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SITE CHARACTERIZATION WORK PLAN

POTOMAC RIVER POWER GENERATING STATION

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SITE CHARACTERIZATION WORK PLAN
POTOMAC RIVER POWER GENERATING STATION

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1. INTRODUCTION

On behalf of HRP Potomac, LLC (HRP Potomac), Ramboll US Consulting, Inc. (Ramboll) has prepared this Site Characterization Work Plan (Work Plan) for the former Potomac River Generating Station (PRGS) located at 1400 N. Royal Street, Alexandria, Virginia (the "Site"; Figure 1). This Work Plan has been prepared for submittal to the Virginia Department of Environmental Quality (VDEQ) Voluntary Remediation Program (VRP) in accordance with the Site's entrance into the VDEQ VRP (site ID 00783).

1.1 Objective

The objective of the proposed site characterization activities is to evaluate the nature and extent of releases resulting from historical site activities and to collect the information necessary to inform corrective action decisions and complete a preliminary evaluation of human health risk. Certain areas of the site are not accessible due to the current condition of the Main Building and Laboratory and thus, investigation in those areas of the site will be performed as appropriate concurrent with, or subsequent to demolition of the structures.

1.2 Organization

This work plan includes a brief overview of the site setting and background (Section 2); a summary of identified concerns based on prior investigations (Section 3); a proposed sampling and analysis plan (Section 4); and a quality assurance project plan (QAPP) (Section 5). Reporting and communications are discussed in Section 6 and a schedule for the proposed work is presented in Section 7. References are included as Section 8.

2. SITE SETTING AND BACKGROUND

2.1 Site Setting and Layout

The Site consists of 18.8 acres located at 1400 North Royal Street in Alexandria, Virginia at the intersection of Bashford Lane and North Royal Street. The Site is bounded to the south by an inactive railroad spur followed by residential and commercial development, to the west by a Potomac Electric Power Company (Pepco) switchyard and parking lot followed by East Abingdon Drive and the George Washington Memorial Parkway, to the north by Slaters Lane and a condominium building, and to the east by the National Park Service's Mount Vernon Trail followed by the Potomac River.

The site is currently developed with structures associated with the former Potomac River Power Generating Station which include a Main Power Plant Building, Administration/Laboratory Building, Accelerator Building, Chlorine Storage Building, Open Bay Area, Fly Ash Silos, Clarifier/Clarifier Building, Breaker House, Gate House, Coal Car Dumper, Bulldozer Shed, and multiple ASTs; the Main Power Plant and Administration/Laboratory Buildings are currently unsafe for entry (Figure 2).

2.2 Regional Geology

The site is located within the Atlantic Coastal Plain Physiographic Province, which is characterized by sequences of marine and terrestrial sedimentary deposits which thin to the east. According to local geologic mapping, the Site is underlain by Quaternary terrace (Old Town terrace) and floodplain (lowland) deposits of the Potomac River (Fleming 2015a). The terrace deposits beneath Old Town Alexandria and the Del Ray area approach a thickness of 85 to 125 feet (ft). The terrace deposits are described as a broadly fining upward sequence that is gravelly at its base and grades up through sand to finer-grained material at higher elevations. Regionally, above an elevation of about 30 to 35 ft above mean sea level (amsl), the terrace is composed primarily of silt and clay, and, below those elevations, the soils have been described as muddy sand. Below the Del Ray area is the Arell Clay, which is a regional, possibly discontinuous, lacustrine clay (Fleming 2015a, 2015b). Based on the 7.5-minute USGS topographic map, the nearest surface water body is the Potomac River. The elevation of the Potomac River is tidally influenced at the Subject Property's location. Tidal predictions by the National Oceanic and Atmospheric Administration for the Potomac River show a tidal fluctuation of approximately 3.44 feet for Alexandria, Virginia in June 2019.

2.3 Site-Specific Geology and Hydrogeology

The elevation of the Site ranges from approximately 12 to 33 feet above mean sea level (ft amsl) and slopes downhill to the east. Site-specific subsurface data is limited to the investigation area associated with VDEQ Petroleum Program Pollution Complaint (PC) #2013-3154. This PC# is related to a historical release from underground storage tanks (USTs) at the Property. Previous Site investigations in the vicinity of the USTs indicate that the upper 20 ft of soil is a clayey soil matrix containing rubble, including broken brick, river gravel, and concrete fragments. Below this 20-ft depth, there is a transition to native fluvial soil intervals (Groundwater & Environmental Services, Inc. [GES] and Geosyntec 2014a, 2014b). The native soils are comprised of gravel, sandy clays to clayey sands, and sand zones and are consistent with Old Town Terrace deposit mapped for the Site. Historical boring logs indicate the presence of a fine-grained lithologic feature beginning at approximately 25 ft below ground surface (bgs) (or 7 ft amsl) with a thickness ranging from 2 to 6 ft (GES and Geosyntec 2014a). This feature, typically described as lean clay, separates the perched shallow groundwater at the Site from the deeper regional aquifer. The clay layer appears to be continuous across the investigation area associated with PC#2013-3154, except in areas to the north of the screen/pump

house. A saturated zone of sand, silty sand, and sand and gravel zones has been encountered beneath the clay layer (GES and Geosyntec 2014a).

Site-specific hydrogeologic data is limited to the investigation area associated with PC#2013- 3154. As described above, a clay layer is present in the vicinity of the USTs. This clay layer acts as an aquitard dividing the groundwater into two zones: the perched water zone and the deeper regional aquifer. The groundwater elevations in the perched aquifer in the vicinity of the USTs are higher than the groundwater elevations in the deeper regional aquifer indicating a downward vertical gradient. Groundwater flow in the perched aquifer is generally to the east. As the perched water flows east toward the Potomac River, the clay layer that forms the aquitard becomes thinner and eventually pinches out altogether. As a result, the perched groundwater migrates downward and drains into the deeper regional aquifer prior to discharging to the Potomac River. The groundwater elevations in the deeper regional aquifer in the vicinity of the USTs indicate that flow in this area is controlled by the sheet pile wall along the Potomac River. The sheet pile wall acts as a barrier to flow, and groundwater flows either north or south around the wall to discharge to the river. Groundwater appears to mound behind the northern section of the wall, which might lead to stagnation points in the flow in this area.

2.4 Site Background

The Site was developed as a power-generating facility in the 1940s. Prior to the generation station, the Site was mostly vacant but was occupied circa the 1920s to 1940s at the northern end by the Potomac River Clay Work and at the southern end by American Chlorophyll Company and Green Colors Manufacturing. From the 1940s to 2000, the generating station was operated by the Potomac Electric Power Company (Pepco).[1] In 2000, the generating station was acquired (with ground lease) by an entity, which through mergers and other transactions, became GenOn Holdings, LLC (GenOn), while Pepco maintained ownership of the land. The Site ceased operations in October 2012. HRP acquired the PRGS Site and its generating facilities from Pepco and GenOn in the fall of 2020 and plans to redevelop the property as mixed-used development.

The site is currently improved with a multi-story industrial power plant building constructed with a basement (Main Plant Building); a covered utility corridor historically referred to as the “Precipitator Area”); and five coal-fired steam boilers and turbine generators (Units 1 to 5). Supporting features include the air emissions equipment, former (unlined) coal pile area, a clay-lined sediment basin, rail yard, water treatment facilities, one bottom ash and two fly ash silos, administration offices and analytical laboratory, and storage facilities and ancillary buildings, which include maintenance areas.

2.5 Prior Remedial Actions and Regulatory Status

The facility historically used No. 2 fuel oil to preheat its generating unit boilers with coal as its primary fuel to generate electricity. The No. 2 fuel oil was stored in two adjoining 25,000-gallon underground storage tanks (USTs) centrally located within the power plant complex. As part of the October 2012 shutdown, the facility assessed these two USTs before their closure in-place. A release of petroleum hydrocarbons was identified during a Site characterization program triggered by the UST closure, and VDEQ opened PC # 2013-3154. To address the detection of petroleum products in soil and groundwater near the USTs, GenOn conducted investigations and remediation, in coordination with the VDEQ, the National Park Service, and the DC DOEE. At least 56 wells (26 shallow and 30 deep) have been installed in the area of the petroleum release (Figure 3). A corrective action plan (CAP) was

[1] Initially under an entity called Braddock Light and Power Company, Inc., which was merged into Pepco.

approved by VDEQ in March 2015 and subsequently implemented at the site. Corrective action activities included the following:

- Implementation of total phase extraction (TPE) to remove LNAPL in the shallow groundwater zone and from overlying soils in and near the smear zone.
- Installation and operation of a pump and treat (P&T) system to remove LNAPL and remediate the dissolved phase plume in deep groundwater in the area of the source zone.
- Installation and operation of a biosparging system to address the dissolved phase plume downgradient of the source area.
- Sealing of holes at six seeps observed at the bulkhead.

On September 29, 2019, the VDEQ approved the discontinuation of active remediation, and the Site transitioned to post-remediation monitoring. The most recent groundwater monitoring event was completed in the first quarter of 2021. The results from recent groundwater monitoring events indicate that groundwater conditions are stable and that the concentrations of constituents of concern (COCs) in groundwater at the point of discharge to the Potomac River are less than the remediation goals identified in the March 2015 VDEQ CAP approval and the DOEE Surface Water Quality Standards. However, the concentrations of COCs exceed the remediation goals and DOEE Standards in some individual wells. Based on discussions between HRP and the VDEQ Petroleum Program on May 5, 2021, HRP plans to submit a CAP addendum during the late 3rd quarter of 2021. The CAP addendum will clarify the remediation end point(s) for this release in light of planned future site redevelopment.

3. IDENTIFIED CONCERNS

The following known and potential areas of interest (AOI) have been identified at the Site:

- ***AOI-1 - Known Petroleum Release (PC #2013-3154) and Petroleum Storage Areas.*** Prior investigations identified an area of known petroleum impacts associated with two (closed in place) 25,000-gallon fuel oil USTs located beneath the Open Bay Area in the east-central portion of the property. As described above, this release is being addressed under the Storage Tank Program; therefore, no additional sampling to evaluate impacts associated with this release is proposed as part of the site characterization activities. HRP will provide copies of future Petroleum Program submittals to the VDEQ VRP.

  The site also operated a number of additional (smaller) petroleum tanks including a 3,500-gallon diesel UST; a 2,000-gallon kerosene UST; a 4,000-gallon kerosene UST; three 275-gallon lube oil ASTs, and a 4,000-gallon diesel fuel AST. These former USTs were closed in accordance with VDEQ requirements. Releases associated with certain of these tanks were identified and investigated under the direction of VDEQ and received "no further action" determinations. Based on available information, residually impacted soils may be present near these former USTs, but site development plans are likely to include excavation and off-site disposal of significant volumes of soil from the site and as such, detailed characterization of residual petroleum impacts associated with these tanks is beyond the level of detail needed for the planned site characterization. Sampling of shallow soils in the vicinity of former petroleum ASTs is proposed if visual inspection indicates potential impact.
- ***AOI-2 - Chemical Storage Areas.*** Chemical and hazardous substance storage areas include a former Chemical Storage Area; former RCRA Storage Area; former Drum Storage Area; Chlorine Storage Building, Chlorine House, a neutralization tank, an Alum House, a 10,000-gallon aluminum sulfate AST, a former 3,500-gallon antifreeze AST; a former hydrazine AST and two former 330-gallon ammonia ASTs.
- ***AOI-3 - Power Plant and Laboratory Buildings.*** The Power Plant building is equipped with floor drains and sumps. Visual evidence of spills from petroleum ASTs and possibly other types of chemicals was observed by others in 2020. At present, the Power Plant Building is unsafe for entry; as such, potential impacts associated with the Power Plant Building and Laboratory Building will be investigated at a later date concurrent with, or subsequent to, building demolition. As such, Ramboll anticipates submission of a Work Plan Addendum for sampling beneath the Power Plant and Laboratory Buildings. However, groundwater sampling downgradient of the Power Plant and Laboratory Buildings will provide some indication of potential impacts resulting from historical operations in these buildings.
- ***AOI-3b - Drain Lines and Outfalls.*** Numerous subsurface conveyances external to the Power Plant Building are present at the site. Ten outfalls discharging to the Potomac River were previously identified at the Site; the integrity of many of the subsurface conveyances is not known. Outfalls 003, 004, 009 and 010 have been plugged. The location of Outfall 002 is not presently known and the status of Outfalls 001, 005, 007, and 008 are not known. The planned investigation will include limited investigation for some of the drain lines and associated Outfalls, but access to these lines is currently limited due to safety concerns with the aging Power Plant Building. As such, additional investigation of these structures will be proposed, as appropriate, following or concurrent with, demolition of the Power Plant Building.

- ***AOI-4 - Former Coal and Ash Handling and Storage Areas.*** Former coal and ash handling areas include the former unlined coal storage yard, the breaker house, the (clay-lined) sedimentation pond, the secondary ash pond, the rejects pile, and fly ash and bottom ash storage silos.
- ***AOI-5 Former Transformer Areas.*** Former transformer areas include the generator/transformer areas north of the Power Plant Building, a former transformer area located between the switch yard and the Power Plant Building, which includes an oil reclaiming pit designated as Oil Reclaiming Pit #1, a sump pit located south of the transformer area, and a separate transformer located adjacent to the bulldozer shed.
- ***AOI-6 - Rail Yard.*** A rail yard has been present at the southwestern edge of the Site since the late 1800s. Ancillary structures serving the rail yard include the former coal car dumper and a warming shed which is serviced by a former UST.

4. SAMPLING AND ANALYSIS PLAN

4.1 Field Preparation Activities

Ramboll will conduct a site reconnaissance visit with the Client prior to the commencement of field investigation activities. A visual inspection of the physical condition of the site will be performed to document indications of subsurface utilities and to evaluate access or other logistical constraints. Ramboll will also subcontract with vendors to provide subsurface utility locating or other geophysical services, a driller, and analytical laboratory. Ramboll will also prepare a site-specific health and safety plan (HASP) for use by Ramboll personnel during the execution of field activities at the site. The HASP will be developed to be protective of Ramboll workers as well as the surrounding community and will be updated as the project progresses.

4.2 Pre-Investigation Site Reconnaissance and Subsurface Utility Clearance

Prior to conducting invasive work, Ramboll will review available utility drawings and request a subsurface public utility mark-out from the Virginia 811 Call-Before-You-Dig service. Ramboll will also retain the services of a private subsurface utility locator to check individual boring locations for potential subsurface conflicts, confirm subsurface utility locations, and verify the locations of USTs. Proposed sample locations will be adjusted to avoid marked utilities or other obstructions. At a minimum, the private subsurface locator will be equipped with a magnetometer and ground-penetrating radar (GPR). Ramboll will also be prepared with a low-impact air knife and vacuum excavator to expose suspect pipes where proximal soil borings may be placed. As necessary, Ramboll may also utilize a remote downhole camera to assist with tracing subsurface piping.

4.3 Soil Sampling and Analysis Procedures

Ramboll proposes to collect surface and subsurface soil samples at the site for laboratory analysis to evaluate surface and subsurface conditions. A summary of proposed soil sampling activities is provided in Table 1 and proposed (approximate) soil boring locations are presented on Figure 4. More specifically, the proposed scope of work includes:

- Installation of 28 soil borings to allow for collection and laboratory analysis of 28 surface soil samples (0 to 1 foot below ground surface [ft bgs]) and up to 56 subsurface soil samples.
- Collection and analysis of up to five additional surface soil samples from AOI-1; these samples will be collected only if field screening indicates potential impact.

Soil borings will be advanced using a combination of direct push and rotary auger drilling and will be advanced to the first encountered of 1) the water table; 2) refusal; or 3) a depth of 35 ft bgs. At each boring location, continuous soil cores will be collected and screened in two-foot intervals for the presence of volatile organic vapors using a photoionization detector (PID), observed for visual or olfactory indication of impact, and described in general accordance with the Unified Soil Classification System (USCS). Soil samples will be collected at each boring location as described in Table 1, resulting in the collection of one surface soil sample and up to two subsurface soil samples from each boring. Where field indications of impact are observed, one soil sample will be collected from the interval exhibiting the greatest indication of impact and a second soil sample will be collected from a deeper apparent clean soil interval or from the soil interval just above the water table. In the absence of apparent impacts, soil samples will be collected from pre-determined depth intervals based on the likely depth of potential historical releases (i.e., closer to the surface for features of concern such as

drum storage areas or at depth for evaluation of potential releases from underground storage tanks, sumps, etc.).

For the purposes of preliminary site investigation, analytes of potential concern for site soils will include some or all of the following parameters, based on the potential concern being evaluated:

- Volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) method 8260[2],
- Semi-volatile organic compounds (SVOCs) by USEPA method 8270
- Polychlorinated biphenyls (PCBs) by USEPA method 8082
- pH
- Target analyte list metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, silver, sodium, thallium, vanadium, and zinc, by USEPA method 6010 or 6020 /7470 for mercury)
- Cyanide by SM4500
- Total petroleum hydrocarbons – diesel-range organics (TPH-DRO), – gasoline range organics (GRO), and– oil range organics (ORO) by USEPA method 8015C.

Soil samples will be collected into laboratory provided containers, labeled, and packaged on ice. Samples will be shipped under chain-of-custody procedures to a qualified (i.e., Virginia Environmental Laboratory Accreditation Program [VELAP] certified) analytical laboratory for analysis.

Following collection of soil samples, select borings will be converted into permanent groundwater monitoring wells; borings that are not converted into monitoring wells will be abandoned by filling the borehole with drill cuttings and patching the surface with appropriate material to match the surrounding area.[3]

4.4 Well Installation

In addition to soil sample collection, Ramboll proposes to collect groundwater samples at the site for laboratory analysis to further evaluate subsurface conditions. Select soil borings (see Table 1) will be converted into 2-inch diameter monitoring wells to support the collection and analysis of groundwater samples and documentation of groundwater flow direction. Proposed (approximate) well locations are depicted on Figure 4. Each monitoring well will generally be constructed using one of the following methods:

- Direct Push Pre-Packed Wells

  Wells may be installed as direct push 2-inch diameter wells in locations inaccessible to larger drilling equipment. Direct push wells will be installed using 10 to 15 feet of pre-packed 2-inch

[2] Soil samples will be collected for analysis of VOCs and/or TPH-GRO only if field screening indicates potential impact; if samples are collected, they will be collected using TerraCores® in general accordance with USEPA method 5035.

[3] Soil cuttings that exhibit indications of free product or other significant impact will be containerized for appropriate off-site disposal following characterization. In such case, boreholes will be backfilled with a sodium bentonite slurry.

diameter well screen, a two-foot section of bentonite-wrapped riser, and sufficient unwrapped riser to reach the ground surface.

- Traditional Wells

  Soil borings will be over-drilled using 5.25-inch diameter hollow stem augers to a depth 5 to 10 feet below the water table. Monitoring wells will be constructed using 10 to 15 feet of 0.010-inch factory-slotted schedule 40 polyvinyl chloride (PVC) screen set at the base of the borehole with sufficient PVC riser to reach the surface. The annulus of the borehole will be filled with #2 Morrie-type clean silica sand as the augers are removed, to a depth at least 2 feet above the top of the screen. A 2-foot layer of hydrated bentonite chips will be placed above the sand and the remaining annulus will be filled with a 2-percent bentonite/Portland cement grout mixture.

Each monitoring well will be completed with a traffic-rated, flush-mount manhole cover with a bolting lid set into a 2-foot by 2-foot concrete well pad or a stickup well cover set into a 2-foot by 2-foot concrete well pad. An expandable locking plug will be placed at the top each well.

4.5 Well Development

At least 24 hours after groundwater monitoring well installation, each well will be developed by surging and purging to reduce turbidity below 50 nephelometric turbidity units (NTU) and establish connection between the well and the surrounding formation in accordance with USEPA guidance.

4.6 Groundwater Sampling and Analysis Procedures

Following well installation and development, a groundwater sample will be collected from each newly installed groundwater monitoring well and from three existing monitoring wells (MW-30S; MW-72S; MW-100S) using low-flow sampling techniques.[4] Water quality parameters, including pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature, specific conductance and turbidity will be monitored while purging at flow rates less than 500 milliliters per minute (mL/min) from the approximate mid-point of the screened interval in each well. Concurrent with low-flow purging, the water level in the well will be monitored. Stabilization over three consecutive 5-minute readings of the following parameters will be utilized to determine groundwater stability for sampling:

- pH ±0.1 unit
- Specific Conductance ±3%
- Temperature ±3%
- DO ±0.3 milligrams per liter (mg/L) or ±10%
- Turbidity <10 Nephelometric Turbidity Units (NTUs) or ±10%
- ORP ±10 millivolts
- Water Level Drawdown <0.3 foot from static or ±10% after flow adjustments

[4] If any of the existing monitoring wells proposed for sampling is dry or bears insufficient water for sampling, Ramboll may substitute another nearby monitoring well.

Groundwater samples will be analyzed for some or all of the following parameters as outlined in Table 1:

- VOCs by USEPA method 8260
- SVOCs by USEPA method 8270
- PCBs by USEPA method 8082
- Sulfate by SM 4500
- Ammonia (as N) by SM 4500
- Total and dissolved TAL metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, silver, sodium, thallium, vanadium, and zinc, by USEPA method 6010 or 6020 / 7470 for mercury) plus hardness
- Glycols by USEPA 8015M
- Hydrazines by USEPA 3815 or another approved method
- TPH-GRO, -DRO and -ORO by USEPA method 8015C.

Samples will be collected into laboratory-provided containers, labeled, packaged on ice, and shipped under chain-of-custody procedures to a qualified analytical laboratory for analysis.

4.7 Well Gauging and Slug Testing

Prior to and following sample collection, Ramboll will use an electronic oil-water interface probe to gauge the depth to water (and depth to free product, if present) below top of casing in each monitoring well to the nearest 0.01 foot. Well gauging will be performed approximately 48 hours after installation and development are complete, and again following sample completion at all wells.

Ramboll will also conduct two to three rising head and falling-head slug tests on selected monitoring wells to calculate hydraulic conductivity for use, along with gradient and soil properties, to estimate hydraulic conductivity within the saturated zone at the site.

4.8 Site Survey

Following well installation, Ramboll plans to retain the services of a surveying contractor to establish the elevations of the top of the PVC well casing and ground surface at each newly installed groundwater monitoring well to the nearest 0.01 foot, referencing the North American Vertical Datum 1988 (NAVD88). The survey and gauging data will be used to confirm the local shallow groundwater flow direction and approximate gradient. Soil boring and monitoring well locations as well as the location of marked subsurface utilities will be established to the nearest 1.5 foot using a mobile global positioning system (GPS) unit.

4.9 Investigation-Derived Waste (IDW) Management

Soil cuttings generated during the installation of soil borings will be returned to the borehole following sample collection if the boring is not identified for conversion into a temporary groundwater point and evidence of free product is not observed. Soil cuttings generated during the installation of monitoring wells or other soil cuttings exhibiting evidence of free product or other significant contamination will be containerized in US Department of Transportation (DOT) certified 55-gallon drums. Well

development and purge water will be returned to the ground surface in accordance with Petroleum Storage Tank Program Technical Guidance or, if the fluids do not meet the requirements for returning to the ground surface, the fluids will be containerized in USDOT-approved 55-gallon drums for appropriate future off-site disposal. Spent personal protective equipment (PPE), acetate liners and other trash will be containerized in 55-gallon drums and staged on-site for future appropriate off-site disposal.

Drums will be labeled, sealed and staged on-site for future off-site disposal following waste characterization.

5. QUALITY ASSURANCE PROJECT PLAN

Chain-of-custody documents and field logbooks or electronic data logs will be maintained for all samples. Sample locations will be recorded using a combination of GPS and traditional survey methods.

Samples will be collected using standardized field operating procedures. Samples will be collected into laboratory-provided containers, labeled, and shipped or delivered under chain-of-custody procedures to an appropriately qualified laboratory. To evaluate the repeatability of the sampling procedures, at least one duplicate sample per 20 samples will be collected during the sampling event.

Re-useable sampling and/or monitoring equipment will be decontaminated using appropriate procedures including a non-phosphate detergent wash, followed by a double de-ionized water rinse. One equipment rinse blank will be collected for each substantially different type of sampling equipment used (e.g., hand auger, trowel, etc.) per day to document the effectiveness of equipment decontamination methods. Laboratory-provided deionized water will be collected into laboratory provided containers by pouring the water over the sampling tools. The samples will be submitted to the laboratory using the same procedures as described in Section 4. Additionally, electronic monitoring equipment will be calibrated in accordance with manufacturer recommendations and standard field operating procedures.

The analytical laboratory will employ standard QA/QC practices including the analysis of internal laboratory duplicates, reagent blanks, method blanks, matrix spikes and matrix spike duplicates, surrogate spikes, laboratory control samples, and continuing calibrations. Laboratory analytical methods will follow USEPA-approved protocols and quality control criteria.

Field Data Reduction

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct read instrumentation will be employed in the field. Readings collected in the field will be generated from direct read instruments following calibration per manufacturer's recommendations as outlined in the SOPs. Such data will be recorded into field logs immediately after measurements are taken. If errors are made, results will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original (erroneous) entry. Electronic field data collection forms will be utilized for the collection of field data to the extent possible to reduce the potential for transcription errors. Electronic field data forms will be uploaded to a secure file server on a daily basis to avoid data loss. Where data transcription is necessary, the Project Manager will proof the forms to determine whether any transcription errors have been made by the field crew.

Data Usability Review

Following laboratory verification of the data, Ramboll will review analytical data reports for overall completeness and evaluate the usability of the data relative to the investigation objectives. The usability review will include a review of technical holding times and spot checks on instrument performance check sample results, initial and continuing calibration results, blanks, surrogate spikes, matrix spikes/matrix spike duplicates and laboratory control sample results, internal standards, target compound identification and quantitation and system performance checks.

Data not meeting the acceptable QA/QC limits will be flagged for further consideration.

6. REPORTING AND COMMUNICATIONS

Project stakeholders (i.e., VDEQ VRP program, City of Alexandria, and National Park Service) will be notified at least five days prior to commencing field work. The VDEQ VRP will also be notified when major project milestones are completed or if unexpected conditions requiring deviations from this Work Plan are encountered.

Notifications to the VDEQ VRP will be made via telephone and/or email.

Following the receipt of analytical results, Ramboll will tabulate and review analytical results and will discuss with HRP whether supplemental sampling is needed to complete the site characterization in accordance with VDEQ requirements. If supplemental sampling is required, a Work Plan addendum for supplemental sampling will be prepared for review by HRP and subsequent submittal to VDEQ. If the data generated during the implementation of this work plan are sufficient for completion of the site characterization, Ramboll will instead prepare a draft Site Characterization Report in accordance with VDEQ requirements. The draft report will be finalized and submitted to VDEQ following approval by HRP. As appropriate, Ramboll will also participate in a meeting with VDEQ to discuss the findings of the site characterization.

7. PROPOSED SCHEDULE

Ramboll anticipates that field activities will be initiated in early October. Ramboll anticipates that the field activities described herein will require approximately 6 to 7 weeks for completion absent unexpected delays resulting from weather, subcontractor availability or other causes outside of Ramboll's control. Accordingly, if VDEQ or the City of Alexandria have comments on or requested additions to the proposed sampling, there will be time to adjust the sampling activities during the sampling period.

Samples will be analyzed on a 10-business day analytical turn-around time. Following the receipt of initial sample results, Ramboll will quickly tabulate and review analytical data to determine whether samples placed on hold should be released for subsequent analysis. A draft Site Characterization Report will be prepared within approximately 3 to 4 months following receipt of all analytical results. As discussed in the scope of work section above, certain areas of the site are currently inaccessible and as such, further investigation of inaccessible areas will be conducted during a subsequent mobilization; the results of this investigation will be used to inform sampling of remaining areas of the site.

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TABLES

TABLE 1: SUMMARY OF PROPOSED SAMPLING AND ANALYSIS
FORMER POTOMAC RIVER GENERATING STATION, ALEXANDRIA, VIRGINIA

Area of Interest and Rational	Proposed Investigation Activities	Soil						Groundwater								
		VOCs	SVOCs	PCBs	TAL Metals	TPH	pH	VOCs	SVOCs	PCBs	TAL Metals	TPH	Ammonia (N)	Sulfate	Hydrazine	Glycol
AOI-1: Known and Potential Petroleum Releases	Collect up to 5 surface soil samples in the vicinity of the former lube oil ASTs; the former antifreeze AST or other ASTs that were situated on unpaved surfaces. Samples will be collected only if field screening indicates potential impact. Proposed (provisional) surface soil sample locations are not shown on the proposed sample location map.	A									C					
AOI-2: Potential Historical Releases from Chemical Storage and Handling Areas.	Install 3 monitoring wells (SB201/MW201 to SB203/MW203) and 1 soil boring (SB-204) within or adjacent to former chemical storage areas. Collect soil samples from 0-1 ft bgs, interval exhibiting greatest impact plus a deeper apparent clean interval or an interval immediately above the water table. If no indication of impact, collect soil samples at 0 to 1 ft bgs plus 13 to 15 feet bgs.	A									C				D	
AOI-3a: Power Plant and Laboratory Buildings.	Collect groundwater samples from existing wells MW-30S, MW-72S and MW-100S. Install one new soil boring/monitoring well on north side of Main Power Plant Building (SB205/MW205). Collect soil samples at 0-1 ft bgs; apparent most impacted interval and immediately above water table. If no indication of impact; collect soil samples at 0-1 ft bgs and 13 to 15 ft bgs.	A									C					
AOI-3b: Drain Lines and Outfalls.	Specific borings are not proposed to evaluate possible releases from drain lines or outfalls. However, piping integrity inspections may be considered, if feasible. To the extent possible, Ramboll will also collect organic vapor readings at accessible pipe inlets and will make visual observations, to the extent possible, of outfalls to look for evidence of releases.															
AOI-4: Former Coal and Ash Storage and Management Areas.	Install 11 soil borings (SB206 to SB216) and convert 4 of the borings into monitoring wells (MW206 to MW209). Collect soil samples at 0 to 12 inches bgs (surface soil); 5 to 7 feet bgs; and immediately above water table. Collect groundwater from each of the monitoring well locations.	A				B					C					
AOI-5: Transformers.	Install 6 shallow soil borings (SB217 to SB222). Collect surface soil sample plus one subsurface soil sample (4 to 5 ft bgs) at each location. Place deeper soil sample on HOLD for potential analysis if field screening does not identify obvious impact at the deeper interval. Convert 1 boring into a monitoring well (if accessible to a drilling rig). Install one (additional)monitoring well adjacent the sump pit associated with the transformer area.															
AOI-6: Rail Yard.	Install 6 shallow soil borings (SB223 to SB228) and convert 2 of the borings into monitoring wells (MW223/MW224). Collect surface soil sample plus one subsurface soil sample (4 to 5 feet bgs) for laboratory analysis. Deeper soil sample to be placed on HOLD for potential analysis if field screening does not identify obvious impact at the deeper interval. At well locations, collect an additional soil sample at 13 to 15 ft bgs.	A				B					C					

Notes:

A - Sample to be collected only if field screening indicates potential impact by volatile constituents or petroleum constituents. Samples will be collected using Terracores® in conjunction with USEPA method 5035.

B - Sample to be collected only if field screening indicates potential impact by petroleum constituents. GRO will be collected using Terracores® in conjunction with USEPA method 5035.

C - Groundwater samples for metals analysis will be collected as both dissolved (field filtered) and total metals.

D - Only samples from MW201, MW-202 and MW205 will be analyzed for hydrazines (USEPA method 3815 or similar).

TAL Metals - Target analyte list metals by USEPA method 6010 or 6020 and 7470 for mercury. Groundwater samples will be collected as both dissolved and total metals and will be additionally analyzed for hardness.

PCBs - polychlorinated biphenyls (USEPA method 8081/8082).

SVOCs - semi-volatile organic compounds (USEPA method 8270).

TPH - total petroleum hydrocarbons - gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) (USEPA method 8015C).

VOCs - volatile organic compounds (USEPA method 8260).

Ammonia and sulfate to be analyzed by SM 4500 .

FIGURES

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Map Scale: 1:24,000 | Map Center: 77°2'26"W 38°49'4"N

SITE LOCATION MAP

FIGURE 01

KEY MAP (not to scale)

0 500 1,000 Feet

Former Potomac River Generating Station
1400 North Royal Street
Alexandria, Virginia 22314

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

- Outfall Locations
- Site Boundary
- AOI 1: Known Releases from 25,000-gal USTs
- AOI 2: Potential Historical Releases from Chemical Storage Areas and Use
- AOI 3a: Power Plant and Laboratory Building (currently inaccessible)
- AOI 3b: Drain Lines and Outfalls
- AOI 4: Former Coal and Ash Storage Areas
- AOI 5: Transformers/Electrical Equipment
- AOI 6: Rail Yard

0 200 400 Feet

SITE LAYOUT MAP

Former Potomac River Generating Station
1400 North Royal Street
Alexandria, VA 22314

FIGURE 02

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

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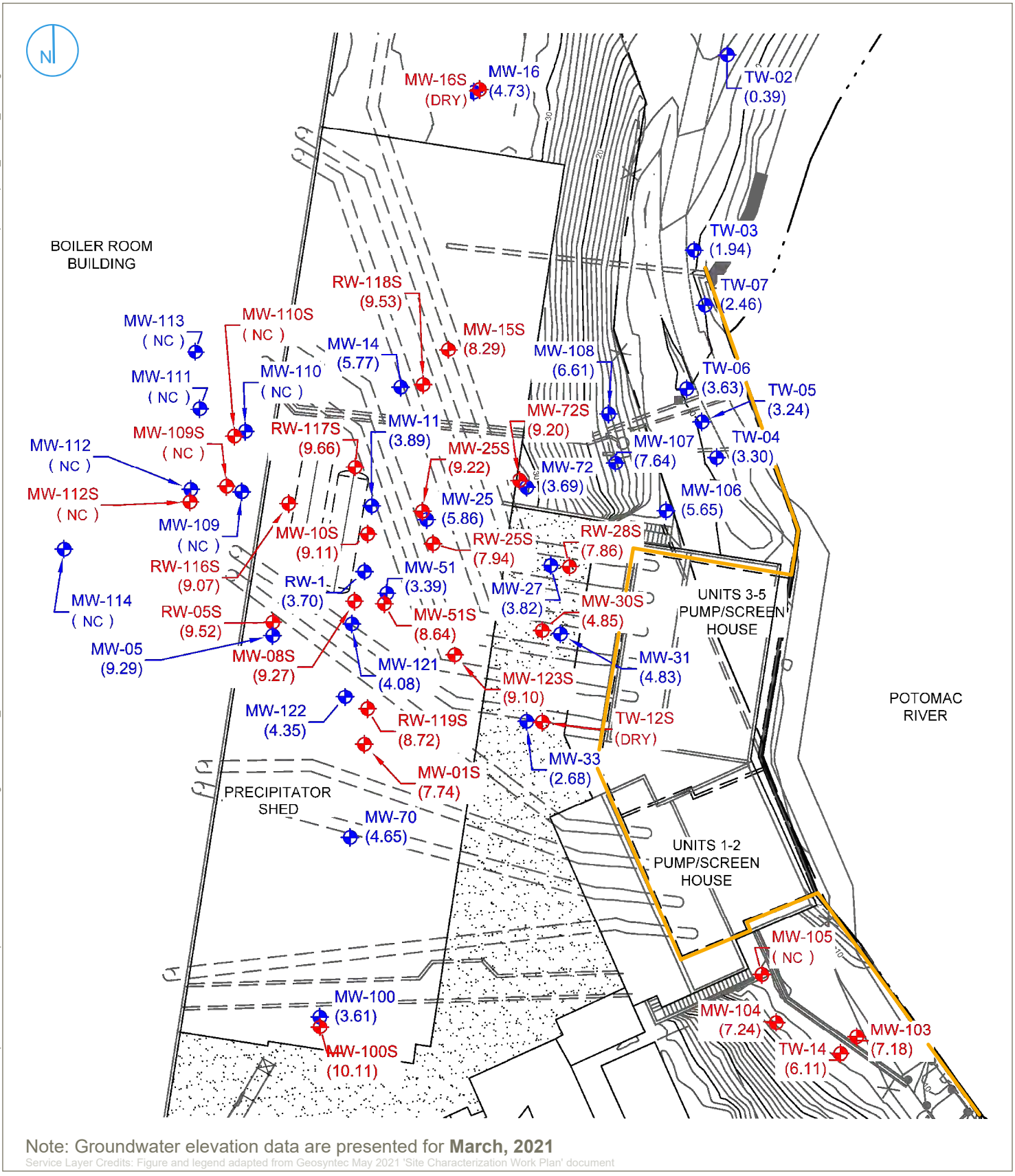
PROJECT: 1690022371 | DATED: 9/20/2021 | DESIGNER: SOSTERTAG



Note: Groundwater elevation data are presented for **March, 2021**

Service Layer Credits: Figure and legend adapted from Geosyntec May 2021 'Site Characterization Work Plan' document

Sheet Pile Wall and Screen House Walls (Serve as a barrier to groundwater flow)

EXISTING MONITORING WELL LOCATIONS

FIGURE 03

0 50 100 Feet

Former Potomac River Generating Station
1400 North Royal Street
Alexandria, VA 22314

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

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- Proposed Soil Boring
- Proposed Soil Boring/Monitoring Well
- Existing Monitoring Well
- Outfall Locations
- AOI 1: Known Releases from 25,000-gal USTs
- AOI 2: Potential Historical Releases from Chemical Storage Areas and Use
- AOI 3a: Power Plant and Laboratory Building (currently inaccessible)
- AOI 3b: Drain Lines and Outfalls
- AOI 4: Former Coal and Ash Storage Areas
- AOI 5: Transformers/Electrical Equipment
- AOI 6: Rail Yard

0 200 400 Feet

PROPOSED SAMPLE LOCATION MAP

Former Potomac River Generating Station
1400 North Royal Street
Alexandria, VA 22314

FIGURE 04

RAMBOLL US CONSULTING, INC.
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