December 12, 2017

Mr. Joseph Martella II
Senior Sanitary Engineer
RIDEM Office of Waste Management
235 Promenade Street
Providence, RI 02908-5767

Subject: Well Inventory Results and Baseline Groundwater Sampling Plan
Former Gorham Facility, Parcel A
333 Adelaide Avenue, Providence, Rhode Island
Amec Foster Wheeler Project No. 3651170068

Dear Mr. Martella:

On behalf of Textron, Inc., Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), has prepared this Work Plan to evaluate the current condition of the chlorinated volatile organic compound (CVOC) plume at Parcel A (the "Site") of the former Gorham facility in Providence, RI (**Figure 1**). The objective of the sampling proposed in this work plan is to develop a snapshot of the current distribution and concentrations of CVOCs to support development of a long-term groundwater monitoring plan and Site closure.

Monitoring Well Inventory and Gauging

Amec Foster Wheeler recently completed an inventory of monitoring wells at and around the Parcel A Plume, the interpreted location of which is shown on **Figure 2**. During the inventory, accessible wells were gauged to determine depth to groundwater table and depth to bottom of the well (to help confirm well identity and condition). The results of the inventory and gauging are presented on **Table 1** which includes well ID, well diameter, depth to water table and bottom of well, and condition or status of well on November 2, 2017. The table also includes screened interval (from well construction records) and well installation date (if known). Wells assessed during the inventory are identified on **Figure 2**. The inventoried wells are further distinguished by the following:

- Wells accessible and gauged (Quantity: 42)
- Wells found but not accessible/gaugeable at time of inventory. Some of these wells may be rendered accessible with additional effort (removing/replacing damaged road boxes, etc.) (Quantity: 5)
- Wells searched for but not located (Quantity: 3).

Baseline Groundwater Sampling Plan

To evaluate current contaminant concentrations and distributions, Amec Foster Wheeler has developed a sampling plan using currently existing groundwater monitoring wells located both at the fringes and inside the interpreted plume. Where available and appropriate, co-located shallow and deep wells (a.k.a. well couplets) have been selected for sampling to provide information about vertical distribution of contaminants. The locations of the proposed monitoring wells are shown on **Figure 3**. **Table 1** identifies the wells

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proposed for sampling, including the "type" of well (deep or shallow) and rationale for well selection/sampling.

The proposed one round of groundwater sampling will be conducted while the on-site groundwater treatment system is operating.

A total of 36 samples will be collected, including 31 field samples, three duplicate samples and two MS/MSD samples. Samples will be collected using EPA low flow (preferred) or equivalent low-aquifer-stress method.

Properly preserved samples will be submitted to ESS Laboratories in Cranston, Rhode Island, and analyzed for VOCs by USEPA Method 8260. The laboratory will be directed to report six analytes of principal concern at the Site: trichloroethane (TCA), dichloroethane (DCA), tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC). Results will be provided by the laboratory as an electronic data delivery (EDD) package, along with all appropriate laboratory quality assurance information within 10 days of sample submittal.

Once available, the laboratory results will be reviewed for quality assurance/quality control and usability purposes. The results will be incorporated into and maintained in a Site analytical database.

During or immediately after the field effort, the spatial location (elevation and horizontal location) of all sampled wells will be determined by a surveyor licensed to practice in Rhode Island. The survey will utilize one or more of the existing benchmarks on Parcel C used during previous engineering projects at the Site, which will allow comparison/integration of the new spatial data with older data. The horizontal spatial data will be referenced to the RI State Plane Coordinate System.

The sampling and surveying results will be compiled, reviewed, and be presented as supporting information for development of a Long-term Groundwater Monitoring Plan (LTM).

We look forward to your review and approval of this workplan. In the absence of any comments from RIDEM, we intend to commence work described in this work plan on January 8, 2018.

If you have any questions regarding this matter, please feel free to call Herb Colby (978/392-5312) or Tim Regan (401/648-9240 x100)

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Herb Colby, PG
Sr. Project Manager

Tim Regan, PE
Client Manager

Attachments: Table 1 – Inventory Results and Proposed Baseline Sampling Wells
Figure 1 – Site Location Map
Figure 2 – Monitoring Well Locations
Figure 3 – Proposed Wells for Baseline Sampling

Table 1
Inventory Results and Proposed Baseline Sampling Wells
Former Gorham Facility
Providence, RI

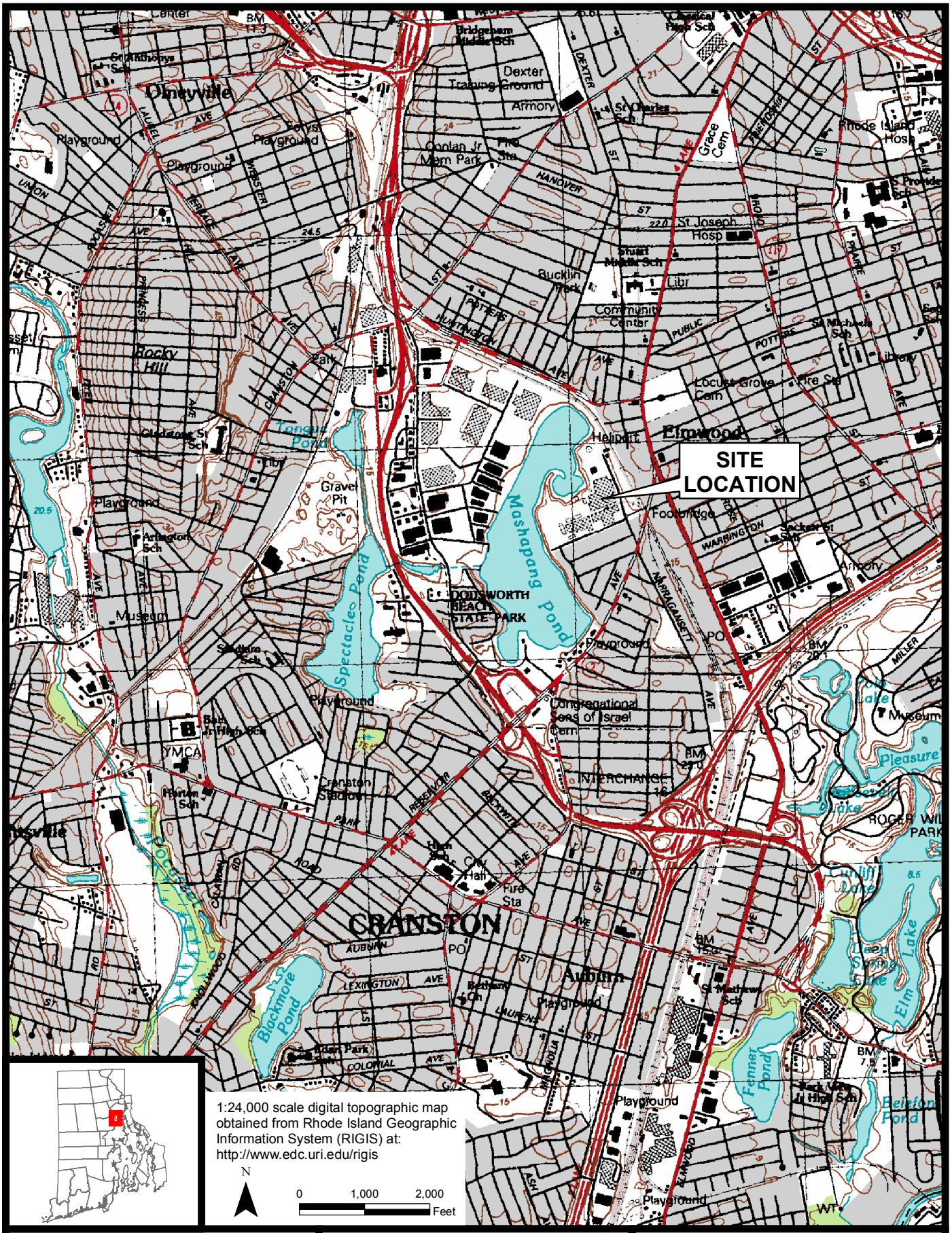
Well ID	Gauging Result (11/2/17		Well Dia (in)	Screen Depth (from MW Construction Diagrams)	Deep/Shallow	Date Installed	Condition of Well	Inventory Comment	Sampling Rationale
	DTW	DTB							
CW-1				45' - 55'	D	2004		Could not find	Eastern plume extent*
CW-2	25.45	54.55	2	45' - 55'	D		Acceptable	Found, gauged	Eastern plume extent
CW-6				25' - 35'				Could not find	NP
MW-101D	26.10	46.00	2	38' - 47'	D	1994	Acceptable	Found, gauged	NP
MW-109D	19.00	74.65	2	69' - 79'	D	1994	Acceptable	Found, gauged	NP
MW-112	27.48	34.60	2	23' - 33'	S	1995	stick up	Found, gauged	NP
MW-116S			(4)	20' - 30'	S	1996			S/SE plume margin, potential upgradient*
MW-116D			2	40' - 50'	D	2002			S/SE plume margin, potential upgradient*
MW-201D	25.60	47.36	2	40' - 50'	D	2002	plug no cover	Found, gauged	NP
MW-201S	25.51	29.98	2	20' - 30'	S	2002	Acceptable	Found, gauged	NP
MW-202D				40' - 50'	D	2002		Could not open or gauge	Southeast plume core*
MW-202S	24.83	37.98	1	30' - 40'	S	2002	Acceptable	Found, gauged	Southeast plume core
MW-204D	25.65	48.92	2	40' - 50'	D	2002	Acceptable	Found, gauged	NP
MW-204S	25.58	35.74	2	30' - 40'	S	2002	Acceptable	Found, gauged	NP
MW-206D	25.49	49.56	2	40' - 50'	D	2002	Acceptable	Found, gauged	SE central plume core
MW-206S	25.31	29.05	2	20' - 30'	S	2002	Acceptable	Found, gauged	SE central plume core
MW-207D				45' - 55'	D	2002		Could not open or gauge	NP
MW-207S	25.03	37.40	1	20' - 30'	S	2002	Acceptable	Found, gauged	NP
MW-209D	27.21	62.32	2	55' - 65'	D		Acceptable	Found, gauged	NP
MW-210	26.80	48.20	1		D		Acceptable	Found, gauged	NP
MW-211	25.80	28.38	2	35' - 45', with additional 2' sump (47')	S		Acceptable	Found, gauged	NP
MW-213	25.62	45.30	1	35' - 45'	D		Acceptable	Found, gauged	NP (well loc/ID considered suspect)
MW-216D	26.23	39.35	2	35' - 40'	D		Acceptable	Found, gauged	SW plume margin
MW-216S	26.22	29.60	2	20' - 30'\	S		Acceptable	Found, gauged	SW plume margin
MW-217D	25.39	46.71	2	39' - 49'	D		Acceptable	Found, gauged	W plume margin
MW-217S	25.42	26.30	2	20' - 30'	S		Acceptable	Found, gauged	W plume margin
MW-218D	26.49	46.72	2	42' - 52'	D		Acceptable	Found, gauged	S/SE plume margin
MW-218S	26.44	29.50	2	20' - 30'	S		Acceptable	Found, gauged	S/SE plume margin
MW-220S	26.02	31.80	2	22' - 32'	S		Acceptable	Found, gauged	NP
MW-221S		31.76	2	22' - 32'	S	2002	Product in well	Found, gauged	NP
MW-222S		29.77	1	23' - 33'	S		Well is dry	Found, gauged	NP
MW-223D	26.68	53.30	1	49' - 59'	D	2008	Acceptable	Found, gauged	NE plume margin, under commercial building. Evaluate potential for VI pathway
MW-223S	26.60	33.00	1	23' - 33'	S	2008	Acceptable	Found, gauged	NE plume margin, under commercial building. Evaluate potential for VI pathway

Table 1
Inventory Results and Proposed Baseline Sampling Wells
Former Gorham Facility
Providence, RI

Well ID	Gauging Result (11/2/17		Well Dia (in)	Screen Depth (from MW Construction Diagrams)	Deep/Shallow	Date Installed	Condition of Well	Inventory Comment	Sampling Rationale
MW-224S	27.13	32.49	1	23' - 34'	S		Acceptable	Found, gauged	Plume core, under commercial building. Evaluate potential for VI pathway
MW-225D	26.75	47.29	1	38' -48'	D	2008	Acceptable	Found, gauged	NE plume margin, under commercial building.
MW-225S	26.67	32.27	1	22' - 32'	S	2008	Acceptable	Found, gauged	NE plume margin, under commercial building. Evaluate potential for VI pathway
MW-226D	27.00	55.25	1	46' - 56'	D	2008	Acceptable	Found, gauged	Plume core, under commercial building
MW-226S	27.15	33.62	1	22.5' - 32.5'	S	2008	Acceptable	Found, gauged	Plume core, under commercial building. Evaluate potential for VI pathway. Confirm loc/ID in field.
MW-227D	25.05	58.49	2	50' - 60'	D	2008	cover damaged	Found, gauged	E central plume margin
MW-227S	24.75	29.60	2	20' - 30'	S	2008	Acceptable	Found, gauged	E central plume margin
MW-228D				45' -55'	D	2008		Could not open or gauge	Plume core*
MW-228S				24' -34'	S	2008		Could not open or gauge	Plume core*
MW-229	25.26	70.50	2	229S at 21'-31'; 229D at 50'-60'	D	*2008*	Acceptable	Found, gauged	NP
MW-231D	3.25	35.70	1	30' - 40'	D	2008	Acceptable	Found, gauged	North/downgradient plume margin
MW-231S	6.94	26.16	1	15' - 25'	S	2008	Acceptable	Found, gauged	North/downgradient plume margin
MW-232D			1	60' -70'	D	2009	Damaged	Could not gauge; riser compromised	North/downgradient plume margin*
MW-232S	7.90	48.35	1	30' -40'	S	2009	no plug	Found, gauged	North/downgradient plume margin. Confirm loc/ID in field
MW-234D	23.62	88.52	1	80-90'	D	2009	Acceptable	Found, gauged	Plume core
MW-234S	23.19	31.14	1	22' - 32'	S	2009	Acceptable	Found, gauged	Plume core
MW-308	26.01	46.98	1	30' - 40'	D		no cap or plug	Found, gauged	NP
MW-GZA3	16.88	22.00	2	17' - 22.5'	S		Acceptable	Found, gauged	NP

Notes: Bold wells proposed for baseline sampling
NP = Not proposed for baseline sampling
D = deep well
S = shallow well (typically water table well)
* = sampling subject to accessing well

Prepared by: HWC
Reviewed by: TR



Former Gorham Manufacturing Site
333 Adelaide Avenue
Providence, RI

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Site Location Map

Project 3651170068

Figure 1

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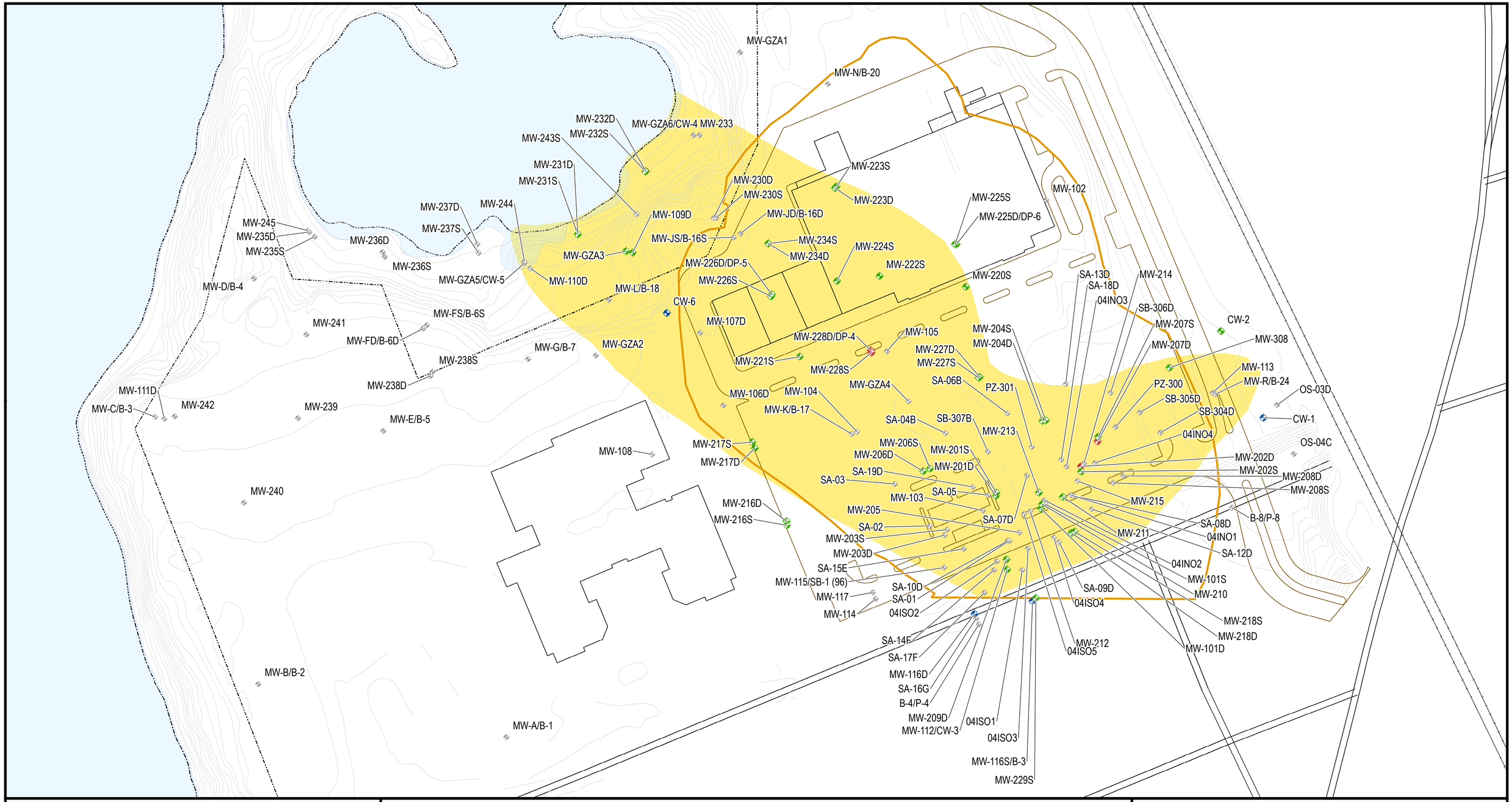

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0 60 120 Feet

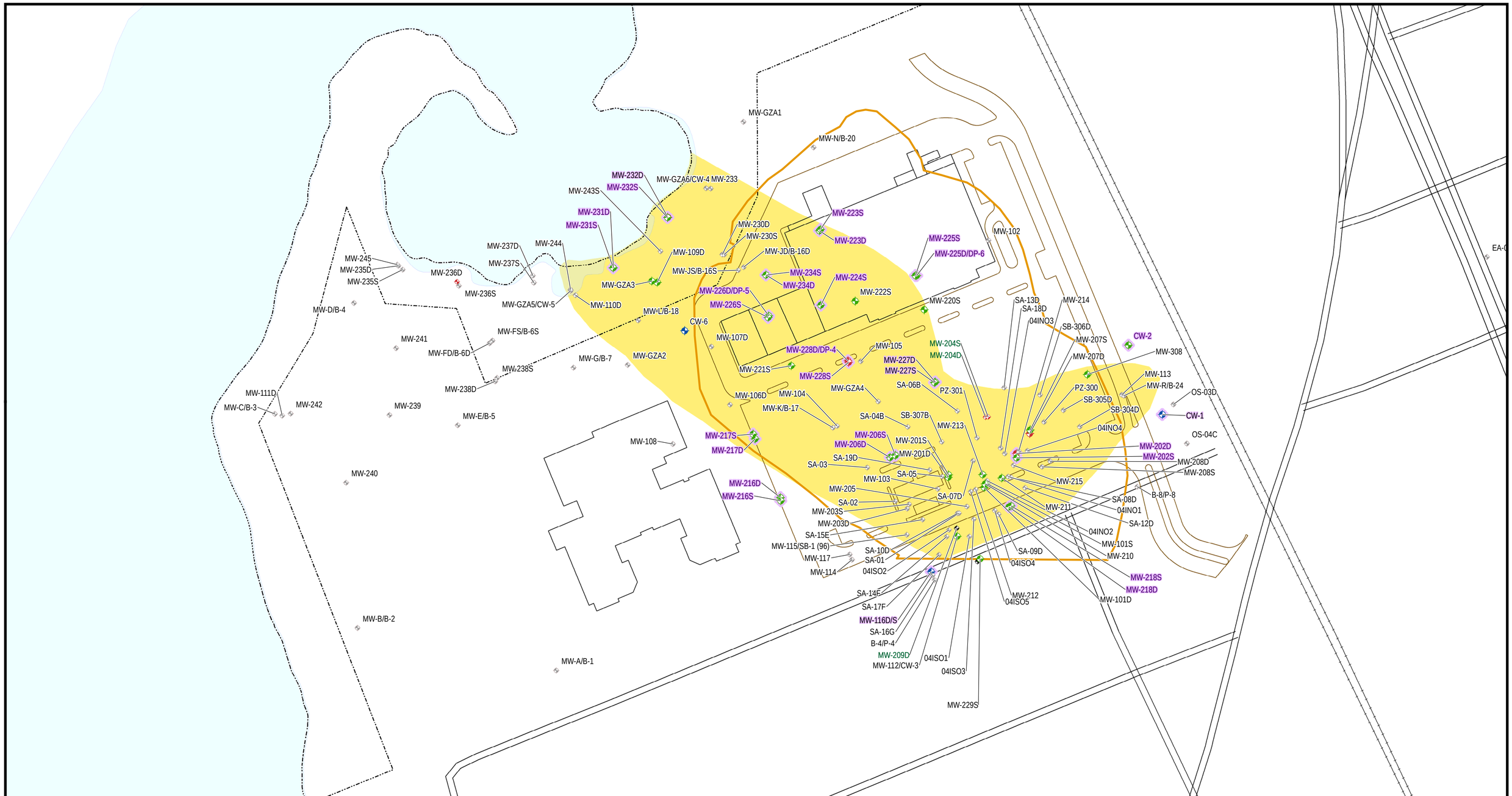
Legend

- Wells Found and Gauged 11/17
- Wells Found Unopenable 11/17
- Well Looked For, Not Found
- All Other Monitoring Wells
- Elevation Contour
- Railroad
- Pavement
- Park Parcel Boundary
- Collection Area
- CVOC Plume

Figure 2
Monitoring Well Locations

333 Adelaide Avenue
Providence, Rhode Island

H:\Textron-Gorham\Providence_RI\Task6\MXD\Fig2_MW_Locations.mxd November 29, 2017 DWN: emily.gardiner CHKD: AKN



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N

0 60 120
Feet

Legend

Status

- Wells Found and Gauged 11/17
- Wells Found Unopenable 11/17
- Well Looked For, Not Found
- All Other Monitoring Wells
- Wells Proposed For Baseline Sampling
- Railroad
- Pavement
- Park Parcel Boundary
- Collection Area
- CVOC Plume

Figure 3
Proposed Baseline Sampling Wells

333 Adelaide Avenue
Providence, Rhode Island

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