June 2019 Semi-Annual Progress Report, Selecting and Designing of Groundwater Corrective Action Remedy

Intermountain Generating Facility
Delta, Utah

Prepared for:
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Project No.: 203709098

June 21, 2019

Sign-off Sheet and Signatures of Environmental Professionals

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1.0 EXECUTIVE SUMMARY

1.1 PURPOSE OF THIS REPORT

On behalf of Intermountain Power Service Corporation ("IPSC"), Stantec Consulting Services Inc. ("Stantec") has prepared this progress report to summarize recent investigative activities designed to help assess corrective measures required by the United States Environmental Protection Agency's 2015 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals (CCR) from Electric Utilities, 40 CFR 257 Subpart D (the "Federal CCR Rule")(and the corresponding Utah CCR Rule at Utah Admin. Code R315-319 (the "State CCR Rule")(collectively, the "CCR Rules")). The activities summarized herein were proposed and outlined in detail within IPSC's January 2019 *Annual Groundwater Monitoring and Corrective Action Summary Report* and IPSC's January 2019 *Assessment of Corrective Measures and Amended Corrective Action Plan* report.

The January 2019 reports presented IPSC's approach for addressing requirements specified by the Federal CCR Rule as well as the facility's Utah Department of Environmental Quality ("UDEQ"), Division of Water Quality ("DWQ") Groundwater Discharge Permit No. UGW270004. The most recent permit renewal was issued by the UDEQ to IPSC's Intermountain Generating Facility ("IGF"), effective May 24, 2016.

The DWQ has regulatory oversight for IPSC's compliance with its Groundwater Discharge Permit. The UDEQ Division of Waste Management and Radiation Control ("DWMRC") also has regulatory oversight pursuant to the State CCR Rule, under which DWMRC will be issuing a separate permit for the CCR Units. The CCR Rules apply to each of IPSC's three (3) CCR units (reference Figures 1 and 2 for regional and site-specific, location maps):

- Combustion By-Products Landfill ("CB Landfill");
- Bottom Ash Basin; and
- Waste Water Basin.

In summary, the primary contaminant of potential concern within groundwater beneath the site is Total Dissolved Solids (TDS), as there are two localized TDS plumes beneath the site, namely: one plume located southwest of the Bottom Ash Basin and a second, smaller plume located southwest of the Waste Water Basin. To date, metal constituents have only been quantified at localized areas at the two basin's boundaries. TDS is considered a leading indicator parameter of impacted groundwater quality for fashioning a suitable groundwater remediation approach, as the recovery of TDS-impacted groundwater at select recovery wells will also intercept metal constituents that might be present, as TDS is expected to migrate at a faster rate than dissolved metals in groundwater and the clay-rich aquifer.

JUNE 2019 SEMI-ANNUAL PROGRESS REPORT, SELECTING AND DESIGNING OF GROUNDWATER CORRECTIVE ACTION REMEDY

EXECUTIVE SUMMARY

June 21, 2019

As proposed in IPSC's January 2019 reports, IPSC initiated supplemental investigative activities designed to support and enhance ongoing, groundwater remediation activities during Spring 2019. Supplemental wells were installed, sampled, and pump-tested to refine IPSC's current Conceptual Site Model (CSM) and understanding of hydraulic conditions characterizing localized portions of the uppermost aquifer at the site, as well as help investigate how the existing groundwater remediation program might be enhanced and expanded for control of the two TDS plumes. Summary activities include:

1) During April and May 2019, IPSC expanded the network of monitoring and recovery wells intended to monitor and control the down-gradient (predominantly southwest), leading edge of the TDS plume associated with historical releases from the Bottom Ash Basin, through installation of supplemental monitoring (remediation, if needed) wells BAC-8, BAC-9, and BAC-10.

2) During April and May 2019, IPSC expanded the network of monitoring and recovery wells in apparent down-gradient directions (predominantly southwest) in relation to recently discovered, apparent release areas (west and south sides) at the Waste Water Basin, through installation of supplemental monitoring (remediation, if needed) wells WWC-8, WWC-9, and WWC-10.

3) During May 2019, IPSC conducted pump-tests of new wells BAC-8, BAC-10, WWC-9, and WWC-10 and older wells RW-4 and RW-5 to investigate well yields and radial cones of influence/capture. Currently, and as anticipated to continue into July 2019, the pump-test data are being analyzed using Stantec's groundwater model (discussed in more detail in following report section *1.2 Background*) to extrapolate well yield, Specific Capacity, and potential lateral extent of capture zones. The results will be used to identify existing wells that might be used for groundwater recovery and TDS plume control including localized, Appendix IV metals, if and where such control might be warranted. The model will also be used to identify if, and where, additional/supplemental monitoring and/or recovery wells might be needed, currently and possibly in the future.

   It is anticipated that the groundwater modeling results will be evaluated by IPSC during July 2019 and reported within IPSC's next semi-annual summary report (anticipated to be IPSC's *Annual Ground Water Monitoring and Corrective Action Summary Report*, tentatively scheduled for documentation during January 2020). Any additional, investigative and/or remedial actions implemented in the interim will also be discussed within IPSC's annual summary report.

4) The new wells will be sampled and incorporated into IPSC's ongoing semi-annual, groundwater quality monitoring program. Since analytical results are not available at this time, all such results will be reported within IPSC's next-scheduled, summary report tentatively scheduled for January 2020.

This report provides summary details regarding IPSC's installation of monitoring wells BAC-8, BAC-9, BAC-10, WWC-8, WWC-9, and WWC-10, including Drilling Logs and well construction diagrams. IPSC has prepared this report to "provide a semi-annual summary describing the progress in selecting and designing the (groundwater) remedy," as specified by UDEQ Rule R315-319-97(a).

1.2 BACKGROUND

Historically, when complying with its Groundwater Discharge Permit, and as reported to the UDEQ, whenever IPSC identified a potential release from a permitted basin, IPSC implemented investigative and remedial actions to identify the source and then repair the leak area (typically a localized tear in the 80-mil high-density, polyethylene [HDPE] liner material). Investigative and remedial measures were implemented and communicated to the UDEQ in a timely manner and in accordance with Groundwater Discharge Permit requisites.

As a result of localized, historical releases from the Bottom Ash Basin, a plume of TDS in excess of background concentrations impacted the uppermost groundwater quality and migrated with groundwater toward the southwest (the predominant, uppermost aquifer flow direction in relation to the Bottom Ash Basin). Since March 2010, IPSC has operated three groundwater recovery wells that recover groundwater from areas that exhibit elevated TDS concentrations within the uppermost aquifer beneath the site. The three recovery wells (wells WR-101, WR-102, and WR-103) collectively recover approximately 25 gallons per minute (gpm) and route recovered groundwater to the Ash Recycle Basin.

The three recovery wells were designed to remove TDS mass from the apparent center of the TDS plume, as proposed in IPSC's original June 2007 *Corrective Action Plan Report*, which was 'approved' by the UDEQ and implemented sequentially, as documented in IPSC's March 2010 *Groundwater Recovery Well Installation Report*. At the time of installation, the three recovery wells were not intended to control the downgradient migration of the TDS plume, but rather to reduce TDS mass within the uppermost aquifer at locations positioned in relatively close proximity to release source areas. In turn, it is anticipated that reduction of total TDS mass in the aquifer should also help promote natural attenuation processes (such as dilution, dispersion, diffusion, etc.), which ultimately should help remediate the TDS plume.

As of September 2016, TDS water quality data indicated that the down-gradient, leading edge of the TDS plume was moving beyond groundwater recovery measures in place at the time. IPSC's September 2016 *Updated Corrective Action Plan* report included a summary of Stantec's groundwater modeling and preliminary analysis of subsurface, hydraulic characteristics which were used in part to formulate a proposed enhanced, groundwater recovery program. The model was developed generally in accordance with ASTM International's (American Standard for Testing and Materials) *Standard Guide for Application of Groundwater Model to a Site-Specific Problem* and the current version of United States Geological Survey (USGS) *Modular Three-Dimensional Finite Difference Groundwater Flow Model* (MODFLOW-2005).

JUNE 2019 SEMI-ANNUAL PROGRESS REPORT, SELECTING AND DESIGNING OF GROUNDWATER CORRECTIVE ACTION REMEDY

EXECUTIVE SUMMARY

June 21, 2019

IPSC proposed to install and test additional groundwater recovery wells near the downgradient, leading edge of the TDS plume to enhance TDS plume control measures and help IPSC gain a clearer understanding of the hydraulic characteristics of the leading edge of the TDS plume. The TDS plume associated with historical releases at the Bottom Ash Basin is located within the boundaries of IPSC-owned property and as such poses no risk to potential on- and/or off-site receptors. Likewise, supplemental monitoring wells were also installed down-gradient of the Waste Water Basin. This report provides a summary of the installation and pump-testing of the newly-installed wells.

2.0 APRIL AND MAY 2019 GROUNDWATER MONITORING WELL INSTALLATIONS

During April and May 2019, Stantec oversaw the drilling, soil screening, installation, and development of groundwater monitoring wells BAC-8, BAC-9, BAC-10, WWC-8, WWC-9, and WWC-10 at the site by Cascade Drilling, LP of Salt Lake City, Utah, a Utah-certified, water well drilling firm. Each well was installed and developed in similar fashion as previous, historical wells at the site. Figure 3 identifies the locations of the six new wells, as well as historical groundwater monitoring wells and recovery wells WR-101, WR-102, and WR-103.

The new wells were drilled by the sonic drilling method, whereby soil samples were collected continuously in 10-feet, sampling intervals for continuous, real-time visual inspection and Drill Log recording of subsurface soil lithologic and moisture characteristics. Stantec's field geologists screened and logged all soil samples during drilling of each of the six well borings. All down-hole drilling and sampling equipment were decontaminated before use between well locations.

In turn, the subsurface soil data were used to help determine respective ground water monitoring well construction details. Typically, once each boring was advanced approximately 20 to 25 feet into the uppermost saturated soils, a monitoring well was constructed within each respective borehole. Each groundwater monitoring well was comprised of 6-inch diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) pipe with a solid, PVC end-cap. The bottom 25 feet of each well was comprised of 6-inch diameter, flush-threaded, 0.02-slotted, Schedule 40 PVC well screen.

Following installation of each well, 16/30 washed, silica sand was emplaced around the well screen from the bottom of the borehole to an approximate height of several feet above the top of the well screen interval. An approximate five to seven feet thick, bentonite pellet seal was added on top of the sand pack material. Then, a cement-bentonite (typically, 10:1 ratio) grout was tremie-slurried from the top of the bentonite pellet seal to an approximate height of two feet below grade. A 5-ft. long, 6-inch diameter, steel, protective casing/monument was emplaced in concrete around each wellhead, with an approximate 2.5-ft. stick-up above natural grade. Each PVC well was furnished with a locking, expandable well cap and lock.

Following well installations, the ground surface and the top of each wellhead were surveyed in relation to one another and the same on-site, mean sea level benchmark used for surveying the tops of other historical monitoring wells. Table 1 presents a summary of all ground water monitoring well construction specific details. Copies of Stantec's Drilling Logs and Schematic Well Diagrams are presented in Appendix A.

Shortly after well installations, each well was developed by a dedicated, well development drill rig. Typically, the rig removed water from each well by means of bailing followed by air-lift. Well water was removed from each well, until return water was relatively clear and free of fine-grained, formational materials.

3.0 MAY 2019 PUMP-TESTING PROGRAM

During May 2019, IPSC conducted pump-tests of new wells BAC-8, BAC-10, WWC-9, and WWC-10 and older wells RW-4 and RW-5 to investigate well yields and radial cones of influence/capture. In summary, each pump-test was conducted by a two-member, Stantec field team. Stantec utilized decontaminated, submersible pumps and dedicated, down-hole, pressure transducers to monitor water levels in pumping and nearby observation wells. Individual well pump-tests were conducted at variable pumping and constant, steady-state pumping rates. Each test approximated 4 to 6 hours, and water levels were allowed to return to steady-state, non-pumping levels, prior to conducting each sequential test. All down-hole equipment was decontaminated with potable water washings, prior to each use between wells

Currently, and as anticipated to continue into July 2019, the pump-test data are being analyzed using Stantec's groundwater model to extrapolate well yield, Specific Capacity, and potential lateral extent of capture zones for existing groundwater monitoring wells. The results will be used to identify existing wells that might be used for groundwater recovery and TDS plume control, if and where such control might be warranted. The model will also be used to identify if, and where, additional/supplemental monitoring and/or recovery wells might be needed, currently and possibly in the future.

It is anticipated that the groundwater modeling results will be evaluated by IPSC during July 2019 and reported within IPSC's next semi-annual summary report (anticipated to be IPSC's *Annual Ground Water Monitoring and Corrective Action Summary Report*, tentatively scheduled for documentation during January 2020). Any additional, investigative and/or remedial actions implemented in the interim will also be discussed within IPSC's annual summary report.

4.0 ONGOING CORRECTIVE ACTIONS AND PROGRESS TOWARD SELECTING ADDITIONAL GROUNDWATER CORRECTIVE ACTION REMEDY

4.1 ONGOING GROUNDWATER RECOVERY AT EXISTING RECOVERY WELLS WR-101, WR-102, AND WR-103

IPSC intends to continue operation of existing groundwater recovery wells WR-101, WR-102, and WR-103 identified on Figure 3. The three wells are recovering groundwater that contains elevated concentrations of TDS, located in relatively close proximity to the apparent historical TDS release areas associated with the Bottom Ash Basin. Wells WR-102 and WR-103 are located generally along the apparent TDS plume centerline, as explained in detail in IPSC's 2016 *Updated Corrective Action Plan*. Continued removal of TDS-enriched groundwater from each of these three wells is helping reduce the total mass of TDS within the uppermost aquifer beneath the site in a generalized down-gradient/southwesterly direction in relation to the Bottom Ash Basin.

4.2 SUMMARY OF ONGOING ACTIONS ASSOCIATED WITH SELECTION OF FINAL GROUNDWATER REMEDY

Stantec is in the process of reviewing the results of May 2019 pump-testing of newly-installed, groundwater monitoring wells BAC-8, BAC-10, WWC-9, and WWC-10 and older wells RW-4 and RW-5 to investigate well yields and radial cones of influence/capture. The respective well yields will be analyzed using Stantec's site-specific, groundwater model to extrapolate potential lateral extent of capture for each well and help extrapolate yields and possible capture zones for supplemental groundwater recovery wells, if and where deemed warranted. Additionally, upon receipt of all May 2019 water quality analytical results, IPSC/Stantec will review all data to help identify if the two TDS plumes and localized, Appendix IV metals have been delineated sufficiently, as well as identify how the existing groundwater recovery program might be enhanced/expanded to provide appropriate control, where needed.

It is anticipated that one or more of the newly-installed wells BAC-8, BAC-9, and/or BAC-10, and one or both older wells RW-4 and RW-5, will be converted to groundwater recovery wells to help supplement existing recovery wells WR-101, WR-102, and WR-103 associated with ongoing Bottom Ash Basin corrective actions. Likewise, the forthcoming pump-test, groundwater model, and water quality results will be used to estimate placement of future-proposed, on-site and off-site, groundwater monitoring and recovery wells associated with the Waste Water Basin. It is anticipated that newly-installed, well WWC-6 will most probably be converted to a groundwater recovery well, and it is anticipated that two or more groundwater monitoring wells may be installed farther southwest/down-gradient of well WWC-6.

Following evaluation of the forthcoming results, IPSC intends to initiate groundwater recovery to control the migration of the TDS plume down-gradient of the Waste Water Basin. The intent of the recovery well program will be to control the down-gradient leading edge of the TDS plume associated with the Waste Water Basin, as well as Appendix IV metals, where warranted.

Upon implementation of the enhanced groundwater recovery and monitoring program proposed in this report, IPSC will evaluate the degree to which groundwater recovery and natural attenuation processes control the down-gradient leading edges of TDS plumes located down-gradient of the Bottom Ash Basin and the Waste Water Basin. IPSC also intends to evaluate potential, alternative means for ongoing enhancement of remediating TDS mass from the uppermost aquifer beneath the site. IPSC will continue to conduct and report to the UDEQ its routine, semi-annual, groundwater monitoring and remediation program in formal Summary Reports.

Figure 1 General Site Location Map

IPSC PROPERTY BOUNDARY

Combustion By-Products Landfill

Non-CCR Regulated, Evaporation Basins

Bottom Ash Basin

Waste Water Basin

Flowing Wells

North Sugarville Reservoir

Flowing Well

Sugarville

Woodrow

4WD

BASE FROM USGS 1:100,000 SCALE METRIC TOPOGRAPHIC MAPS: LYNNDAL, UTAH, 1979 AND DELTA, UTAH, 1989.

1 0 1 2 3 4 KILOMETERS

1 0 1 2 MILES

N

CCR-Regulated Units
DELTA, UTAH

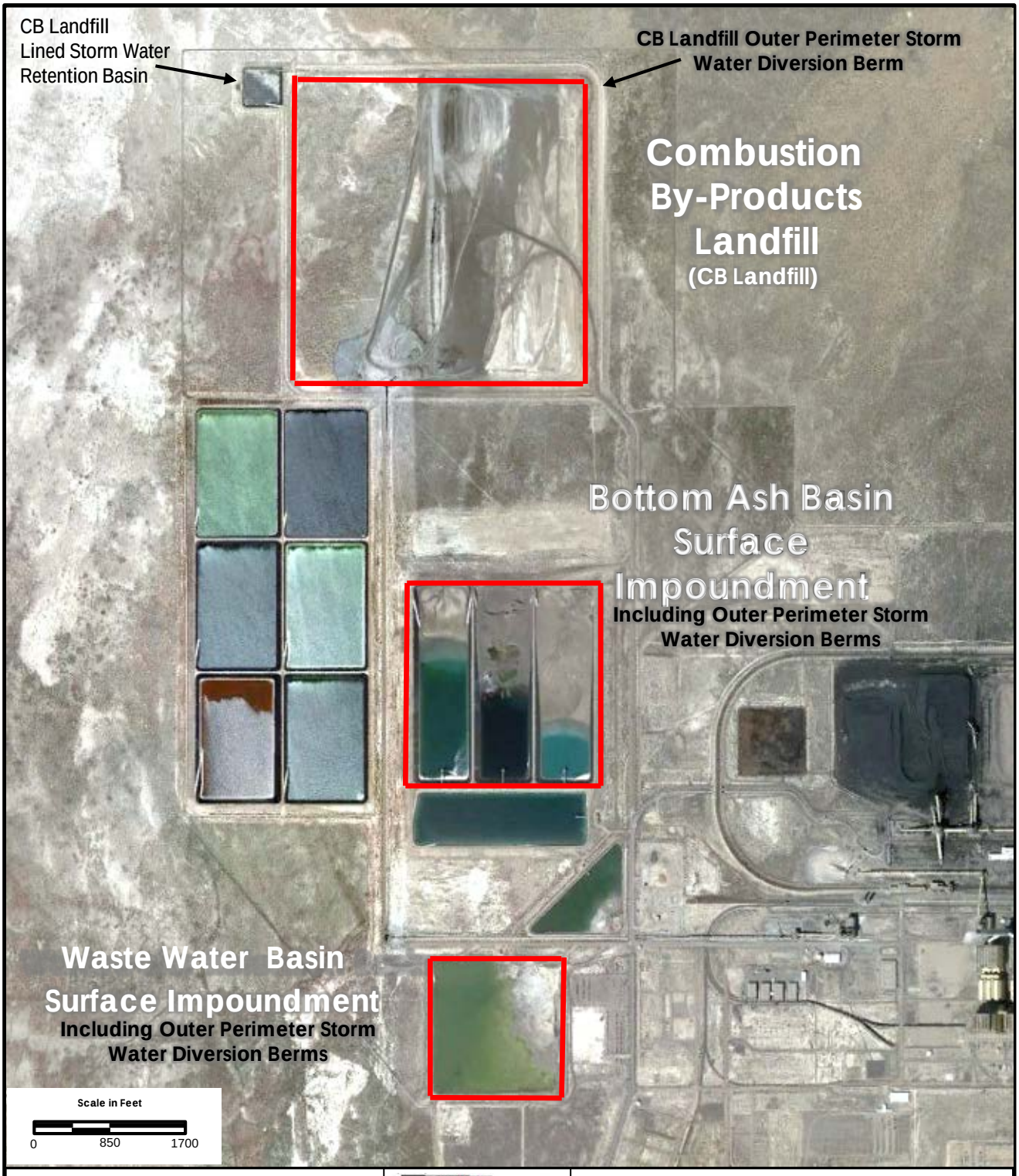
FIGURE 1
SITE TOPOGRAHIC MAP

Stantec

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
JR	CP		1"=1000'	1-26-17	

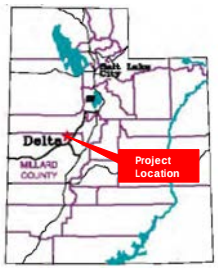
drawings\ipsc-04\Fig2 Site Topographic Map.dwg

Figure 2. CCR Units Location Map



Legend

CCR Unit



INTERMOUNTAIN GENERATING FACILITY

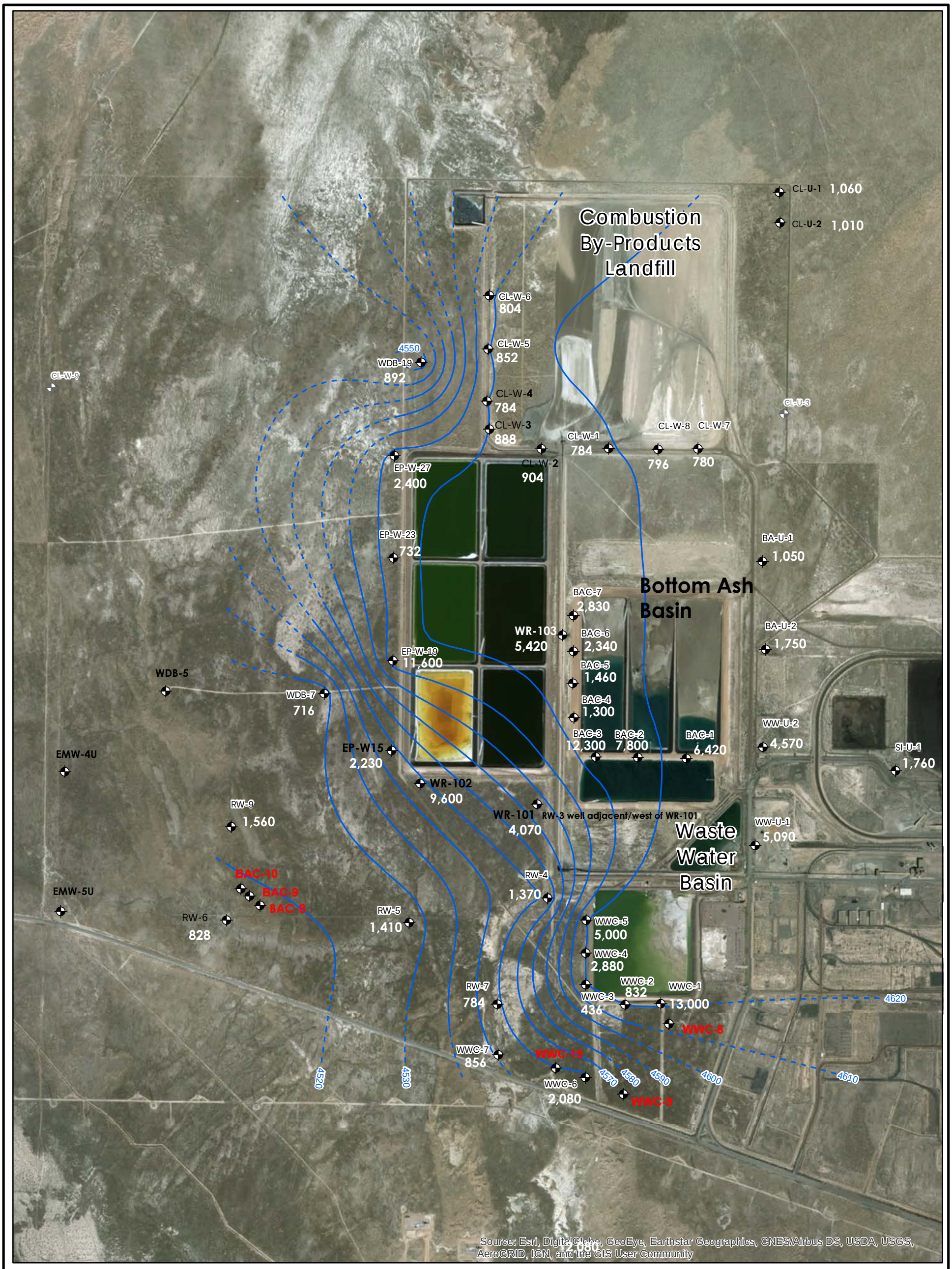
FIGURE 2
Site-Specific Location Map

Stantec

DRAWN BY	JR	DATE DRAWN	9/30/2016
SCALE	1 in. approx. 1700 ft.		
PROJECT	203709098.409		

Figure 3. Map identifying Monitoring Wells

Q:\active\203709098 Intermountain Power\GIS\2018_11\fig12_Oct2018GWE_20181105.mxd



LEGEND:

- MONITORING WELL TDS Concentration (milligrams per Liter; i.e., ppm)
- GROUND WATER CONTOUR

NOTE:

1) BASE MAP INCLUDES OCTOBER 2018 POTENTIOMETRIC MAP AND OCTOBER 2018 TDS RESULTS.
2) ALL ELEVATIONS ARE FEET ABOVE MEAN SEA LEVEL.

0 1,300 2,600
Feet
1 in = 1,350 ft

Stantec

FOR:
INTERMOUNTAIN POWER SERVICE CORP.
INTERMOUNTAIN GENERATION FACILITY
DELTA, UTAH

SPRING 2019-INSTALLED
MONITORING WELLS
Superimposed atop
Oct. 2018 Potentiometric & TDS Concentration Map;
Most Recent, Semi-Annual Map

FIGURE: 3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
203709098	JR	ALL		1/15/19

TABLE 1 GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS

Table 1
WELL CONSTRUCTION SUMMARY
Intermountain Generating Facility
Delta, Utah

MONITOR WELL I.D.	DATE COMPLETED	WELL DIAMETER / MATERIAL	TOTAL DEPTH (feet BGS)	WELL SCREENING INTERVAL (feet BGS)	TOP OF PVC CASING ELEVATION (feet MSL*)
Combustion By-Products Landfill Wells					
CLW-1	5/12/2015	4-inch PVC	65	55-65	4653.46
CLW-2	5/14/2015	4-inch PVC	80	70-80	4648.17
CLW-3	5/13/2015	4-inch PVC	80	70-80	4644.03
CLW-4	5/26/2015	4-inch PVC	82	72-82	4642.88
CLW-5	7/27/2015	4-inch PVC	82	72-82	4640.99
CLW-6	7/26/2015	4-inch PVC	88	78-88	4639.63
CLW-7	7/24/2015	4-inch PVC	72	52-72	4659.34
CLW-8	7/24/2015	4-inch PVC	72	62-72	4655.63
CLW-9	3/25/2018	4-inch PVC	97	87-97	4555.98
CL-U-1	7/23/2015	4-inch PVC	80	68-78	4657.48
CL-U-2	7/22/2015	4-inch PVC	80	70-80	4663.48
CL-U-3	3/27/2018	4-inch PVC	77	67-77	4606.01
Bottom Ash Basin Wells					
BAC-1	7/31/2015	4-inch PVC	70	60-70	4668.70
BAC-2	7/29/2015	4-inch PVC	65	55-65	4668.72
BAC-3	7/28/2015	4-inch PVC	72	52-72	4668.84
BAC-4	8/10/2015	4-inch PVC	75	55-75	4649.45
BAC-5	8/9/2015	4-inch PVC	68	58-68	4649.67
BAC-6	8/8/2015	4-inch PVC	65	55-65	4648.15
BAC-7	8/7/2015	4-inch PVC	67	57-68	4650.09
BAC-8	4/29/2019	6-inch PVC	77	52-77	4626.42
BAC-9	5/1/2019	6-inch PVC	77	52-77	4626.27
BAC-10	5/3/2019	6-inch PVC	87	62-87	4626.27

Table 1
WELL CONSTRUCTION SUMMARY
Intermountain Generating Facility
Delta, Utah

MONITOR WELL I.D.	DATE COMPLETED	WELL DIAMETER / MATERIAL	TOTAL DEPTH (feet BGS)	WELL SCREENING INTERVAL (feet BGS)	TOP OF PVC CASING ELEVATION (feet MSL*)
BA-U-1	7/24/2015	4-inch PVC	55	45-55	4665.73
BA-U-2	7/25/2015	4-inch PVC	70	60-70	4661.33

Table 1
WELL CONSTRUCTION SUMMARY
Intermountain Generating Facility
Delta, Utah

MONITOR WELL I.D.	DATE COMPLETED	WELL DIAMETER / MATERIAL	TOTAL DEPTH (feet BGS)	WELL SCREENING INTERVAL (feet BGS)	TOP OF PVC CASING ELEVATION (feet MSL*)
Waste Water Basin Wells					
WWC-1	7/26/2015	4-inch PVC	60	48-58	4644.72
WWC-2	7/27/2015	4-inch PVC	70	60-70	4645.11
WWC-3	7/30/2015	4-inch PVC	65	55-65	4638.90
WWC-4	7/29/2015	4-inch PVC	75	65-75	4640.58
WWC-5	7/28/22015	4-inch PVC	74	64-74	4641.75
WWC-6	3/24/2018	4-inch PVC	87	67-77	4576.26
WWC-7	3/22/2018	4-inch PVC	87	77-87	4570.78
WWC-8	4/25/2019	6-inch PVC	96	71-96	4647.799
WWC-9	4/28/2019	6-inch PVC	89	62-87	4642.58
WWC-10	4/26/2019	6-inch PVC	90	62-87	4633.72
SI-U-1	8/12/2015	4-inch PVC	79	69-79	4664.59
WC-U-1	8/11/2015	4-inch PVC	70	60-70	4665.03
WC-U-2	8/11/2015	4-inch PVC	75	65-75	4665.46

BGS = Below Ground Surface
MSL = Mean Sea Level

Appendix A Drilling Logs and Well Schematic Diagrams

Project Name: Intermountain Power Service Corporation

Project No.: 203709098

Completion Date: 2019-04-25

Boring Monitor Well: WWC-8

Drilling Firm: Cascade

Driller: Ryan Miller

Boring Method: Sonic

Logged by: Rich Pratt

Boring Diameter: 10 inches

Depth to Water at Drilling: 77 feet

Depth to Water at Drilling (static at 24 hours): 27 feet

WWC-8

Interval (feet)	Description
0 - 3	Light brown sand, moist
3 - 7	Light brown sand with silt, dry
7 - 9	Medium brown clay with sand, moist
9 - 13	Medium brown clay, moist
13 - 15	Light brown clay, moist
15 - 17	Light brown clay, dry
17 - 26	Light brown clay, moist
26 - 35	Light brown clay with sand, moist
35 - 37	Light brown clay, moist
37 - 41	Medium brown medium grained sand, moist
41 - 43	Medium brown medium grained sand, moist
43 - 55	Medium brown medium grained sand, moist
55 - 59	Light brown clay, moist
59 - 63	Light brown clay with sand, moist
63 - 66	Light brown clay, moist
66 - 67	Light brown clay with sand, moist
67 - 68	Light brown sand, moist
68 - 77	Light brown clay with sand, moist
77 - 88	Medium brown sand, saturated
88 - 93	Light brown clay
93 - 94	Light brown clay with sand
94 - 96	Light brown clay
96 - 97	Medium brown sand

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up

Casing, solid (6-inch PVC): 0-69.38 feet

Screen (6 inch, 0.02 slotted, PVC): 69.38-94.38 feet

Sand Pack: 16/30 sand, 64.38-94.38 feet

Bentonite Seal: Hydrolyzed bentonite pellet seal 57.38-64.38 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA

Top of Manhole Cover (Relative Datum Survey): NA

Project Name: Intermountain Power Service Corporation
Boring Monitor Well: WWC-9

Project No.: 203709098
Completion Date: 2019-04-28

Drilling Firm: Cascade
Boring Method: Sonic
Boring Diameter: 10 inches

Driller: Ryan Miller
Logged by: Rich Pratt
Depth to Water at Drilling: 67 feet
Depth to Water at Drilling (static at 24 hours): 23.75 feet

WWC-9

Interval (feet)	Description
0 - 0.5	Medium brown silt, dry
0.5 - 1	Medium brown clay, dry
1 - 4	Light brown fine-grained sand, dry
4 - 8	Light brown clay, dry
8 - 13	Light brown fine-grained sand, dry
13 - 15	Light brown clay, dry
15 - 16	Light brown clay with sand, dry
16 - 17	Light brown clay, dry
17 - 18	Light brown clay with sand, moist
18 – 21.5	Light brown clay, moist
21.5 - 22	Light brown clay with sand, moist
22 - 23	Light brown clay, moist
23 - 26	Light brown clay with sand, moist
26 - 27	Light brown clay, moist
27 - 30	Light brown clay, moist
30 - 31	Light brown clay, saturated
31 - 32	Light brown clay with sand, moist
32 - 36	Light brown clay, moist
36 - 37	Light brown clay with sand, moist
37 - 38	Light brown clay with sand, moist
38 - 51	Medium brown medium grained sand, moist
51 - 54	Light brown clay, moist
54 - 58	Medium brown medium grained sand, moist
58 - 59	Medium brown medium grained sand, moist
59 - 62	Medium brown medium grained sand, moist
62 - 63	Light brown clay, moist to moist
63 - 66	Light brown clay with sand, moist
66 - 67	Light brown clay, moist
67 - 69	Light brown clay with sand, saturated

Interval (feet)	Description
69 – 69.5	Medium brown sand
69.5 - 70	Light brown clay with sand
70 - 71	Light brown clay
71 - 74	Light brown clay with sand
74 - 75	Medium brown sand
75 - 77	Light brown clay
77 - 83	Medium brown sand
83 - 85	Light brown clay
85 - 87	Light brown clay with sand

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up

Casing, solid (6-inch PVC): 0-61.7 feet

Screen (6 inch, 0.02 slotted, PVC): 61.7-86.7 feet

Sand Pack: 16/30 sand, 56.7-86.7 feet

Bentonite Seal: Hydrolyzed bentonite pellet seal 49.7-56.7 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA

Top of Manhole Cover (Relative Datum Survey): NA

Project Name: Intermountain Power Service Corporation
Boring Monitor Well: WWC-10

Project No.: 203709098
Completion Date: 2019-04-26

Drilling Firm: Cascade
Boring Method: Sonic
Boring Diameter: 10 inches

Driller: Ryan Miller
Logged by: Rich Pratt
Depth to Water at Drilling: 67 feet
Depth to Water at Drilling (static at 24 hours): 17.65 feet

WWC-10

Interval (feet)	Description
0 - 5	Light brown sand, moist
5 – 9.5	Light brown clay with sand, moist
9.5 - 13	Dark gray clay, moist
13 - 14	Dark brown silt with organic plant matter, moist
14 - 15	Dark gray clay, moist
15 - 17	Gray medium grained sand, moist
17 - 34	Gray medium grained sand, moist
34 - 45	Brown medium grained sand, moist
45 - 47	Medium brown clay, moist
47 - 49	Medium brown clay with sand, moist
49 - 50	Medium brown medium grained sand, moist
50 - 51	Medium brown clay with sand, moist
51 - 52	Medium brown medium grained sand, moist
52 - 53	Medium brown clay with sand, moist
53 - 54	Medium brown medium grained sand, moist
54 - 60	Medium brown clay, moist
60 - 61	Medium brown clay with sand, moist
61 - 67	Medium brown clay, moist
67 - 68	Medium brown clay, saturated
68 - 69	Medium brown clay with sand
69 - 70	Medium brown clay
70 - 76	Medium brown clay with sand
76 - 87	Medium brown clay

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up
Casing, solid (6-inch PVC): 0-62.75 feet
Screen (6 inch, 0.02 slotted, PVC): 62.75-87.75 feet
Sand Pack: 16/30 sand, 57.75-87.75 feet
Bentonite Seal: Hydrolyzed bentonite pellet seal 50.75-57.75 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA
Top of Manhole Cover (Relative Datum Survey): NA

Project Name: Intermountain Power Service Corporation

Boring Monitor Well: BAC-8

Project No.: 203709098

Completion Date: 2019-04-29

Drilling Firm: Cascade

Boring Method: Sonic

Boring Diameter: 10 inches

Driller: Ryan Miller

Logged by: Rich Pratt

Depth to Water at Drilling: 67 feet

Depth to Water at Drilling (static at 24 hours): 45.59 feet

BAC-8

Interval (feet)	Description
0 - 1	Light brown fine-grained sand with clay, dry
1 - 13	Light brown clay with silt, dry
13 - 17	Light brown fine-grained sand with clay, dry
17 - 18	Light brown clay with sand, moist
18 - 19	Medium brown sand, saturated
19 - 21	Light brown clay with sand, moist
21 - 27	Light brown clay with sand, dry
27 - 28	Brown with red clay, moist
28 - 31	Brown clay, moist
31 - 34	Gray clay, moist
34 - 43	Brown clay, moist
43 - 56	Medium brown medium-grained sand, moist
56 – 56.5	Medium brown medium-grained sand with pebbles, moist
56.5 - 57	Medium brown medium-grained sand, moist
57 - 63	Brown clay, moist
63 - 65	Medium brown fine-grained sand, moist
65 – 66.5	Brown clay, moist
66.5 - 67	Medium brown fine-grained sand, moist
67 - 68	Medium brown fine-grained sand, saturated
68 - 69.5	Medium brown fine-grained sand
69.5 - 77	Red and brown clay

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up

Casing, solid (6-inch PVC): 0-52.62 feet

Screen (6 inch, 0.02 slotted, PVC): 52.62-77.62 feet

Sand Pack: 16/30 sand, 47.62-77.62 feet

Bentonite Seal: Hydrolyzed bentonite pellet seal 40.62-47.62 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA

Top of Manhole Cover (Relative Datum Survey): NA

Project Name: Intermountain Power Service Corporation

Boring Monitor Well: BAC-9

Project No.: 203709098

Completion Date: 2019-05-1

Drilling Firm: Cascade

Boring Method: Sonic

Boring Diameter: 10 inches

Driller: Ryan Miller

Logged by: John Russell

Depth to Water at Drilling: 60 feet

Depth to Water at Drilling (static at 24 hours): 44.82 feet

BAC-9

Interval (feet)	Description
0 - 10	Light gray to brown silt with clay to clay with silt, dry
10 - 20	Light gray to brown silt, dry
20 - 30	Light brown silt, dry
30 - 44	Light brown silt, dry
44 - 50	Medium brown clay, dry
50 - 54	Light brown silt to clay with silt, moist
54 – 54.5	Medium brown silt with clay, moist
54.5 - 60	Light brown clay with silt, moist
60 - 77	Medium brown silt with clay and silt stringers, saturated

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up

Casing, solid (6-inch PVC): 0-53.11 feet

Screen (6 inch, 0.02 slotted, PVC): 53.11-78.11 feet

Sand Pack: 16/30 sand, 48.11-78.11 feet

Bentonite Seal: Hydrolyzed bentonite pellet seal 41.11-48.11 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA

Top of Manhole Cover (Relative Datum Survey): NA

Project Name: Intermountain Power Service Corporation
Boring Monitor Well: BAC-10

Project No.: 203709098
Completion Date: 2019-05-3

Drilling Firm: Cascade
Boring Method: Sonic
Boring Diameter: 10 inches

Driller: Ryan Miller
Logged by: Rich Pratt
Depth to Water at Drilling: 69 feet
Depth to Water at Drilling (static at 24 hours): 63.1 feet

BAC-10

Interval (feet)	Description
0 - 1	Light brown silt, dry
1 - 3	Light brown silt with clay, dry
3 - 14	Light brown clay with silt, dry
14 - 17	Light brown fine-grained sand, dry
17 - 19	Light brown fine-grained sand with clay, moist
19 - 21	Light brown fine-grained sand with clay, moist
21 - 23	Light brown fine-grained sand, moist
23 - 25	Light brown fine-grained sand with clay, moist
25 - 26	Light brown fine-grained sand, moist
26 - 27	Light brown fine-grained sand with clay, moist
27 - 28	Light brown fine-grained sand, moist to moist
27 - 34	Light brown fine-grained sand, moist
34 – 34.5	Light brown silt with clay, dry
34.5 – 40.5	Red brown clay, dry
40.5 - 41	Medium brown medium grained sand, moist to moist
41 - 45	Medium brown clay, moist
45 - 46	Medium brown sand, moist to moist
46 - 48	Medium brown clay, moist
48 – 56.5	Red brown clay, moist
56.5 - 57	Gray clay, moist
57 - 62	Light brown clay, moist to moist
62 - 63	Medium brown medium grained sand, moist
63 - 64	Medium brown medium grained sand with clay, moist
64 - 69	Red, brown, and gray clay, moist
69 – 69.5	Medium brown sand, saturated
69.5 - 77	Red, brown, and gray clay
77 - 79	Medium brown clay with sand
79 - 81	Medium brown clay
81 - 85	Medium brown clay with sand

85 - 87	Medium brown clay, moist

Well Completion materials and Depth Intervals (feet) Below Ground Surface

Surface Completion: Stick-up

Casing, solid (6-inch PVC): 0-62.95 feet

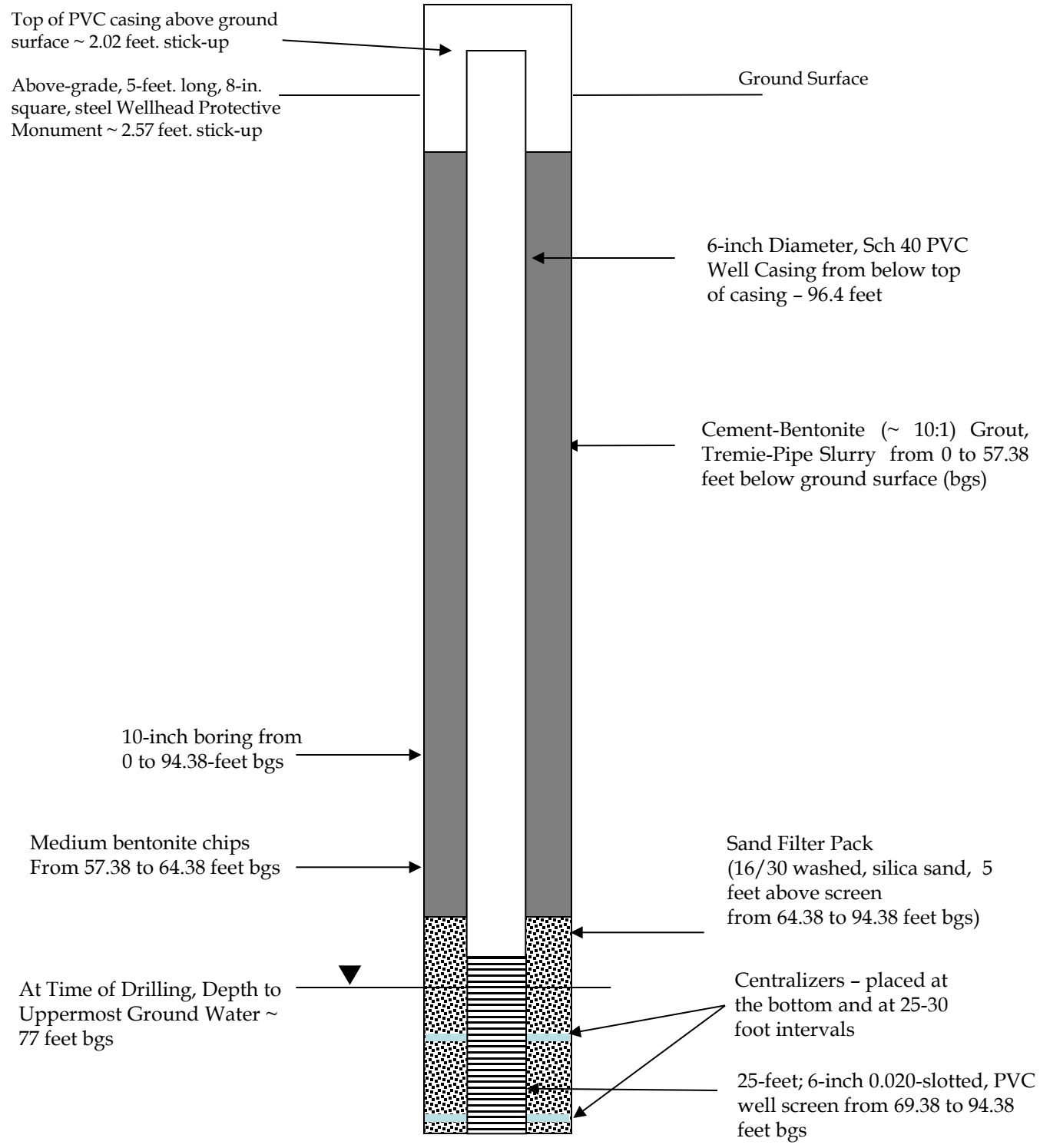
Screen (6 inch, 0.02 slotted, PVC): 62.95-87.95 feet

Sand Pack: 16/30 sand, 57.95-87.95 feet

Bentonite Seal: Hydrolyzed bentonite pellet seal 50.95-57.95 feet

Top of 6 in. PVC Casing Elevation (Relative Datum Survey): NA

Top of Manhole Cover (Relative Datum Survey): NA



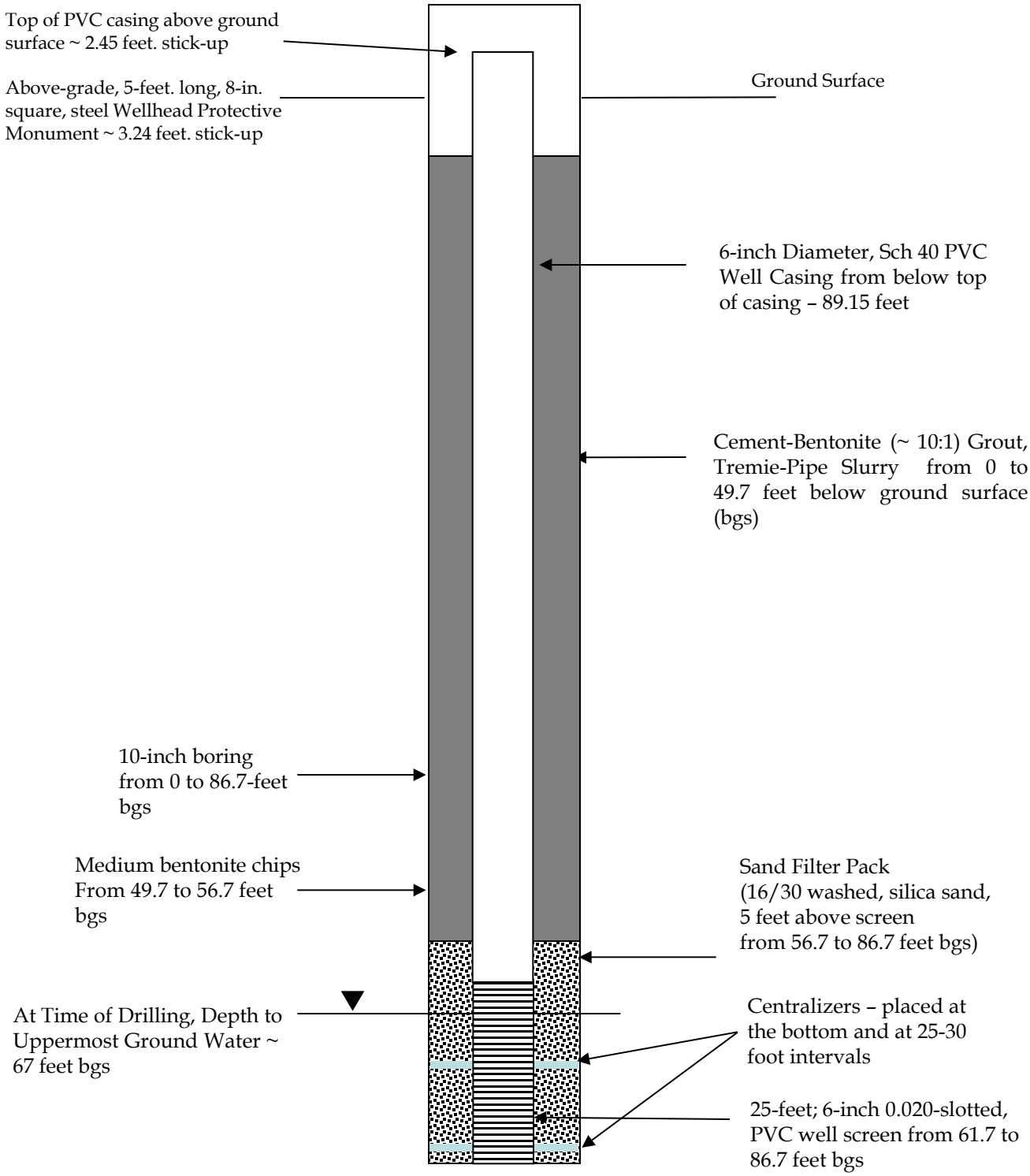
Total Depth (TD) = 94.38 feet bgs

Stantec

Intermountain Power Service Corporation
Delta, Utah

WWC-8 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	



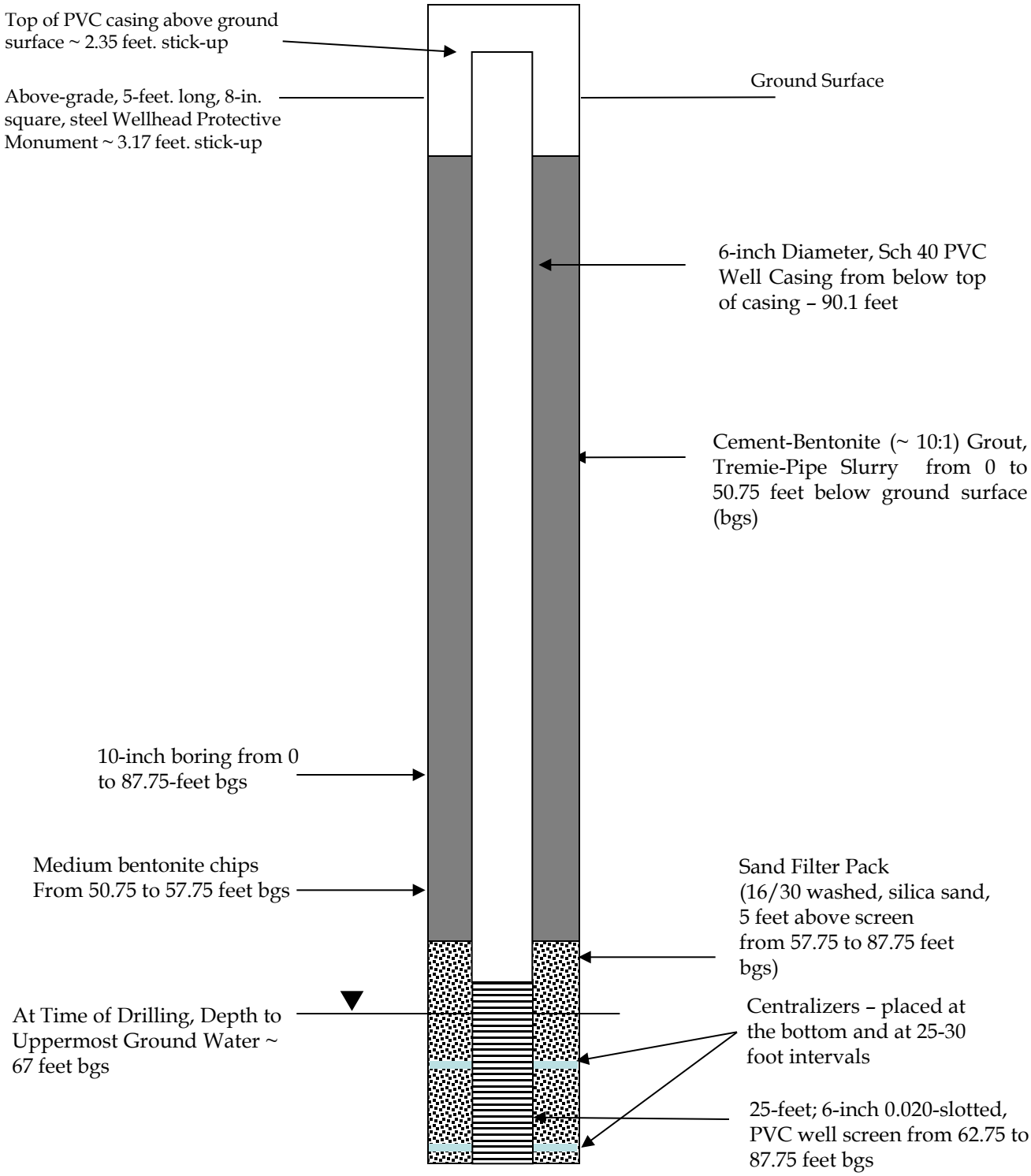
Total Depth (TD) = 86.7 feet bgs

Stantec

Intermountain Power Service Corporation
Delta, Utah

WWC-9 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	



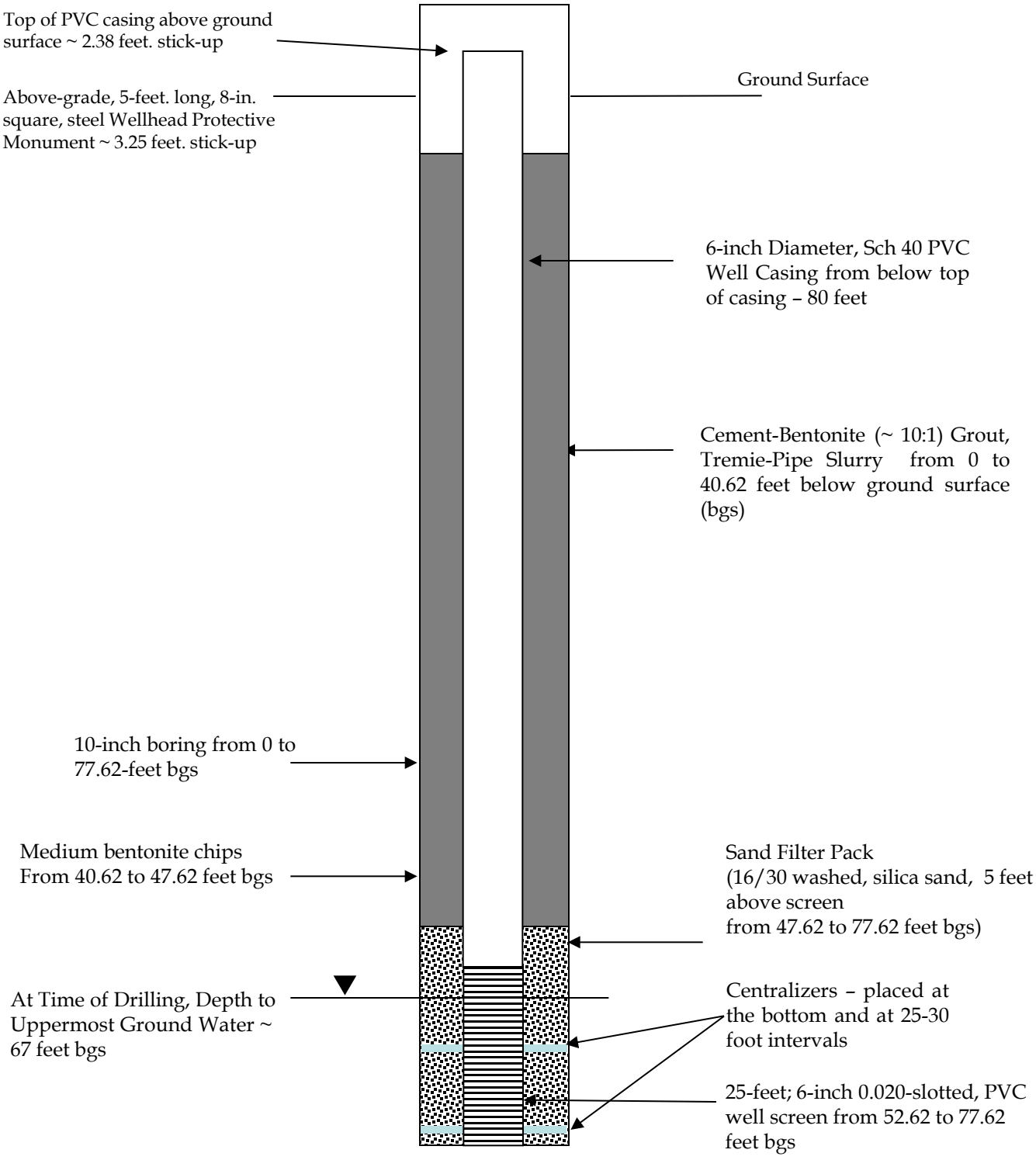
Total Depth (TD) = 87.75 feet bgs

Stantec

Intermountain Power Service Corporation
Delta, Utah

WWC-10 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	



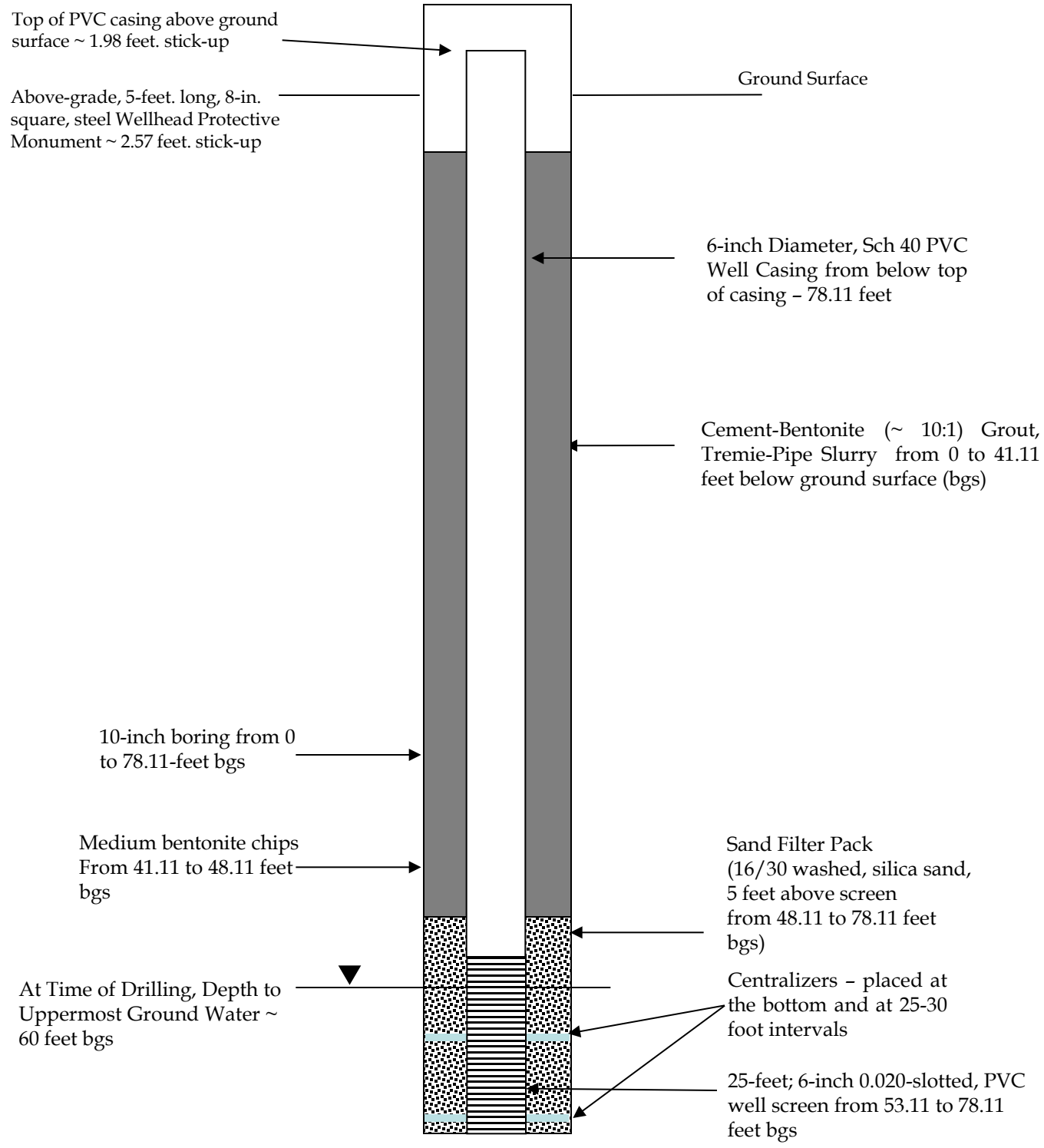
Total Depth (TD) = 77.62 feet bgs

Stantec

Intermountain Power Service Corporation
Delta, Utah

BAC-8 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	

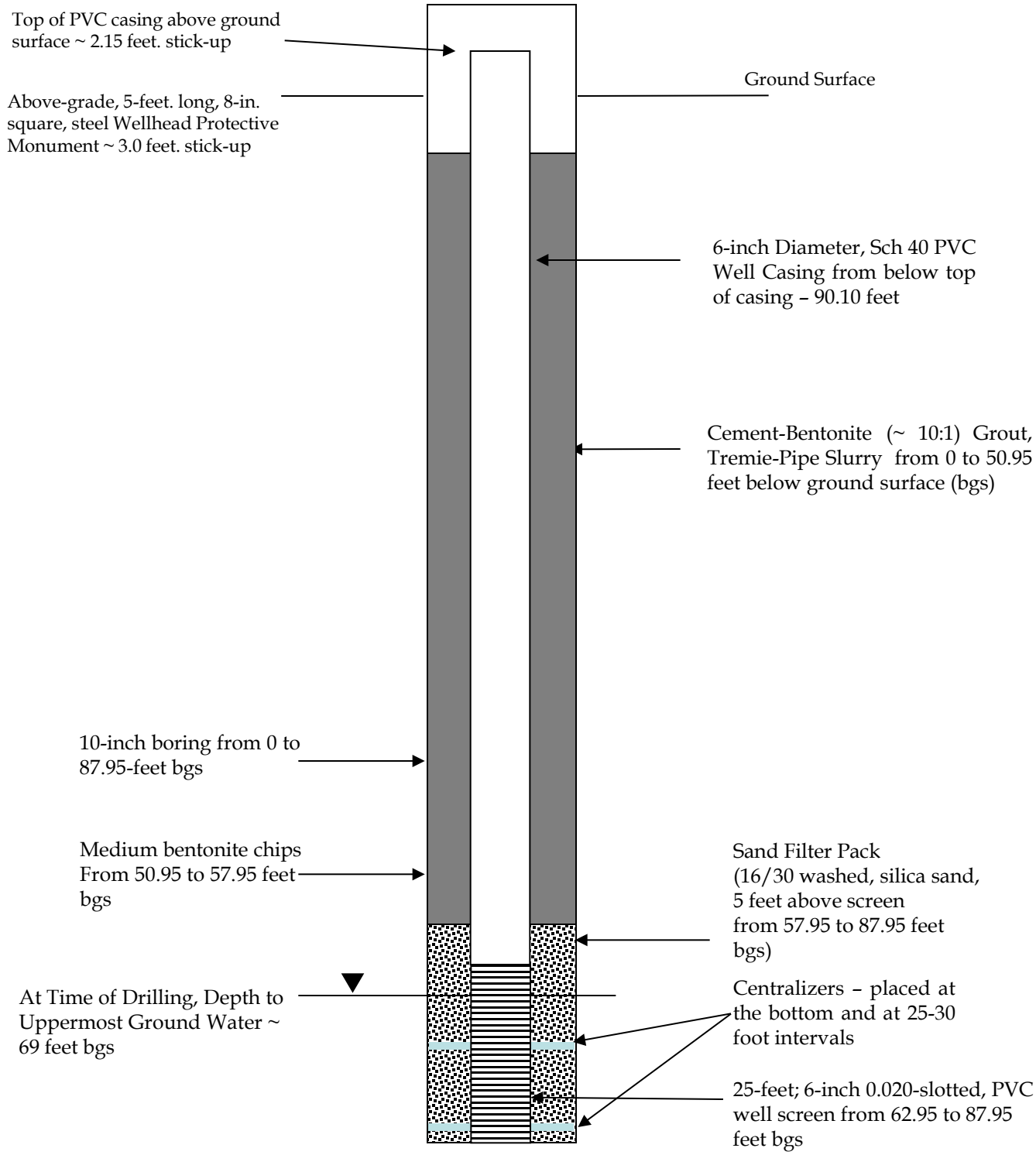


Stantec

Intermountain Power Service Corporation
Delta, Utah

BAC-9 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	



Total Depth (TD) = 87.95 feet bgs

Stantec

Intermountain Power Service Corporation
Delta, Utah

BAC-10 Monitoring Well Schematic

Design by	Drawn by	Scale	Date Drawn	Last Revision Date
TH	RP		6-4-19	