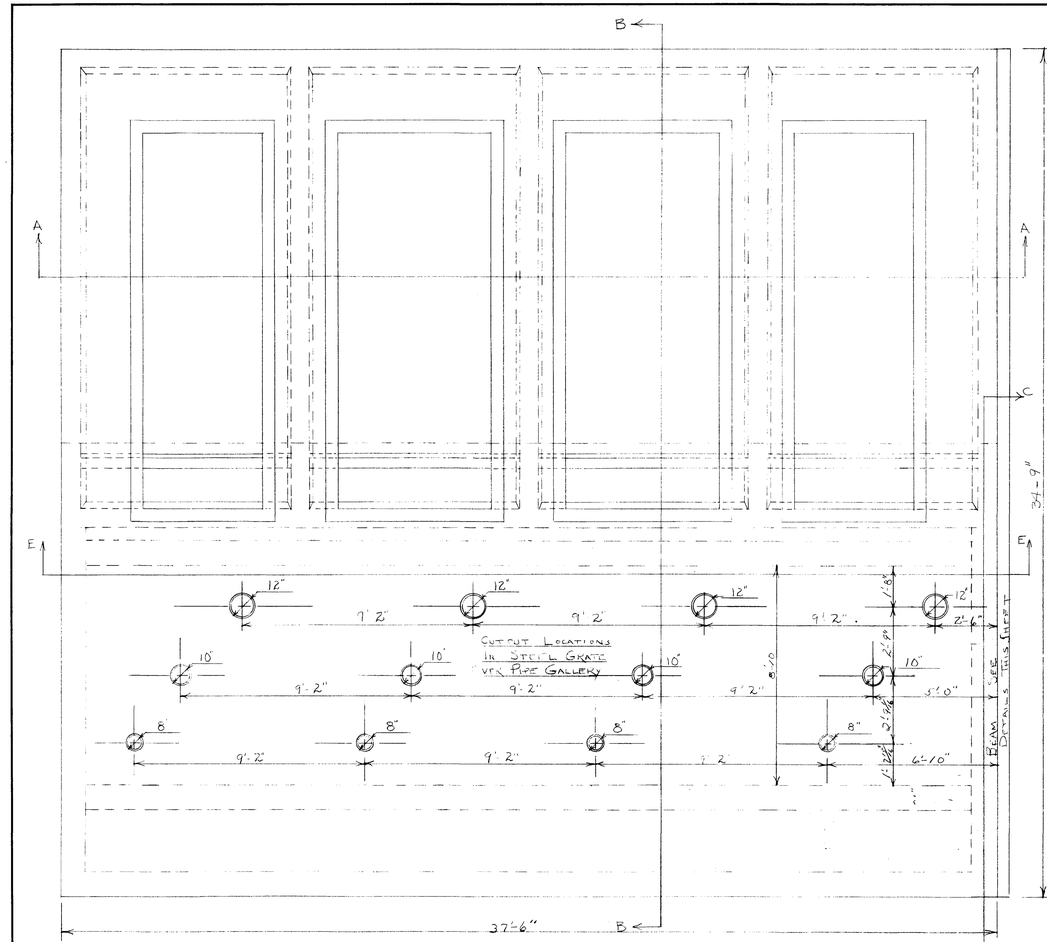
DRAWN JJJ
TRACED
CHECKED BB 2/14/55

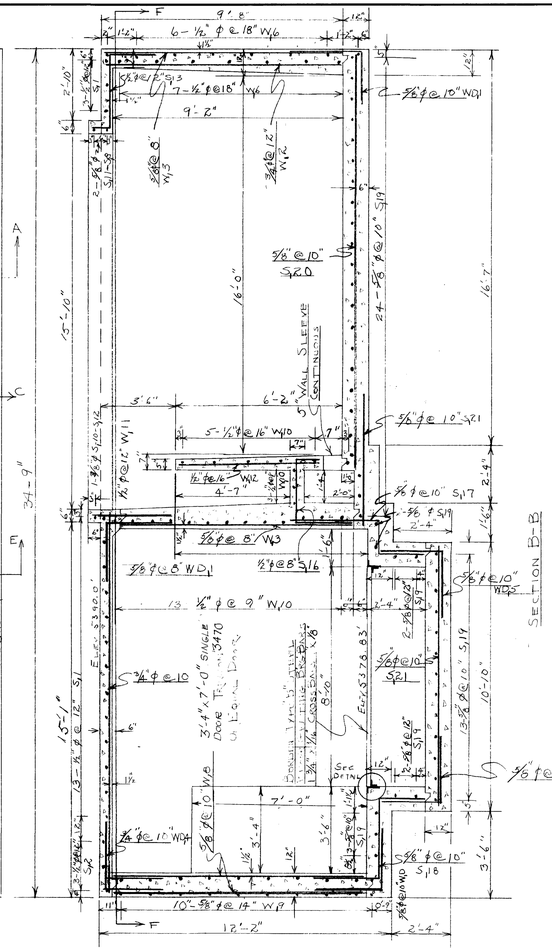
REVISED

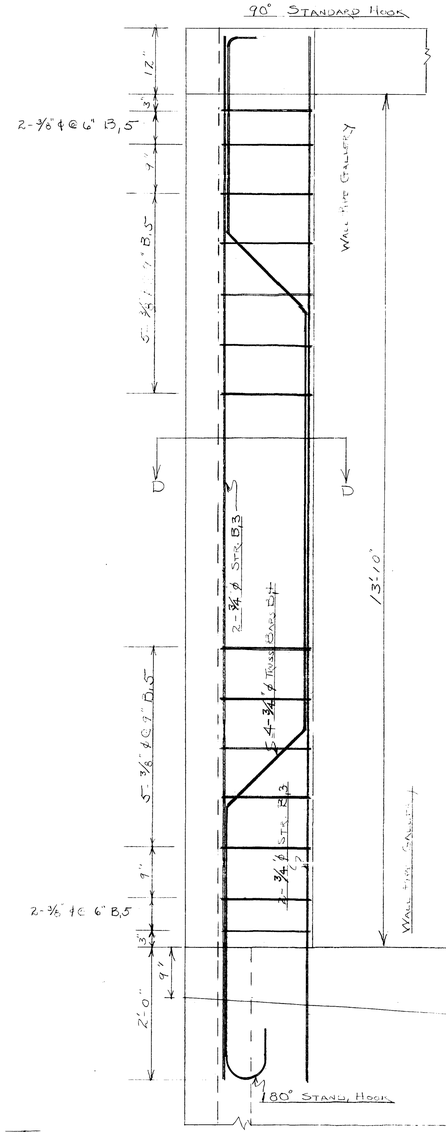
2/13

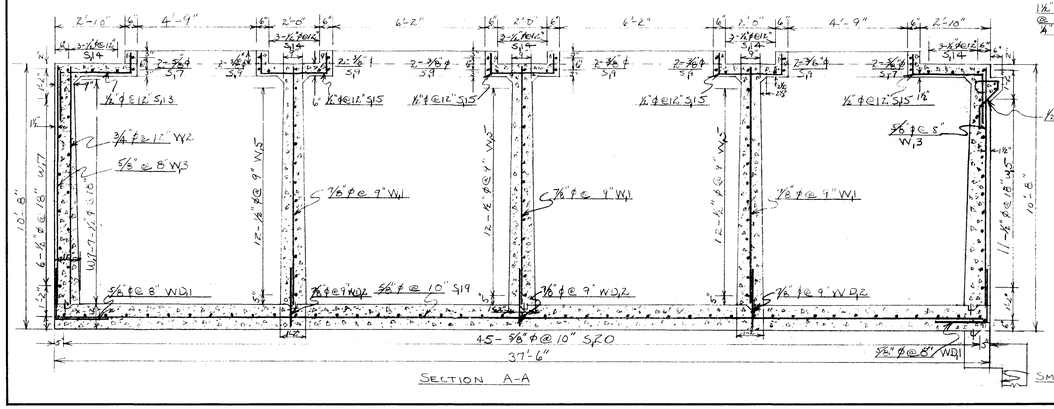
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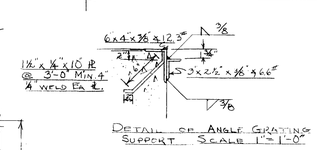
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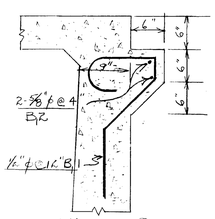




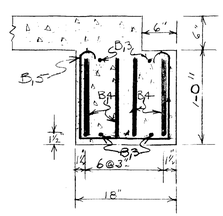








SMALL WALL PIPE GALLERY SEE SECTION A-A



V. A. VASCENKO REGISTERED CIVIL ENGINEER STATE OF COLORADO

FILTER UNIT REINFORCING DETAILS

WATER TREATMENT PLANT
THORNTON, COLORADO

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN JJJ 1-24-55	REVISED 2-3-55	3 / 13
TRACED		
CHECKED BB 2/14/55		

1-1-2

5-1-8

DRAWING NUMBER

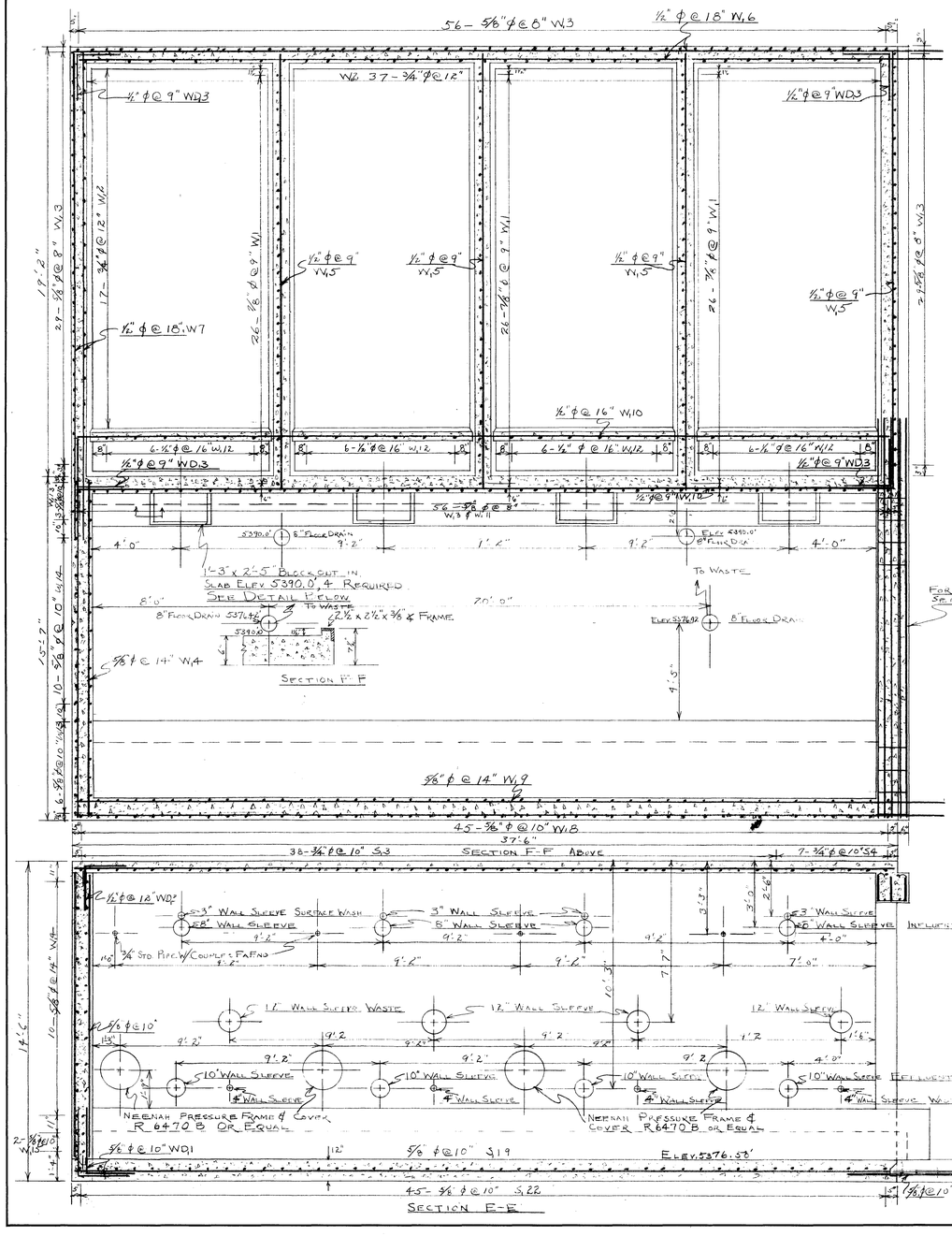
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
DESIGNED BY NUMBER DATE
DRAWN BY NUMBER DATE
CHECKED BY NUMBER DATE
REVISED BY NUMBER DATE

DRAWING NUMBER

Thornton Water Treatment Plant

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
DESIGNED BY NUMBER DATE
DRAWN BY NUMBER DATE
CHECKED BY NUMBER DATE
REVISED BY NUMBER DATE

DRAWING NUMBER



MARK	NO	SIZE	TYPE	SKETCH	LENGTH	A	B	C	D	E	F	G	H	K	O	J	TOTAL LENGTH
S.1	16	4	STR	—	37'-2"												594'-8"
S.2	3	4	STR	—	31'-2"												93'-6"
S.3	38	6	STR	—	15'-3"												579'-6"
S.4	7	6	STR	—	12'-3"												85'-9"
S.5	4	4	STR	—	5'-0"												20'-0"
S.6	10	6	STR	—	8'-0"												80'-0"
S.7	4	5	STR	—	16'-6"												66'-0"
S.8	4	5	STR	—	5'-5"												21'-8"
S.9	12	3	STR	—	16'-6"												198'-0"
S.10	2	3	STR	—	5'-5"												10'-10"
S.11	4	5	STR	—	6'-10"												27'-4"
S.12	2	3	STR	—	6'-10"												13'-8"
S.13	56	4	20	⌐	5'-10"	0'-9	3'-0	2'-1"									326'-8"
S.14	15	4	STR	—	21'-9"												326'-3"
S.15	51	4	17	⌐	4'-0"	0'-9	2'-6	0'-9									204'-0"
S.16	56	4	17	⌐	5'-5"	0'-8	2'-5	2'-4"									303'-4"
S.17	45	5	20	⌐	6'-2"	3'-1	1'-3	1'-10									277'-6"
S.18	45	5	20	⌐	7'-7"	2'-7	3'-½	1'-10									321'-3"
S.19	46	5	STR	—	38'-8"												1778'-8"
S.20	45	5	STR	—	17'-3"												776'-3"
S.21	45	5	STR	—	5'-6"												247'-6"
S.22	45	5	STR	—	10'-6"												452'-6"
S.23	13	5	STR	—	4'-2"												54'-2"
W.1	78	7	STR	—	9'-6"												741'-0"
W.2	54	6	STR	—	9'-6"												513'-0"
W.3	170	5	STR	—	9'-6"												1615'-0"
W.4	20	5	STR	—	15'-3"												305'-0"
W.5	49	4	STR	—	19'-7"												959'-7"
W.6	15	4	STR	—	38'-8"												580'-0"
W.7	14	4	STR	—	22'-0"												308'-0"
W.8	90	5	STR	—	10'-2"												915'-0"
W.9	20	5	STR	—	38'-8"												773'-4"
W.10	21	4	STR	—	37'-2"												781'-6"
W.11	38	4	STR	—	3'-9"												142'-6"
W.12	24	4	STR	—	5'-5"												130'-0"
W.13	18	5	STR	—	10'-8"												192'-0"
W.14	20	5	STR	—	13'-0"												260'-0"
W.15	4	5	STR	—	8'-6"												34'-0"
WD.1	287	5	17	⌊	4'-8"		2'-7	2'-1"									1339'-8"
WD.2	78	7	STR	—	2'-11"												227'-6"
WD.3	67	4	17	⌊	4'-0"		2'0"	2'0"									268'-0"
WD.4	45	6	17	⌊	6'-7"		3'-4	3'-1"									276'-3"
WD.5	90	5	17	⌊	5'-5"		2'-10	2'-7									457'-6"
WD.6	31	4	17	⌊	5'-6"		4'-0	1'-6									170'-6"
B.1	20	4	12	⌐	4'-1"	0'-6	0'-9	0'-4	1'-2"	1'-0			0'-10	0'-10"		0'-4	81'-8"
B.2	2	4	STR	—	19'-8"												39'-4"
B.3	4	6	STR	—	16'-8"												66'-8"
B.4	4	6	3	∿	18'-6"	0'-7	4'-6"	12½	7'-4"	12½	3'-4"	0'-7	0'-9	0'-9	16⅛	0'-5	74'-0"
B.5	14	3	59	⌐⌐	3'-5"	0'-5	0'-18	1'-4	0'-16				0'-4			0'-3	47'-10"

For Bar Sizes, Beam Dimension See Page 1 Structural

V. A. VASEEN REGISTERED STRUCTURAL ENGINEER STATE OF COLO.

FILTER UNIT
REINFORCING DETAILS

THORNTON, COLORADO

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

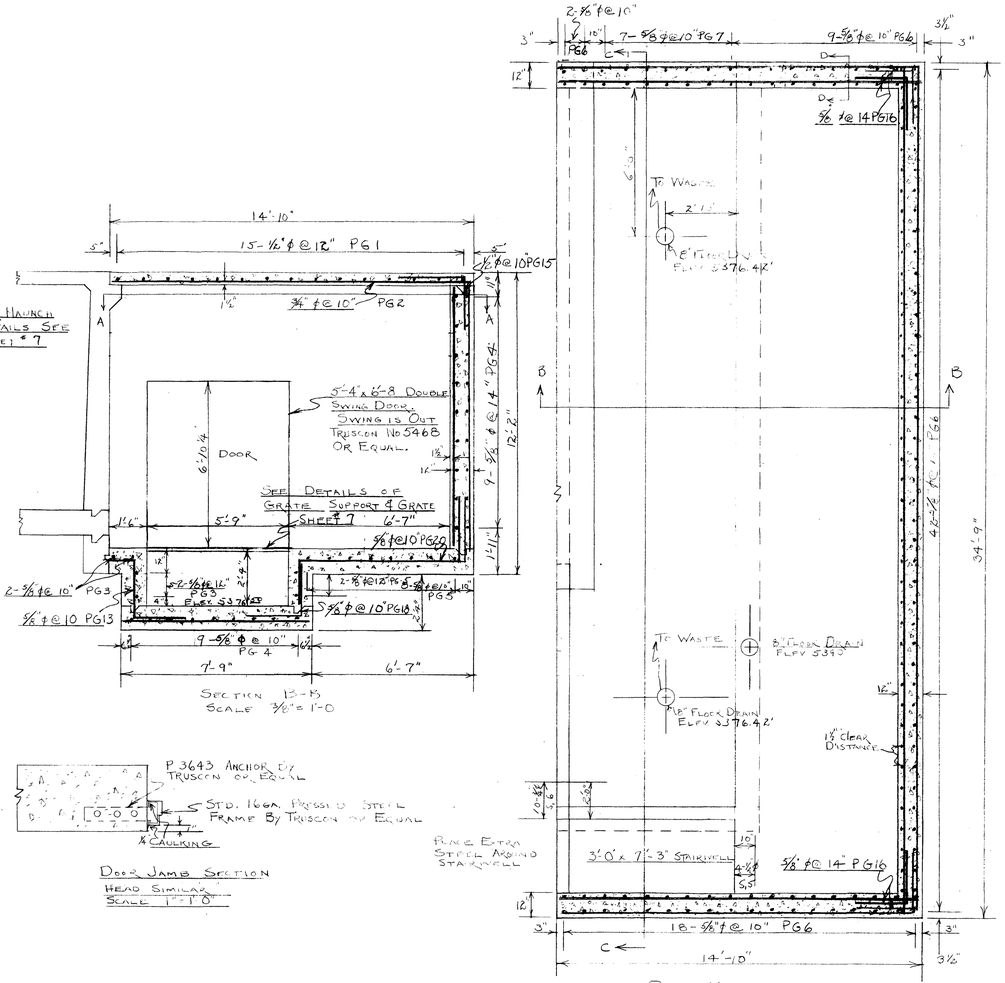
DRAWN	J J J	REVISED 2-3-55
TRACED		2-22-55-555
CHECKED	BB 1/14/55	4/13

DRAWING NUMBER

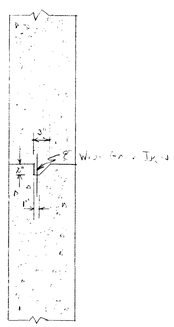
1-1-2

5+8

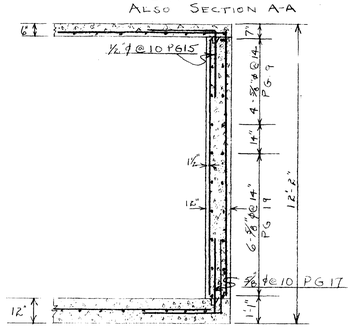
DRAWING NUMBER
TRUAX-TRAER CORPORATION • IRVINE, CALIFORNIA
ARCHITECTURAL PRECAST CONCRETE
DRAWING NUMBER
TRUAX-TRAER CORPORATION • IRVINE, CALIFORNIA
ARCHITECTURAL PRECAST CONCRETE



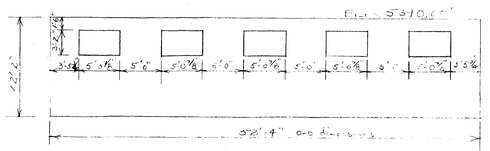
Door Jamb Section
Head Similar
Scale 1"=1'-0"



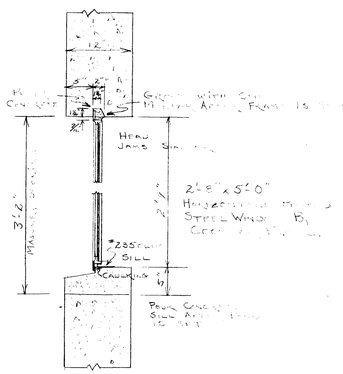
Construction Joint Detail



Sect. D-D



Elevation of East Wall of Fire Gallery Showing Main Operating Floor Handrail and Windows Scale ⅛"=1'-0"



MARK	No	Size	Type	Sketch	Length	B	C	D	Total Length
PG1	15	4	STR		34'-5"				516'-3"
PG2	42	6	STR		14'-8"				616'-0"
PG3	4	5	STR		19'-9"				79'-0"
PG4	18	5	STR		31'-0"				558'-0"
PG5	10	5	STR		34'-5"				344'-2"
PG6	142	5	STR		10'-8"				1514'-8"
PG7	14	5	STR		3'-6"				29'-0"
PG9	30	5	STR		14'-6"				435'-0"
PG10	4	5	STR		13'-0"				52'-0"
PG11	4	5	STR		10'-6"				43'0"
PG12	2	5	STR		11'-2"				22'-4"
PG13	24	5	20		5'-11"	1'-0	2'-4	2'-7	142'-0"
PG14	9	5	20		3'-5"	1'-10	5'-8	3'-1	75'-9"
PG15	78	4	20		4'-5"	2'-1	2'-4		344'-6"
PG16	36	5	20		5'-2"	2'-7	2'-7		186'-0"
PG17	36	5	20		5'-3"	2'-5	2'-7		189'-0"
PG18	47	5	20		4'-11"	2'-4	2'-7		231'-1"
PG19	6	5	STR		7'-3"				43'-6"
PG20	38	5	20		11'-6"	1'-10	6'-7	3'-1	437'-0"

V. A. VASEEN REGISTERED

PIPING GALLERY
REINFORCING DETAILS

WATER TREATMENT PLANT
TROUTDALE, OREGON

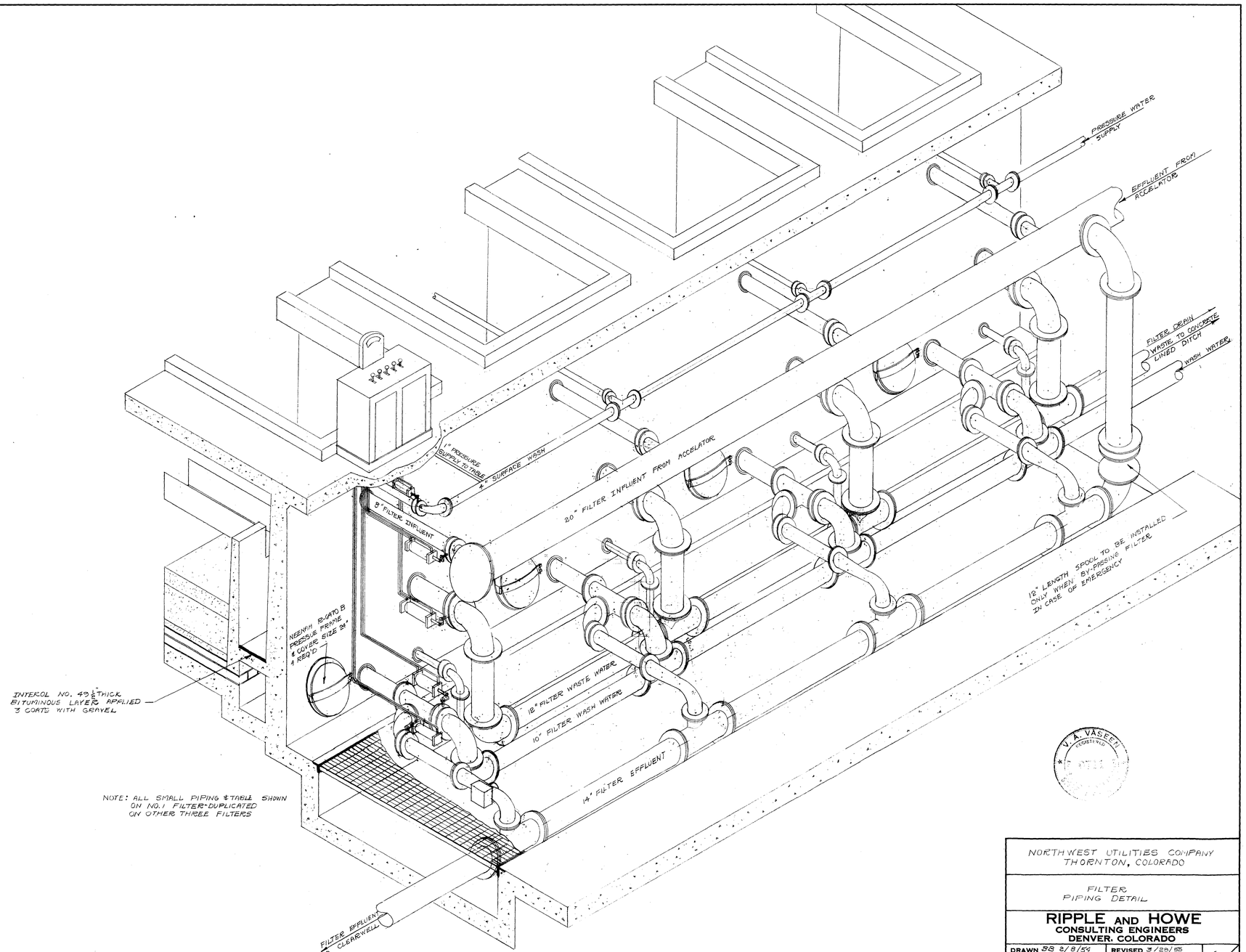
RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN J J J 1-24-55 | REVISED 2-3-55 JJJ | 5/13
TRACED
CHECKED BB 1/14/55

1-1-2

5-1-8

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RIPPLE AND HOWE CONSULTING ENGINEERS DENVER, COLORADO
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NOTE: ALL SMALL PIPING & TABLE SHOWN ON NO. 1 FILTER-DUPLICATED ON OTHER THREE FILTERS

V. A. VASEEN
LOMBARD, ILL.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

FILTER
PIPING DETAIL

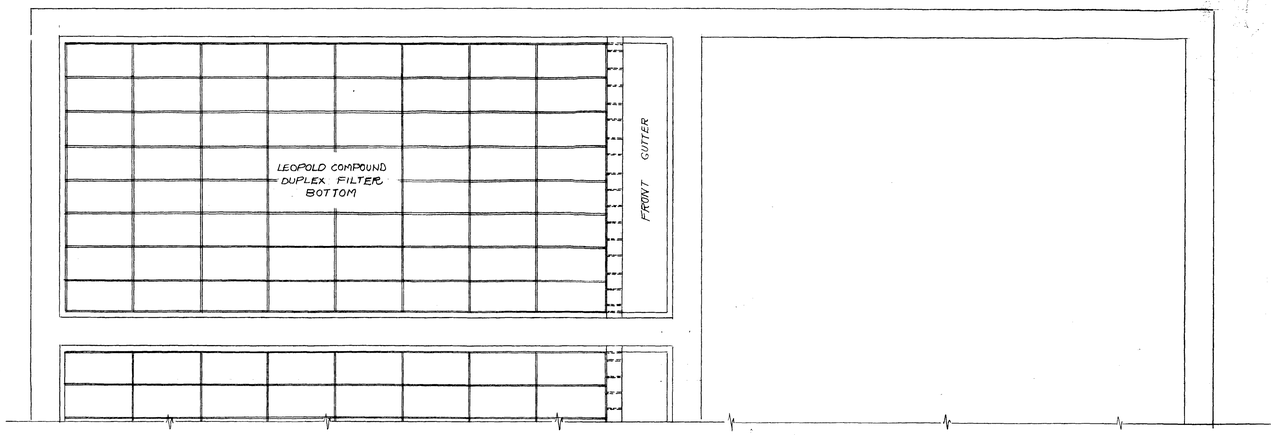
RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

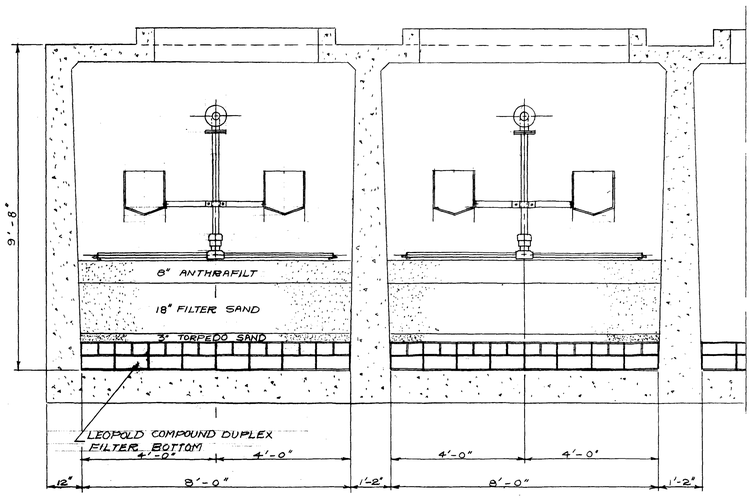
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CHECKED RLM 2-23-55		

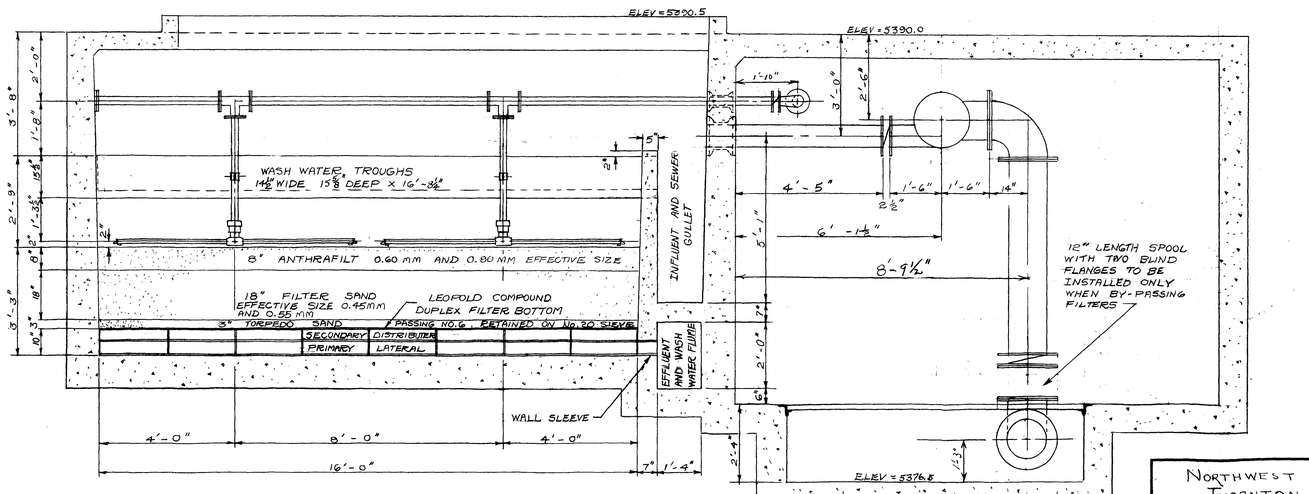
1-1-2

S-1-8

PLANHOLD CORPORATION • SANTA CLARA, CALIFORNIA
REORDER BY NUMBER
REORDER BY NUMBER







V. A. VASSEEN
REGISTERED
ENGINEER
STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON, COLORADO

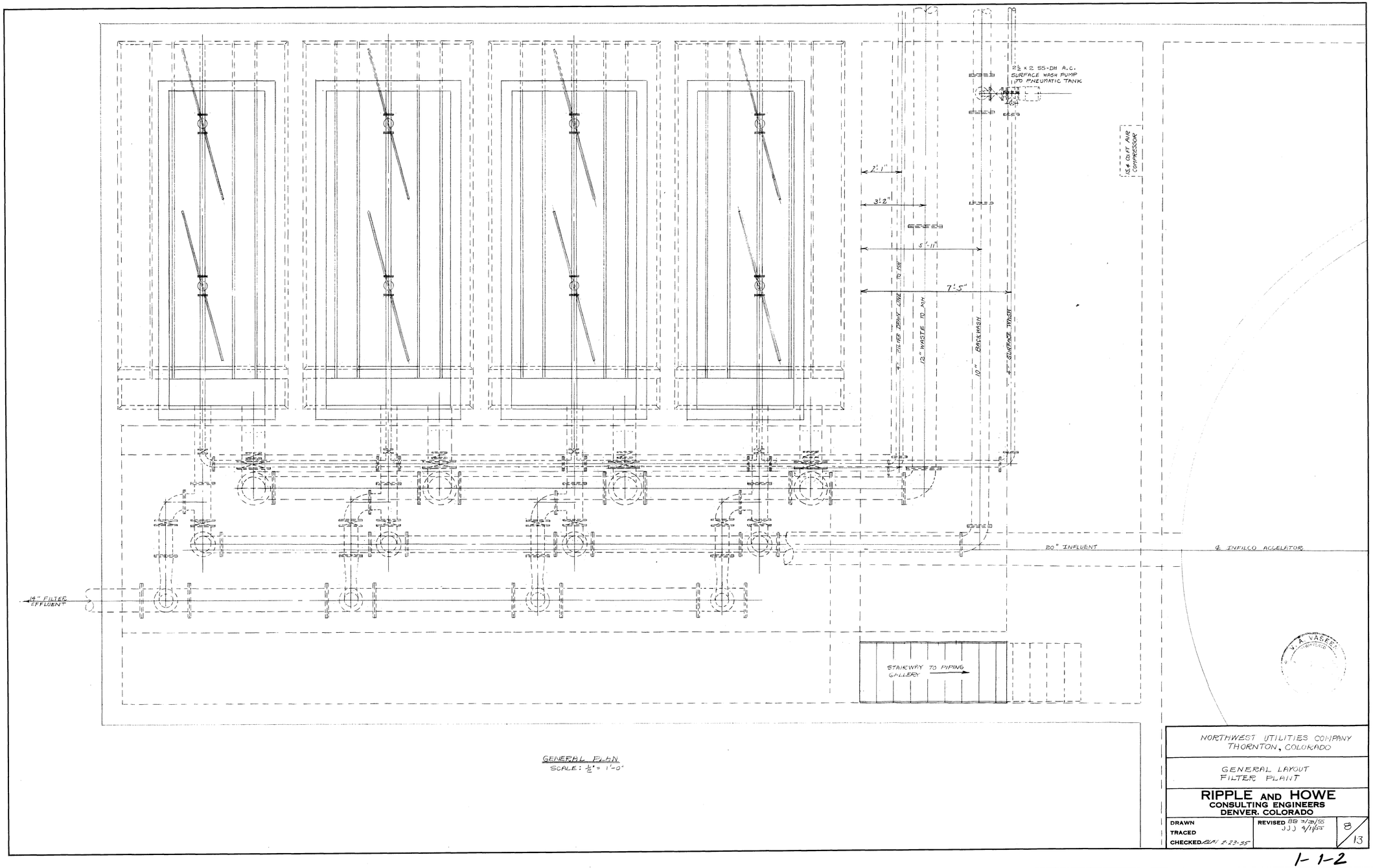
WATER TREATMENT PLANT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN SB 2/11/54 | REVISED SB 3/28/55 | 7/13
TRACED
CHECKED ELM 2-23-55

1-1-2

5+8



GENERAL PLAN
SCALE: ½" = 1'-0"

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

GENERAL LAYOUT
FILTER PLANT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN
TRACED
CHECKED RH 8-23-55

REVISED BB 3/20/56
JJJ 4/1/56

8/13

1-1-2

5-1-8

DRAWING NUMBER

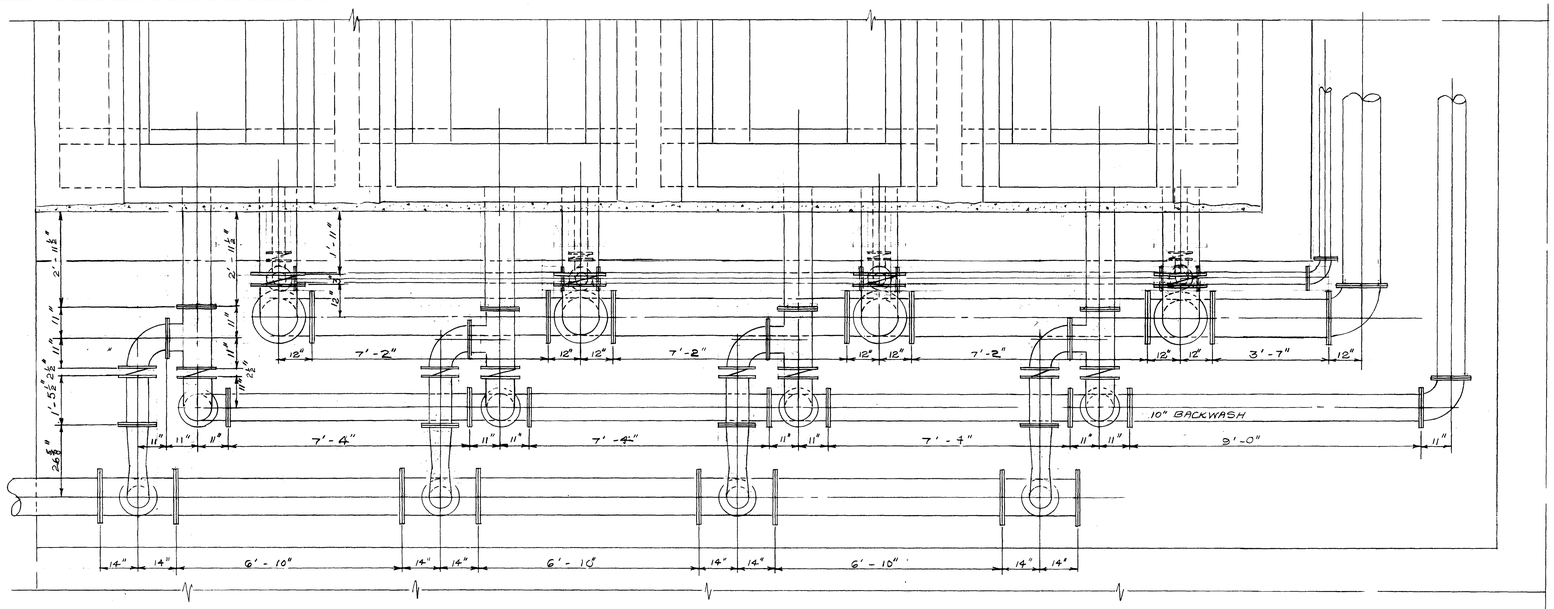
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA

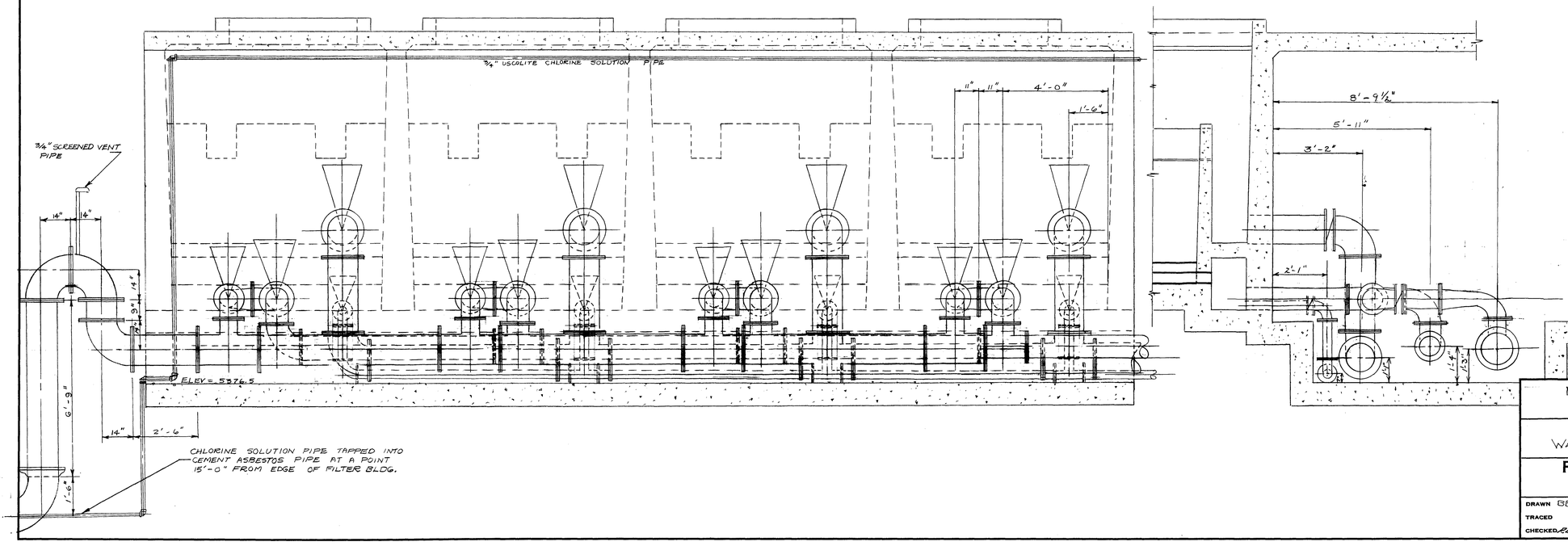
DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA





V. A. VASEEN
REGISTERED
ENGINEER
STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON, COLORADO

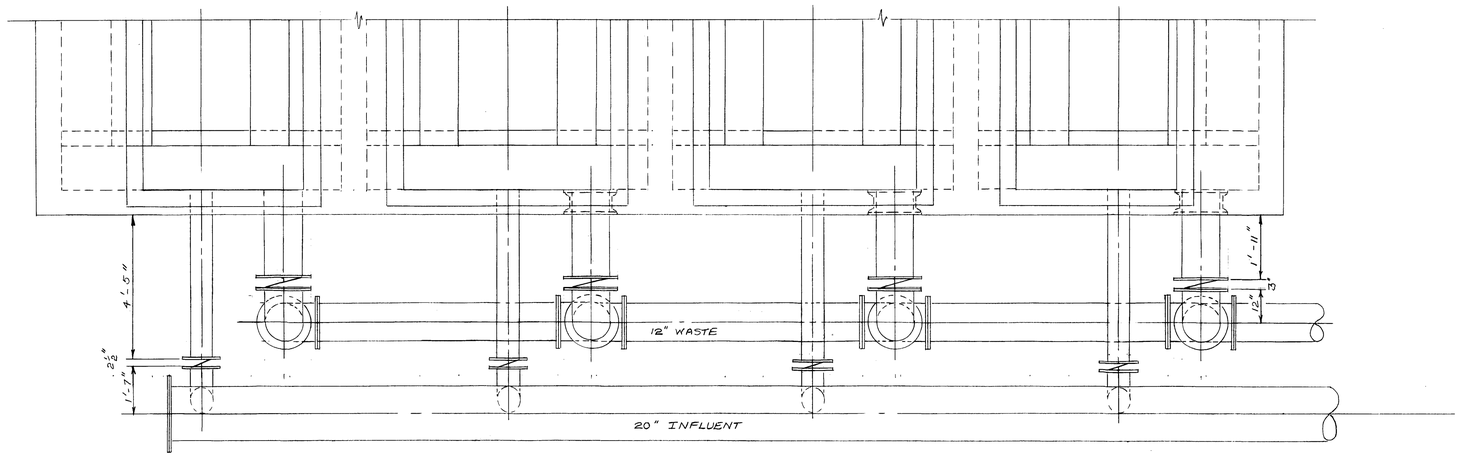
PIPING DETAILS
WATER TREATMENT PLANT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

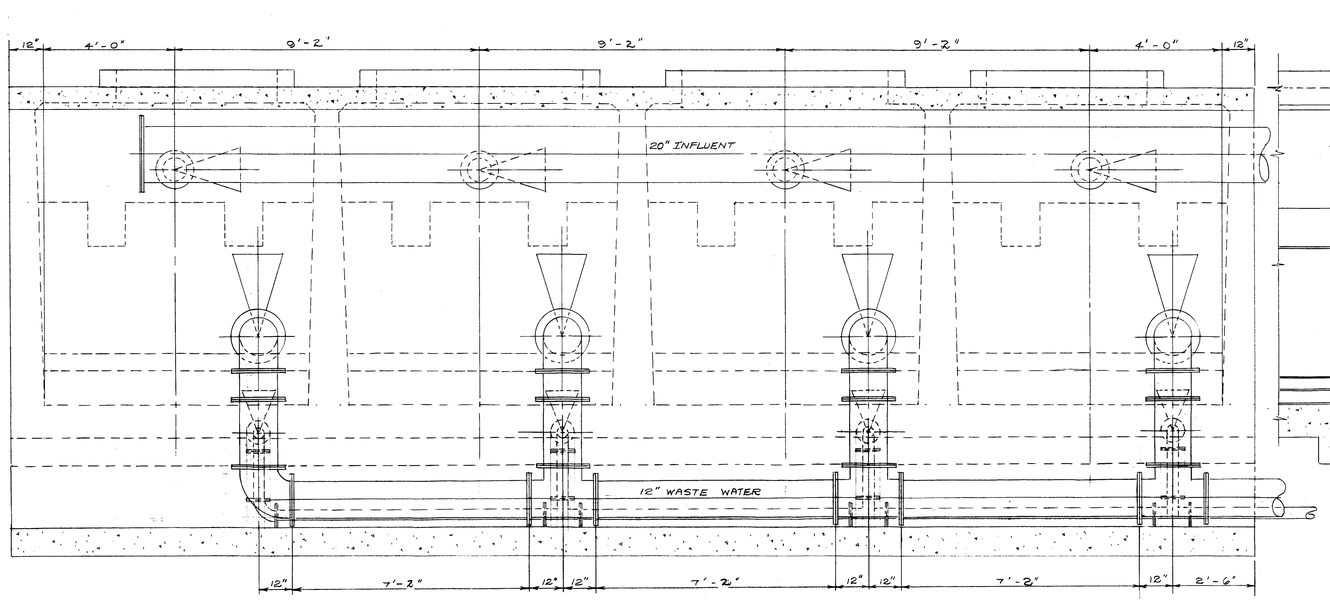
DRAWN GB 2/14/54	REVISED SS 3/28/55 JJJ 4/11/55	9/13
TRACED		
CHECKED RLM 2-23-55		

L-1-7

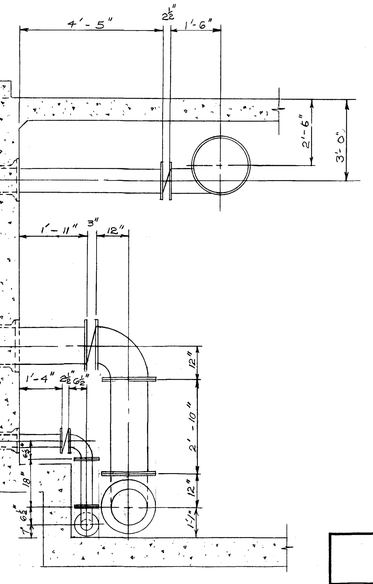
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER 017345



PLAN WASTE & EFFLUENT PIPE
SCALE : ½" = 1'-0"



ELEVATION WASTE & EFFLUENT PIPE
SCALE: ½" = 1'-0"



V. A. VASEEN
REGISTERED
ENGINEER
STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON, COLORADO

PIPING DETAILS
WATER TREATMENT PLANT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN BB 2/14/54	REVISED BB 2/28/55 BB 3/28/55 JJJ 4-11-55	10/13
TRACED		
CHECKED RLH 2-23-55		

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY PLAN REPRODUCTIONS

1-1-2

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

SECTION C-C

SECTION B-B

SECTION A-A

SECTION D-D

SECTION J-J

SECTION H-H

SECTION E-E

COL. PAD "A"

FOOTING SYMMETRICAL ABOUT ℄

12" SQ TIED COL. STEEL DETAILS SIMILAR TO COL. "A"

CHEMICAL FEEDER ROOM
NORTHWEST ADDITIONS

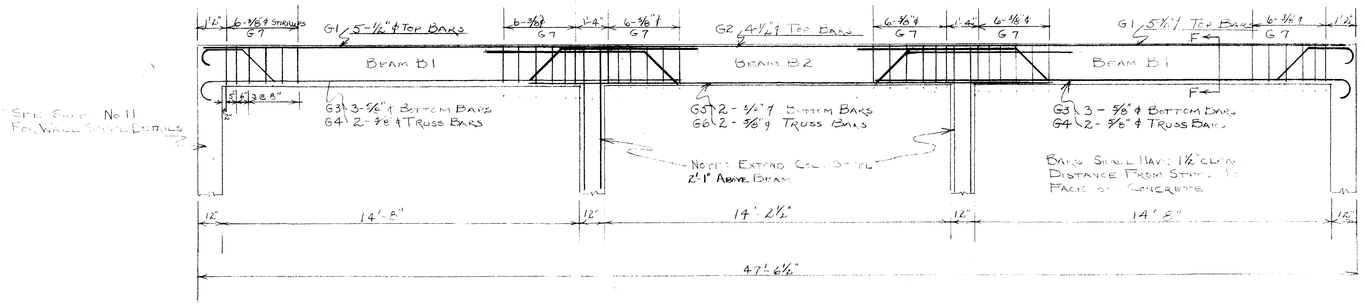
WATER TREATMENT PLANT
THORNTON, COLORADO

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN	1-23-55 JJJ	REVISED	11/13
TRACED			
CHECKED	BB 2/23/55		

1-1-2

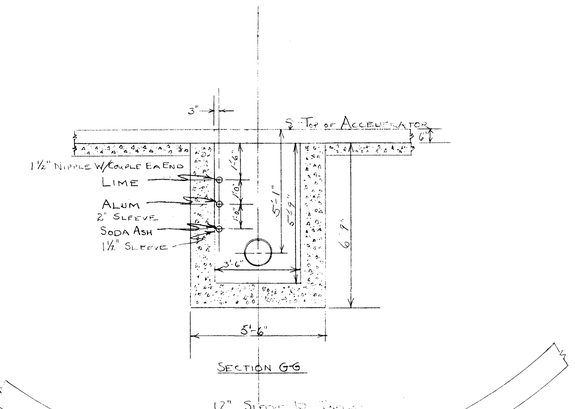
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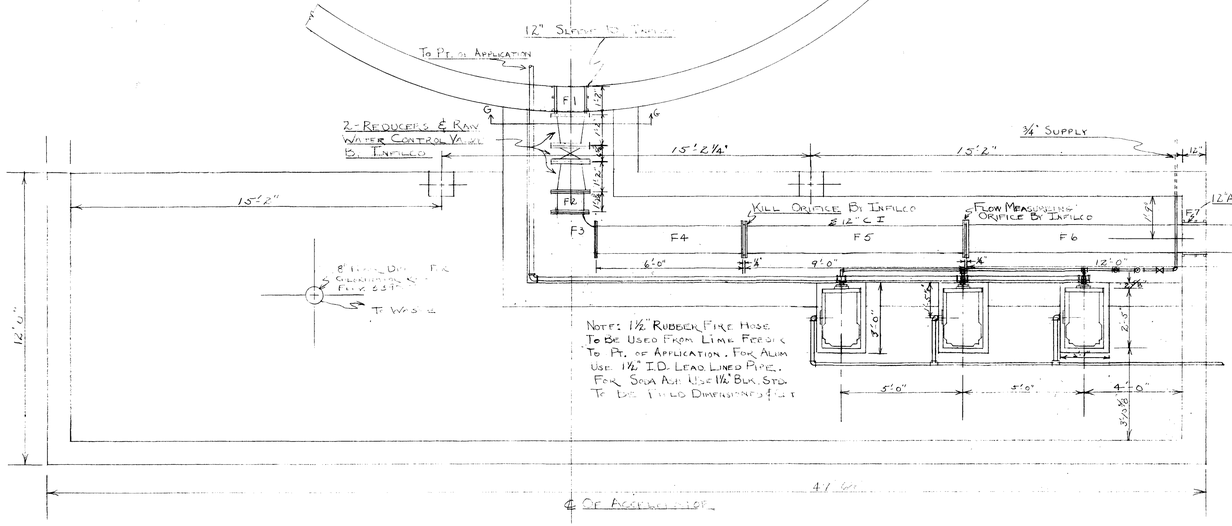
BEAM DETAILS

SECTION F-F

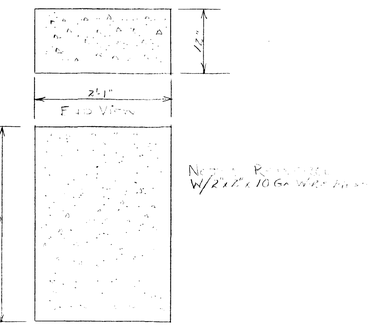
MARK	No	SIZE	TYPE	SKETCH	LENGTH	A	B	C	D	E	F	G	H	J	O	TOTAL LENGTH
G1	10	4	1		20'-8	0'-6"	20'-2"							0'-4"	20'-2"	206'-8"
G2	4	4	STR		20'-2"											80'-4"
G3	6	5	1		20'-9"	0'-7"	20'-2"							0'-5"		124' 6"
G4	4	5	3		21'-11"	0'-7"	1'-5"	1'-10⅝"	9'-6"	1'-10⅝"	6'-8"			0'-5"	20'-10"	87' 8"
G5	2	5	STR		22'0"											88'-0
G6	2	5	3		25'-3"		6'-6"	1'-10⅝"	8'-6"	1'-10⅝"	6'-6"				24'-2"	50'-6"
G7	36	3	S9		4'-3"	0'-4"	1'-5"	0'-9"	1'-5"			0'-4"	0'-3¼"			153'-0"
C1	8	5	STR		20'-0"		FIELD CUT AS REQUIRED									160'-0"
C2	40	2	T1		3'-8"	0'-4"	0'-9"	0'-9"	0'-9"	0'-9"		0'-4"				146'-8"
P1	64	5	STR		9'-6"											608'-0"
P2	5	5	STR		15'-3"											76'-3"
P3	26	4	17		18'-0"		6'-6"	5'-0	6'-6"							260'-0"
P4	9	4	17		14'-3"		6'-6"	7'-9"								128'-3"
P5	28	4	17		9'-9"		5'-11"	3'-10	5'-11							273'-0"
P6	7	4	17		13'-8"		5'-11	7'-9"								95'-8"
P7	10	4	STR		40'-0"											400'-0"
P8	7	5	STR		40'-0"											280'-0"
P9	20	4	17		16'-2"		5'-0"	11'-2"								323'-4"
P10	14	5	17		17'-9"		6'-0"	11'-9"								248'-6"
P11	13	4	STR		23'-10"											309'10"
P12	21	4	STR		27'-7"											579'-3"
P13	13	4	STR		7'-9"											100'-5"
P14	13	4	STR		3'-4"											43'-4"
P15	57	5	3		14'-7"	0'-7"	1'-10"	0'-6½"	7'-0"	0'-6½"	4'-1"		0'-5"	0'-5"	13'-8"	831'-3"
P16	56	5	STR		14'-0"											784'-0"
P17	11	3	STR		27'-0"											297'-0"
P18	7	3	STR		16'-7"											116'-1"
P19	67	4	STR		9'-6"											636'-6"
P20	5	4	STR		15'-3"											76'-3"
P21	4	3	STR		21'-0"											84'-0"
P22	15	5	STR		19'6"											292'-6
P23	22	5	STR		12'-0"											264'-0"
P24	35	5	STR		7'-6"											262'-6"
P25	8	5	STR		30'-11											247'-4"
P26	186	5"	17		4'-9"		2'-1	2'-8"								883'-6"
P27	10	6	1		3'-8"	0'-8"	2'-4"						0'-8"		0'-6"	36'-8"



SECTION G-G



PIPING FOR CHEMICAL FEEDER ROOM



CHEMICAL FEEDER PEDESTAL PLAN VIEW

CHEMICAL FEEDER ROOM
NORTH WATER TREATMENT PLANT

WATER TREATMENT PLANT
THORNTON, COLORADO

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN JJJ 2-22-55	REVISED JJJ 4-11-55	12/13
TRACED		
CHECKED		

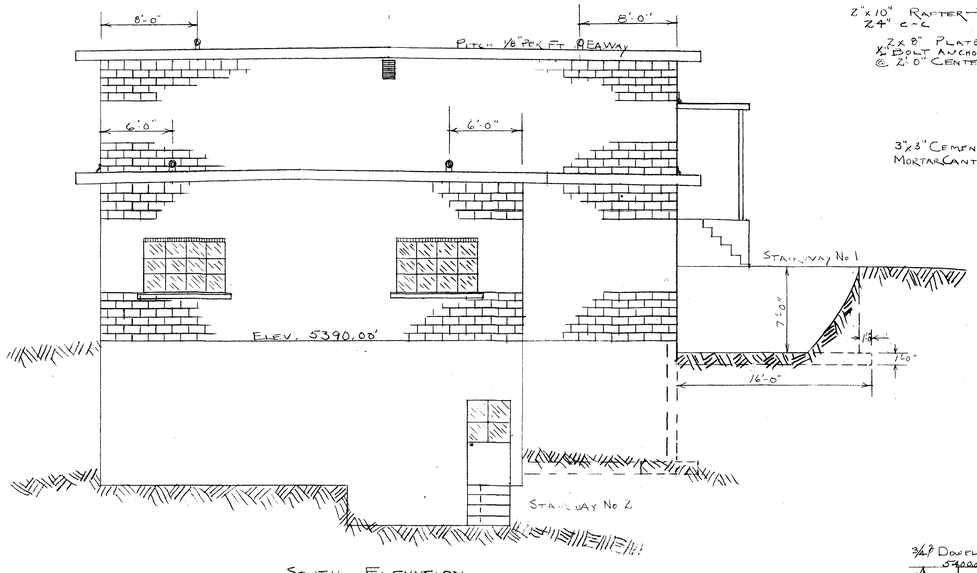
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5-1-0

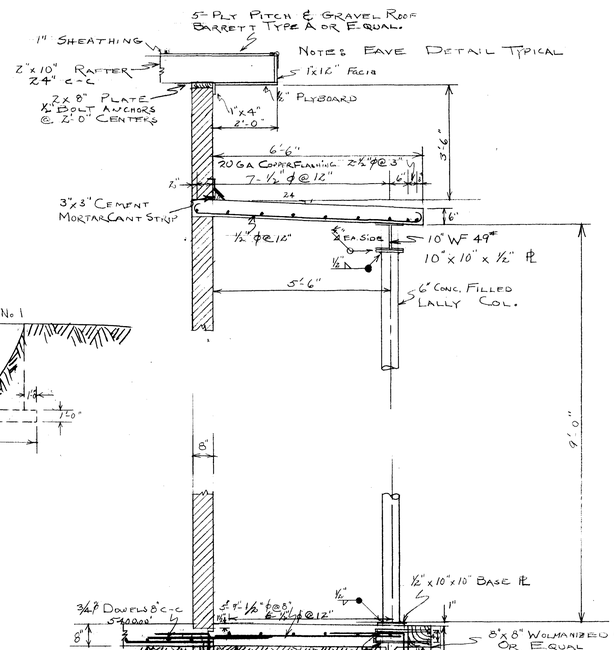
DRAWING NUMBER

DRAWING NUMBER

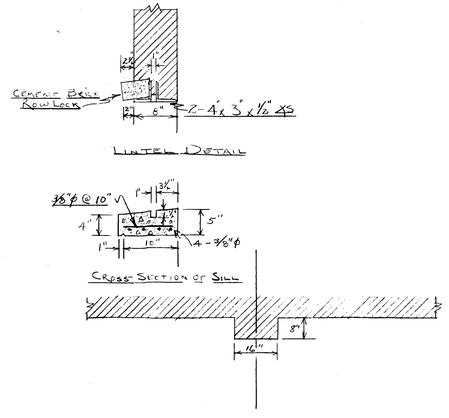
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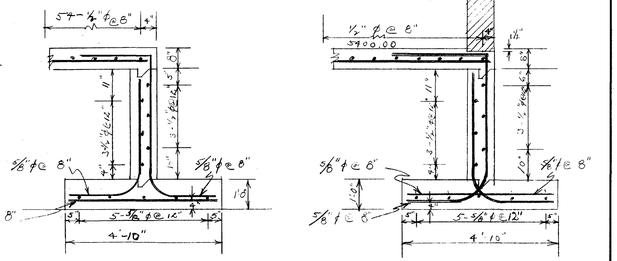


SOUTH ELEVATION



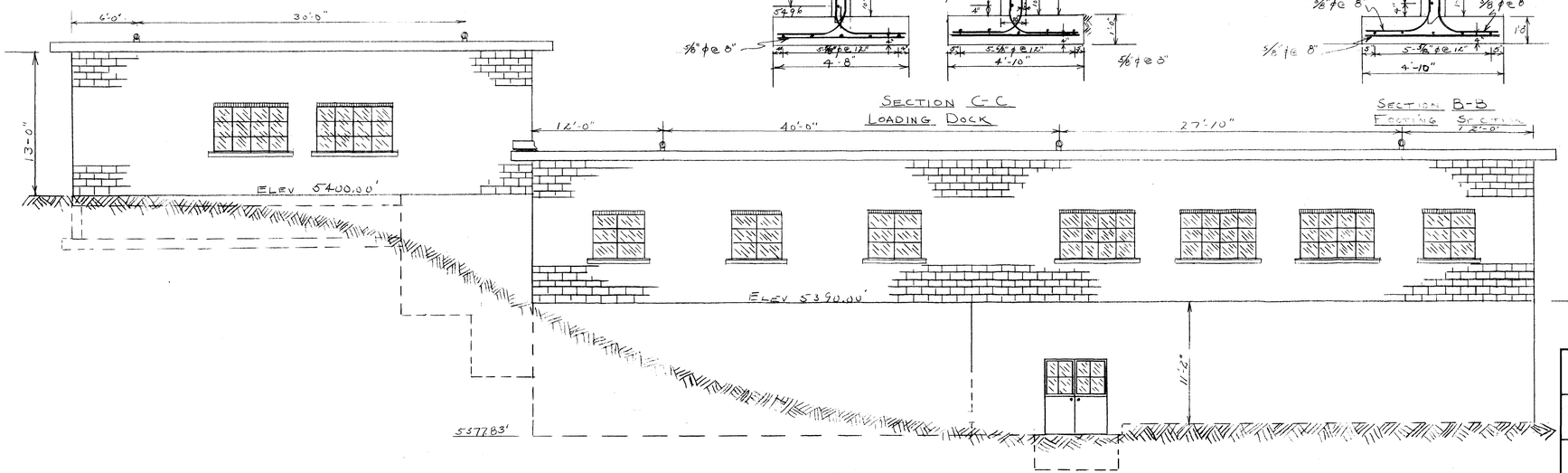
SECTION C-C
LOADING DOCK





SECTION B-B
FOOTING SECTION

SECTION A-A



WEST ELEVATION

V. A. VASEEN REGISTERED ENGINEER STATE OF COLORADO

NORTHWEST UTILITIES THORNTON COLORADO	
WATER TREATMENT PLANT ARCHITECTURAL DETAILS	
RIPPLE AND HOWE CONSULTING ENGINEERS DENVER, COLORADO	
DRAWN JJJ 4-3-53	REVISED
TRACED	14
CHECKED	

1-1-2

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER OTHER

DRAWING NUMBER

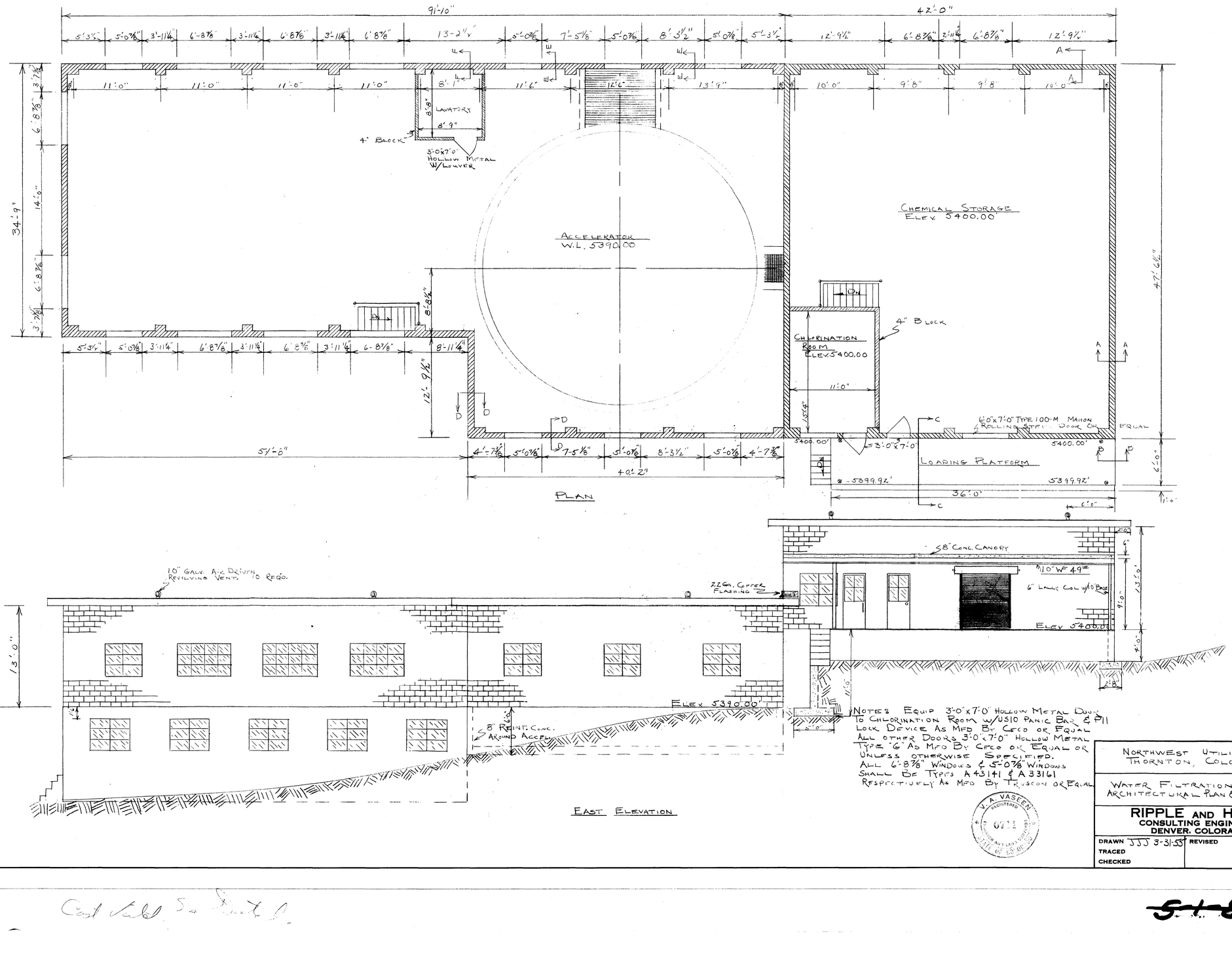
Detail

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER OTHER

DRAWING NUMBER

Typical Water Treatment Plant

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER OTHER



NOTES EQUIP 3'-0"x7'-0" HOLLOW METAL DOOR TO CHLORINATION ROOM W/US10 PANIC BAR & P11 LOCK DEVICE AS MFD BY CECO OR EQUAL. ALL OTHER DOORS 3'-0"x7'-0" HOLLOW METAL TYPE "G" AS MFD BY CECO OR EQUAL OR UNLESS OTHERWISE SPECIFIED. ALL 6'-8⅞" WINDOWS & 5'-0⅞" WINDOWS SHALL BE TYPES A43141 & A33161 RESPECTIVELY AS MFD BY TRUSCON OR EQUAL

V. A. VASEEN REGISTERED 6772 STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON, COLORADO

WATER FILTRATION PLANT
ARCHITECTUKAL PLAN & ELEVATION

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

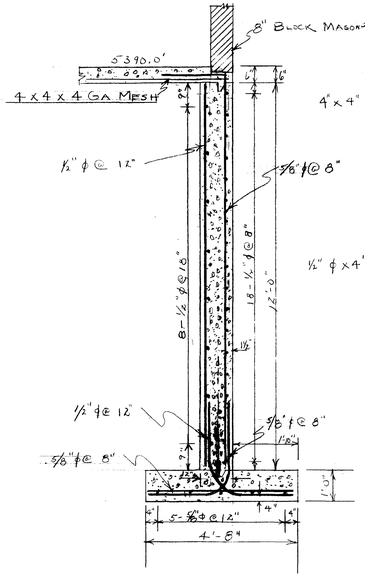
DRAWN JJJ 3-31-55	REVISED	15
TRACED		
CHECKED		

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PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

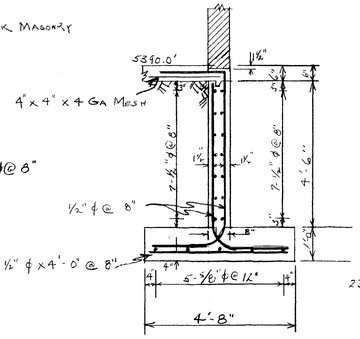
DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

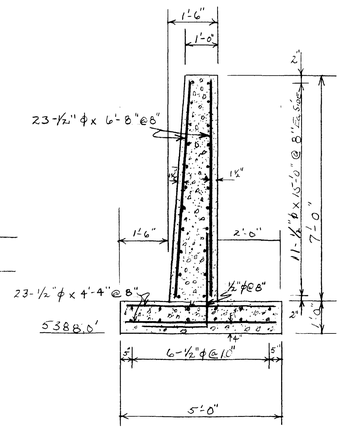
1-1-2



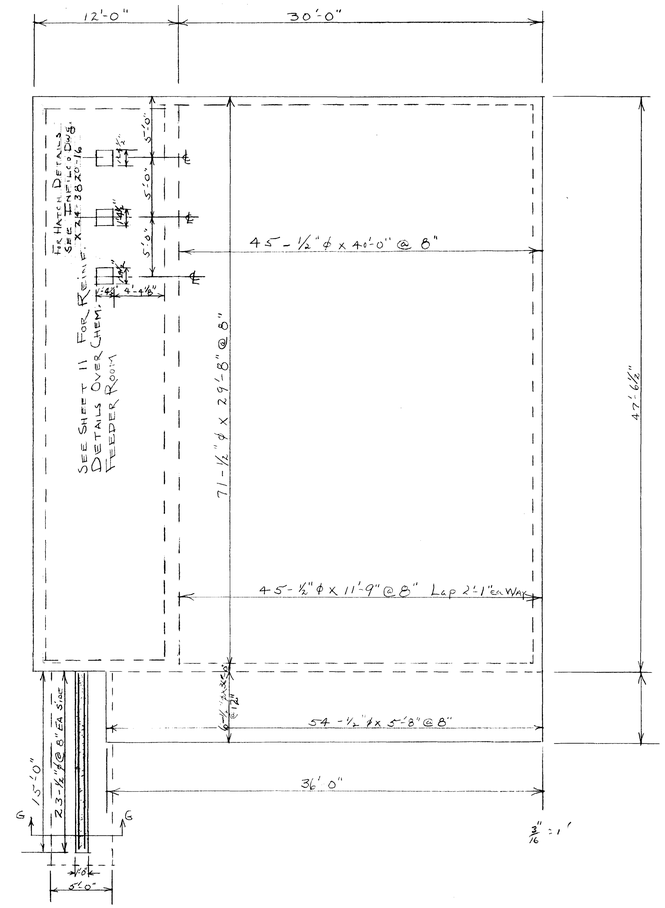
SECTION E-E
SEE SHEET 15

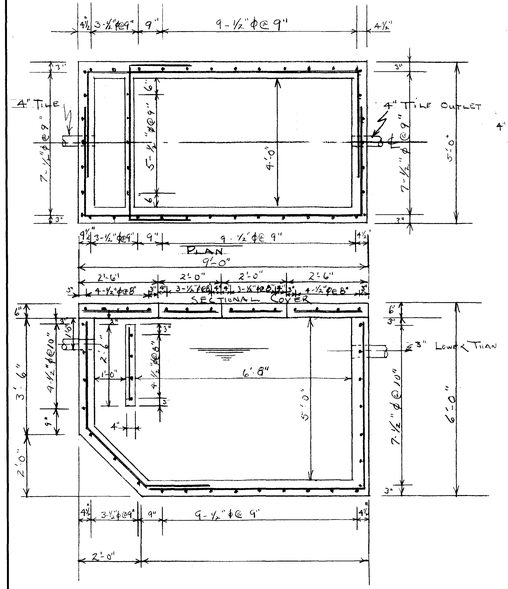


SECTION D-D
SEE SHEET 15

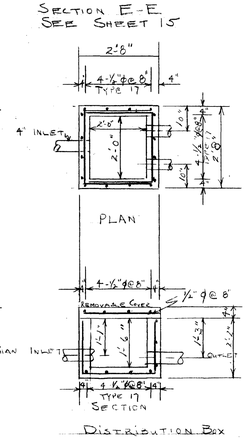


SECTION G-G
SEE SHEET 16

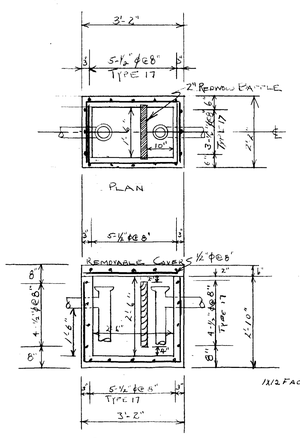




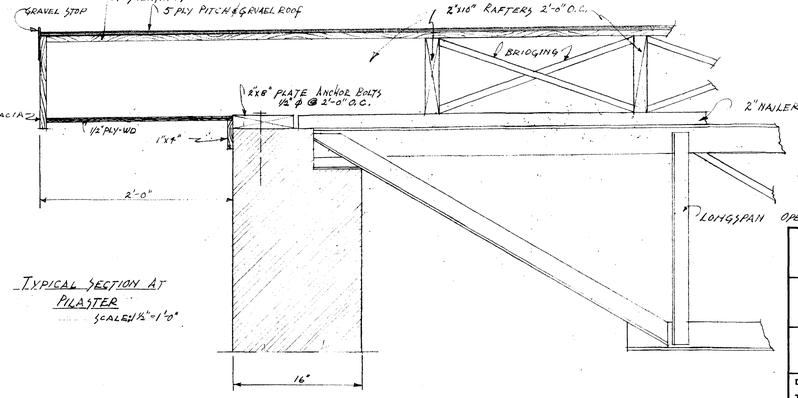
SEPTIC TANK DETAILS



DISTRIBUTION BOX



GREASE TRAP



TYPICAL SECTION AT PILASTER
SCALE ½"=1'-0"

NORTHWEST UTILITIES
THORNTON COLORADO

WATER FILTRATION PLANT
MISCELLANEOUS DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN	JJJ 4-12-55	REVISED
TRACED		
CHECKED		

16

1-1-2

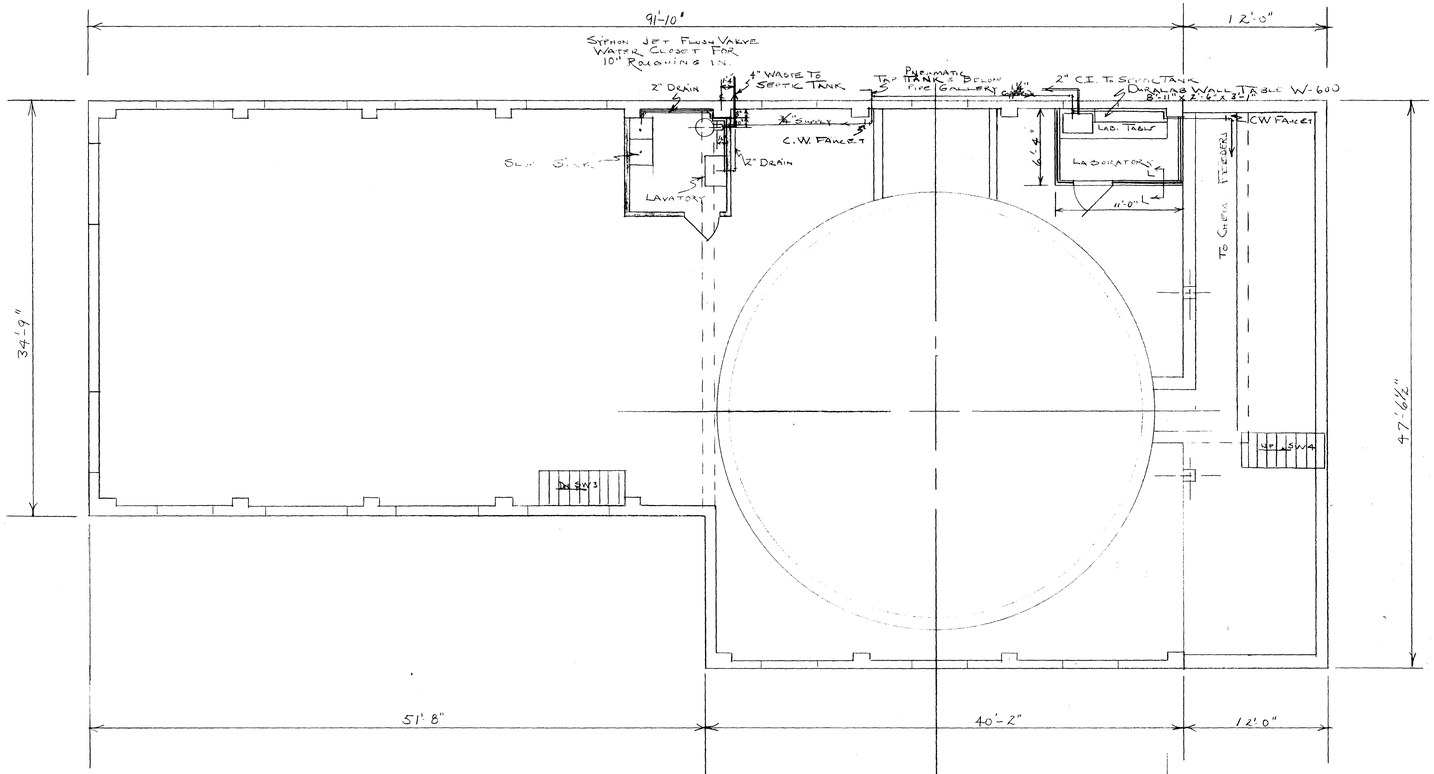
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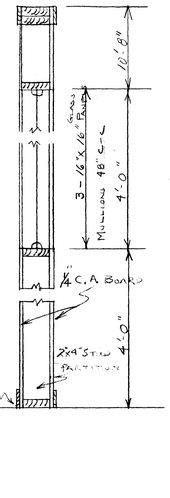
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER PLAN NUMBER 67048

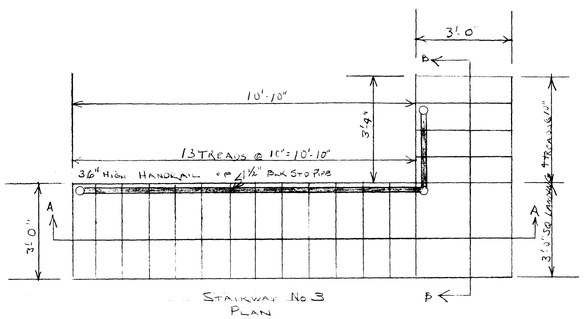
DRAWING NUMBER

Thornton Water Treatment Plant

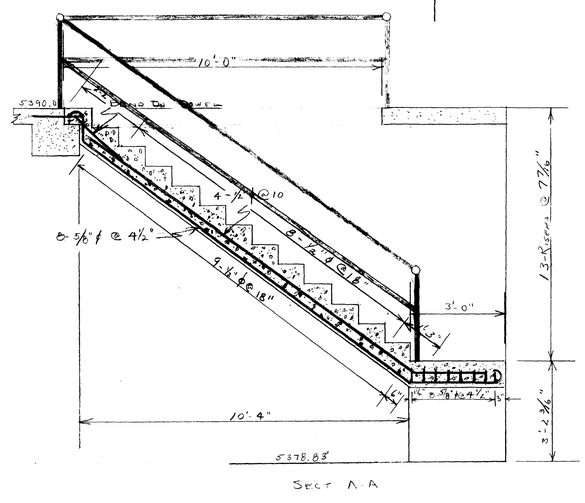
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER PLAN NUMBER 67048



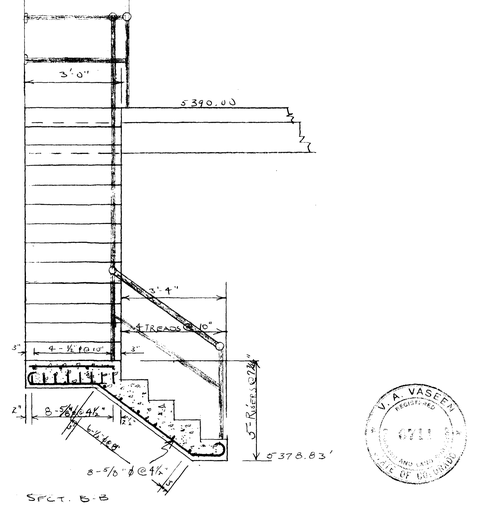




Stairway No 3
Plan



Sect. A-A



Sect. B-B

V. A. VASEK
REGISTERED
6751
PROFESSIONAL ENGINEER
STATE OF COLORADO

NORTHWEST UTILITIES
THORNTON COLORADO

WATER TREATMENT PLANT
ARCHITECTURAL DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

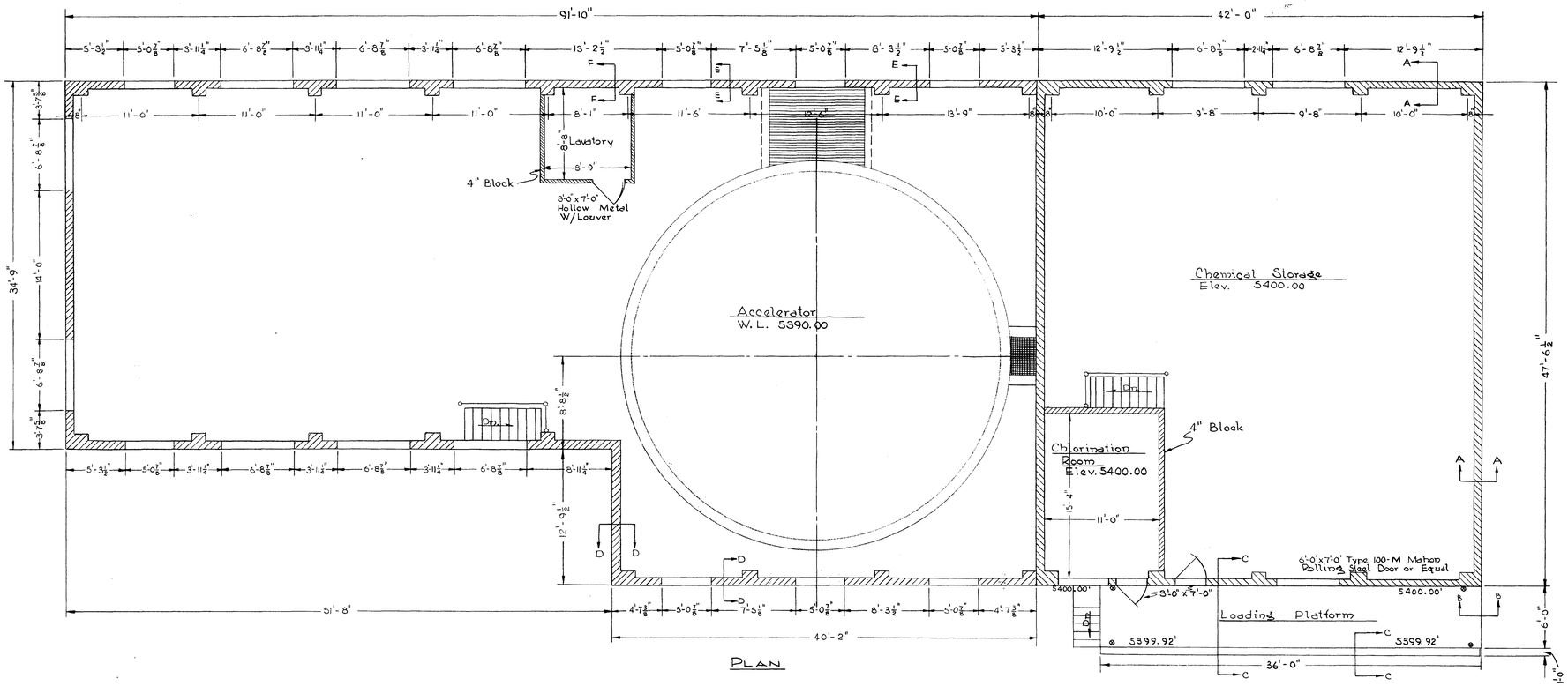
DRAWN JJJ 4-14-58	REVISED	17
TRACED		
CHECKED		

1-1-2

5-1-0

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REPRODUCTION PROHIBITED
ORIGINAL DRAWING



RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN	REVISED
TRACED	
CHECKED	

1-1-2

5-1-0

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ETCH

DRAWING NUMBER

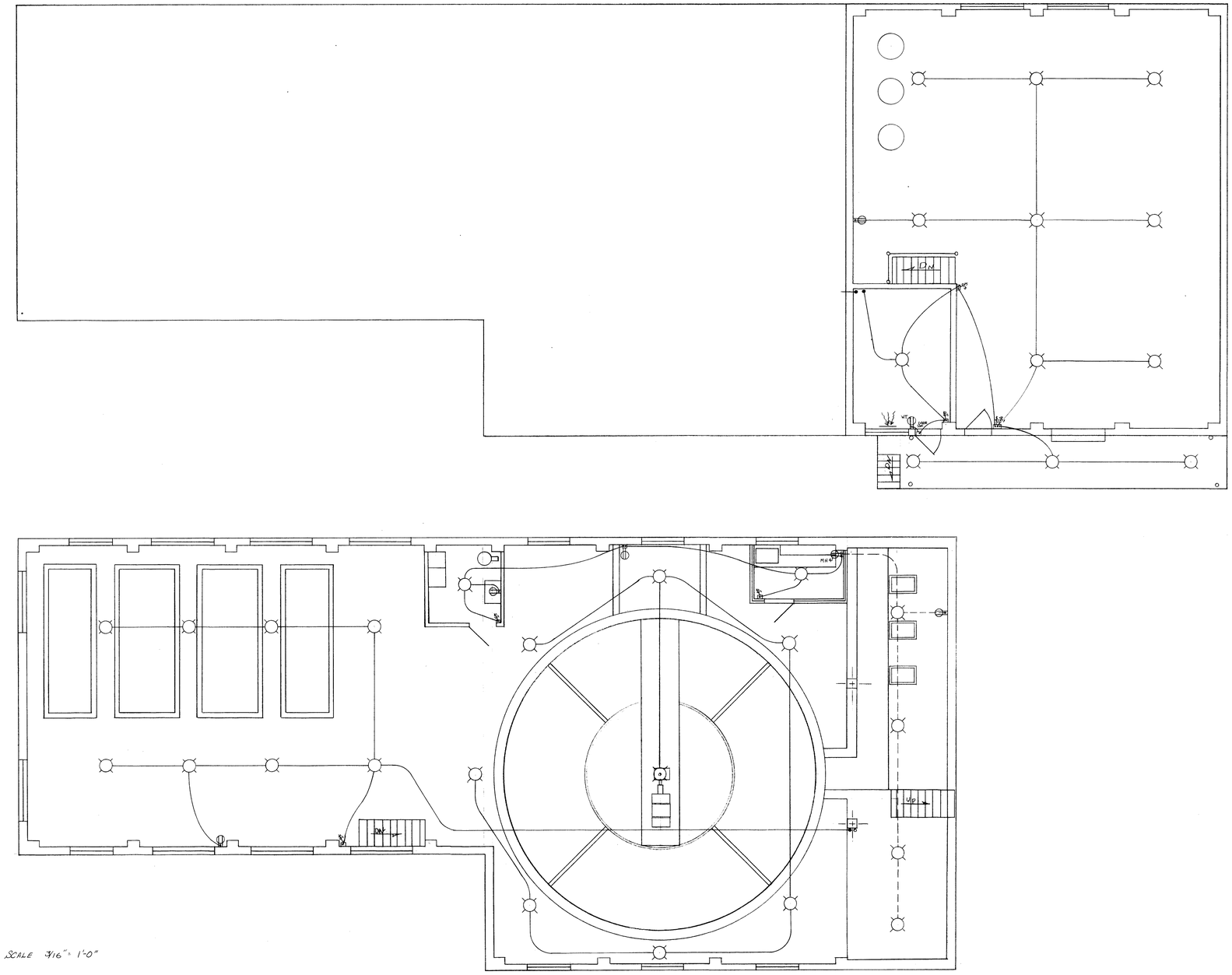
Approved

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ETCH

DRAWING NUMBER

Property Line Transfer Point

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ETCH



NORTHWEST UTILITIES
WATER FILTRATION PLANT
ELECTRICAL INSTALLATION
LIGHTING LAYOUT

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN H.R.P.	REVISED
TRACED	
CHECKED	

DRAWING NUMBER

1-1-2

~~5-1-7~~ ~~8-6~~

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07569

DRAWING NUMBER

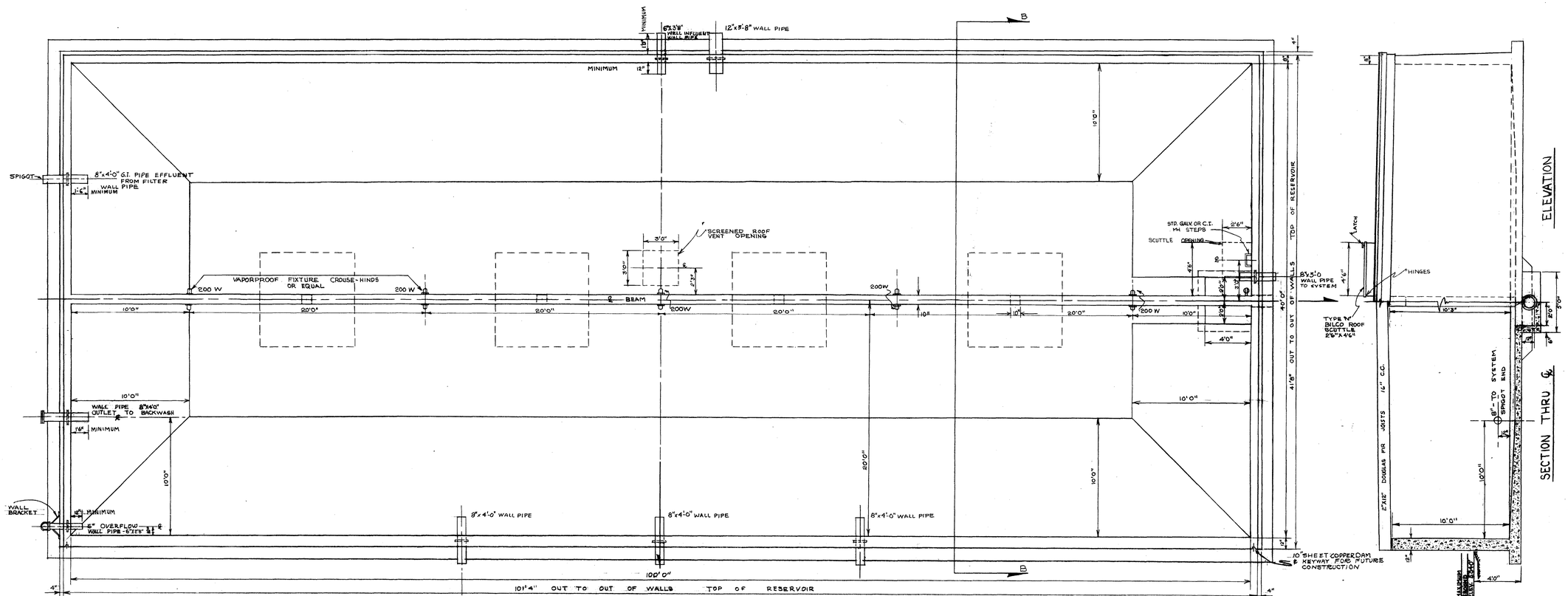
A-1-1-2

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07569

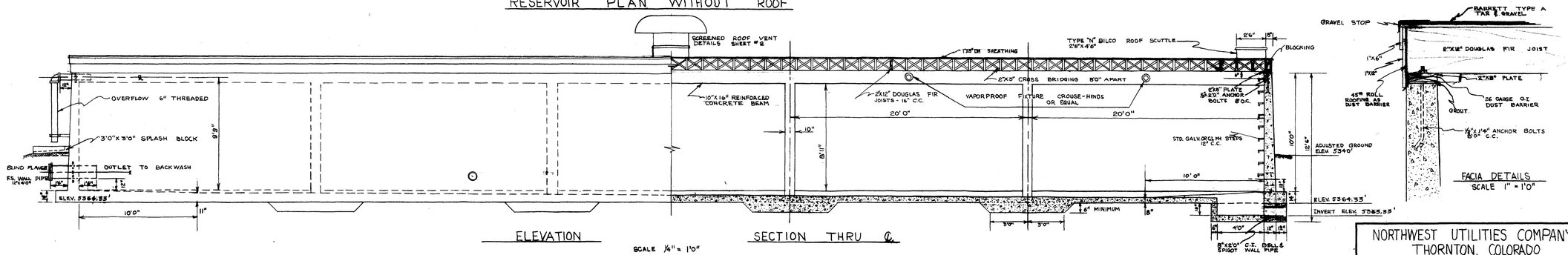
DRAWING NUMBER

Alhambra Water Treatment Plant

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07569



RESERVOIR PLAN WITHOUT ROOF



ELEVATION SECTION THRU ℄

SCALE 1/4" = 1'0"

FACIA DETAILS
SCALE 1" = 1'0"

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

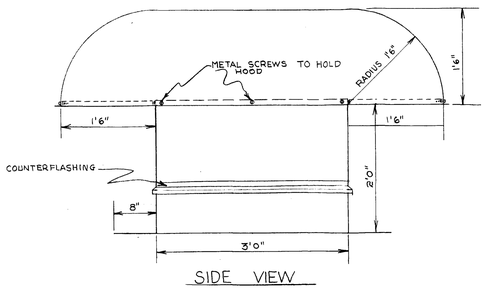
300,000 GALLON WATER STORAGE RESERVOIR

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

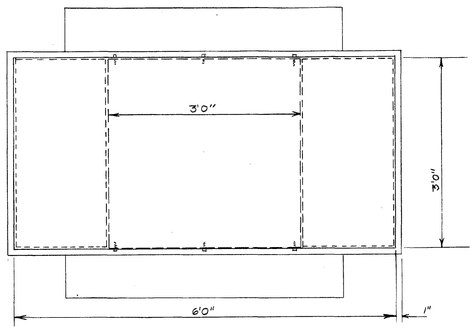
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TRACED			
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THORNTON PLANT
CLEARWELL

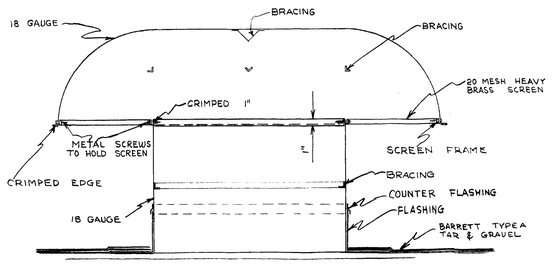
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07041



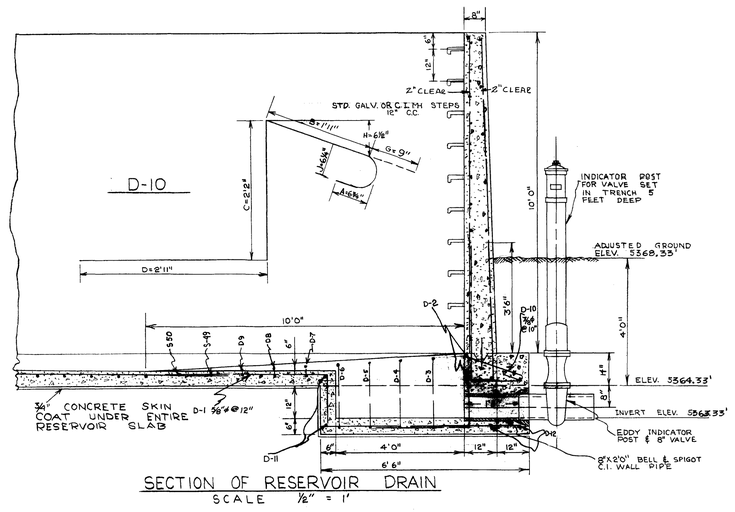
SIDE VIEW



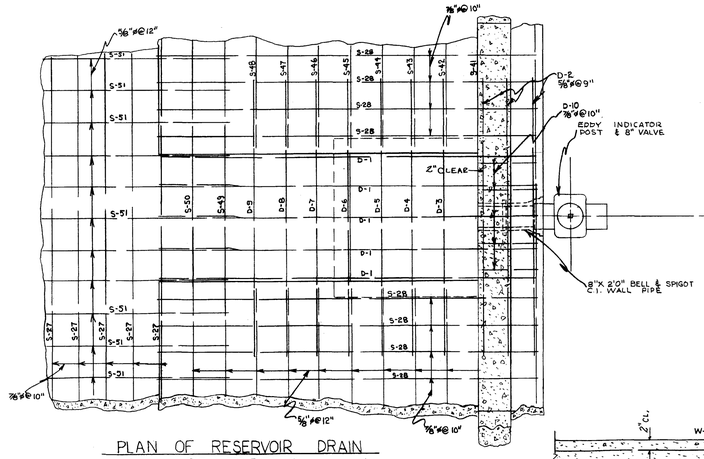
TOP VIEW



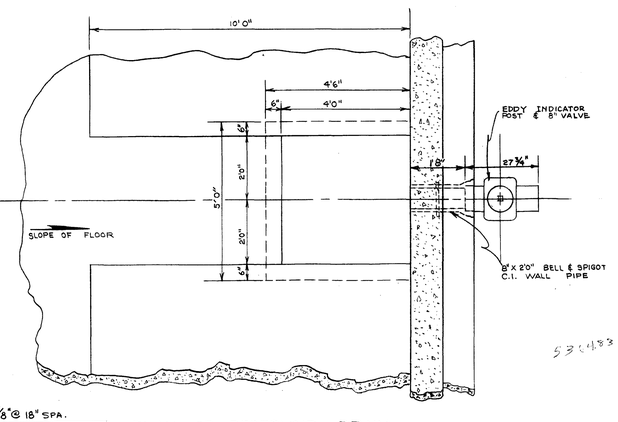
SECTION OF SCREENED ROOF VENT
SCALE 1" = 1'



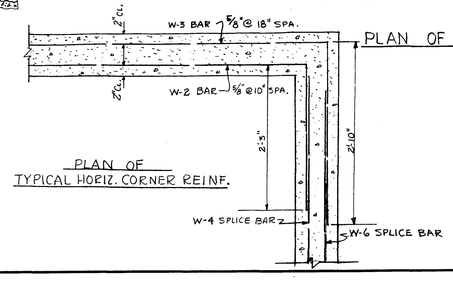
SECTION OF RESERVOIR DRAIN
SCALE ½" = 1'



PLAN OF RESERVOIR DRAIN REINFORCING
SCALE ½" = 1'



PLAN OF RESERVOIR DRAIN



PLAN OF TYPICAL HORIZ. CORNER REINF.

DIAGRAM	REINFORCING STEEL SCHEDULE														
	MK.	NO.	SIZE	TYPE	LGTH.	A	B	C	D	E	J	G	H	K	WGT.
	S-35	2	5	STR	400"										800#
	S-36	4	5	"	294"										1174#
	S-36A	2	5	"	400"										800#
	S-37	4	5	"	314"										1254#
	S-37A	2	5	"	400"										800#
	S-38	4	5	"	314"										1254#
	S-38A	2	5	"	400"										800#
	S-39	4	5	"	324"										1294#
	S-39A	2	5	"	400"										800#
	S-40	4	5	"	334"										1334#
	S-40A	2	5	"	400"										800#
	S-41	4	5	"	330"										1334#
	S-42	122	7	S	7'5"	0'6¾"	1'11"	5'0"			0'6¾"	0'9"	0'10½"		4524#
	S-43	2	5	STR	340"										1280#
	S-43A	1	5	STR	400"										400#
	D-1	5	5	8	13'4"	5'9"	1'7"	6'0"							668#
	D-2	4	5	STR	88"										348#
	D-3	1	5	84	130"	2'1"	2'2"	4'6"	2'2"			2'1"			130#
	D-4	1	5	54	121'0"	2'1"	2'1"	4'6"	2'1"			2'1"			121#
	D-5	1	5	54	128"	2'1"	2'0"	4'6"	2'0"			2'1"			128"
	D-6	1	5	54	126"	2'1"	1'11"	4'6"	1'11"			2'1"			126"
	D-7	1	5	54	9'3"	2'1"	0'3¾"	4'6"	0'3¾"			2'1"			73"
	D-8	1	5	54	9'11"	2'1"	0'10¾"	4'6"	0'2¾"			2'11"			9'11"
	D-9	1	5	54	8'11"	2'1"	0'1¾"	4'6"	0'1½"			2'1"			8'11"
	D-10	5	7	84 Bent	7'9"	0'6¾"	1'11"	2'2"	2'11"		0'6¾"	0'9"	0'6¾"		387#
	D-11	2	5	56	20'0"	2'1"	1'6"	4'6"	1'6"			2'1"			418#
	D-12	2	5	56	10'0"	2'1"	1'6"	4'6"	1'6"			2'1"			214#
	W-1	461	5	STR	5'0"										4535#
	W-2	76	5	2	34'6"	2'3"	32'3"								2622#
	W-3	78	5	2	36'6"	5'8"	32'10"								3328#
	W-4	36	5	STR	400"										1440#
	W-5	676	5	2	35'0"	4'3"	1'8"								2579#
	W-6	14	5	2	40'0"	2'10"	37'6"								560#
	C-1	118	5	1	7'4"	0'8"	6'0"				0'3¼"	0'8"			867#
	C-2	16	4	2	4'5"	1'8"	2'5"								66#
	C-3	36	3	T	3'0"	0'2½"	0'7¼"	0'7¼"	0'7¼"	0'7¼"		0'2½"			108#
	C-4	16	4	STR.	9'9"										156#
						A	B	C	D	E	F	G	H	J	
	B-1	2	8	3	29'9"	0'10"	3'0"	1'4"	11'8"	1'4"	10'9"	0'10"	1'0"	0'7"	596#
	B-2	2	5	3	29'1"	0' 6"	3'0"	1'4"	11'0"	1'4"	10'9"	0' 6"	1'0"	0'4½"	582#
	B-3	2	8	1	21'4"	0'10"	20'6"							0'7"	428#
	B-4	2	5	1	21'0"	0' 6"	20'6"							0'4½"	420#
	B-5	6	3	3	33'7"	0'8"	9'5"	1'4"	10'5"	1'4"	8'11"	0'8"	1'0"	0'5¼"	1304#
	B-6	6	6	STR.	20'0"										1200#
	B-7	2	6	3	33'5"	0'8"	8'11"	1'4"	10'7"	1'4"	8'11"	0'8"	1'0"	0'5¼"	668#
	B-8	52	3	53	3'6"	0'5"	1'1"	0'7½"	1'1"			0'5"	0'3½"		1054#
	S-1A	21	4	STR.	10'8"										225'9
	W-7	7	5	STR.	40'0"										280-0

NORTHWEST UTILITIES COMPANY
THORNTON, COLO.

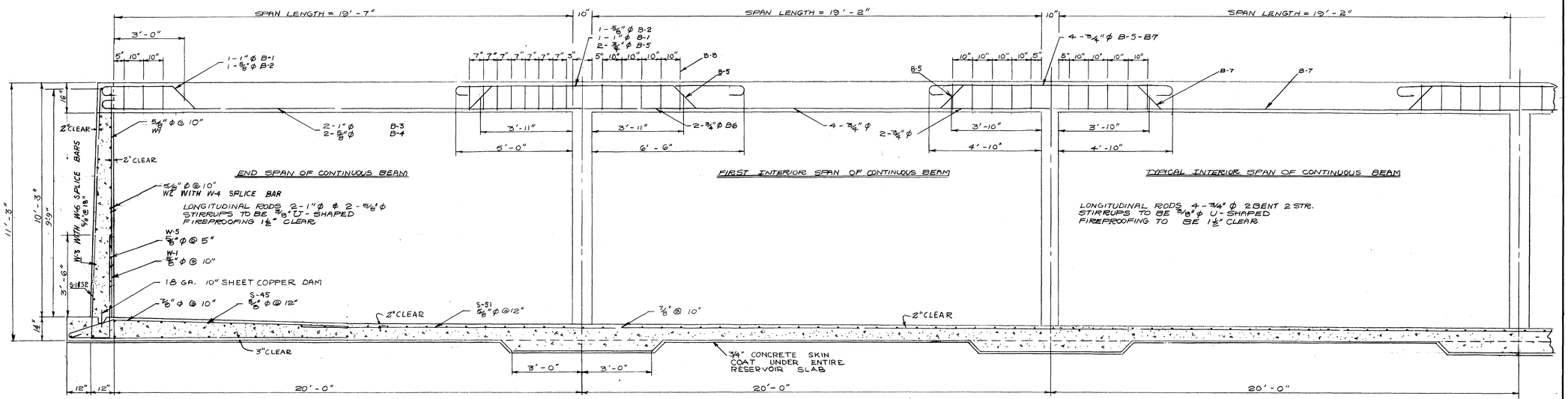
300,000 GALLON WATER STORAGE RESERVOIR DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

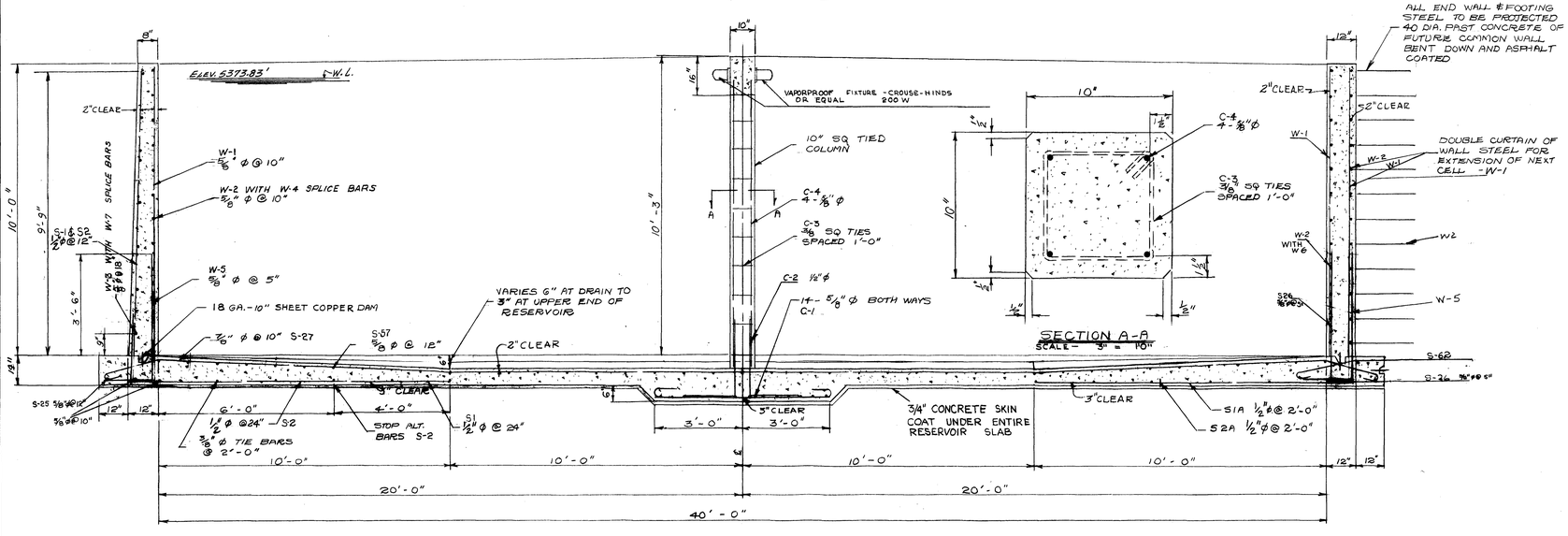
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TRACED			
CHECKED 7/27/53 GB			

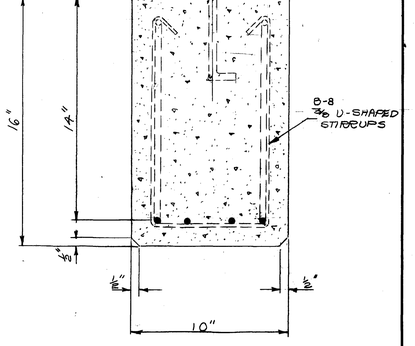
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1-1-1



SECTION THROUGH RESERVOIR
SHOWING CONTINUOUS BEAM
& COLUMN DETAIL
SCALE: ½" = 1'-0"





BEAM SECTION
SCALE: 3" = 1'-0"

SECTION BB THRU RESERVOIR
SCALE: ½" = 1'-0"

NORTHWEST UTILITIES CO.
THORNTON, COLORADO

300,000 GALLON RESERVOIR
CONCRETE DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN BB	7/16/53	REVISED	6
TRACED			8
CHECKED	7/22/53		

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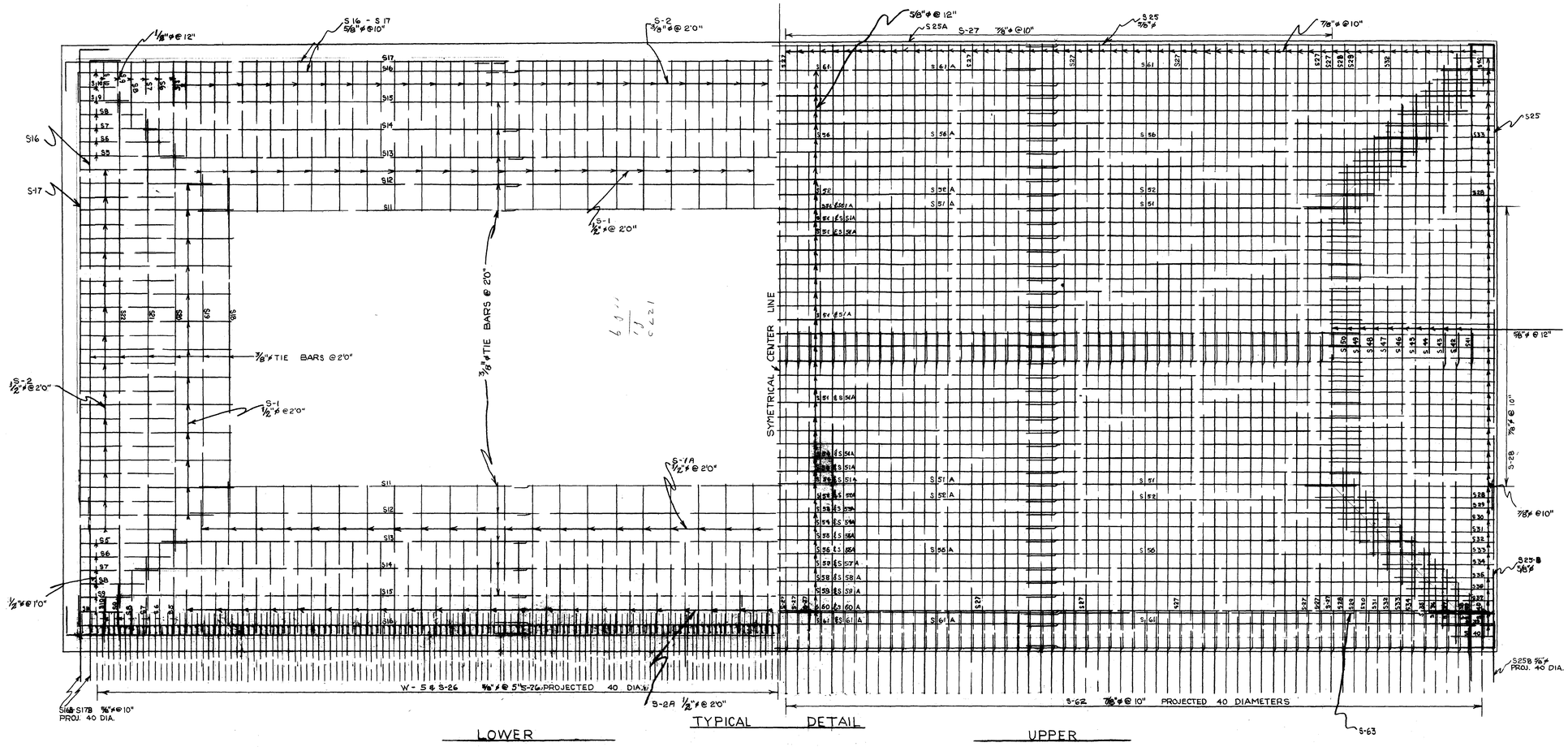
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

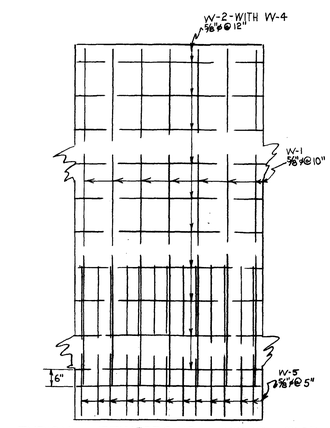
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY



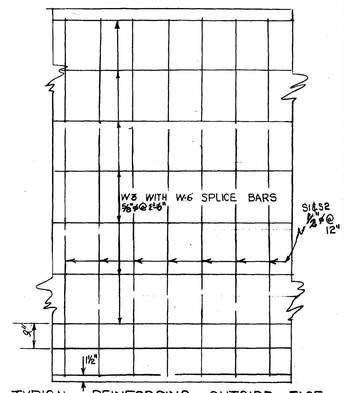
LOWER TYPICAL DETAIL UPPER

SLAB REINFORCING STEEL

SCALE 1/4" = 1'0"



TYPICAL REINFORCING INSIDE FACE OF WALL



TYPICAL REINFORCING OUTSIDE FACE OF WALL

SCALE 1/2" = 1'0"

QUANTITIES

CONCRETE 225 CU.YDS.

REINFORCING STEEL:

#3 - 3/8"ϕ	559.26 lb
#4 - 1/2"ϕ	2607.30 "
#5 - 5/8"ϕ	22,597.44 "
#6 - 3/4"ϕ	476.13 "
#7 - 7/8"ϕ	12,245.60 "
#8 - 1"ϕ	272.34 "

TOTAL 38,158.01 LBS.

REINFORCING STEEL SCHEDULE

MK.	NO.	SIZE	TYPE	LGH.	A	B	C	D	E	F	G	H	K	TOTAL LENGTH	DIAGRAM
S1	68	4	2	21'5"	10'3"	10'10"								1454.5'	
S-2	72	4	2	19'-5"	10'-7"	6'10"								1398.5'	
S-2A	22	4	STR.	6'9"										148.5'	
S-5	8	4	2	16'-10"	6'10"	100"								134.8'	
S-6	8	4	2	13'6"	6'10"	68"								108.0'	
S-7	8	4	"	12'8"	6'10"	58"								101.8'	
S-8	8	4	"	11'6"	6'-35"	45"								92.0'	
S-9	8	4	"	10'10"	6'10"	38"								86.0'	
S-10	8	4	"	9'6"	6'10"	28"								76.0'	
S-11	4	3	STR.	230'										920'	
S-11A	2	"	"	400'										800'	
S-12	4	"	"	235'										940'	
S-12A	2	"	"	400'										800'	
S-13	4	"	"	261'										1044'	
S-13A	2	"	"	400'										800'	
S-14	4	"	"	270'										1080'	
S-14A	2	"	"	400'										800'	
S-15	4	"	"	296'										1184'	
S-15A	2	"	"	400'										800'	
S-16	8	5	2	389"	2'11"	385"								2019'	
S-16A	2	5	STR.	400'										800'	
S-16B	2	5	STR.	389"										778'	

MK	NO.	SIZE	TYPE	LGH.	A	B	C	D	E	J	G	H	K	TOTAL LENGTH	DIAGRAM
S-17	6	3	2	38'8"	2'11"	34'8"								2307'	
S-17A	2	3	STR	400'										800'	
S-17B	2	3	STR	154'										308'	
S-18	2	3	"	245'										490'	
S-19	2	3	"	255'										510'	
S-20	2	3	"	295'										590'	
S-21	2	3	"	334'										668'	
S-22	2	3	"	375'										748'	
S-25	6	5	2	359'	2'11"	338'								2146'	
S-25A	2	5	STR	400'										800'	
S-25B	2	5	STR	148'										294'	
S-26	240	5	2	83"	4'8"	4'0"								1980'	
S-27	192	7	5	23'8"	9'-3"	1'11"	10'0"	11'1"		0'6¾"	0'9"	0'4⅞"	10'0"	4360'0"	
S-28	8	7	5	14'0"	9'-3"	1'11"	10'0"	1'4"		0'6¾"	0'9"	0'4⅞"	10'0"	112'0"	
S-29	8	7	5	13'2"	"	"	"	0'6"		"	"	"	"	105'4"	
S-30	8	7	5	12'4"	"	"	9'8"			"	"	"	9'8"	98'8"	
S-31	8	7	5	11'8"	"	"	9'0"			"	"	0'4"	9'0"	93'4"	
S-32	8	7	5	10'8"	"	"	8'0"			"	"	0'4"	8'0"	85'4"	
S-33	8	7	5	9'8"	"	"	7'2"			"	"	0'3½"	7'2"	78'8"	
S-34	8	7	5	9'0"	"	"	6'4"			"	"	0'3"	6'4"	72'0"	
S-35	8	7	5	8'8"	"	"	5'7"			"	"	0'3"	5'7"	65'0"	
S-36	8	7	5	8'5"	"	"	4'9"			"	"	0'2"	4'9"	59'8"	
S-37	8	7	5	6'8"	"	"	4'0"			"	"	0'2"	4'0"	53'4"	

MK	NO.	SIZE	TYPE	LGH.	A	B	C	D	E	J	G	H	K	TOTAL LENGTH	DIAGRAM
S 38	8	7	5	5'8"	0'6¾"	1'11"	5'0"			0'6¾"	0'9"	0'1¾"	3'0"	45'4"	
S 39	8	7	5	4'10"	"	"	2'2"			"	"	0'1"	2'2"	38'8"	
S 40	8	7	5	4'0"	"	"	1'4"			"	"	0'½"	1'4"	32'0"	
S 41	4	5	STR	240'										198'0"	
S 42	4	5	STR	225'										179'4"	
S 43	4	5	"	216'										172'0"	
S 44	2	5	"	386"										770'	
S 45	2	5	"	366"										730'	
S 46	2	5	"	346"										690'	
S 47	2	5	"	326"										650'	
S 48	2	5	"	306"										611'	
S 49	2	5	"	286"										570'	
S 50	2	5	"	266"										530'	
S 51	42	5	STR	244"										10220'	
S 51A	21	5	"	400'										8400'	
S 52	4	5	"	254"										1014'	
S 52A	2	5	"	400'										800'	
S 53	4	5	"	264"										1054'	
S 53A	2	5	"	400'										800'	
S 54	4	5	"	274"										1094'	
S 54A	2	5	"	400'										800'	
S 55	4	5	"	284"										1134'	

STEEL SCHEDULE COMPLETED SHEET # 2

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

300,000 GALLON WATER STORAGE RESERVOIR - FLOOR REINFORCEMENT

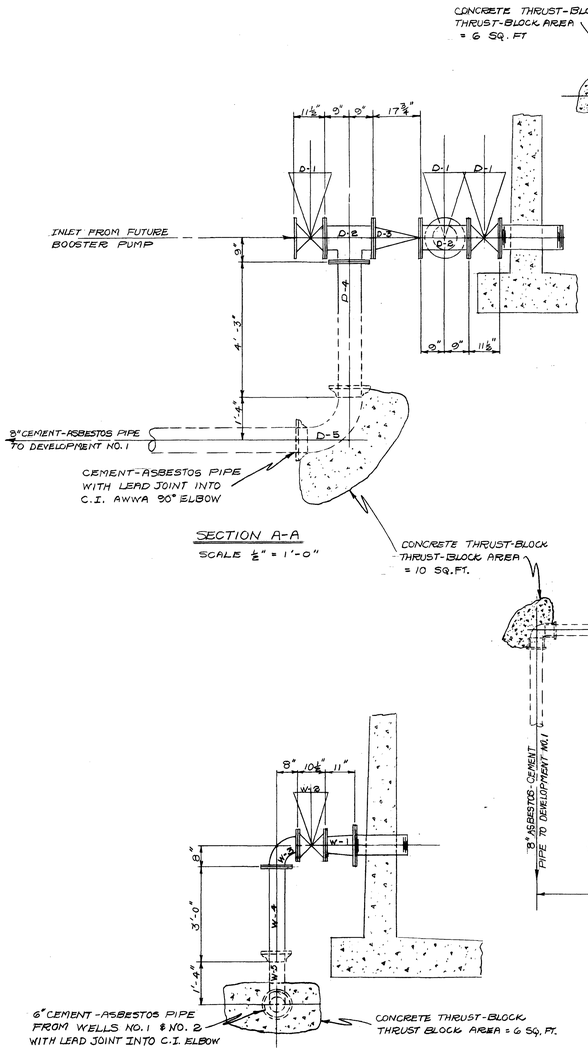
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CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN JH 7-27-53 | REVISED 10/6/53 BB | 7/8

TRACED

CHECKED

1-1-7

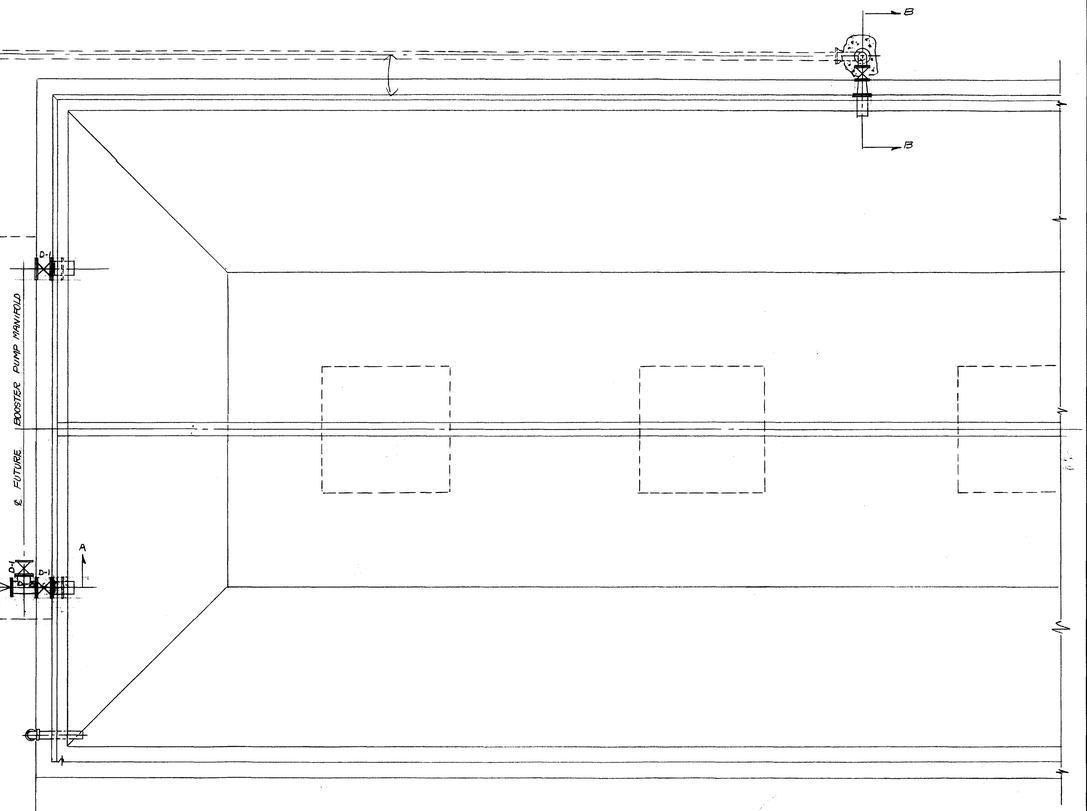


SECTION A-A

SCALE ½" = 1'-0"

SECTION B-B

SCALE ½" = 1'-0"



PLAN

SCALE: ¼"=1'-0"

PIPING MATERIALS LIST			
ITEM	DESCRIPTION	LOCATION	NO. REQ'D
D-1	8" F.F. IRON BODY BRASS MOUNTED GATE VALVE 150	FUTURE BOOSTER MANIFOLD	4
D-2	8" F.F. AMERICAN STD. 125	FUTURE BOOSTER MANIFOLD	2
D-3	8" F.F. I.B.B.M. HORIZONTAL SWING CHECK VALVE	FUTURE BOOSTER MANIFOLD	1
D-4	8" x 4'-3" F.S. C.I. PIPE CLASS 150	FUTURE BOOSTER MANIFOLD	1
D-5	8" DOUBLE BELL 90° AWWA QUARTER BEND CLASS "D"	FUTURE BOOSTER MANIFOLD	1
W-1	8" x 6" F.F. REDUCER AM. STD. 125	WELL LINE TO RESERVOIR	1
W-2	6" F.F. I.B.B.M. GATE VALVE CLASS 150	WELL LINE TO RESERVOIR	1
W-3	6" F.F. 90° ELBOW AM. STD. 125	WELL LINE TO RESERVOIR	1
W-4	6" x 3'-0" F.S. C.I. PIPE CLASS 150		
W-5	6" DOUBLE-BELL 90° AWWA QUARTER BEND	WELL LINE TO RESERVOIR	1
	8" COMPANION FLANGE		7
	8" BLIND FLANGE		4
	12" BLIND FLANGE		1
	12" COMPANION FLANGE		1

W. A. VASCEK REGISTERED ENGINEER AND LAND SURVEYOR STATE OF COLORADO 0711

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO 2

PIPING TO AND FROM RESERVOIR
AND 6", 8" CEMENT-ASBESTOS PIPE

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN B.B. 11/27/53 | REVISED | 8/8
TRACED
CHECKED

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1-1-1

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07041

DRAWING NUMBER

Approved

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07041

DRAWING NUMBER

Approved Northwest Utilities Company

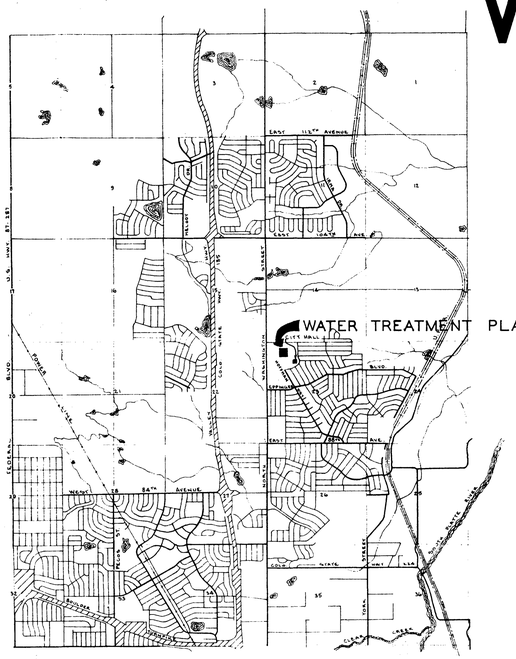
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07041

ADDITIONS AND ALTERATIONS TO WATER TREATMENT PLANT

FOR THE

CITY OF THORNTON COLORADO

JANUARY 1966



LIST OF DRAWINGS

1 SITE PLAN
2 REACTION BASIN - PLAN AND SECTIONS
3 REACTION BASIN - STRUCTURAL DETAILS
4 REACTION BASIN - STRUCTURAL DETAILS
5 REACTION BASIN - MISCELLANEOUS DETAILS
6 PIPING PLAN
7 PIPING DETAILS
8 ALTERATIONS TO EXISTING FILTER BUILDING
9 MISCELLANEOUS DETAILS
10 DETAILS - STAIRS AND SLOPE PAVING
11 ELECTRICAL PLAN

MAYOR

JAMES L. CARPENTER

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MAX PERRY LOOMIS • WILLIAM L. KENNEDY • JAMES M SHEPARD
SAM A. WOOD • KENNETH D. LINQUIST • JOHN J. MILNE
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CITY MANAGER

ARTHUR H. COLBY

CITY ENGINEER

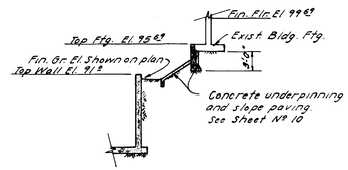
ROBERT V. GORSLINE

PLANS PREPARED BY

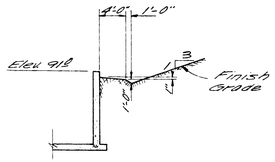
NELSON-HALEY-PATTERSON AND QUIRK, INC., ENGINEERING CONSULTANTS
GREELEY COLORADO

1-1-13

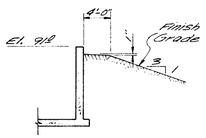
DRAWING NUMBER
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER NUMBER 1013-61



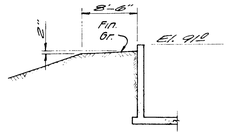
SECTION A-A
Scale: 1" = 10'



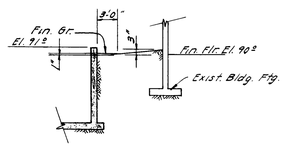
SECTION B-B
Scale: 1" = 10'



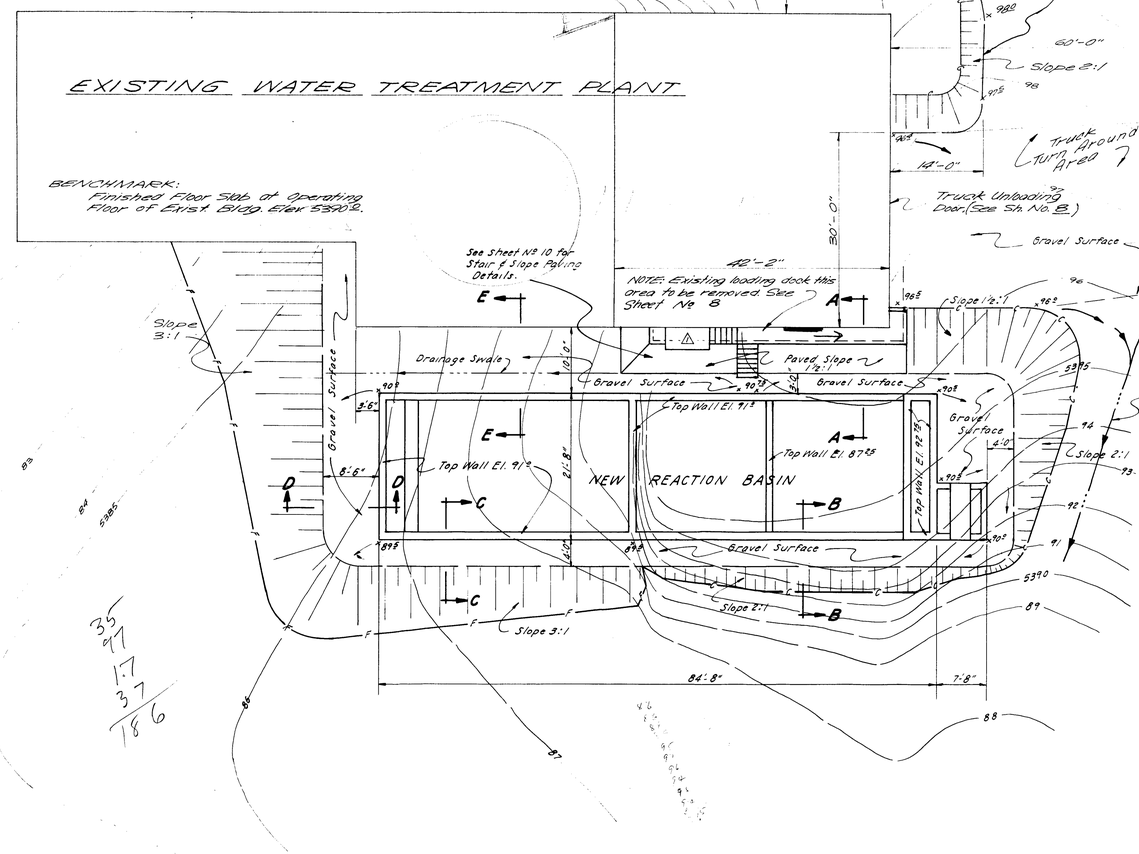
SECTION C-C
Scale: 1" = 10'



SECTION D-D
Scale: 1" = 10'



SECTION E-E
Scale: 1" = 10'



LEGEND

- 5400 — Existing Contours
- C — C — Top Cut Backslope
- F — F — Toe Fill
- ×97.5 — New Finished Grade Elev. at Location Shown
- Surface Drainage

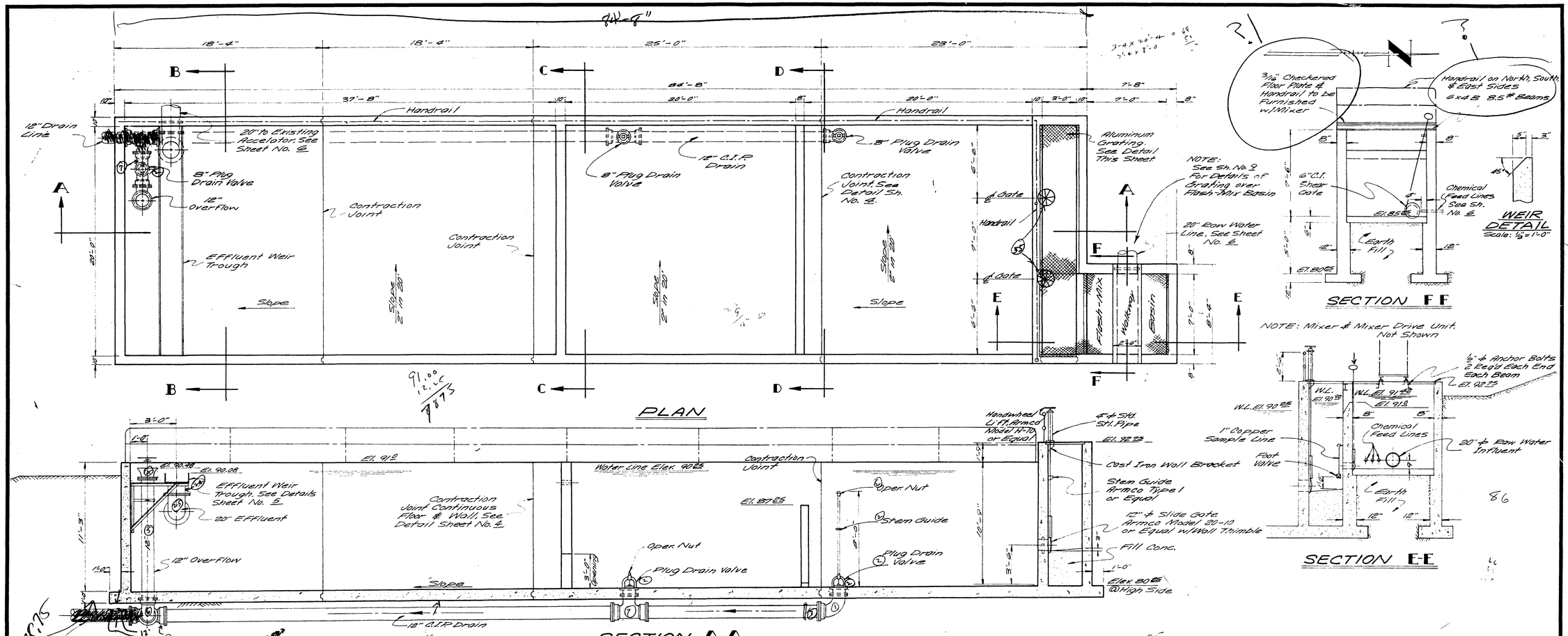
16'×45'	=	720 SF
4'×40'	=	160
16'×15'	=	240
4'×15'	=	60
5'×5'	=	25
60'×30'	=	1,800
½ × 6'×5'	=	15
30'×5'	=	150
		3,220 SF

35
91
1.7
37
186

REVISIONS						SHEET	
BY P.L. DATE 2-3-66 DESCR. ⚠	DATE January, 1966	DRAWN R.M.G.	PROJECT NO.	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO	ADDITIONS TO WATER TREATMENT PLANT	11
BY ____ DATE ____ DESCR.	SCALE As Shown	CHECKED D.A.L.	62.114	GREELEY COLORADO	WATER SYSTEM IMPROVEMENTS	SITE PLAN	SHEETS 1
BY ____ DATE ____ DESCR.		APPROVED					

1-1-13

Approved as Built
Thornton Water Treatment Plant
Additions and Alterations
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ITEM



REVISIONS							
BY	DATE	DESCR.	DATE January, 1966	DRAWN R.M.G.	PROJECT NO. 63114	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS GREELEY COLORADO	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	ADDITIONS TO WATER TREATMENT PLANT REACTION BASIN PLAN AND SECTIONS	SHEET 11 SHEETS 2
BY	DATE	DESCR.	SCALE 1/4" = 1'-0"	CHECKED D.L.					
BY	DATE	DESCR.		APPROVED					

1-1-13

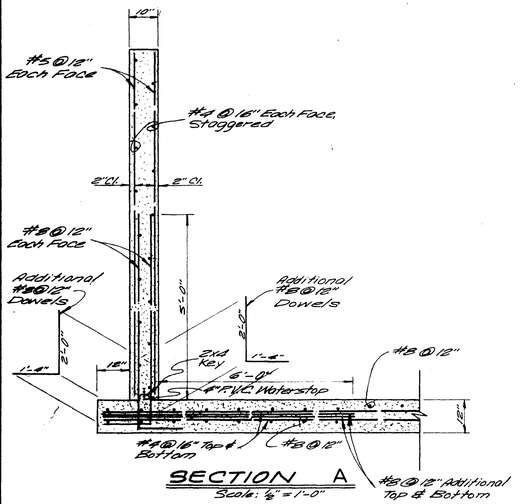
DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

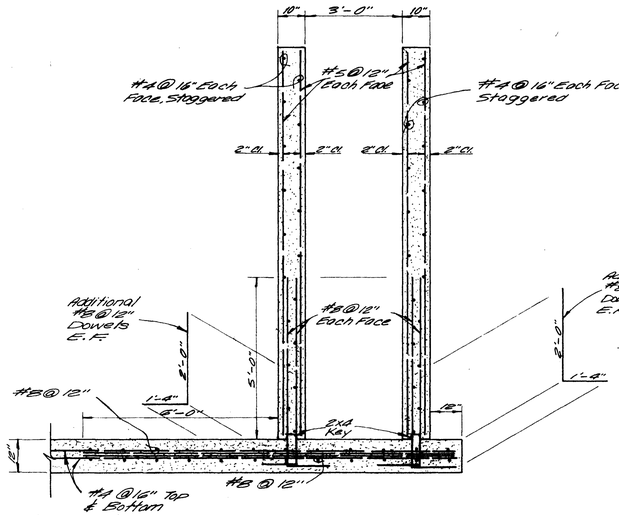
DRAWING NUMBER

— Thornton Water Treatment Plant —
Additions and Improvements
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

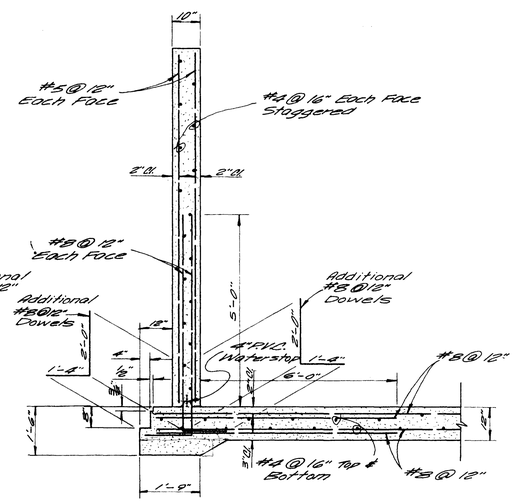
DRAWING NUMBER



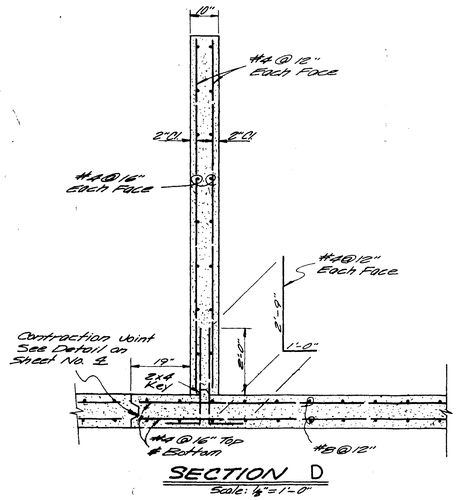
SECTION A
Scale: 1/2" = 1'-0"



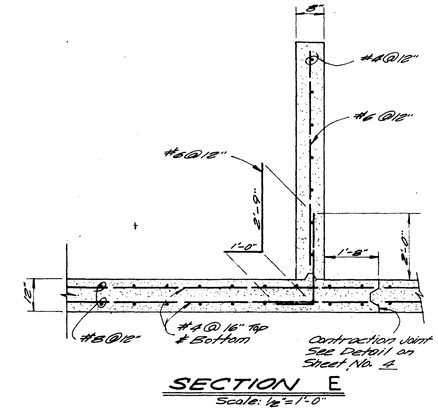
SECTION B
Scale: 1/2" = 1'-0"



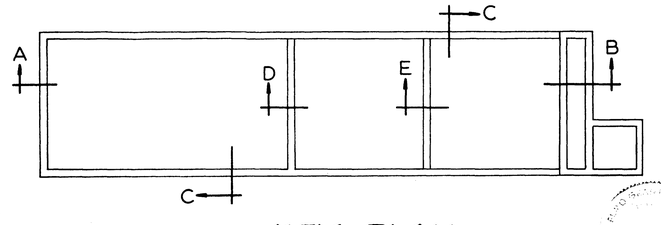
SECTION C
Scale: 1/2" = 1'-0"



SECTION D
Scale: 1/2" = 1'-0"



SECTION E
Scale: 1/2" = 1'-0"



KEY PLAN
Scale: 1" = 10'

REVISIONS							
BY	DATE	DESCR.	DATE January, 1965	DRAWN R.M.G.	PROJECT NO.	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO	ADDITIONS TO WATER TREATMENT PLANT REACTION BASIN STRUCTUAL DETAILS	11 SHEETS	SHEET 3
BY	DATE	DESCR.	SCALE As Shown	CHECKED D.L.	63114	GREELEY COLORADO	WATER SYSTEM IMPROVEMENTS			
BY	DATE	DESCR.		APPROVED						

1-1-13

DRAWING NUMBER

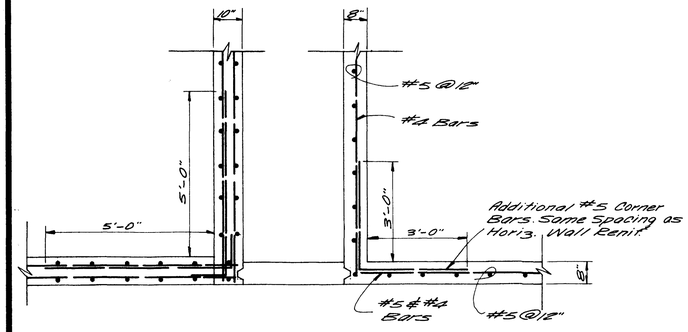
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07048

DRAWING NUMBER

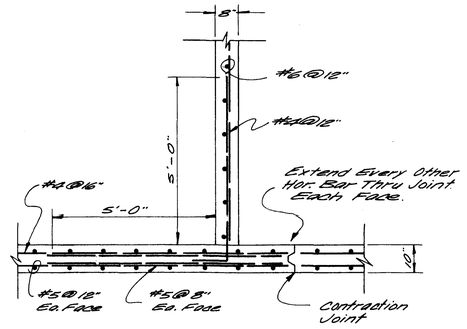
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07048

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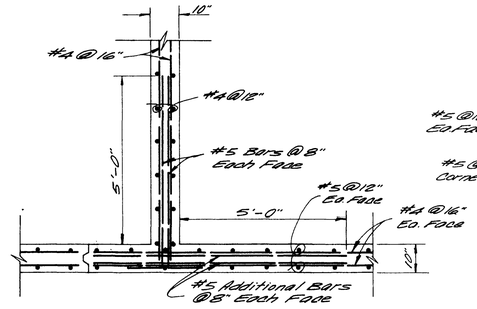
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07048



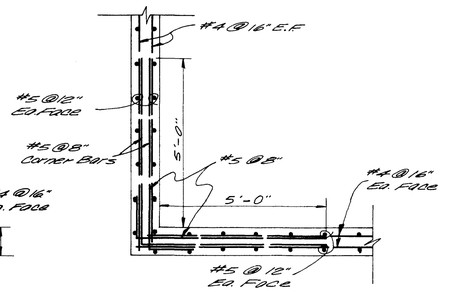
DETAIL 1
Scale: ½" = 1'-0"



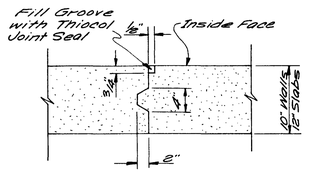
DETAIL 2
Scale: ½" = 1'-0"



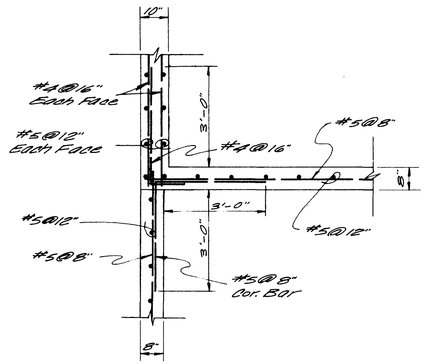
DETAIL 3
Scale: ½" = 1'-0"



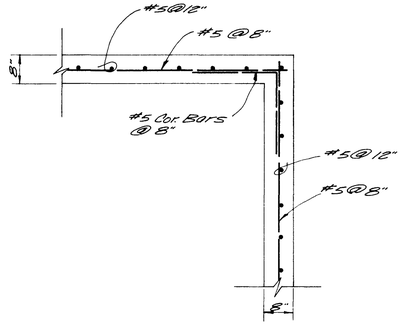
DETAIL 4
Scale: ½" = 1'-0"



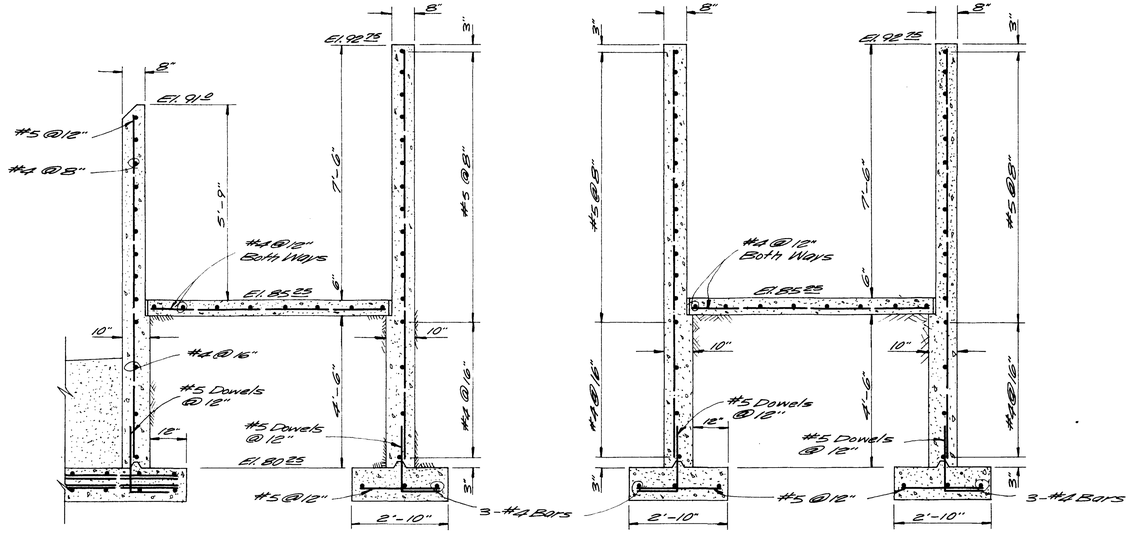
CONTRACTION JOINT
Scale: 1" = 1'-0"



DETAIL 5
Scale: ½" = 1'-0"

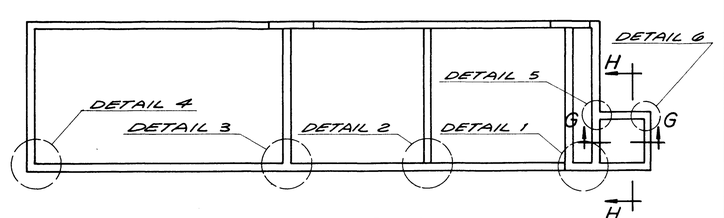


DETAIL 6
Scale: ½" = 1'-0"



SECTION G-G
Scale: ½" = 1'-0"

SECTION H-H
Scale: ½" = 1'-0"



KEY PLAN

REVISIONS							
BY	DATE	DESCR.	DATE January, 1966	DRAWN R.M.G.	PROJECT NO.	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO
BY	DATE	DESCR.	SCALE As Shown	CHECKED D.L.	63114	GREELEY COLORADO	WATER SYSTEM IMPROVEMENTS
BY	DATE	DESCR.		APPROVED			

ADDITIONS TO WATER TREATMENT PLANT REACTION BASIN STRUCTURAL DETAILS

SHEET 11 SHEETS 4

1-1-13

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

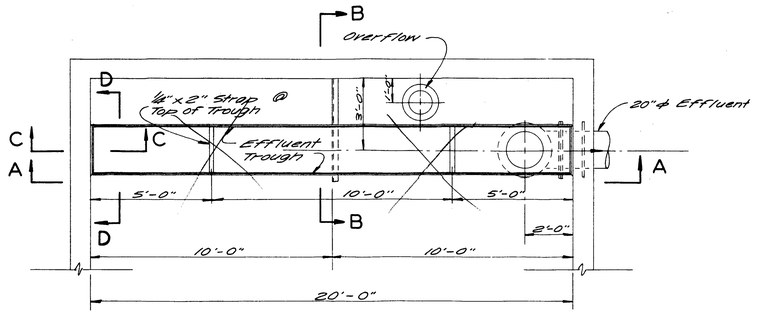
DRAWING NUMBER

Addition Water Treatment Plant Additions and Alterations

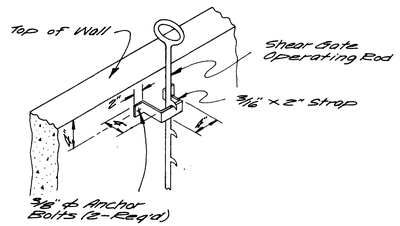
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

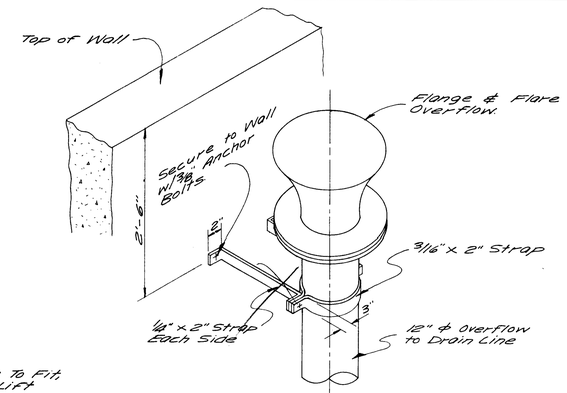
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY



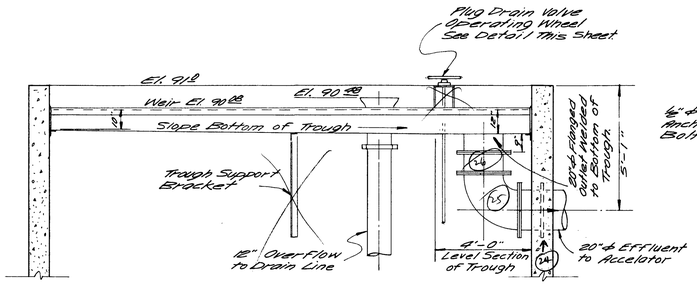
PLAN
Scale: 3/8" = 1'-0"



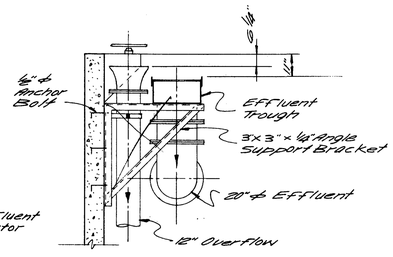
DETAIL ~ SHEAR GATE OPERATING HANDLE
No Scale



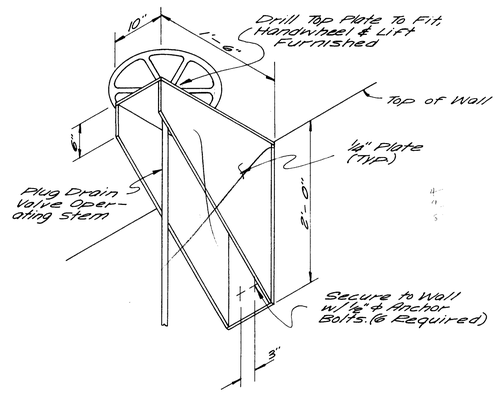
OVERFLOW PIPE SUPPORT
No Scale



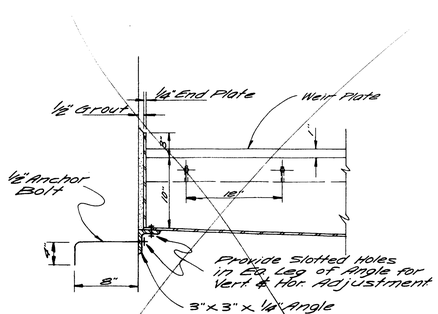
SECTION A-A
Scale: 3/8" = 1'-0"



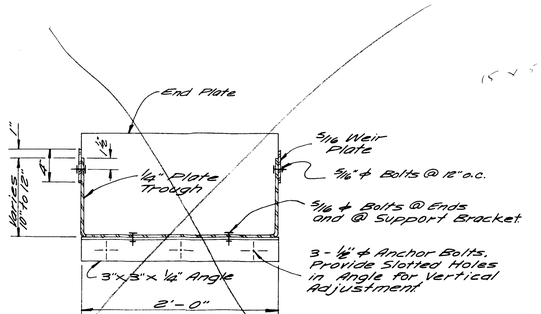
SECTION B-B
Scale: 3/8" = 1'-0"



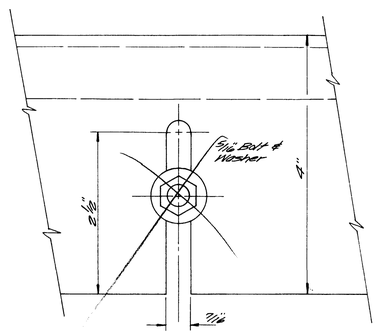
DETAIL ~ HANDWHEEL MOUNTING BRACKET FOR PLUG DRAIN VALVE
No Scale

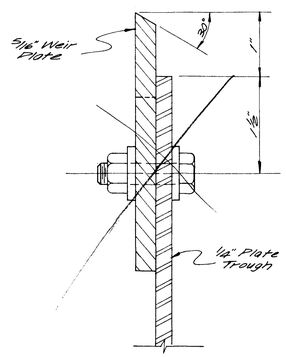


SECTION C-C
Scale: 1½" = 1'-0"



SECTION D-D
Scale: 1½" = 1'-0"





WEIR DETAILS
Full Scale

REVISIONS					
BY	DATE	DESCR	DATE January, 1966	DRAWN W. ϕ R.M.G.	PROJECT NO. 63114
BY	DATE	DESCR	SCALE As Shown	CHECKED D.L.	
BY	DATE	DESCR		APPROVED	

NELSON - HALEY - PATTERSON AND QUIRK
ENGINEERING CONSULTANTS
GREELEY COLORADO

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS

ADDITIONS TO WATER TREATMENT PLANT
REACTION BASIN
MISCELLANEOUS DETAILS

SHEET 11
SHEETS 5

DRAWING NUMBER

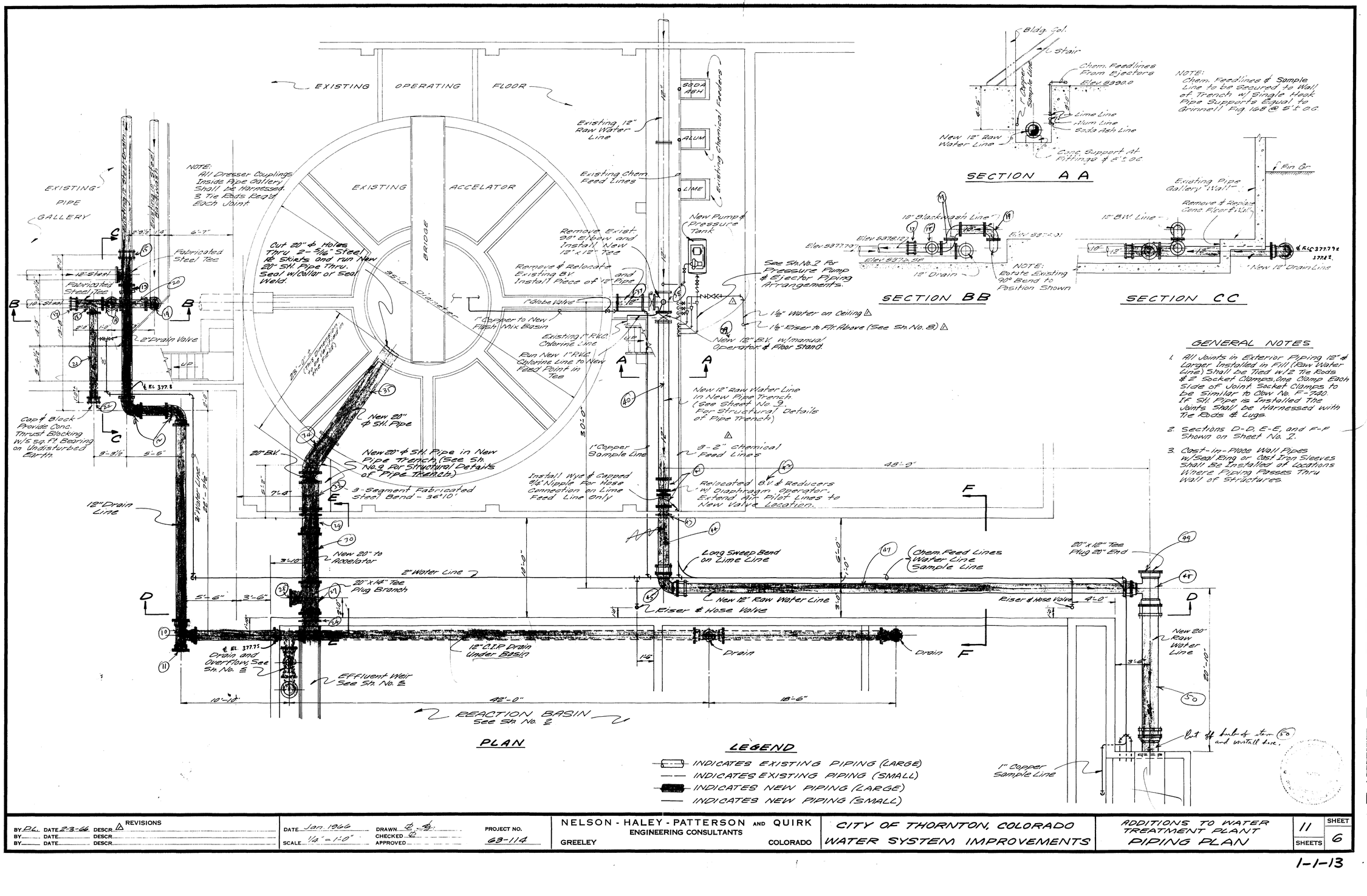
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07549

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07549

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07549



GENERAL NOTES

1. All Joints in Exterior Piping 12" ϕ Larger Installed in Full (Raw Water Line) Shall be Tied w/2 Tie Rods & 2 Socket Clamps, One Clamp Each Side of Joint. Socket Clamps to be Similar to Clow No. F-7420. If STL. Pipe is Installed The Joints Shall be Harnessed with Tie Rods & Lugs.
2. Sections D-D, E-E, and F-F Shown on Sheet No. 7.
3. Cast-in-Place Wall Pipes w/Seal Ring or Cast Iron Sleeves Shall Be Installed at Locations Where Piping Passes Thru Wall of Structures.

LEGEND

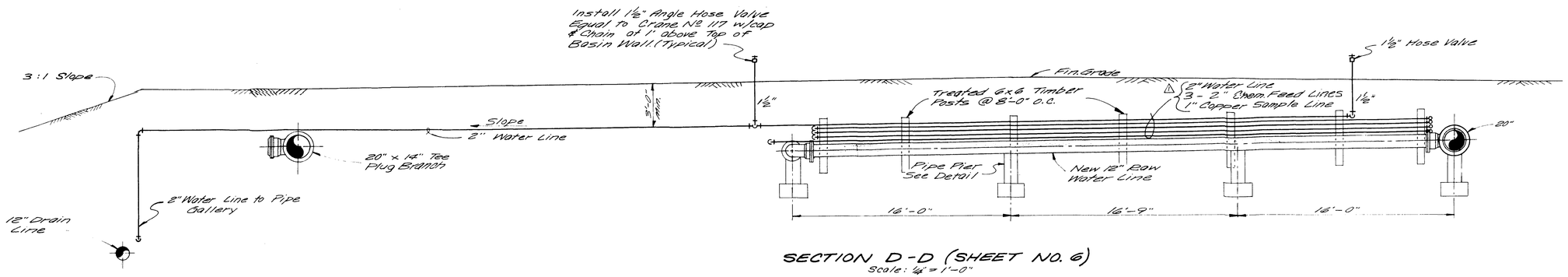
- INDICATES EXISTING PIPING (LARGE)
- INDICATES EXISTING PIPING (SMALL)
- INDICATES NEW PIPING (LARGE)
- INDICATES NEW PIPING (SMALL)

REVISIONS					
BY PL DATE 2-3-66 DESCR. △	DATE Jan 1966	DRAWN	PROJECT NO.	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO	ADDITIONS TO WATER TREATMENT PLANT	SHEET 11
BY DATE DESCR.	SCALE 1/4" = 1'-0"	CHECKED	63-114	GREELEY COLORADO	WATER SYSTEM IMPROVEMENTS	PIPING PLAN	SHEETS 6
BY DATE DESCR.		APPROVED					

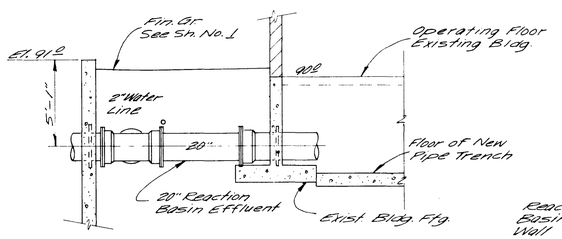
DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECEIVED BY PLAN-HOLD CORP.

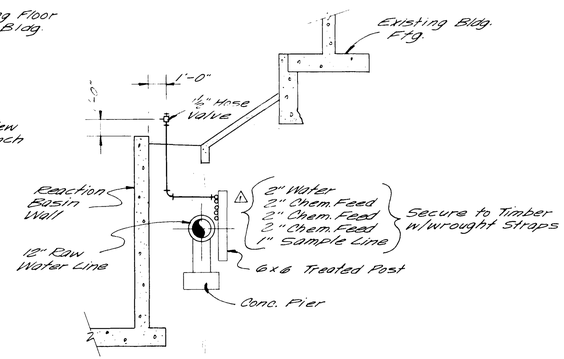
1-1-13



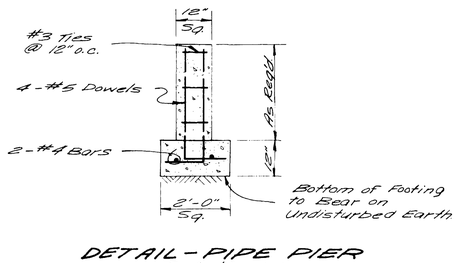
SECTION D-D (SHEET NO. 6)
Scale: ¼" = 1'-0"



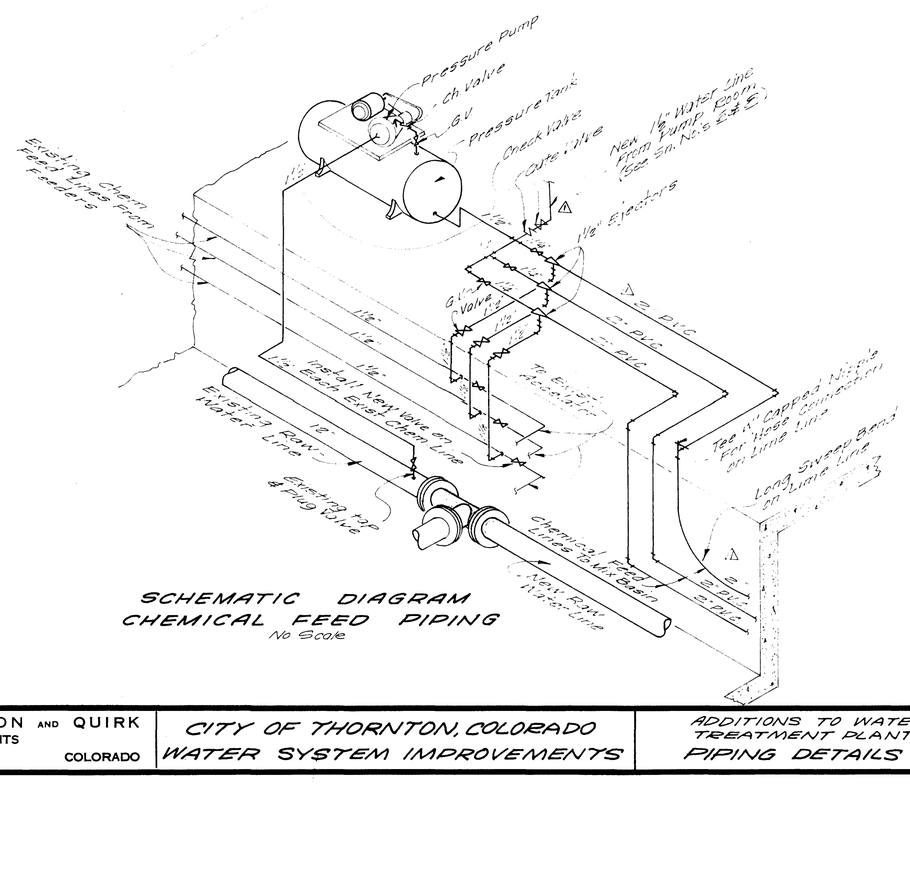
SECTION E-E
Scale: ¼" = 1'-0"



SECTION F-F
Scale: ½" = 1'-0"



DETAIL - PIPE PIER
Scale: ½" = 1'-0"



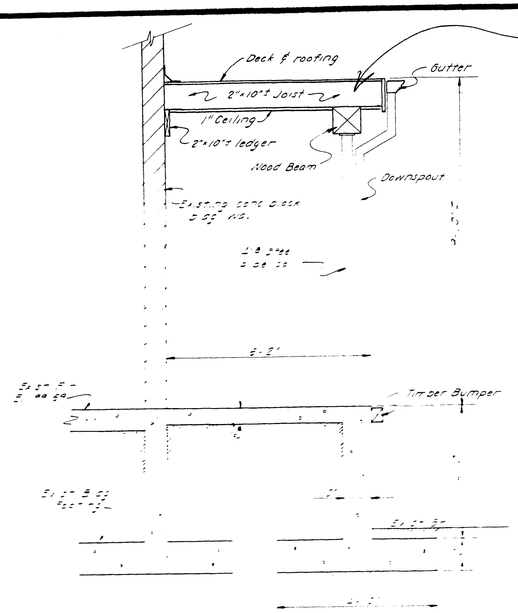
SCHEMATIC DIAGRAM
CHEMICAL FEED PIPING
No Scale

REVISIONS							
BY D.L.	DATE 2-3-66	DESCR. ⚠	DATE January, 1966	DRAWN E.M.G.	PROJECT NO.	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	ADDITIONS TO WATER TREATMENT PLANT PIPING DETAILS	SHEET 11
BY	DATE	DESCR.	SCALE As Shown	CHECKED D.L.	63114	GREELEY COLORADO			SHEETS 7
BY	DATE	DESCR.		APPROVED					

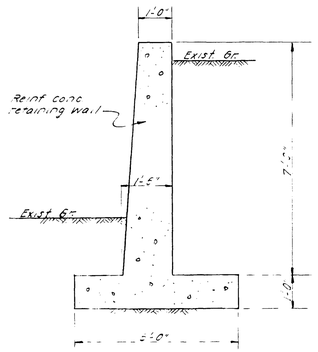
1-1-13

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER D77549
Additions to Water Treatment Plant
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER D77549

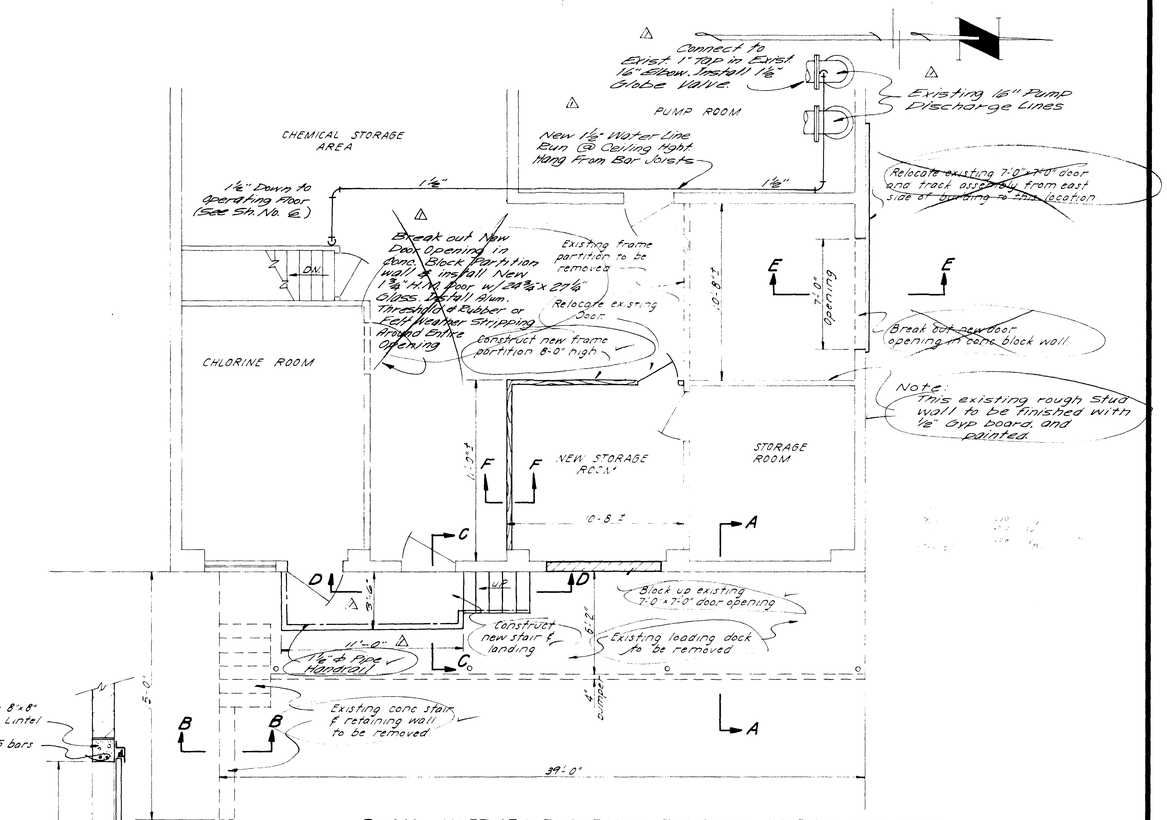
Don this also get removed.



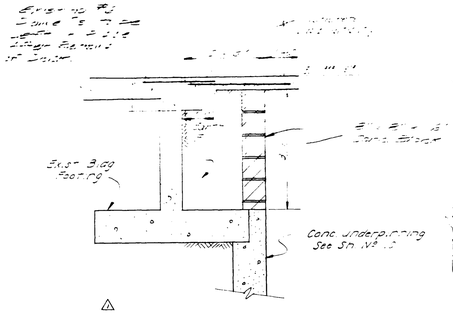
SECTION A-A
LOADING DOCK TO BE REMOVED
SCALE 3/8" = 1'-0"



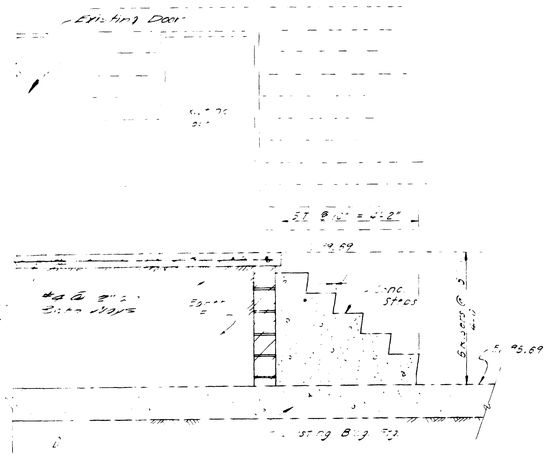
SECTION B-B
RETAINING WALL TO BE REMOVED
SCALE 1/8" = 1'-0"



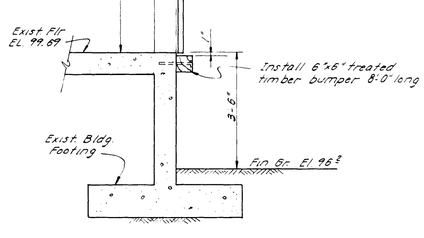
PLAN - NORTHEAST CORNER EXISTING FILTER BUILDING
SCALE 1/4" = 1'-0"



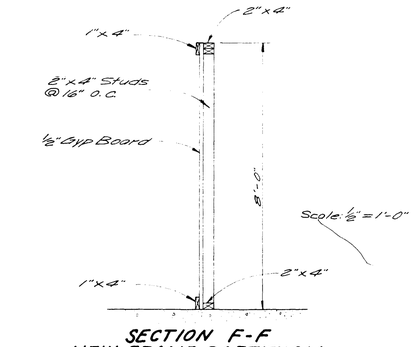
SECTION C-C
SCALE ½" = 1'-0"



SECTION D-D
SCALE ½" = 1'-0"



SECTION E-E
SCALE ½" = 1'-0"



SECTION F-F
NEW FRAME PARTITION

REVISIONS BY P.C. DATE 2-3-66 DESCR. △ BY ____ DATE ____ DESCR. ____ BY ____ DATE ____ DESCR. ____	DATE January, 1966 SCALE As Shown DRAWN [illegible] CHECKED [illegible] APPROVED [illegible]	PROJECT No. 6311	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS DENVER COLORADO GREELEY	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	ADDITIONS TO WATER TREATMENT PLANT ALTERATIONS TO EXISTING FILTER BUILDING	11 SHEETS SHEET 8

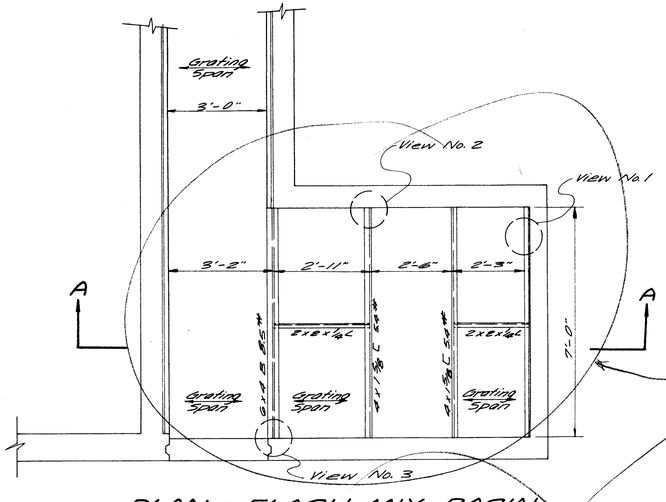
1-1-13

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER OTHER
PRINTED FROM FILM ON PAPER OR TRACING

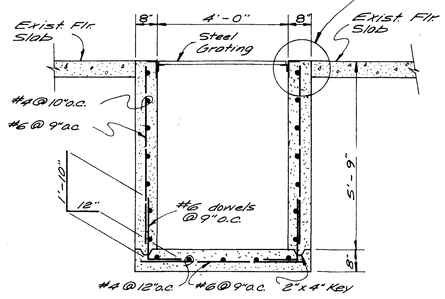
DRAWING NUMBER

Remove Wire Treatment Plant
Demolish and Re-Install
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER OTHER
PRINTED FROM FILM ON PAPER OR TRACING

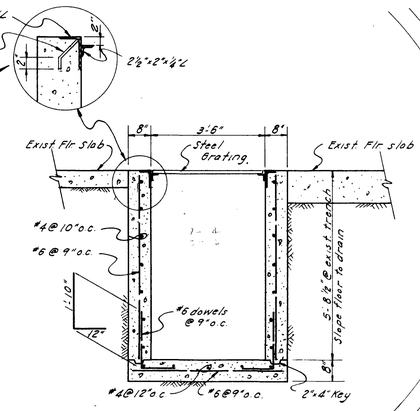


PLAN - FLASH MIX BASIN
Scale: ½" = 1'-0"

There should be ample room for guided with float switches. Check this

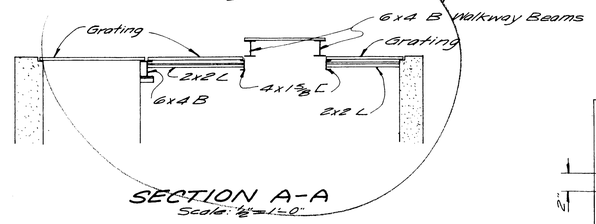


SECTION B-B
SCALE: ½" = 1'-0"

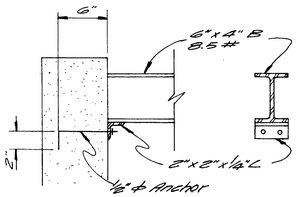


SECTION A-A
SCALE ½" = 1'-0"

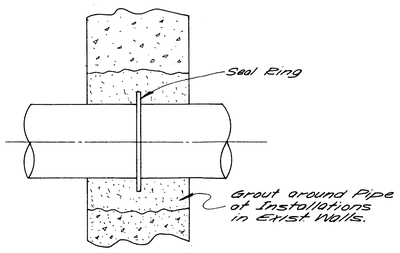
PLAN - EXISTING FILTER BUILDING
SCALE ½" = 1'-0"



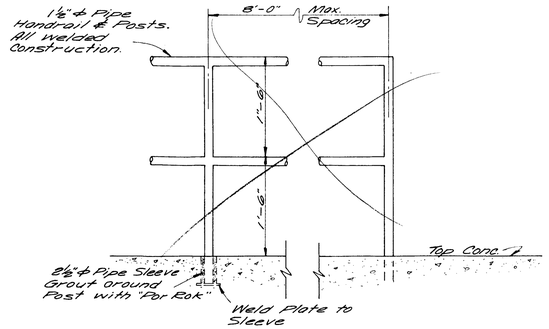
SECTION A-A
Scale: ½" = 1'-0"



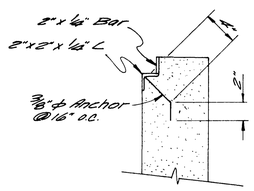
VIEW NO. 3
Scale: 1½" = 1'-0"



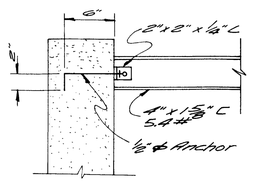
WALL PIPE DETAIL
No Scale



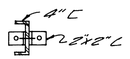
HANDRAIL DETAILS
No Scale



VIEW NO. 1
Scale: 1½" = 1'-0"



VIEW NO. 2
Scale: 1½" = 1'-0"



REVISIONS							
BY	DATE	DESCR.	DATE January, 1966	DRAWN W & E.M.G.	PROJECT NO. 63114	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO
BY	DATE	DESCR.	SCALE As Shown	CHECKED D.L.		GREELEY COLORADO	WATER SYSTEM IMPROVEMENTS
BY	DATE	DESCR.		APPROVED			ADDITIONS TO WATER TREATMENT PLANT

MISCELLANEOUS DETAILS

SHEET 11 / SHEETS 9

1-1-13

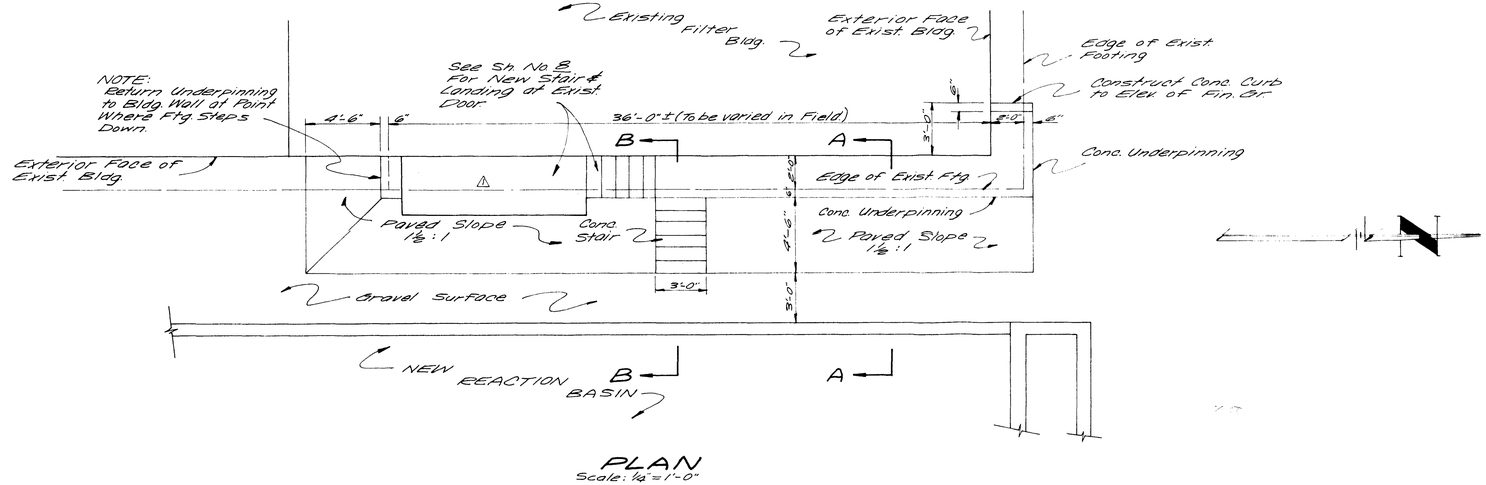
DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548

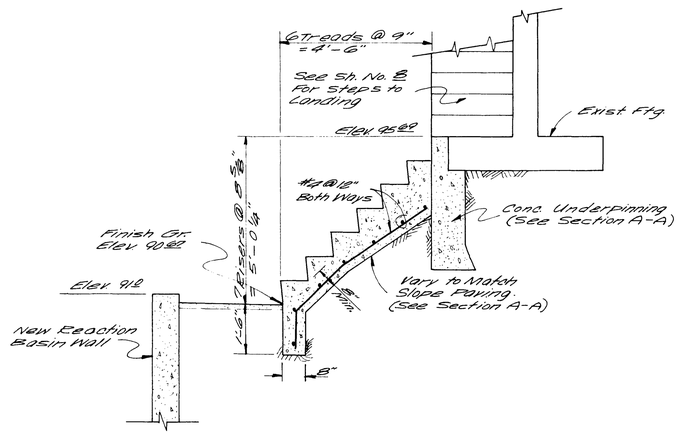
DRAWING NUMBER

Thornton Water Treatment Plant — Additions and Improvements

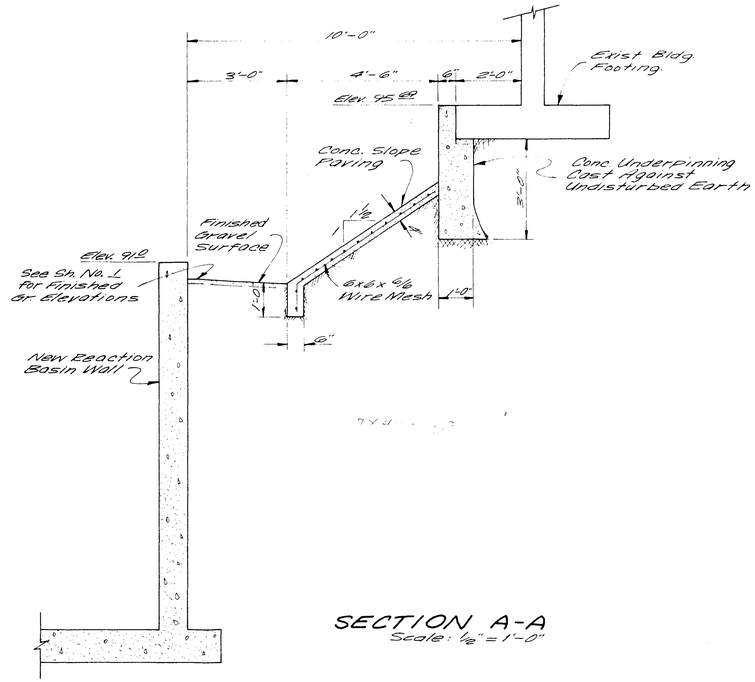
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548



PLAN
Scale: 1/8" = 1'-0"



SECTION B-B
Scale: ½" = 1'-0"



SECTION A-A
Scale: ½" = 1'-0"

REVISIONS					
BY P.L. DATE 2-3-66 DESCR. ⚠	DATE January, 1966	DRAWN E.N.G.	PROJECT NO. 63 114	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	ADDITIONS TO WATER TREATMENT PLANT DETAILS	SHEET 11
BY DATE DESCR.	SCALE As Shown	CHECKED D.L.		GREELEY COLORADO			SHEETS 10
BY DATE DESCR.		APPROVED					

1-1-13

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER (7) 541

DRAWING NUMBER

Addition

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER (7) 541

DRAWING NUMBER

Thornton Water Treatment Plant
Additions and Alterations

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER (7) 541

CITY OF THORNTON

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

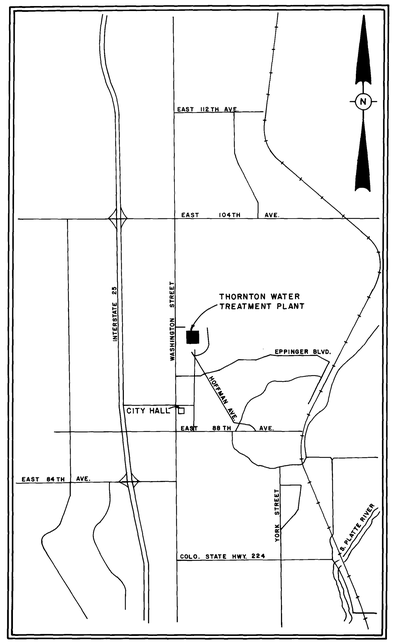
PIPING AND MISCELLANEOUS IMPROVEMENTS

CHAIRMAN, UTILITIES BOARD

W. BROWN

DIRECTOR OF UTILITIES

C. R. PALMER



LOCATION MAP

LIST OF DRAWINGS

SHEET NO.	TITLE
G-1	GENERAL LEGEND, NOTES AND DETAILS
G-2	YARD WORK
G-3	GENERAL SITE PLAN, EXISTING PLANT LAYOUT, MECHANICAL DETAIL
M-1	REMOVAL OF EXISTING IN PLANT — PLAN AND SECTIONS
M-2	NEW PIPING — PLAN
M-3	NEW PIPING — SECTIONS AND DETAILS
S-1	NEW GRATING AND STAIR DETAILS
I-1	PROCESS INSTRUMENTATION — SCHEMATIC AND LEGEND
I-2	PROCESS INSTRUMENTATION — LOOP DIAGRAMS
I-3	PROCESS INSTRUMENTATION — INSTALLATION DETAILS AND PANELS
E-1	PARTIAL FIRST FLOOR AND SITE PLANS
E-2	OPERATING FLOOR PLAN
E-3	PIPE GALLERY

SEPARATE SET BY OTHERS:
INSTRUMENTATION DRAWINGS BY HYDROLOGICS INC. (UNREVISED)

SEPTEMBER 1978

(REVISED APRIL 1979)

RECORD DRAWINGS
MARCH 1980
REPRESENTS AS-CONSTRUCTED CONDITIONS. ALL MINOR ITEMS MAY NOT BE SHOWN.

JOHN D. RAY NO. REGISTERED STATE OF COLORADO

CAMP DRESSER & McKEE Inc. • ENVIRONMENTAL ENGINEERS • DENVER, COLORADO

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 01040

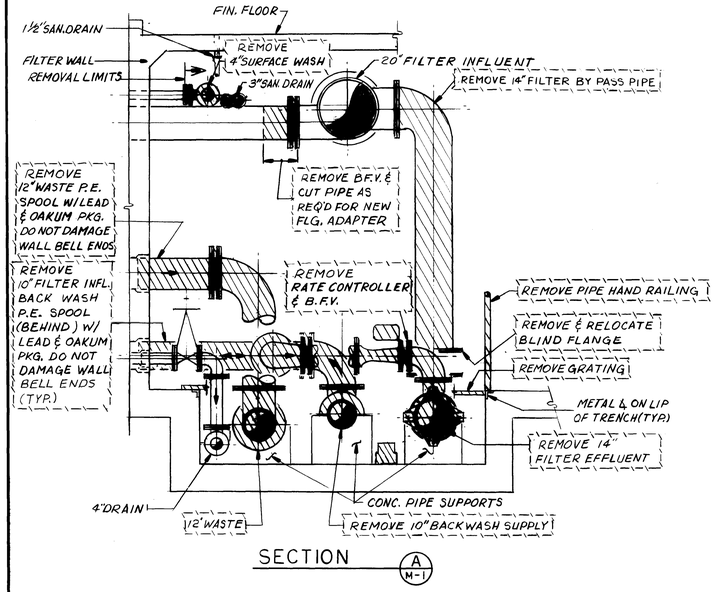
DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 01040

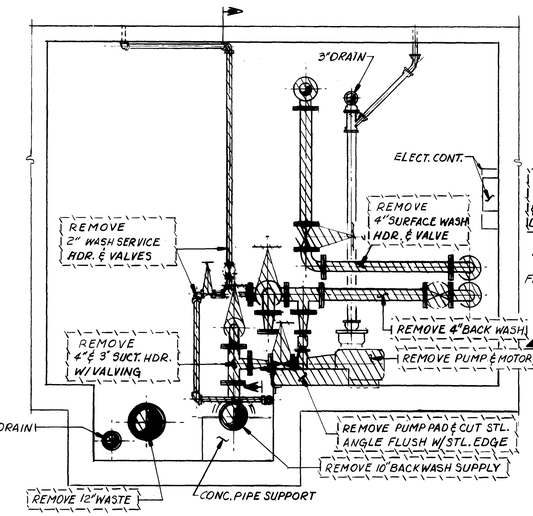
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PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 01040

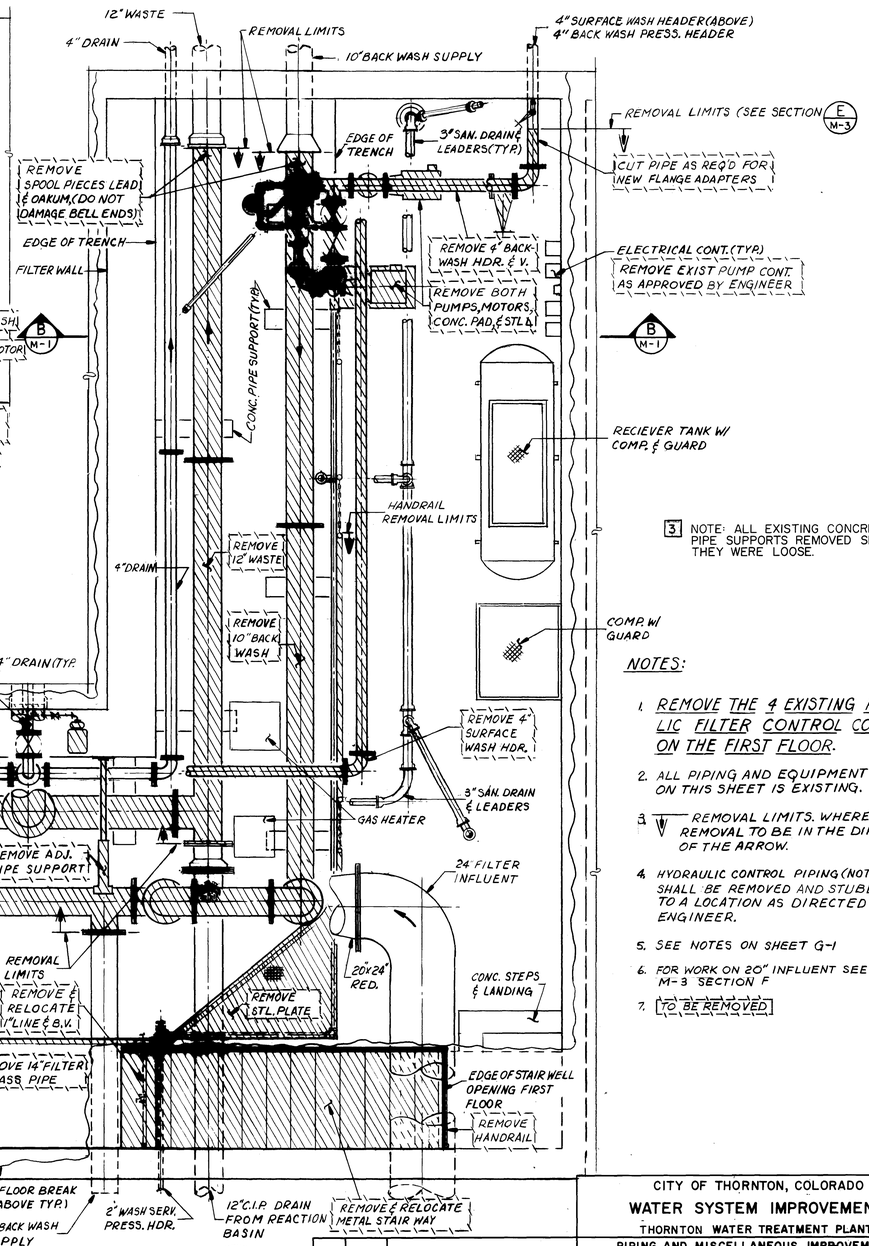
1-3-1



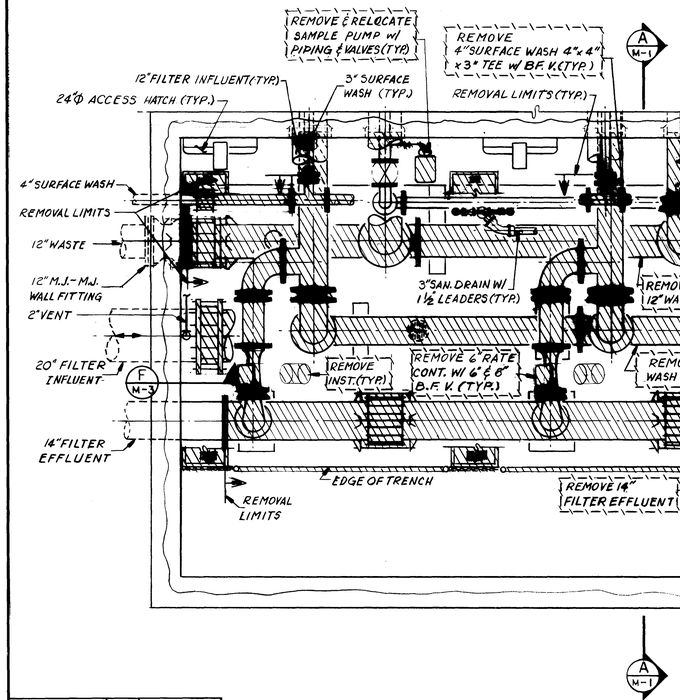
SECTION A M-1



SECTION B M-1



3 NOTE: ALL EXISTING CONCRETE PIPE SUPPORTS REMOVED SINCE THEY WERE LOOSE.



PLAN

NOTES:

1. REMOVE THE 4 EXISTING HYDRAULIC FILTER CONTROL CONSOLES ON THE FIRST FLOOR.
2. ALL PIPING AND EQUIPMENT SHOWN ON THIS SHEET IS EXISTING.
3. V REMOVAL LIMITS. WHERE SHOWN REMOVAL TO BE IN THE DIRECTION OF THE ARROW.
4. HYDRAULIC CONTROL PIPING (NOT SHOWN) SHALL BE REMOVED AND STUBBED BACK TO A LOCATION AS DIRECTED BY THE ENGINEER.
5. SEE NOTES ON SHEET G-1
6. FOR WORK ON 20" INFLUENT SEE SHEET M-3 SECTION F
7. TO BE REMOVED

Approved by:	Date	Name
Structural		
Electrical		
HVAC		
Project Engineer	9/78	WHP
Project Manager	9/78	ECR

JOHN D. RATTRAY REGISTERED 12268 PROFESSIONAL ENGINEER STATE OF COLORADO

Date	Ch'k'd	Revision
3/80	BOD	RECORD DRAWINGS

Designed by: BOD
Drawn by: CB
Checked by: BOD
Approved by:
Date: SEPT 1978
Scale: 1/2"= 1'-0"

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

REMOVAL OF EXISTING IN PLANT— PLAN AND SECTIONS

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
CDM environmental engineers, scientists, planners & management consultants

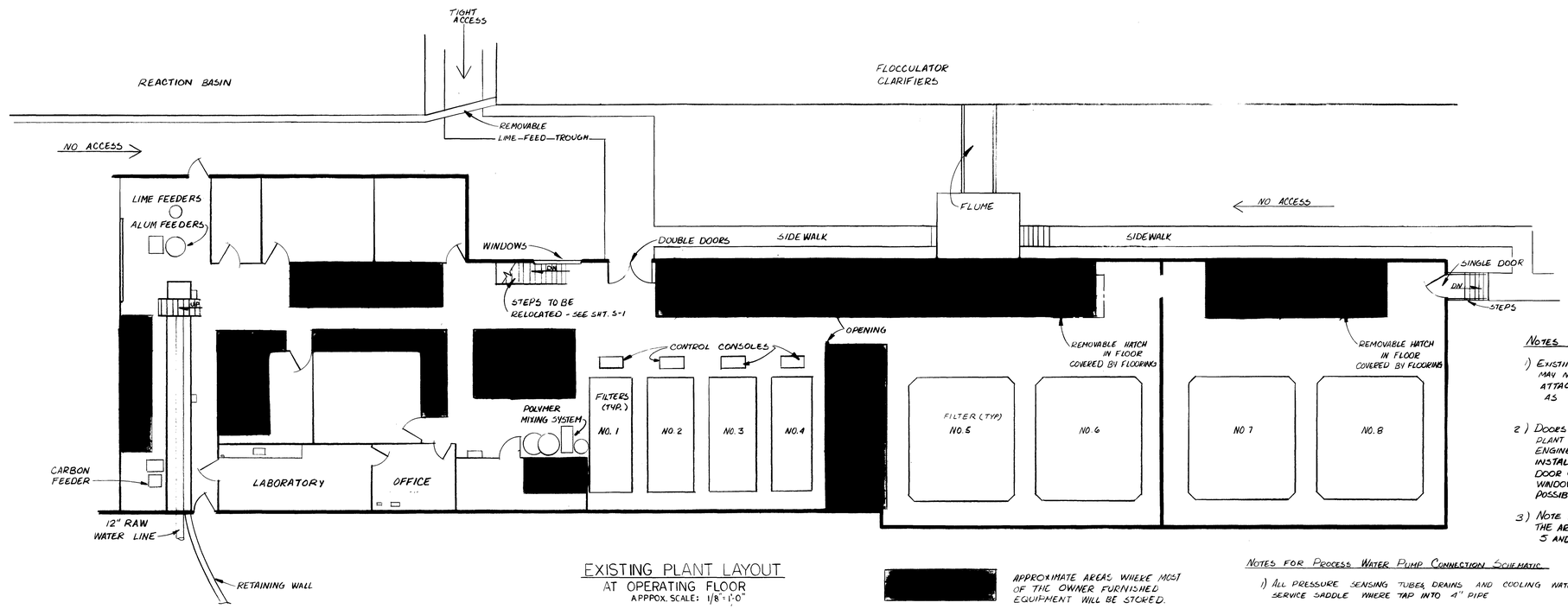
SHEET NO. M-1

1-3-1

DRAWING NUMBER

DRAWING NUMBER

DRAWING NUMBER



EXISTING PLANT LAYOUT
AT OPERATING FLOOR
APPROX. SCALE: 1/8" = 1'-0"

APPROXIMATE AREAS WHERE MOST OF THE OWNER FURNISHED EQUIPMENT WILL BE STORED.

Notes on Access -

1) Existing roof trusses and piping may not be utilized for lifting. All attachments to existing structure as approved by engineer.

2) Doors and windows in the existing plant may be removed as approved by the engineer to facilitate movement for installation of equipment. Window and door openings must be covered and the windows and doors reglazed as quickly as possible. Work to be at contractor's expense.

3) Note lack of access in filter gallery between the area at filters 1 to 4 and that at filters 5 and 6.

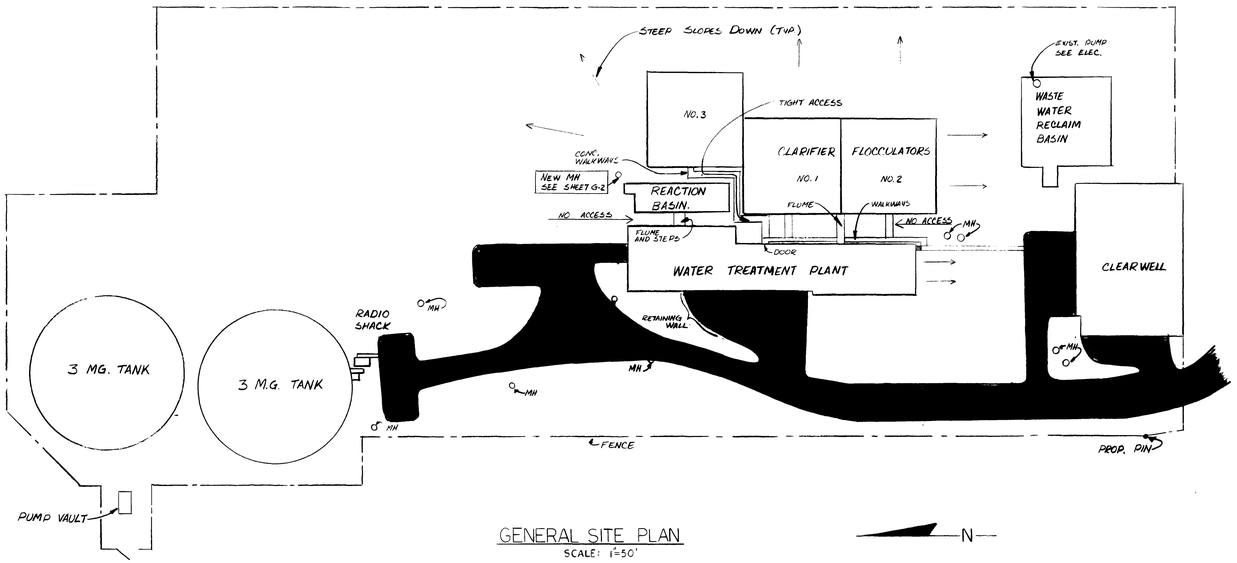
Notes for Process Water Pump Connection Schematic

1) All pressure sensing tubes, drains and cooling water lines to be copper. Use service saddle where tap into 4" pipe

2) Provide all pressure sensing tubes and cooling water lines with shutoff corp stop and union at equipment and pipe connections. Drain valves at low points.

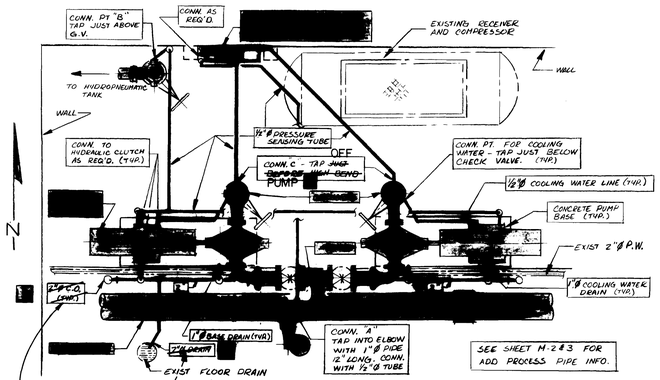
3) Connect drains with adaptors as required.

4) This is a schematic only - field run as required by equipment, provide supports. Minimum headroom = 8'-0". No pipe on floor except drains - 2" above floor.



GENERAL SITE PLAN
SCALE: 1"=50'

N



MECHANICAL DETAIL
PROCESS WATER PUMP CONNECTIONS SCHEMATIC DRAWING — NTS.

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS
PIPING AND MISCELLANEOUS IMPROVEMENTS

GENERAL SITE PLAN
EXISTING PLANT LAYOUT
MECHANICAL DETAIL

Date	Ch'k'd.	Revision
3/80	BOD	RECORD DRAWINGS

Designed by: BOD
Drawn by: GLS
Checked by: BOD
Approved by: JDR
Date: APRIL 1979
Scale: AS NOTED

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
CDM environmental engineers, scientists, planners, & management consultants

SHEET NO. G-3

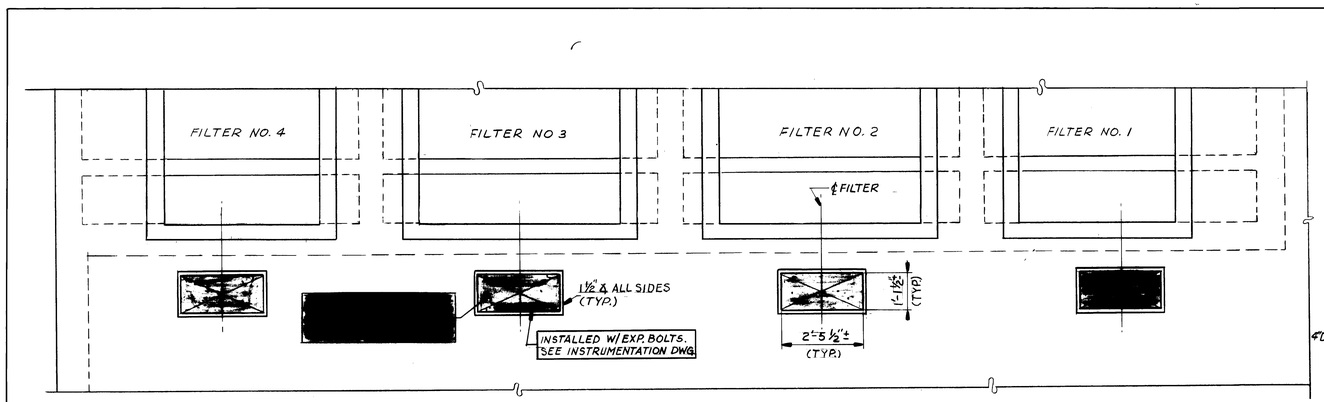
PROJECT MANAGER Approved by: [illegible] Date: 5/4/79
PROJECT ENGINEER Approved by: RB OLD Date: 5/4/79
PLUMBING Approved by: Date:
HVAC Approved by: Date:
INSTRUMENTATION Approved by: Date:
ELECTRICAL Approved by: Date:
STRUCTURAL Approved by: Date:
ARCHITECTURAL Approved by: Date:

DRAWING NUMBER

DRAWING NUMBER

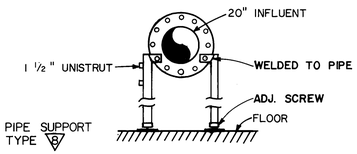
DRAWING NUMBER

1-3-1

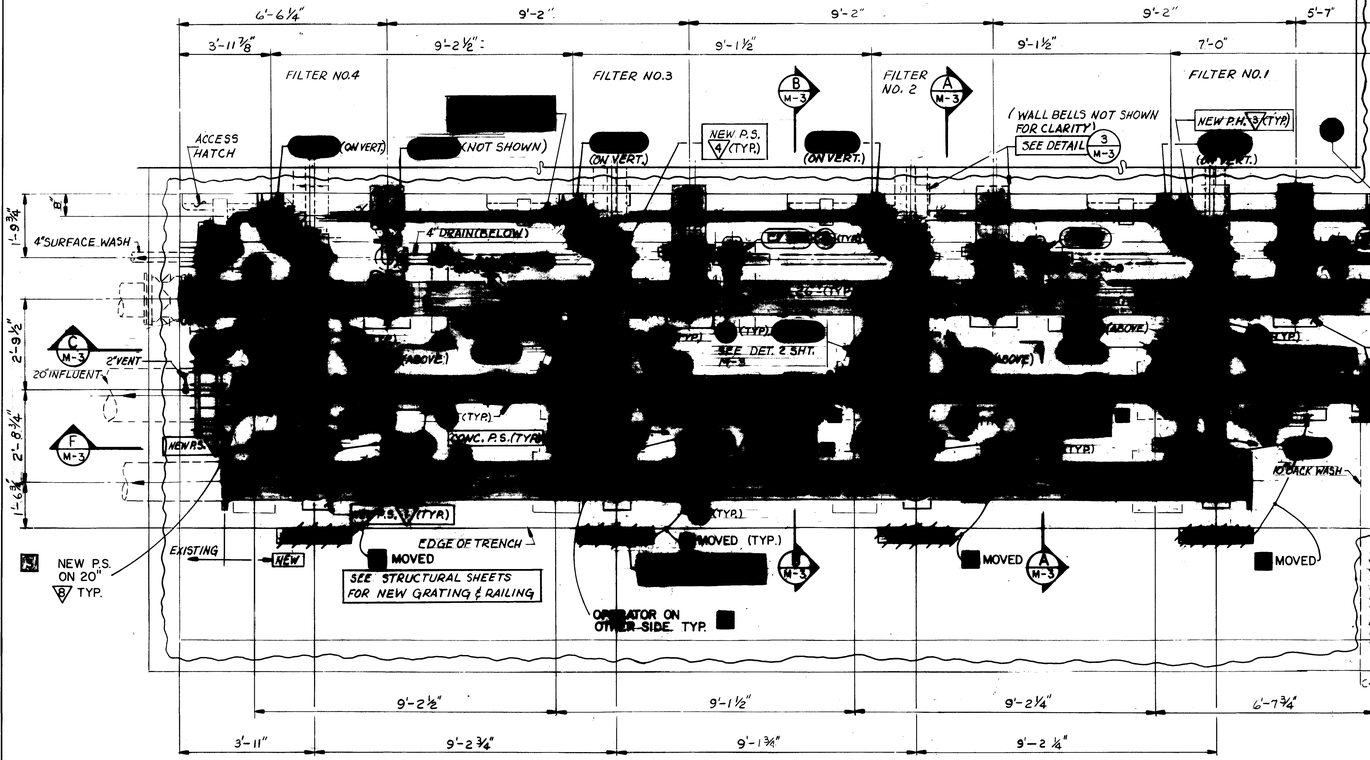


PLAN FIRST FLOOR

Scale 1/2" = 1'-0"

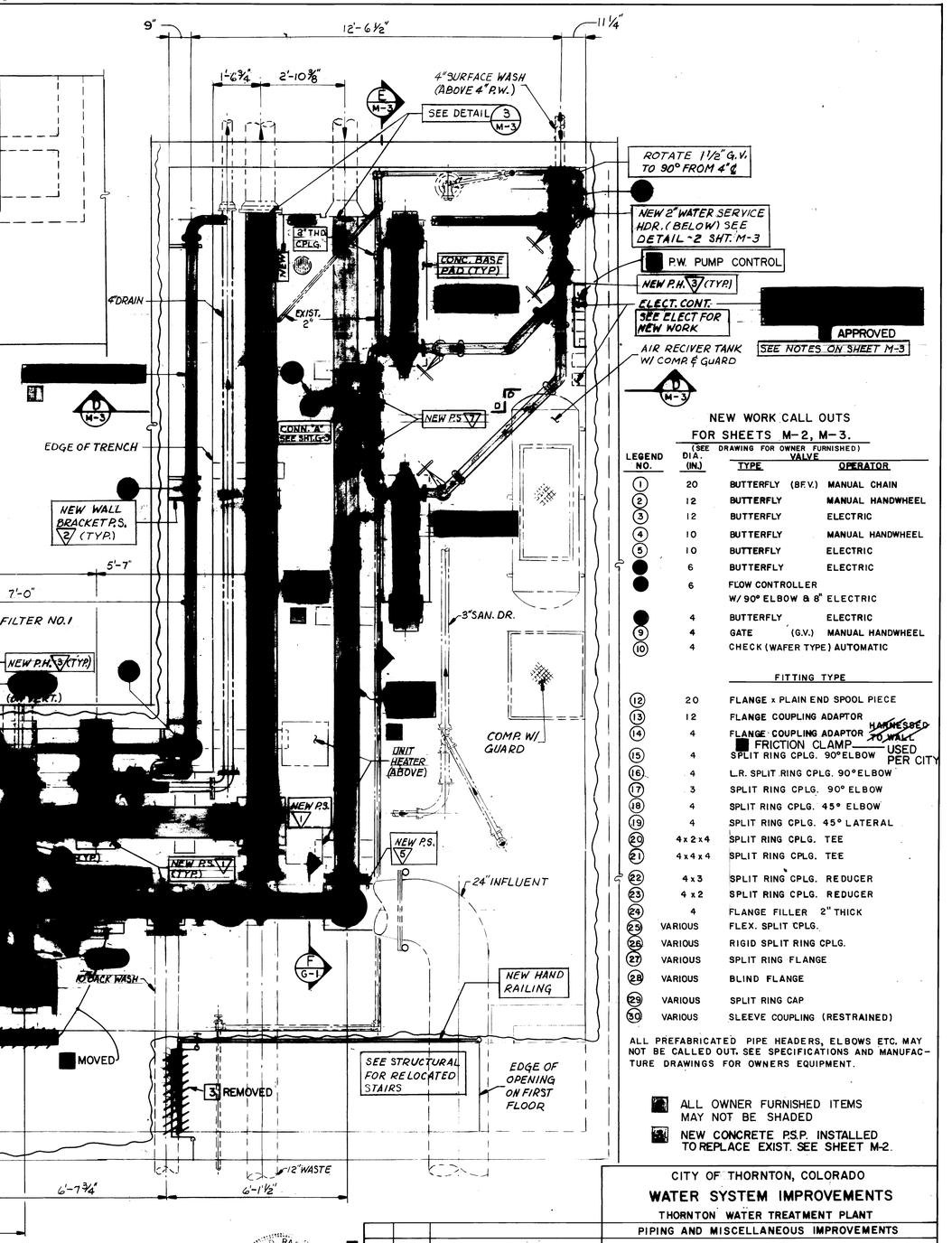


3 PIPE SUPPORT TYPE B



PLAN BASEMENT

Scale 1/2" = 1'-0"



NEW WORK CALL OUTS FOR SHEETS M-2, M-3.

(SEE DRAWING FOR OWNER FURNISHED)

LEGEND NO.	DIA. (IN.)	VALVE TYPE	VALVE OPERATOR
1	20	BUTTERFLY (B.F.V.)	MANUAL CHAIN
2	12	BUTTERFLY	MANUAL HANDWHEEL
3	12	BUTTERFLY	ELECTRIC
4	10	BUTTERFLY	MANUAL HANDWHEEL
5	10	BUTTERFLY	ELECTRIC
●	6	BUTTERFLY	ELECTRIC
●	6	FLOW CONTROLLER W/ 90° ELBOW & 8"	ELECTRIC
●	4	BUTTERFLY	ELECTRIC
9	4	GATE (G.V.)	MANUAL HANDWHEEL
10	4	CHECK (WAFER TYPE)	AUTOMATIC

		FITTING TYPE
12	20	FLANGE x PLAIN END SPOOL PIECE
13	12	FLANGE COUPLING ADAPTOR
14	4	FLANGE COUPLING ADAPTOR ~~HARNESSED TO WALL~~
■	4	FRICTION CLAMP- SPLIT RING CPLG. 90° ELBOW USED PER CITY
15	4	L.R. SPLIT RING CPLG. 90° ELBOW
16	4	SPLIT RING CPLG. 90° ELBOW
17	3	SPLIT RING CPLG. 90° ELBOW
18	4	SPLIT RING CPLG. 45° ELBOW
19	4	SPLIT RING CPLG. 45° LATERAL
20	4x2x4	SPLIT RING CPLG. TEE
21	4x4x4	SPLIT RING CPLG. TEE
22	4x3	SPLIT RING CPLG. REDUCER
23	4x2	SPLIT RING CPLG. REDUCER
24	4	FLANGE FILLER 2" THICK
25	VARIOUS	FLEX. SPLIT CPLG.
26	VARIOUS	RIGID SPLIT RING CPLG.
27	VARIOUS	SPLIT RING FLANGE
28	VARIOUS	BLIND FLANGE
29	VARIOUS	SPLIT RING CAP
30	VARIOUS	SLEEVE COUPLING (RESTRAINED)

ALL PREFABRICATED PIPE HEADERS, ELBOWS ETC. MAY NOT BE CALLED OUT. SEE SPECIFICATIONS AND MANUFACTURE DRAWINGS FOR OWNERS EQUIPMENT.

■ ALL OWNER FURNISHED ITEMS MAY NOT BE SHADED

■ NEW CONCRETE P.S.P. INSTALLED TO REPLACE EXIST. SEE SHEET M-2.

Approved by:	Date	Name
Structural		
Electrical		
HVAC		
Project Engineer	9/78	WJP
Project Manager	9/78	CCR

■	3/80	BOD	RECORD DRAWINGS
■	5/79	BOD	ADDENDUM
■	4/79	BOD	REVISED FOR REBIDDING
	Date	Ch'k'd	Revision

Designed by: BOD CB
Drawn by: CB GS
Checked by: BOD
Approved by:
Date: SEPT. 1978
Scale: AS NOTED

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

NEW PIPING-PLAN

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
CDM
environmental engineers, scientists, planners & management consultants

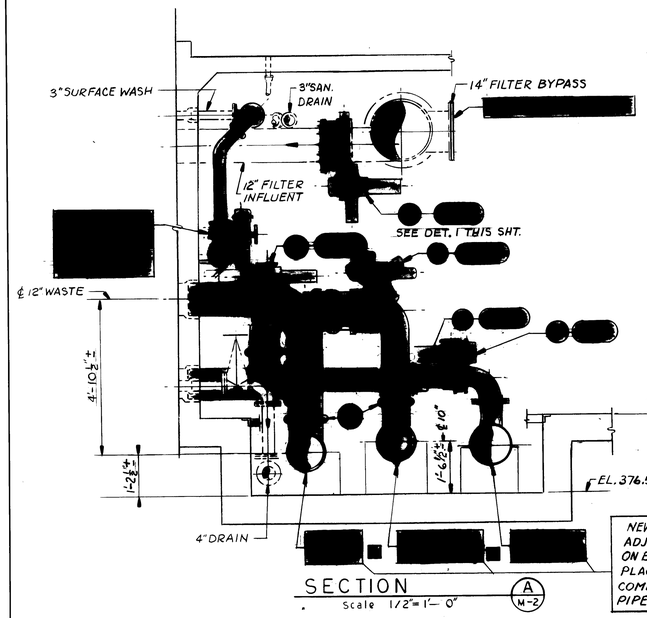
SHEET NO. M-2

1-3-1

DRAWING NUMBER

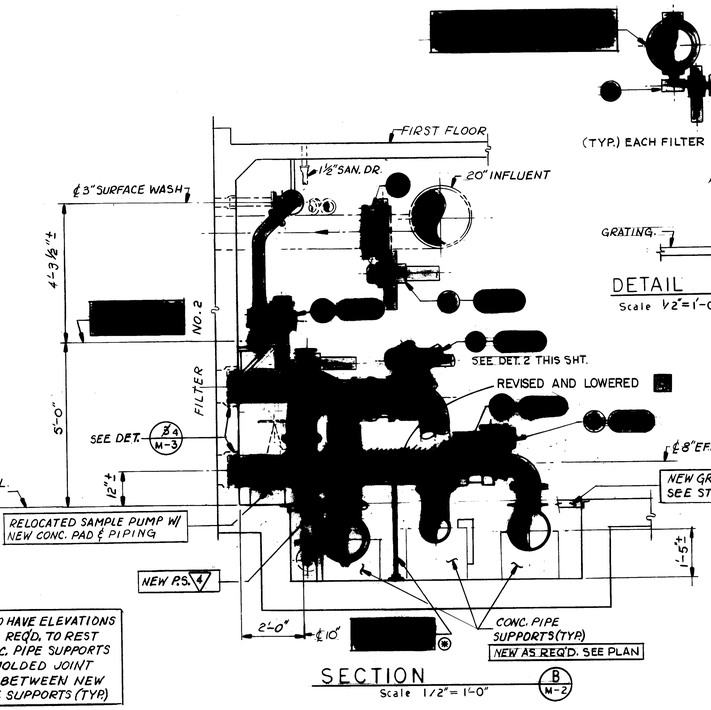
DRAWING NUMBER

DRAWING NUMBER



SECTION
Scale 1/2"= 1'-0" (A M-2)

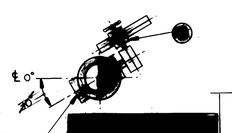
NEW PIPES TO HAVE ELEVATIONS ADJUSTED AS REQ'D. TO REST ON EXIST. CONC. PIPE SUPPORTS PLACE PRE MOLDED JOINT COMPOUNDS BETWEEN NEW PIPES & EXIST. SUPPORTS (TYP.)



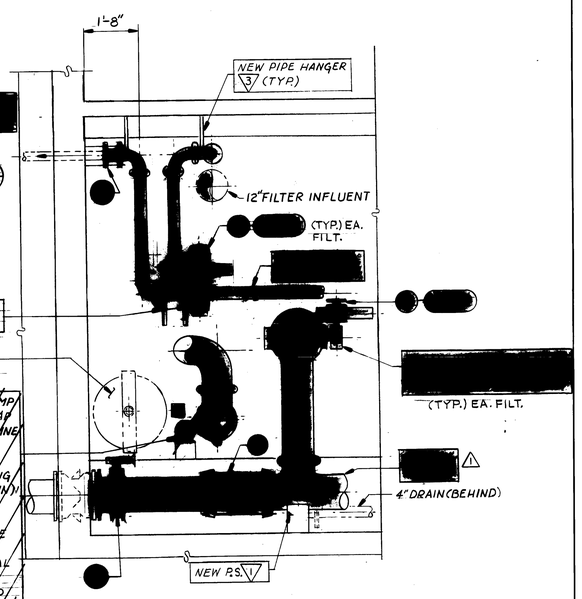
SECTION
Scale 1/2"= 1'-0" (B M-2)

INSTALLATION TYPICAL FOR ALL FILTERS

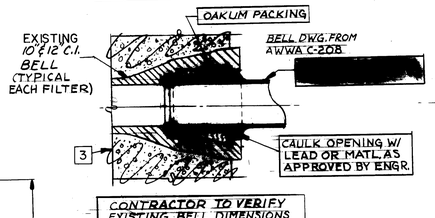
DETAIL
Scale 1/2"=1'-0" (1 M3)



DETAIL
Scale 1/2"=1'-0" (2 M-2)

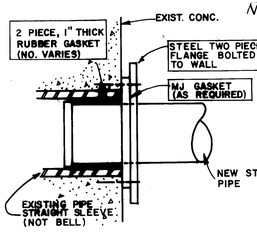


SECTION
Scale 1/2"=1'-0" (C M-2)

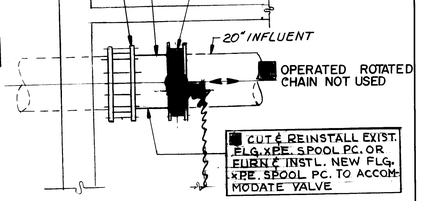


NEW STEEL PIPE CONNECTIONS TO EXISTING C.I. PIPE BELLS (*)

DETAIL - EXIST PIPE
N.T.S. (3 M-2 / 5 M-3)



DETAIL AT WALL
N.T.S. (4 M-3)

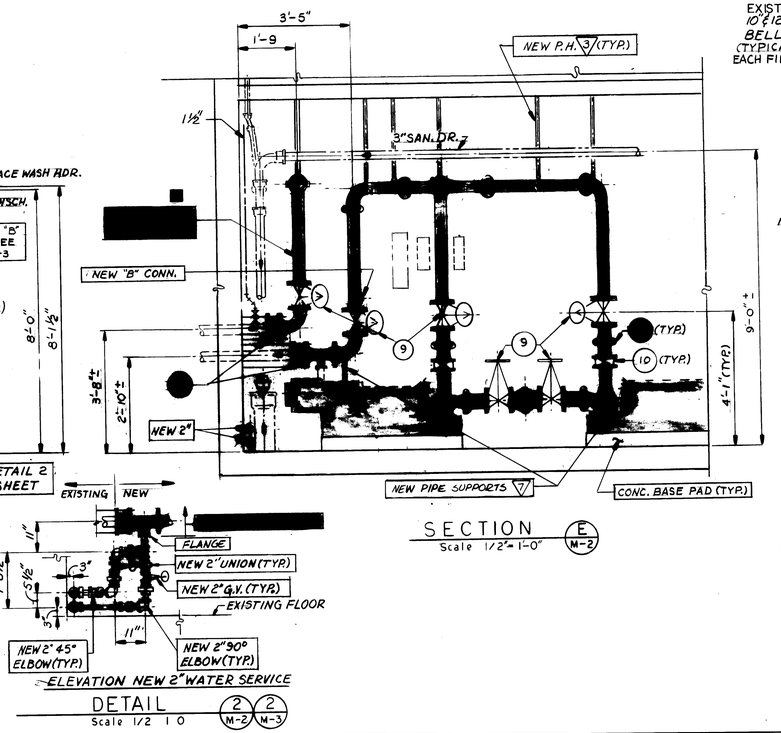


SECTION
Scale 1/2"=1'-0" (F M-2)

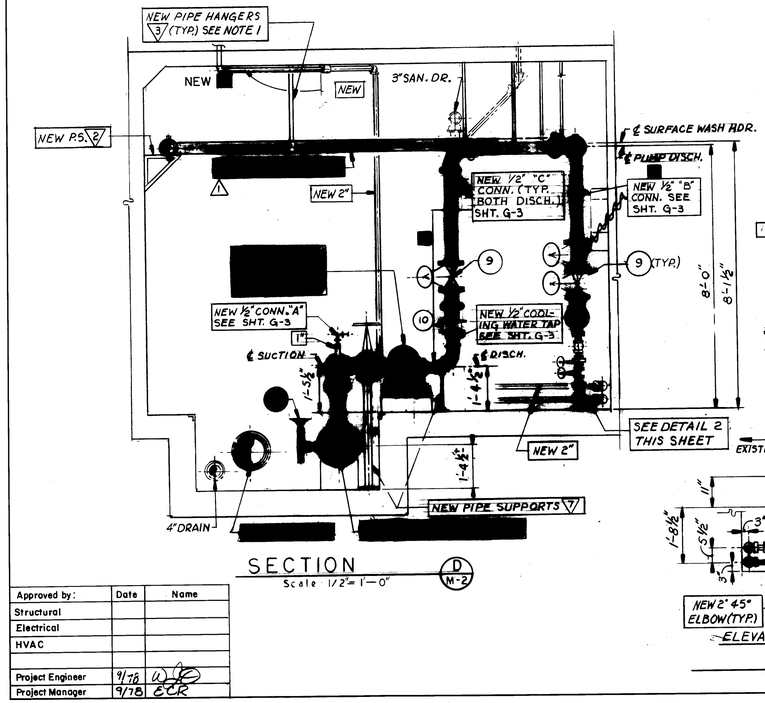
NOTES:

1. NEW PIPE HANGERS AND PIPE SUPPORTS LOCATION ARE APPROXMATE. SEE SHEET G-1 ATTACH PIPE HANGARS TO EXISTING CONCRETE AS APPROVED BY ENGINEER
2. DUE TO VARIATIONS OF FILTER DIMENSIONS DO NOT SCALE THESE SHEETS. CONTRACTOR TO FIELD VARIFY ALL DIMENSIONS AND LOCATIONS. ALL EXISTING DIMENSIONS ARE INTERPERTATED AS + OR -
3. EVERYTHING SHOWN M-2 AND M-3 IS EXISTING UNLESS OTHERWISE NOTED.
4. ALL ITEMS SHADED OR INDICATED ■ ARE TO BE SUPPLIED BY THE OWNER AND INSTALLED BY THE CONTRACTOR. ALL OTHER NEW ITEMS ARE TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

■ NOT ALL OWNER FURNISHED ITEMS CALLED OUT. SEE SPEC. SECTION 17, ADDENDUM NO. 1 ITEM 12.



SECTION
Scale 1/2"=1'-0" (E M-2)



SECTION
Scale 1/2"=1'-0" (D M-2)

ELEVATION NEW 2" WATER SERVICE

DETAIL
Scale 1/2 1 0 (2 M-2 / 2 M-3)

Approved by:	Date	Name
Structural		
Electrical		
HVAC		
Project Engineer	9/78	
Project Manager	9/78	ECR

3/80	BOD	RECORD DRAWINGS
5/79	BOD	ADDENDUM
4/79	BOD	REVISED FOR REBIDDING
Date	Ch'k'd	Revision

Designed by: BOD/CB
Drawn by: CB,GS
Checked by: BOD
Approved by:
Date: SEPT. 1978
Scale: AS NOTED

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

NEW PIPING-SECTIONS AND DETAILS

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
environmental engineers, scientists, planners & management consultants

SHEET NO. M-3

1-3-1

DRAWING NUMBER

DRAWING NUMBER

DRAWING NUMBER

ARCHITECTURAL	HVAC	PLUMBING	PROJECT ENGINEER	PROJECT MANAGER	
Approved by:	Approved by:	Approved by:	Approved by:	Approved by:	
Date:	Date:	Date:	Date:	Date:	
STRUCTURAL	ELECTRICAL	INSTRUMENTATION			
Approved by:	Approved by:	Approved by:			
Date:	Date:	Date:			

NEW HANDRAIL (ALIGN SEE SHT M-2)

EXIST FIRST FLOOR

3 4 RAILS, 12" o.c.

3 NEW 12" STEEL CHANNEL WITH REMOVABLE 9" TREADS SIMILAR TO GRATING. FASTEN TO WALL ON ONE SIDE.

3 CUT EXIST STAIR CHANNEL FLUSH WITH NEW CHANNEL BEING USED PLATE TO CUT EDGE AND BOLT TO NEW LONG PIPE EACH SIDE.

SECTION A
3 NTS
S-1

DETAIL B
SCALE 3"=1'-0"
S-1

DETAIL C
SCALE 3"=1'-0"
S-1

DETAIL D
SCALE 3"=1'-0"
S-1

DETAIL E
SCALE 3"=1'-0"
S-1

DETAIL F
SCALE 3"=1'-0"
S-1

DETAIL G
SCALE 3"=1'-0"
S-1

DETAIL H
SCALE 1"=1'-0"
S-1

SECTION 1
SCALE 1"=1'-0"
S-1

SECTION K
SCALE 1"=1'-0"
S-1

3 2x2x1/4 x MAX 4.5' SPAN INTERMEDIATE SUPPORT W/ ADJ. VERT. SUPPORTS

GRATING STR. POSSIBLE CONTACT WITH PIPE HARNESS (TYP)

GRATING STR. CONTACT W/ PIPE HARNESS (TYP)

PLACE GRATING UNDER PIPES & CUT OUT OPNGS FOR PIPES, VALVES & FITTINGS ~~BANDS ALL EDGES OF CUT GRATING W/ BAR EQUAL IN SIZE~~ TO GRATING MAIN MEMBER.

EXIST EDGE OF CONCRETE

PLAN
SCALE 1/2 = 1'-"

3 NEW STAIRS

3 ENTIRE SHEET REVISED

3 ALL GRATING IS 9" WIDE, 2" DEEP, 9/2" LONG ± REMOVABLE SECTIONS OF GALVANIZED STEEL SET ON LEVEL OF CONC. WALKWAY.

DETAIL:
3 INDIVIDUAL SUPPORT AT CORNER POINTS & BASE OF INTERIOR ∠

4"x4"x1/4" PLATE
3/4"x7/8" NUTS & ROD (ADJ.)
1 1/4" PIPE
4"x4"x1/4" PLATE
EXIST. FLOOR
WELD

NOTES:
1. ALL FASTENERS SHALL BE 3/8" GALV. BOLTS W/NUTS & WASHERS OR 3/8" ϕ EXP. BOLTS
2. ALL GRATING SHALL BE 1" x 1/4" STEEL, CUT IN REMOVABLE SECTIONS NOT TO EXCEED 2'-0" IN WIDTH
3. ALL RAILING, GRATING, SUPPORTS, ETC. THIS SHEET ARE NEW, UNLESS NOTED.

3	3/80	BOD	RECORD DRAWINGS
2	5/79	BOD	ADDENDUM
1	4/79	BOD	REVISED FOR REBIDDING
Date	Ch'k'd.		Revision

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

NEW GRATING AND STAIR DETAILS

Designed by: RSC
Drawn by: DA CB
Checked by: BOD
Approved by:
Date: SEPT. 1978
Scale: AS NOTED

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1660 South Albion Street
Denver, Colorado 80222
CDM
environmental engineers, scientists, planners, & management consultants

SHEET NO. S-1

1-3-1

TAGGING LEGEND

FIRST LETTER (USED AS)		SUCCEEDING LETTER (USED AS)
A	ANALYSIS (NOTE 1)	ALARM
B	BURNER (FLAME)	
C	CONTROL	CONTROLLER (CONTROL)
DP	DIFFERENTIAL PRESSURE	
E	ELECTRIC VOLTAGE	ELEMENT (MEASURING)
F	FLOW	RATIO
H	HAND (MANUALLY INITIATED)	HIGH
I	CURRENT (ELECTRICAL)	INDICATOR
K	TIME OR TIME SCHEDULE	STATION
L	LEVEL	LIGHT (PILOT) OR LOW
MP	MULTIPLEXER	
P	PRESSURE OR VACUUM	
Q	QUANTITY OR EVENT	TOTALIZER
R	RUNNING (STATUS)	RECORDER
S	SPEED	SWITCH OR SHUT DOWN
T	TEMPERATURE	TRANSMITTER (NOTE 3)
V	VALVE	VALVE
W	WEIGHT, FORCE, TORQUE	WELL
X	SPECIAL (NOTE 2)	SPECIAL (NOTE 2)
Y		COMPUTING (NOTE 2)
Z	POSITION	

NOTES

1. TYPE OF ANALYSIS TO BE DEFINED OUTSIDE BALLOON (SEE INSTRUMENT SYMBOLS)
2. AS DEFINED IN INSTRUMENTATION TABULATIONS
3. ALL TRANSMITTERS WITH INDICATORS
4. TYPICAL INSTRUMENT TAG NUMBER

FT-301

LEGEND — LOOP IDENTIFICATION

INSTRUMENT SYMBOLS

- LOCALLY MOUNTED
- ONE DEVICE WITH TWO OR MORE FUNCTIONS
- [illegible]
- XX PANEL MOUNTED

MCP - MAIN CONTROL PANEL
FCC - FILTER CONTROL CONSOLE

- REAR OF PANEL MOUNTED OR BACK MOUNTED

CABINET/CONSOLE SYMBOLS

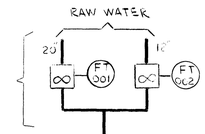
- PILOT LIGHT
- PUSHBUTTON (LIGHTED)
- SELECTOR SWITCH

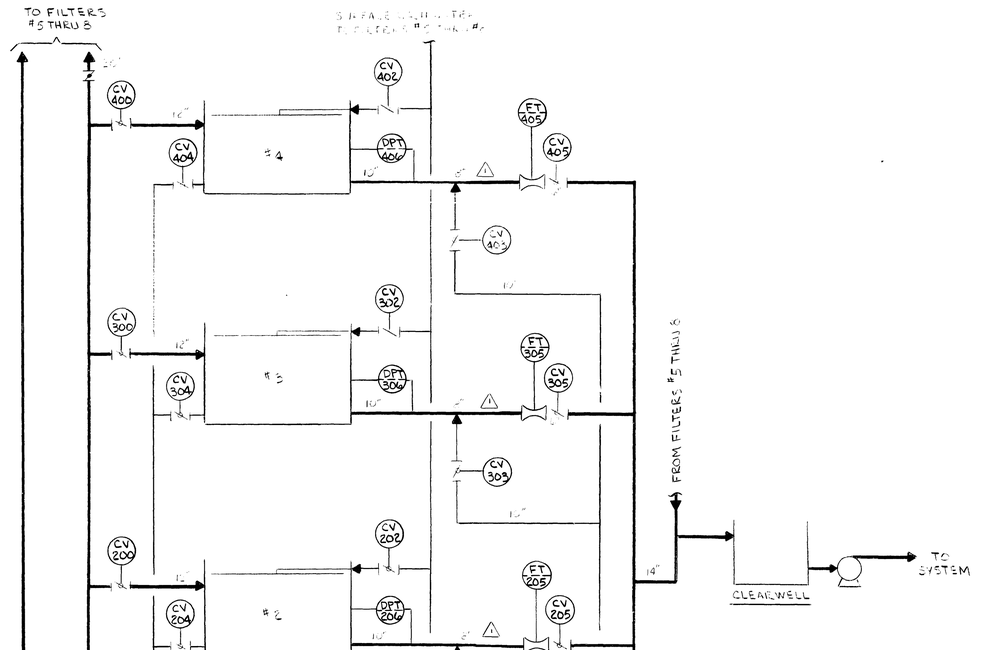
MISCELLANEOUS SYMBOLS

- MAIN PROCESS
- MINOR PIPING OR MECHANICAL CONNECTION
- ELECTRIC [illegible]
- 120V 60HZ POWER
- ANALOG SIGNAL WIRE
- AIR SUPPLY
- P PURGING
- SW SWITCH
- BW BACKWASH CONTROL INTERLOCK CIRCUIT
- M MOTOR OR MCC
- DRAIN
- LIGHTNING / SURGE PROTECTION

PRIMARY FLOW SYMBOLS

- VENTURI FLOW TUBE
- [illegible] WITH [illegible]
- PROPELLER FLOW METER
- T TRAP
- [illegible]
- CENTRIFUGAL PUMP





3	3/80	BOD	RECORD DRAWINGS
1	4/79	BOD	REVISED FOR REBIDDING
Date	Ch'k'd.		Revision

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

PROCESS INSTRUMENTATION— SCHEMATIC AND LEGEND

Designed by: [illegible]
Drawn by: [illegible]
Checked by: [illegible]
Approved by: [illegible]
Date: SEPT. 1978
Scale: NONE

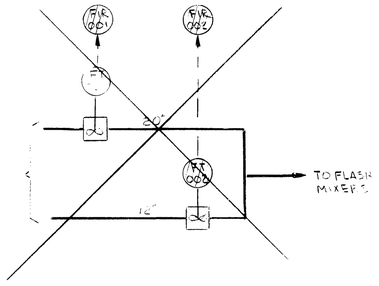
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Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222

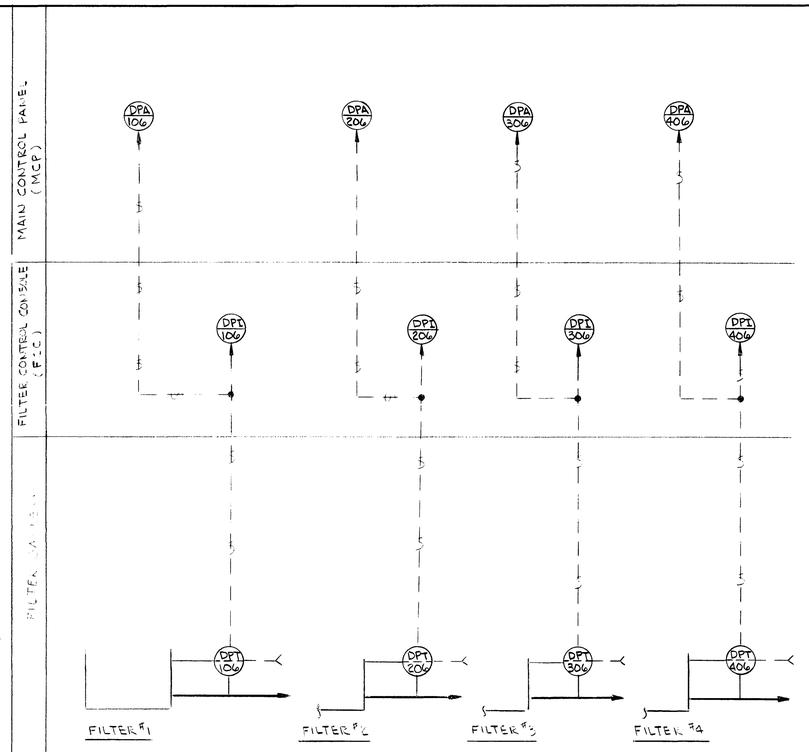
CDM
environmental engineers, scientists, planners, & management consultants

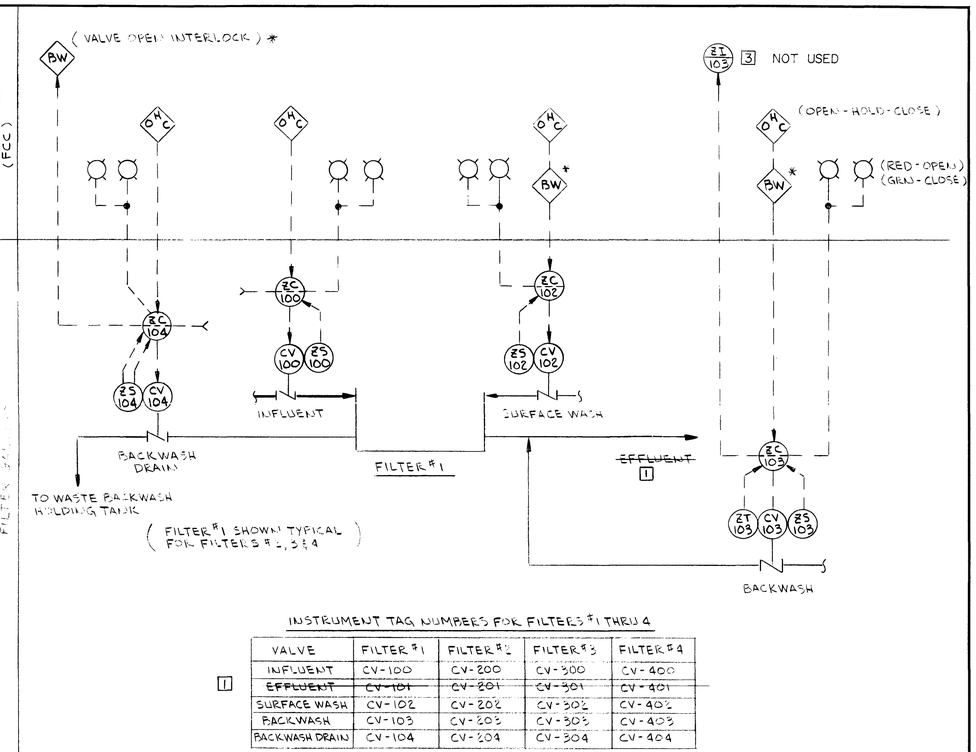
SHEET NO. I-1

ARCHITECTURAL — Approved by: — Date:
STRUCTURAL — Approved by: — Date:
ELECTRICAL — Approved by: — Date:
INSTRUMENTATION — Approved by: [illegible] — Date: 9/27/78
HVAC — Approved by: — Date:
PLUMBING — Approved by: — Date:
PROJECT ENGINEER — Approved by: — Date: / /
PROJECT MANAGER — Approved by: — Date: / /

MAKEPEACE P-2565

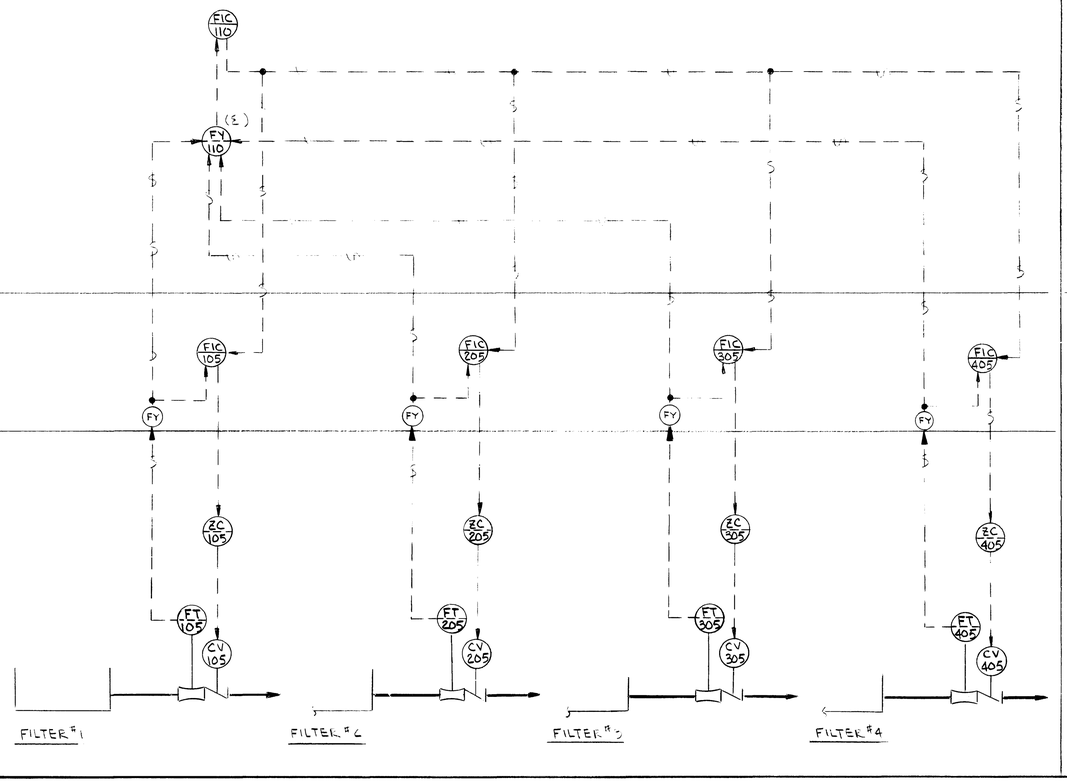


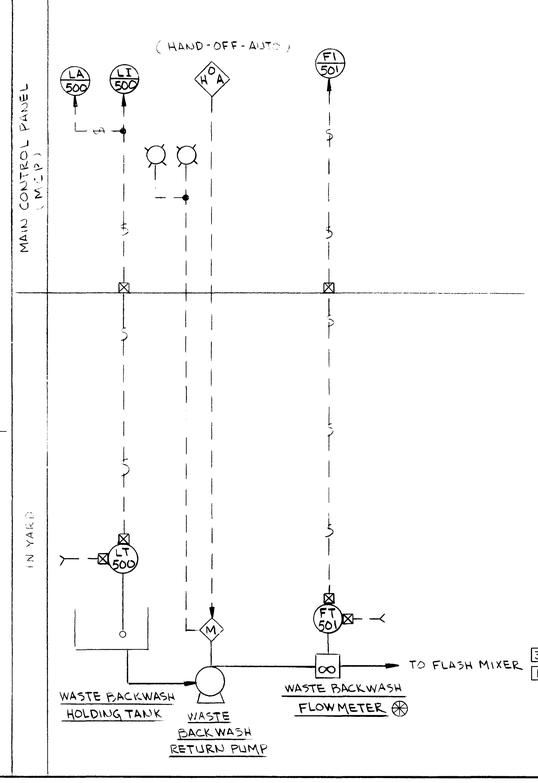




INSTRUMENT TAG NUMBERS FOR FILTERS #1 THRU 4

	VALVE	FILTER #1	FILTER #2	FILTER #3	FILTER #4
1	INFLUENT	CV-100	CV-200	CV-300	CV-400
	~~EFFLUENT~~	~~CV-101~~	~~CV-201~~	~~CV-301~~	~~CV-401~~
	SURFACE WASH	CV-102	CV-202	CV-302	CV-402
	BACKWASH	CV-103	CV-203	CV-303	CV-403
	BACKWASH DRAIN	CV-104	CV-204	CV-304	CV-404





* - FOR USE WHEN BACKWASH PUMPS ARE OPERATED (ON MANUAL)

3	3/80	BOD	RECORD DRAWINGS
1	4/79	BOD	REVISED FOR REBIDDING
	Date	Ch'k'd.	Revision

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

PROCESS INSTRUMENTATION— LOOP DIAGRAMS

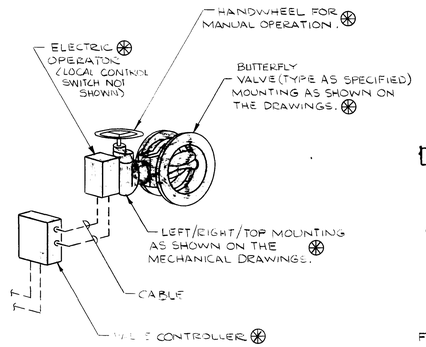
Designed by: [illegible]
Drawn by: [illegible]
Checked by: [illegible]
Approved by:
Date: SEPT. 1978
Scale: NONE

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Denver, Colorado 80222
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environmental engineers, scientists, planners, & management consultants

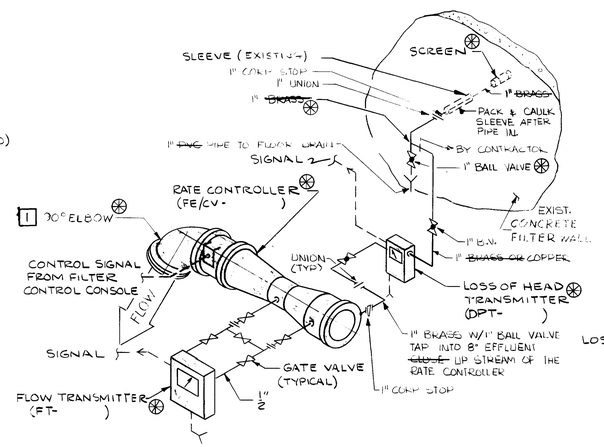
SHEET NO. I-2

HVAC / PLUMBING / PROJECT ENGINEER / PROJECT MANAGER / ARCHITECTURAL / STRUCTURAL / ELECTRICAL / INSTRUMENTATION — Approved by: / Date:

MAKEPEACE P-2565

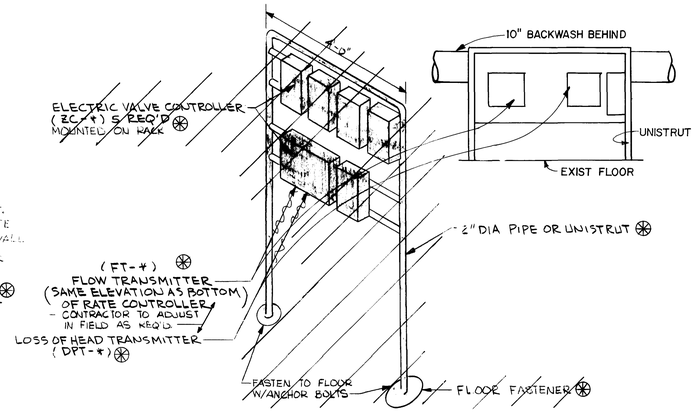


VALVE OPERATOR
NTS



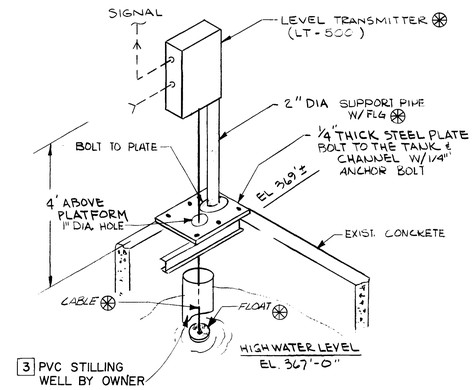
FILTER EFFLUENT INSTRUMENTATION AND TRANSMITTERS
NTS
(TYPICAL 4 PLACES)

3 REVISED



3 FOR REVISED INSTRUMENT RACK SEE HYDROLOGICS DRAWINGS

INSTRUMENT RACK
(TYPICAL 4 PLACES)

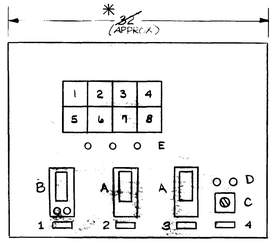


DETAIL
LEVEL TRANSMITTER IN WASTE BACKWASH HOLDING TANK PUMP CHAMBER

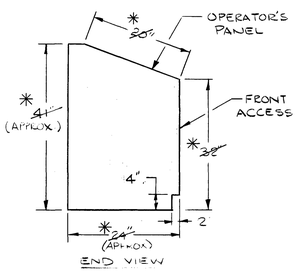
2 SEE NOTE ITEM NO. 14 ADDENDUM NO. 1

SEE NOTES ON SHEET I-1

⊛ FURNISHED BY OWNER INSTALLED BY CONTRACTOR (SHADED)



OPERATOR'S PANEL



END VIEW

MAIN CONTROL PANEL ⊛
ALL ITEMS BELOW ARE MOUNTED ON CONSOLE BY OWNER

FASTEN PANEL TO FLOOR W/ 3/8" ANCHOR BOLTS

LEGEND

A INDICATOR (ELECTRONIC)
B INDICATOR/CONTROLLER
C. [illegible] W/ HAND-OFF-AUTO
D. STATUS LIGHTS: RED-RUN GREEN-STOP
E. [illegible] STATION:

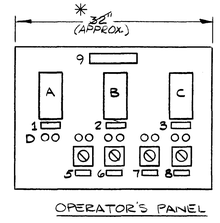
NAMEPLATES (WITHOUT TAG NOS.)

[illegible]
WASTE BACKWASH HOLDING TANK - TANK LEVEL ALARM
WASTE BACKWASH HOLDING TANK PUMP

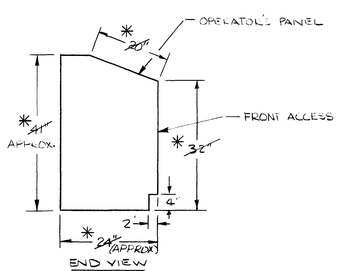
ANNUNCIATOR

1 FILTER NO. 1 - LOSS OF HEAD
2 FILTER NO. 2 - LOSS OF HEAD
3 FILTER NO. 3 - LOSS OF HEAD
4 FILTER NO. 4 - LOSS OF HEAD
5-7 SPARES
8 WASTE BACKWASH HOLDING TANK HI/LO

3 * FOR REVISED SIZES AND LAYOUTS SEE HYDROLOGICS DRAWINGS



OPERATOR'S PANEL



END VIEW

FILTER CONTROL CONSOLE ⊛
4 - REQUIRED
ALL ITEMS BELOW ARE MOUNTED ON CONSOLE BY OWNER

LEGEND

	DEVICE	FILTER 1	FILTER 2	FILTER 3	FILTER 4
A	FLOW INDICATING CONTROLLER	FIC-105	-205	-305	-405
B	LOSS OF HEAD INDICATOR	DPI-106	-206	-306	-406
C	VALVE POSITION INDICATOR	ZI-103	-203	-303	-403

BACKWASH SUPPLY
D. STATUS LIGHTS: RED-OPEN, GREEN-CLOSED
E. SELECTOR SWITCH (3-POSITION): OPEN-CLOSED-OFF

NAMEPLATES
1. FILTER RATE OF FLOW
2. FILTER LOSS OF HEAD
3. BACKWASH VALVE POSITION
1 ~~4. FILTER EFFLUENT SHUT-OFF VALVE~~
5. FILTER INFLUENT VALVE
6. FILTER BACKWASH DRAIN VALVE
7. FILTER SURFACE WASH VALVE
8. FILTER BACKWASH VALVE
9. FILTER NO. _ (1 THRU 4)

FASTEN CONSOLE TO NEW SUPPORT PLATE FASTENED OVER EXISTING OPENING IN FLOOR. USE 3/8" ANCHOR BOLTS. BRACE UNIT AS REQ'D TO BE STEADY ON ITS SUPPORT.

3	3/80	BOD	RECORD DRAWINGS
2	5/79	BOD	ADDENDUM
1	4/79	BOD	REVISED FOR REBIDDING
Date	Ch'k'd.		Revision

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS
THORNTON WATER TREATMENT PLANT
PIPING AND MISCELLANEOUS IMPROVEMENTS

PROCESS INSTRUMENTATION— INSTALLATION DETAILS AND PANELS

Designed by: [illegible]
Drawn by: LGW
Checked by: [illegible]
Approved by: _____
Date: SEPT. 1978
Scale: NONE

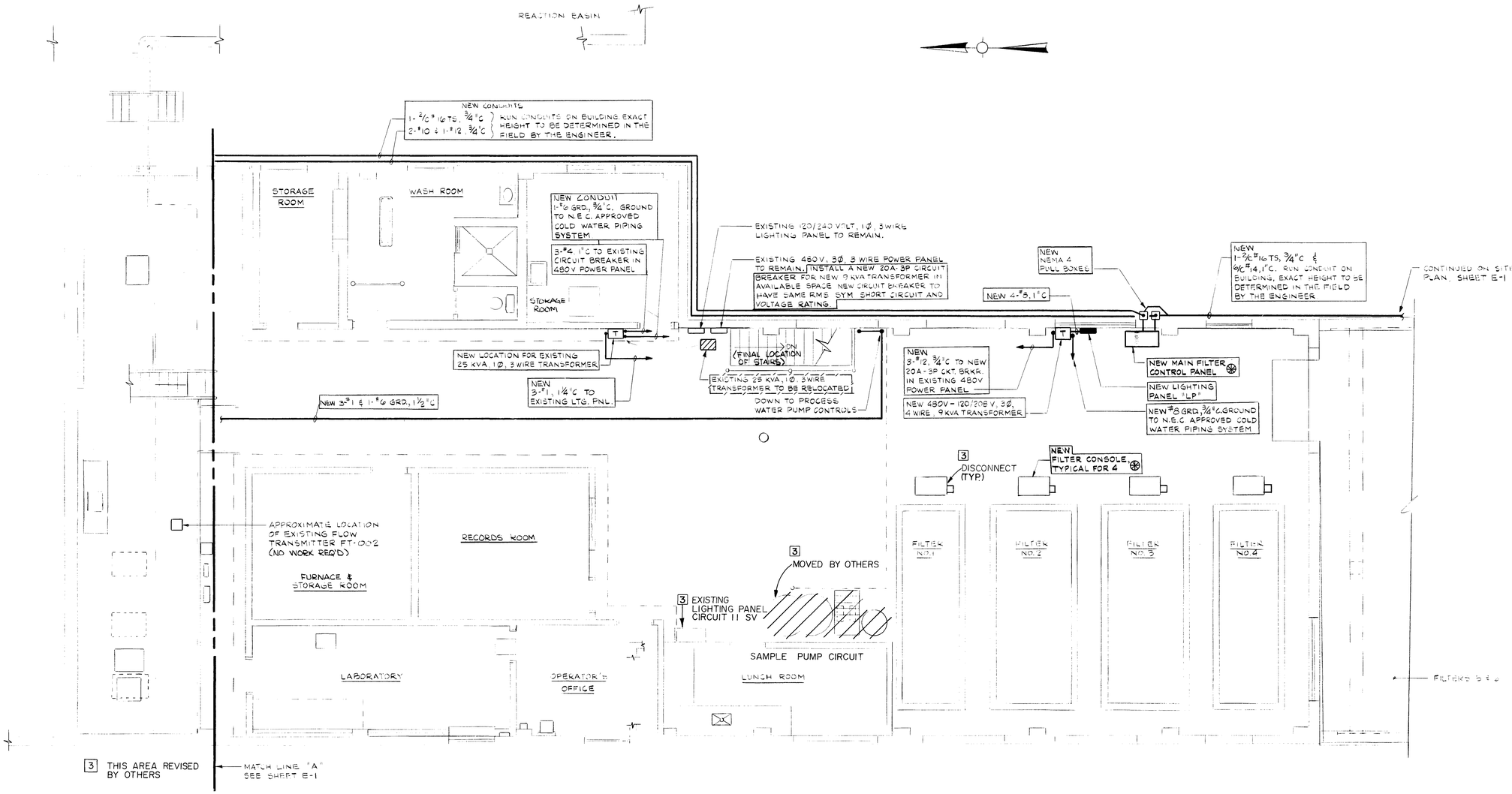
CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
CDM environmental engineers, scientists, planners, & management consultants

SHEET NO. I-3

ARCHITECTURAL Approved by: Date:
STRUCTURAL Approved by: Date:
ELECTRICAL Approved by: Date:
INSTRUMENTATION Approved by: R. Cox Date: 9/19
PLUMBING Approved by: Date:
HVAC Approved by: Date:
PROJECT ENGINEER Approved by: [illegible] Date: 9/18
PROJECT MANAGER Approved by: C.C.R. Date: 9/78

MAKEPEACE P-2565

ARCHITECTURAL	Approved by:	Date:	
STRUCTURAL	Approved by:	Date:	
ELECTRICAL	Approved by: R Calvin	Date: 9/78	
INSTRUMENTATION	Approved by:	Date:	
HVAC	Approved by:	Date:	
PLUMBING	Approved by:	Date:	
PROJECT ENGINEER	Approved by: [signature]	Date: 9/78	
PROJECT MANAGER	Approved by: E.C.R.	Date: 9/78	



OPERATING FLOOR PLAN
SCALE: 1/4"=1'-0"

3	3/80	BOD	RECORD DRAWINGS
1	4/79	BOD	REVISED FOR REBIDDING
	Date	Ch'k'd.	Revision

CITY OF THORNTON, COLORADO

WATER SYSTEM IMPROVEMENTS

THORNTON WATER TREATMENT PLANT

PIPING AND MISCELLANEOUS IMPROVEMENTS

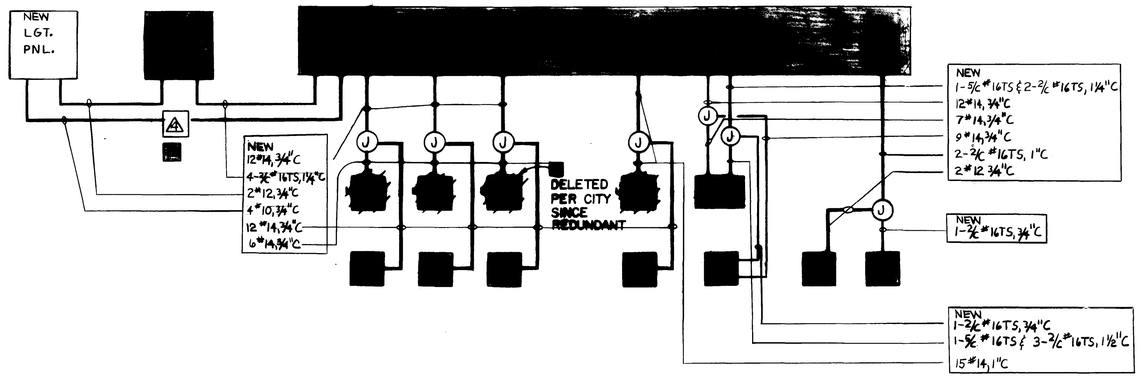
OPERATING FLOOR PLAN

Designed by: R P P
Drawn by: G P C
Checked by: R N C
Approved by: [signature]
Date: SEPTEMBER 1978
Scale: AS NOTED

CAMP DRESSER & McKEE INC.
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1660 South Albion Street
Denver, Colorado 80222
CDM environmental engineers, scientists, planners, & management consultants

SHEET NO. E-2

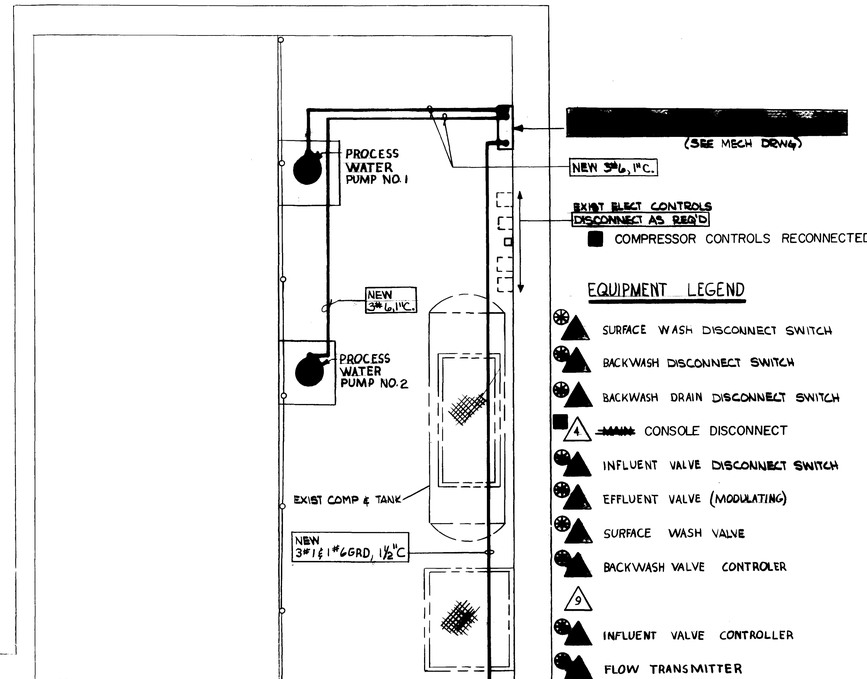
1-3-1



TYPICAL NEW FILTER WIRING DIAGRAM

N.T.S.
(4 FILTER CONSOLES REQ'D)

■ -ELIMINATED LOCAL DISCONNECTS ON PUMPS.
-ADD EXTERNAL MAIN POWER DISCONNECT ON CONSOLE

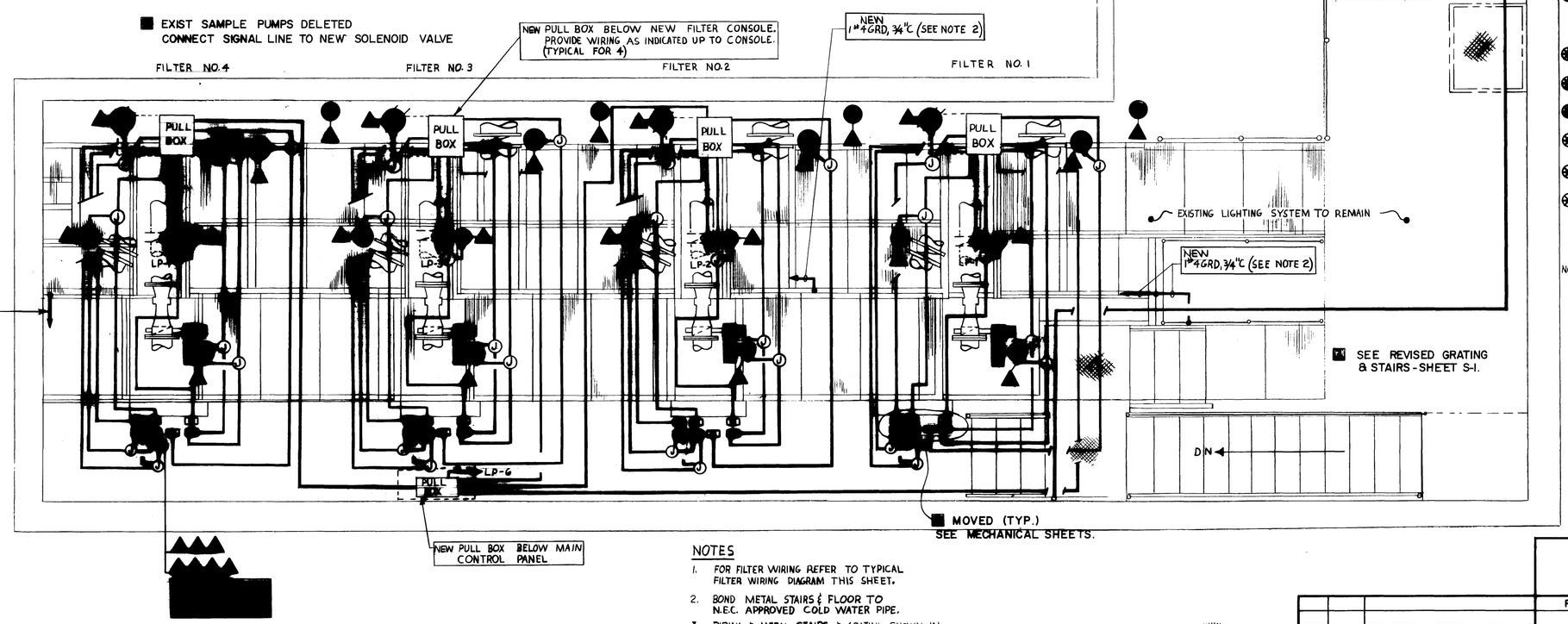


EQUIPMENT LEGEND

- SURFACE WASH DISCONNECT SWITCH
- BACKWASH DISCONNECT SWITCH
- BACKWASH DRAIN DISCONNECT SWITCH
- 4 ~~MAIN~~ CONSOLE DISCONNECT
- INFLUENT VALVE DISCONNECT SWITCH
- EFFLUENT VALVE (MODULATING)
- SURFACE WASH VALVE
- BACKWASH VALVE CONTROLER
- 9
- INFLUENT VALVE CONTROLLER
- FLOW TRANSMITTER
- LOSS OF HEAD TRANSMITTER
- BACKWASH DRAIN VALVE CONTROLLER
- EFFLUENT VALVE (MODULATING) CONTROLLER.
- EXISTING SAMPLE PUMP RELOCATED. (DISCONNECT THE EXISTING PUMP MOTOR. EXTEND THE EXISTING BRANCH CIRCUIT WIRING TO THE NEW PUMP LOCATION AND RECONNECT MOTOR.)

NOTES: ⊛ ALL NEW EQUIPMENT FURNISHED BY OWNER & INSTALLED BY CONTRACTOR. (ALSO SHADED)
2. SEE SHEET G-1 & E-1 FOR ADD NOTES.

■ EXIST SAMPLE PUMPS DELETED
CONNECT SIGNAL LINE TO NEW SOLENOID VALVE



DISCONNECTS ARE AS FOLLOWS:

A. IN THE PIPE GALLERY - INTERNAL TO VALVE OPERATOR.
B. ON FILTER CONSOLE - INTERNAL TO CABINET.
C. ONE MAIN POWER DISCONNECT ON EACH CONSOLE.
D. OTHER DISCONNECTS IN PIPE GALLERY DELETED. (1, 2, 3, 4, 5)

NOTES

1. FOR FILTER WIRING REFER TO TYPICAL FILTER WIRING DIAGRAM THIS SHEET.
2. BOND METAL STAIRS & FLOOR TO N.E.C. APPROVED COLD WATER PIPE.
3. PIPING & METAL STAIRS & GRATING SHOWN IN FINISHED CONFIGURATION.

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

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS
THORNTON WATER TREATMENT PLANT
PIPING AND MISCELLANEOUS IMPROVEMENTS
PIPE GALLERY

Date	Ch'k'd.	Revision
3/80	BOD	RECORD DRAWINGS
4/79	BOD	REVISED FOR REBIDDING

Designed by: RPP
Drawn by: PMA
Checked by: RMC
Approved by:
Date: SEPTEMBER 1978
Scale: AS NOTED

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1990 South Albion Street
Denver, Colorado 80222
environmental engineers, scientists, planners, & management consultants

SHEET NO. E-3

PROJECT MANAGER Approved by: ECC Date: 9/78
PROJECT ENGINEER Approved by: RMC Date: 9/78
PLUMBING Approved by: Date:
HVAC Approved by: Date:
ELECTRICAL Approved by: R. Cahoon Date: 9/78
INSTRUMENTATION Approved by: Date:
STRUCTURAL Approved by: Date:
ARCHITECTURAL Approved by: Date:

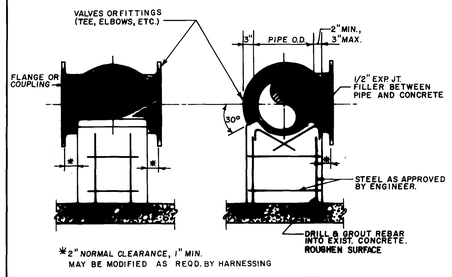
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED AT THE REQUEST OF PLAN-HOLD CORPORATION
WHEN RECORDED MAIL TO
NAME
STREET ADDRESS
CITY & STATE
OFFICIAL RECORDS OF ORANGE COUNTY, CALIFORNIA
RECORDER'S USE
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA

1-3-1

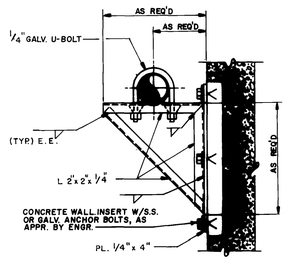
SHEET WHERE CUT: A / M-2 — DESIGNATION — SHEET WHERE SHOWN

SHEET WHERE SHOWN: A / M-1 — SHEET WHERE CUT

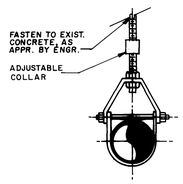
SECTION/DETAIL CALL-OUTS



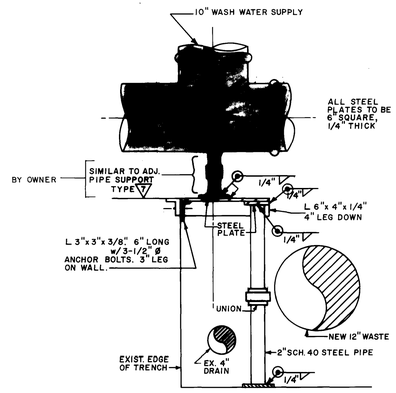
NEW CONCRETE VALVE OR REG. FITTING P.S.
TYPE 1



NEW WALL BRACKET P.S.
TYPE 2

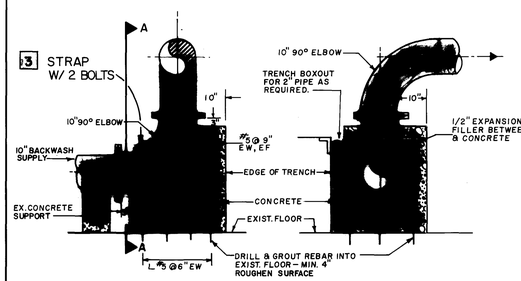


NEW CLEVIS P.H.
TYPE 3



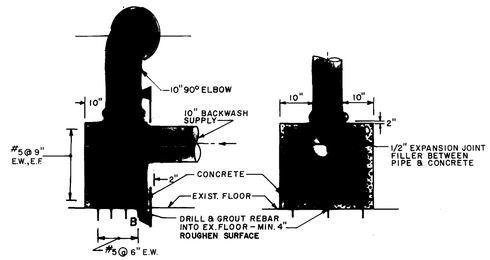
NEW PIPE SUPPORT
TYPE 4

NOTES: P.H. & P.S. TYPE 2, 3, 4, 7.
1. ALL METAL CONST. GALV. SEE SPEC.



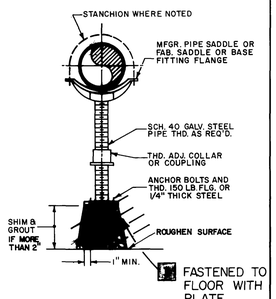
SECTION (F / M-2) SECTION A-A

NEW CONCRETE PIPE SUPPORT
TYPE 5



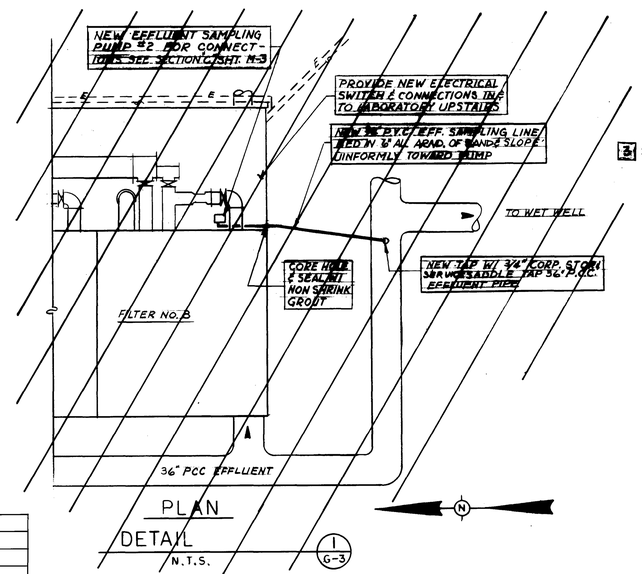
SECTION (H / M-2) SECTION B-B

NEW CONCRETE PIPE SUPPORT
TYPE 6

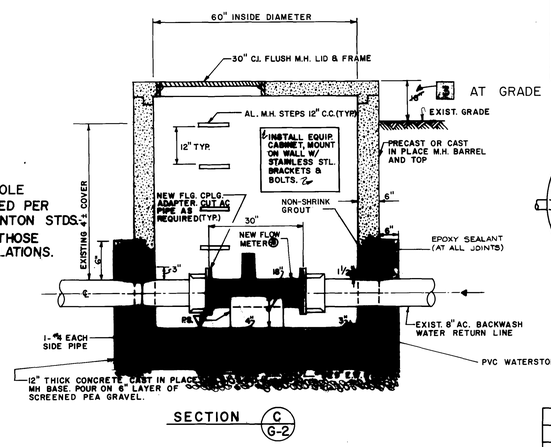


FABRICATED P.S.P. SIMILAR (MOST FURNISHED BY OWNER)

NEW ADJUSTABLE P.S.P.
TYPE 7

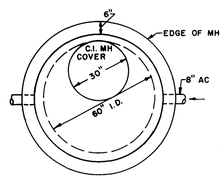


3 SEE ELECTRICAL DRAWINGS



SECTION (C / G-2)

MANHOLE REVISED PER THORNTON STDS. SEE THOSE REGULATIONS.



PLAN

NEW MANHOLE DETAIL

2 ADDENDUM NO. 1, ITEM NO. 9

Approved by:	Date	Name
Structural		
Electrical		
HVAC		
Project Engineer	9/78	WSW
Project Manager	9/78	ECR

NOTES

PIPING / MECHANICAL

1. PIPE USAGE AND DIRECTION OF FLOW INDICATE NORMAL PROCESS USE AND MAY CHANGE AS REQUIRED. PIPE SIZE SHOWN IS NOMINAL DIA. (ø) IN INCHES, UNLESS OTHERWISE NOTED.
2. PIPES SHALL SLOPE UNIFORMLY (OR BE STRAIGHT) BETWEEN ℄ AND/OR INVERT ELEVATIONS SHOWN.
3. FITTINGS & VALVES, JOINTS, MATERIAL & SIZE (DIA.) SHALL BE THE SAME AS THE STRAIGHT PIPE THEY ARE CONNECTED TO, EXCEPT AS NOTED.
4. PIPING ARRANGEMENTS & LOCATIONS SHOWN ARE BASED ON EQUIP SELECTED, & ALLOW FOR FUTURE PIPING & EQUIP IF MODIFICATIONS OF THIS PIPING ARE REQ'D. (INCLUDING P.S.P. & P.H.) AS RESULT OF EQUIP FURNISHED BY CONTRACTOR, THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE ENGINEER.
5. ALL PIPING NEAR VALVES, FITTINGS, APPURTENANCES, CPLG. & CONN. TO BE PROPERLY SUPPORTED & ANCHORED ACCORDING TO MFR. RECOMMENDATIONS, IN ADD. TO P.S.P. & P.H. SHOWN, ESPECIALLY NEAR EQUIP. SUPPORT & THRUST DET. MUST BE APPROVED BY THE ENGINEER.
6. PIPING SHALL BE INSTALLED SUCH THAT ANY PIPES OR LAYER OF PIPING CAN BE REMOVED WITHOUT DISTURBING REMAINING PIPES OR SUPPORTS. NOT ALL PIPE THRUST BLOCKS, ANCHORS, OR P.S.P. & P.H. ARE SHOWN. SEE SPECIFICATIONS.
7. NUMBERS AND LOCATIONS OF UNIONS AND DISMANTLING COUPLINGS ARE APPROXIMATE. PROVIDE ALL UNIONS AND COUPLINGS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND EQUIPMENT.
8. WHERE SPLIT RING COUPLINGS ARE INSTALLED, THE CONTRACTOR SHALL INSURE THAT THE JOINTS ARE FULLY EXTENDED AFTER THE RINGS ARE IN PLACE, AND PRIOR TO TIGHTENING THE BOLTS.
9. PIPE CUTTING WILL ONLY BE ALLOWED WHERE APPROVED BY THE ENGINEER.
10. EQUIPMENT FOUNDATIONS INDICATED ARE APPROXIMATE. EXACT DIMENSIONS WILL BE DETERMINED BY THE EQUIPMENT FURNISHED.
11. ALL PIPING SHALL BE CONNECTED SO AS TO PROVIDE A COMPLETE, SMOOTH FLOW PATH.
12. UNLESS OTHERWISE NOTED, EXISTING PIPING SHALL BE REMOVED WHERE NEW PIPING IS TO BE INSTALLED IN ITS PLACE, INCLUDING SPOOL PIECES. REMOVE EXISTING PIPE TO THE NEAREST JOINT.
13. UNLESS OTHERWISE NOTED:
    (a.) RELOCATED PIPE SHALL MEAN AN EXISTING PIPELINE RELOCATED WITH REUSE OF EXISTING PIPE AND FITTINGS, AS APPROVED BY THE ENGINEER.
    (b.) ALL ABANDONED OR REMOVED PIPING IS TO HAVE THE STUBS PLUGGED AS REQUIRED.

CIVIL / YARD WORK

1. UTILITIES AND PIPES TO BE DISTURBED BY NEW WORK SHALL BE PROTECTED AS NOTED.
2. CARE SHALL BE TAKEN TO PROTECT EXISTING FACILITIES.
3. SEE ALSO ELECTRICAL SITE WORK.
4. FINISHED GRADES SHOULD SLOPE UNIFORMLY BETWEEN ELEVATIONS.

OTHER ABBREVIATIONS	
ALUMINUM	AL.
CENTER TO CENTER	C.C.
POLYVINLY CHLORIDE	P.V.C.

NOTES

GENERAL

1. SEE SCHEMATICS AND INDIVIDUAL SHEETS FOR ADDITIONAL ABBREVIATIONS, SYMBOLS, LEGENDS AND NOTES.
2. THE TYPICAL DETAIL AND INFORMATION SHOWN ON GENERAL SHEETS SHOULD BE USED WHOLLY OR IN PART, EXCEPT AS MODIFIED BY SPECIFIC DETAIL DRAWINGS OR SPECIFICATIONS.
3. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE DIMENSIONS.
4. THE TERM "APPR. BY ENGR" SHALL MEAN WRITTEN APPROVAL BY THE ENGINEER TO BE RECEIVED BEFORE INSTALLATION.
5. ALL WORK TO BE DONE UNDER THIS CONTRACT UNLESS OTHERWISE NOTED. ALL ITEMS SHADED OR INDICATED ● ARE TO BE SUPPLIED BY THE OWNER AND INSTALLED BY THE CONTRACTOR. ALL OTHER NEW ITEMS ARE TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
7. INSTRUMENTATION IS SHOWN ON MECHANICAL, AND INSTRUMENTATION DRAWINGS WITH TAG NO. ATTACHED. SEE INSTRUMENTATION FOR TAG I.D. CODE.
8. LOCATION OF ALL EXISTING PIPES, CABLES, UTILITIES, UNDERGROUND STRUCTURES AND PROPERTY LINES ARE NOT WARRANTEED TO BE EXACT, NOR IS IT WARRANTEED THAT ALL ARE SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING INFORMATION ON EXISTING FACILITIES IN THE FIELD. THE CONTRACTOR SHALL MAKE EXPLORATORY EXCAVATIONS AS NECESSARY TO DETERMINE THE LOCATION OF UNDERGROUND FACILITIES. FOR UTILITIES REQUIRING RELOCATION, THE CONTRACTOR SHALL NOTIFY AND ARRANGE WITH THE UTILITY OWNER. RELOCATE MINOR FACILITIES IN FIELD, AS APPROVED BY THE ENGINEER.
9. REMOVE EXISTING EQUIPMENT SO AS TO PREVENT DAMAGE TO REMAINING FACILITIES.
10. ON SHEETS THE FOLLOWING CODE IS NORMALLY USED:

ACTION UNDER THIS CONTRACT	SYMBOL OR NOTES	NOTES
EXISTING TO REMAIN		NOT BOXED
EXISTING TO BE REMOVED (MAY BE ABANDONED IN PLACE AS NOTED OR APPROVED BY ENGINEER)		
NEW TO BE ADDED, OR FINAL LOCATION OF EXISTING TO BE RELOCATED — NEW SUPPLIED BY OWNER — (N) — OR		

LEGEND

ITEM	ABBR.	SYMBOLS
FLOW METER	FL.M.	
PRESSURE GAUGE	P.G.	(P)
REDUCER OR REDUCING	RED.	
ECCENTRIC - REDUCER	ECC. RED.	
TEE		OR
90° ELBOW (OR 1/4 BEND)	90° ELB.	OR
45° ELBOW (OR 1/8 BEND)	45° ELB.	OR
22-1/2° ELBOW (1/16 BEND)	22-1/2° ELB	OR
UNION		OR
FLANGED (SEE SPECS.)	FLG.	
BLIND FLANGE	BL. FLG.	
FLANGE FILLER	FLG. FLR.	
SCREWED / THREADED	SCD./THD.	(≤ 3" ø & AS NOTED)
PIPE SUPPORT	P.S.	× — TYPE = ▽
PIPE HANGER	P.H.	✳ — TYPE = ▽
INSTRUMENTATION (TAG NO.)	INST.	SEE SHT. I-1
CENTER LINE	℄	
MANHOLE	MH	
NOT TO SCALE	N.T.S.	
TYPICAL	TYP.	
MECHANICAL JOINT	M.J.	
PLAIN END	P.E.	
DUCTILE IRON (PIPE)	D.I.(P)	
CAST IRON (PIPE)	C.I.(P)	
EACH WAY / EACH FACE	E.W./E.F.	
COUPLING	CPLG.	
DIAMETER	DIA.	ø
ASBESTOS CEMENT	AC	
CORRUGATED METAL PIPE	CMP	

Symbol	Date	Ch'k'd	Revision
3	3/80	BOD	RECORD DRAWINGS
2	5/79	BOD	ADDENDUM
1	4/79	BOD	REVISED FOR REBIDDING

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS
THORNTON WATER TREATMENT PLANT
PIPING AND MISCELLANEOUS IMPROVEMENTS

GENERAL LEGEND, NOTES AND DETAILS

JOHN D. RATTRAY — REGISTERED — 12268 — PROFESSIONAL ENGINEER — STATE OF COLORADO

Designed by: BOD
Drawn by: CB/CA
Checked by: BOD
Approved by:
Date: SEPT. 1978
Scale: NONE

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
environmental engineers, scientists, planners & management consultants

SHEET NO. G-1

1-3-1

DRAWING NUMBER

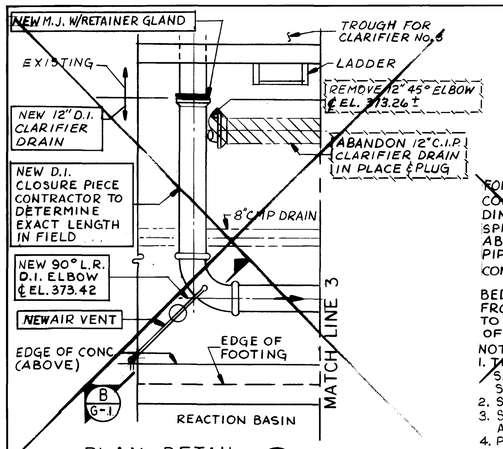
PLAN HOLD DOOR NO. • PANEL NO. • PANEL CALIFORNIA

DRAWING NUMBER

Thornton Water Treatment Plant Finish Water Main Improvements

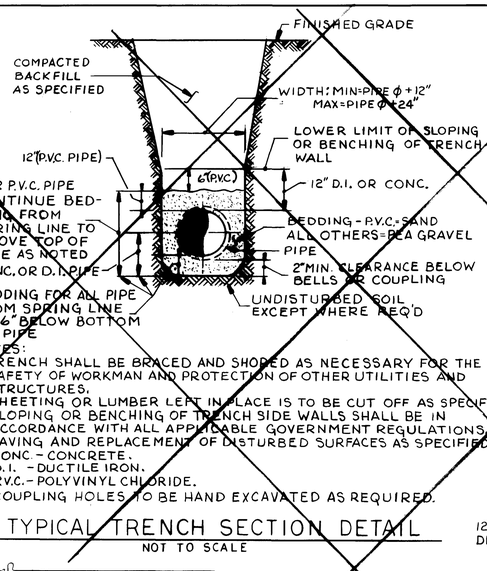
PLAN HOLD DOOR NO. • PANEL NO. • PANEL CALIFORNIA

DRAWING NUMBER



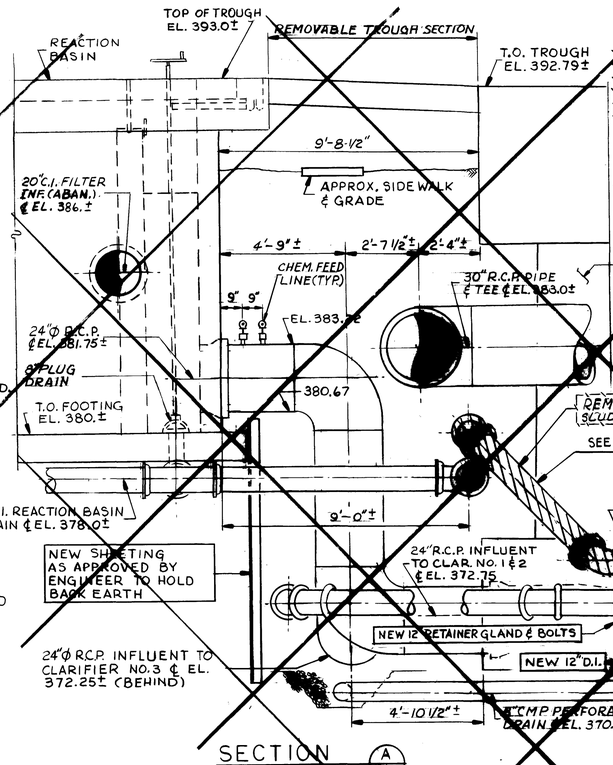
PLAN-DETAIL (2) G-2
Scale 3/8"=1'-0"

I DELETED

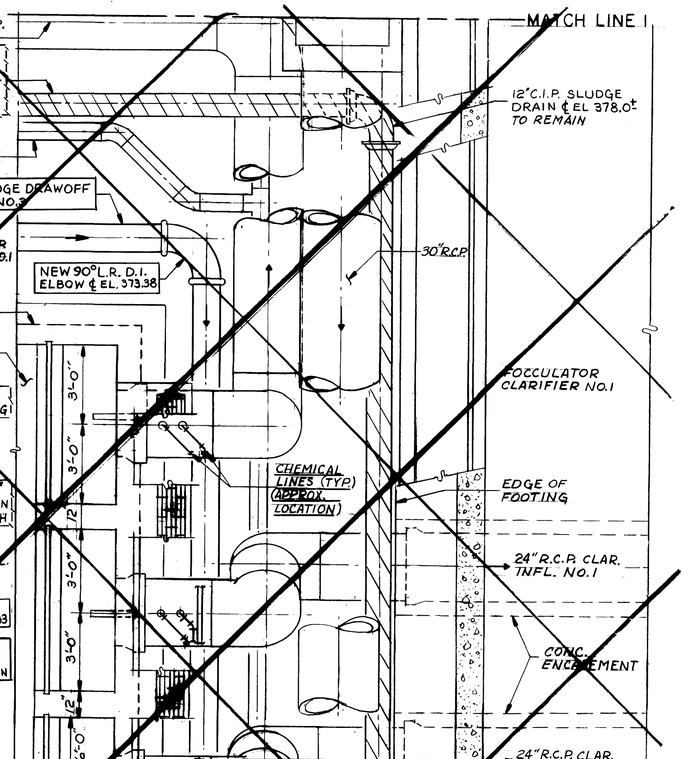


NOTES:
1. TRENCH SHALL BE BRACED AND SHORED AS NECESSARY FOR THE SAFETY OF WORKMAN AND PROTECTION OF OTHER UTILITIES AND STRUCTURES.
2. SHEETING OR LUMBER LEFT IN PLACE IS TO BE CUT OFF AS SPECIFIED.
3. SLOPING OR BENCHING OF TRENCH SIDE WALLS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT REGULATIONS.
4. PAVING AND REPLACEMENT OF DISTURBED SURFACES AS SPECIFIED.
5. CONC. - CONCRETE.
   D.I. - DUCTILE IRON.
   P.V.C. - POLYVINYL CHLORIDE.
6. COUPLING HOLES TO BE HAND EXCAVATED AS REQUIRED.

TYPICAL TRENCH SECTION DETAIL
NOT TO SCALE



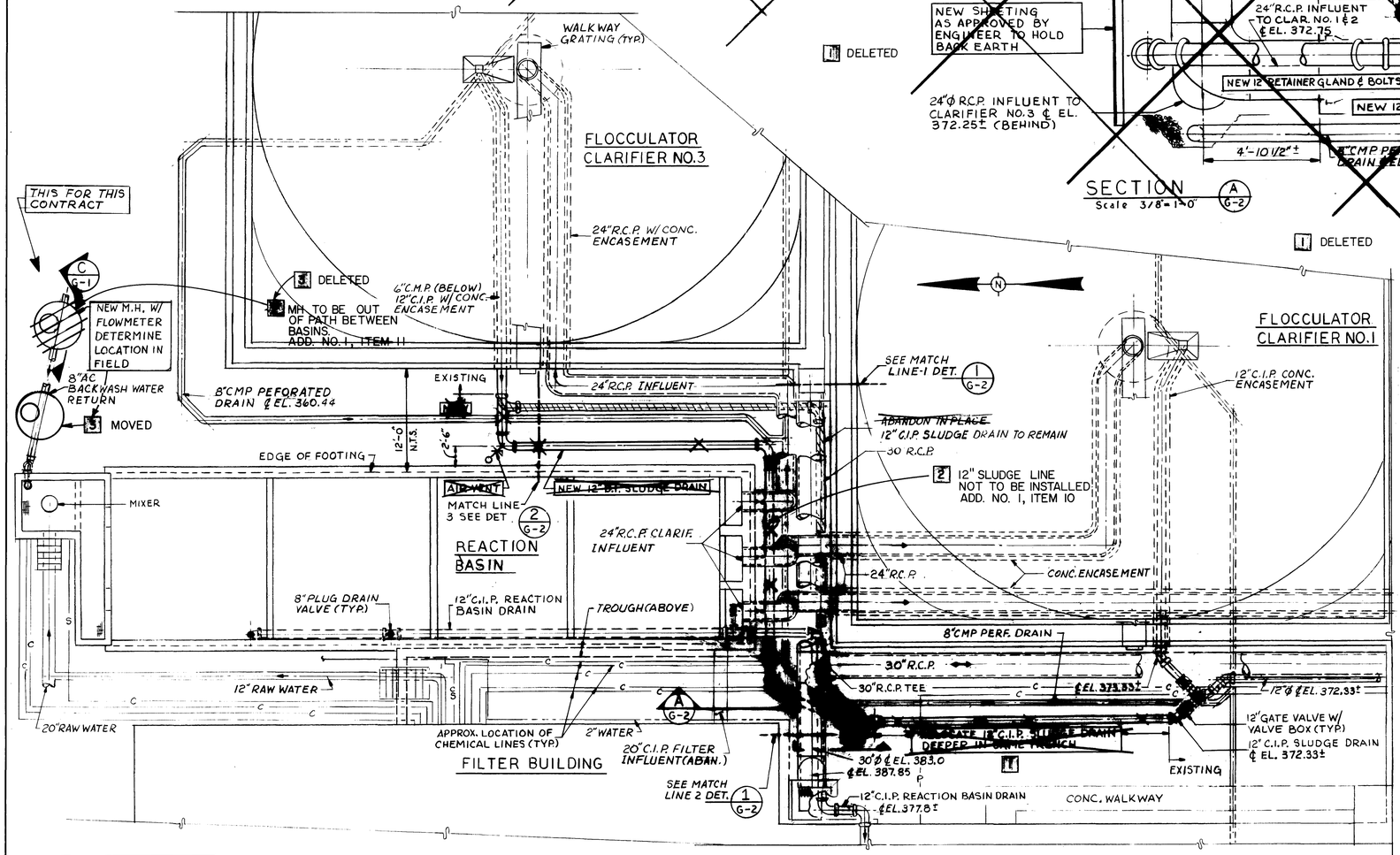
SECTION (A) G-2
Scale 3/8"=1'-0"



NOTES:
1. IN THE AREAS SHOWN ON THIS DETAIL EXCAVATION SHALL BE BY HAND. EXTREME CARE SHALL BE TAKEN TO MAINTAIN ALL CHEMICAL LINES AND OTHER PIPES IN OPERATION.
2. ALL TRENCHING MUST BE ADEQUATELY SHORED.
3. SHEETING TO BE USED AS DIRECTED OR APPROVED BY ENGINEER.

[E] DELETED

PLAN-DETAIL (1) G-2
Scale 3/8"=1'-0"



BASIN PLAN
Sale 1/8"=1-0"

NOTES:
1. EVERTHING SHOWN THIS SHEET IS EXISTING UNLESS OTHERWISE NOTED. FOR SAMPLE PUMP CONNECTION SEE SHEET E-1 & G-1 ALSO SEE ELECTRIC.
[T] 2. NEW 12" SLUDGE DRAWOFF FROM CLARIFIER NO. 3 TO BE CEMENT LINED DUCTILE IRON, WITH SPLIT RING COUPLINGS, AND POLYETHYLENE WRAP (SEE SHEET G-1)
3. SEE NOTES ON SHEET G-1

Approved by:	Date	Name
Structural		
Electrical		
HVAC		
Project Engineer	9/78	
Project Manager	9/78	ECR

Symbol	Date	Ch'k'd	Revision
3	3/80	BOD	RECORD DRAWINGS
2	5/79	BOD	ADDENDUM
1	4/79	BOD	REVISED FOR REBIDDING

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS
THORNTON WATER TREATMENT PLANT
PIPING AND MISCELLANEOUS IMPROVEMENTS

YARD WORK

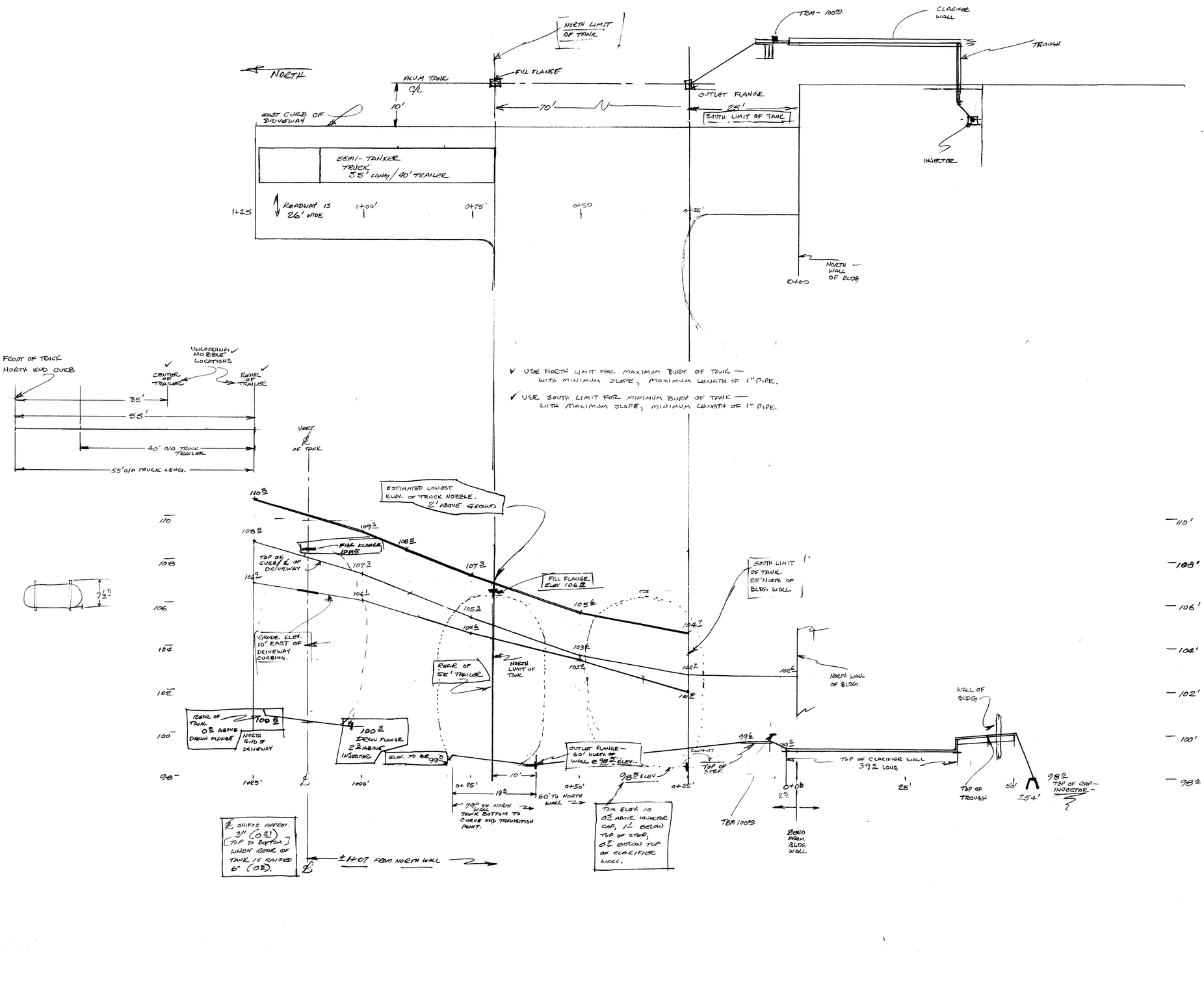
Designed by: BOD
Drawn by: CB
Checked by: BOD
Approved by:
Date: SEPT. 1978
Scale: AS NOTED

CAMP DRESSER & McKEE INC.
Writer's Tower, Suite 1100
1660 South Albion Street
Denver, Colorado 80222
environmental engineers, scientists, planners & management consultants

SHEET NO. G-2

PROFESSIONAL ENGINEER STATE OF COLORADO 9968

1-3-1



HORIZ - 1" = 10'
VERT - 1" = 2'

FIBERGLAS TANK - ± 25' L x 8' D

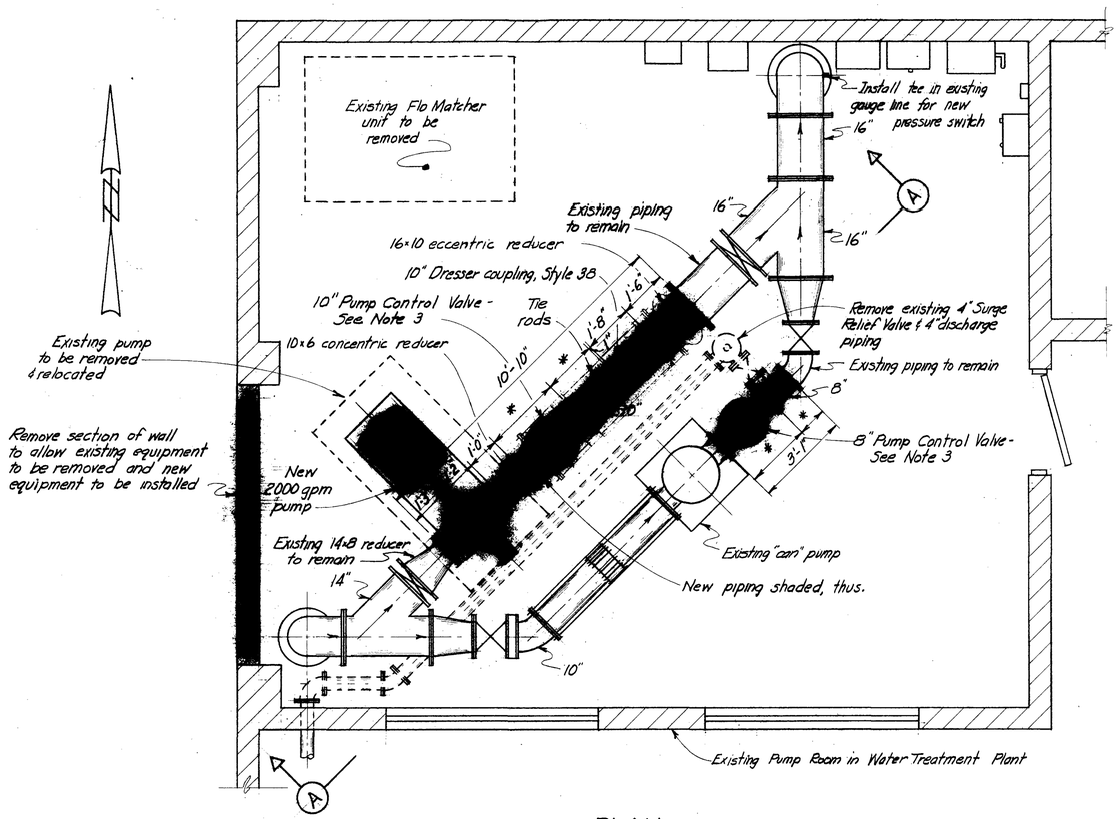
ALUM TANK INSTALLATION @ THORNTON TREATMENT PLT.

SURVEY - 7 MARCH
ROBERT / BUIG.

5
1-2-12

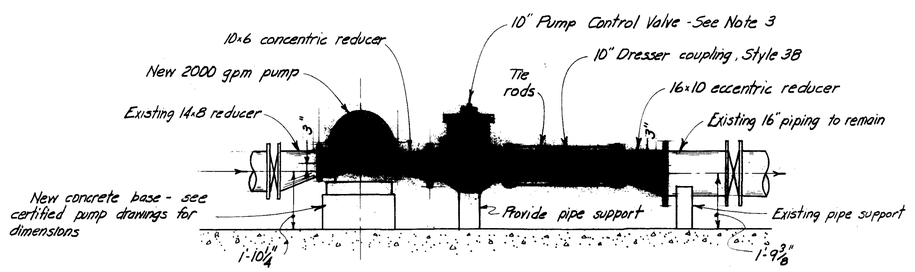
BOOK 18, PAGE 75

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECEIVED BY NUMBER DETAIL
PRINTED FOR PLAN HOLD CORP. ON 1/2/12



PLAN

3/8" = 1'-0"



SECTION (A)

3/8" = 1'-0"

NOTES

1. All pipe and fittings shall be cast iron, flanged, Class 125

2. Dimensions denoted thus: * depend on the laying length of the Pump Control Valves.

3. Pump Control Valves shall be either:
   a) Golden - Anderson Fig. No. 173-D "Electric Check Valve for Pump Control", or
   b) Ralph N. Brodie Co. No. 805 "Booster Pump Control Valve", or
   c) Cla-Val Co. No. 60 P "Pump Control Valve."

Normal sequence of operation shall be as follows:

Starting pump: Valve shall remain closed until pump reaches full speed, then valve shall open slowly to full open position.

Stopping pump: Pump shall continue running after control circuit has been de-energized but valve shall begin closing slowly. When valve is nearly closed, limit switch on valve shall shut off pump.

Power failure: Valve shall close slowly, taking no less than 12 seconds to reach full closed position.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

REVISIONS TO NORTH-GLENN BOOSTER PUMPS

PHILLIPS-CARTER-OSBORN INC., ENGINEERS
DENVER, COLORADO

DESIGNED	R.K.
DRAWN	R.K.
CHECKED	R.G.C.

P-1680	MAY, 1962	Sh. 1 of 2

1-1-10

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548

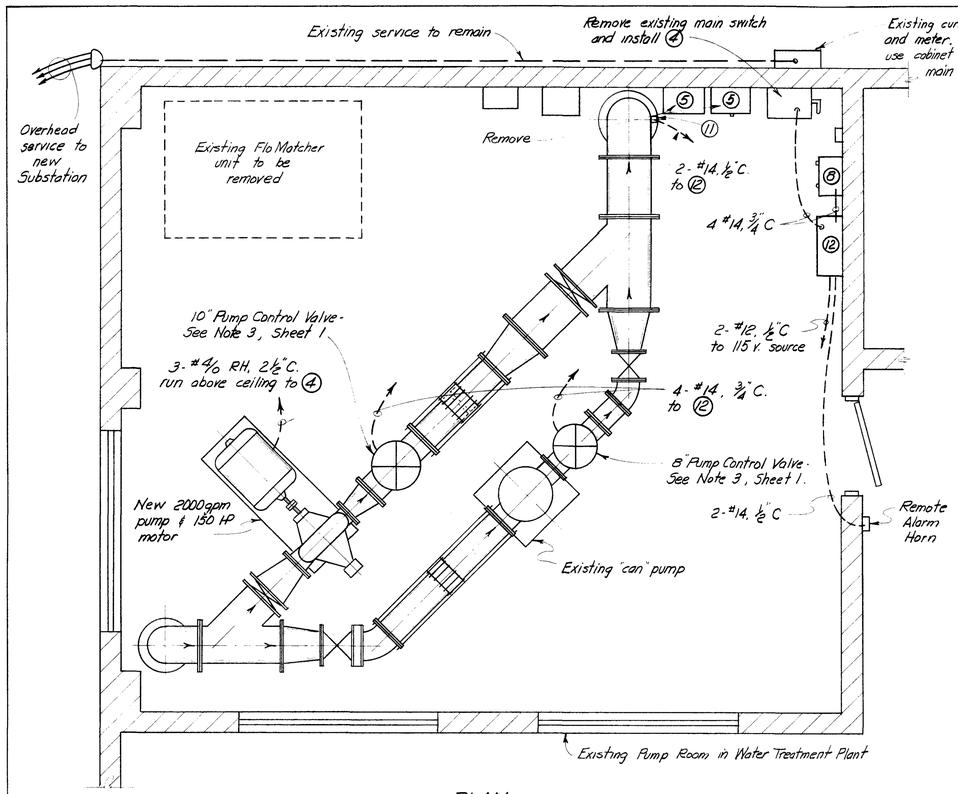
DRAWING NUMBER

Hospital Water Treatment Plant

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548

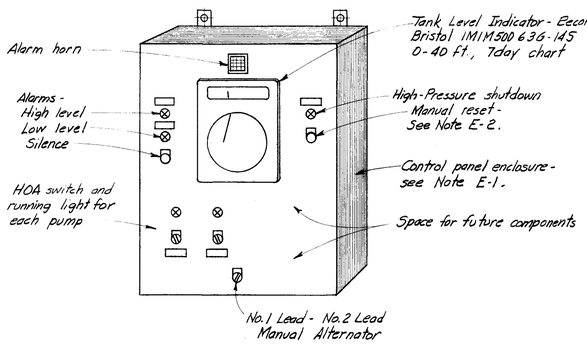
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PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548



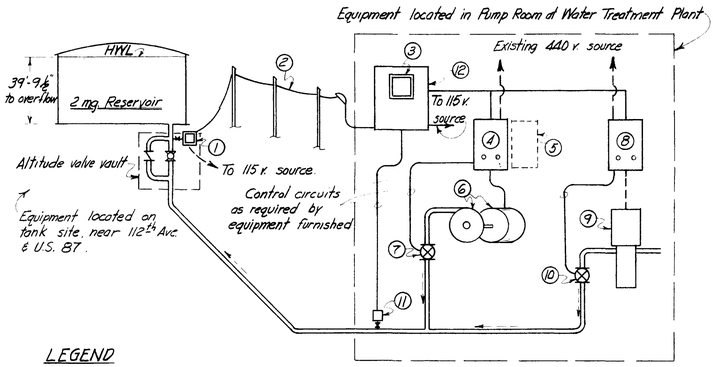
PLAN

3/8" = 1'-0"



CONTROL PANEL DETAIL

No Scale



LEGEND

① Pressure operated level transmitter, Bristol 06686M-14, Waterproof; Range, 0-40 ft.; 7 ft(ft) zero suppression; Mount on common top with pressure gauge (by others) nearest tank; provide shutoff cock.

② Leased telephone lines (by Owner).

③ Indicating & Recording Receiver w/ 6 control switches; indicates & records tank level on 7-day chart; Bristol 1 IM1M500 & 36-145; starts Pump #1 when tank level falls to 37.5 ft.; starts Pump #2 when level falls to 35.5 ft.; as level rises, stops pumps in reverse order, 2 ft. above starting level; sounds alarm when tank level falls below 10 ft., or rises to 39.75 ft.

④ New comb. FVNR starter for new 150 HP pump motor, C-H 9589 H 4401.

⑤ Existing starter & disconnect - Remove and turn over to owner.

⑥ New 2000 gpm pump w/ 150 HP motor.

⑦ Pump Control Valve - see Note 3, Sh. 1 for operating sequence.

⑧ Existing combination starter.

⑨ Existing "can" pump

⑩ Pump Control Valve - see Note 3, Sh. 1 for operating sequence.

⑪ High-Pressure shutoff switch. See Note E-2.

⑫ New Control Panel - see Detail

ELECTRICAL SCHEMATIC

NOTES:

E-1. Control panel enclosure to be NEMA 12. Control panel shall be provided complete with external items as shown, as well as necessary control relays, time delay relays, D.C. power supplies, terminal blocks, etc.

E-2. If pump discharge pressure exceeds a preset adjustable value, both pumps shall be automatically stopped (sequence of operation to be as outlined in Note 3, Sh. 1), alarm shall sound, and pumps must be restarted manually.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

ELECTRICAL REVISIONS TO NORTH-GLENN BOOSTER PUMPS

PHILLIPS-CARTER-OSBORN INC., ENGINEERS
DENVER, COLORADO

DESIGNED H. L.	
DRAWN R. K.	
CHECKED R. G. C.	
P-1680	MAY, 1962

Sh 2 of 2

1-1-10

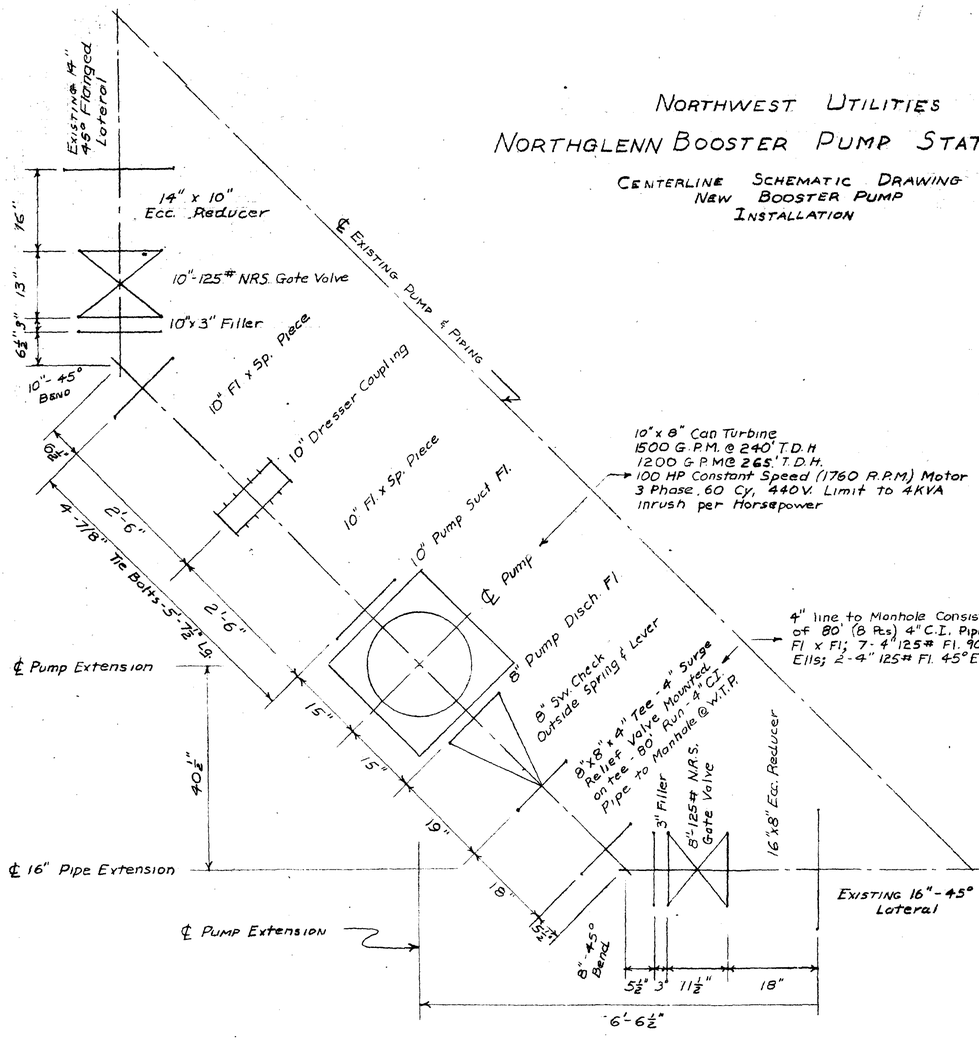
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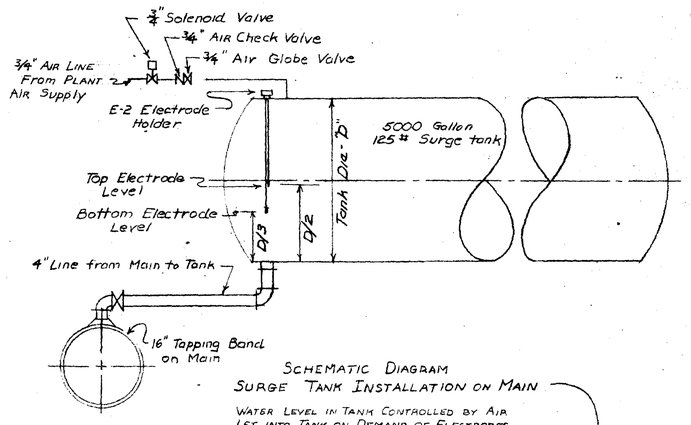
DRAWING NUMBER

NORTHWEST UTILITIES

NORTHGLENN BOOSTER PUMP STATION

CENTERLINE SCHEMATIC DRAWING
NEW BOOSTER PUMP
INSTALLATION

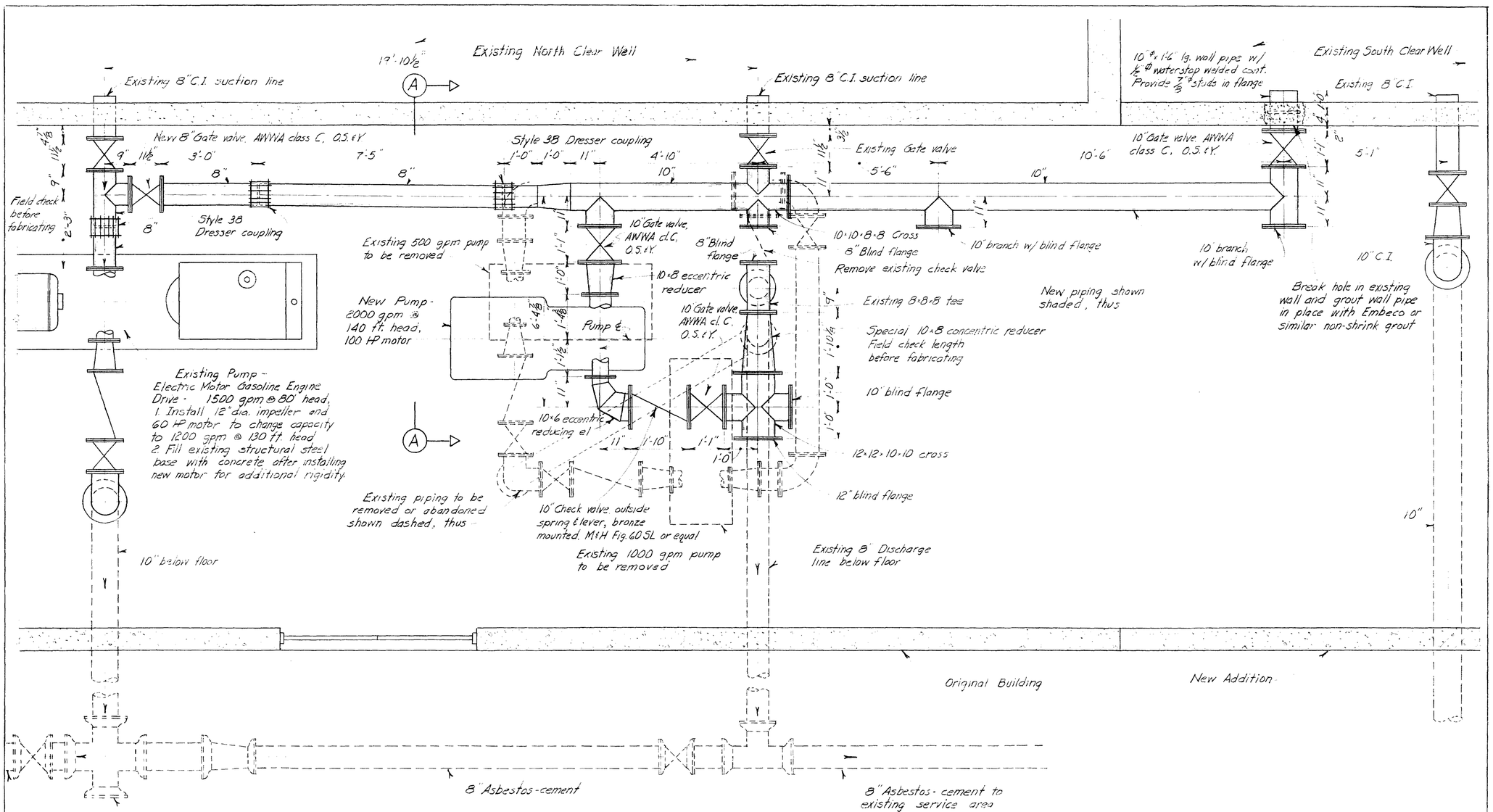




SCHEMATIC DIAGRAM
SURGE TANK INSTALLATION ON MAIN

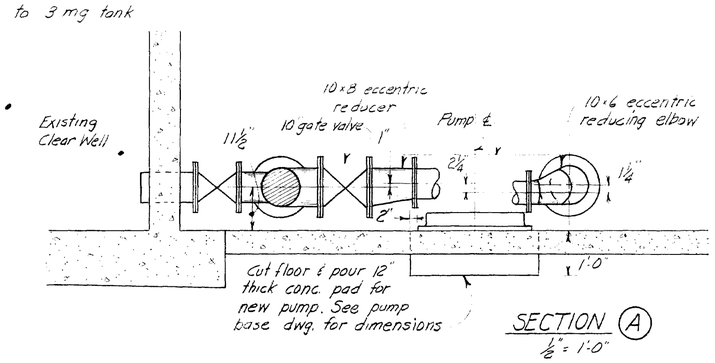
WATER LEVEL IN TANK CONTROLLED BY AIR LET INTO TANK ON DEMAND OF ELECTRODES. WHEN WATER LEVEL IN TANK REACHES TOP ELECTRODE, SOLENOID VALVE IS OPENED AND AIR PRESSURE FORCES WATER LEVEL BELOW BOTTOM ELECTRODE. SOLENOID VALVE THEN CLOSES. ALL MEASUREMENTS & DIMENSIONS TO BE FIELD DETERMINED.

1-1-10
~~10-1-6~~



PLAN

½" = 1'-0"



SECTION (A)

½" = 1'-0"

NOTES:

1. All new piping shown shall be fabricated steel pipe meeting AWWA Specifications. Wall thicknesses shall be as follows: 10" o.d. - 10 gauge; 8" o.d. - 12 gauge. Flanges shall be 150 psi plate flanges with ASA Class 125 drilling.
2. All steel piping shall be hot-dipped galvanized after fabrication.

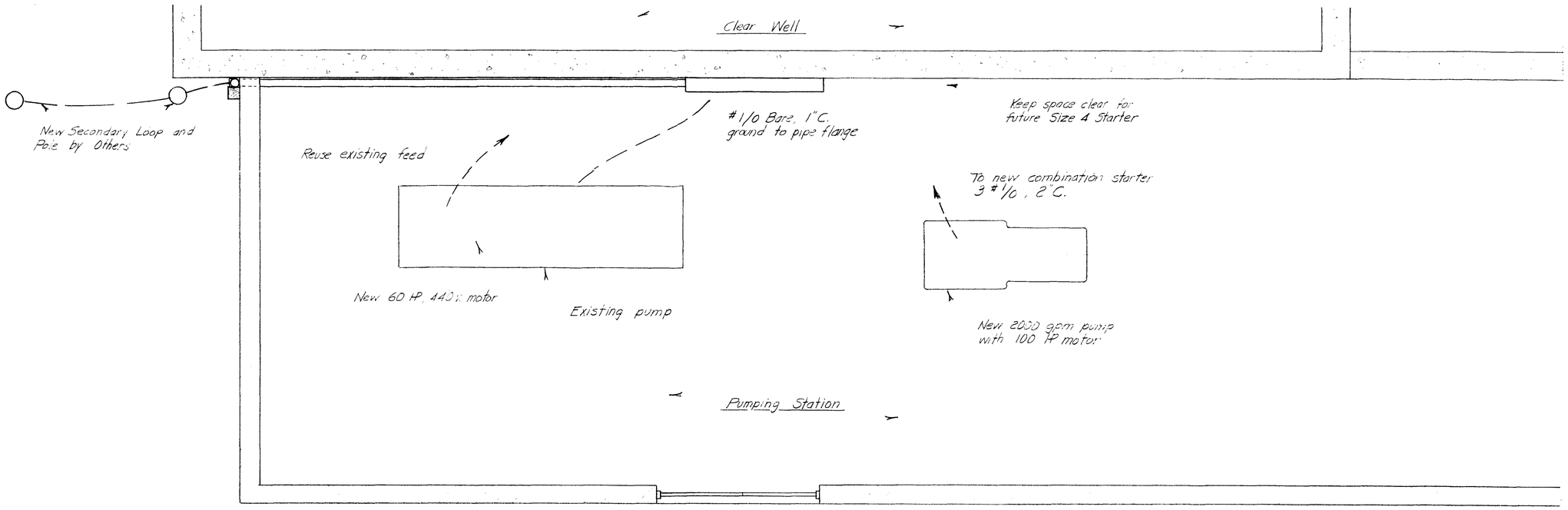
NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

CLEAR WELL PUMPING STATION MODIFICATIONS

PHILLIPS-CARTER-OSBORN INC., ENGINEERS
DENVER, COLORADO

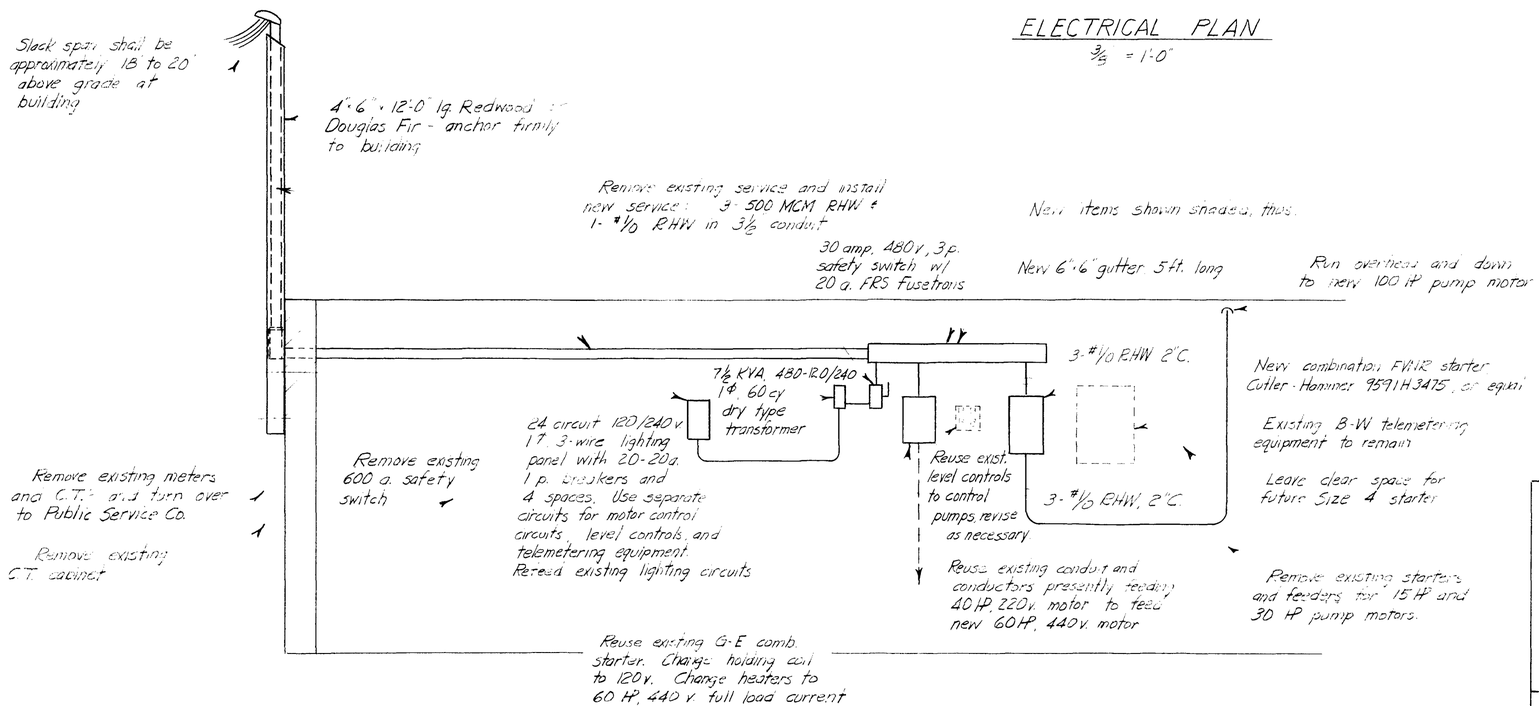
DESIGNED R.K.	SUBMITTED Robert L. Carter PHILLIPS-CARTER-OSBORN INC.
DRAWN R.K.	
CHECKED R.G.C.	
P-1680	APRIL, 1962 — Sh. 1 of 2

1-1-9



ELECTRICAL PLAN

3/8" = 1'-0"



SCHEMATIC ELEVATION
ELECTRICAL POWER & MOTOR CONTROLLER REVISIONS

No Scale

Notes:

1. Any power outages necessary to make the change over to 440 volt power shall be fully coordinated with the Owners operations and with the operations of the Contractor providing the New Substation.
2. This Contractor shall connect the overhead service to the Service Pole (being provided by Others).
3. Material not reused shall be turned over to the Owner.
4. Grounding shall be provided in accordance with the N.E.C.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

CLEAR WELL PUMPING STATION MODIFICATIONS

PHILLIPS-CARTER-OSBORN INC., ENGINEERS
DENVER, COLORADO

DESIGNED H.L. & F.S.	SUBMITTED Robert C. Carter PHILLIPS-CARTER-OSBORN INC.
DRAWN R.K.	
CHECKED R.G.C.	
P-1680	APRIL, 1962 — Sh. 2 of 2

1-1-9

THORN. WATER TREATMENT PLANT — CLEARWELL MODIFICATIONS

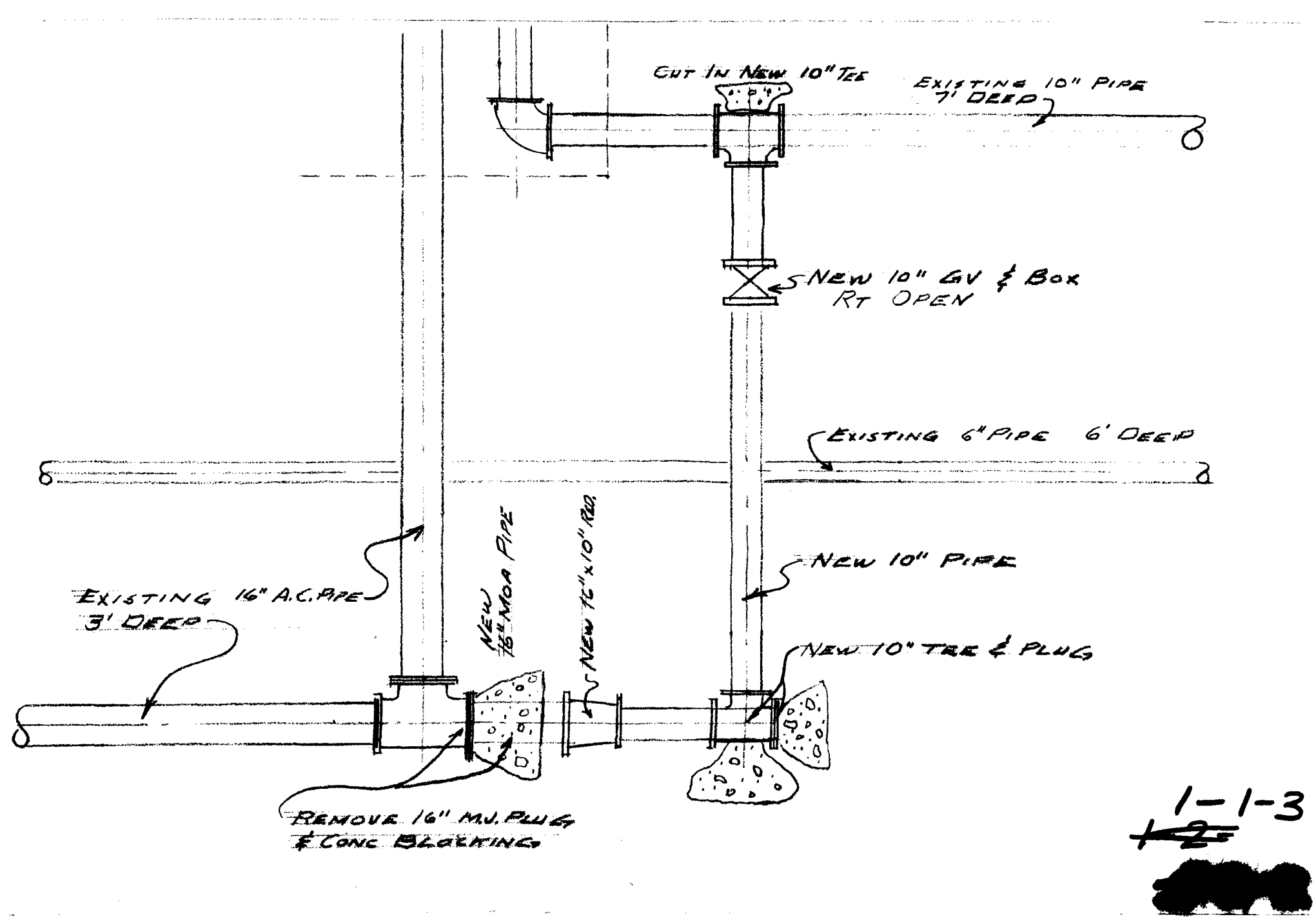
THORNTON WATER TREATMENT PLANT

CLEARWELL BUILDING

Archive

POSITION EDGE OF PRINT ON THIS LINE

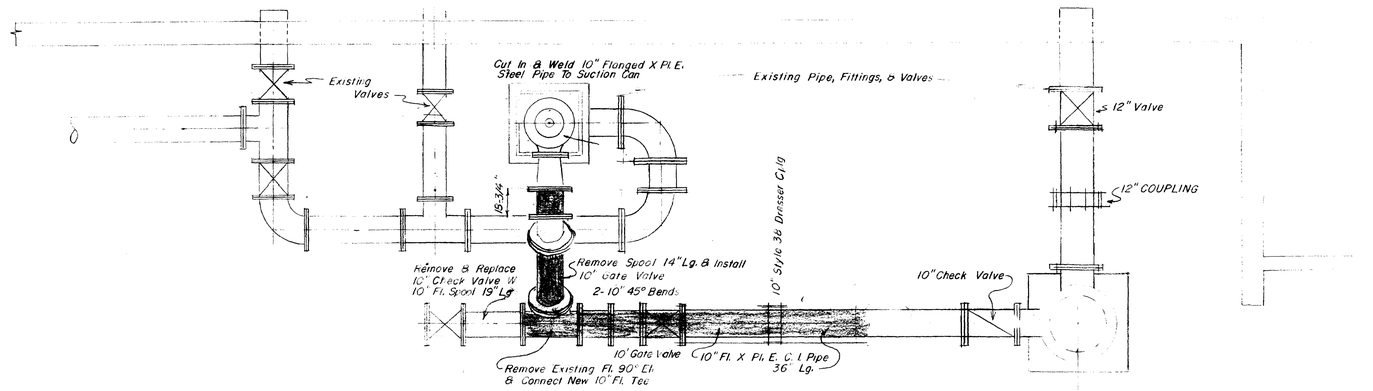
CLEARWELL BUILDING THORNTON PLANT



1-1-3

[redacted]

CLEAR WELL



INSTALLED JUNE 1968

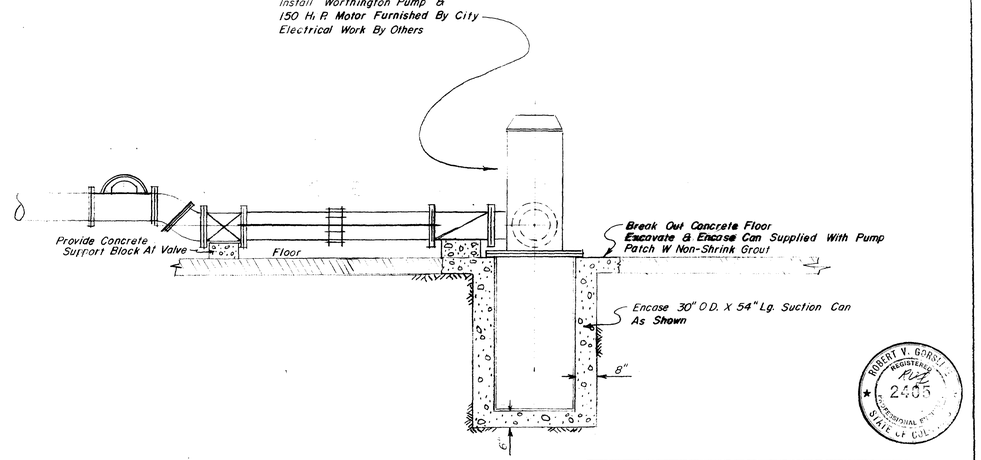
PLAN
Scale 1" = 2 Ft.

MATERIALS REQUIRED

12" FLANGED GATE VALVE W HANDWHEEL	1
10" FLANGED GATE VALVE W HANDWHEEL	2
12" DRESSER COUPLING STYLE 38	1
10" " " " "	1
10" FLANGED C.I. TEE	2
10" FLANGED 45° BEND	3
10" FL. 22-1/2° BEND	1
10" FL. CHECK VALVE (CARTRIDGE TYPE)	1
10" FL. X PLAIN END C.I. PIPE 36" Lg.	2
10" FL. X PLAIN END C.I. PIPE 16" LG.	2
10" FL. C.I. SPOOL 19" LG.	1
10" FL. X PL. END STEEL PIPE 18" LG.	1
10" FABRICATED STEEL PIPE SPOOL 30" LG.	1
10" WELDING FLANGE 125#	1
10" BLIND FLANGE	1
3/4" TIE RODS 3'-2" LG.	4
5/8" TIE RODS 6'-2" LG.	4
12" GASKET, BOLTS & NUTS SET	3
10" " " " "	17
8" " " " "	1
CLASS "A" CONCRETE	1-1/2 C.Y.
NO PAINT REQ'D.	

NOTES:

ALL FITTINGS TO BE CEMENT OR COAL TAR ENAMEL LINED
FLANGES TO BE A.S.A. 125 #
PUMP TO BE SET PLUMB
ALL JOINTS SHALL BE WATERTIGHT



ELEVATION AT PUMP
Scale 1" = 2'

ROBERT V. GORSUCH REGISTERED CIVIL ENGINEER 2455 PROFESSIONAL ENGINEER STATE OF COLORADO

PIPING PLAN	PUMP ELEVATION

PUMP #5 AT CLEARWELL

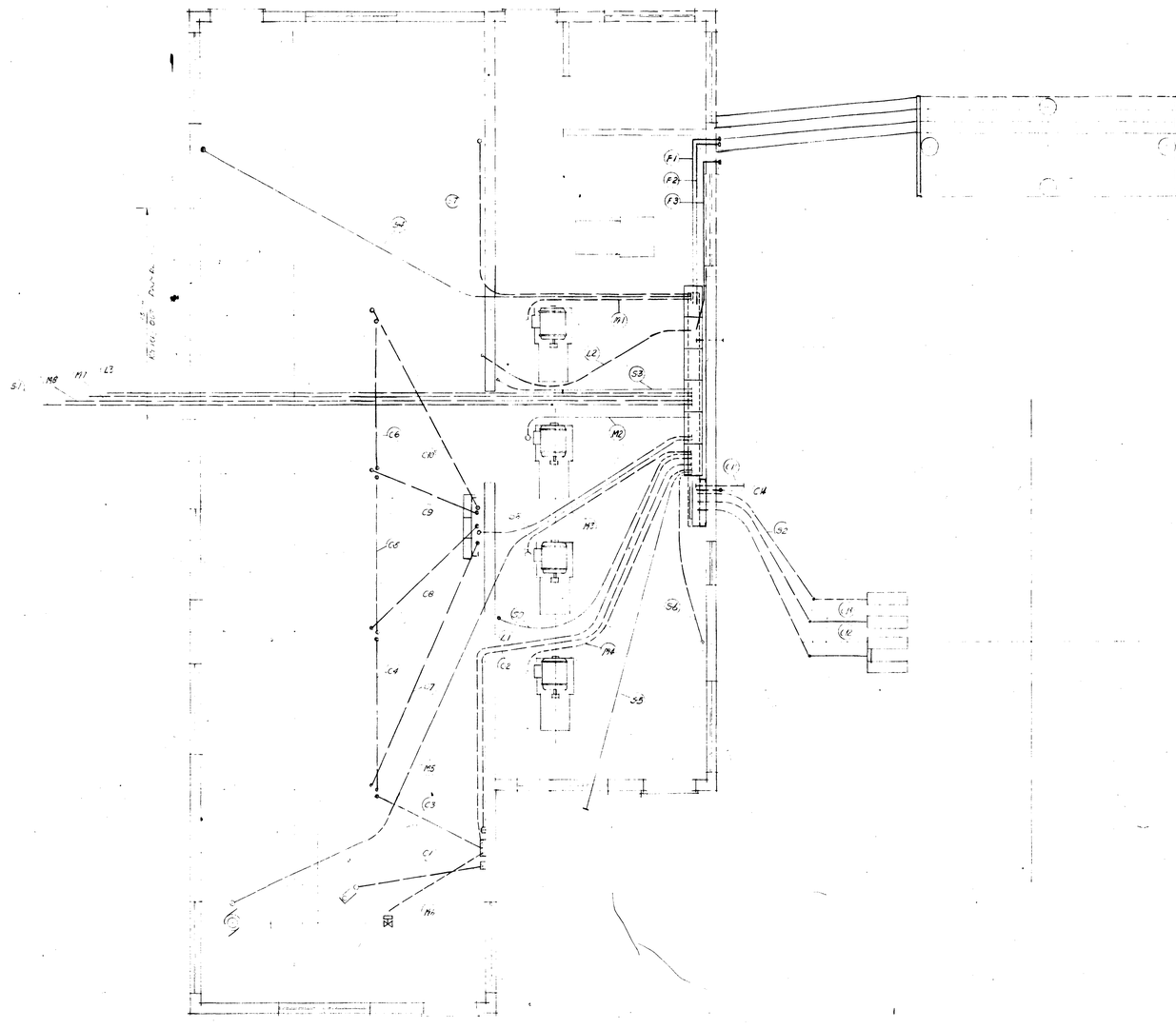
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DWG. BY: RVG CHKD BY: RVG	CITY OF THORNTON UTILITY DEPT.	SHEET 1 OF 1 SHEET

THORNTON CLEARWELL PUMP

1-2-4

DRAWING NUMBER

DRAWING NUMBER



CONDUIT SCHEDULE

Cond. No.	Size	Conductors	Service	H.P.	From	To	Remarks
C1	1/2"	3 # 14	Electrodes		Brine Tank	RH Relay	
C2	1/2"	2 # 14	Brine pump Con.		Control Cntr.	Selection Sw.	
C3	3/4"	4 # 14	Relay Control		Relays	Softner # 3	
C4	1/2"	3 # 14	Relay Control		Softner # 3	Softner # 2	
C5	1/2"	2 # 14	Relay Control		Softner # 2	Softner # 1	
C6	1/2"	Spare			Softner # 1	Future Softner	Spare
C7	1"	10 # 14	Interlock Control		Softner # 3	Interlock	
C8	1"	10 # 14	Interlock Control		Softner # 2	Interlock	
C9	1"	10 # 14	Interlock Control		Softner # 1	Interlock	
C10	1"	Spare	Interlock Control		Future Softner	interlock	Spare
C11	2"	12 Cond Contr. Ckt.	Control Ckts.		Telem. panel	Shallow Well pmp	Remote Control-Shallow Well
C12	1"	9 # 14	Electrode Cont		Telem. panel	Electrode	
C13	3/4"	4 # 14	Electrode Cont		Telem. panel	Electrode	
F1	3 1/2"	3 # 350 MCM	Main Entrance				
F2	3 1/2"	3 # 350 MCM	Main Entrance				
F3	1"	3 # 6	Main Entrance				
L1	1/2"	2 # 12	Dunco & 2 RH Relays		L.P. Cont. Cntr.	Dunco & 2 RH Rels.	110 V. Service
L2	3/4"	3 # 10	Light Panel		L.P. Cont. Cntr.	L.P. Softning Bld.	115/230 V - 1 ø 3 W
L3	1"	3 # 8	Light - heat		L.P. Cont. Cntr.	Aux. Pump Bld.	115/230 V - 1 ø 3 W
M1	2"	3 # 3/0 TW	Booster pump #1	50	Motor Cont Cr.	Pump motor	
M2	2"	3 # 3/0 TW	Booster pump #2	50	Motor Cont Cr.	Pump motor	
M3	2"	3 # 3/0 TW	Booster pump #3	50	Motor Cont Cr.	Pump motor	
M4	2"	3 # 3/0 TW	Booster pump #4	50	Motor Cont Cr.	Pump motor	
M5	1/2"	3 # 12	Brine pump	3/4	Motor Cont Cr.	Brine pump	
M6	1/2"	3 # 12	Motor for valve		Cutoff relay	Motor valve	110 V.
M7	1"	3 # 6	Shallow Well #6	15	Motor Cont Cr.	Pump # 6	
M8	1 1/4"	3 # 4	Deep Well #7	15	Motor Cont Cr.	Deep well #7	
S1	1"		Spare		Motor Cont Cr.	As shown	Spare
S2	3/4"		Spare		Motor Cont Cr.	As shown	Spare
S3	3/4"		Spare		Motor Cont Cr.	As shown	Spare
S4	3/4"		Spare		Motor Cont Cr.	As shown	Spare
S5	1"		Spare		Motor Cont Cr.	As shown	Spare
S6	3/4"		Spare		Motor Cont Cr.	As shown	Spare
S7	1"		Spare		Motor Cont Cr.	As shown	Spare
S8	2"		Spare		Motor Cont Cr.	As shown	Spare
S9			Spare		Motor Cont Cr.	As shown	Spare
C14	3/4"				Telemeter	As shown	

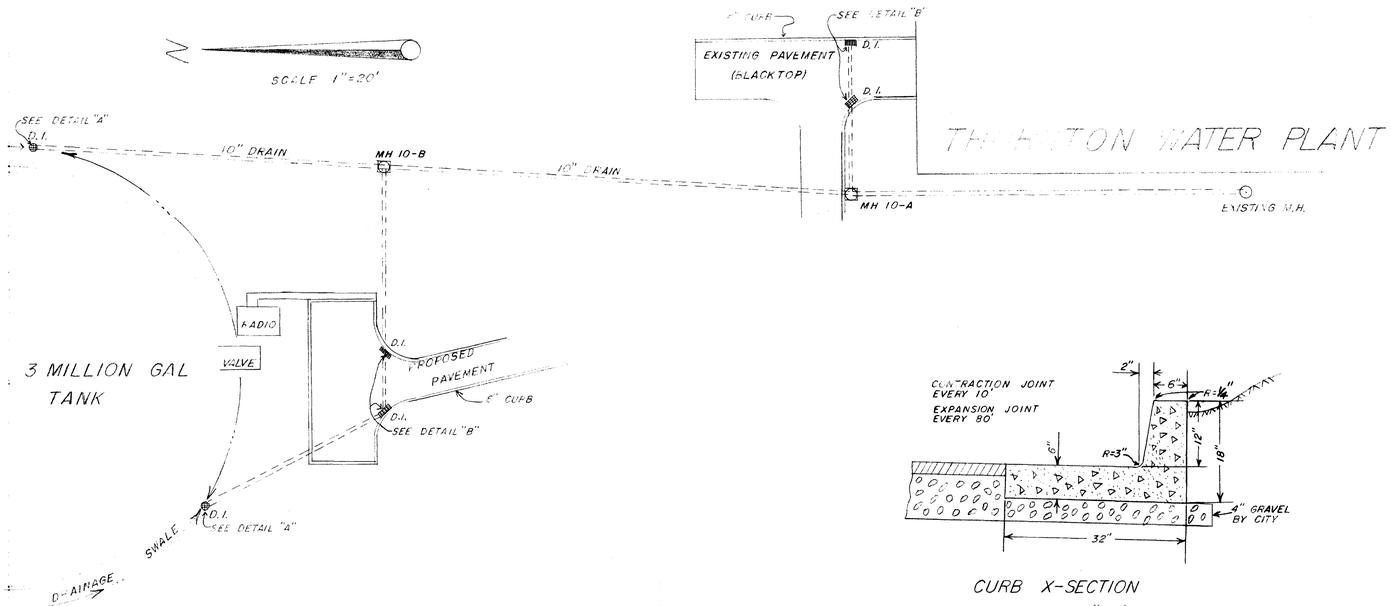
Northwest [illegible] Company
Thornton, Colorado

Date [illegible]

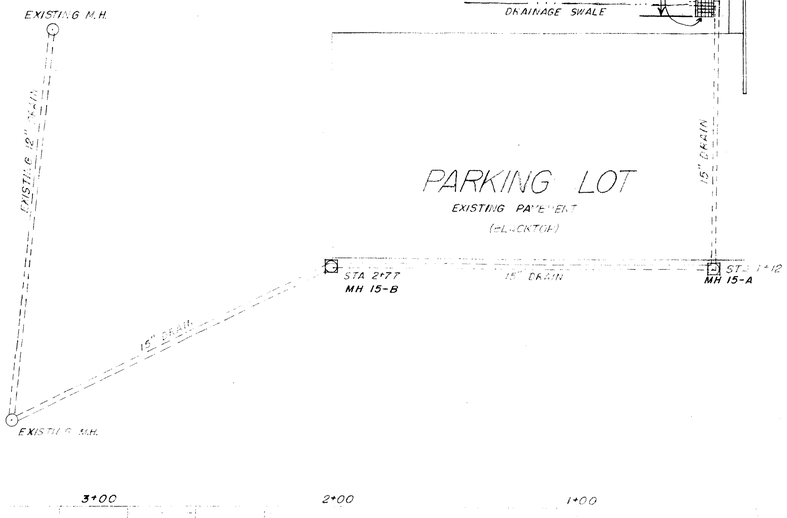
RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

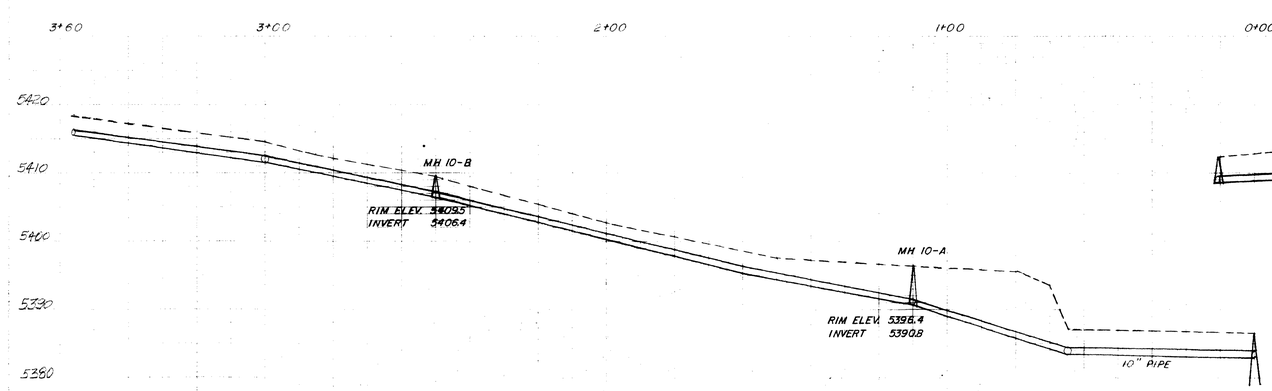
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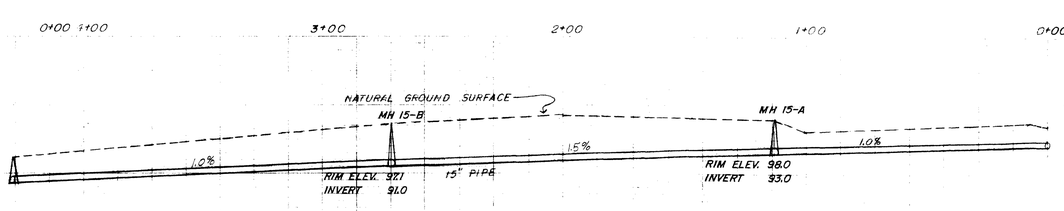
1-1-2



CURB X-SECTION
SCALE 1"=1'







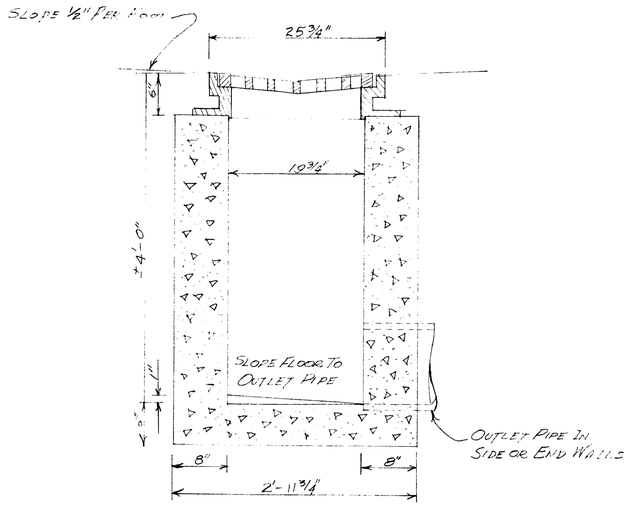
ROBERT V. GARLAND
REGISTERED
2405
PROFESSIONAL ENGINEER
STATE OF COLORADO

CITY OF THORNTON, COLORADO UTILITY DEPARTMENT	
THORNTON PLANT DRAINAGE PLAN	
DWG. BY: CSE DATE: 2-70	SCALE 1" = 20' 1" = 30'
APPROVED AVG	SHEET 1 OF 2 SHEETS

1-2-5

DRAWING NUMBER
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER D7SAR
DRAWING NUMBER
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER D7SAR
DRAWING NUMBER
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER D7SAR

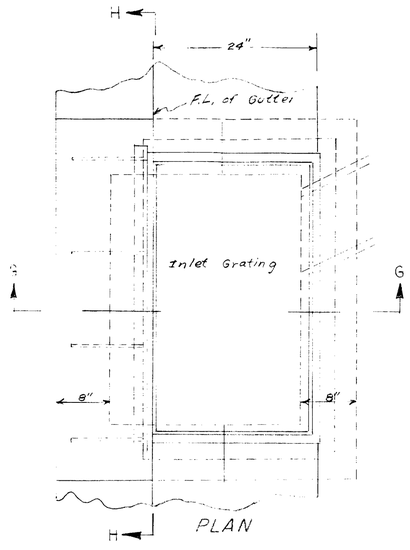
DETAIL "A"

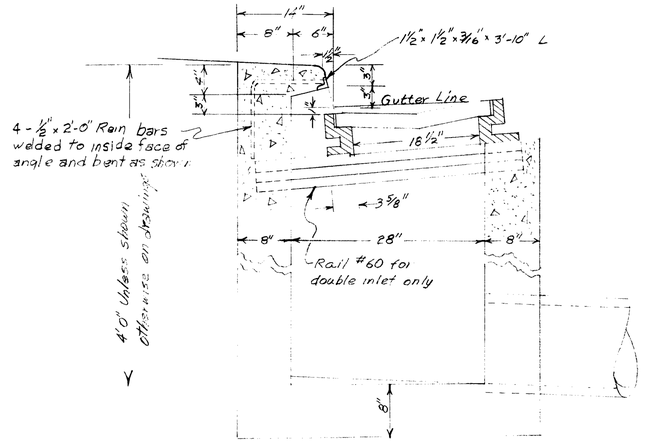


SECTION OF AN INLET FOR A VALLEY GUTTER

SCALE 1" = 1'-0"

DETAIL "B"

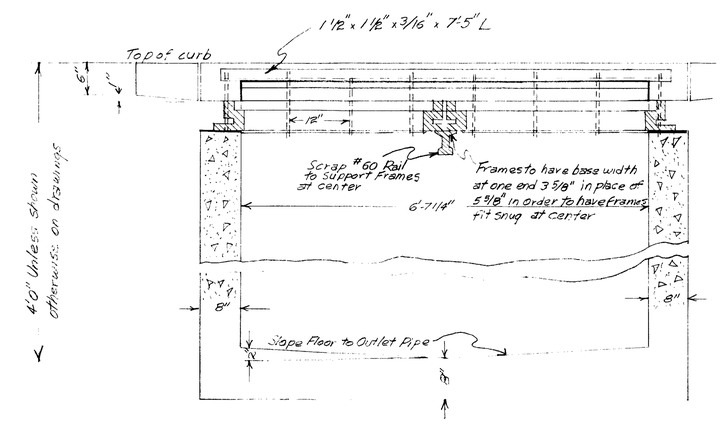


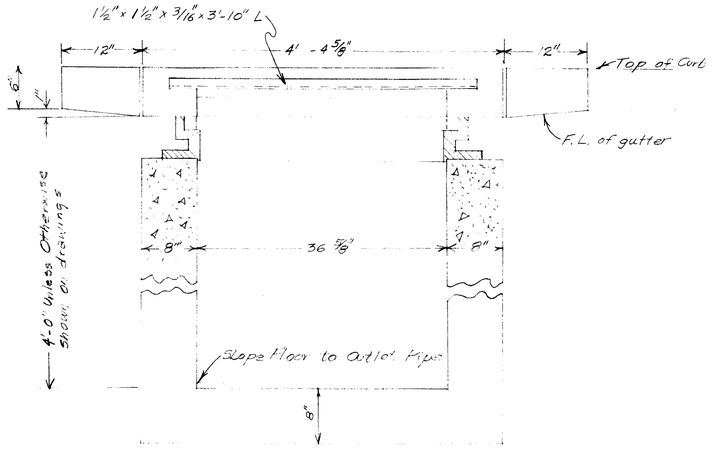


SINGLE INLET WITH OPENING IN 6" VERTICAL CURB

SCALE 1" = 1'-0"

DETAIL "C"





DOUBLE INLET WITH OPENING IN 6" VERTICAL CURB

SCALE 1" = 1'-0"

PRECAST CONCRETE

STANDARD MANHOLE DETAILS

SCALE ½" = 1'-0"

CITY OF THORNTON, COLORADO
UTILITY DEPARTMENT

THORNTON PLANT DRAINAGE PLAN

DWG. BY: CSR DATE: 2-70	SCALE 1" = 20' 1" = 30'
Approved [illegible]	SHEET 2 OF 2 SHEETS

~~5-27~~ 1-2-5

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548

DRAWING NUMBER

Approved
Thornton Water Treatment Plant Drainage Plan

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07548

ELECTRODE HOLDER IN RESERVOIR ROOF
13 14 15 16 17 18 19
1ST PUMP STOPS
2ND PUMP STOPS
3RD PUMP STOPS
1ST PUMP STARTS
2ND PUMP STARTS
3RD PUMP STARTS
LOW LEVEL ALARM

C.F. WARRICK UHZ RES. LEVEL CONTR. 40 H.P.
C.F. WARRICK UHZ RELAY BACKWASH RES. LEVEL CONTROL 15 HP
15 AMP. FUSIBLE DISCONNECT RESERVOIR LEVEL CONTROL

GE TIME CLOCK DISCONNECT AFTER INSTALLATION OF AUTO CONTROL & BACK WASH. RES.

GE COMBINATION MAGNETIC STARTER 40 H.P.

GE 15HP COMBINATION MAGNETIC STARTER

GE AK1 ACB MAIN DISCONNECT

15 AMP FUSIBLE DISCONNECT-TELEMETERING SUPPLY

H-O-A SELECTOR SWITCHES MUST BE IN AUTO. POSITION FOR AUTO OPER.
40 H.P. PUMP
15 H.P. PUMP

EQUIPMENT MOUNTED IN COVER (AS VIEWED FROM INSIDE)
B11 BELL SOUNDS AT LOW LEVEL
INDICATING PILOT LIGHT
LOW
2500Ω
ALARM SILENCE PUSH BUTTON
H-O-A SELECTOR SWITCHES
BOOSTER PUMP 3
BOOSTER PUMP 2
BOOSTER PUMP 1
NOTE: FOR 3 PUMP OPERATION REMOVE JUMPER B2-H3 BETWEEN TERMINALS 1 & 5 AND A1A2 CAM WHICH PREVENTS MOTOR FROM STOPPING IN NO. 3 POSITION.

TELEMETERING
2 R.P.M. NON-SYNC. MOTOR
BW1 6N RELAY
BW2 8N RELAY
BW3 8N RELAY
BW4 2S RELAY
BW5 D RELAY
50 VA TRANSFORMER 220 V. 60 ~ TO 110 V.
1 RPM SYNC MOTOR
HEATER THERMOSTAT
2 POLE CONTACTOR
150 WATT HEATER
TELEPHONE INSULATING TRANSFORMER TO PROVIDE SIMPLEXED CONTROL CIRCUIT
TEL. LINE TO PUMP HOUSE
TO TELEPHONE

WIRING GUTTER

M1 40 HP
M2 15 HP
C1 C2 C3 F1

G.E. 40 H.P. COMBINATION MAGNETIC STARTER
40 H.P. LEVEL CONTR. RELAY
15 H.P. LEVEL CONTR. RELAY
FUSIBLE DISCONN. RES. LEVEL CONTR.
H-O-A SEL. SW.
G.E. TIME CLOCK
G.E. 15 H.P. COMBINATION MAGNETIC STARTER
G.E. AK1 ACB MAIN DISCONNECT
FUSIBLE DISCONN. TELE.
TELEMETERING CABINET
WIRING GUTTER
CONDUIT C1 RES LEVEL CONTROL
CONDUIT F1 INCOMING FEED
CONDUIT M1 FEEDER 30 HP PUMP
SPARE
CONDUIT M2 FEEDER 15 H.P. PUMP
CONDUIT C2 CONTROL CABLE BACK WASH RES
CONDUIT C3 CONTROL CABLE FILTER PLANT

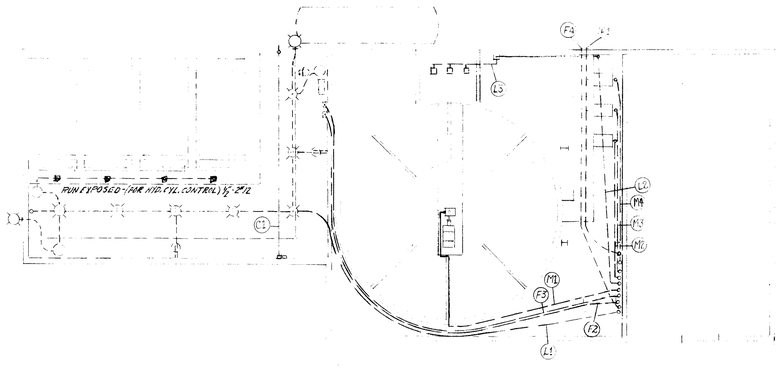
BURIED 8 CONDUCTOR CONTROL CABLE TO BACKWASH RESERVOIR (FUTURE)
ELECTRODE HOLDER BACKWASH RESERVOIR
PUMPS STOP
15 HP PUMP STARTS
40 HP PUMP STARTS
BURIED 8 CONDUCTOR CONTROL CABLE FROM RES. PUMP HOUSE TO WATER FILTER PLANT
H-O-A SELECTOR SWITCHES MOUNTED IN FILTER PLANT ON WEST WALL OF CONTROL ROOM PILOT LIGHT INDICATES "PUMP RUNNING" PUTTING SWITCHES IN AUTO. POS. WILL NOT PUT PUMPS INTO AUTOMATIC OPERATION UNLESS SWITCHES AT RESERVOIR PUMP HOUSE SET FOR AUTOMATIC OPERATION
40 H.P. PUMP
15 H.P. PUMP

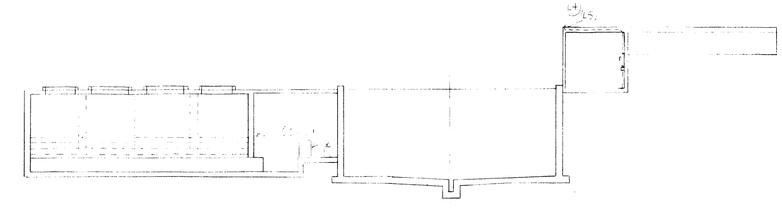
NORTHWEST UTILITIES CO.
RESERVOIR PUMPING STATION
ELECTRICAL INSTALLATION
WIRING DIAGRAM
RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO
DRAWN HRD 4-20-56
TRACED
CHECKED
REVISED
3

9

1-1-3

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER 01340





CONDUIT SCHEDULE

CND. NO.	SIZE	CONDUCTORS	SERVICE	H.P.	FROM	TO	REMARKS
C1	1"	10 #12					
F1	2"	2 #2	Main Feeder				
F2	3/4"	3 #8	Surge Wash Pump	10	Wiring Gutter	Starter	
F3	1/2"	3 #12	Air Compressor	3	Wiring Gutter	Starter	
F4	1"		Main Feeder				
C1		#10	Control Circuit		Lighting Panel		
C2	1/2	4 #12	Solenoid Valve		Wiring Gutter	Timer	
L3	1/2	4 #12	Solenoid Valve		Timer	Solenoid Valve	
L4	1"		Future				
L5	1"		Future				
M1	1"	3 #2 - 3 #4	Accelator Drive	3	Wiring Gutter	Accelator Motor	Furnish P.E.
M2	1/2	3 #12	Limestone Feeder	1/4	Wiring Gutter	Feeder Motor	
M3	1/2	3 #12	Alum Feeder	1/4	Wiring Gutter	Feeder Motor	
M4	1/2	3 #12	Soda Ash Feeder	1/4	Wiring Gutter	Feeder Motor	

DEVICE SCHEDULE

A	CHRONOFLO TRANSMITTER Model CTU-A
B	CHRONOFLO TOTALIZER, INDICATOR, RECORDER
C	A-B RELAY - Bulletin 700 - C20 Type 1 - 2 Pole N.O.
D	A-B RELAY - Bulletin 700 - B30 Type 1 - 3 Pole N.O.
E	GENERAL ELECTRIC AK-1-15 Air Circuit BREAKER-Gen. Purpose Encl-Wall mounted
F	G.E. CR 7006 COMB. MAG. STARTER NEMA SIZE-0 ½ HP Alum Feeder
G	G.E. CR 7006 COMB. MAG. STARTER NEMA SIZE-0 ½ HP Limestone Feeder
H	G.E. CR 7006 COMB. MAG. STARTER NEMA SIZE-0 ½ HP Soda Ash Feeder
J	G.E. CR 7006 COMB. MAG STARTER NEMA SIZE-1 3 HP Accelator Drive
K	D.P.-S.T. SNAP SW. with 3 Amp Fuse - By contractor
I	LIGHTING PANEL - 12 CKT. - MAINS with CKT. BRKRS. - By Contractor
	and Wire by Electrical Contractor

NOTE: All equipment & wire furnished by owner, unless otherwise specified

NORTH WEST UTILITIES
FILTER PLANT

ELECTRICAL INSTALLATION
GENERAL ARRANGEMENT & DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN Pace - Hall	REVISED	88-6-14
TRACED		4-1
CHECKED A.B.A.		

1-1-2

PLANS FOR

WATER TREATMENT PLANT EXPANSION

CITY OF THORNTON, COLORADO

CITY OF THORNTON, COLO.
UTILITIES DEPT.
1972

1 GENERAL LAYOUT - BLDG. ELEVATIONS
2 GENERAL LAYOUT - BLDG. ELEVATION - WALL DETAILS
3 FILTER BUILDING - ARCHITECTURAL DETAILS
4 FILTER BUILDING - ROOF PLANS
5 FILTER BUILDING - NEW OPERATING FLOOR PLAN
6 FILTER BUILDING - PIPE GALLERY FLOOR PLAN
7 FILTER BUILDING - PIER LAYOUT
8 FILTER BUILDING - CONCRETE SECTIONS
9 FILTER BUILDING - CONCRETE SECTIONS
10 FILTER BUILDING - CONCRETE SECTIONS
11 STANDARD CONCRETE DETAILS
12 FILTER BUILDING - HEATING
13 FILTER BUILDING - ELECTRICAL
14 FLOCCULATOR - CLARIFIER - BASIN PLAN
15 FLOCCULATOR - CLARIFIER - PIER PLAN - CONNECTION TO 20" HEADER
16 FLOCCULATOR - CLARIFIER - PIPING & DETAILS
17 FLOCCULATOR - CLARIFIER - SECTIONS & DETAILS

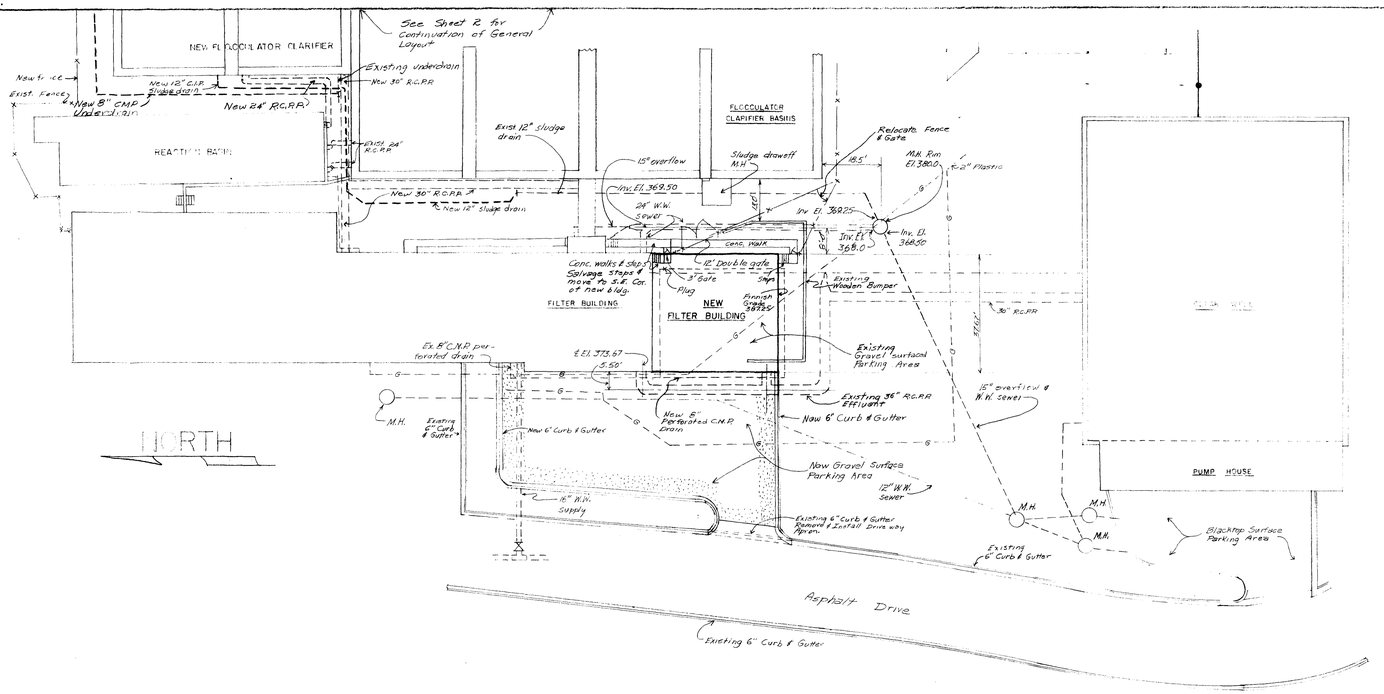
1-2-8
~~5-5-5~~

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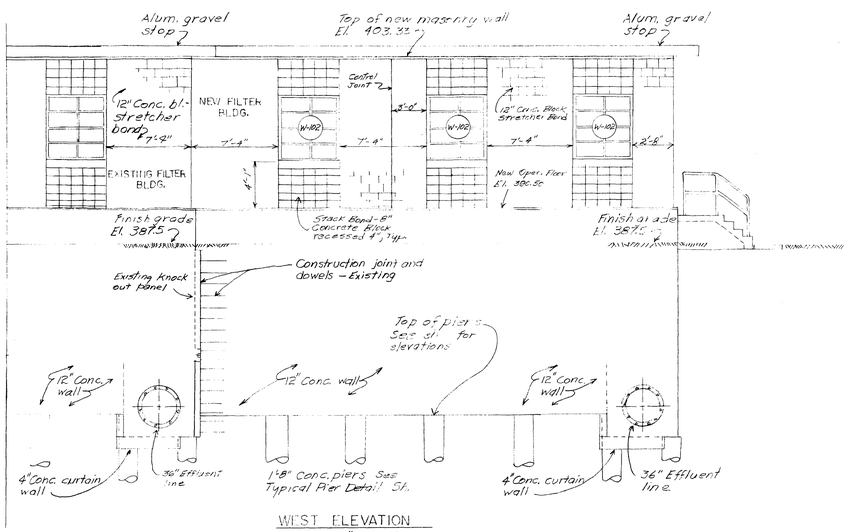
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DRAWING NUMBER

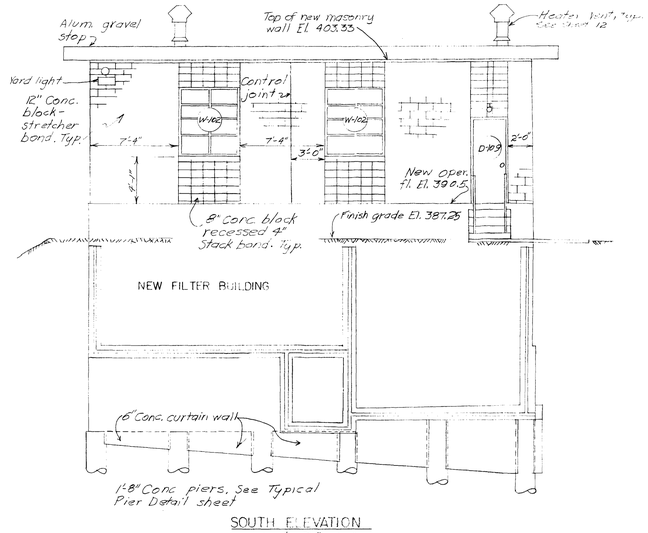
8-C-1



GENERAL LAYOUT
Scale 1" = 20'



WEST ELEVATION
Scale 3/16" = 1'-0"



SOUTH ELEVATION
Scale 3/16" = 1'-0"

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDER BY ALMANDO STOVER
ARCHITECTURE ENGINEERING PLANNING

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDER BY ALMANDO STOVER
ARCHITECTURE ENGINEERING PLANNING

DRAWING NUMBER

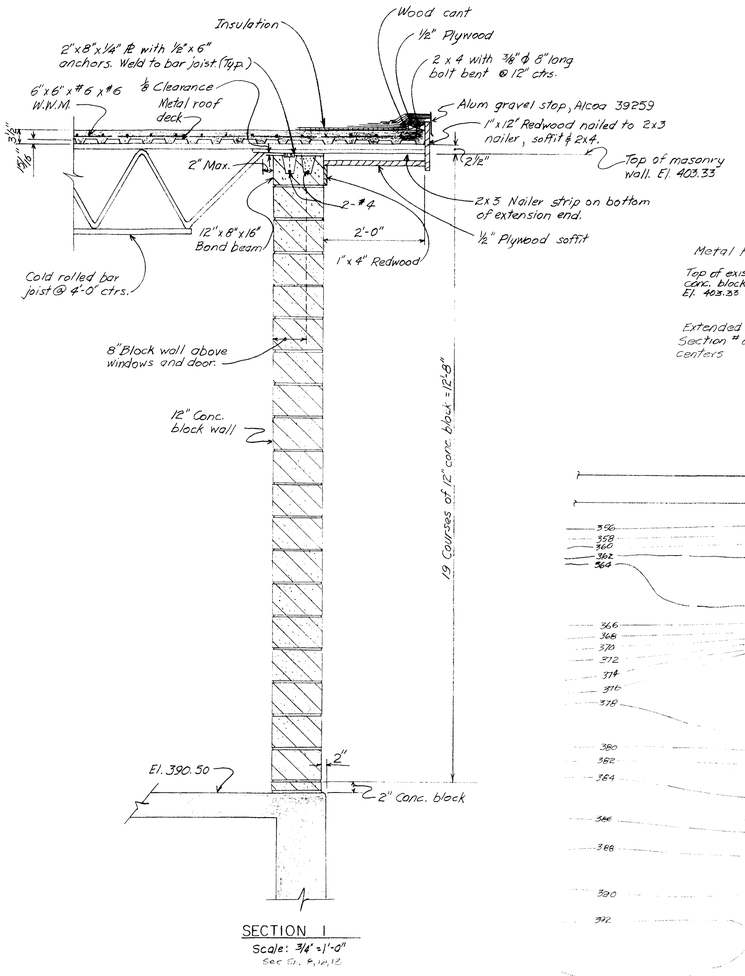
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDER BY ALMANDO STOVER
ARCHITECTURE ENGINEERING PLANNING

DRAWING NUMBER

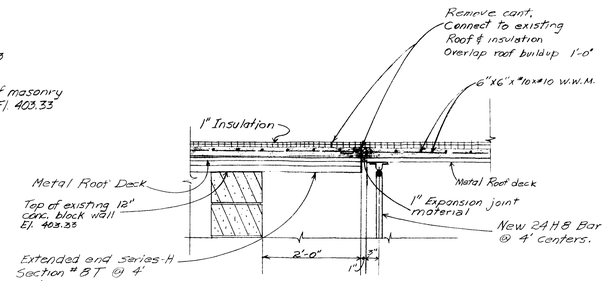
[illegible]
[illegible] PLANT EXPANSION
GENERAL LAYOUT & ELEVATIONS
[illegible] DEPT.

BY:	SHD:	DATE:	SHEET
GSR	1104	15 JUNE 1972	1 OF 17

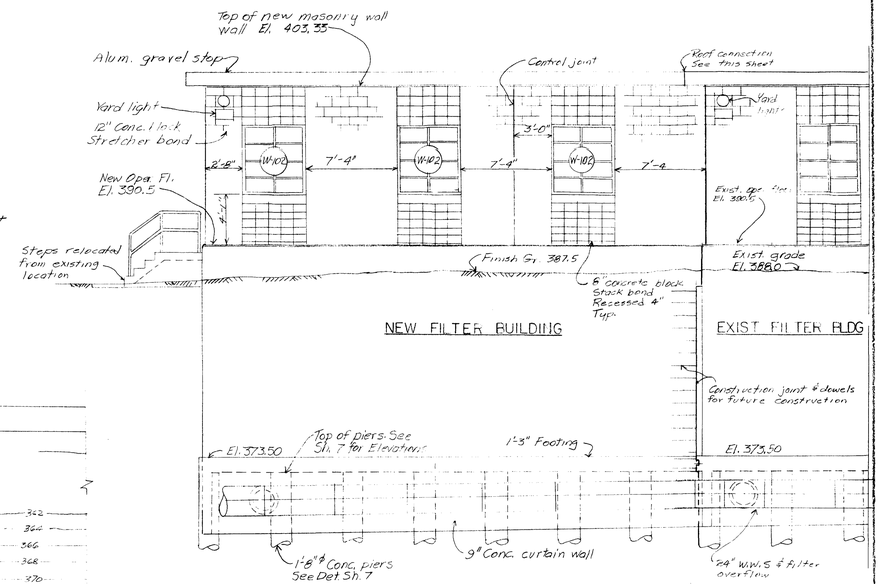
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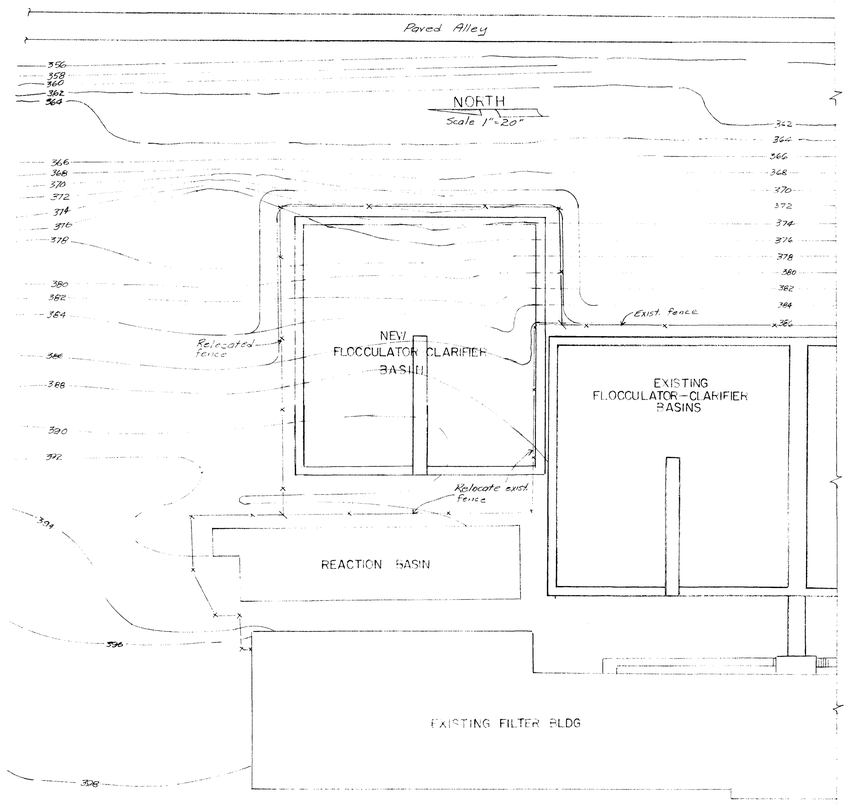
SECTION 1
Scale: 3/4" = 1'-0"
See Sh. 5, 11, 12



ROOFING CONNECTION TO EXISTING BLDG
Scale: 3/4" = 1'-0"



EAST ELEVATION
Scale 3/16" = 1'-0"



GENERAL LAYOUT

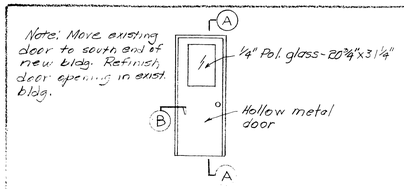
THORNTON, COLORADO			
WATER TREATMENT PLANT EXPANSION			
FILTER BUILDING WALL DETAILS GENERAL LAYOUT			
CITY OF THORNTON UTILITIES DEPT.			
DWG.	CHKD.	DATE	SHEET
		15 JUNE 1972	2 OF 17

1-2-8 ~~5-3-5~~

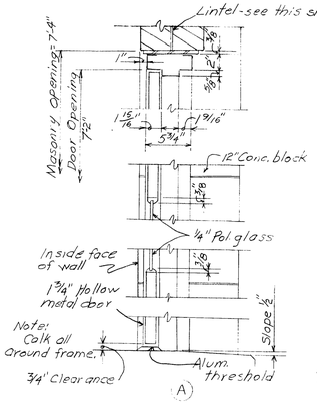
DRAWING NUMBER
PLAN HOLD DOWN DESIGN • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

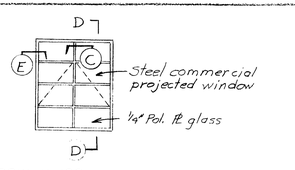
DRAWING NUMBER
Addenda
PLAN HOLD DOWN DESIGN • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER
Thornton Water Treatment Plant Expansion
PLAN HOLD DOWN DESIGN • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

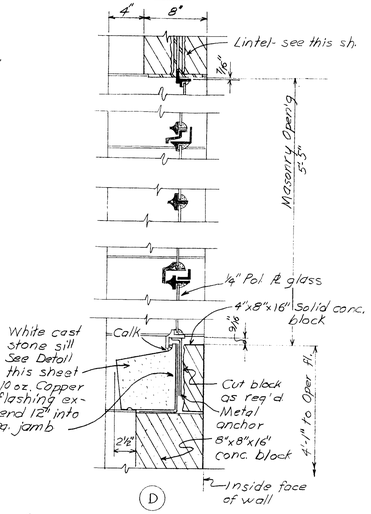


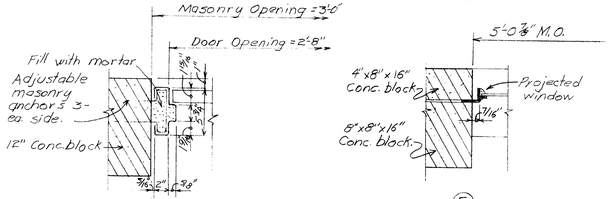
DOOR D-109





WINDOW W-102



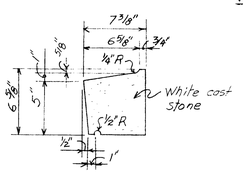


DOOR D-109 DETAIL
Scale 1 1/2" = 1'-0"

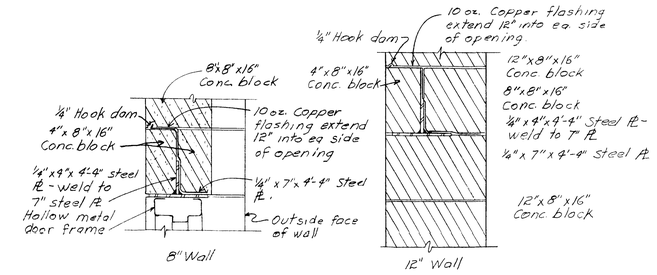


Note: Min. thickness of any section of window is 1/4".

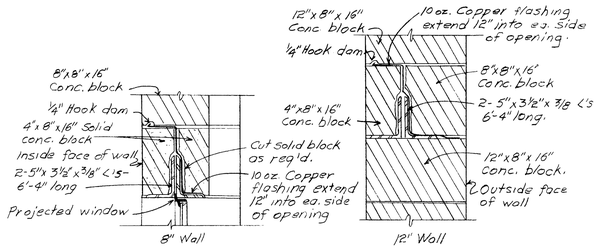
WINDOW W-102 DETAILS



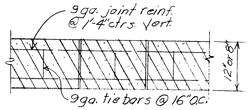
WINDOW SILL DETAIL
Scale: 1 1/2" = 1'-0"



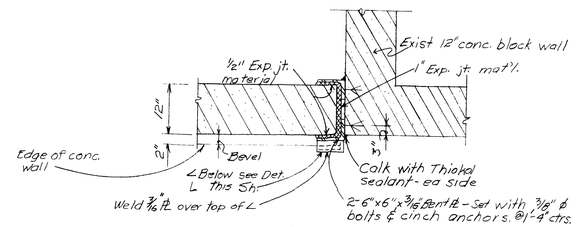
DOOR LINTELS - D-109
Scale 1 1/2" = 1'-0"



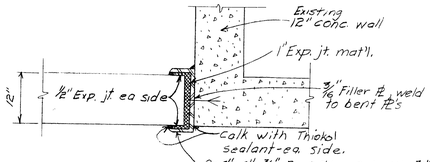
WINDOW LINTELS W-102
Scale 1 1/2" = 1'-0"



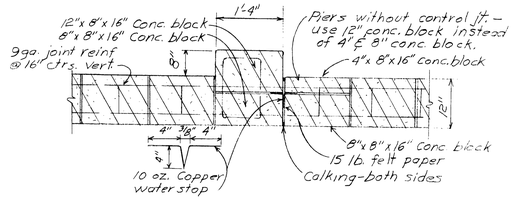
MASONRY WALL REINF.
Scale 3/4" = 1'-0"



DETAIL K
Scale 3/4" = 1'-0"



DETAIL L
Scale 3/4" = 1'-0"



PILASTER CONTROL JOINT
Scale 3/4" = 1'-0"

THORNTON, COLORADO

WATER TREATMENT PLANT EXPANSION

FILTER BUILDING
ARCHITECTURAL DETAILS

CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHK'D	DATE	SHEET
ESP	RVG	15 JUNE 1972	3 OF 17

1-2-8

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

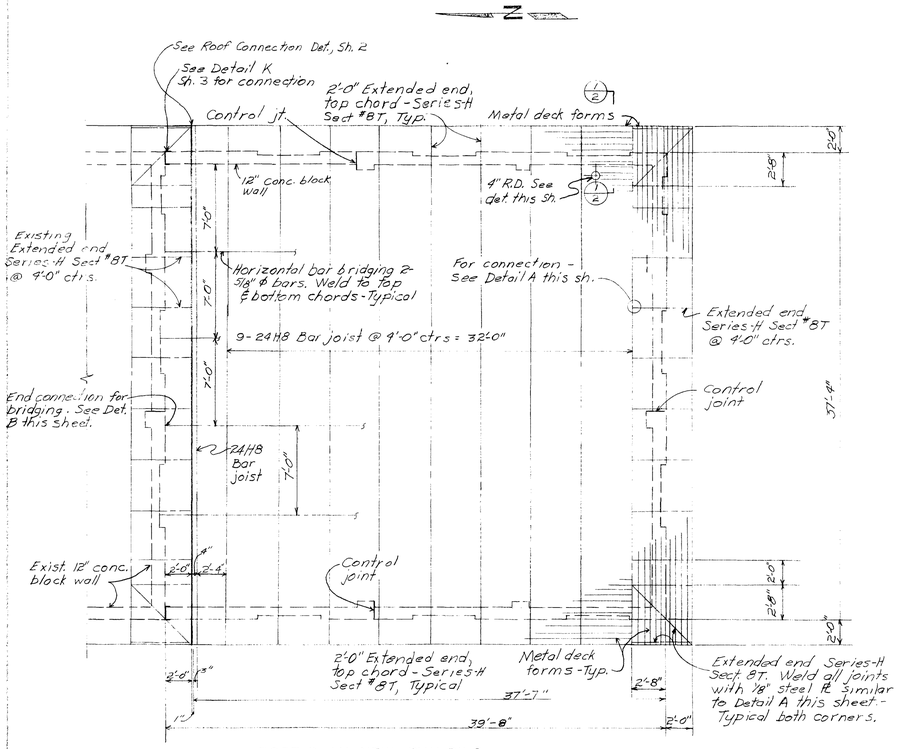
Addendum

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

DRAWING NUMBER

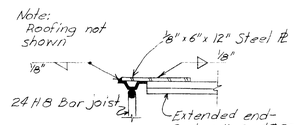
Thornton Water Treatment Plant Expansion

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY



ROOF PLAN NEW BUILDING

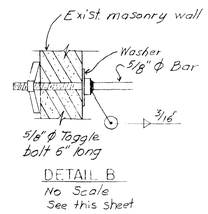
Scale 3/16"=1'0"



DETAIL A

Scale 1"=1'0"

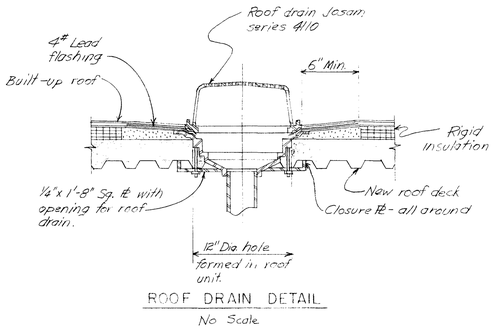
See this sheet



DETAIL B

No Scale

See this sheet



ROOF DRAIN DETAIL

No Scale

THORNTON, COLORADO

WATER TREATMENT PLANT EXPANSION

FILTER BUILDING
ROOF PLANS

CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
[illegible]	RVG	15 JUNE 1972	4 OF 17

1-2-8 ~~5-3-5~~

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA

REORDER BY NUMBER ST-1241

PRINTED IN USA BY PLAN HOLD CORP. IRVINE, CALIFORNIA

DRAWING NUMBER

Addition

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA

REORDER BY NUMBER ST-1241

PRINTED IN USA BY PLAN HOLD CORP. IRVINE, CALIFORNIA

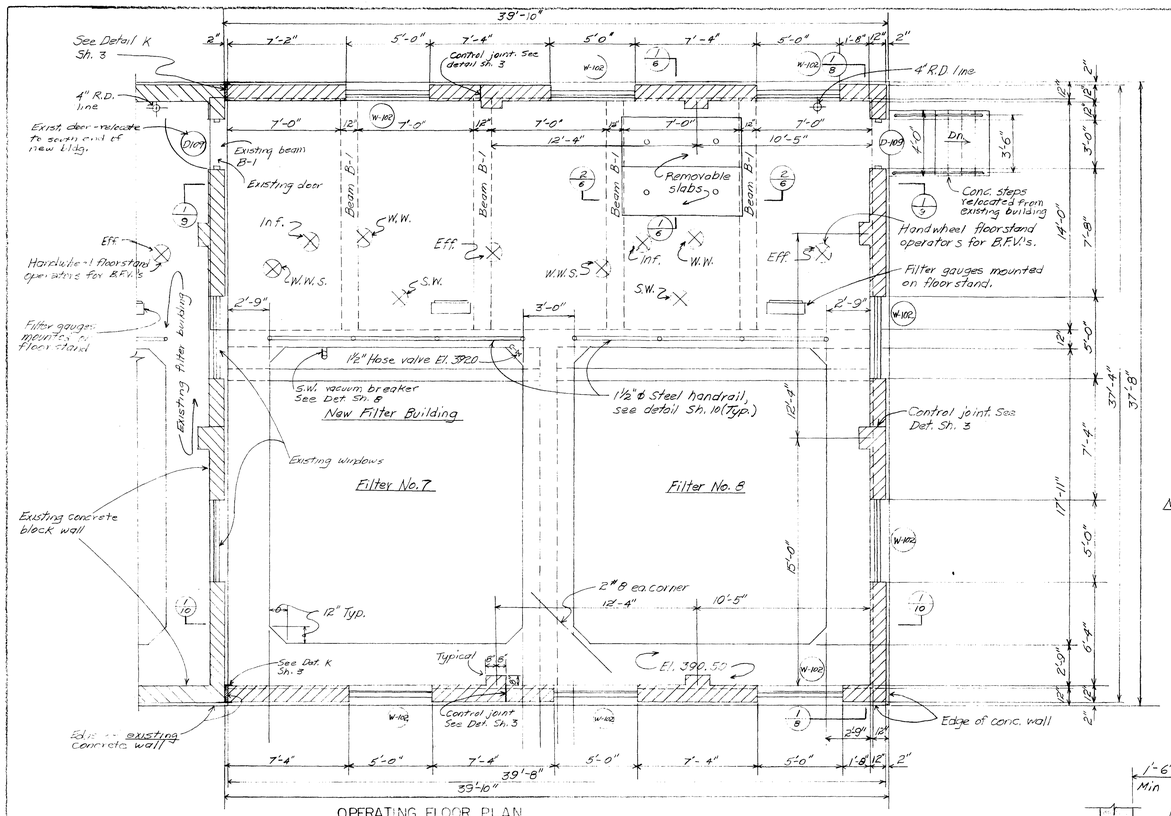
DRAWING NUMBER

Thornton Water Treatment Plant Expansion

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA

REORDER BY NUMBER ST-1241

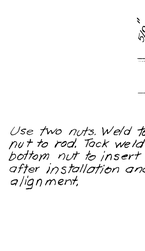
PRINTED IN USA BY PLAN HOLD CORP. IRVINE, CALIFORNIA



OPERATING FLOOR PLAN

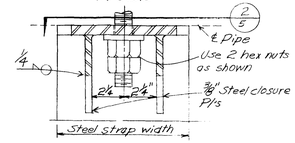
Scale: 1/4" = 1'-0"

Note: Locations shown for valve operators & filter gauges are approximate. Exact location will be determined by equip. furnished.



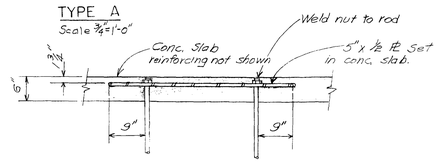
SECTION 2

No Scale.



SECTION 1

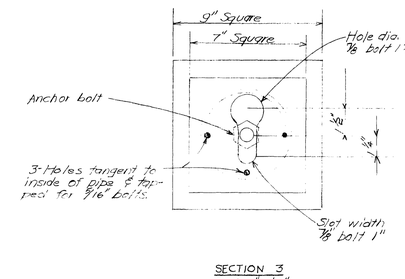
No Scale



Note: Type B hanger is similar to Type A except for conc. anchorage.

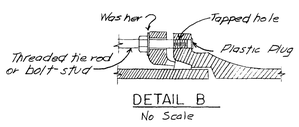
TYPE B

Scale ¾"=1'-0"



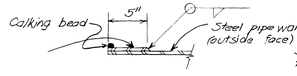
SECTION 3

Scale 3"=1'-0"



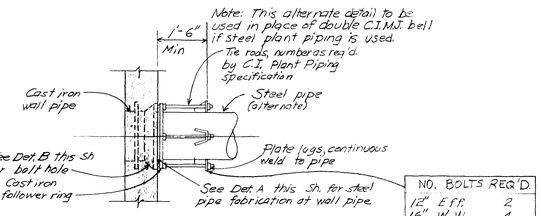
DETAIL B

No Scale



DETAIL A

No Scale

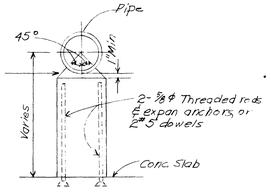


STEEL PIPE TO C.I. WALL PIPE ANCHOR DETAIL

No Scale

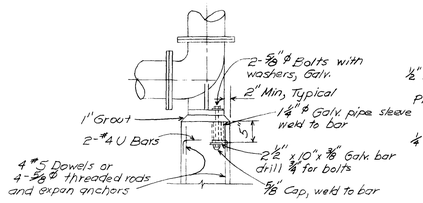
NO. BOLTS REQ'D	
12" Eff.	2
16" W.W.	4
16" Inf.	None
20" W.W.S.	4
4" S.W.	2

PIPE HANGER DETAILS



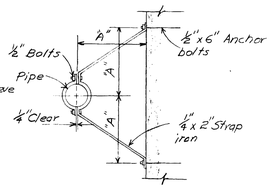
TYPICAL CONCRETE PIPE SUPPORT DETAIL

No Scale.



TYPICAL PIPE BASE DETAIL

No Scale



PIPE SUPPORT DETAIL D

No Scale

LEGEND

Inf.	Influent
S.W.	Surface wash supply
W.W.	Wash water
W.W.S.	Wash water sewer
Eff.	Filter effluent

THORNTON, COLORADO			
WATER TREATMENT PLANT EXPANSION			
FILTER BUILDING NEW OPERATING FLOOR PLAN			
CITY OF THORNTON UTILITIES DEPT.			
DWG. 65	CHKD. RJG	DATE 15 JUNE 1972	SHEET 5 OF 17

1-2-8 ~~5-3-5~~

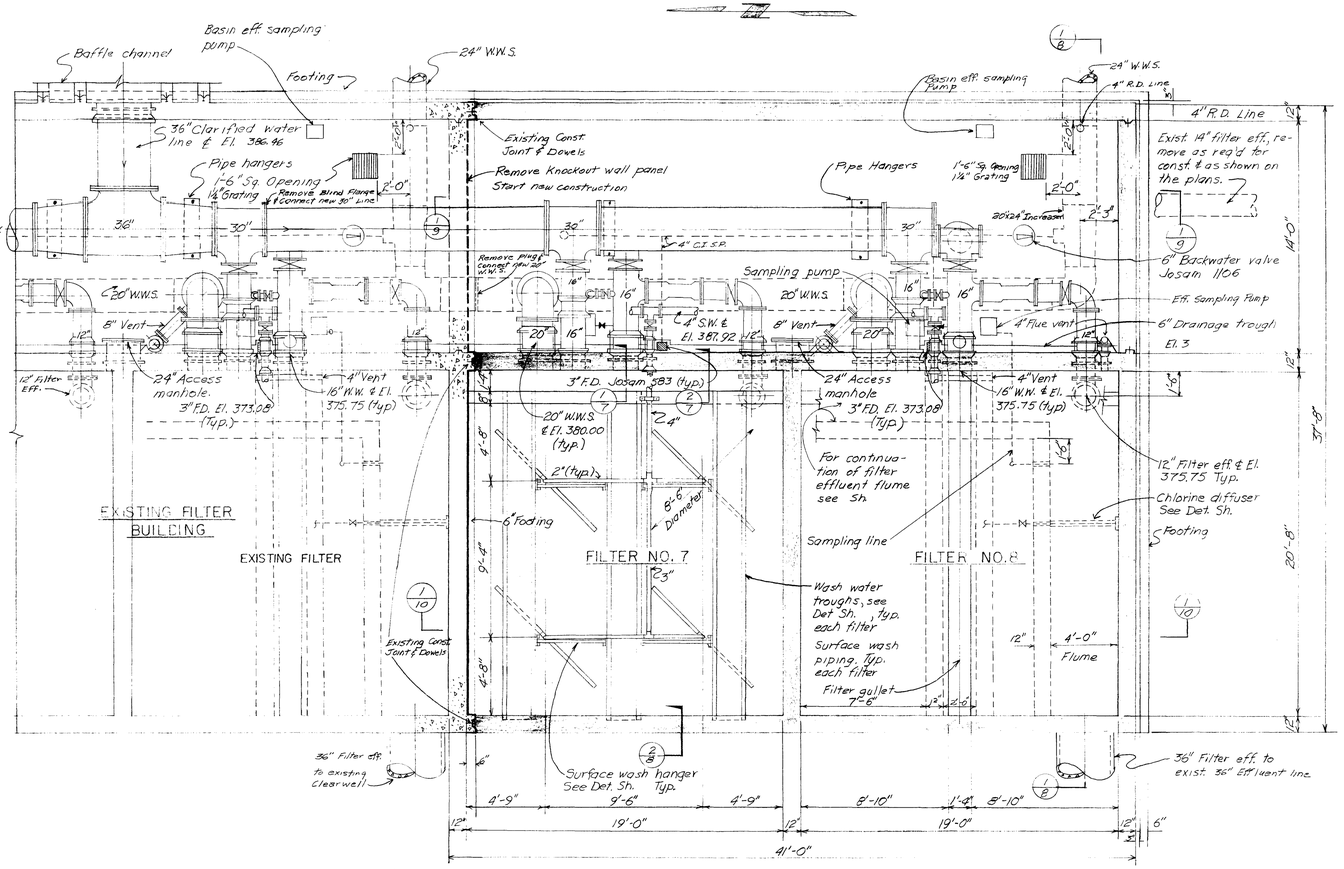
DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
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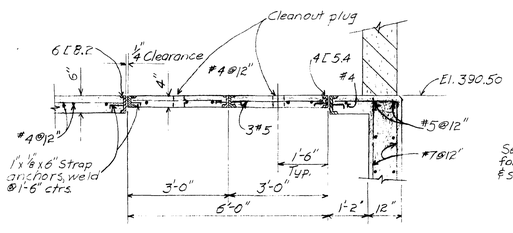
DRAWING NUMBER

Thornton Water Treatment Plant Expansion

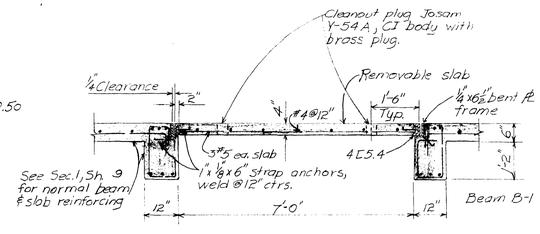
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07040



NEW FILTER BUILDING
BASEMENT FLOOR PLAN
Scale: 1/4" = 1'-0"



SECTION 1
Scale: 3/8" = 1'-0"
See Sheet 5



SECTION 2
Scale: 3/8" = 1'-0"
See Sheet 5

THORNTON, COLORADO
WATER TREATMENT PLANT EXPANSION
FILTER BUILDING
PIPE GALLERY FLOOR PLAN
CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
[illegible]	RVH	15 JUNE 1972	6 OF 17

1-2-8 ~~5-3-5~~

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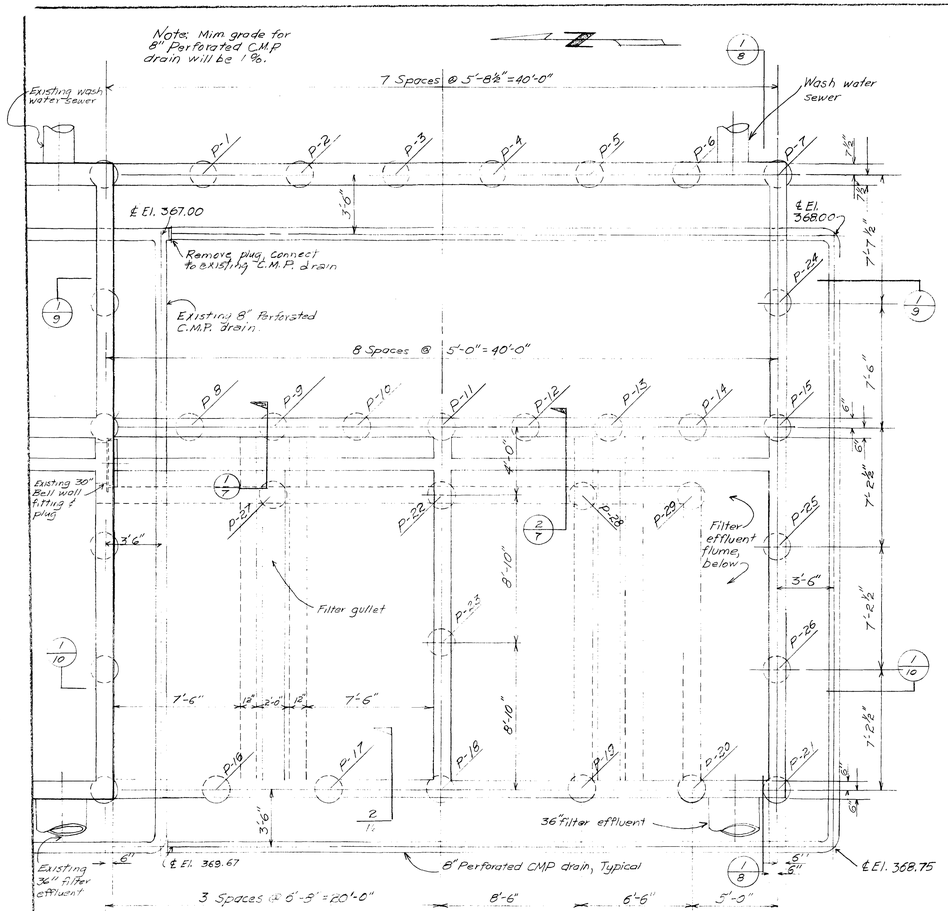
Arapahoe

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DRAWING NUMBER

Arapahoe Water Treatment Plant Expansion

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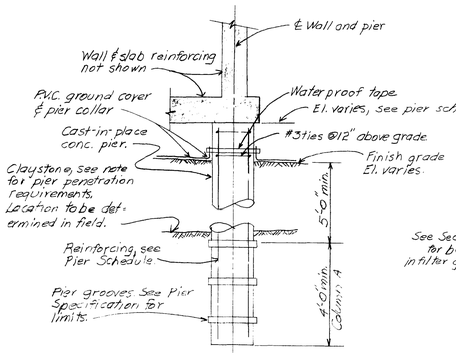
Note: Wall footings not shown this layout.

PIER LAYOUT
Scale 1/4" = 1'-0"

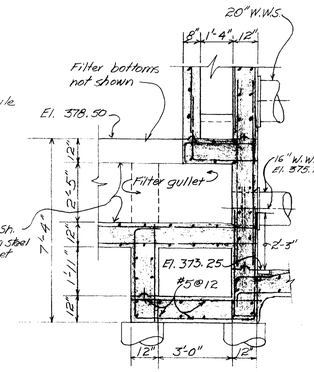
Note: Column A denotes length of pier into claystone that is required to develop side shear. The top 5 feet of pier below finish grade shall not be considered as developing side shear, even if in claystone. The minimum length of any pier below finish subgrade is thus 9 feet. All piers are 1'-8" in diameter unless noted otherwise. Piers are located on center lines of walls.

PIER SCHEDULE

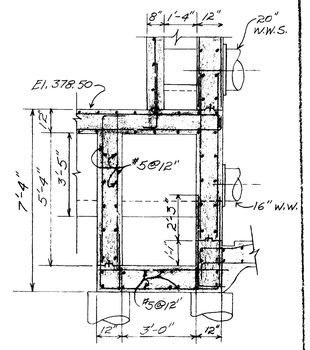
Pier	Top Elev.	Col. A See Note	Reinforcing
P-1	72.25	4 ft.	3 #5
2	72.25	4	
3	72.25	4	
4	72.25	4	
5	72.25	4	
6	72.25	4	
7	72.25	4	
8	71.17	6	
9	71.17	6	
10	71.17	6	
11	71.17	12	
12	71.17	6	
13	71.17	6	
14	71.17	6	
15	71.17	11	
16	73.08	7	
17	73.08	7	
18	73.08	13	
19	73.08	7	
20	73.08	7	
21	71.17	8	
22	71.17	10	
23	77.50	7	
24	72.25	4	3 #6
25	71.17	9	4 #5
26	71.17	9	4 #5
27	71.17	16	3 #5
28	71.17	10	4 #5
29	71.17	10	4 #5



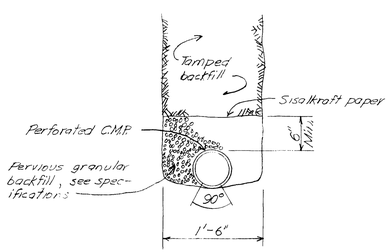
TYPICAL FILTER BUILDING PIER DETAIL
No Scale
See This Sheet



SECTION 1
Scale 3/8" = 1'-0"



SECTION 2
Scale 3/8" = 1'-0"



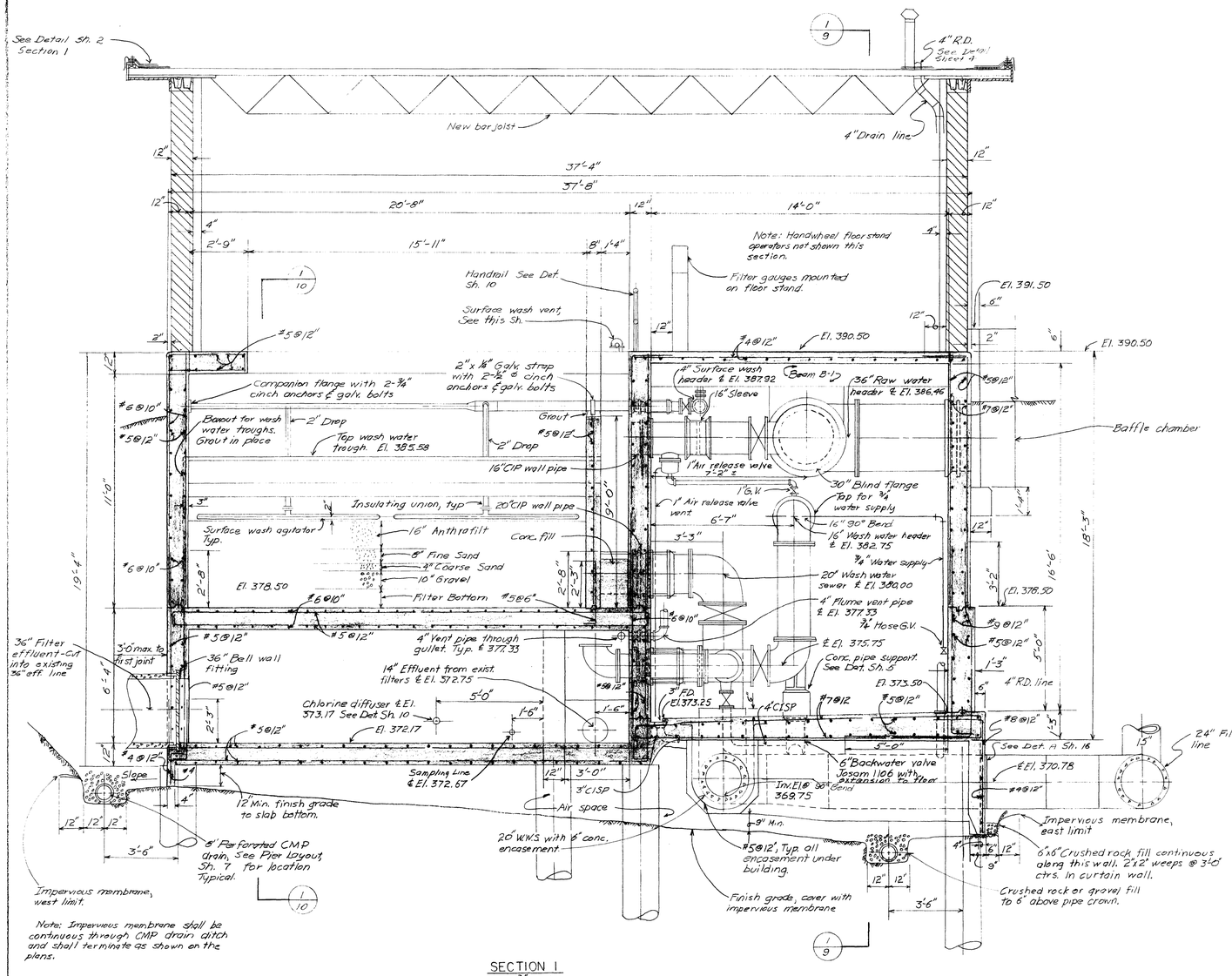
TYPICAL PERFORATED UNDERDRAIN DETAIL
Scale: 1" = 1'-0"

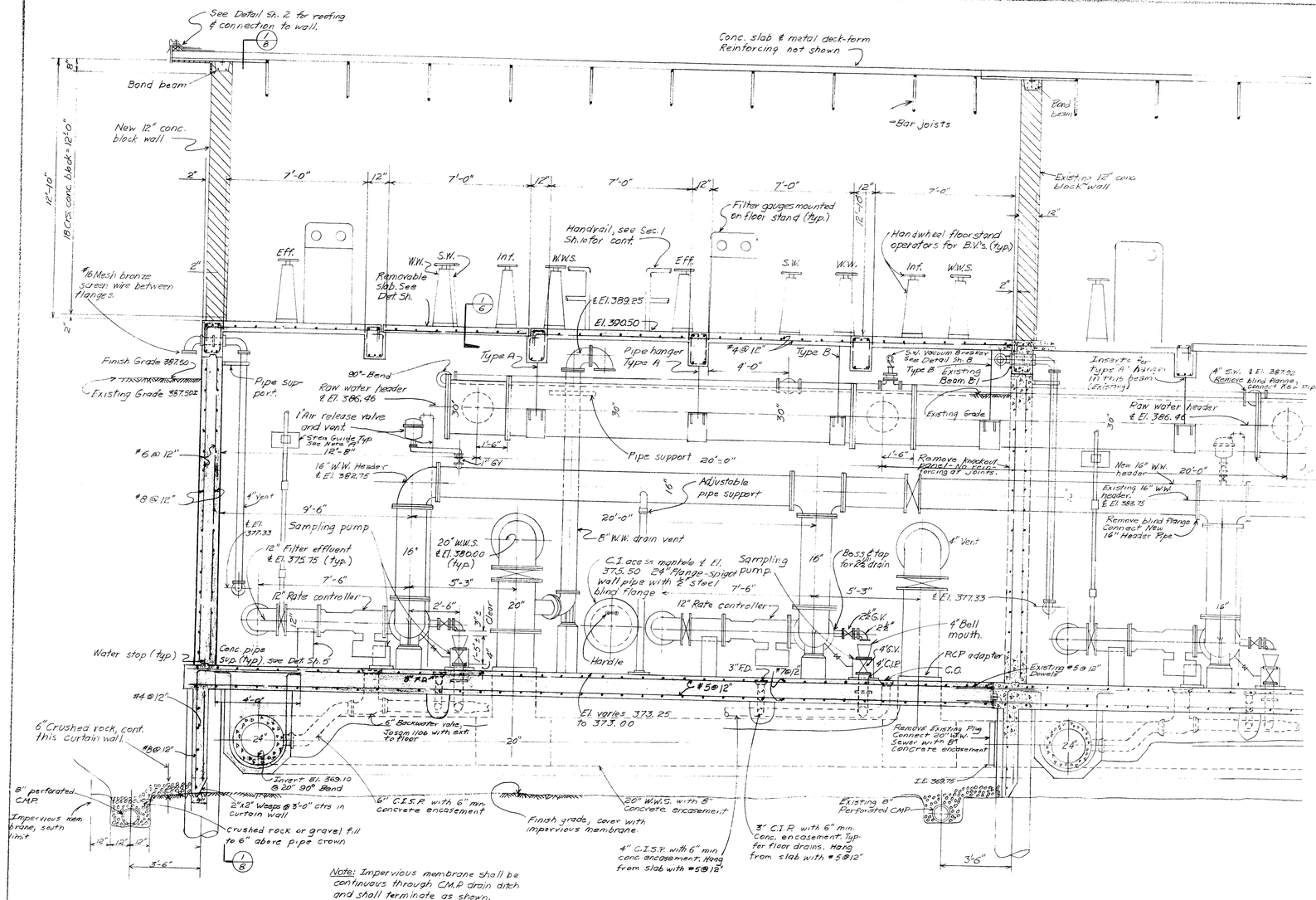
THORNTON, COLORADO
WATER TREATMENT PLANT EXPANSION
FILTER BUILDING
PIER LAYOUT
CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
	RVG	15 JUNE 1972	7 OF 17

1-2-8

DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER D75A1


See Detail Sh. 2 Section 1
4" R.D. See Detail Sheet 4
New bar joist
4" Drain line
37'-4"
37'-8"
20'-8"
14'-0"
15'-11"
2'-9"
8" 1'-4"
Note: Handwheel floor stand operators not shown this section.
Filter gauges mounted on floor stand.
Handrail See Det. Sh. 10
Surface wash vent, See this Sh.
El. 391.50
El. 390.50
#5@12"
#6@10"
#4@12"
2"x ¼" Galv. strap with 2-⅝" ø cinch anchors & galv. bolts
Companion flange with 2-⅞" cinch anchors & galv. bolts
Grout
Baffle chamber
Beam B-1
4" Surface wash header & El. 387.92
16" Sleeve
36" Raw water header & El. 386.46
#7@12"
Baffle chamber
Bevel wall between piers
Perforated CMP drain trench
20" ø Pier
1" Air release valve
1" G.V.
30" Blind flange
Top for ¾" water supply
1" Air release valve vent
6'-7"
16" 90° Bend
16" Wash water header & El. 382.75
¾" Water supply
20" Wash water sewer & El. 380.00
4" Flume vent pipe & El. 377.33
¾" Hose G.V.
El. 375.75
Conc. pipe support. See Det. Sh. 5
El. 373.50
4" R.D. line
3" FD El. 373.25
4" CISP
#8@12"
#9@12"
#5@12"
#6@10"
#4@12"
#5@12"
#7@12"
#5@12"
#5@12"
#5



SECTION 1
Scale: 3/8" = 1'-0"
See sh. 5, 6 & 7

Note "A" Provide stem guides on all extension stems where floor stand base to B.F.V. ℄ is 10' or greater.

THORNTON, COLORADO			
WATER TREATMENT PLANT EXPANSION			
FILTER BUILDING CONCRETE SECTIONS			
CITY OF THORNTON UTILITIES DEPT.			
DWG. ESR	CHKD. WJG	DATE 15 JUNE 1972	SHEET 9 OF 17

1-2-8

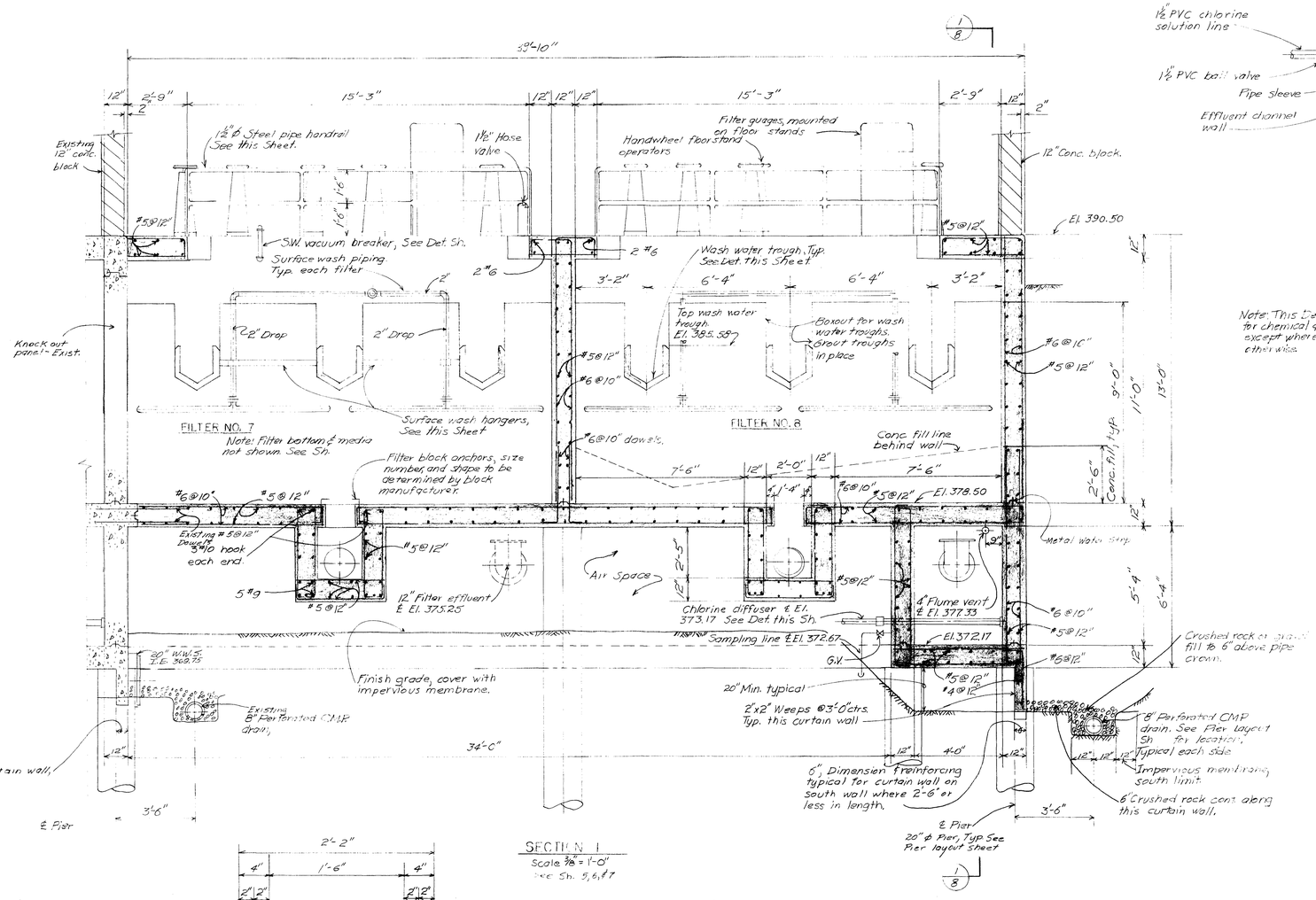
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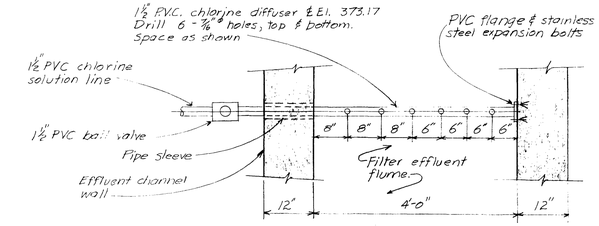
PLANNED CORPORATION • IRVINE, CALIFORNIA
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DRAWING NUMBER
Arch-E

PLANNED CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY

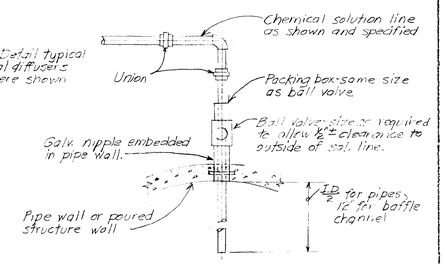
DRAWING NUMBER
Thornton Water Treatment Plant Expansion





CHLORINE DIFFUSER IN FILTER EFFLUENT FLUME

Scale: ¾"=1'-0"



Note: This Detail typical for chemical diffusers except where shown otherwise.

CHEMICAL SOLUTION DIFFUSER DETAIL

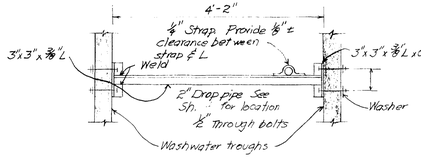
No Scale

See Sh. 6, 5 & 11

SECTION 1

Scale ⅜"=1'-0"

See Sh. 5, 6, & 7

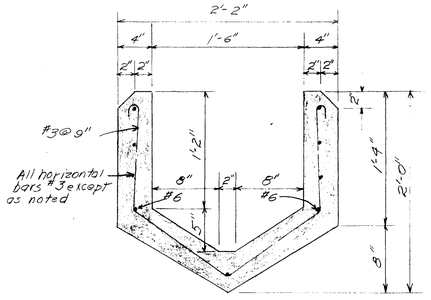


PLAN - SURFACE WASH HANGERS

Scale ¾"=1'-0"

See Sh. 6 & 10

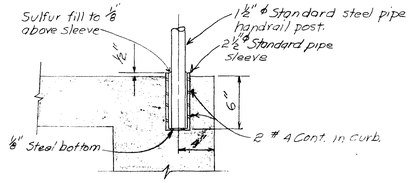
Note
All angles, straps and washers to be 9g/n steel. All bolts & nuts to be stainless steel. Holes for bolts to be field drilled



TYPICAL SECTION WASH WATER TROUGH

Scale 1½"=1'-0"

See Sh. 6, 8, & 10



TYPICAL HANDRAIL POST DETAIL

No Scale

THORNTON, COLORADO

WATER TREATMENT PLANT EXPANSION

FILTER BUILDING CONCRETE SECTIONS

CITY OF THORNTON UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
GRC	RVG	15 JUNE 1972	10 OF 17

1-2-8 ~~5-3-5~~

DRAWING NUMBER

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RECORDED BY NUMBER 07254

POSITION 1000 OF PRINT ON THIS LINE

DRAWING NUMBER

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PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA

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POSITION 1000 OF PRINT ON THIS LINE

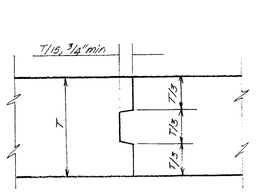
DRAWING NUMBER

Thornton Water Treatment Plant Expansion

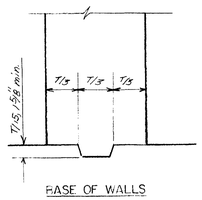
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA

RECORDED BY NUMBER 07254

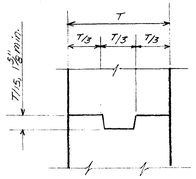
POSITION 1000 OF PRINT ON THIS LINE



SLABS

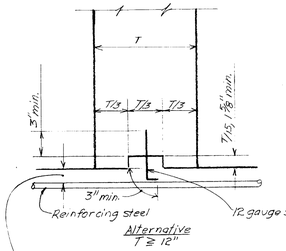


BASE OF WALLS

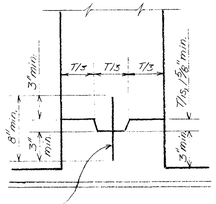


WALLS

JOINTS WITHOUT WATER STOPS

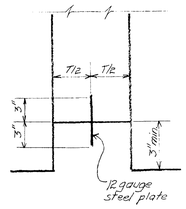


Alternative
T ≥ 12"

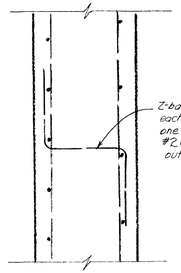


Alternative
T ≥ 12"

BASE OF WALLS



T < 12"



SPACERS FOR WALL REINFORCEMENT

BAR SIZE	LENGTH OF LAPPED SPLICES FOR REINFORCING IN INCHES		LENGTH OF EMBEDMENT FOR END ANCHORAGE OF REINFORCING IN INCHES	
	* TOP BARS	OTHERS	* TOP BARS	OTHERS
3	14	14	12	12
4	18	18	12	12
5	23	23	13	12
6	27	27	18	13
7	33	32	25	18
8	43	36	32	23
9	55	41	41	29
10	69	49	52	37
11	86	60	64	45
14	← Not Permitted →		86	62
18	← Not Permitted →		117	82

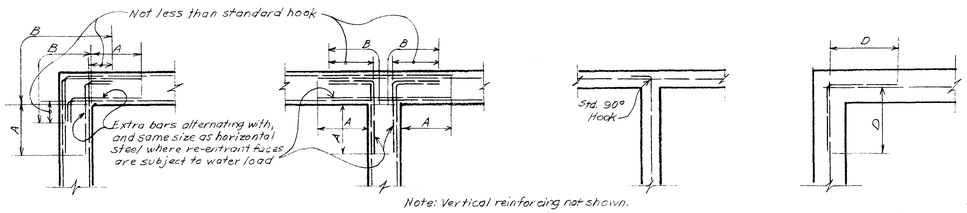
* Top bars are horizontal bars so placed that more than 12" of concrete is cast in the member below the bar. Horizontal bars in walls are to be provided with laps as required for top bars.

Except as otherwise indicated on the plans, embedment lengths for end anchorage and lapped splices shall be not less than (no minus tolerance) shown above. Lapped splices shall not be made at points of maximum stress as determined by the Engineer, and shall not be spaced closer than 12 bar diameters. No more than 1/2 of the bars shall be spliced within a length of 40 bar diameters.

CONCRETE COVER FOR REINFORCEMENT

LOCATION	MINIMUM COVER
Unformed surfaces adjacent to excavation	3"
Formed or top surfaces exposed to weather or saturated air, submerged or in contact with earth	
#6 or larger bars	2"
#5 or smaller bars	1 1/2"
Other locations	
Bars in beams or girders, including stirrups	1 1/2"
Column spirals or ties	1 1/2"
Other bars #7 or larger	Bar Diameter
Other bars #6 or smaller	3/4"

Cover for reinforcing steel shall not be less than the minimum given above (no minus tolerance), and shall not exceed the minimum by more than 1/2 inch where the concrete thickness is 24 inches or less, or more than 1/2 inch where the concrete thickness is more than 24 inches.



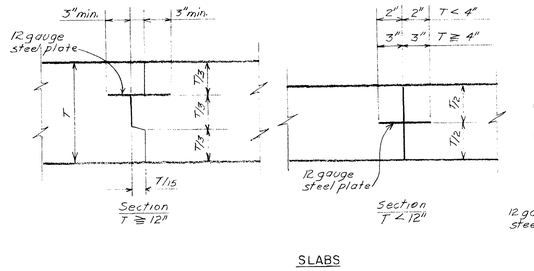
Note: Vertical reinforcing not shown.

A = 1/5 the clear span distance measured horizontally or vertically, whichever is the smaller; but in no case less than the required length of lapped splices for top bars as shown on this sheet.

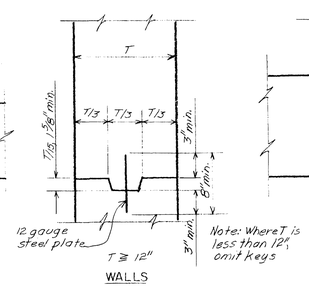
B = Sufficient length to permit bars to extend through the wall to the opposite face and terminate in a standard hook but shall not be less than the length required for embedment of top bars, as shown on this sheet.

D = not less than the length required for lapped splices for top bars, as shown on this sheet.

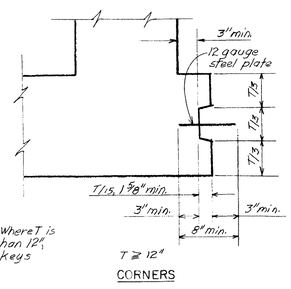
TYPICAL CORNER REINFORCING DETAILS



SLABS



WALLS

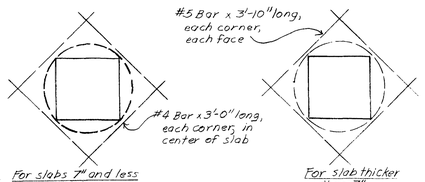


CORNERS

WATERTIGHT JOINTS

TYPICAL CONSTRUCTION JOINTS

Note: Reinforcing steel is to be carried across all construction joints.

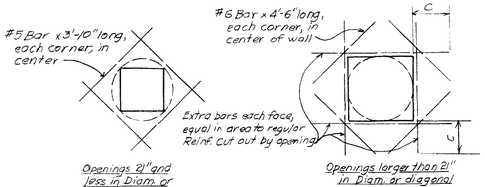


For slabs 7" and less in thickness

For slab thicker than 7"

Note: These details apply to openings larger than 18" in Diam. or diagonal.

SLABS



Openings 21" and less in Diam. or diagonal

Openings larger than 21" in Diam. or diagonal

C = the required length for lapped splice for top bars as shown on this sheet.

WALLS

TYPICAL EXTRA REINFORCING AT OPENINGS

GENERAL NOTE:

Details on this sheet apply to the entire set of plans except where specifically shown otherwise.

THORNTON, COLORADO
WATER TREATMENT PLANT EXPANSION
STANDARD CONCRETE DETAILS
CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
	RVG	15 JUNE 1972	11 OF 17

1-2-8 6326

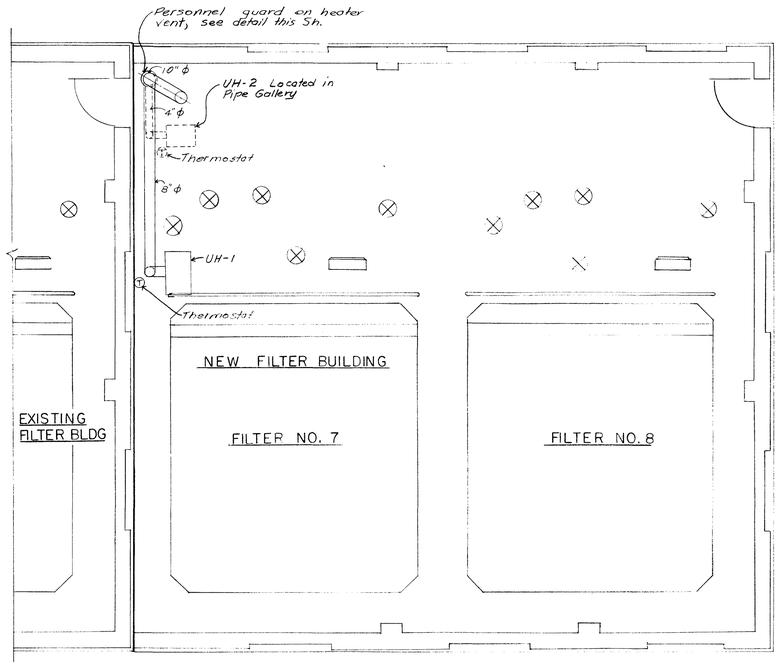
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PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07-1581
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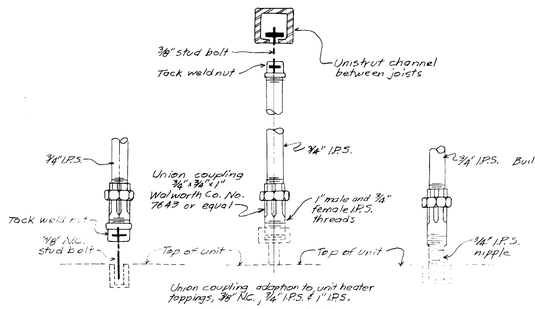
DRAWING NUMBER

Typical Water Treatment Plant Expansion

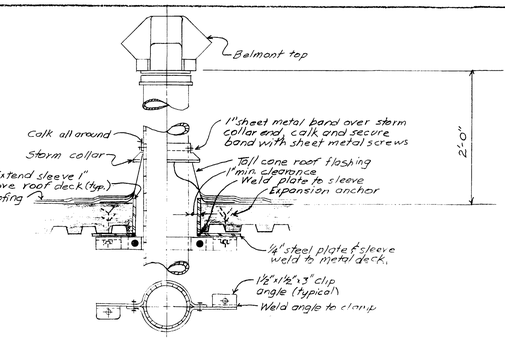
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07-1581
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OPERATING FLOOR PLAN
Scale 1/4" = 1'-0"



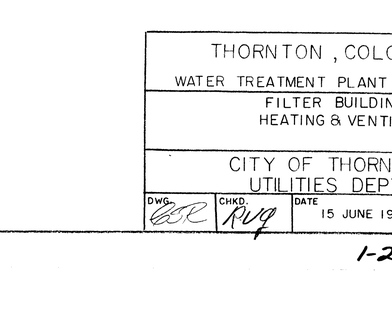
SUSPENSION DETAIL
No Scale



HEATER VENT DETAIL
No Scale

HEATING UNITS

Unit No.	Type Unit	Cap. in Btu/Hr.	Location
UH-1	Unit heater	135000	New Filter Floor
UH-2	" "	25000	New Pipe Gallery



PERSONNEL GUARD
No Scale

THORNTON, COLORADO
WATER TREATMENT PLANT EXPANSION
FILTER BUILDING
HEATING & VENTILATING
CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
BR	RVG	15 JUNE 1972	12 OF 17

1-2-8 ~~S-3-5~~

DRAWING NUMBER

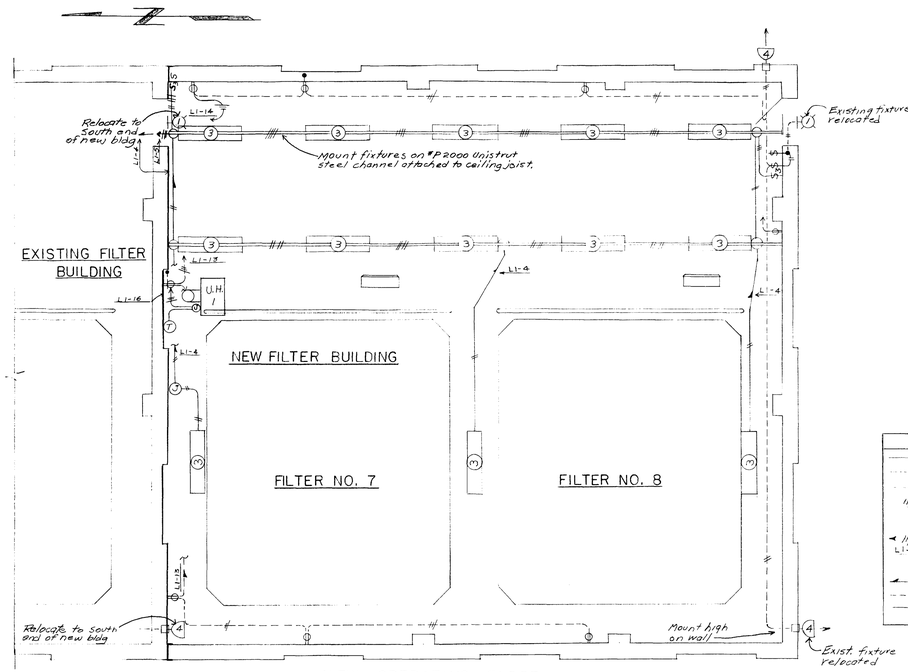
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER STAMP
PRINTED ONLY IF RED IS VISIBLE

DRAWING NUMBER
Archive

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER STAMP
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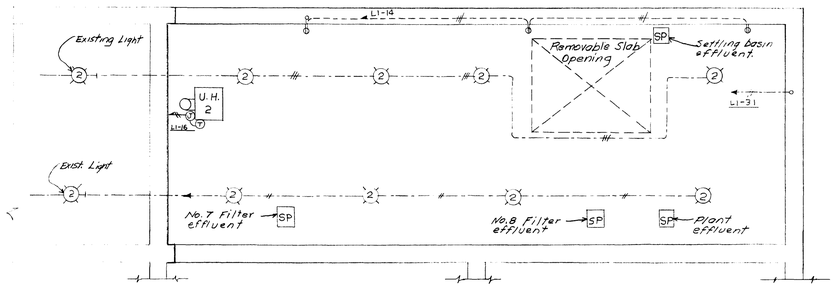
DRAWING NUMBER
Thornton Water Treatment Plant Expansion

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
RECORDED BY NUMBER STAMP
PRINTED ONLY IF RED IS VISIBLE



NEW OPERATING FLOOR
FILTER BUILDING

Scale 1/4" = 1'-0"



BASEMENT FILTER BUILDING

Scale 1/4" = 1'-0"

Note: All outlets below grade in wet walls to have 1/4" copper tube drain flush in wall down to approx. 2" above finish floor.

All fluorescent ballasts shall be Dri-Lok thermal type as manufactured by Jefferson Elec. Co. which carry the "CBM" certified by "ETL" label or approved equal.

Sample Pump Selector Switch – Existing selector switch in laboratory has additional circuits available for new sampling pumps.

LEGEND

———	Exposed conduit
- - - -	Concealed cnd. in ceiling & wall.
- - - -	Concealed cnd. in floor & wall.
///	Short dash for each #12 phase & neut. Wire, long dash for #12 bare ground Wire 1/2" conduit.
◄ /// LI-5	Denotes circuit to panel LI connected to branch CB #5. A 3 wire 220 V. 1Ø c.k.t. would be noted as LI-5,7.
◄——	Half arrow indicates partial ckt.
- - -●- - -	Concealed cnd. turning down.
——○——	Exposed cnd. turning up.
S & $	Surface & Flush mounted switches.
$3 & $3	Three-way switches.
ⓡ & ⓡ	Surface & Flush mounted receptacle
S.P.	Sample pump
(J)	Junction box.
(T)	Thermostat

LIGHTING FIXTURE SCHEDULE

SYM.	LAMP	MTG. HGT.	TYPE	MFR.	FIXTURE
(1)	200 W	7'-6" above door	Asymmetric bracket	Holophane Co. # 420	
(2)	150 W.	Mount 9'-0" high	Shallow dome pendent type	Benj. Mfg. Co. # 7423	
(3)	2/40T12 RS/CW	on ceiling or 9'-0 high	10% up; baked enamel reflector	Benj. Mfg. Co # FTM-1129-A	
◄(4)	G 500 T3/CL	High on wall	Med. beam floodlight CH2a "SRF2 for "SRF11 cover, Gask. 1/8" EL19 elbow	Steber Mfg. Co. # 7324 with Swivel 1/2" arm.	
(5)	175 W 120V H1175C39-22	12' high 2 1/2" Steel	Mercury vapor lamp with normal P.F. ballast	Steber Mfg. Co # P1019-120N.	

THORNTON, COLORADO

WATER TREATMENT PLANT EXPANSION

FILTER BUILDING
ELECTRICAL

CITY OF THORNTON
UTILITIES DEPT.

DWG.	CHKD.	DATE	SHEET
CSC	VKG	15 JUNE 1972	13 OF 17

1-2-8 ~~5-3~~

DRAWING NUMBER

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY
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DRAWING NUMBER

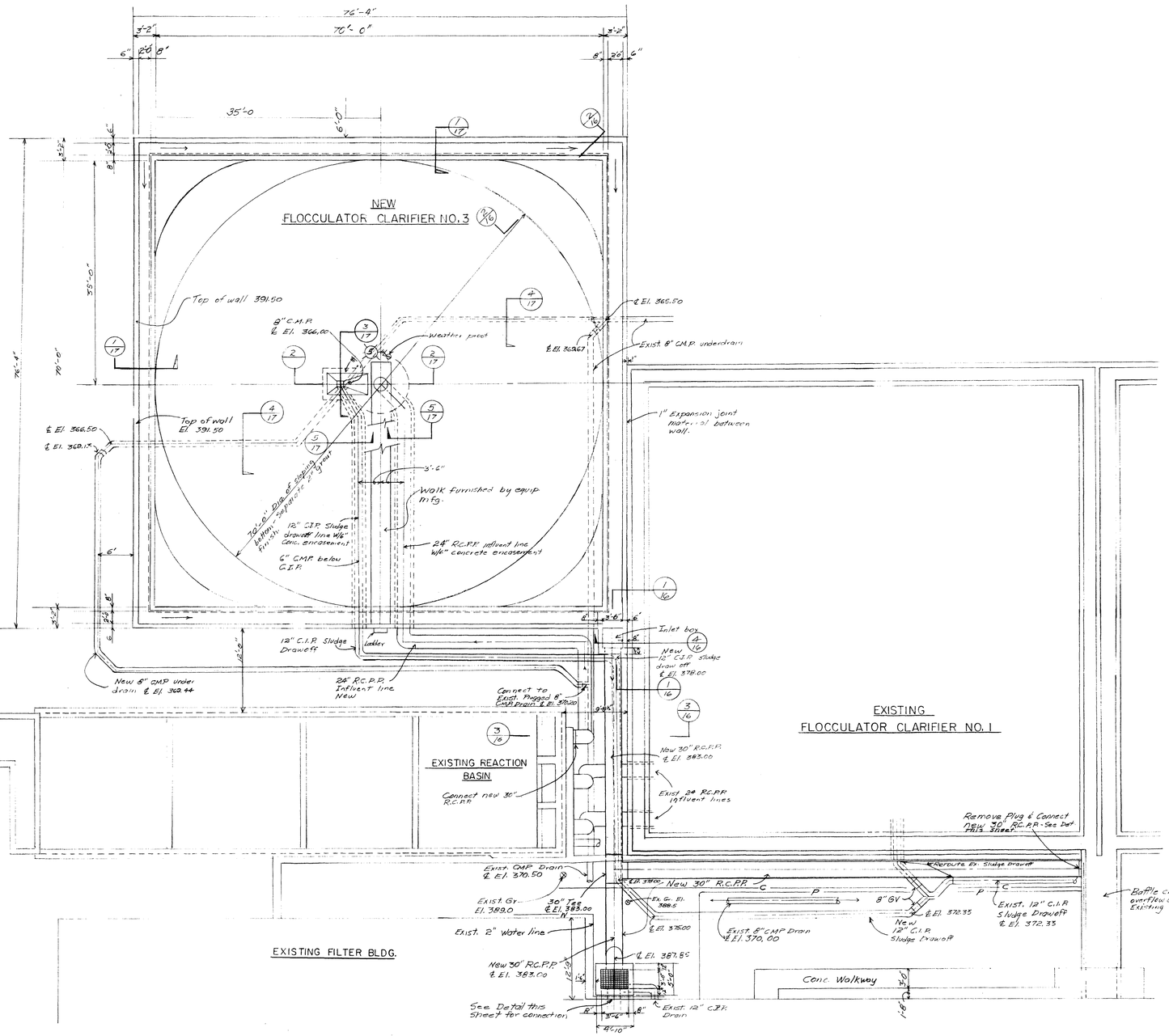
Alpine

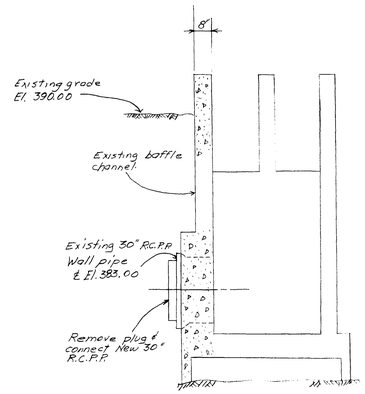
PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY
PRINTED USE OF PHRASE PROHIBITED

DRAWING NUMBER

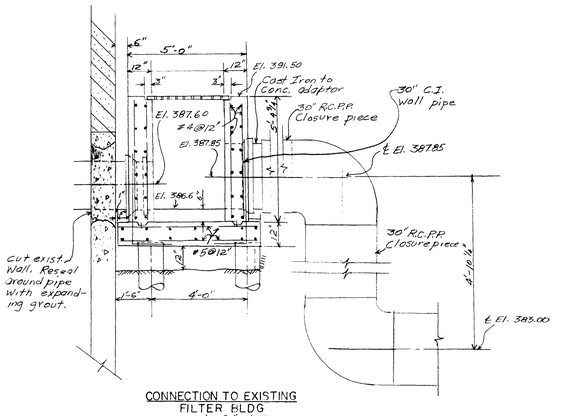
Intermediate Water Treatment Plant Expansion

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY
PRINTED USE OF PHRASE PROHIBITED





CONNECTION TO BAFFLE CHANNEL
Scale: 3/8" = 1'-0"



CONNECTION TO EXISTING FILTER BLDG.
Scale: 3/8" = 1'-0"

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY
SPECIFY SIZE OF SHEET WHEN NOTED

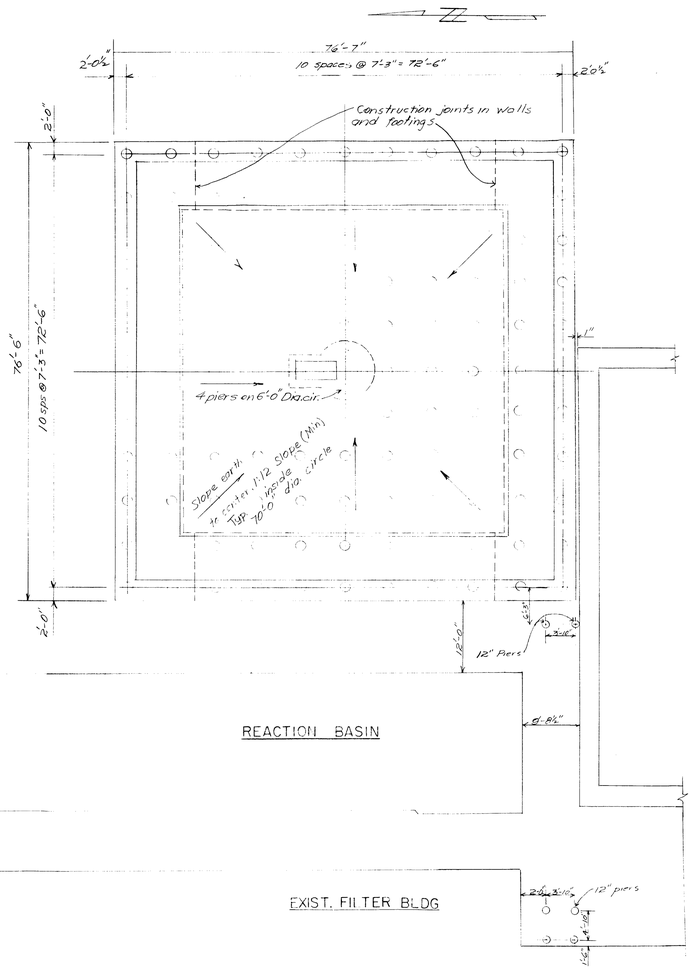
DRAWING NUMBER

Approved
Thornton Water Treatment Plant Expansion
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER ONLY
SPECIFY SIZE OF SHEET WHEN NOTED

DRAWING NUMBER

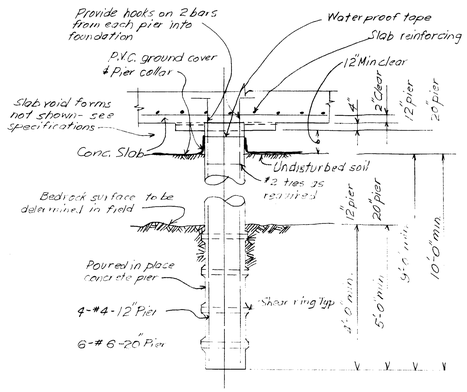
THORNTON COLORADO	
WATER TREATMENT PLANT EXPANSION	
FLOCCULATOR - CLARIFIERS BASIN PLAN	
CITY OF THORNTON UTILITIES DEPT.	
DWG. CGR	CHKD. RWH
DATE 15 JUNE 1972	SHEET 14 OF 17

1-2-8 5-30

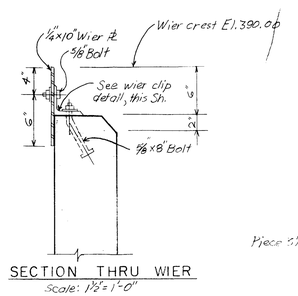


REACTION BASIN

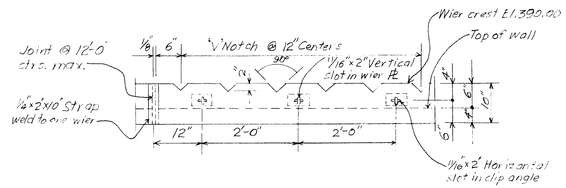
PIER SETTING PLAN
FLOCCULATOR-CLARIFIER
Scale 3/16" = 1'-0"



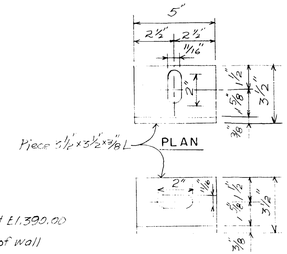
FLOCCULATOR-CLARIFIER
PIER DETAIL
Scale 3/16" = 1'-0"
See this sheet



SECTION THRU WIER
Scale: 1½" = 1'-0"

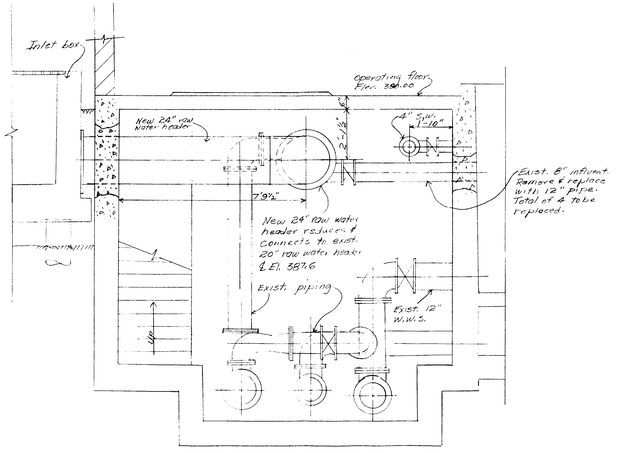


DETAIL OF WIER PLATE
Scale ¾" = 1'-0"

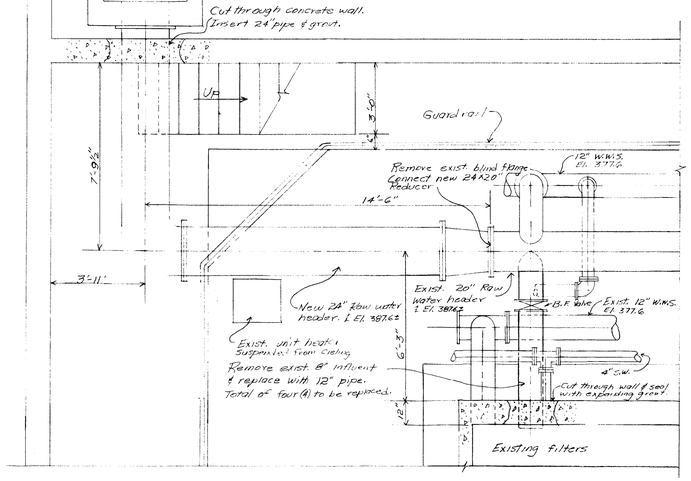


ELEVATION

WIER CLIP ANGLES
Scale 3" = 1'-0"



SECTION I
Scale: 3/8" = 1'-0"



PLAN-CONNECTION TO 20" HEADER
Scale: 3/8" = 1'-0"

THORNTON, COLORADO	
WATER TREATMENT PLANT EXPANSION	
FLOCCULATOR-CLARIFIERS PIER PLAN & DETAILS CONNECTION TO 20" HEADER	
CITY OF THORNTON UTILITIES DEPT.	
DWG: GR	CHKD: RVG
DATE: 15 JUNE 1972	SHEET 15 OF 17

1-2-8

DRAWING NUMBER

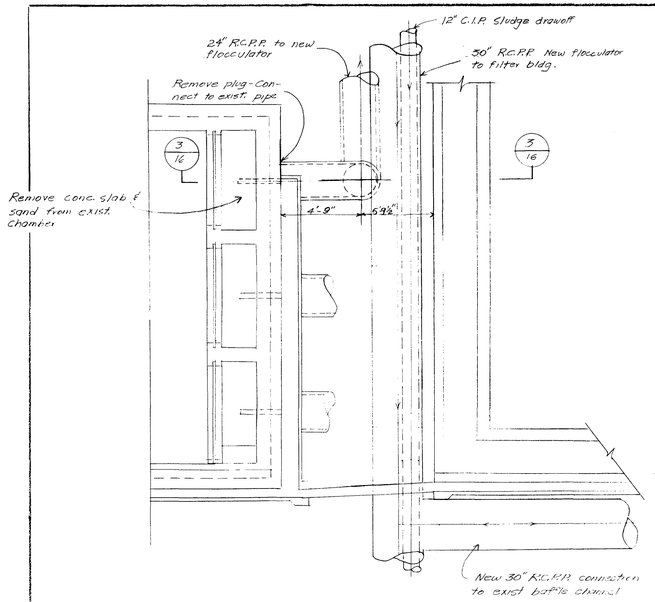
PLAN HOLD DOWN BOARD • IRVINE, CALIFORNIA
MEMBER OF NAMM INSTITUTE

DRAWING NUMBER

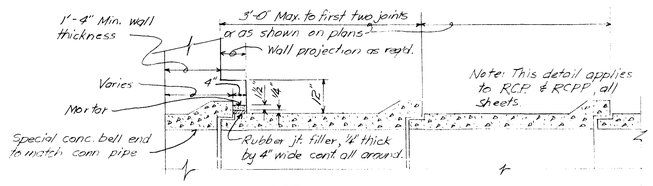
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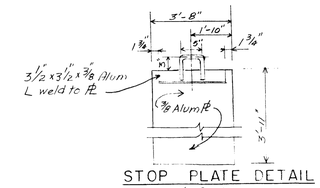
PLAN HOLD DOWN BOARD • IRVINE, CALIFORNIA
MEMBER OF NAMM INSTITUTE



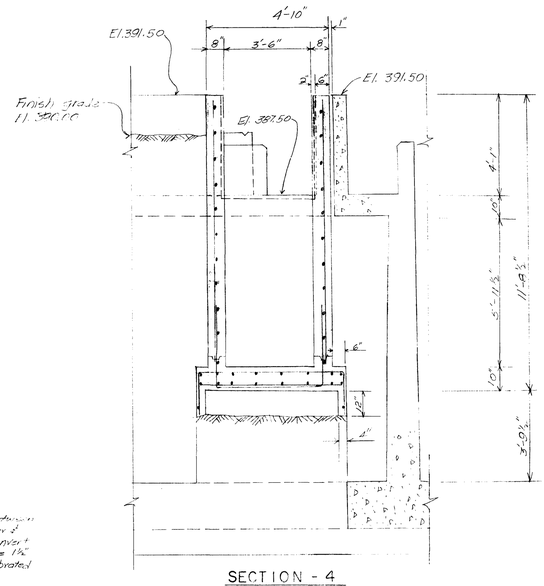
PLAN - REACTION BASIN CONNECTION
Scale: ¼" = 1'-0"



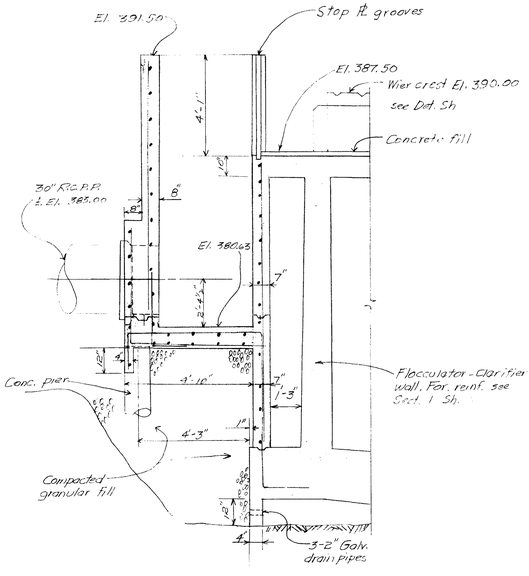
DETAIL A
TYPICAL CONCRETE PIPE WALL FITTINGS
No Scale



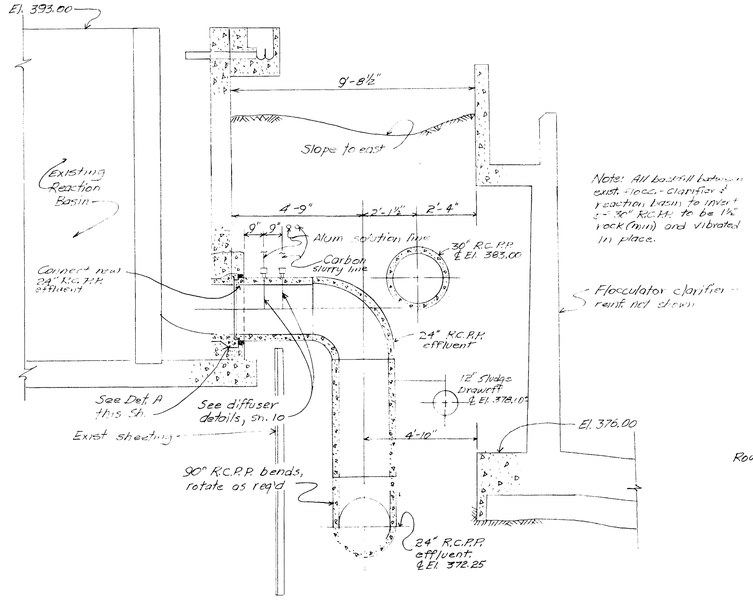
STOP PLATE DETAIL
No Scale



SECTION - 4
Scale: ⅜" = 1'-0"

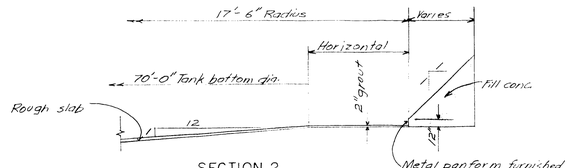


SECTION - 1
Scale 3/8" = 1'-0"



Note: All backfill between exist. floc.-clarifier & reaction basin to be 2" - 30" R.C.P.P. to be 1½ rock (min.) and vibrated in place.

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



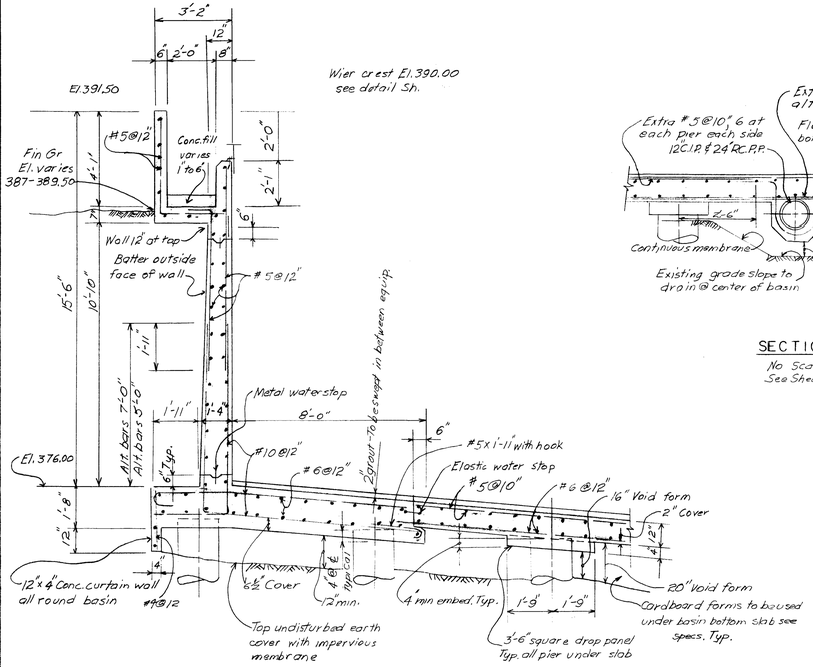
SECTION 2
Scale ½" = 1'-0"
See Sh. 14

Metal pan form furnished by equip. mfg.

THORNTON, COLORADO			
WATER TREATMENT PLANT EXPANSION			
FLOCCULATOR - CLARIFIER PIPE CONNECTIONS & DETAILS			
CITY OF THORNTON UTILITIES DEPT			
DWG. ER	CHKD. RVH	DATE 15 JUNE 1972	SHEET 16 OF 17

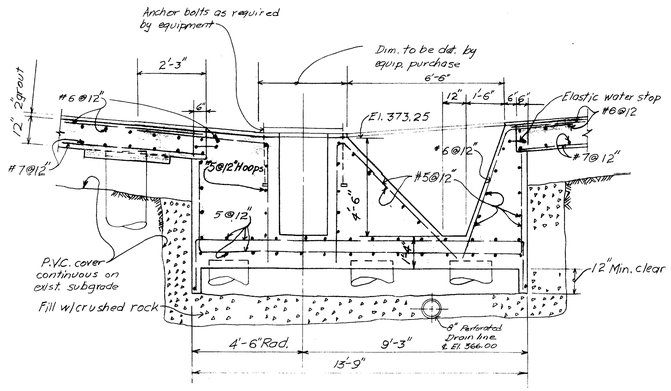
1-2-8 ~~535~~

PLAN-HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07534
PRISM 1000 © PRISM SYSTEMS, INC.

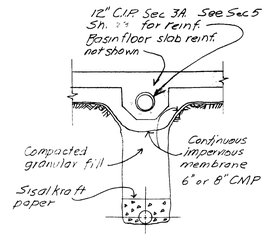


SECTION 1
Scale 3/8"=1'-0"
See Sheet 14

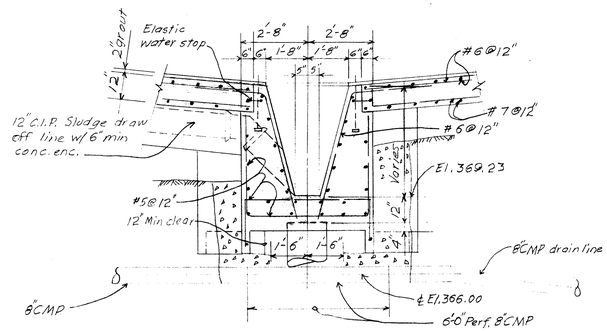
SECTION 5
No Scale
See Sheet 14



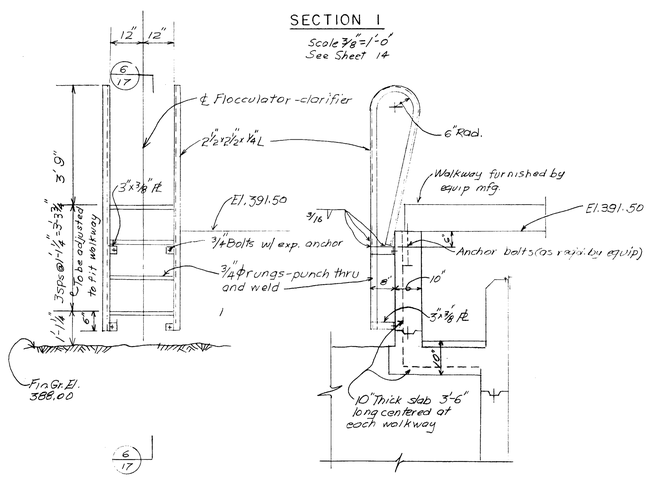
SECTION 2
Scale 3/16"=1'-0"
See Sheet 14



SECTION 4 & 4A
Scale 1/4"=1'-0"
See Sheet 14



SECTION 3
Scale 3/16"=1'-0"
See Sheet 14



ELEVATION

SECTION 6

LADDER DETAILS
Scale ½"=1'-0"

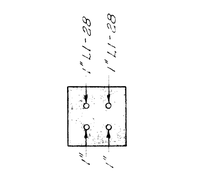
THORNTON, COLORADO			
WATER TREATMENT PLANT EXPANSION			
FLOCCULATOR-CLARIFIER SECTIONS & DETAILS			
CITY OF THORNTON UTILITIES DEPT.			
DWG: CSR	CHKD. RWH	DATE 15 JUNE 1972	SHEET 17 OF 17

1-2-8 ~~5-5-5~~

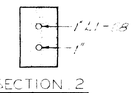
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DRAWING NUMBER

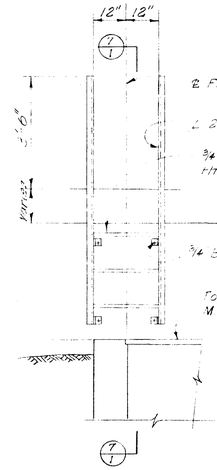
DRAWING NUMBER



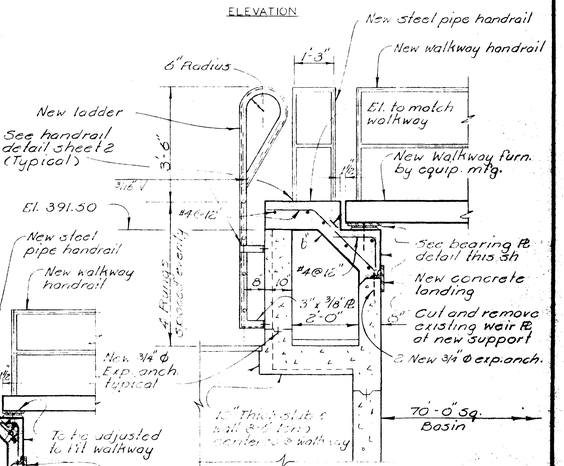
SECTION 1
Scale: 1"=1'-0"
See this Sheet



SECTION 2
Scale: 1"=1'-0"
See this Sheet



ELEVATION



SECTION 7

LADDER DETAILS
Scale: ½"=1'-0"

SECTION 6
Scale: 3/16"=1'-0"
See this sheet

Note: All items existing unless noted otherwise
Clean exist. conc. surfaces as necessary before pouring new conc.

SECTION 3
Scale: 3/8"=1'-0"
See this sheet

SECTION 4
Scale: 1"=1'-0"
See this sheet

SECTION 5
Scale: 1"=1'-0"
See this Sh.

BEARING PLATE DETAIL
Scale: 1"=1'-0"

MATERIAL LEGEND

Existing concrete
New concrete
—E—E— New elec. duct

No.	Date	Revision	By	CHKD
	9-72	Conforms to construction records	JHM	JWK

CONTRACT NO.2

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

FLOCCULATOR CLARIFIERS
BASIN EQUIPMENT
BASIN PLAN

BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

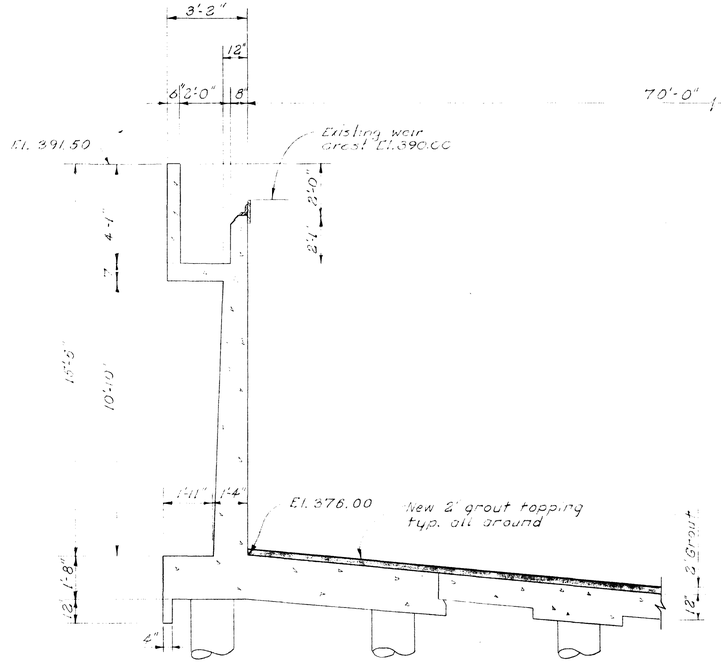
DESIGNED JWK & JHM CHECKED JWK
DETAILED R.I.M. GDS. APPROVED J.D. Veatch
DATE 7-27-71

SHEET 1 OF 2

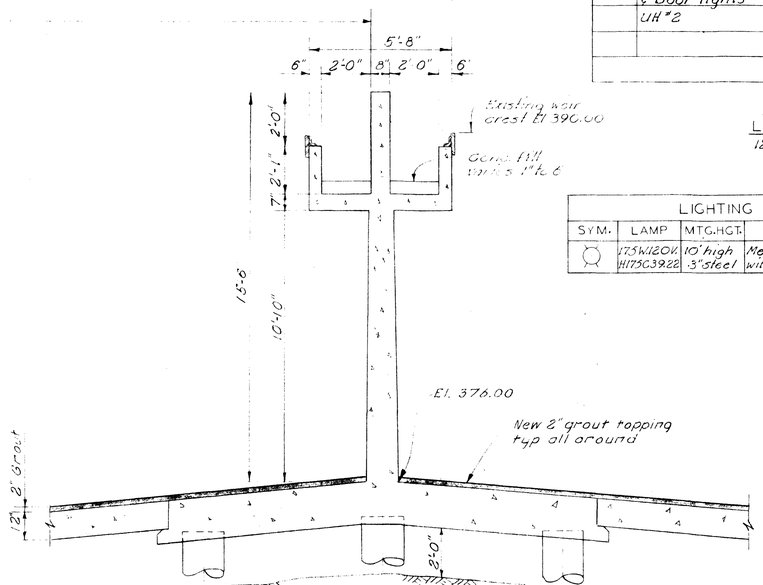
1-2-7

DRAWING NUMBER

DRAWING NUMBER



SECTION 1
Scale 3/8"=1'-0"
See sheet 1



SECTION 2
Scale 3/8"=1'-0"
See sheet 1

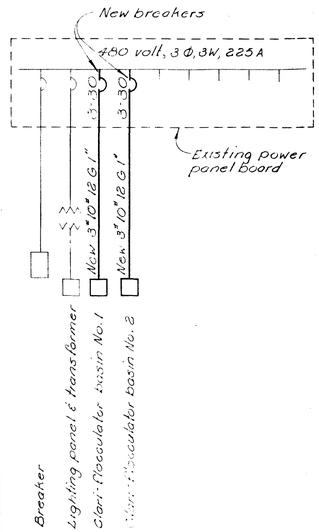
Walls				Walls
Recp. @ laboratory 120V	27	26	New Basin Ltgs & Recps	520
Lime Feeder	29	30		
2 Flood lights & Door lights	31	32		
UH #2	33	34		
	35	36		
NEUTRAL				

PARTIAL VIEW
LIGHTING PANEL L1
120/240 V 1Φ, 3W

Exist. lighting panel

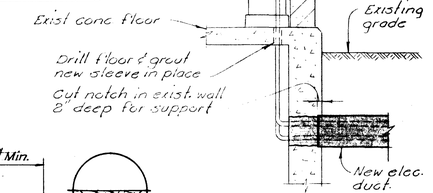
LIGHTING FIXTURE SCHEDULE

SYM.	LAMP	MTG.HGT.	TYPE	MFG	FIXTURE
○	175W 120V H175C3922	10' high 3" steel	Mercury vapor lamp with normal P.F ballast	Steber Mfr. Co #P1019-180N	

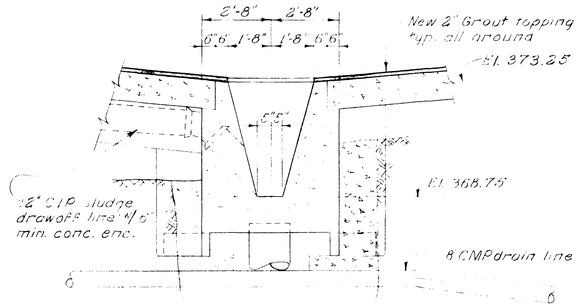


POWER PANEL BOARD ONE LINE

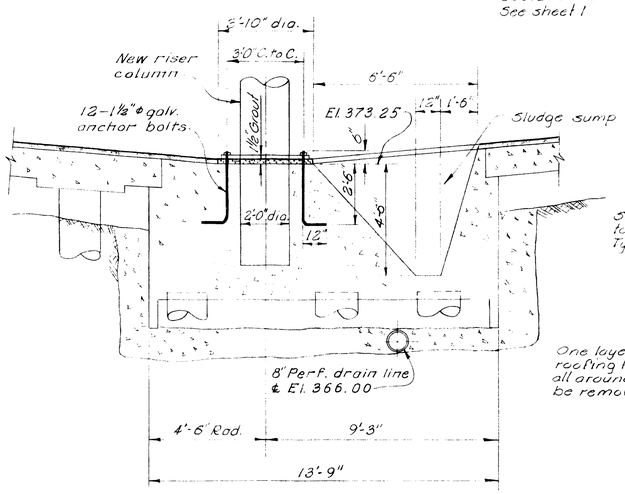
LEGEND	
———	Exposed conduit
- - - -	Concealed conduit in floor or wall
——(	Conduit turning up
——●	Conduit turning down
——o	Conduit all or part underground (one-lines)
L1-3 ——//——	Denotes circuit to panel L1 connected to branch c/b #3. 1-3 wire 220 V-1Φ ckt. would be noted as L1-3
——//——	Short dash for each #12 phase & neut. wire long dash for #12 bare ground wire 1/2" conduit.
⊕ ⊖	Surface & flush mounted recps.
W.P	Weatherproof



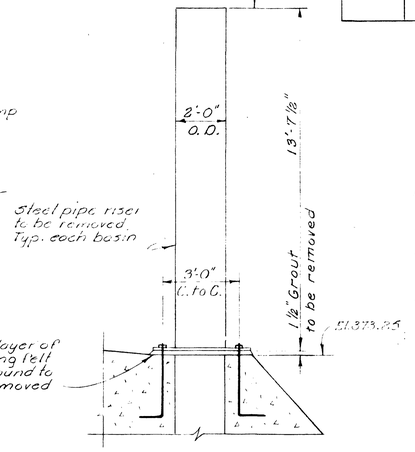
SECTION 5
Scale: 3/8"=1'-0"
See sheet 1



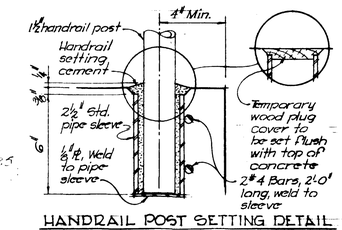
SECTION 3
Scale 3/8"=1'-0"
See sheet 1



SECTION 4
Scale 3/8"=1'-0"
See sheet 1



EXISTING BASIN
CENTER RISER
Scale 3/8"=1'-0"
See sheet 1



HANDRAIL POST SETTING DETAIL
Scale - 3/4"=1'-0"

CONTRACT NO. 2

THORNTON, COLORADO

WATER WORKS IMPROVEMENTS

FLOCCULATOR CLARIFIERS BASIN EQUIPMENT MISCELLANEOUS DETAILS

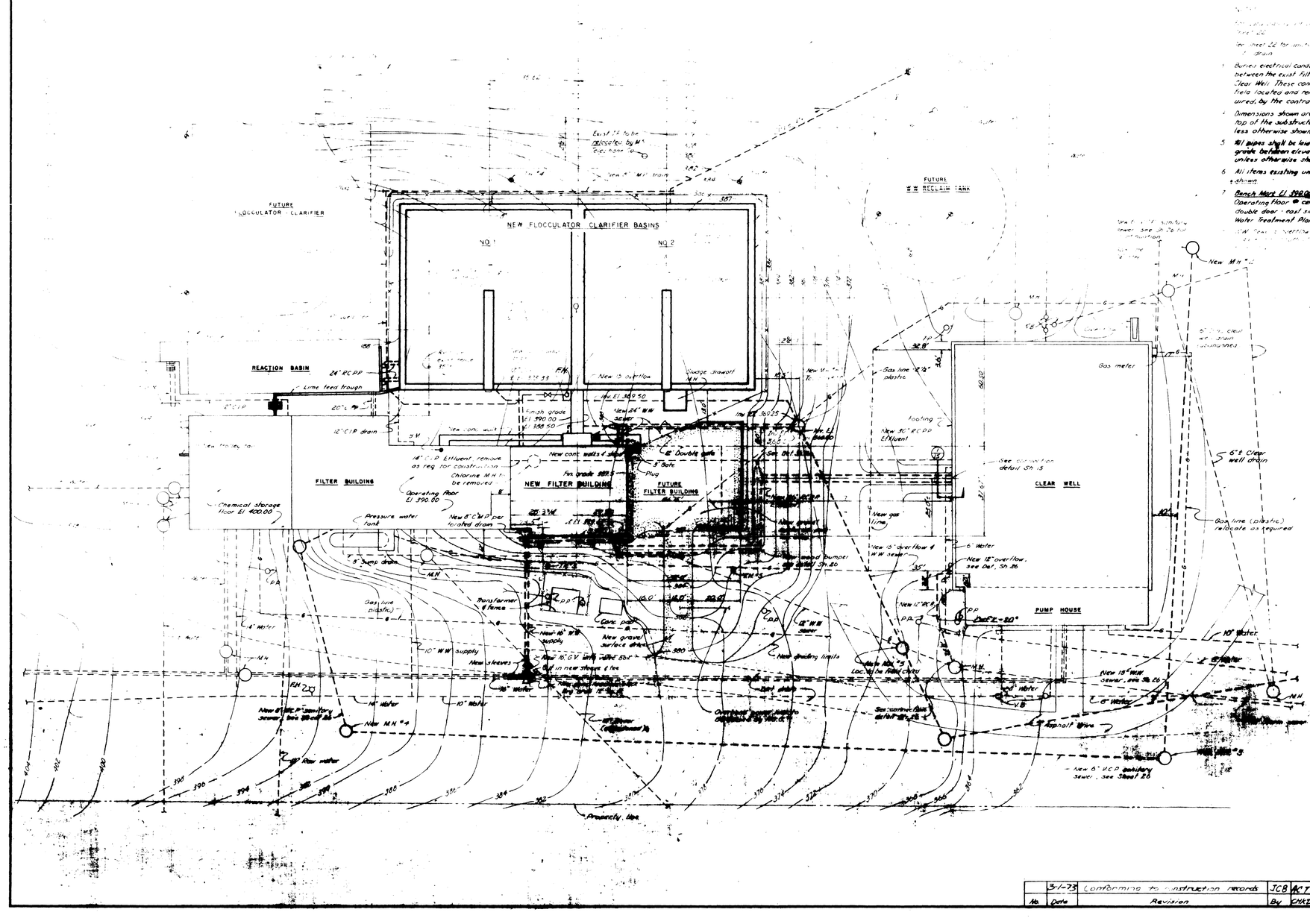
BLACK & VEATCH — CONSULTING ENGINEERS
KANSAS CITY, MO. — DENVER, COLO.

No.	Date	Revision	By	Chkd
	9-72	Conforms to construction records	JHM	JWK

DESIGNED JWK JHM CHECKED JWK
DETAILED RJM JHM APPROVED J W Kelly
DATE 7-27-71

SHEET 2 OF 2

1-2-7


NEW FLOCCULATOR CLARIFIER BASINS
NO. 1
NO. 2
FUTURE FLOCCULATOR CLARIFIER
FUTURE W.W. RECLAIM TANK
REACTION BASIN
FILTER BUILDING
NEW FILTER BUILDING
FUTURE FILTER BUILDING
CLEAR WELL
PUMP HOUSE
Existing to be demolished by M.V. Elec. Assn.
Finish grade El. 390.00
Top of wall El. 388.50
New 24" W.W. sewer
New 15" overflow
Sludge drawoff MH
New 30" R.C.P.P. Effluent
Gas line 4" plastic
Gas meter
Footing
Operating floor El. 390.00
Chemical storage floor El. 400.00
Pressure water tank
New 8" C.W. P. per isolated drain
Transformer & fence
Conc. pad
New ground surface elev.
New 16" W.W. supply
New 16" G.V. with valve box
Cut in new storage tee
New sleeves
New 8" R.C.P. Storm Water Sewer, See Sh. 25 and 26
New M.H. #4
New Rain water
Property line
New 15" W.W. Sewer, see Sh. 26
New 6" V.C.P. Sanitary Sewer, see Sheet 26
Asphalt Wire
New gas line
New 12" overflow, see Det. Sh. 26
New 12" W.W. Sewer
New grading limits
Loc. to be field chkd.
See contour flow detail Sh. 15
Gas line (plastic) relocate as required
6" ø Clear well drain
New M.H. #5
New M.H. #6
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New M

PAVEMENT
12" CURB
POPLAR TREES
SPIREA BUSHES
GRASS
2" SPRINKLER
SPIREA
SPIREA
2" SPRINKLER
DRAINAGE INLET
15" DRAIN
12" CURB
BLUE SPRUCE
PARKING LOT
EXISTING PAVEMENT
GRASS
FUTURE WASTE WATER RECLAIM TANK
1" SP
3" SPRINKLER
3' HEDGE
2"
GRAVEL WALK
CLARIFIER BASINS
MARCH LINE
3' HEDGE
BLUE SPRUCE
REACTION TANKS
BLUE SPRUCE
2" SPRINKLER
GRASS
GRAVEL WALK
GRASS
6" CURB
PAVEMENT
D.I.
D.I.
THORNTON WATER PLANT
FUTURE FILTER BUILDING
3' HEDGE
GRASS
CLEARWELL
6" CURB
10" DRAIN
M.H.
PAVED PARKING AREA
D.I.
SPRUCE
6" CURB
1"
4' TO 1' RET. WALL
JUNIPERS
PAVEMENT
GRAVEL PARKING PAVE WHEN BLDG. COMPLETED
1"
EXISTING 12" DRAIN
3' TO 1' RET. WALL
ROSE BEE
CONCRETE SLAB
SCOTCH PINE
PAVEMENT
6" CURB
6" CURB
PAVEMENT
6" CURB
PAVEMENT
18" DRAIN
D.I.
D.I.
M.H.
M.H.
JUNIPERS
D.I.
GRASS
2" SPRINKLER
3' HEDGE
3' HEDGE
PROPERTY LINE

CITY OF THORNTON, COLORADO
UTILITY DEPARTMENT

THORNTON PLANT LANSCAPE PLAN

DWG. BY: RVZ.
DATE: 5-69

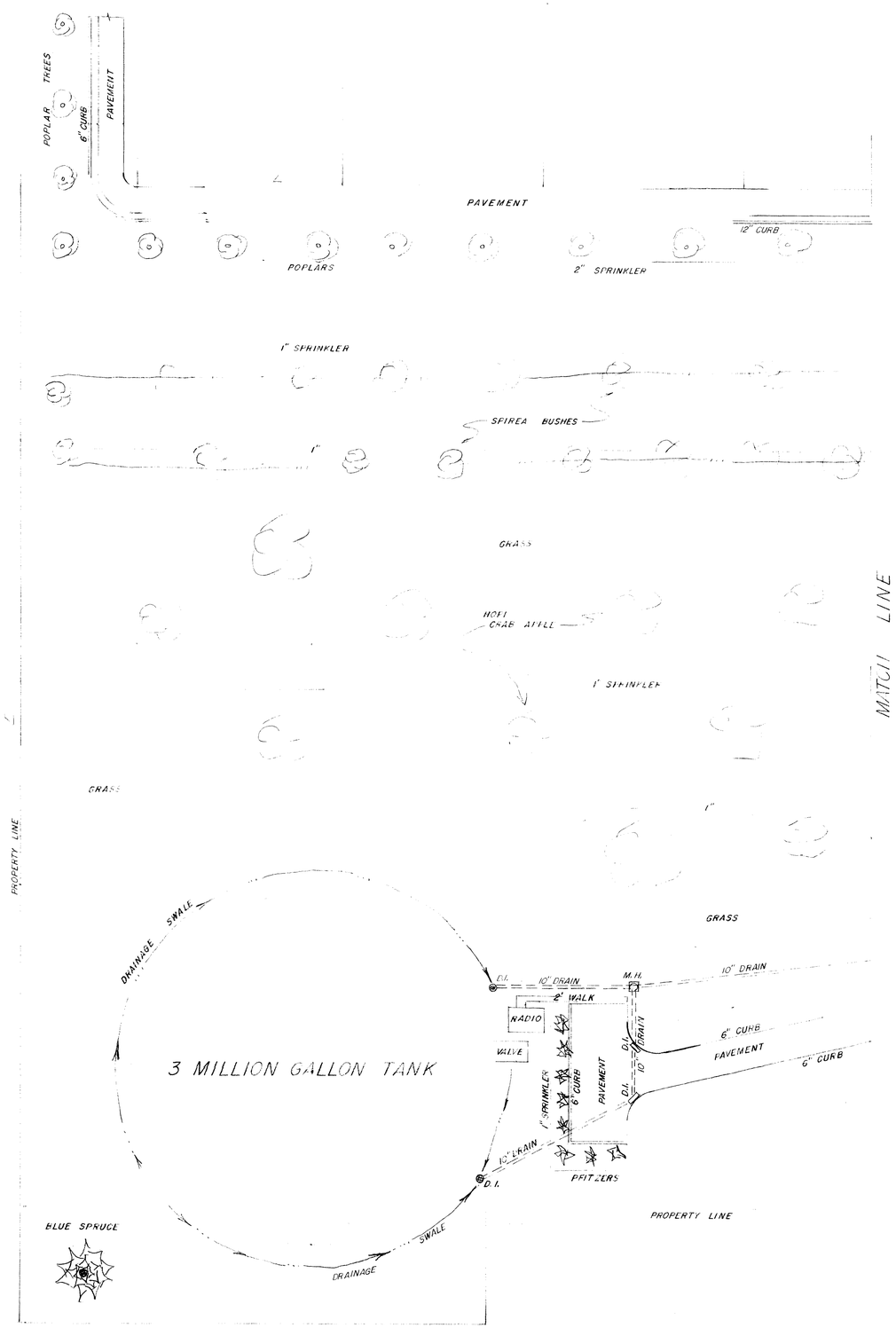
SCALE 1" = 20'

SHEET 1 OF 2 SHEETS

1-2-5

DRAWING NUMBER

DRAWING NUMBER



CITY OF THORNTON, COLORADO
UTILITY DEPARTMENT

THORNTON PLANT LANDSCAPE PLAN

DWG. BY: RVJ
DATE: 5-69

SCALE 1" = 20'

SHEET 2 OF 2 SHEETS

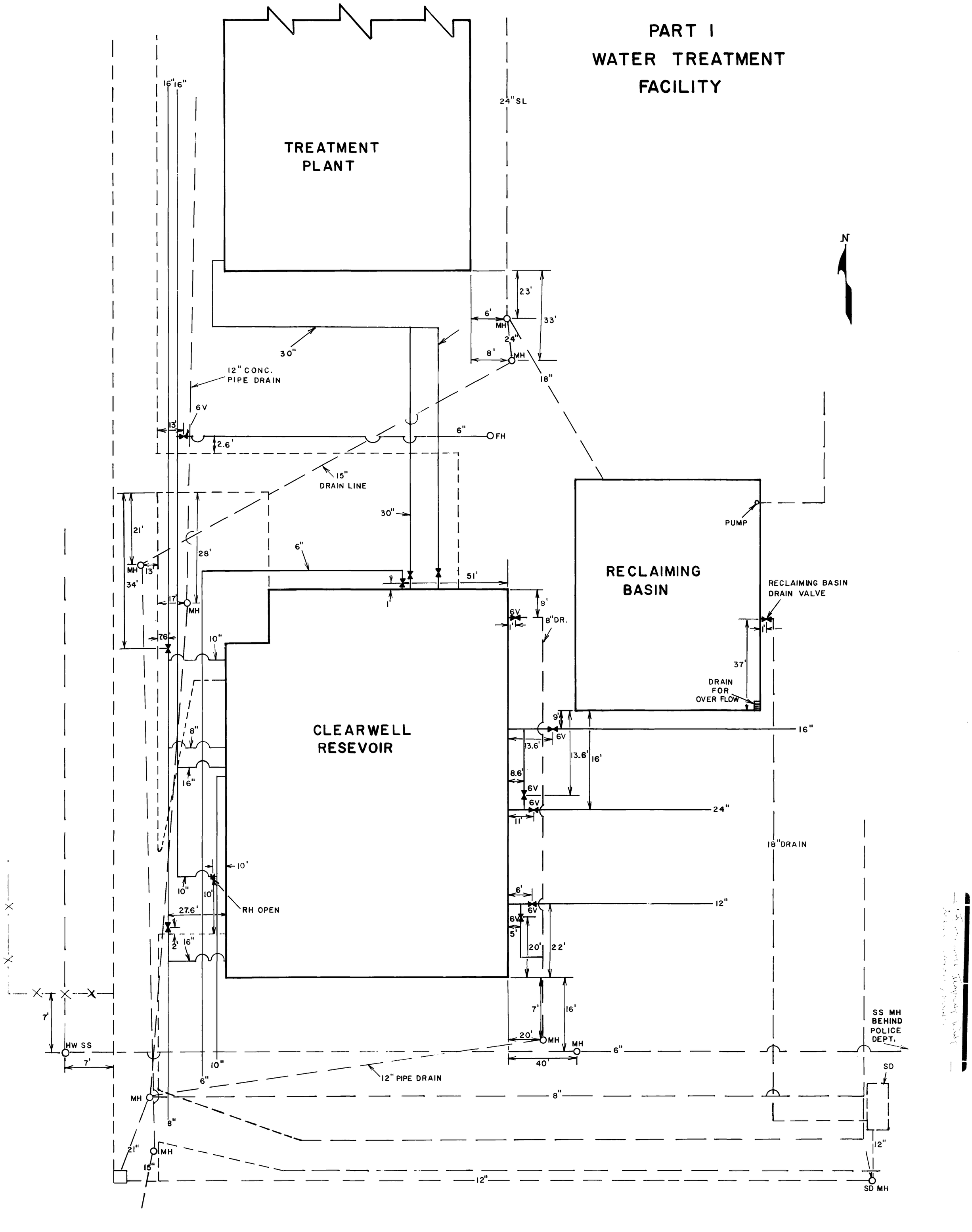
~~526~~ 1-2-5

DRAWING NUMBER

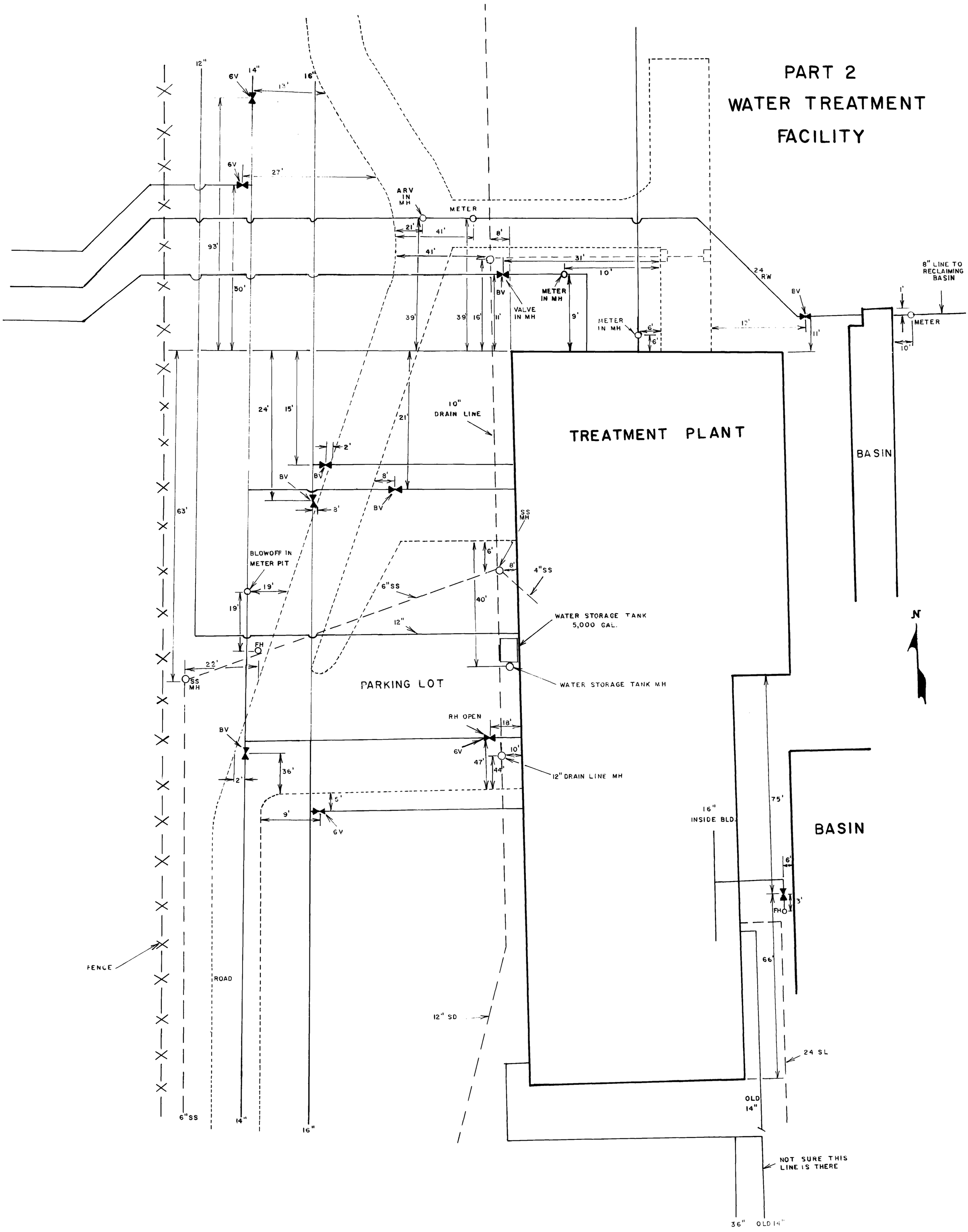
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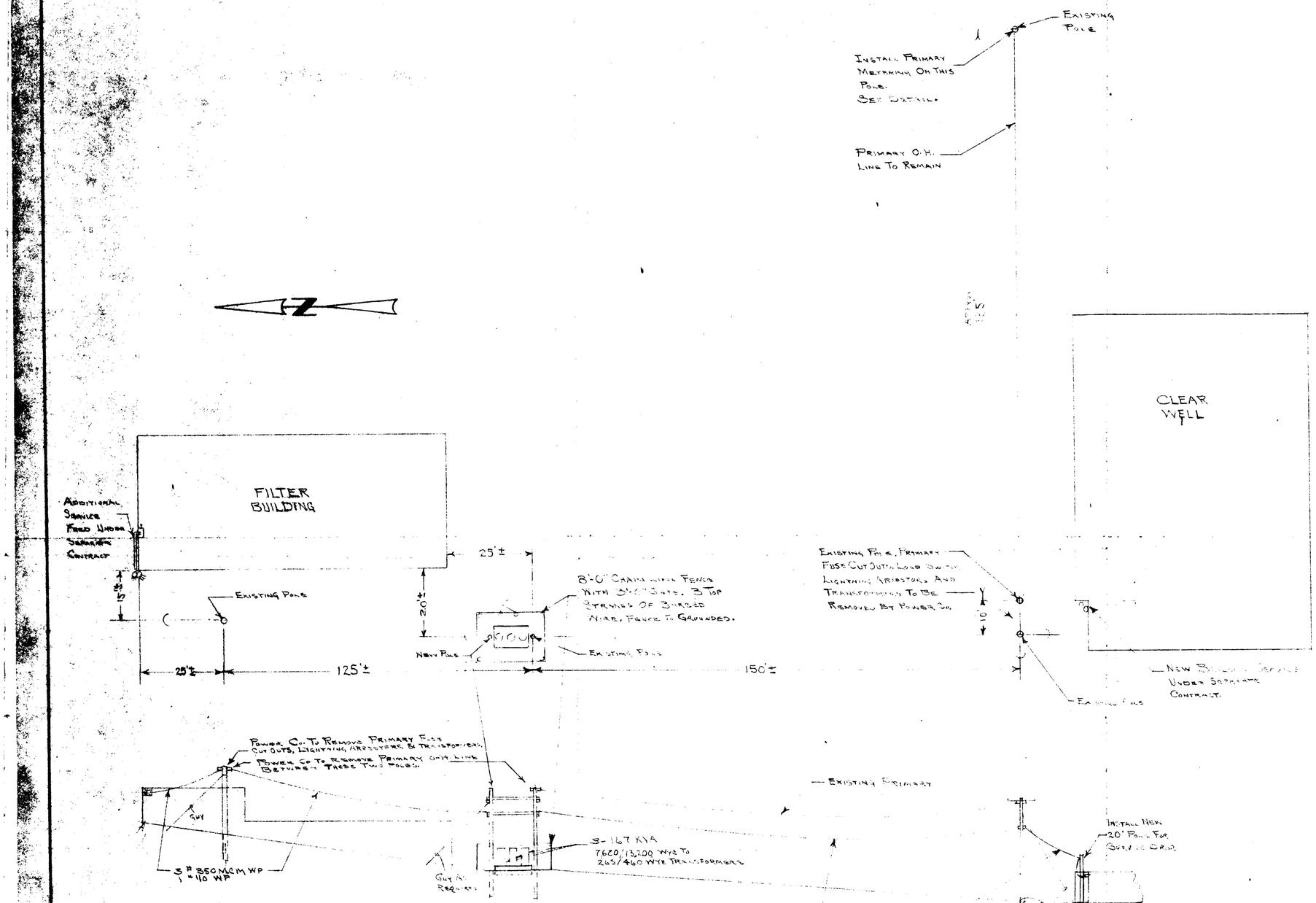
DRAWING NUMBER

PART I
WATER TREATMENT FACILITY



PART 2
WATER TREATMENT FACILITY





PRIMARY METERING - 13,200 V. WYE INSTALLATION

PRIMARY METERING NOTES:

A. INSTALL NEUTRAL CONNECTION, GROUND AND ARRESTER GROUND.
C. TIE GROUND RODS TOGETHER BELOW GROUND SURFACE WITH No. 4 COPPER.
D. GROUND METER HOUSING, CONDUIT AND SWITCH OPERATING HANDLE.
E. ONE INCH POLYETHYLENE PIPE.
H. ONE INCH THINWALL CONDUIT.
M. No. 12 Cu. SECONDARY IN CONDUIT.
N. No. 4 Cu. NEUTRAL IN CONDUIT.
CONNECT SECONDARY AND CASE GROUND TO COMMON NEUTRAL.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

PRIMARY POWER CONVERSION AND NEW SUBSTATION

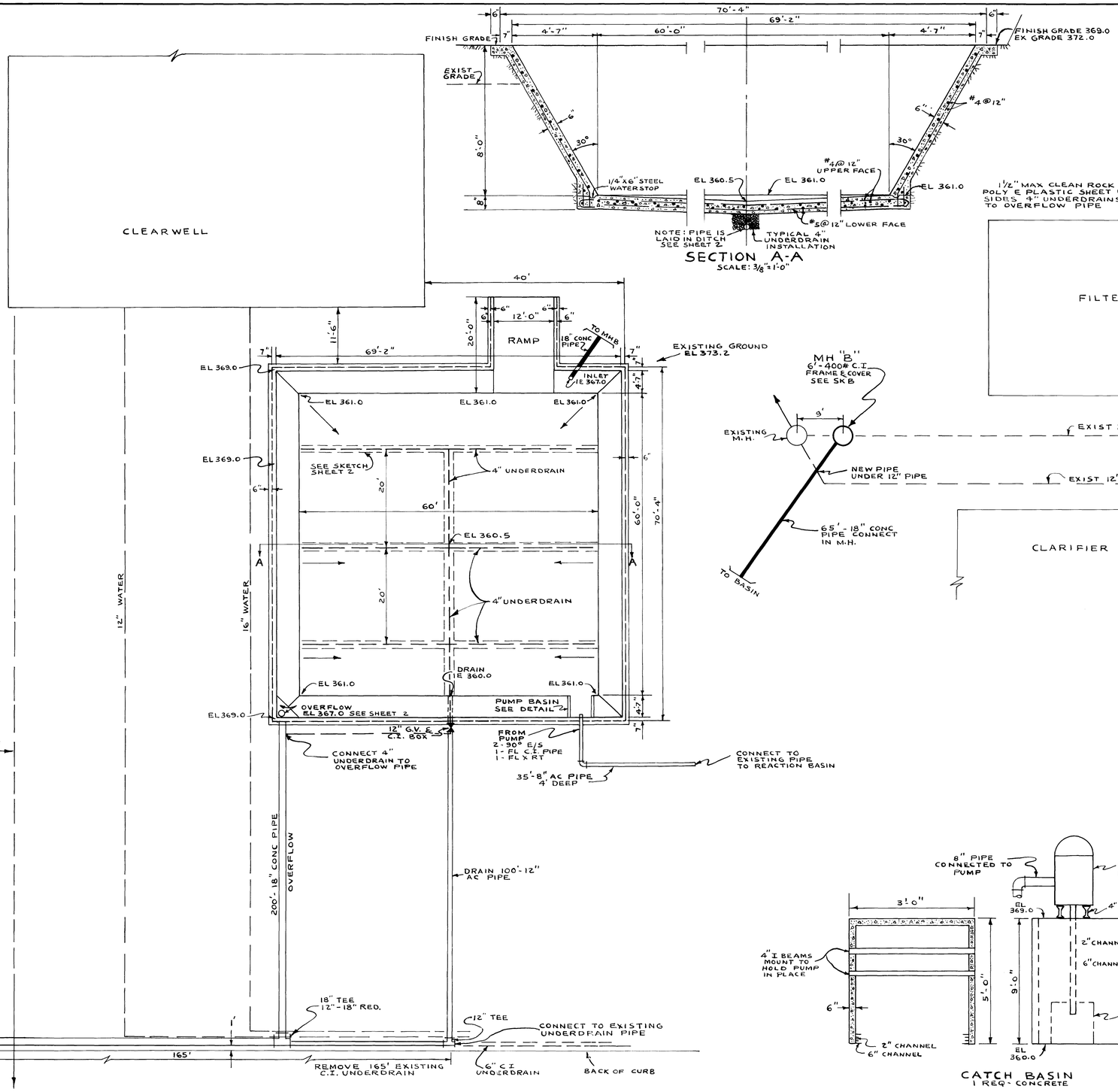
THORNTON FILTER PLANT - 95th & Ellen Ct.

PHILLIPS-CARTER-OSBORN, INC., ENGINEERS
DENVER, COLORADO

DESIGNED H.L.	SUBMITTED Robert L. Carter PHILLIPS - CARTER - OSBORN, INC.	
DRAWN F.S.		
CHECKED H.L.		
P-1731	APRIL, 1962	Sh. 1

1-1-8

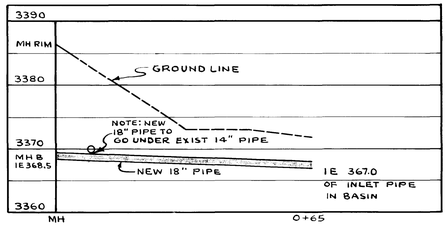
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 07549



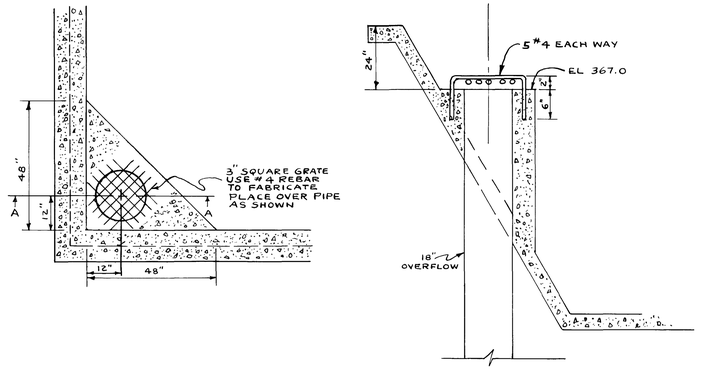
SITE PLAN (THORNTON PLANT)

WASTEWATER RECLAIM BASIN PUMP INSTALLATION CONNECTING PIPELINES

SCALE: 1"=10'	DATE: 7/11/73	SHEET 1 OF 2
DWG: W.T.K	CITY OF THORNTON UTILITIES DEPT.	~~5-29~~ 1-2-9
CHKD:		

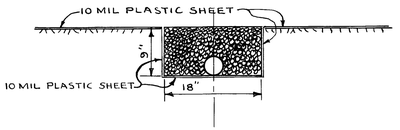


PROFILE OF GROUND FROM MH "B" TO BASIN

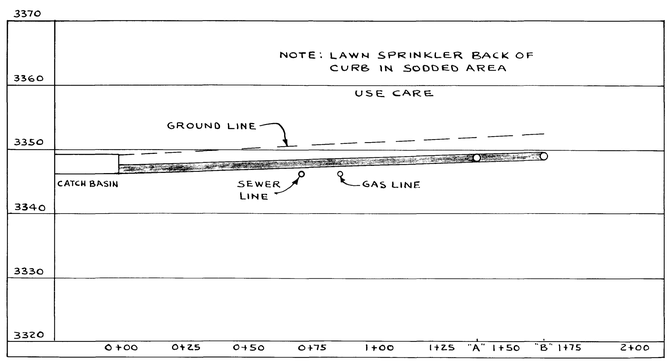


SECTION A-A

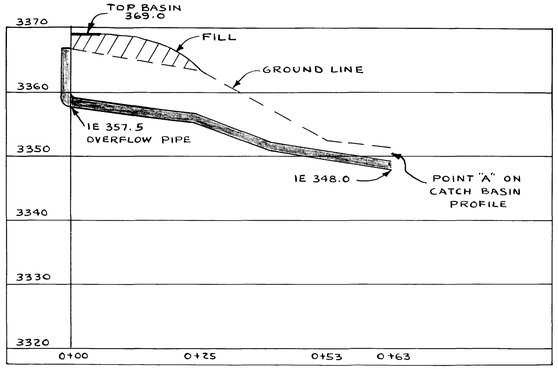
OVERFLOW PIPE
SCALE 1" = 2'



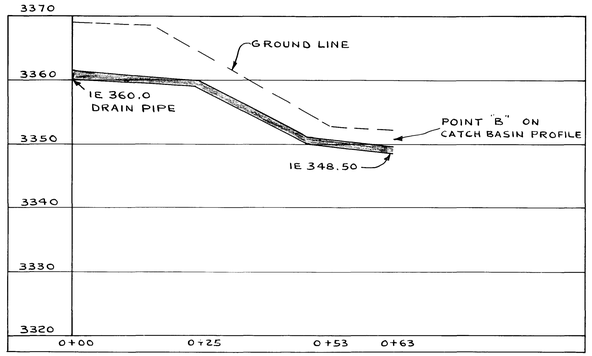
UNDERDRAIN DITCH & PIPE ARRANGEMENT
SCALE 1"=2"



PROFILE CATCH BASIN TO DRAIN PIPE
BACK OF CURB
SCALE: 2"=50' HORIZ.
1"=10' VERT



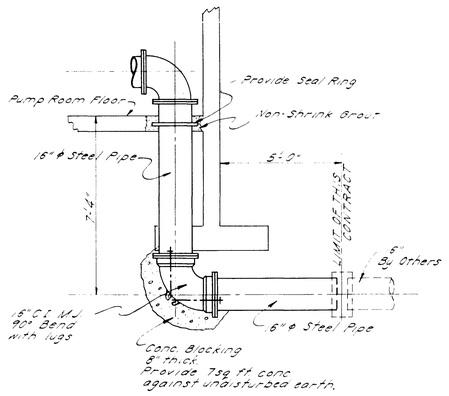
OVERFLOW PIPE PROFILE
SCALE: 2"= 25' HORIZ
1"= 10' VERT



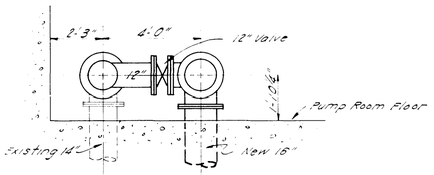
DRAIN PIPE PROFILE
SCALE: 2"= 25' HORIZ
1"= 10' VERT

ROBERT V. GORSUCH REGISTERED 2405 PROFESSIONAL ENGINEER STATE OF COLORADO

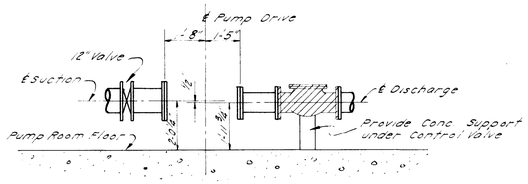
SITE PLAN		
WASTEWATER RECLAIM BASIN PUMP INSTALLATION CONNECTING PIPELINES		
SCALE: 1"=10'	DATE: 7/11/73	SHEET 2 OF 2
DWG: W.T.K	CITY OF THORNTON UTILITIES DEPT.	~~5 2 9~~ 1-2-7
CHKD:		



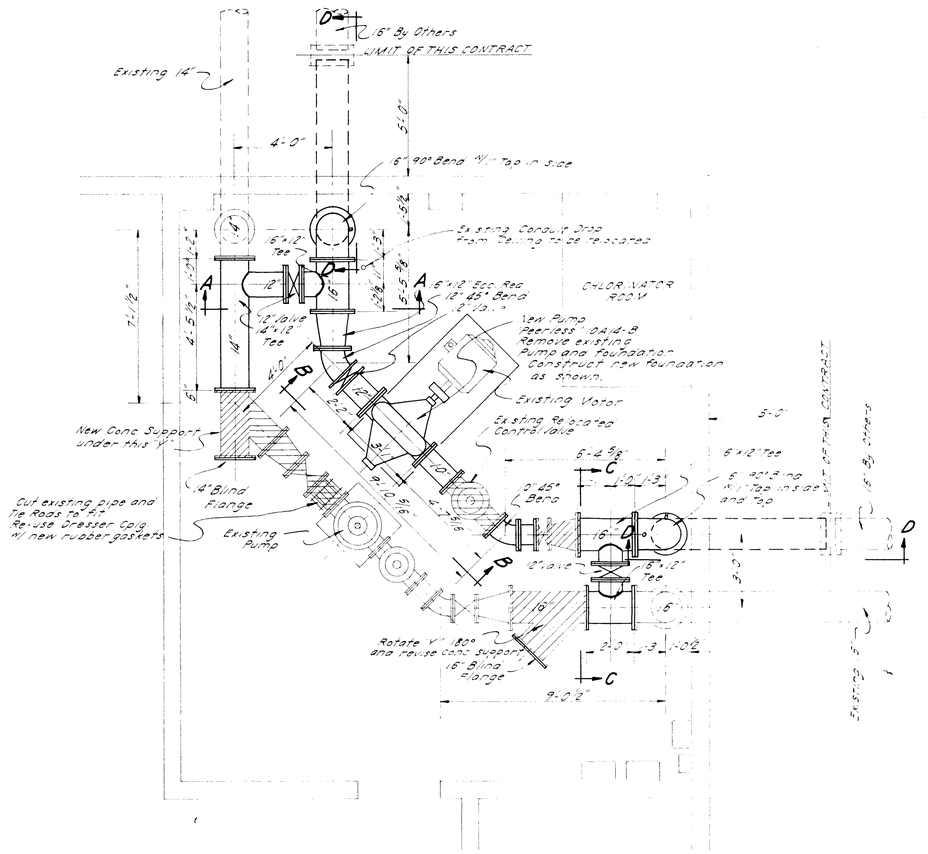
SECTION D-D
SCALE 3/8" = 1'-0"



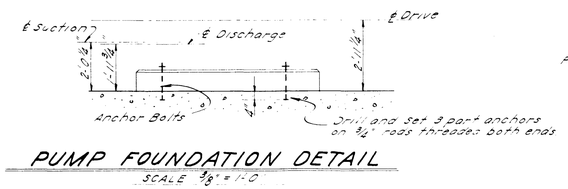
SECTION A-A
SCALE 3/8" = 1'-0"



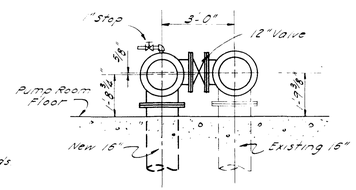
SECTION B-B
SCALE 3/8" = 1'-0"



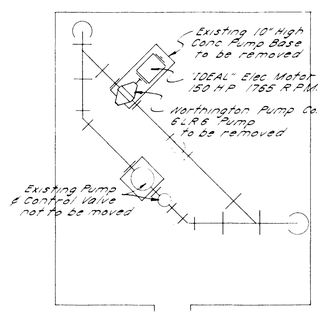
PLAN
SCALE 3/8" = 1'-0"



PUMP FOUNDATION DETAIL
SCALE 3/8" = 1'-0"



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



EXISTING ARRANGEMENT PUMP ROOM IN N.W. CORNER THORNTON FILTER PLANT
SCALE 3/16" = 1'-0"

LEGEND
- Existing Piping to Remain
- Existing Piping to be Relocated as shown
- New Piping

NOTE
All Tees shall be fabricated from Schedule 30 Steel Pipe with Screw-on Flanges

THORNTON #2A

REVISIONS					
BY	DATE	DESCR.	DATE JAN 1964	DRAWN DLL	PROJECT NO. 63-114
BY	DATE	DESCR.	SCALE AS SHOWN	CHECKED EGP	
BY	DATE	DESCR.		APPROVED	

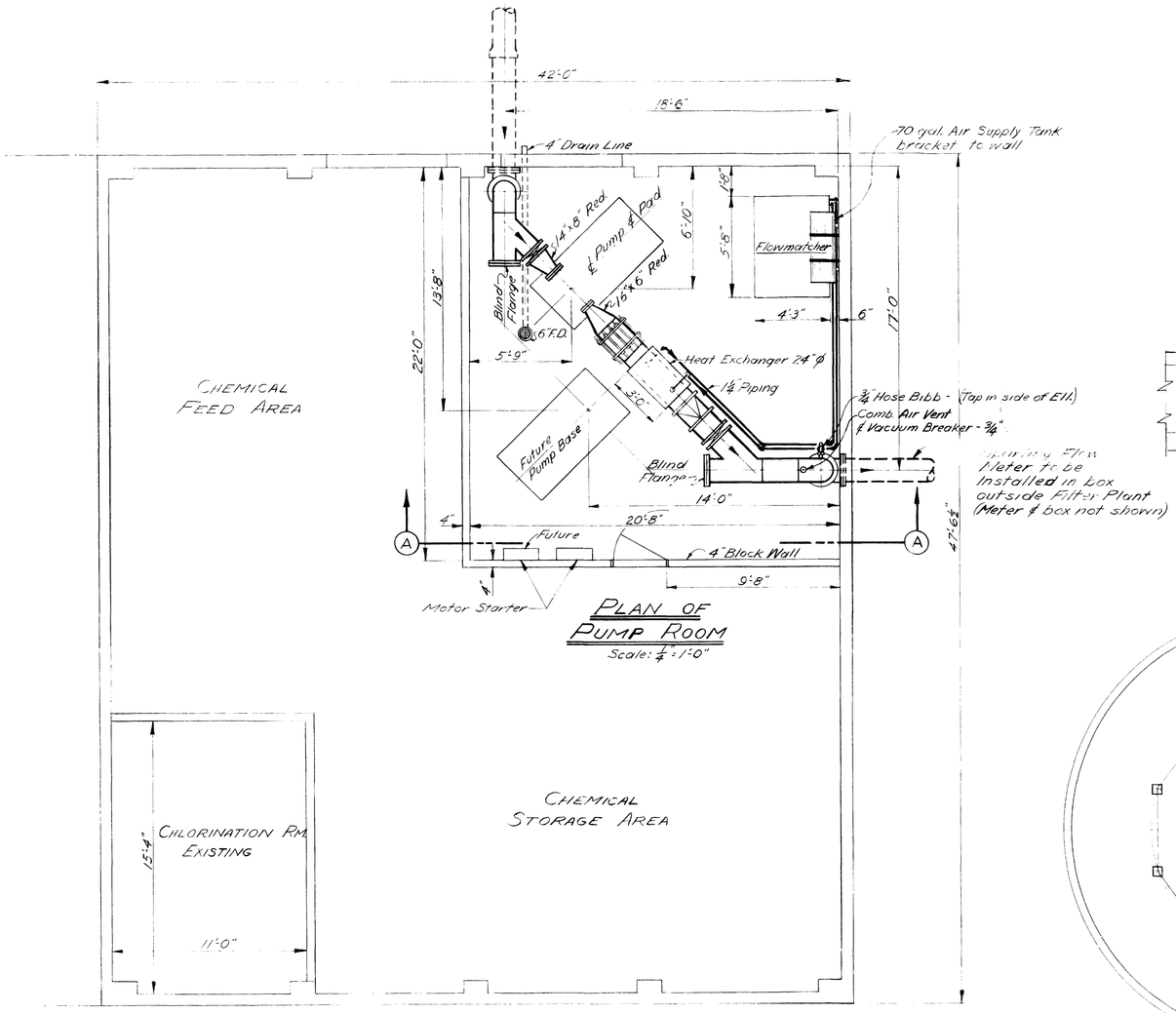
NELSON - HALEY - PATTERSON AND QUIRK
ENGINEERING CONSULTANTS
GREELEY COLORADO

CITY OF THORNTON, COLORADO
WATER SYSTEM IMPROVEMENTS

ADDITIONS AND REVISIONS TO FILTER BLDG. PUMP ROOM

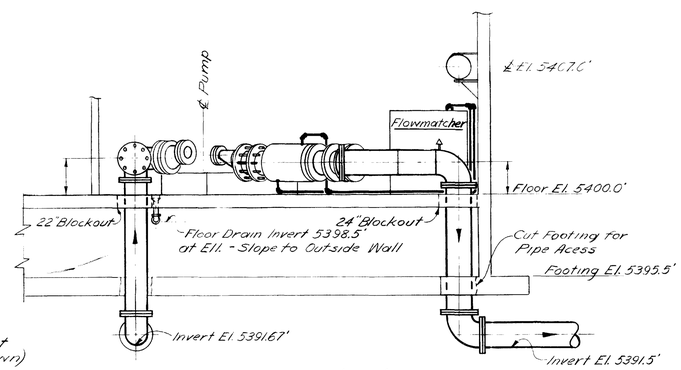
SHEET 3 SHEETS 1

~~10-1-3~~ 1-1-11



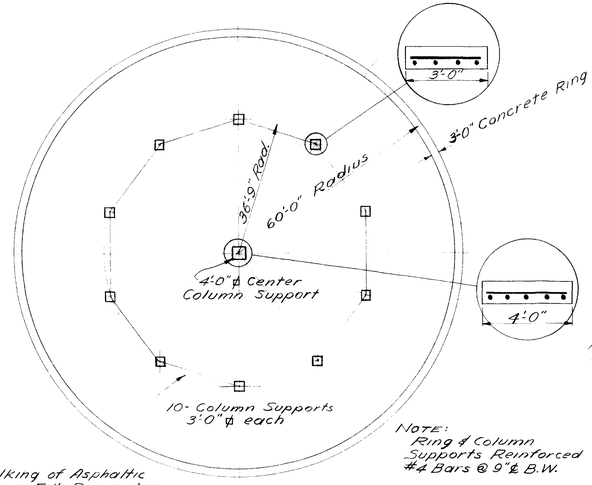
PLAN OF PUMP ROOM

Scale: ¼"=1'-0"

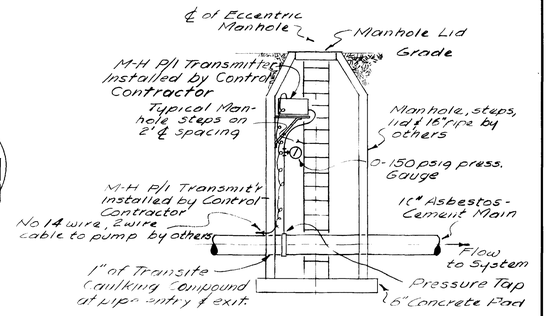


SECTION 'A-A'

Scale: ¼"-1'-0"

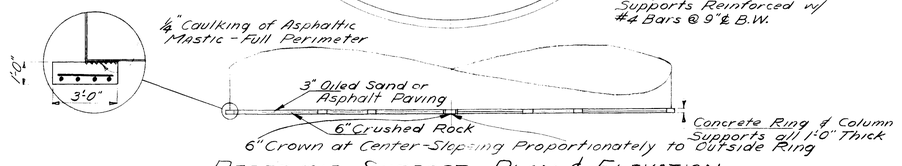


NOTE: Ring & Column Supports Reinforced w/ #4 Bars @ 9"℄ B.W.



CONTROL MANHOLE DETAILS

(Located 7000 ft± from main pump)



RESERVOIR SUPPORT PLAN & ELEVATION

Scale: 1"-20'

NOTES

NO.	REVISIONS	DATE	BY

REFERENCE DRAWINGS	PRINT RECORD (REV. NO / ISSUED)

ENGR. RECORD		
DRAWN	H.P.K.	5-1-59
DESIGNED	T.G.G.	4-27-59
CHECKED	T.G.G.	5-1-59
APPROVED		

SCALE: ¼"-1'-0"

RIPPLE & HOWE, INC.
CONSULTING ENGINEERS
DENVER, COLORADO

PUMP ROOM PLAN & DETAILS

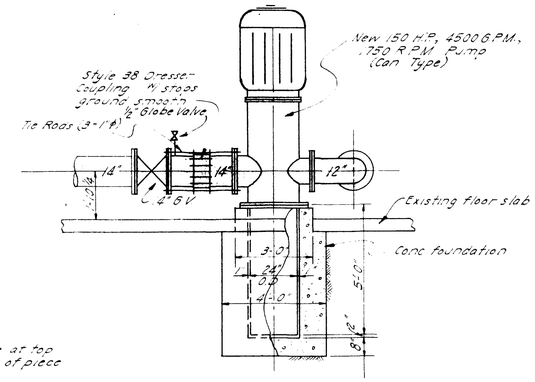
NORTHWEST UTILITIES EXPAN.

DWG. NO. 1-NW

SHEET NO. 102

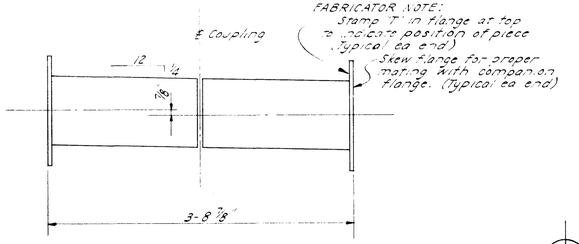
1-1-4

— Typical Water Treatment Plant Finish Floor Level —



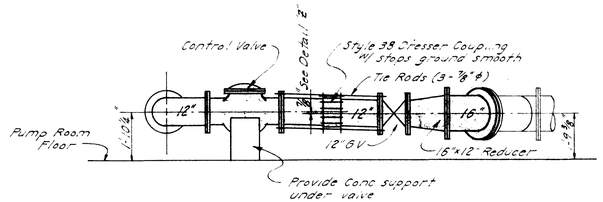
SECTION A-A

SCALE ⅜"=1'-0"



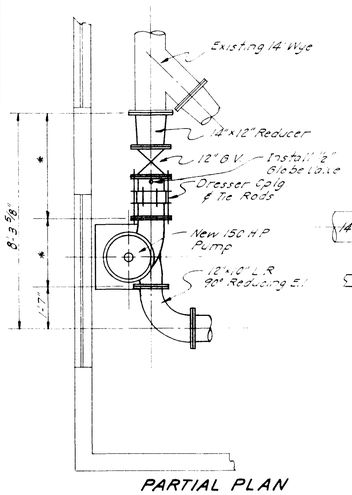
DETAIL "Z"

NO SCALE

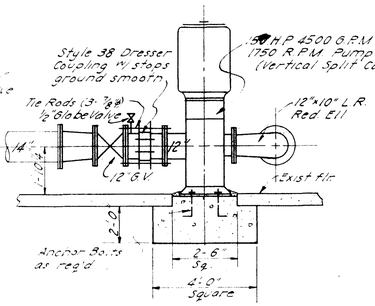


SECTION B-B

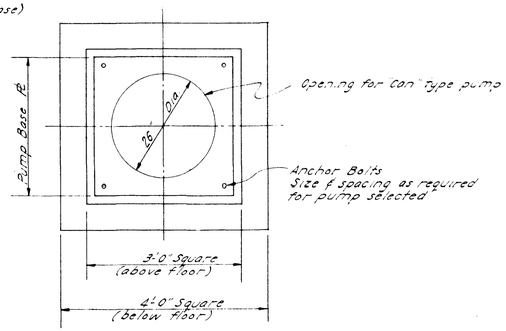
SCALE ⅜"=1'-0"



PARTIAL PLAN



ELEVATION

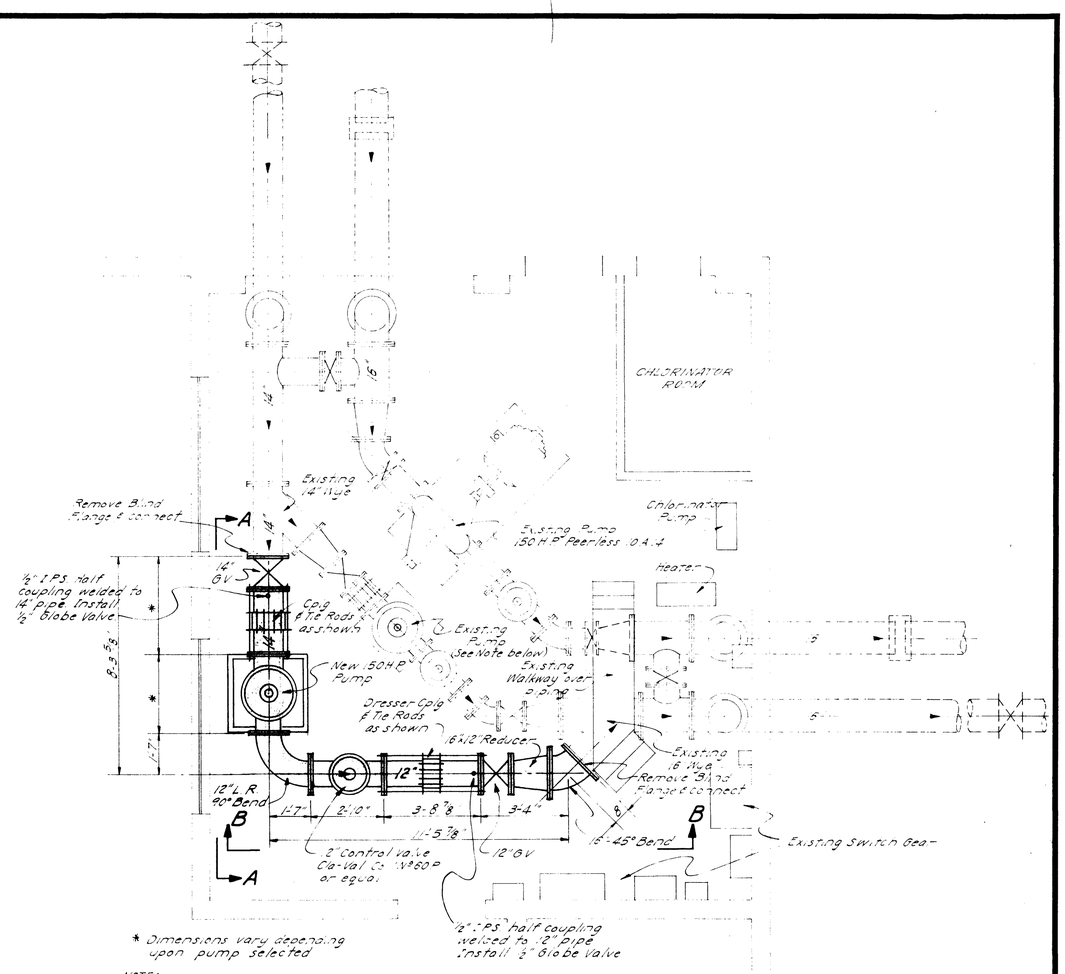


PLAN - PUMP FOUNDATION (CAN TYPE PUMP)

SCALE ¾"=1'-0"

VERTICAL SPLIT CASE PUMP INSTALLATION DETAILS

SCALE ⅜"=1'-0"



PIPING PLAN

SCALE ⅛"=1'-0"

LEGEND

INDICATES EXISTING PIPING

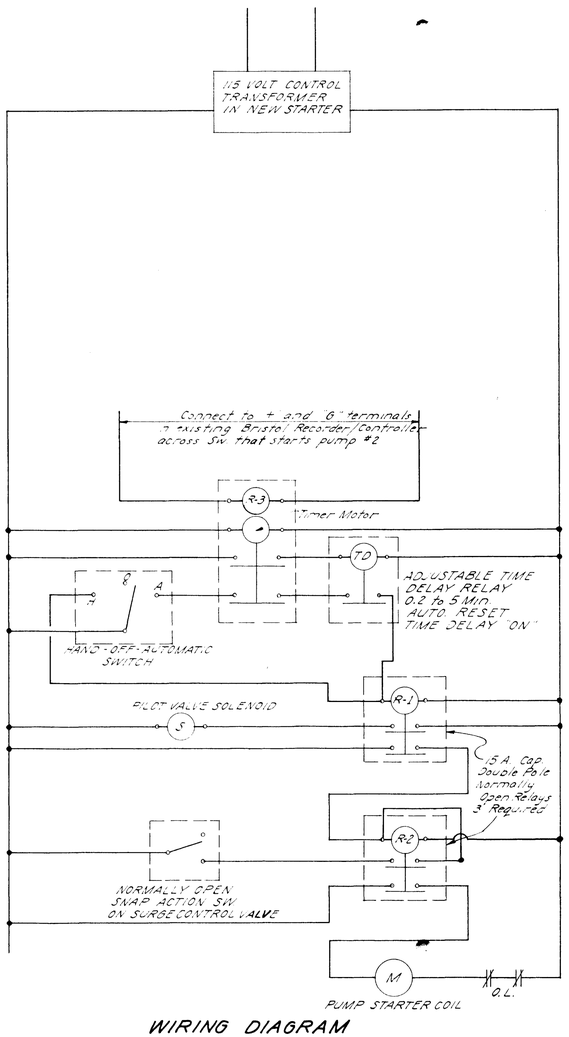
INDICATES NEW PIPING

THORNTON PLANT

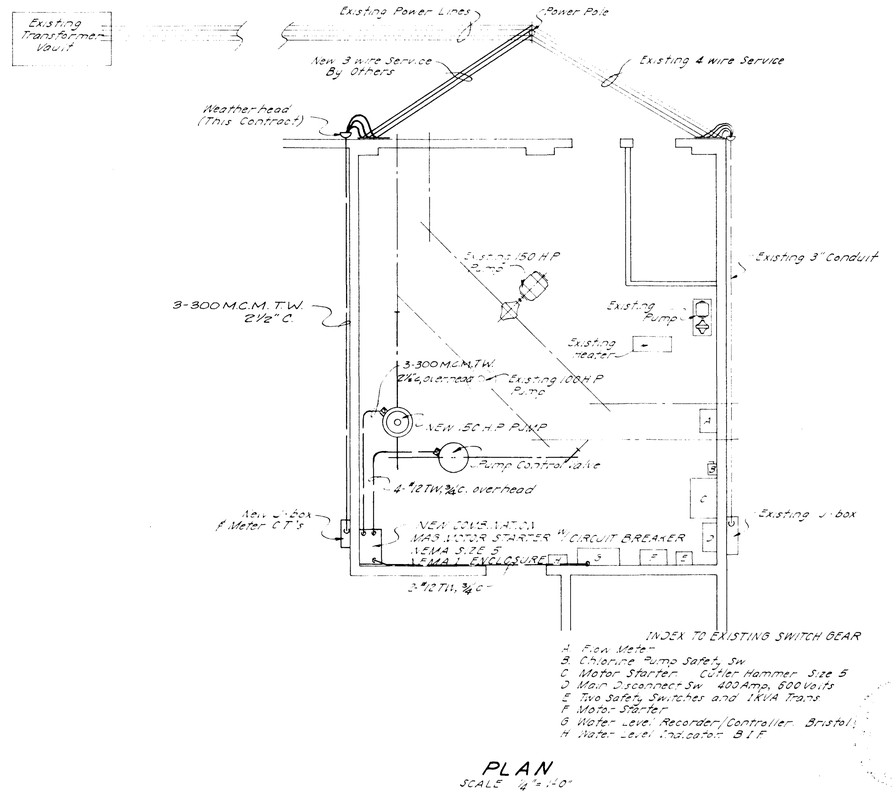
SCHEDULE 5

REVISIONS							
BY	DATE	DESCR.	DATE JAN. 1965	DRAWN EGP	PROJECT NO. 63114	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	NORTHGLENN PUMP STATION NO. 3 - MECHANICAL	SHEET 10
BY	DATE	DESCR.	SCALE As Shown	CHECKED		GREELEY COLORADO			SHEETS 5
BY	DATE	DESCR.		APPROVED					

1-1-12



WIRING DIAGRAM

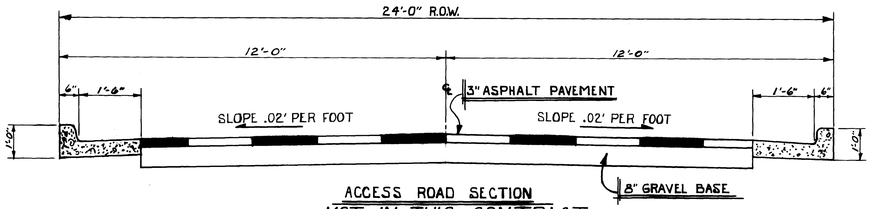


PLAN
SCALE ¼" = 1'-0"

SCHEDULE 5

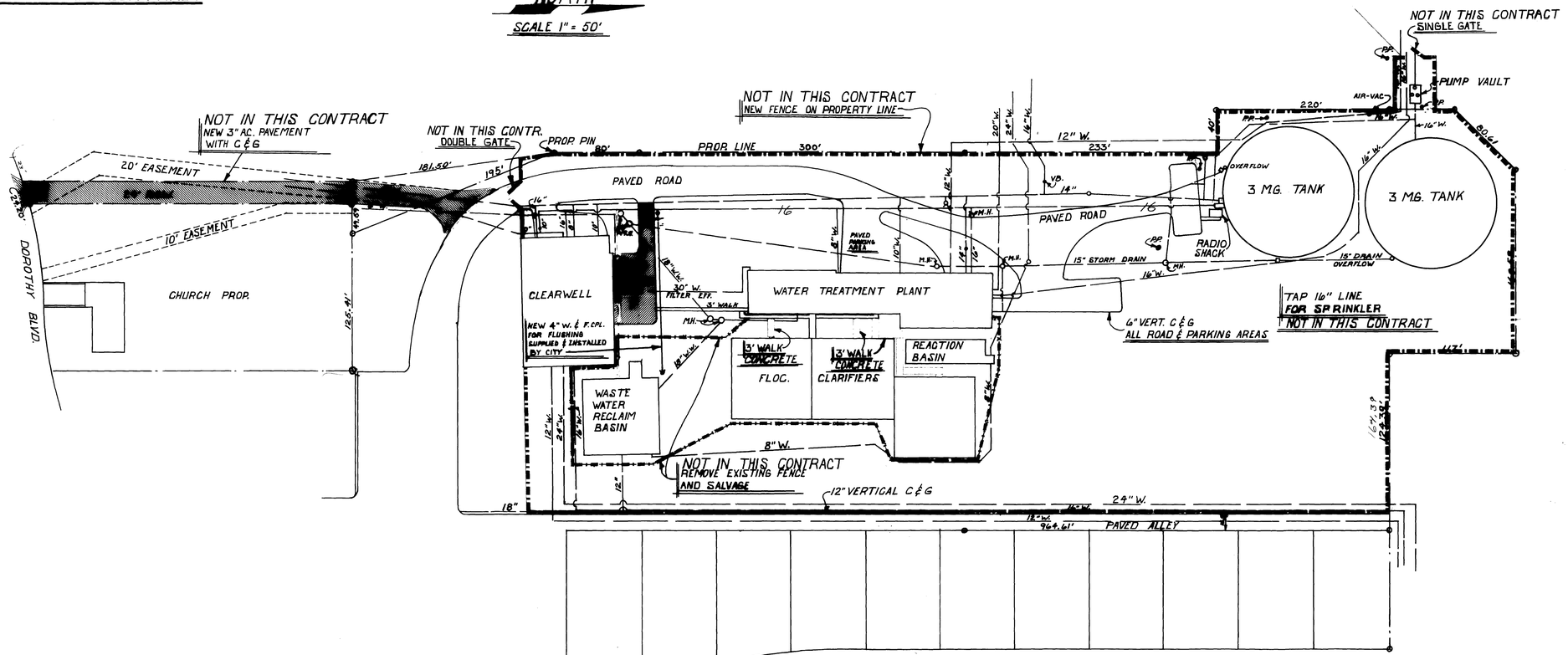
REVISIONS									
BY	DATE	DESCR.	DATE JAN. 1965	DRAWN		PROJECT NO. 63114	NELSON - HALEY - PATTERSON AND QUIRK ENGINEERING CONSULTANTS	CITY OF THORNTON, COLORADO WATER SYSTEM IMPROVEMENTS	NORTHGLENN PUMP STATION PUMP Nº 3 - ELECTRICAL	SHEET 10 SHEETS 6
BY	DATE	DESCR.	SCALE AS SHOWN	CHECKED E.G.P.			GREELEY COLORADO			
BY	DATE	DESCR.		APPROVED						

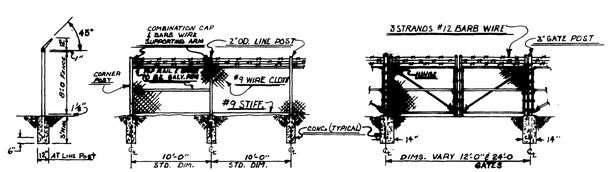
1-1-12



ACCESS ROAD SECTION
NOT IN THIS CONTRACT

NORTH
SCALE 1" = 50'



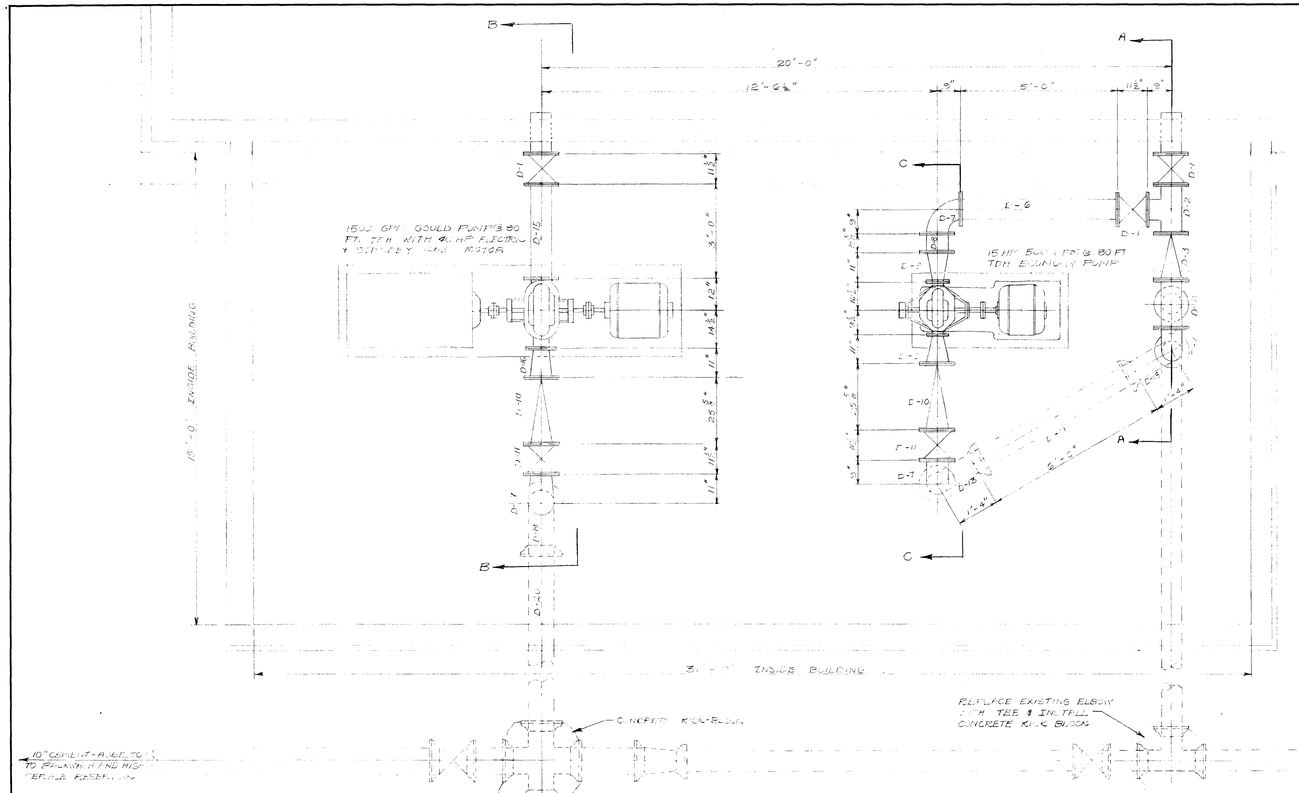


CHAIN LINK FENCE & GATE DETAILS
NOT IN THIS CONTRACT

INCLUDED IN THIS CONTRACT
2" AC. PAVEMENT AT CLEAR WELL, 3'-0 SIDEWALK CONCRETE
AT TREATMENT PLANT, 24" WATER LINE AT CROSSINGS FOR FLUSHING

UTILITY ENGINEER R.L. Linthicum
LICENSE NO. 11470

SITE PLAN		
WATER TREATMENT FACILITIES CITY HALL		
SCALE: 1"=50'	DATE: 9-12-74	SHEET 1 OF 1
DWG: AL SMITH	CITY OF THORNTON ENGINEERING DEPT.	1-10-10



ITEM	DESCRIPTION	NO. REQ'D
D-6	6" x [illegible] FF. C.I. PIPE	1
D-7	4" F.F. 90° ELBOW AM. STD. 125	3
D-8	8" X 8'-8" F.F. C.I. PIPE CLASS 150	1
D-9	8" X 4" ECCENTRIC REDUCER	2
D-10	8" CLAYTON (FLNGD) NO-SLAM CHECK VALVE	2
D-11	8" FF. I.E.B.B. CLASS 150 GATE VALVE	2
D-12	8" X 2'-0" F.S. C.I. F.F.	2
D-14	8" X 6'-0" S.S. C.I. PIPE CLASS 150	1
D-13	8" BELL BELL 90° QUARTER BEND CLASS D	2
D-15	8" X 3'-0" F.F. C.I. PIPE CLASS 150	1
D-16	8" X 6" ECCENTRIC REDUCER	1
D-17	8" X 10" INCREASING ELBOW AM. STD 125	1
D-18	10" X 4'-0" F.S. C.I. PIPE CLASS 150	1
D-19	10" DOUBLE BELL 90° QUARTER BEND CURB	1
D-20	10" x 2'-0" S.S. C.I. PIPE CLASS 150	1

PIPING MATERIAL LIST

NOTE: EXISTING PIPING SHOWN AS SHOWN ON DWG. 8/9 DATED 11/27/57

ALL PIPING THROUGH SLAB SHALL HAVE WATER EXPANSION BETWEEN CONCRETE & PIPE

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

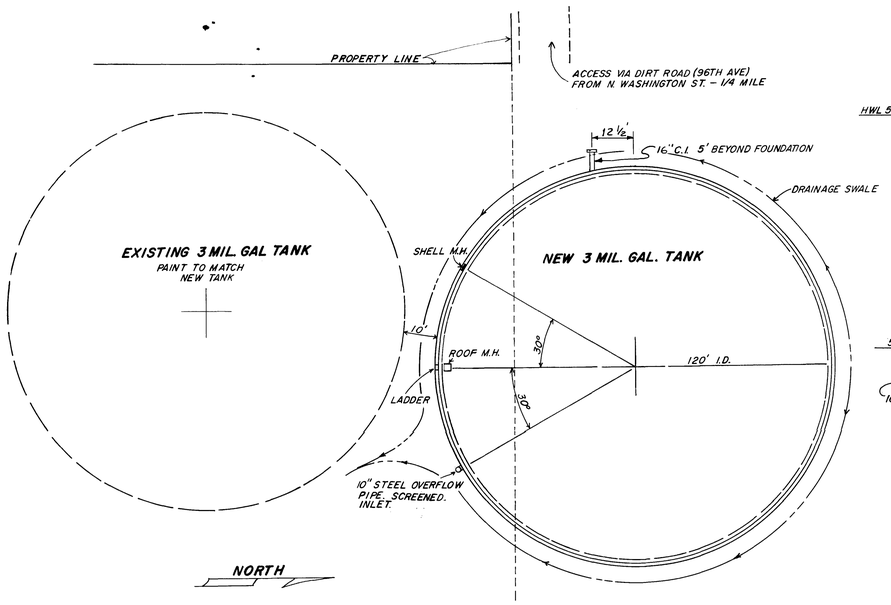
RECEIVING BOOSTER PUMP PIPING

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN BB 3/22/58 | REVISED
TRACED
CHECKED

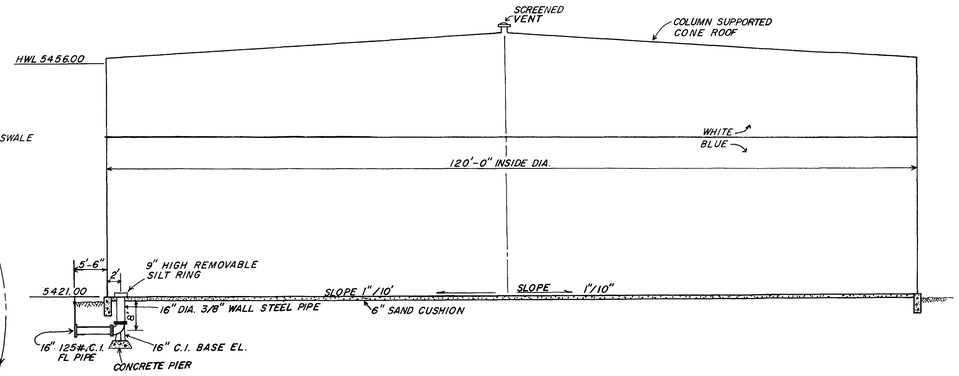
1 / 1

10-1-5 1-1-3



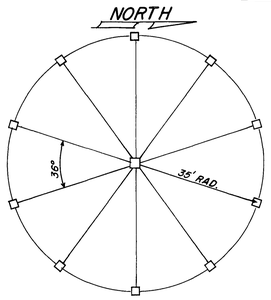
SITE PLAN

SCALE: 1" = 20'



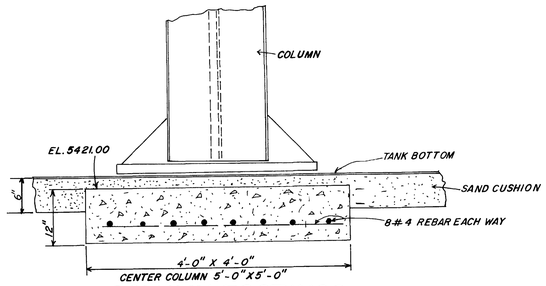
TANK ELEVATION

SCALE: 1" = 10'



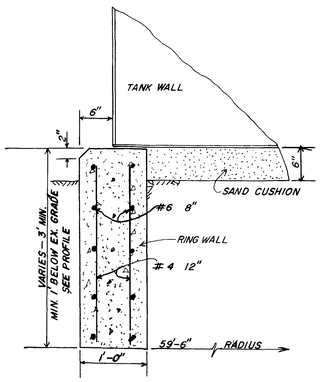
FOOTING LAYOUT

NO SCALE



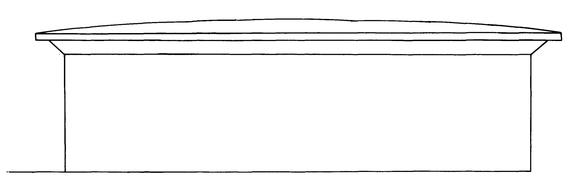
COLUMN FOOTINGS

NO SCALE

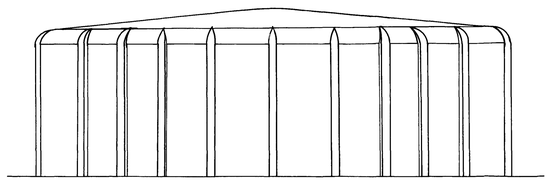


RING WALL

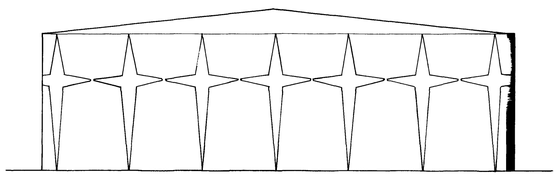
SCALE: 1" = 1'



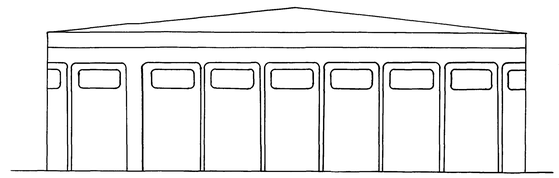
SHAPE A



SHAPE B



DECORATIVE TRIM



DECORATIVE PAINT

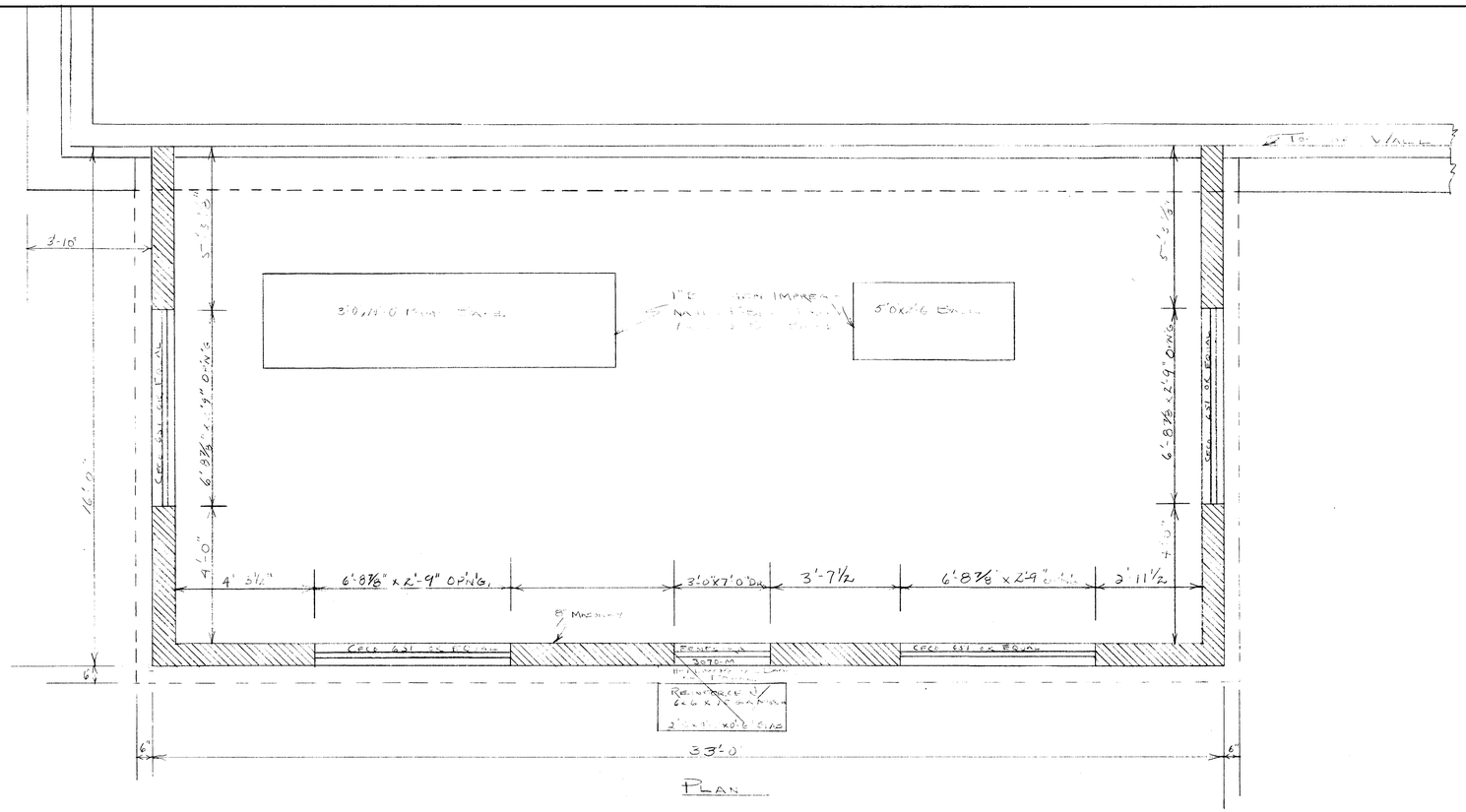
ROBERT V. GORSUCH REGISTERED 2405 PROFESSIONAL ENGINEER STATE OF COLORADO

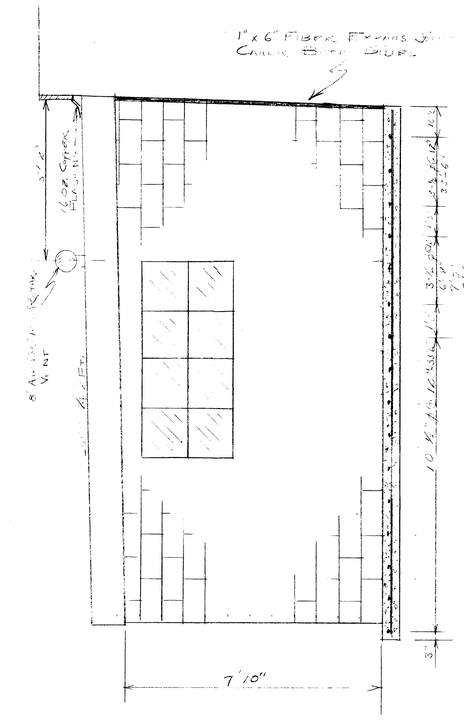
SITE PLAN
ELEVATION
FOUNDATION DETAILS

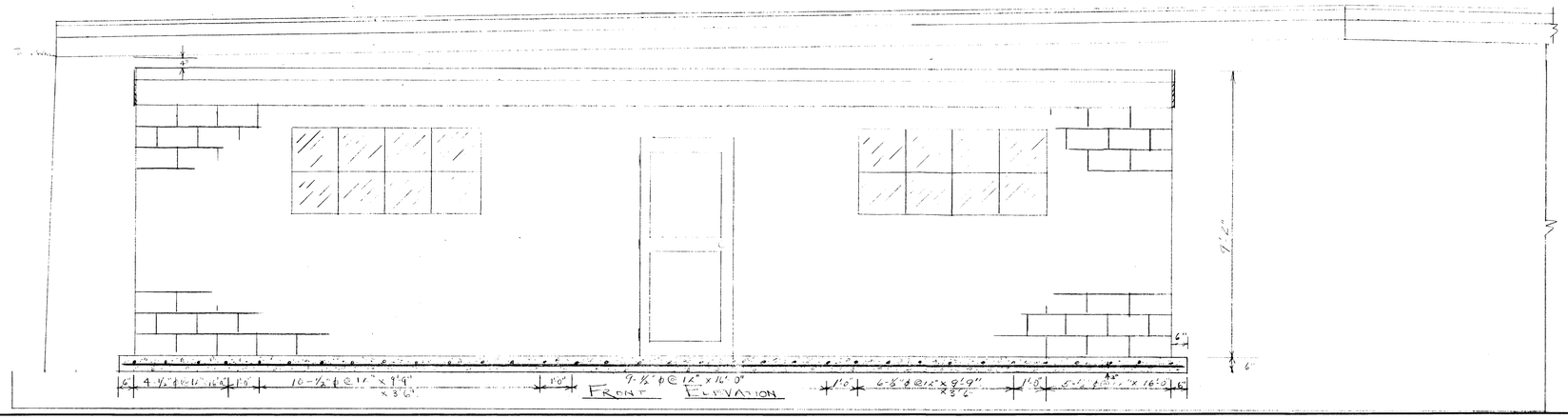
3 MILLION GALLON WATER STORAGE TANK

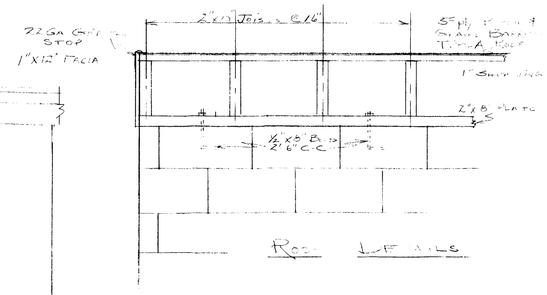
SCALE: AS SHOWN	DATE: 15 SEPT. 1972	SHEET 1 OF 4
DWG: RSR CHKD: RVG	CITY OF THORNTON ENGINEERING DEPT.	DWG NO. 72 C.I. 5

4-5-73









NORTHGATE UNIT TWO
THORNTON COLORADO

RESERVOIR BOOSTER PUMP HOUSE

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

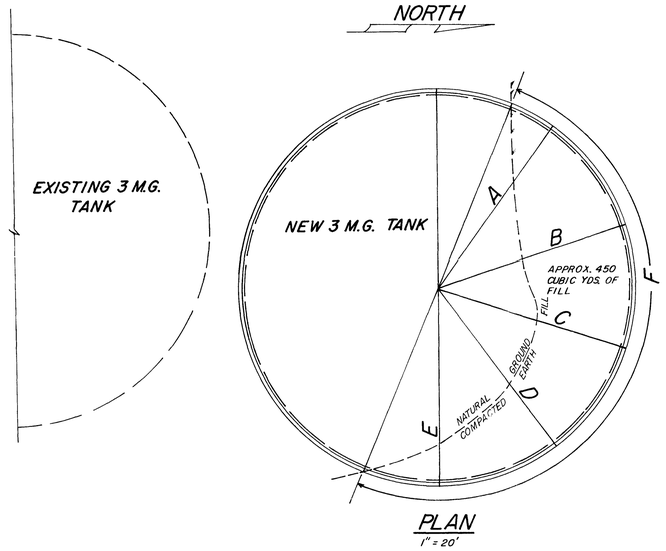
DRAWN	JJJ 4 27-55	REVISED
TRACED		
CHECKED		

DRAWING NUMBER A-2

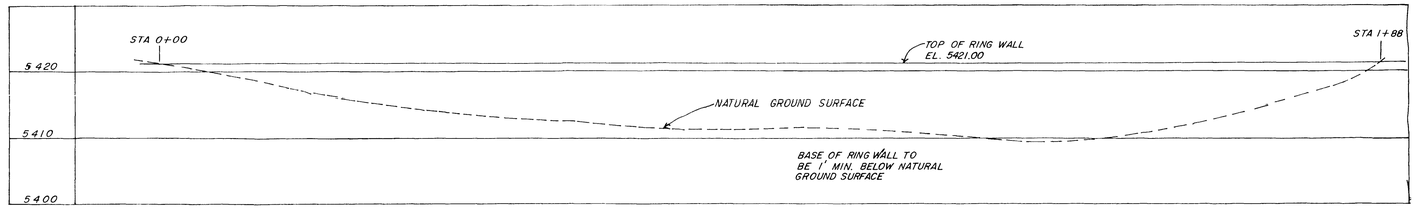
DRAWING NUMBER A-2

DRAWING NUMBER A-2

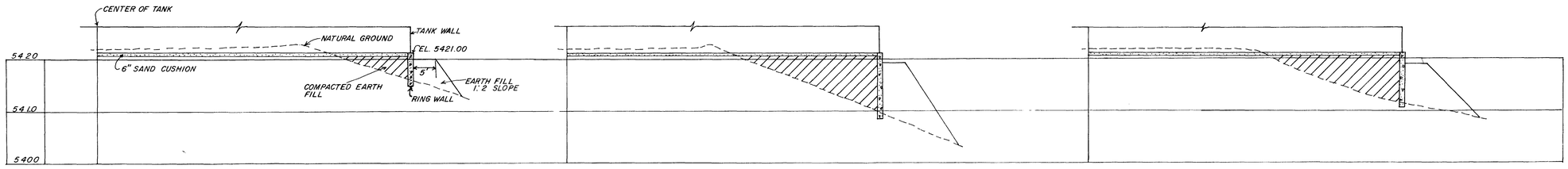
1-1-3



PLAN
1" = 20'



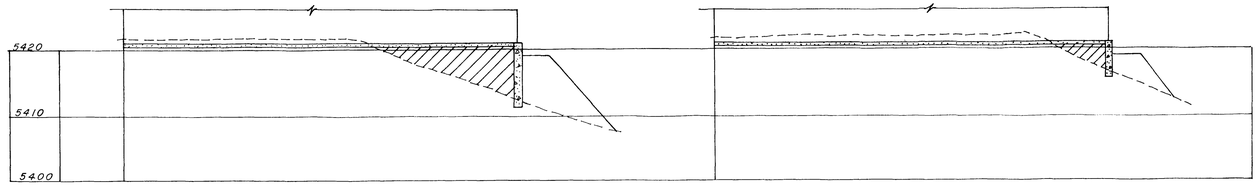
PROFILE F



PROFILE A
1" = 10' HOR.
1" = 10' VERT.
(ALL PROFILES)

PROFILE B

PROFILE C



PROFILE D

PROFILE E



PLAN AND PROFILES		
3 MILLION GALLON WATER STORAGE TANK		
SCALE: AS SHOWN	DATE: 15 SEPT 1972	SHEET 2 OF 4
DWG: BSR CHKD: RVG	CITY OF THORNTON ENGINEERING DEPT.	DWG. NO. 72 C.I. 5

4-5-2

DRAWING NUMBER

DRAWING NUMBER

Apline

PLAN HOLO CORPORATION • IRVINE, CALIFORNIA

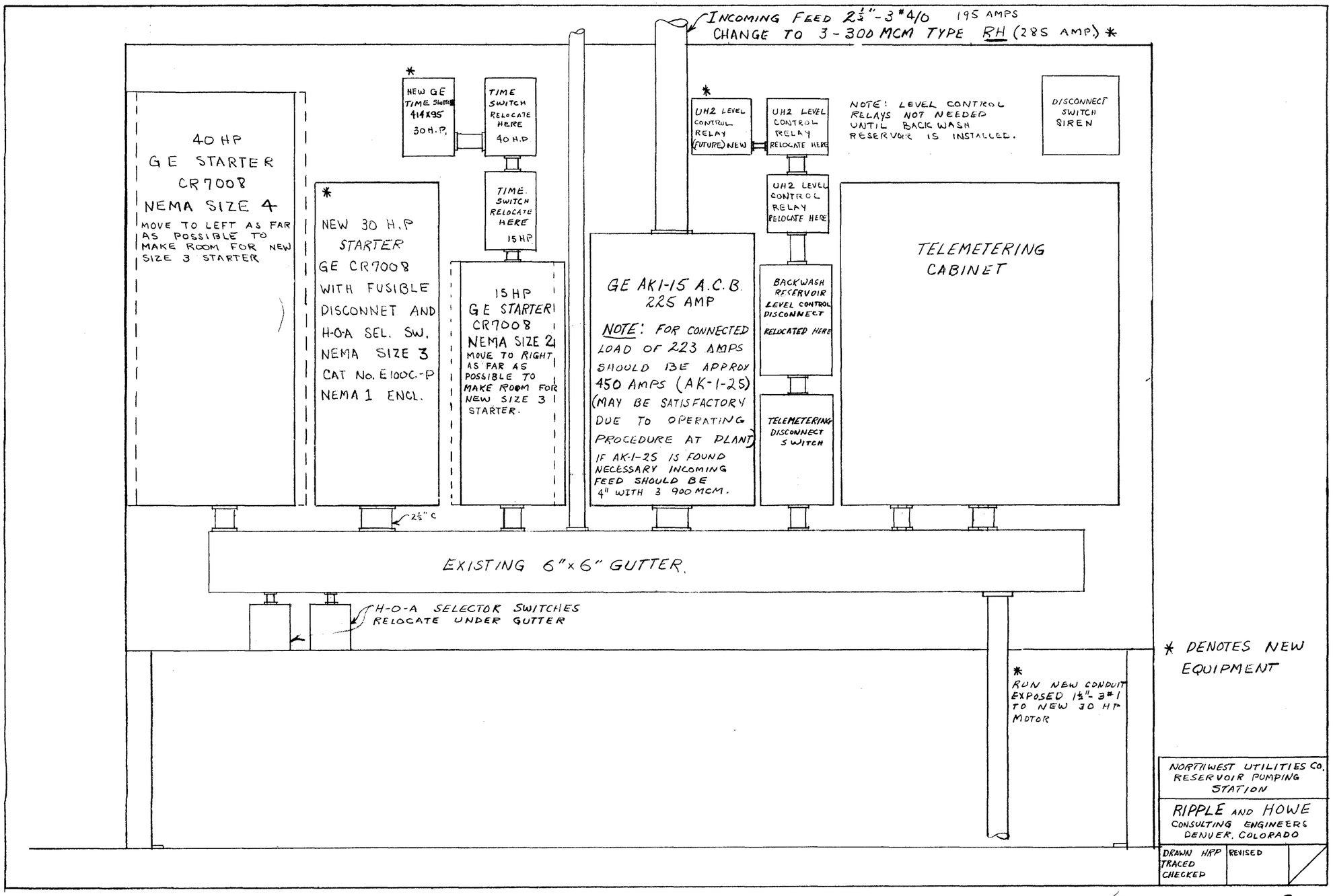
ORDER BY NUMBER 07548

DRAWING NUMBER

Thornton Water Treatment Plant
Reservoir Pumping Station

PLAN HOLO CORPORATION • IRVINE, CALIFORNIA

ORDER BY NUMBER 07548



* DENOTES NEW EQUIPMENT

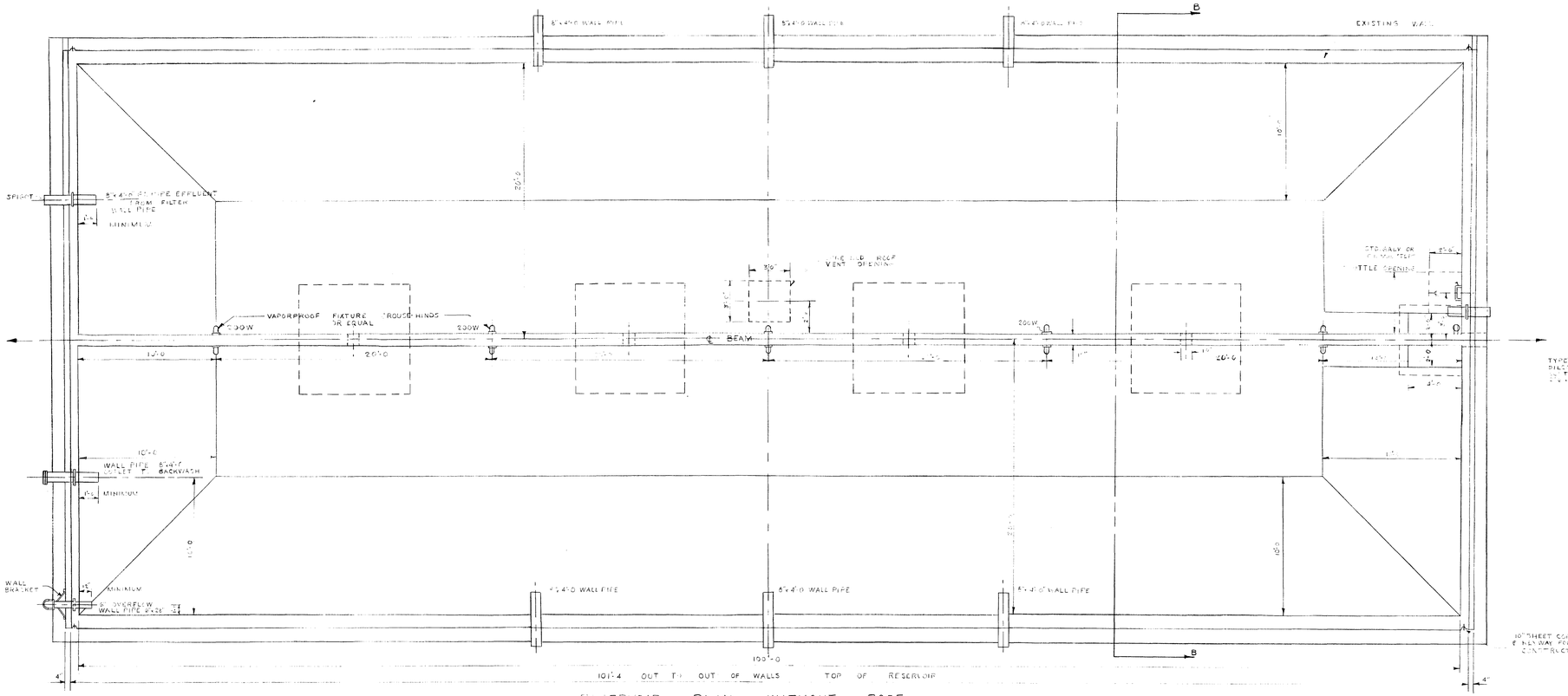
NORTHWEST UTILITIES CO.
RESERVOIR PUMPING STATION

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

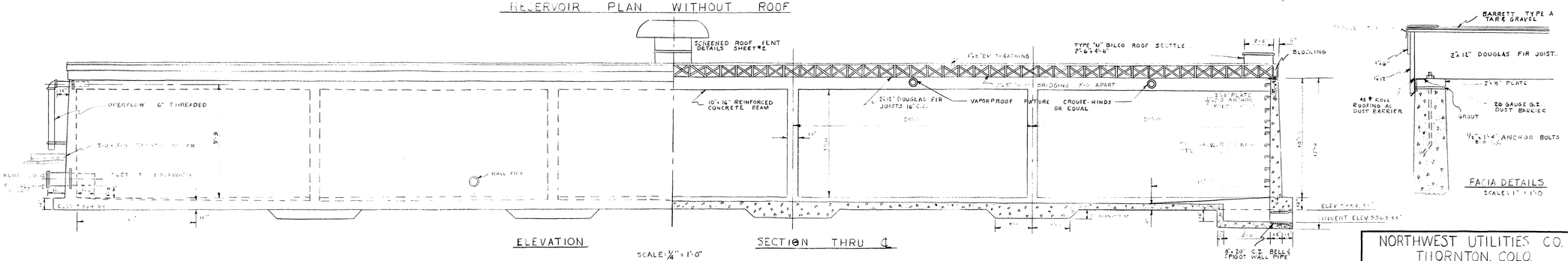
DRAWN HPP
TRACED
CHECKED

REVISED

1-1-3



RESERVOIR PLAN WITHOUT ROOF



ELEVATION

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

SECTION THRU ℄

FACIA DETAILS

SCALE: 1" = 1'-0

NORTHWEST UTILITIES CO.
THORNTON, COLO.

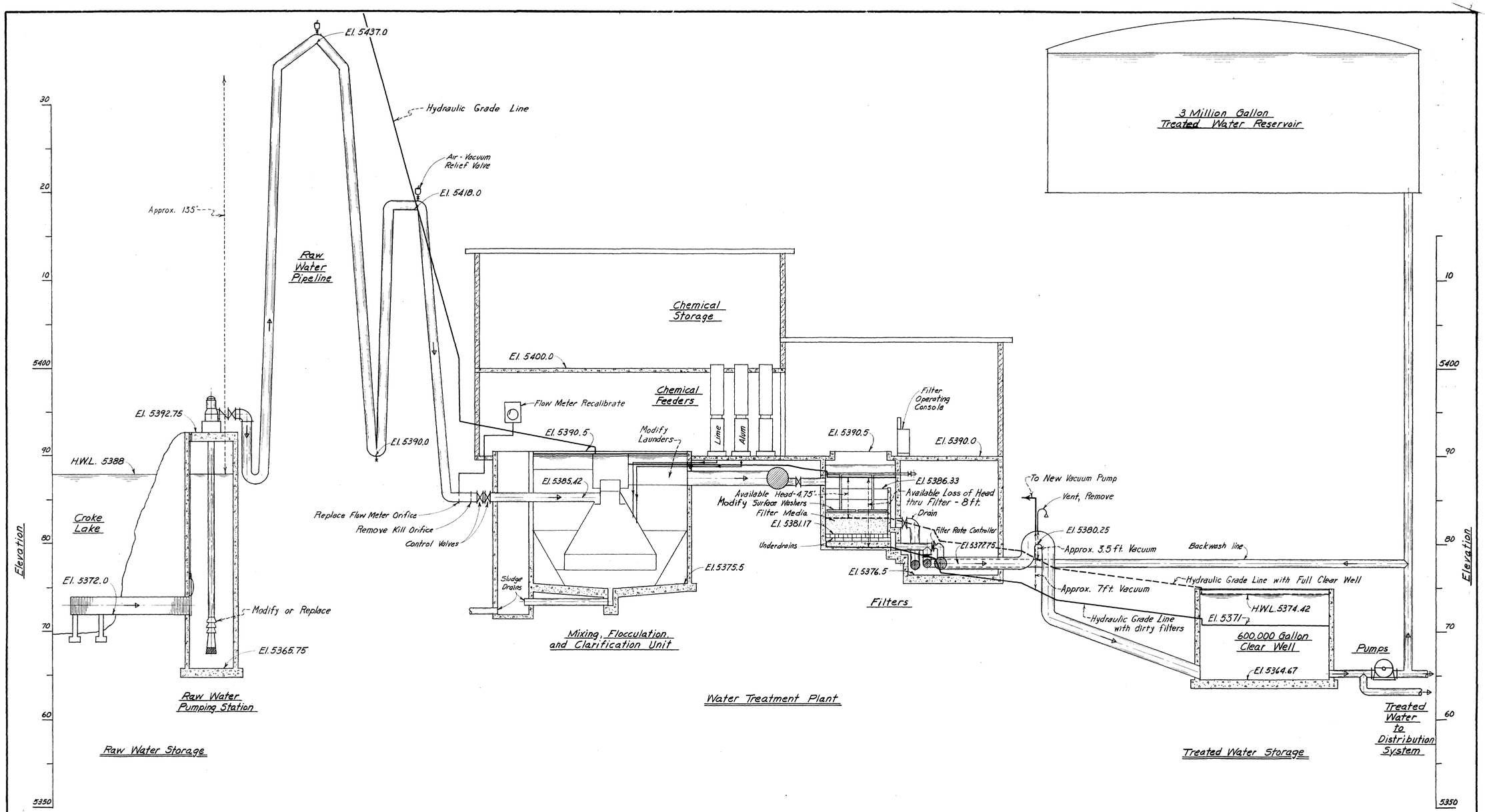
300,000 GALLON WATER STORAGE RESERVOIR NO. 2

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN	E.A.E. 3-24-54	REVISED	1
TRACED			5
CHECKED	BB 3/31/54		

[redacted] [redacted]

7-1-1



NOTE:
Modifications shown are necessary to convert plant to Micro-Floc process. Hydraulic grade line of converted plant shown at 3000 g.p.m.

NORTHWEST UTILITIES COMPANY
THORNTON, COLORADO

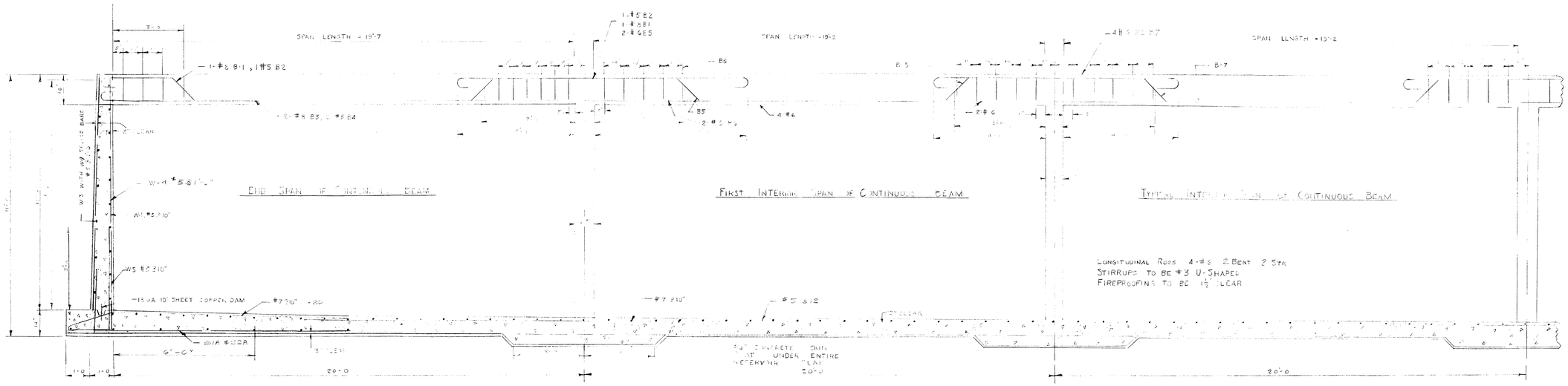
WATER TREATMENT PLANT SCHEMATIC DIAGRAM

PHILLIPS-CARTER-OSBORN, INC., ENGINEERS
DENVER, COLORADO

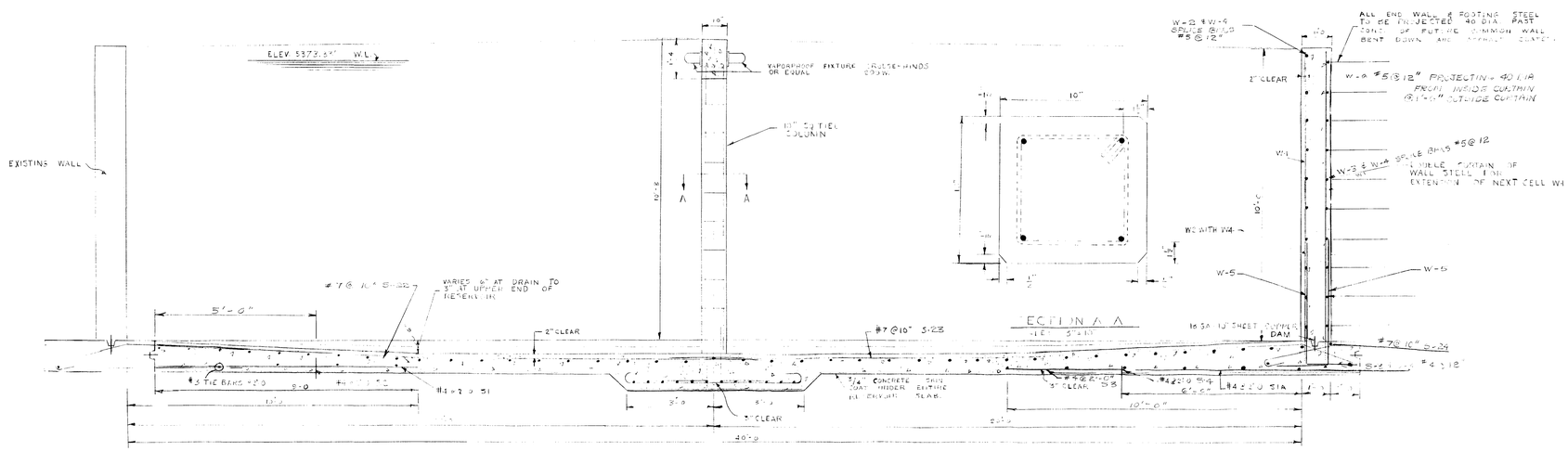
Designed —
Drawn R.K.
Checked R.G.C.
Submitted Robert G. Crutchfield

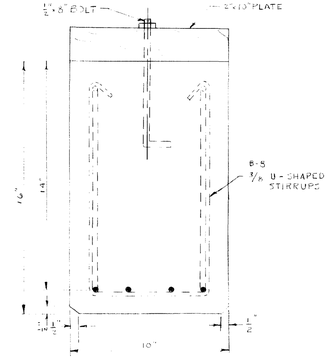
P-1680 | DECEMBER, 1961 | Sh. 1 of 1

1-1-7



SECTION THROUGH RESERVOIR
SHOWING CONTINUOUS BEAM
& COLUMN DETAILS
SCALE: ½" = 1'-0"





BEAM SECTION
SCALE: 3"=1'-0

NORTHWEST UTILITIES CO.
THORNTON, COLO.

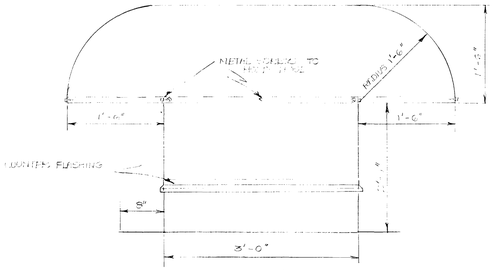
300,000 GALLON RESERVOIR NO.2
CONCRETE DETAILS

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

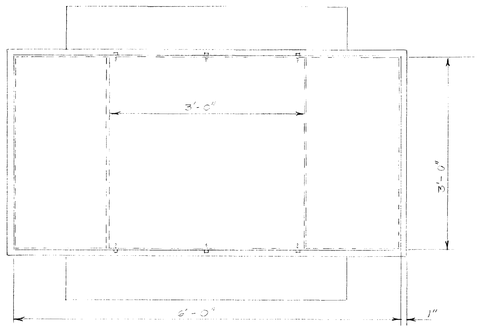
DRAWN E.E. 3-27-54	REVISED [redacted]	2/5
TRACED		
CHECKED BB 4/2/54		

[redacted]

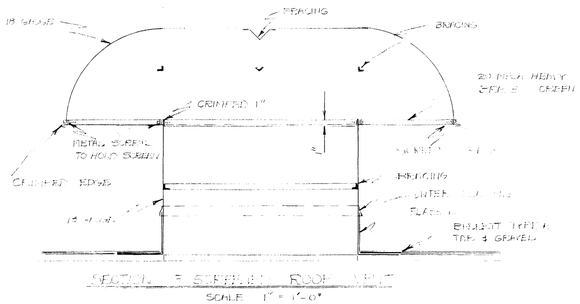
1-1-1



SIDE VIEW

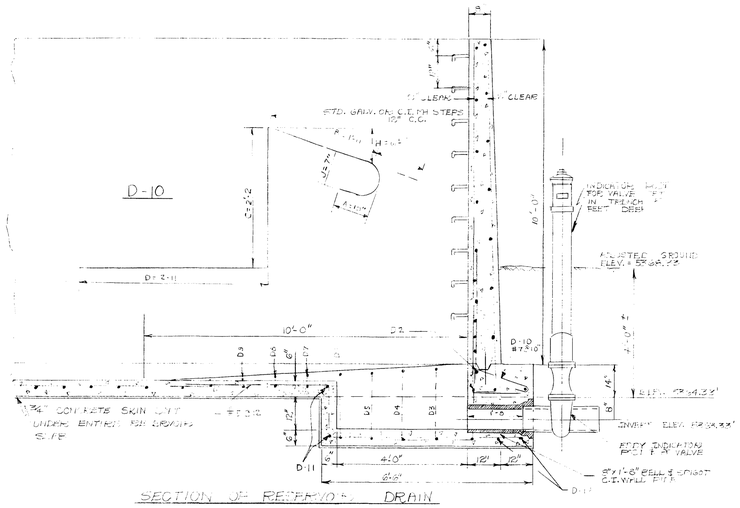


TOP VIEW



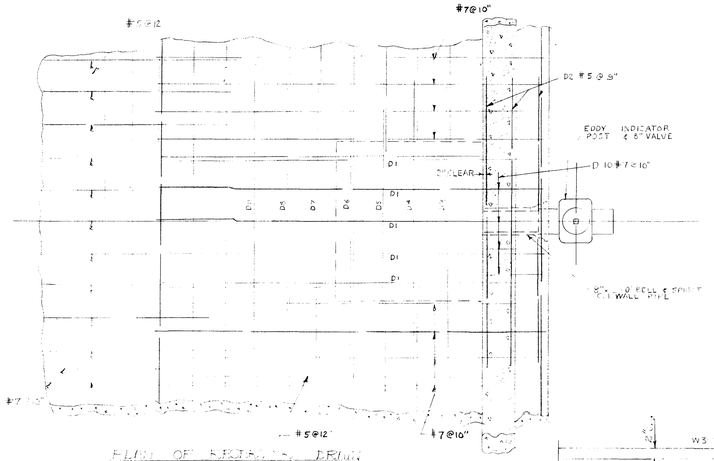
SECTION OF STEEL ROOF UNIT

SCALE 1" = 1'-0"

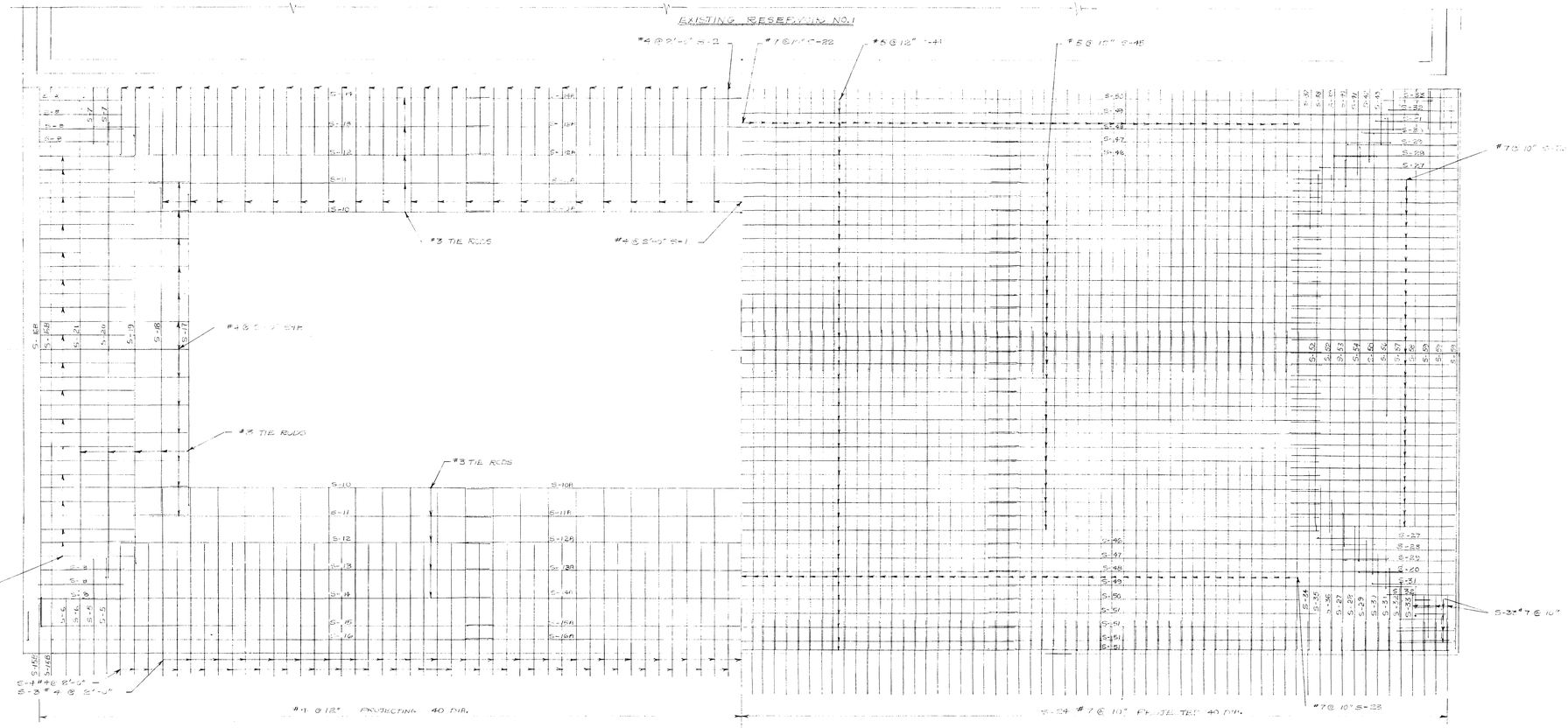


SECTION OF RESERVOIR DRAIN

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


#7@12
#7@10"
#5@12"
#7@10"
D2 #5 @ 9"
EDDY INDICATOR POST & 8" VALVE
D1
D1
D1

EXISTING RESERVOIR NO.1



LOWER

UPPER

SLAB REINFORCING STEEL

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

NORTHWESTERN UTILITIES COMPANY
THORNTON, COLORADO

300,000 GALLON WATER RESERVOIR NO.2
SLAB REINFORCING

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN SR 4/2/54	REVISED	3
TRACED		5
CHECKED E E 4/2/54		

1-1-1

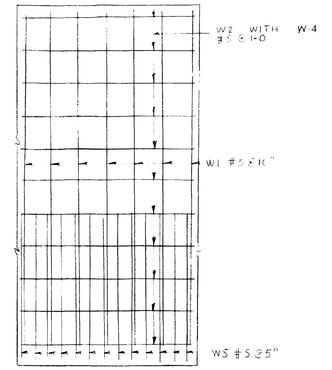
PLACING SCHEDULE

REINFORCING STEEL SCHEDULE

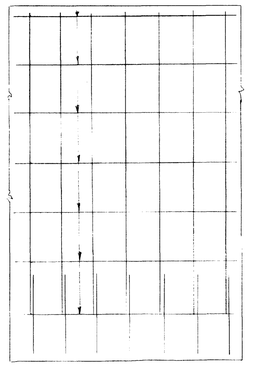
MK.	NO.	SIZE	TYPE	LEN.	A	B	C	D	E	F	G	H	K	TOTAL LENGTH	DIAGRAM
S1	48	4	STR.	9'-0"										2730.0	
S1A	20	4	2	13'-6"	10'-10"	2'-8"								2810.0	
S2	48	4	STR.	5'-0										240.0	
S2A	20	4	2	9'-6"	6'-10"	2'-8"								820.0	
S3	44	4	STR.	13'-9"										605.0	
S4	48	4	STR.	9'-9"										468.0	
S5	4	4	STR.	8'-6"										34.0	
S6	6	4	STR.	5'-6"										33.0	
S7	4	4	STR.	4'-0"										16.0	
S8	16	4	"	8'-8"	6'-0"									138.7	
S10	4	3	STR.	23-0										92.0	
S11A	2	3	"	40-0										80.0	
S11	4	3	"	24-0										96.0	
S11A	2	3	"	40-0										80	
S12	4	3	"	26-9										107.0	
S12A	2	3	"	40-0										80.0	
S13	4	3	"	28-9"										115.0	
S13A	2	3	"	40-0										80.0	
S14	4	3	"	29-6										118.0	
S14A	2	3	"	40-0										80.0	
S15	2	5	2	34'-10"	2'-1"	32'-9"								69.6	
S15A	1	5	STR.	40-0										40.0	
S15B	2	5	STR.	5'-0										10.0	
S16	2	5	2	35'-10"	2'-1"	33'-9"								71.7	
S16A	1	5	STR.	40-0										40.0	
S16B	2	5	STR.	40'-0										80.0	
S17	2	3	STR.	22'-6"										45.0	
S18	2	3	STR.	23-6										47.0	
S19	2	3	"	31'-0										62.0	
S20	2	3	"	33'-0										66.0	
S21	2	3	"	35-0										70.0	
S22	96	7	"	20-6										1968.0	
S23	96	7	5	24-2	0'-9	1'-11	10'-5	11'-6					0'-4½	2320.3	
S24	122	7	5	6'-8	"	"	4'-0						"	813.7	
S25	62	7	5	12'-8	"	"	10'-0						"	790.5	
S26	6	7	5	11'-9	"	"	7'-0						" 9'-0	70.5	
S27	6	7	5	10'-5	"	"	7'-0						" 8'-0	64.5	
S28	6	7	5	11'-8	"	"	7'-0						" 7'-0	58.5	
S29	5	7	5	8'-8	"	"	6'-0						" 8'-0	52.5	
S31	5	7	5	11'-8	"	"	5'-0						" 5'-0	46.5	
S32	4	7	5	6'-8	"	"	4'-0						" 4'-0	40.5	
S33	17	7	5	5'-8	"	"	3'-0						" 4'-0	103.5	
S34	2	7	5	13'-8	"	"	11'-0						" 11'-0	27.5	
S35	2	7	5	12'-8	"	"	10'-0						" 10'-0	25.5	
S36	2	7	5	11'-8	"	"	9'-0						" 10'-0	23.5	
S37	2	7	STR.	10'-0										20.0	
S38	2	7	"	9'-0										18.0	
S39	2	7	"	8'-0										16.0	
S40	2	7	"	7'-0										14.0	
S41	2	7	"	6'-0										12.0	
S42	2	7	"	5'-0										10.0	
S43	2	7	"	4'-0										8.0	
S44	40		STR.	40'-0										1600.0	
S45	54	5	STR.	24'-0										1296.0	
S46	4	5	STR.	2'-[illegible]										112.0	
S47	4	5	STR.	29'-[illegible]										170.0	

REINFORCING STEEL SCHEDULE

MK.	NO.	SIZE	TYPE	LEN.	A	B	C	D	E	F	G	H	K	TOTAL LENGTH	DIAGRAM
W1	336	5	STR.	9-10										3323.6	
W2	20	5	2	35-2	2-6	32-8								703.3	
W-3	20	5	2	36-6	3-2	33-4								730.0	
W-4	52	5	STR	40-0										2080.0	
W-5	677	5	2	5-11	4-3	1-8								4005.0	
W-6	34	5	STR.	4-2										141.7	
D1	5	5	8	13-4	5-9	1-7	6-3							66.7	
D2	4	5	STR.	8-8										35.0	
D3	1	5	34	13-0	2-1	2-2	4-6	2-2			2-1			13.0	
D4	1	5	34	12-10	2-1	2-1	4-6	2-1			2-1			12.8	
D5	1	5	34	12-5	2-1	2-0	4-6	2-0			2-1			12.7	
D6	1	5	34	12-6	2-1	1-11	4-6	1-11			2-1			12.5	
D7	1	5	34	9-3	2-1	0-3½	4-6	0-3½			2-1			9-3	
D8	1	5	34	9-1	2-1	0-2½	4-6	0-2½			2-1			9.1	
D9	1	5	34	8-11	2-1	0-1½	4-6	0-1½			2-1			8.9	
D10	5	7	SEE SHEET	7-9	0-6¾	1-11	1-2	1-11		0-6½	0-9	0-6½		38.5	
D11	2	5	36	20-10	2-1	6-1	4-6	6-1			2-1			41.7	
D12	2	5	36	10-5	2-1	1-6	4-6	1-6			2-1			21.5	
C1	112	5	1	7-4	0-5	6-10				0-5½	0-5			821.0	
C2	16	4	2	4-2	1-6	2-6								66.7	
C3	36	3	T1	3-0	0-2⅜	0-7⅜	0-7¾	0-7¾	0-7¾		0-2⅜			108.0	
C4	16	4	STR	9-9										156.0	
B1	2	8	3	29-9	0-10	3-0	1-4	11-3	1-4	10-9	6-10	1-0	0-7	59.5	
B2	2	5	3	29-1	0-6	3-0	1-4	11-3	1-4	10-9	0-6	1-0	0-4½	58.1	
B3	2	8	1	21-4	0-10	20-6							0-7	42.6	
B4	2	5	1	21-0	0-6	20-6							0-4½	42.0	
B5	4	6	3	32-7	0-5	9-3	1-4	10-5	1-4	5-11	0-8	1-0	0-5½	130.3	
B6	6	6	STR.	20-0										120.0	
B7	2	6	3	33-3	0-8	5-11	1-4	10-7	1-4	5-11	0-8	1-0	0-5½	66.5	
B8	52	3	53	3-7½	0-5	1-1	0-7½	1-1			0-5	0-3¾		187.2	
W-7	80	4	STR.	9-10										794.7	
S48	4	5	STR	30-0										120.0	
S49	4	5	"	31-0										124.0	
S50	4	5	"	32-0										128.0	
S51	8	5	"	34-0										272.0	
S52	2	5	"	26-0										52.0	
S53	2	5	"	28-0										56.0	
S54	2	5	"	30-0										60.0	
S55	2	5	"	32-6										64.0	
S56	2	5	"	34-0										68.0	
S57	2	5	"	36-0										72.0	
S58	2	5	"	38-0										76.0	
S59	2	5	"	40-0										340.0	



TYPICAL REINFORCING INSIDE FACE OF WALL AND OUTSIDE FACE FUTURE COMMON LONG WALL.



TYPICAL REINFORCING OUTSIDE FACE OF WALL (TWO SHORT END WALLS)

SCALE: ½" = 1'-0

QUANTITIES

REINF. STEEL:

#3	568.6
#4	2403.1
#5	18498.5
#6	477.3
#7	13390.7
#8	274.7
TOTAL	35,213.9

NORTHWEST UTILITIES CO.
THORNTON, COLO.

REINF. STEEL SCHEDULE
CONC RESERVOIR NO. 2

RIPPLE AND HOWE
CONSULTING ENGINEERS
DENVER, COLORADO

DRAWN EE 3-30-54	REVISED	5
TRACED		5
CHECKED GB 4/2/54		

1-1-1

THORNTON WATER TREATMENT PLANT
WATER SOFTENING FACILITY

WELL HOUSE

TO 4" RECYCLE

60'-4" PIPE

10"

FLOW

Cleanout

6" Drain

6" To Deep Well

SALT STORAGE

50'-4" PIPE

FLOW

To Distribution System

Flow

18"

4" VALVE

12"

Valve M.H.

14"

Flow

14" x 4" TAPPING TEE

Flow

WATER SOFTENER BUILDING

NEW SOFTNERS

Flow

R.H. Open Valve

12"

Flow

Suction

Discharge

From Softners

Suction

Discharge

8"

12"

12"

Closed

12"

Flow

Flow

18"

14"

12"

Pump Suction Line

Pump Discharge

10" Valve

20"

6" Outflow Drain

12" From Softners

Flow

12"

Pump Discharge

Meter M.H.

F.H.

6"

75,000 GALLON RESERVOIR

To Distribution

Flow

Flow

From Wells

Flow

From Wells

Flow

From Wells

Flow

SCALE 1 IN. = 10 FT.

THORNTON, COLORADO.
WATER SOFTENING FACILITY

REVISED 4-4-75 [illegible]

C. MEEHAN MAY, 1967

12-1-3