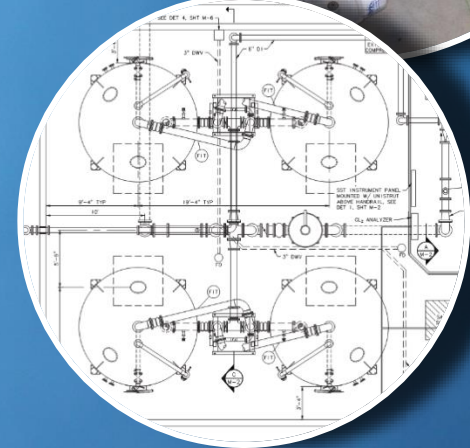


Year in Review: PCE Contaminated Well Head Treatment Performance After 1st Year in Operation



Presented by:
Bob Lawrence
and Craig Anderson, P.E.

May 6, 2016



Acknowledgements

- SUEZ Water Idaho



- Confluence Engineering Group, LLC



- CTA Architects Engineers



- DC Engineering



Overview

**Facility
Background**

**Treatment
Process
Selection and
Construction**

**First Year
Operations**

Questions

Overview

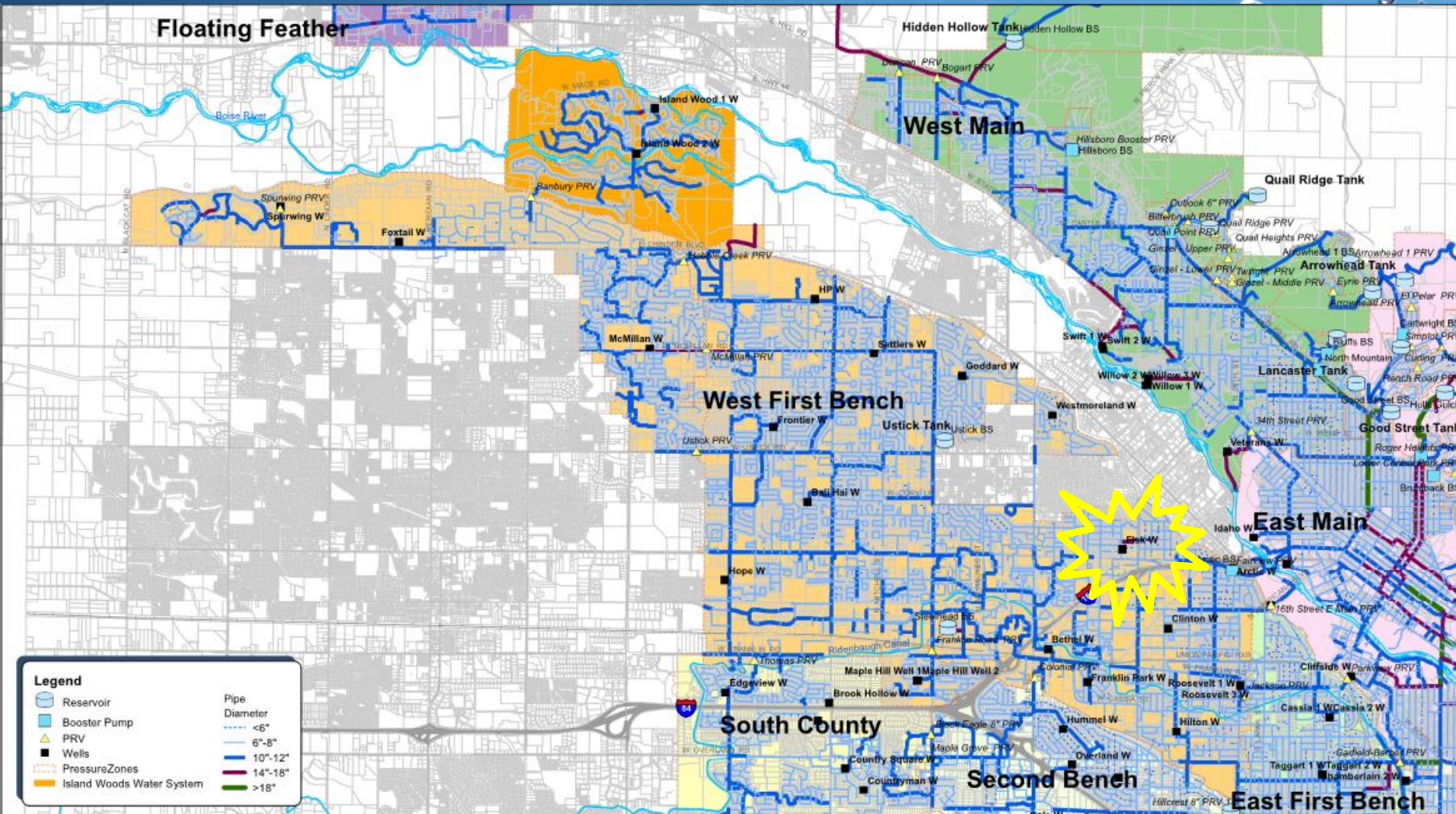
**Facility
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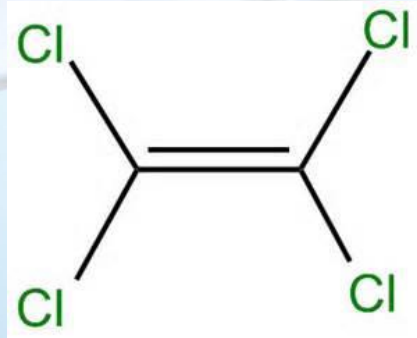
Questions

Background



Background

- Contaminated Potable Water Supply at Existing United Water Idaho Fisk Well
 - Well Contaminated with tetrachloroethylene (PCE)



- Well Capacity 2,000 gpm



Raw Water PCE Data

Raw Water Sample (ug/L)	Sample Date
4.6	7/9/10
6.1	9/2/10
6.6	9/2/10
6.1	9/14/10
7.0	9/14/10
7.3	9/21/10
7.8	9/21/10
7.9	9/21/10

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PCE Alternative Selection



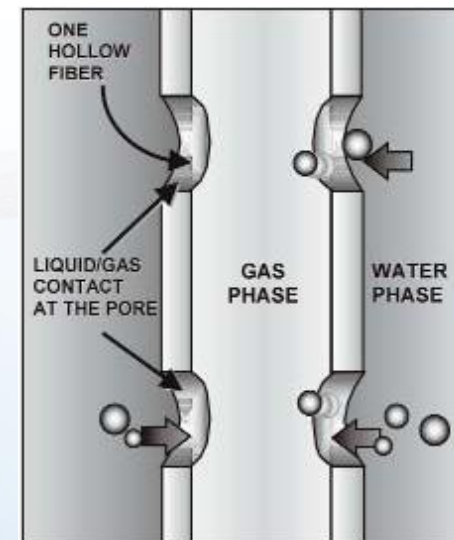
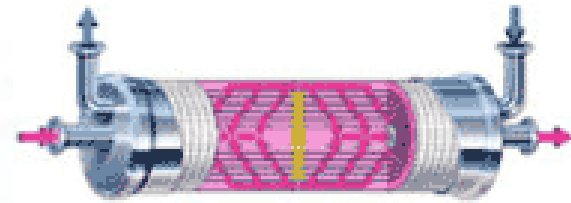
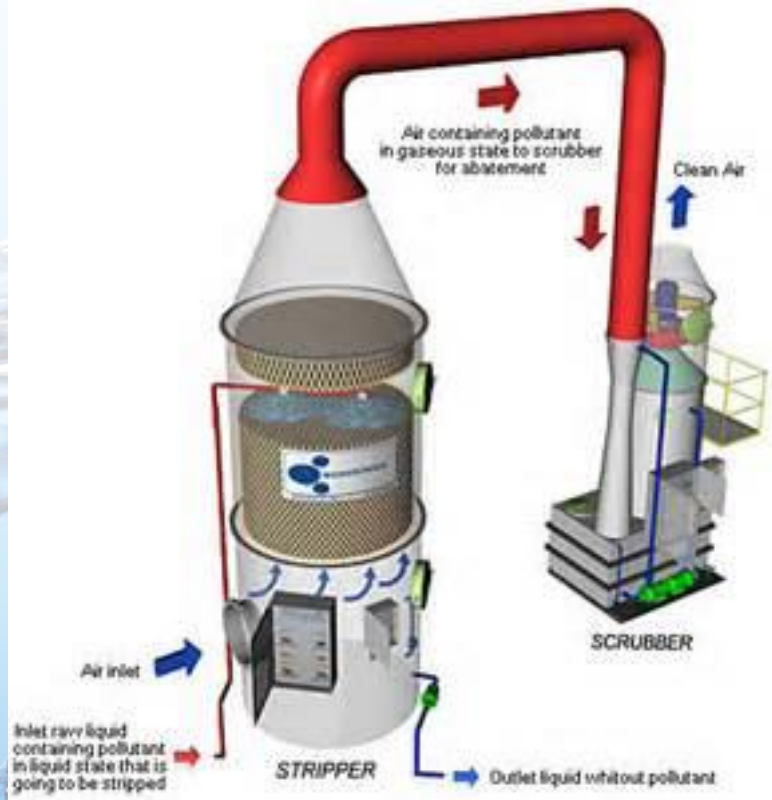
~~Abandon Well~~



~~Water Blending~~

- Air Stripping (Volatilization)
- Granular Activated Carbon (Adsorption)

Air Stripping: Stripping Tower vs. Membranes



- Membranes not required to break head through treatment system; eliminate clearwell and booster pumping

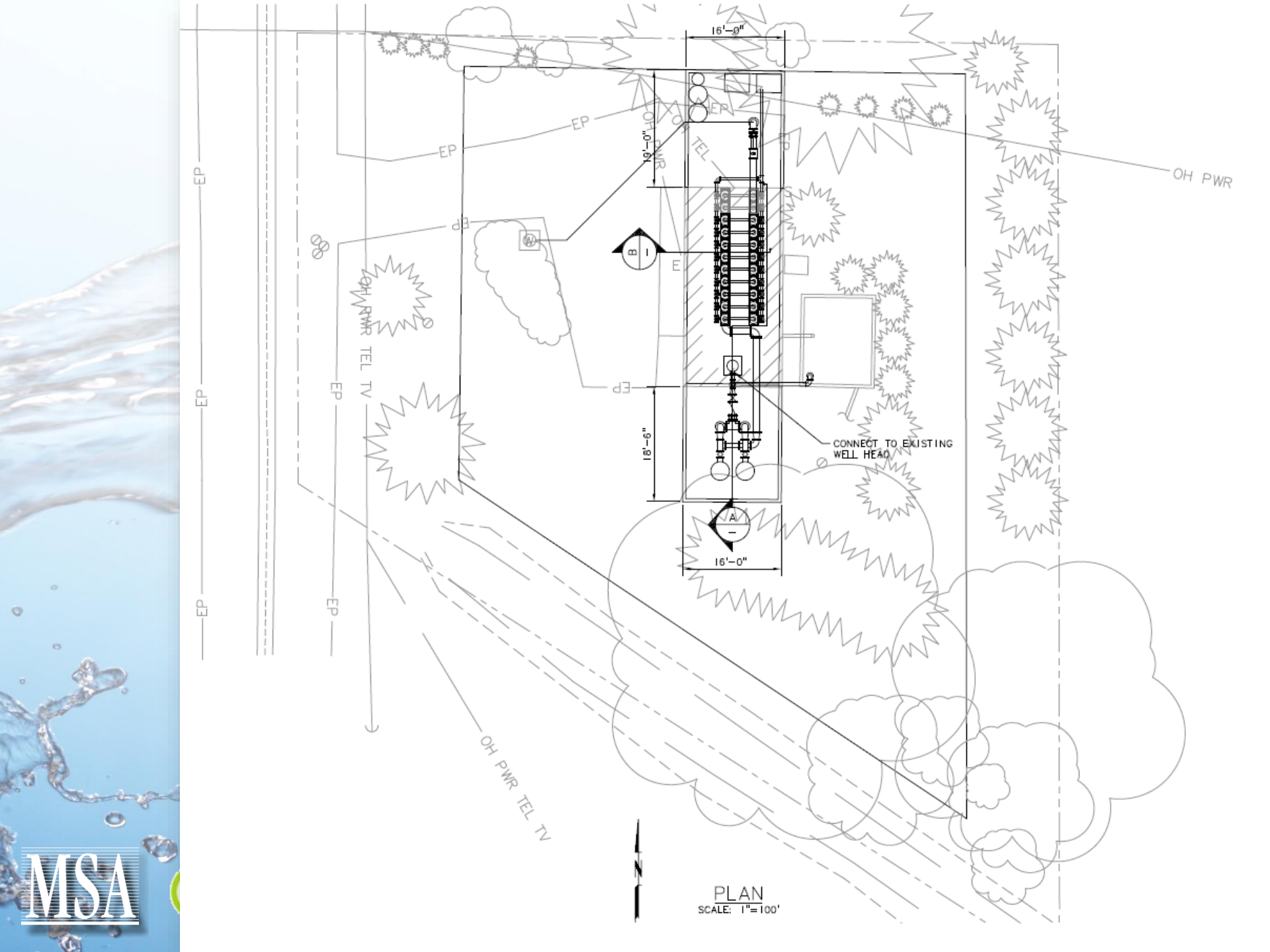
Granular Activated Carbon (GAC)



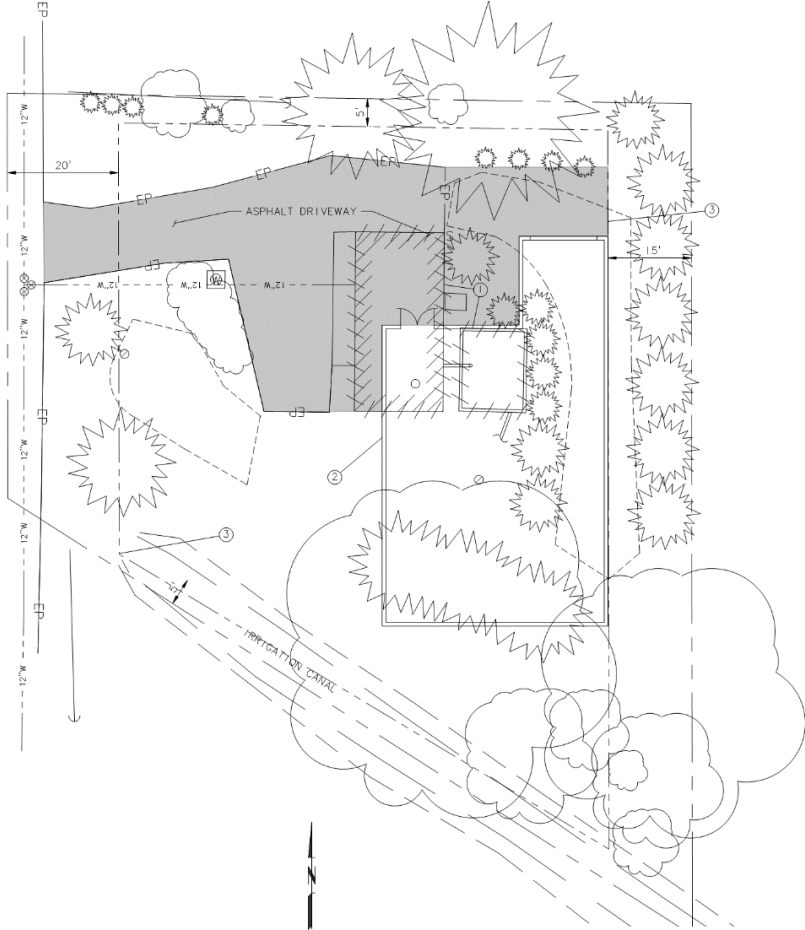
MSA



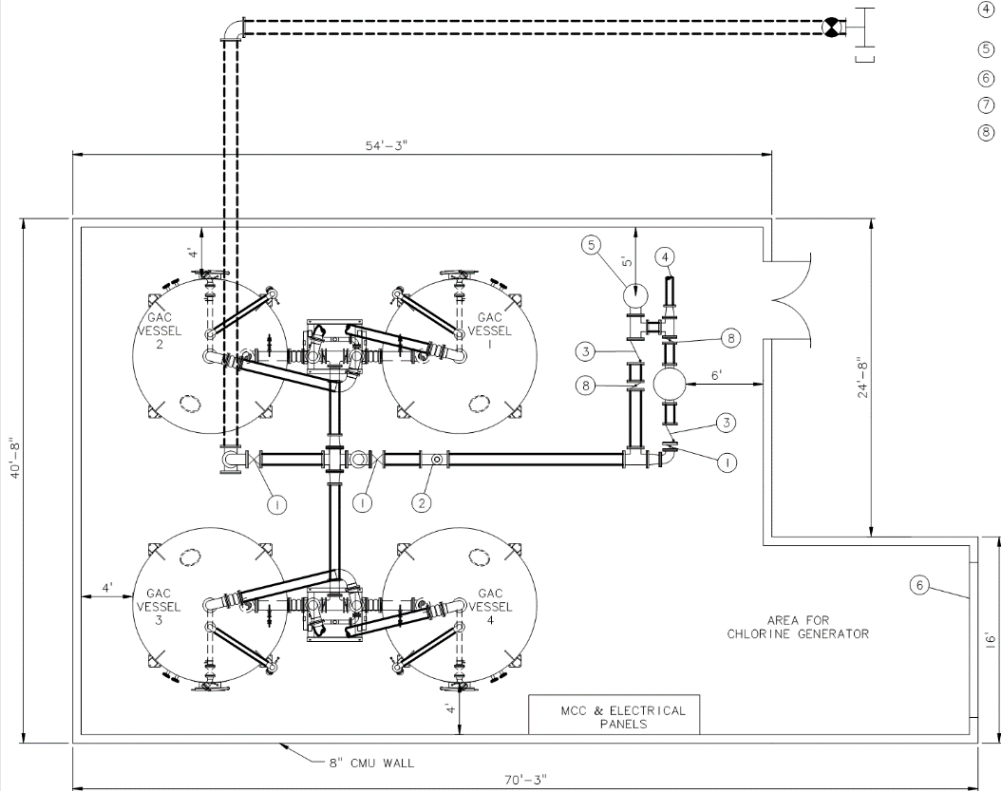
suez



N FISK ST



FISK WELL
SCALE: 1" = 10'-0"



FISK WELL PLAN
SCALE: 1" = 5'-0"

- ②
- ③
- ④
- ⑤
- ⑥
- ⑦
- ⑧



MSA

suez

Cost Comparison to Treat Below Current MCL

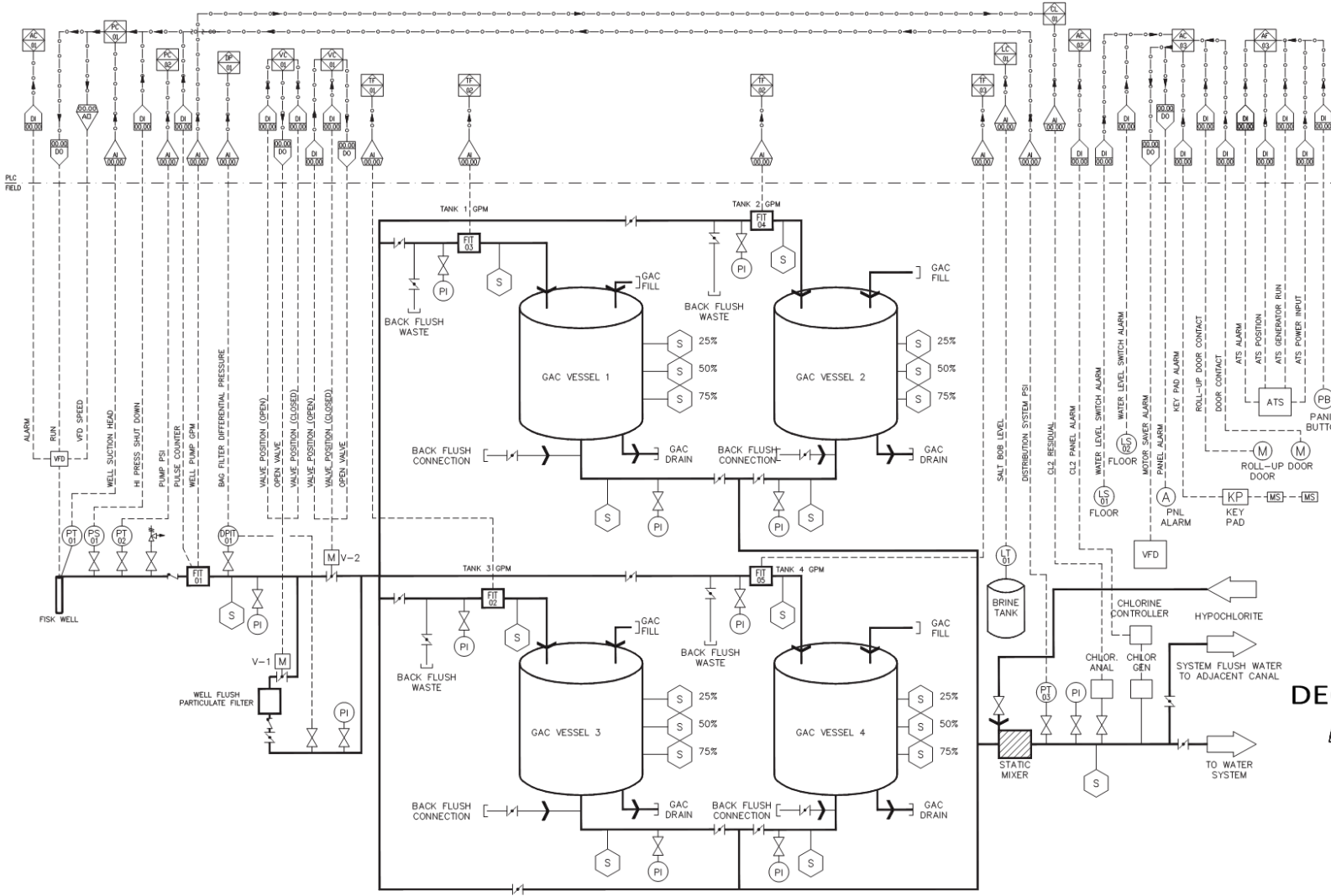
Item	Membrane Contactors	GAC
Capital Costs	\$1,461,000	\$2,076,000
Capital Replacement Costs (NPV)	\$472,000	\$415,000
Annual O&M Costs	\$34,000	\$4,000

Cost Comparison to Treat Below Future MCL

Item	Membrane Contactors	GAC
Capital Costs	\$2,614,000	\$2,076,000
Capital Replacement Costs (NPV)	>\$472,000	\$415,000
Annual Additional O&M Costs	>\$34,000	\$4,000

LEGEND

- WATER SUPPLY LINE
- GAC PACKAGE
- PRESSURE RELIEF VALVE
- CHECK VALVE
- CAP
- BUTTERFLY VALVE
- VALVE
- SAMPLE PORT
- FIT FLOW INDICATING TRANSMITTER
- P1 PRESSURE TRANSDUCER
- P2 PRESSURE SWITCH
- PI PRESSURE INDICATOR
- LT LEVEL TRANSMITTER
- LS LEVEL SWITCH
- WELL
- TANK
- MOTOR
- KP KEY PAD
- M MAGNETIC SWITCH
- MS MOTION SENSOR
- DI ANALOG INPUT
- DO DIGITAL INPUT
- DO DIGITAL OUTPUT



PROCESS & INSTRUMENTATION DIAGRAM - 1
SCALE: NTS

DEQ REVIEW SET



NO.	DATE	BY	REVISION
1	6/20/14		DEQ REVIEW SET

NOTICE
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JFALK DESIGNED
JFALK DRAWN
JFALK CHECKED



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1640 W. Sherman Dr., Suite 200 PRINCE 208.947.9053
Boise, Idaho 83702-6701 FAX 208.947.9054

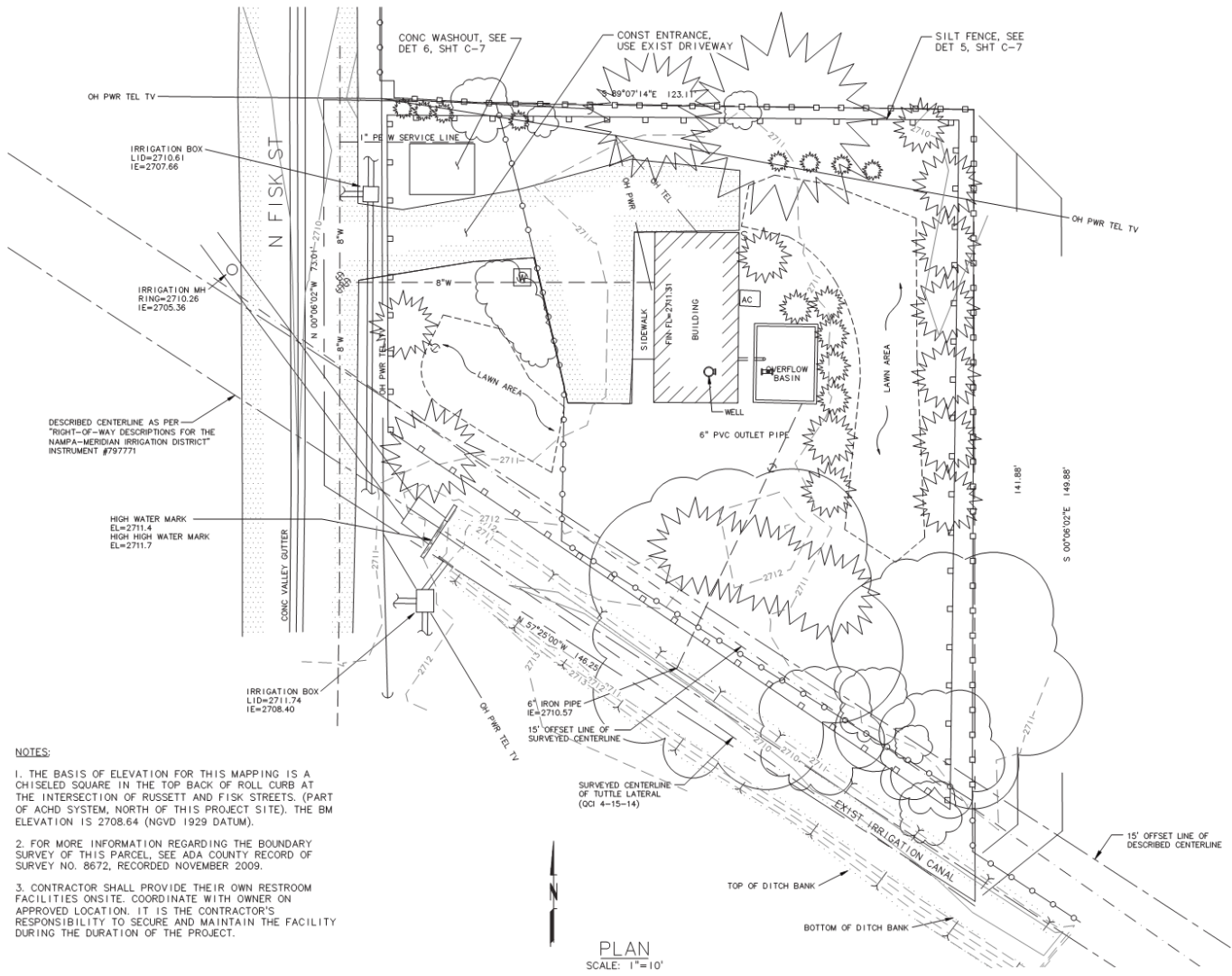


UNITED WATER IDAHO
FISK WELL GAC
TREATMENT SYSTEM
BOISE, ID

PROJECT NO.:	10-1174	SCALE:	AS SHOWN	DATE:	APRIL 2014	SHEET	1&C-3
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- NOTES:**
1. THE BASIS OF ELEVATION FOR THIS MAPPING IS A CHISELED SQUARE IN THE TOP BACK OF ROLL CURB AT THE INTERSECTION OF RUSSETT AND FISK STREETS. (PART OF ACHD SYSTEM, NORTH OF THIS PROJECT SITE). THE BM ELEVATION IS 2708.64 (NGVD 1929 DATUM).
 2. FOR MORE INFORMATION REGARDING THE BOUNDARY SURVEY OF THIS PARCEL, SEE ADA COUNTY RECORD OF SURVEY NO. 8672, RECORDED NOVEMBER 2009.
 3. CONTRACTOR SHALL PROVIDE THEIR OWN RESTROOM FACILITIES ONSITE. COORDINATE WITH OWNER ON APPROVED LOCATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SECURE AND MAINTAIN THE FACILITY DURING THE DURATION OF THE PROJECT.

PLAN
SCALE: 1"=10'

NO.	DATE	BY	REVISION
1	06/20/14	DEO	REVIEW SET

NOTICE

0 1/2 1

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PROFESSIONAL ENGINEER
12043
STATE OF IDAHO
DAWN A. SCHUE

MSA Murray Smith & Associates, Inc.
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1640 T Sheraton Dr, Suite 200 BOISE, IDAHO 83702
PHONE 208.947.9033 FAX 208.947.9034

United Water
suez environmental
UNITED WATER IDAHO
FISK WELL GAC TREATMENT SYSTEM
BOISE, ID

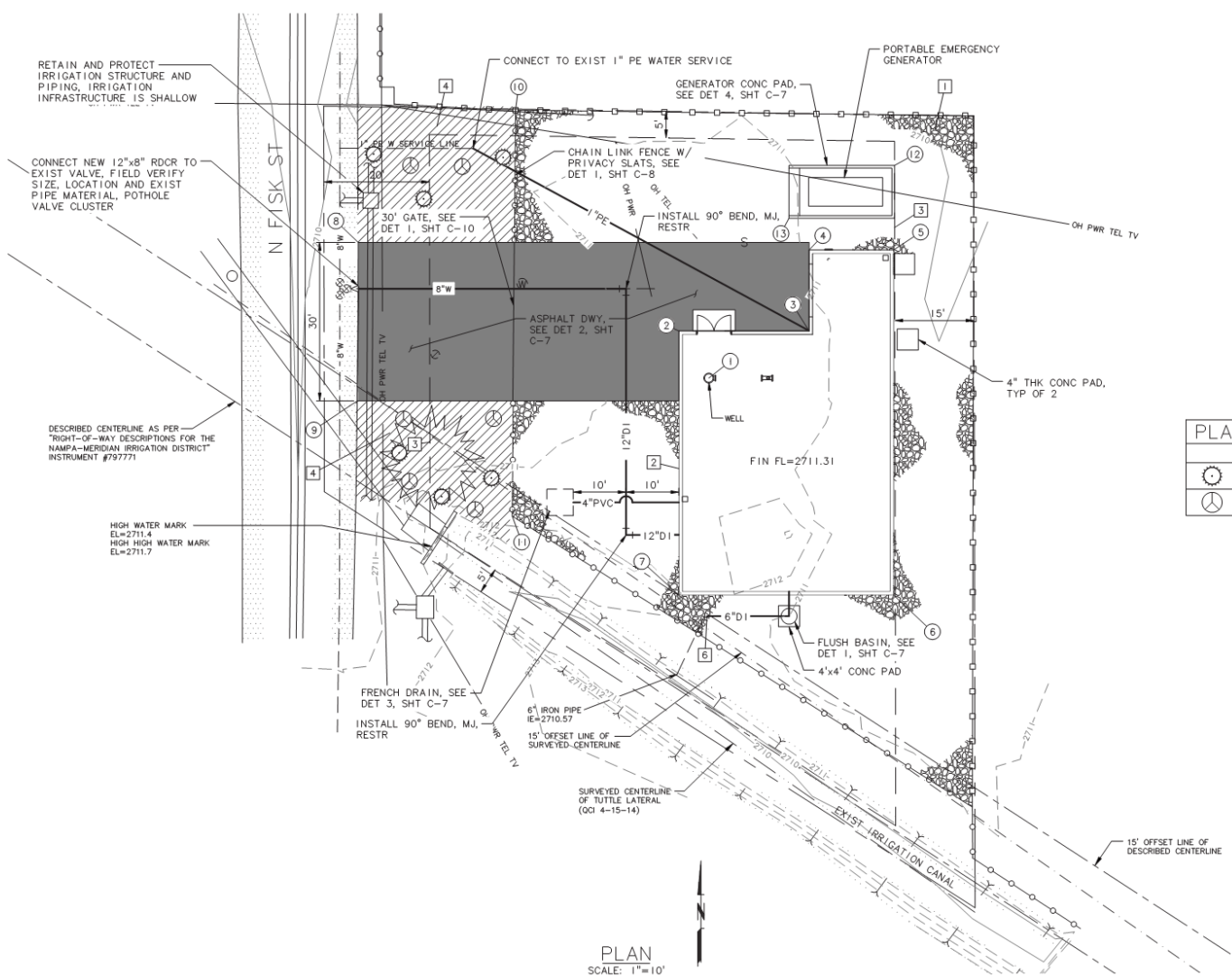
EXISTING SITE PLAN AND EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.: 10-1174 SCALE: AS SHOWN DATE: JUNE 2014

SHEET
C-1



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- ### KEY NOTES
- 3/4" CRUSHED AGG INSIDE FENCE, 4" DEEP WHERE NOT COVERED OR SHOWN AS OTHER ITEMS OR MATERIAL
 - PROPOSED FISK WELL HOUSE AND TREATMENT SYSTEM
 - CITY OF BOISE BUILDING SETBACKS FOR RIC ZONING
 - ALL PLANTER BEDS: INSTALL 1"-1/2" ROUND RIVER COBBLE ROCK MULCH, 3" DEEP
 - USE EXIST SPRINKLER SYSTEM, FURNISH AND INSTALL DRIP EMITTERS TO NEW PLANTS, PROVIDE HOSE TO DRIP EMITTERS AS NECESSARY
 - FIELD LOCATE PIPE, VERIFY PIPE MATERIAL AND INSTALL COUPLINGS AND FITTINGS AS NEEDED TO CONNECT NEW 6" DI PIPE TO EXIST 6" PIPE

NOTES:
 1. CONTRACTOR TO FIELD LOCATE EXISTING IRRIGATION SYSTEM AND RECONNECT PIPING AS NEEDED AFTER EXCAVATION IS COMPLETE TO DELIVER WATER TO THE LANDSCAPING SYSTEM. CONTRACTOR TO REINSTALL THE EXISTING IRRIGATION CONTROLLER AND CONTROL SYSTEM.

PLANT SCHEDULE

	COMMON NAME	SCIENTIFIC NAME	SIZE	QUANTITY
☉	CARPET JUNIPER	JUNIPERIS HORIZONTALIS	1 GAL	6
☾	WOOLY THYME	THYMUS SPP	1 GAL	6

SITE FEATURE	AREA, SQ FT
ASPHALT	2235
LANDSCAPE	1337
GRAVEL	5632

COORDINATE TABLE

	LOCATION	NORTHING	EASTING
①	EXIST WELL	10450.83	9188.00
②	BUILDING CORNER	10459.75	9182.33
③	BUILDING CORNER	10459.75	9207.00
④	BUILDING CORNER	10475.08	9207.00
⑤	BUILDING CORNER	10475.08	9223.00
⑥	BUILDING CORNER	10409.75	9223.00
⑦	BUILDING CORNER	10409.75	9182.33
⑧	ASPHALT DRIVEWAY	10476.51	9121.62
⑨	ASPHALT DRIVEWAY	10446.52	9121.42
⑩	FENCE CORNER	10501.57	9151.39
⑪	FENCE CORNER	10424.69	9150.77
⑫	GENERATOR PAD	10491.08	9223.17
⑬	GENERATOR PAD	10481.08	9203.17

PLAN
 SCALE: 1"=10'

NO.	DATE	BY	REVISION
1	06/20/14	DEO	REVIEW SET

NOTICE
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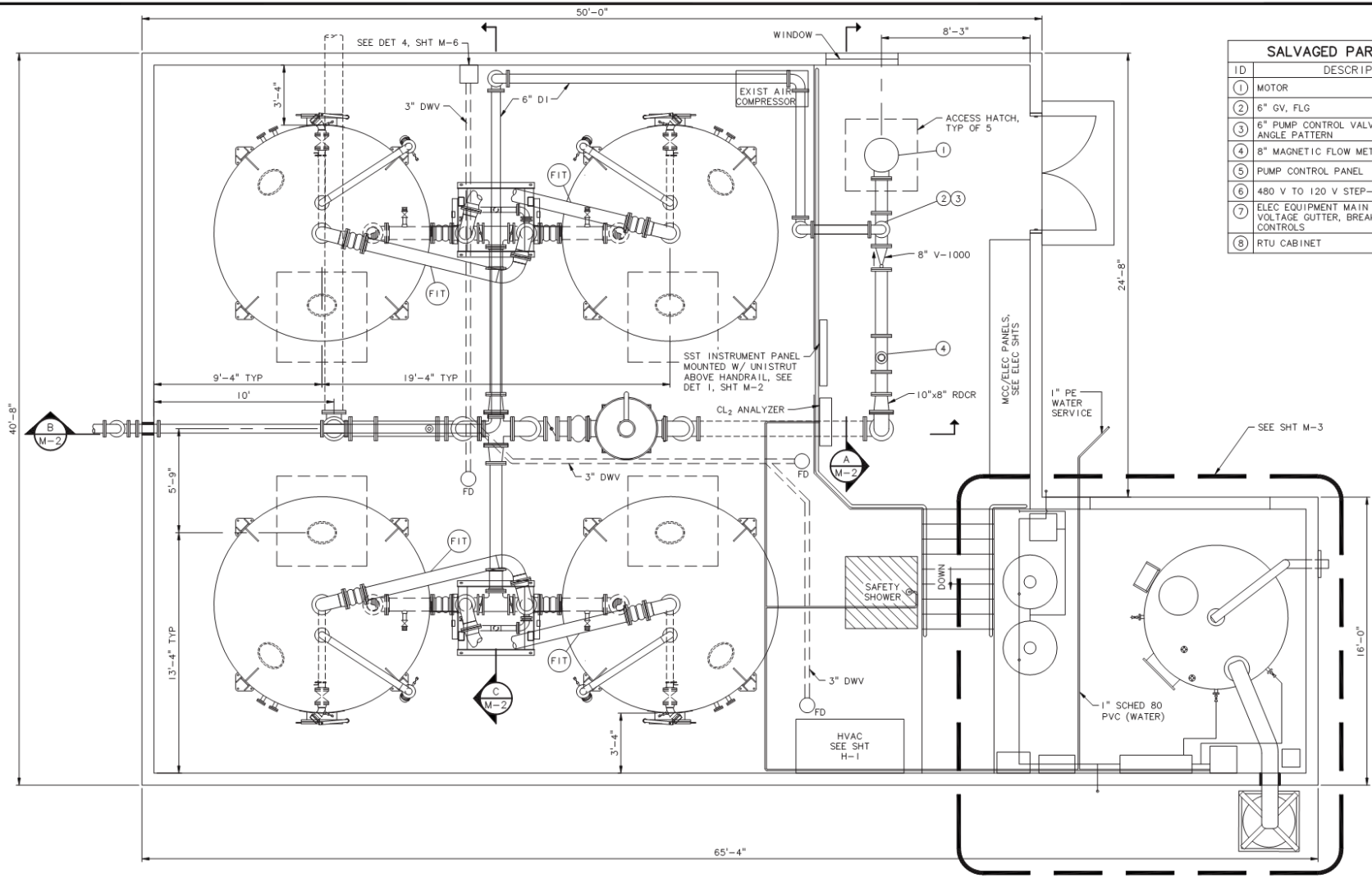
United Water IDAHO FISK WELL GAC TREATMENT SYSTEM BOISE, ID

SITE PLAN

PROJECT NO.: 10-1174 SCALE: AS SHOWN DATE: JUNE 2014

SHEET
 C-5





SALVAGED PARTS LIST	
ID	DESCRIPTION
①	MOTOR
②	6" GV. FLG
③	6" PUMP CONTROL VALVE, CLA VALVE, ANGLE PATTERN
④	8" MAGNETIC FLOW METER
⑤	PUMP CONTROL PANEL
⑥	480 V TO 120 V STEP-DOWN XFMR
⑦	ELEC EQUIPMENT MAIN CUT-OFF, HIGH VOLTAGE GUTTER, BREAKER & MISC CONTROLS
⑧	RTU CABINET

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

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NO.	DATE	BY	DEO REVIEW SET	REVISION

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SAK CHECKED



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Boise, Idaho 83702 FAX 208.947.9034



UNITED WATER IDAHO
FISK WELL GAC TREATMENT SYSTEM
BOISE, ID

FISK WELL BUILDING PLAN
MECHANICAL PLAN

PROJECT NO.: 10-1174 SCALE: AS SHOWN DATE: JUNE 2014

SHEET
M-1





1770

NOTICE
NO TRESPASSING
NO TO BE OPEN
PHONE TO BE OPEN

NO TRESPASSING

CHERRY LIME BLOSSOM
2017
204-492-4107





Calgon

Calgon

LIMIT TANK - DO NOT
WELD, BURN OR TAP



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NOTICE
THIS
VALVE
IS OFF
P. 224









113

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Overview

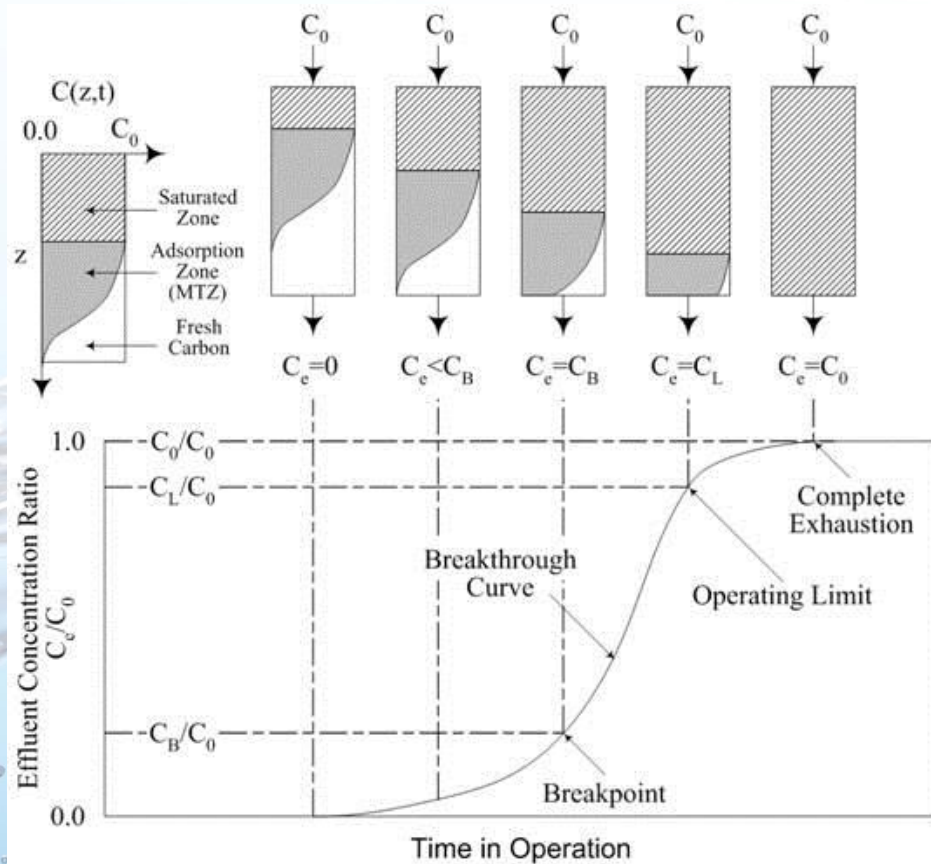
Facility
Background

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Construction

**First Year
Operations**

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GAC Performance Monitoring

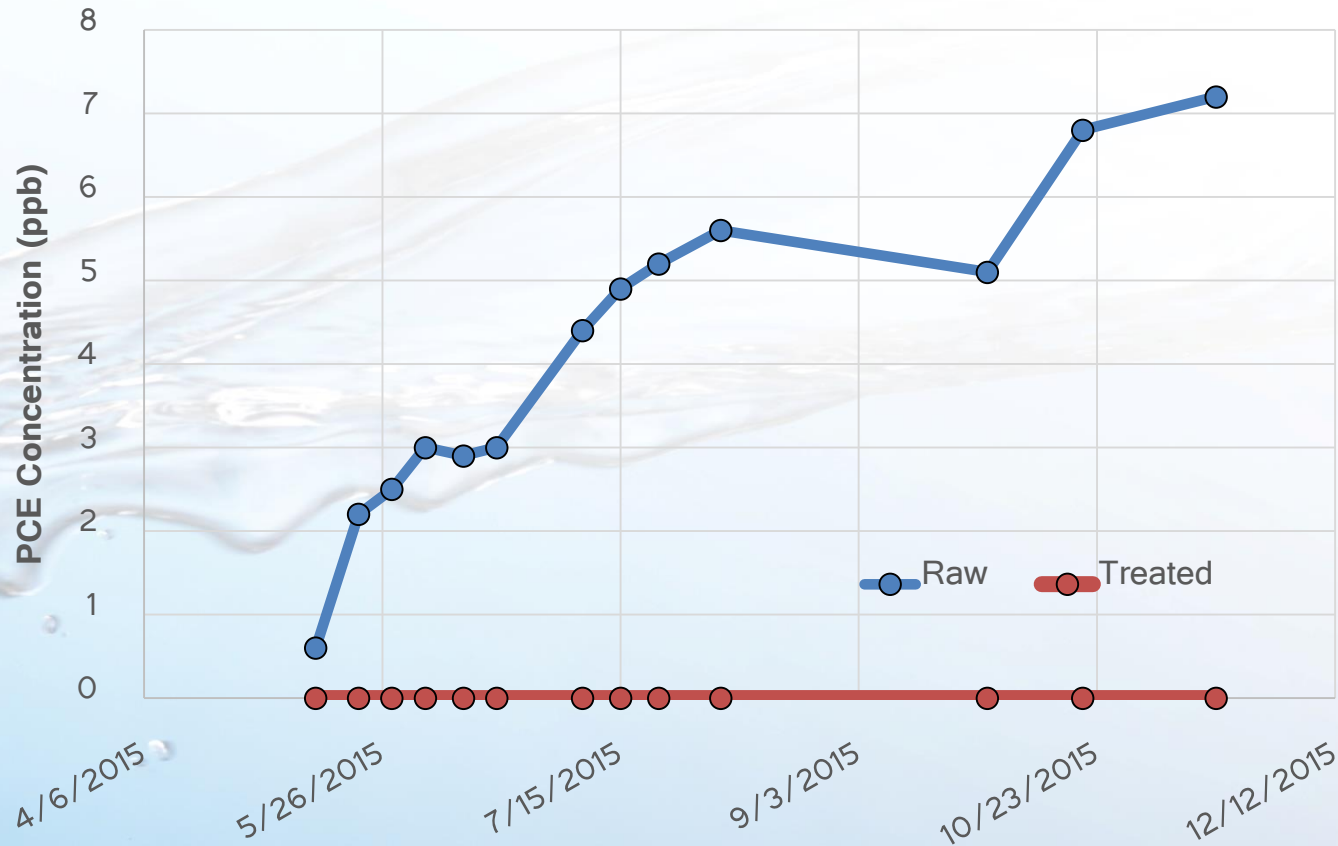


- Monitoring PCE breakthrough
 - Routine sampling program

Historical PCE Data

Raw Water Sample (ug/L)	Sample Date
4.6	7/9/10
6.1	9/2/10
6.6	9/2/10
6.1	9/14/10
7.0	9/14/10
7.3	9/21/10
7.8	9/21/10
7.9	9/21/10

2015 Operation and Testing



Unforeseen Operational Issues

- GAC media clogging began in summer 2015
- Completely blocked in January 2016 by Iron Bacteria
- Force facility to shut down.

Iron Bacteria



Iron Bacteria

- Maintenance in March 2016
 - Acid cleaned the well
 - Super-chlorinated all facility piping and bag filter housing
 - Removed top six inches of media and iron bacteria that has accumulated in the top half inch of the media

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