HEALTH, SAFETY, ENVIRONMENTAL AND REMEDIATION WEEKLY REPORT
Williams AFB ST012

Site No.: 910-11-10001

Week Ending 3 June 2016

I. SITE SUBCONTRACTOR SUMMARY

Company	Sat	Sun	Mon	Tue	Wed	Thu	Fri
Amec Foster Wheeler				X	X	X	X
Terra Therm				X	X	X	X
MP Environmental						X	
Yellow Jacket				X	X		
Standard Construction					X	X	

II. SCHEDULE / SITE ACTIVITIES REVIEW

A. SEE Demolition

- Continued pipe removal across site including:
  1. Removal of piping in zones 4,5, and 6 to trunk line
- Moving material from cell phone lot to between piping zones 2 and 3.
- Began removal of electrical panels and cabling
- Above ground storage tanks cleaned and ready for removal
- All eductor pumps and associated piping removed from pad; ready for EBR construction

B. Well Drilling and Development

- Set LSZ43
- Mini rig hit an unmarked water (fire suppression) pipe on 31 May during install of LSZ45. Repair completed by Standard Construction on 2 June. Measured the pipe from a wall to know where it is when we covered it so that it would be safe to resume work in the area.
- The drill crews successfully used their fabricated cone for safely removing drill pipe. They have not used any water while drilling to date (as per the "new procedure") – they have just been double bagging samples. For more information on new steam energy mitigation procedure, see Weekly Report for Week Ending 27 May 2016.

III. SVE OPERATING DATA

Destruction Efficiency/Mass Removal Summary

The destruction efficiency and mass removal calculations are tabulated below. A correction factor was applied to PID readings based on available analytical data and corresponding PID data. This factor is updated each time new analytical data is available.

Date Period Began	Date Period Ended	Days in Period	Time Catalytic Oxidizer Operated	Catalytic Oxidizer Uptime	Date of Influent Laboratory TPH Result	Influent Concentration (PID)	Influent Concentration (Adjusted PID)	Effluent Concentration (PID)	Effluent Concentration (Adjusted PID)	Calculated Destruction Efficiency[a]	Flowrate into Oxidizer (End of Period)	Estimated VOC Mass Removed[b]	Average Daily Removal Rate[b]	Estimated VOC Mass Released to Atmosphere[b]	Average VOC Mass Released to Atmosphere[b]
---	---	days	hrs	%		ppmv	mg/m^3	ppmv	mg/m^3	%	scfm	lbs/period	lbs/day	lbs/period	lbs/day
4/7/2016	4/15/2016	9	112	52%	3/11/2016	560	78,951	4.6	4.17	99.99%	1396	46,243	5,138	2	0.27
4/15/2016	4/21/2016	7	147	88%	3/11/2016	342	48,216	1.0	0.91	100.00%	1571	41,700	5,957	0.8	0.11
4/21/2016	4/29/2016	9	188	87%	4/25/2016	296	18,000	2.6	2.36	99.99%	1396	17,697	1,966	2.3	0.26
4/29/2016	5/5/2016	7	130	77%	4/25/2016	179	10,885	1.6	1.45	99.99%	1396	7,400	1,057	1.0	0.14
5/5/2016	5/20/2016	16	323	84%	4/25/2016	394	23,959	0.5	0.45	100.00%	1047	30,354	1,897	0.6	0.04
5/20/2016	5/26/2016	7	146	87%	4/25/2016	699	42,507	25.0	22.67	99.95%	698	16,228	2,318	8.7	1.24
5/26/2016	6/2/2016	8	166	86%	4/25/2016	340	20,676	10.0	9.07	99.96%	698	8,975	1,122	3.9	0.49

Notes:
% - percent
hrs - hours
JP-4 - jet petroleum fuel grade four
lbs - pounds
ppmv - parts per million by volume
scfm - standard cubic feet per minute
TPH - total petroleum hydrocarbons
PID - photoionization detector
SVE - soil vapor compound
VOC - volative organic compound
(a) Calculated destruction efficiencies are calculated using a single sampling event for each quarter, not using the average influent and effluent results.

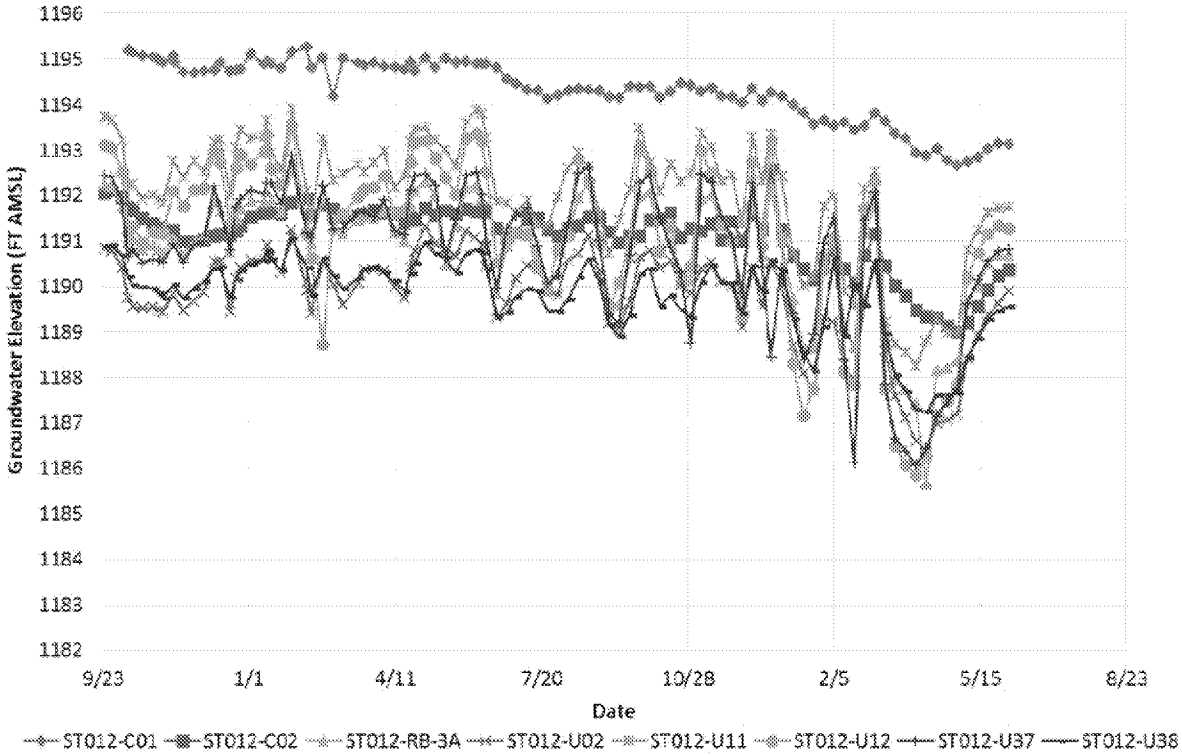
(b) Mass and volumes are calculated based on laboratory data for TPH reported as JP-4. As has been the basis for previous calculations at ST012, the average molecular weight of TPH as JP-4 is assumed equivalent to xylene (106.168 grams per mole). The assumed liquid density of the fuel is 6.57 lbs per gallon.

IV. GROUNDWATER ELEVATION MONITORING

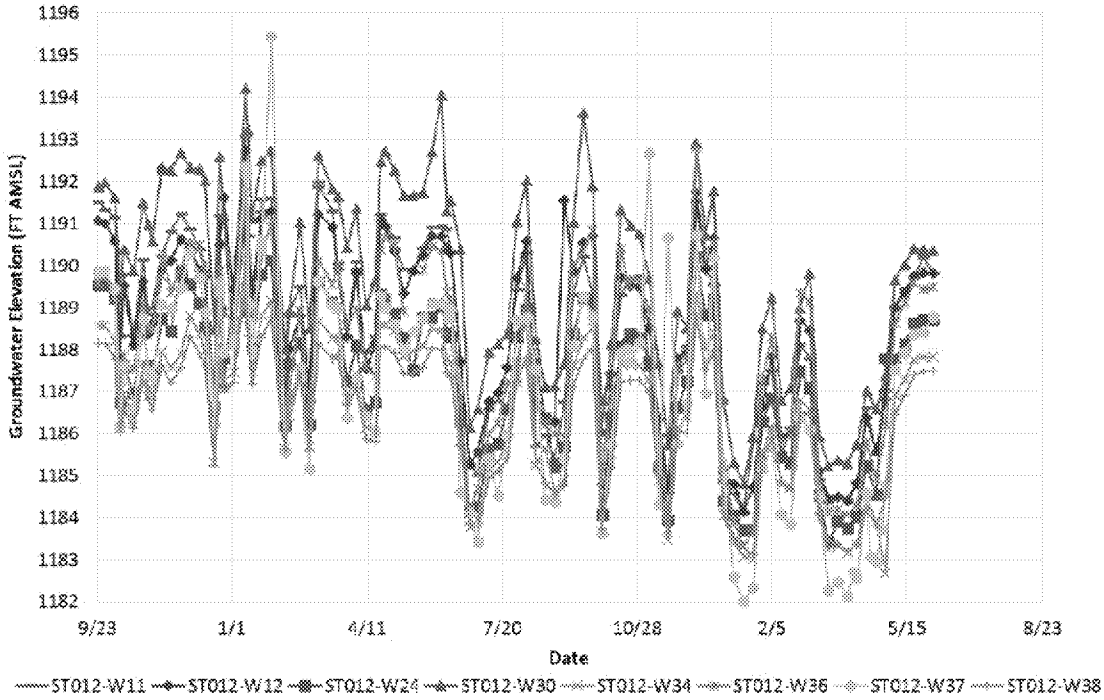
A. Perimeter groundwater elevation differences (measured in feet) adjusted for regional groundwater table increase

Monitoring Well	5/13/2016		5/20/2016		5/27/2016		6/3/2016	
	Change from Baseline	Change from Previous	Change from Baseline	Change from Previous	Change from Baseline	Change from Previous	Change from Baseline	Change from Previous
CZ/UWBZ Wells								
ST012-C01	-2.41	0.13	-2.23	0.21	-2.11	0.15	-2.13	0.01
ST012-C02	-2.48	0.38	-2.11	0.40	-1.80	0.34	-1.68	0.15
UWBZ Wells								
ST012-RB-3A	-2.26	0.35	-1.76	0.53	-1.57	0.22	-1.58	0.02
ST012-U02	-1.90	0.55	-1.45	0.48	-1.21	0.27	-0.93	0.31
ST012-U11	-2.50	0.47	-2.10	0.43	-2.01	0.12	-2.00	0.04
ST012-U12	-2.37	0.56	-1.94	0.46	-1.76	0.21	-1.83	-0.04
ST012-U37	-2.29	0.55	-1.86	0.46	-1.66	0.23	-1.61	0.08
ST012-U38	-2.04	0.42	-1.61	0.46	-1.41	0.23	-1.33	0.11
LSZ Wells								
ST012-W11	-2.07	0.45	-1.80	0.30	-1.31	0.52	-1.69	-0.35
ST012-W12	-1.70	0.40	-1.30	0.43	-1.24	0.09	-1.25	0.02
ST012-W24	-1.39	0.36	-0.88	0.54	-0.80	0.11	-0.81	0.02
ST012-W30	-1.85	0.40	-1.48	0.40	-1.50	0.01	-1.53	0.00
ST012-W34	-1.28	0.42	-0.80	0.51	-0.74	0.09	-0.76	0.01
ST012-W36	-0.49	0.52	-0.01	0.51	-0.18	-0.14	-0.11	0.10
ST012-W37	-1.90	0.45	-1.48	0.45	-1.45	0.06	-1.05	0.43
ST012-W38	-1.23	0.49	-0.75	0.51	-0.66	0.12	-0.65	0.04

CZ and UWBZ Groundwater Elevations

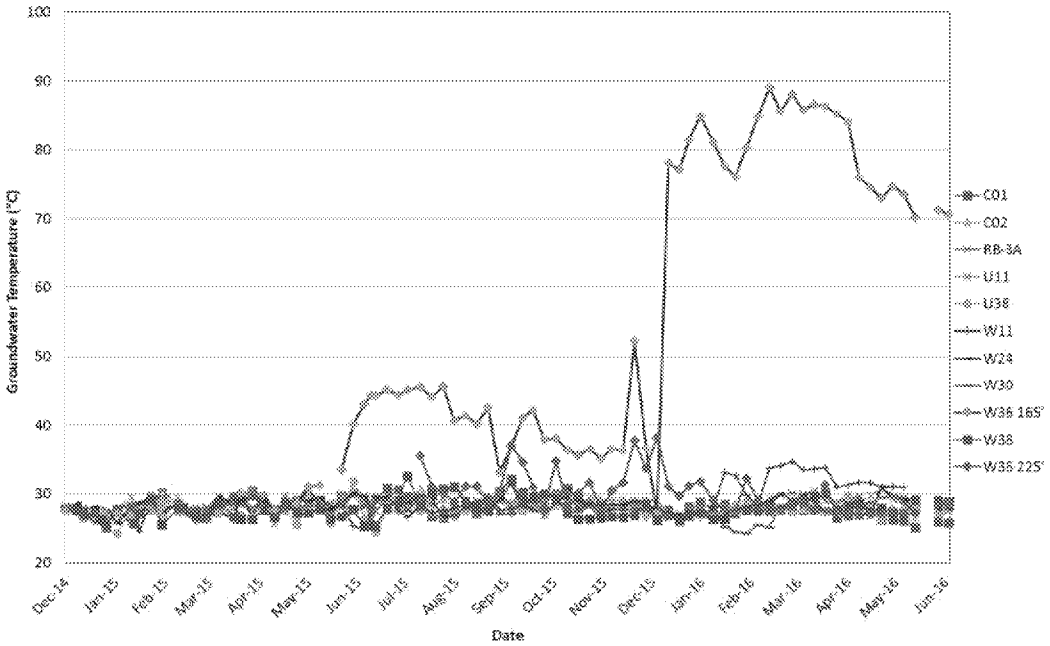


LSZ Groundwater Elevations



V. SUBSURFACE TEMPERATURE MONITORING

A. Perimeter Monitoring Well Temperatures



B. SEE Well Temperature Monitoring

The following wells used during SEE were monitored for vertical temperature profile. The table lists the high temperature and the average temperature across the profile. Wells included on this table are anticipated to be used for baseline sampling or EBR extraction activities. Any additional wells that are monitored in future weeks will be included on this table.

WELL ID	EBR USE	High Temperature (F) (1)	Average Temperature (F) (2)
CZ11	None	124.9	186.4
CZ12	Injection	195.4	115.2
CZ14	Injection	203.4	97.2
CZ16	Injection	198.9	105.0
UWBZ10	Extraction	216.1	114.8
UWBZ21	Injection	180.7	89.8
UWBZ22	Extraction	168.4	96.8
UWBZ23	Injection	196.3	88.7
UWBZ27	Extraction	181.8	96.3
LSZ09	Extraction	177.8	131.7
LSZ11	Extraction	158.1	104.0
LSZ12	Extraction	161.4	88.4
LSZ14	Extraction	186.1	99.6
LSZ17	Extraction	213.1	95.4
LSZ23	Extraction	178.9	124.1
LSZ26	Extraction	190.9	113.0
LSZ28	Extraction	125.8	113.2
LSZ29	Extraction	178.9	102.2
LSZ34	SAMPLING	181.8	94.4
LSZ36	Extraction	176.0	93.5
LSZ37	Extraction	168.1	98.5
LSZ38	Extraction	109.4	102.7
LSZ39	Extraction	97.2	88.1

Note:
(1) High temperature corresponds to the maximum temperature in the well casing below the water table.
(2) Average temperature corresponds to the average temperature in the well casing, based on 10 ft measurements from the top of casing to the first measurement in the water table. Subsequent water measurements were excluded to remove bias based on significantly higher temperatures in the groundwater.

VI. LNAPL MONITORING

A. Perimeter LNAPL Thickness (ft)

Monitoring Well	5/13/2016			5/20/2016			5/27/2016			6/3/2016		
	Before bailing/ pumping (ft)	After Bailing/ pumping (ft)	Weekly Volume Removed (gal)	Before bailing/ pumping (ft)	After Bailing/ pumping (ft)	Weekly Volume Removed (gal)	Before bailing/ pumping (ft)	After Bailing/ pumping (ft)	Weekly Volume Removed (gal)	Before bailing/ pumping (ft)	After Bailing/ pumping (ft)	Weekly Volume Removed (gal)
CZ Wells												
ST012-C01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-C02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UWBZ Wells												
ST012-U02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-RB-3A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LSZ Wells												
ST012-W11	6.06	6.06	0.00	4.45	1.60	1.90	0.00	0.00	0.00	1.61	1.61	0.00
ST012-W12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W37	4.01	4.01	0.00	4.23	4.23	0.00	4.22	4.22	0.00	0.00	0.00	0.00
ST012-W38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

B. SEE Injection/Extraction Well LNAPL Screening

Well ID	Date Pump Pulled	Screened for NAPL (Y/N)	Bailer Used	NAPL Initially Present (Y/N)(1)
CZ10	5/23/2016			
CZ11	5/20/2016	Y	SS	Y
CZ12	5/17/2016	Y	SS	Y
CZ14	5/17/2016	Y	SS	Y
CZ15	5/24/2016			
CZ16	5/18/2016	Y	SS	Y
CZ18	5/26/2016	Y	SS	Y
CZ19	5/26/2016	Y	SS	Y
CZ20	5/24/2016			
UWBZ02	5/27/2016			
UWBZ10	5/20/2016	Y	SS	Y
UWBZ19	5/27/2016			
UWBZ21	5/17/2016	Y	SS	Y
UWBZ22	5/19/2016	Y	SS	Y
UWBZ23	5/17/2016	Y	SS	Y
UWBZ26	5/26/2016			
UWBZ27	5/20/2016	Y	SS	Y
LSZ09	---	Y	SS	Y
LSZ11	5/19/2016	Y	SS	Y
LSZ12	5/18/2016	Y	SS	Y
LSZ14	5/18/2016	Y	SS	Y
LSZ17	5/24/2016	Y	SS	Y
LSZ23	---	Y	SS	Y
LSZ26	---	Y	SS	Y
LSZ28	5/23/2016	Y	SS	Y
LSZ29	5/18/2016	Y	SS	Y
LSZ31	5/23/2016			
LSZ32	5/27/2016			
LSZ34	5/17/2016	Y	SS	Y
LSZ36	5/18/2016	Y	SS	Y
LSZ37	5/20/2016	Y	SS	Y
LSZ38	5/19/2016	Y	SS	Y
LSZ39	5/19/2016	Y	SS	Y

Notes:
--- = Not applicable. Wells were steam injection wells and did not have eductor pump piping.
SS = stainless steel
PTFE = Teflon
(1) Due to temperatures, LNAPL observations were made with a stainless steel bailer which limits observation to a qualitative Yes/No on presence of floating layer. This method does not allow for definitive differentiation of bioemulsions from true NAPL. NAPL or bioemulsions present may have been present in the well through much of SEE operations if the layer remained above the eductor pump intake. All wells will be assessed by removal of floating layers and subsequent monitoring with Teflon bailers in hot areas to allow evaluation of potential flowable LNAPL.

C. LNAPL Bailing

The following table summarizes the bailing and monitoring performed at LNAPL screened wells. Any additional wells that are monitored in future weeks will be included on this table:

Well	Date	NAPL Present (Y/N)	Bailed (Y/N)	NAPL Remaining (Y/N)	Able to Use Interface Probe? (Y/N)	Depth to Product (ft. bgs)	Depth to Water (ft. bgs)	NAPL Thickness (ft.)[1]	LNAPL Removed (Gallons)
UWBZ10	6/3/2016	Y	Y	N	N	~143	NA	NA	13
LSZ11	6/1/2016	Y	Y	N	N	NA	NA	NA	10
LSZ17	6/2/2016	Y	Y	N	N	~130	NA	NA	50
LSZ28	6/3/2016	Y	Y	N	N	~146	NA	NA	5
LSZ37	5/23/2016	Y	N	Y	Y	138.40	185.80	47.40	
	5/24/2016	Y	Y	Y	Y	145.09	161.65	16.56 [2]	60
	5/25/2016	Y	Y	Y	Y	148.55	149.60	1.05 [2]	25
	5/25/2016	Y	N	Y	Y	148.45	149.51	1.06	
	5/26/2016	Y	N	Y	Y	148.46	149.50	1.04	
	5/26/2016	Y	N	Y	Y	148.42	149.54	1.12	
	5/27/2016	Y	N	Y	Y	148.31	149.50	1.19	
	5/31/2016	Y	N	N	Y	148.31	149.49	1.18	
	6/2/2016	Y	Y	Y	Y	149.12	150.11	0.99	17[3]
	6/3/2016	Y	N	Y	Y	148.66	148.70	0.04	
LSZ38	5/23/2016	Y	N	Y	Y	145.33	156.19	10.86	
	5/24/2016	Y	Y	Y	Y	148.50	149.58	1.08 [2]	15
	5/25/2016	Y	N	Y	Y	148.55	149.70	1.15	
	5/25/2016	Y	N	Y	Y	148.47	149.66	1.19	
	5/26/2016	Y	N	Y	Y	148.51	149.76	1.25	
	5/26/2016	Y	N	Y	Y	148.42	149.61	1.19	
	5/27/2016	Y	N	Y	Y	148.34	149.58	1.24	
	5/31/2016	Y	N	Y	Y	148.33	149.61	1.28	
	6/3/2016	Y	N	Y	Y	148.41	149.62	1.21	
LSZ39	5/23/2016	Y	N	Y	Y	135.78	191.02	55.24	
	5/26/2016	Y	N	Y	Y	135.91	191.20	55.29	
	6/1/2016	Y	Y	Y	Y	135.85	190.80	54.95	
	6/1/2016	Y	Y	Y	Y	150.16	152.45	2.29 [2]	80
	6/1/2016	Y	Y	Y	Y	148.49	150.82	2.33	

Well	Date	NAPL Present (Y/N)	Bailed (Y/N)	NAPL Remaining (Y/N)	Able to Use Interface Probe? (Y/N)	Depth to Product (ft. bgs)	Depth to Water (ft. bgs)	NAPL Thickness (ft.)(1)	LNAPL Removed (Gallons)
	6/1/2016	Y	N	Y	Y	148.71	151.09	2.38	
	6/3/2016	Y	N	Y	Y	148.71	151.11	2.40	

Notes:

(1) NAPL thickness measured before bailing/pumping, unless indicated with a note.
(2) NAPL thickness measured after bailing/pumping.
(3) NAPL volume suspect based on NAPL thickness. May have included water or NAPL stored in pump discharge pipe

VII. WASTE GENERATION

Waste generation and removal will be tracked in this section during subsequent weekly reports.

Waste removal activities during this week:

- SEE demolition activities generated two rolloff bins of construction debris and one rolloff bin of steel that were removed on 1 June 2016.

VIII. TWO WEEK LOOK AHEAD

A. SEE Demolition

- Electrical wire spooling and removal
- Eductor piping removal from non-priority wells
- Removal of thermal accelerators

B. EBR Construction

- Construction of electrical and control mounting rack
- Electrical wiring along manifold piping
- Cut down existing SEE wells in cell phone lot; re-finish flush-mounted.
- Move equalization tank and oil water separator to eductor pad
- Receive air stripper equipment

C. Well Drilling/Development

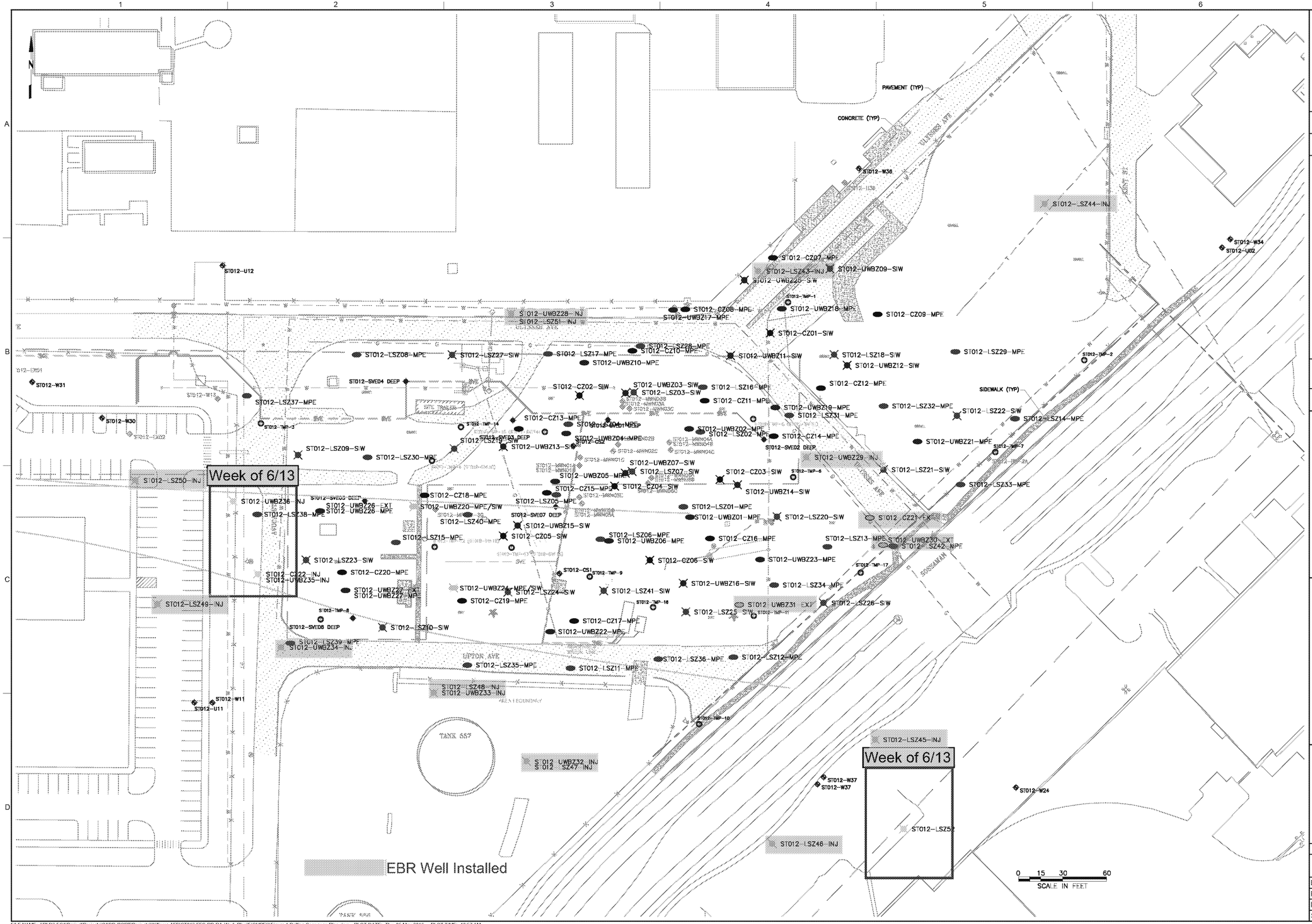
- Upcoming wells: LSZ45, LSZ52, UWBZ34, CZ22/UWBZ35
- Well development and eductor piping removal.
- See attached plan for upcoming drilled well locations.

D. Sampling Activities

- Pumping and bailing to remove NAPL from SEE wells
- Continued NAPL screening in SEE extraction and injection wells
- Baseline sampling of perimeter and interior SEE wells

IX. ATTACHMENTS

- Upcoming Well Drilling Site Plan figure
- TerraTherm Wellfield Temperature Presentation dated 1 June 2016



NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
DSGN							

REMEDIAL DESIGN/ REMEDIAL ACTION WORK PLAN

ST012-FORMER WILLIAMS AIR FORCE BASE

MESA, ARIZONA

DRAWING STATUS
CONSTRUCTION RFP DRAWINGS

amec foster wheeler
Environment & Infrastructure, Inc.
511 Congress Street, Suite 200
Portland, ME 04112
(207) 775 - 5401

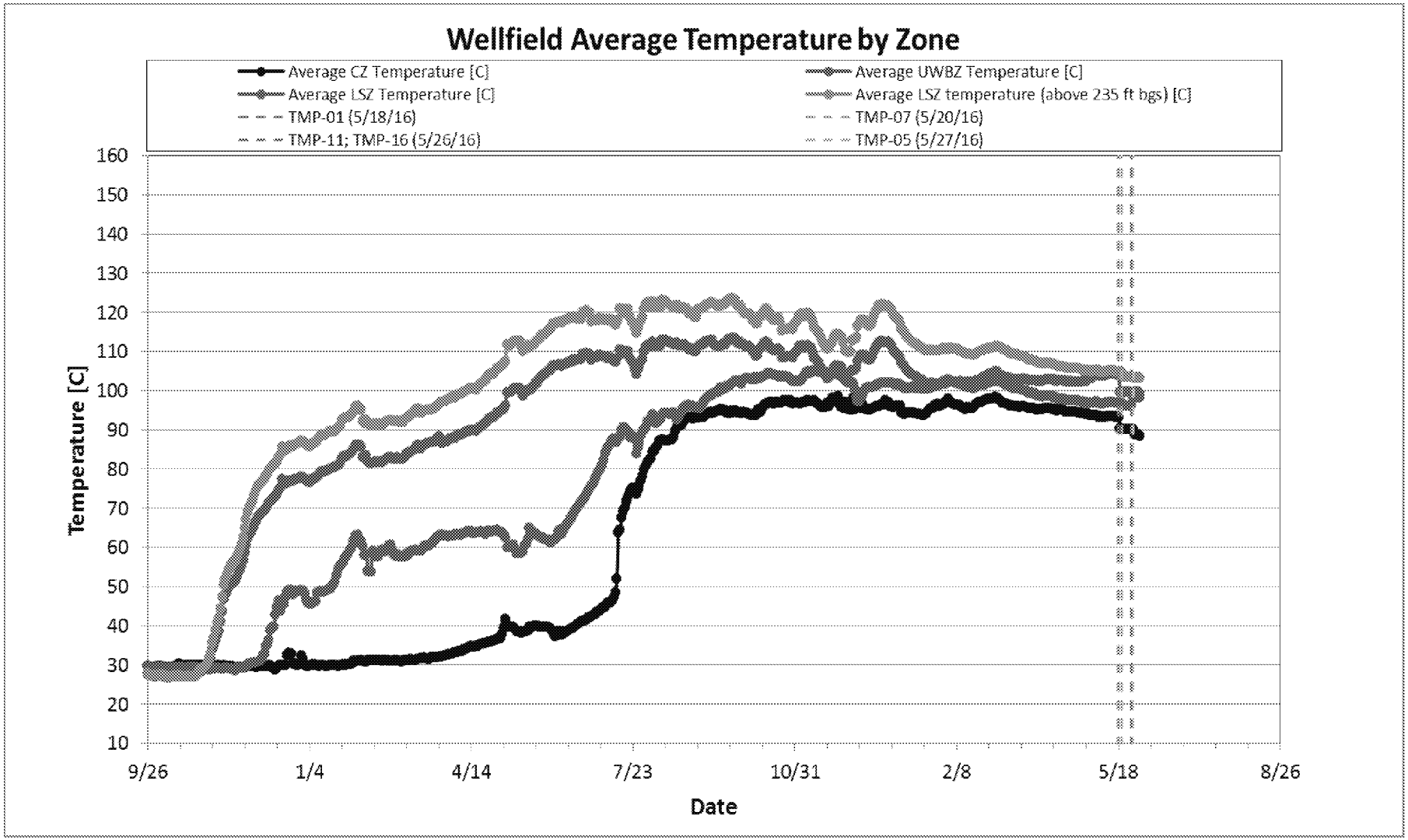
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	
PROJ	9101-11-0001
DWG	
SHEET	OF 15

THIS DRAWING IS THE PROPERTY OF AMEC FOSTER WHEELER, INCLUDING ALL PATENTED AND PATENTABLE FEATURES, AND/OR CONFIDENTIAL INFORMATION AND ITS USE IS CONDITIONED UPON THE USERS AGREEMENT NOT TO REPRODUCE THE DRAWING, IN WHOLE OR PART, NOR THE MATERIAL DESCRIBED THEREON, NOR THE USE OF THE DRAWING FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY AMEC FOSTER WHEELER.

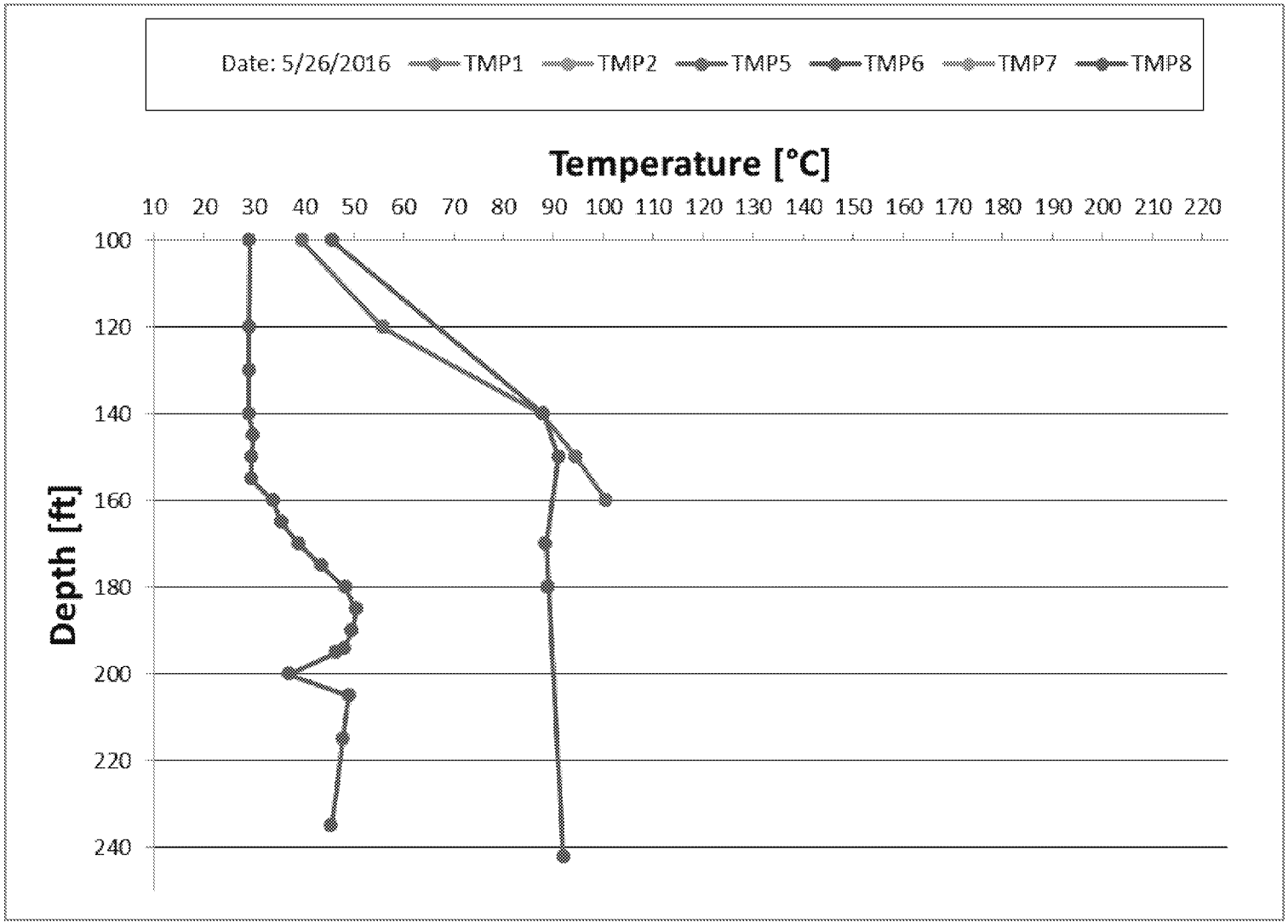
FILE NAME: \\PLD2-FS1\Project\Projects\CADD-PORT\Projects\Williams AFB\ST012 FFS-RD-RA-Work-Plan\FIGURES\Figure 1 Drilling Sequence Plan.dwg PLOT DATE: Thu, 05 May 2016 PLOT TIME: 10:57 AM

Average Temp by Zone



Note: Dashed lines indicate last day of automatic temperature data collection at select TMPs; once TMPs were offline they were removed from average zone temperature calculation

TMP Profiles



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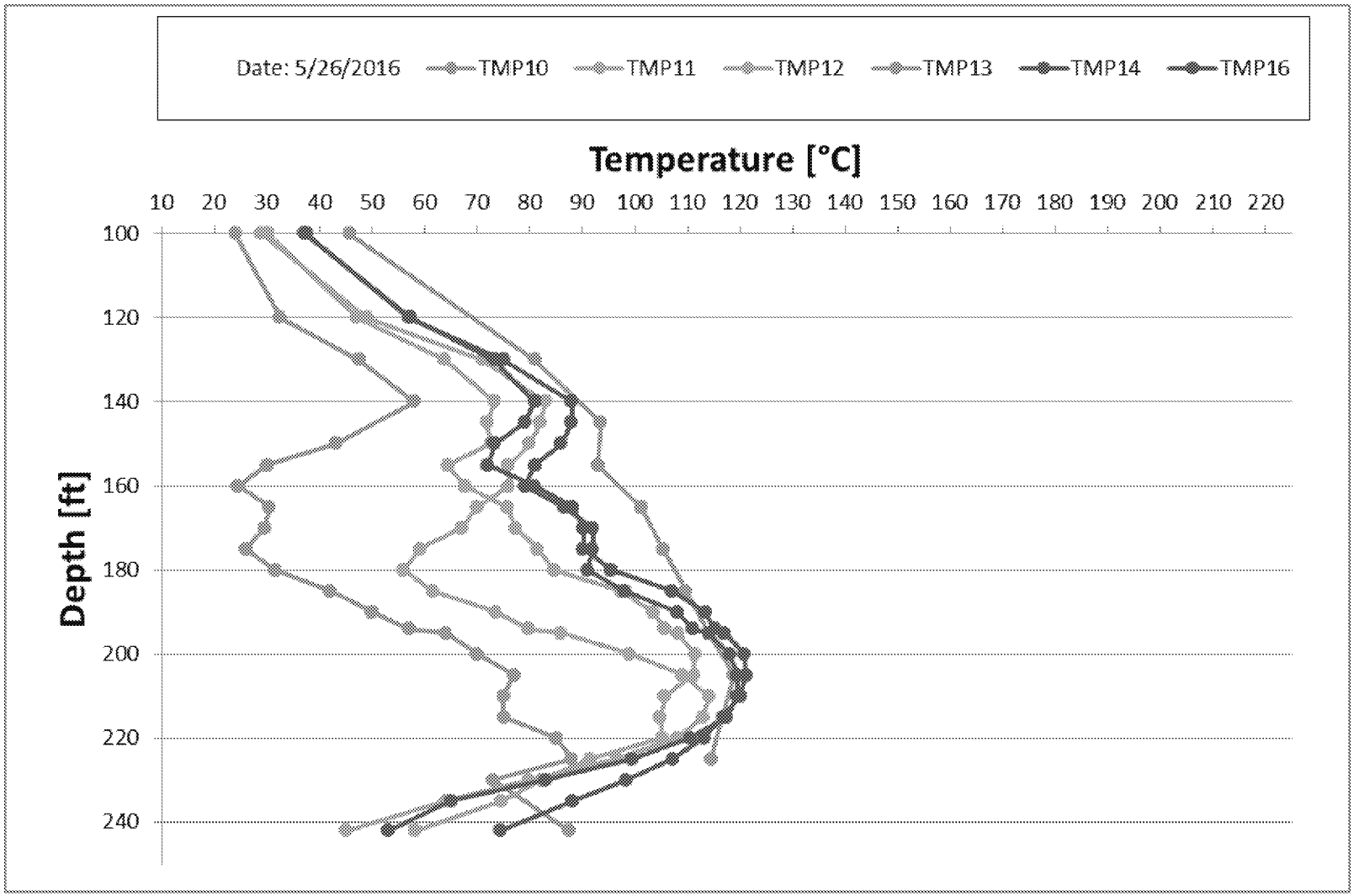

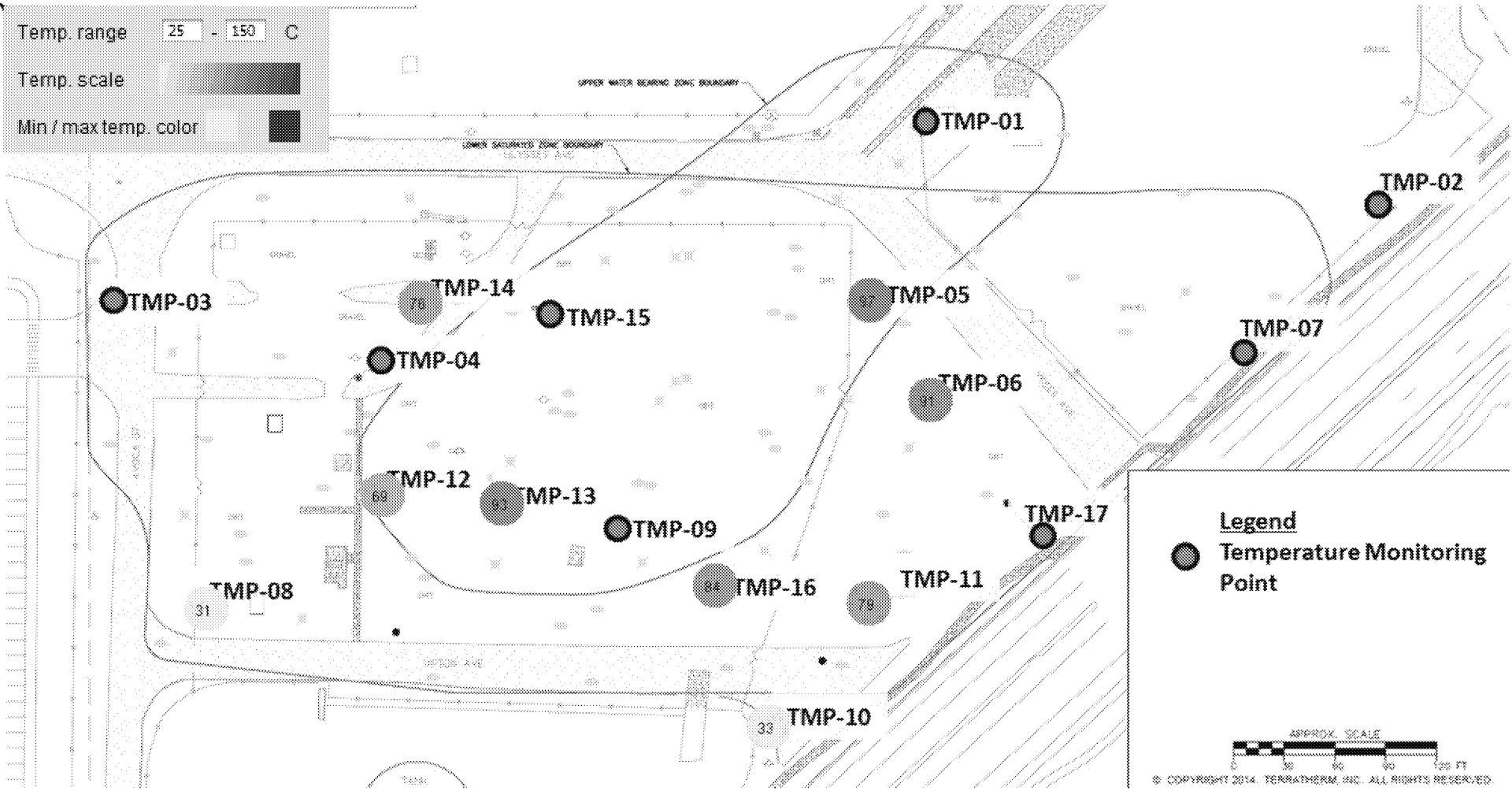

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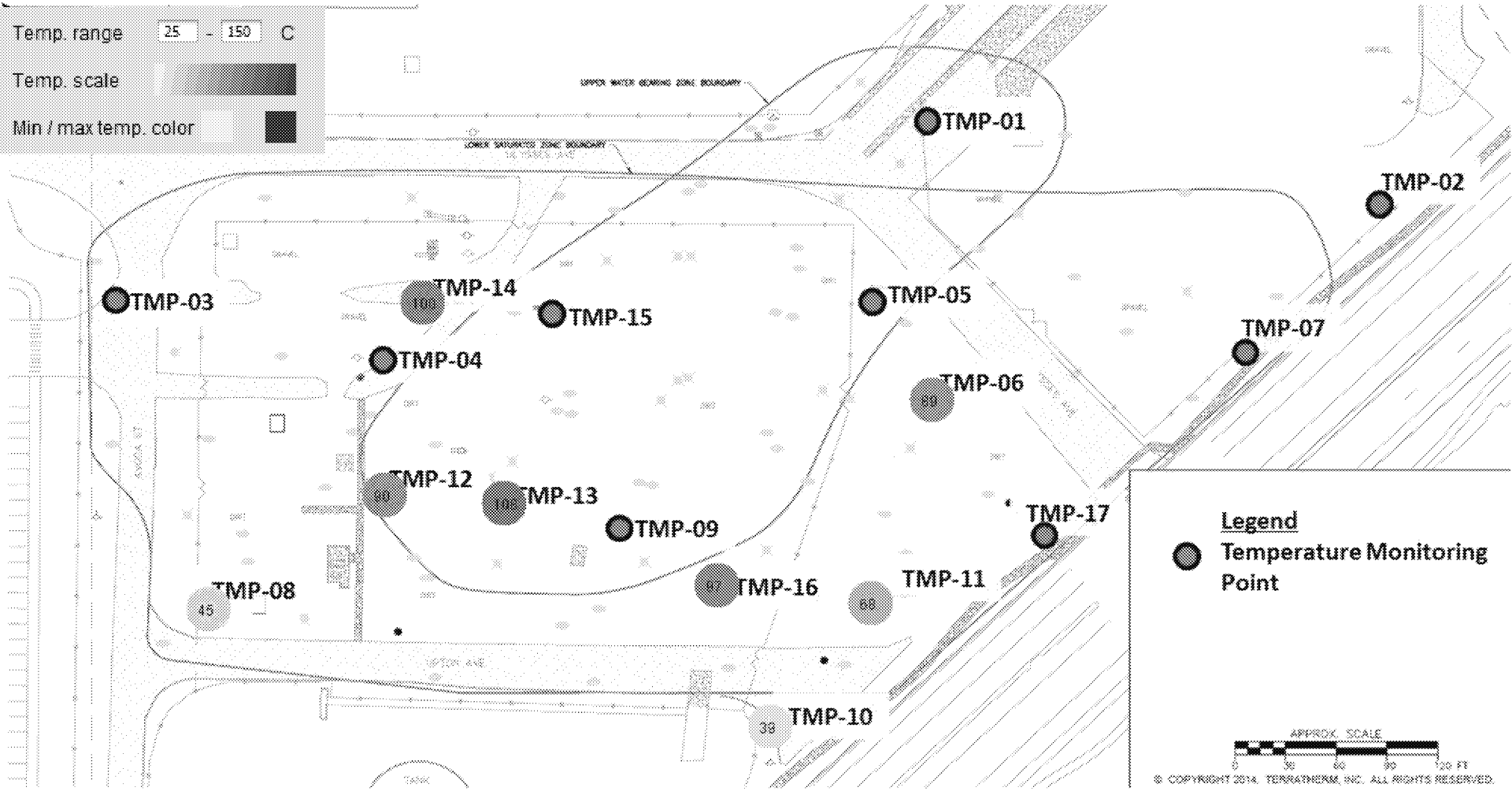
145-160 ft bgs



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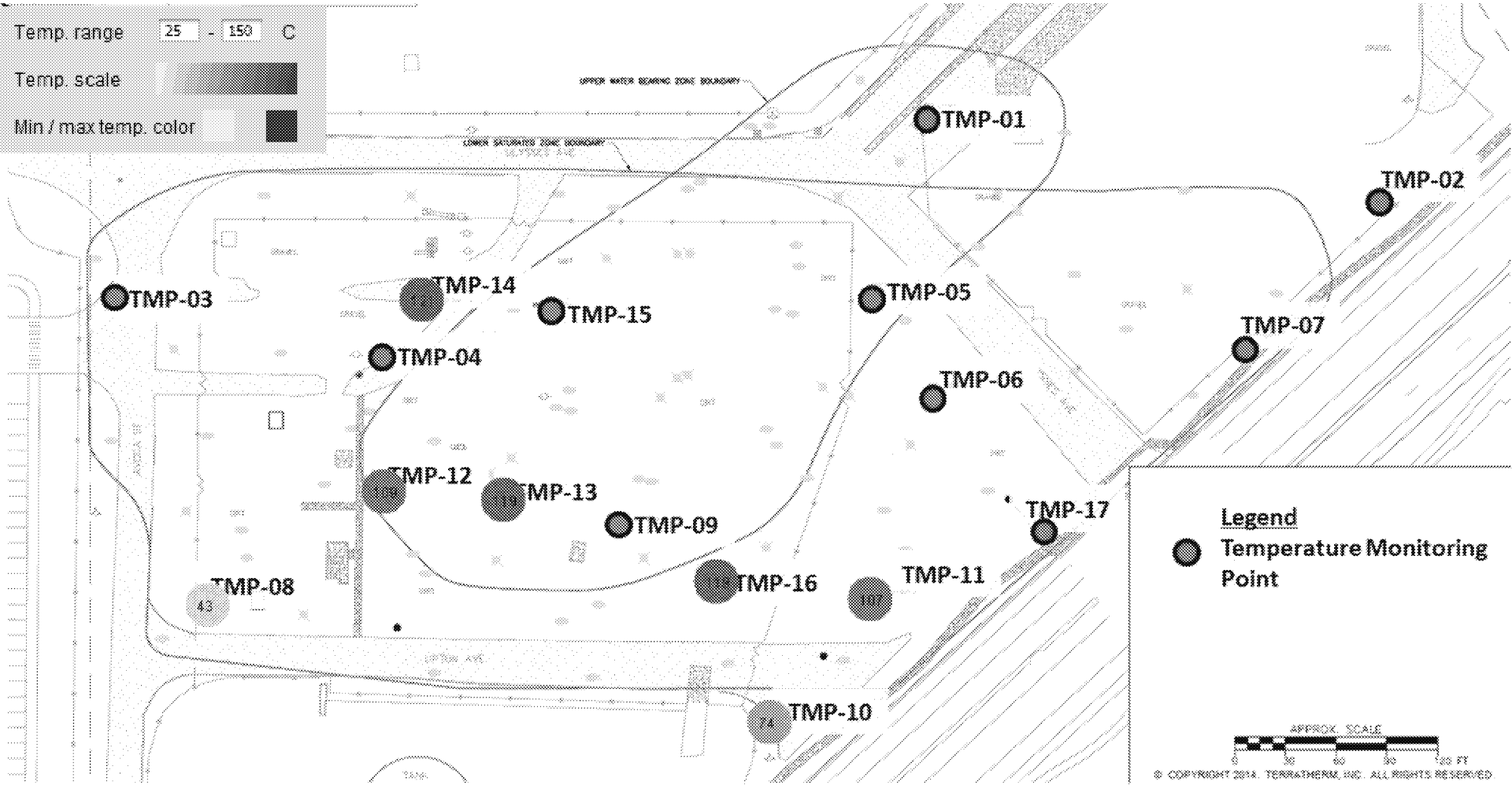
161-195 ft bgs



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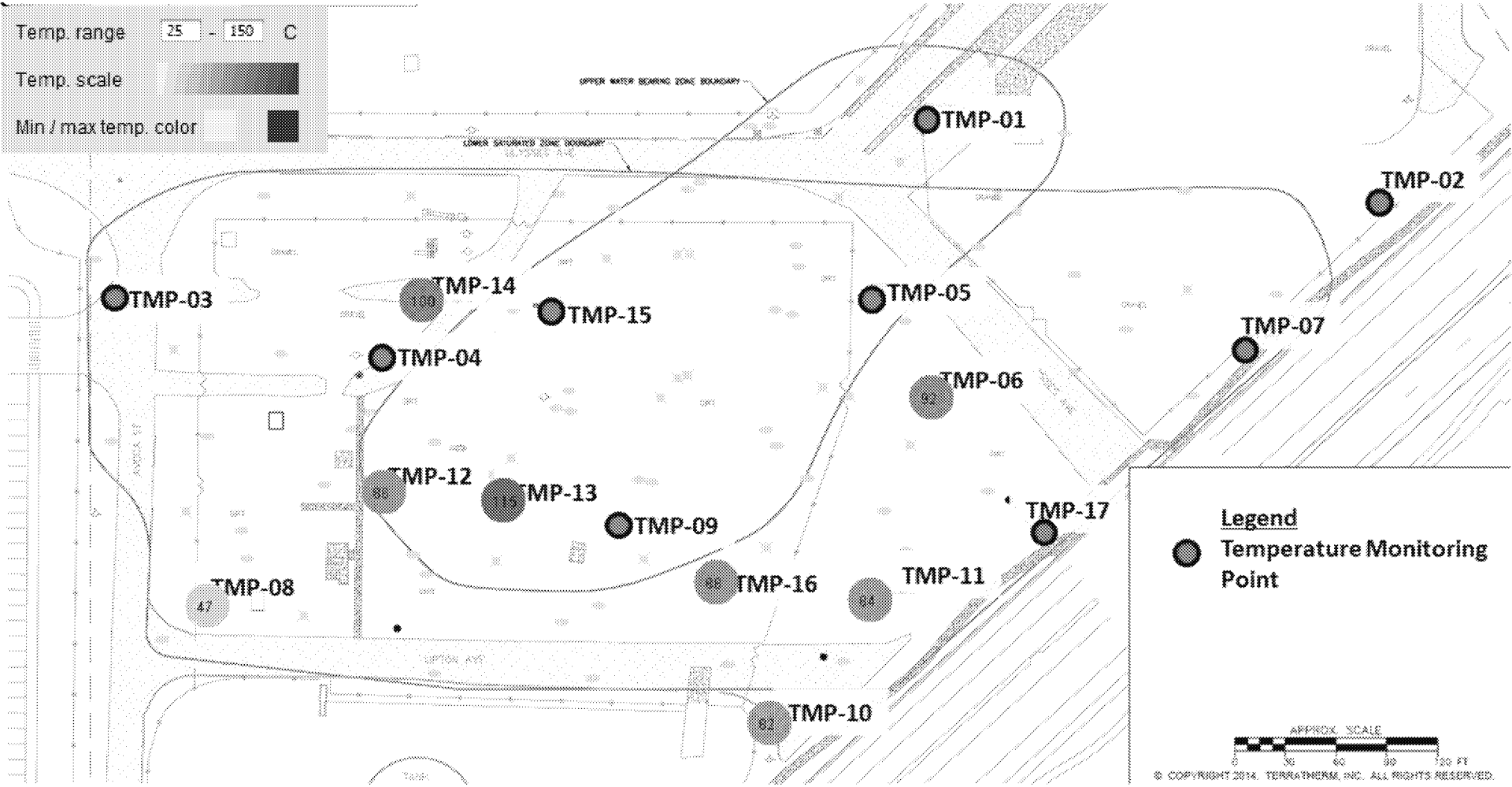
196-210 ft bgs



Date: 5/26/16

211-245 ft bgs