Request for Bid

Fixed-Price Bid to Result

Site Remediation through Closure
Statewide Health Standard

Solicitor

Mr. Richard Vennard

Vennard's Crossroads Convenience, Inc.

4985 Lucerne Road
Indiana, PA 15701

PADEP Facility ID #: 32-81802 PAUSTIF Claim #: 2015-0116(I)

Date of Issuance

July 24, 2019

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The Pennsylvania Underground Storage Tank Indemnification Fund (PAUSTIF), on behalf of the claimant who hereafter is referred to as the Client or Solicitor, is providing this Request for Bid (RFB) to prepare and submit a bid to complete the Scope of Work (SOW) for the referenced Site. The Solicitor is the current owner/operator of the Site. PAUSTIF has determined that the claim reported by the Solicitor is eligible for coverage from the PAUSTIF subject to the applicable statutes and regulations. Reimbursement of Solicitor approved reasonable and necessary costs, not to exceed the claim aggregate limit, for the corrective action work described in this RFB will be provided by PAUSTIF. Solicitor is responsible to pay any applicable deductible and/or proration.

Each bid response will be considered individually and consistent with the evaluation process described in the PAUSTIF Competitive Bidding Fact Sheet which can be downloaded from the PAUSTIF website https://ustif.pa.gov.

Calendar of Events

Activity	Date and Time
Notification of Intent to Attend Site Visit	**August 5, 2019 by 5 p.m.**
Mandatory Pre-Bid Site Visit	**August 8, 2019 at 11 a.m.**
Deadline to Submit Questions	**September 6, 2019 by 5 p.m.**
Bid Due Date and Time	**September 13, 2019 by 3 p.m.**

Contact Information

Technical Contact
Mr. Robert Breakwell, P.G. **Excalibur Group, LLC** **1193 State Road** **Monessen, PA 15062** **rbreakwell@excaliburgrpllc.com**

All questions regarding this RFB and the subject Site conditions must be directed via email to the Technical Contact identified above with the understanding that all questions and answers will be provided to all bidders. The email subject line must be **"Vennard's Crossroads Convenience, Claim #2015-0116(I) – RFB QUESTION".** Bidders must neither contact nor discuss this RFB with the Solicitor, PAUSTIF, the Pennsylvania Department of Environmental Protection (PADEP), or ICF unless approved by the Technical Contact. Bidders may discuss this RFB with subcontractors and vendors to the extent required for preparing the bid response.

Requirements

Mandatory Pre-Bid Site Meeting

The Solicitor, the Technical Contact, or their designee will hold a mandatory Site visit on the date and time listed in the Calendar of Events to conduct a Site tour for one (1) participant per bidding company. The Technical Contact will collect questions and respond via email. All questions and answers will be provided via email to all attendees. This meeting is mandatory for all bidders, no exceptions. This meeting will allow each bidding company to inspect the Site and evaluate Site conditions. **A notice of the bidder's intent to attend this meeting is requested to be provided to the Technical Contact via email by the date listed in the Calendar of Events with the subject "Vennard's Crossroads Convenience, Claim #2015-0116(I) – SITE MEETING ATTENDANCE NOTIFICATION".** The name and contact information of the company participant should be included in the body of the email. Notification of intent to attend is appreciated; however, it is not required. Attendance at the Pre-Bid Site Meeting is mandatory. Changes to the Site meeting date and/or time due to inclement weather conditions or other unexpected circumstances will be posted at https://ustif.pa.gov/bids; and, the Technical Contact may notify via email all companies that provided Site Meeting Attendance Notification.

Submission of Bids

To be considered for selection, **one (1) hard copy of the signed bid package and one (1) electronic copy (one (1) PDF file on a compact disk (CD) included with the hard copy) must be provided directly to the PAUSTIF's third party administrator, ICF, to the attention of the Contracts Administrator.** The Contracts Administrator will be responsible for opening the bids and providing copies to the Technical Contact and the Solicitor. Bid responses will only be accepted from those companies that attended the Mandatory Pre-Bid Site Meeting. **The ground address for overnight/next-day deliveries is ICF International, 4000 Vine Street, Middletown, PA 17057, Attention: Contracts Administrator. The outside of the shipping package containing the bid must be clearly marked and labeled with "Bid – Claim #2015-0116(I)".** Please note that the use of U.S. Mail, FedEx, UPS, or other delivery method does not guarantee delivery to this address by the due date and time listed in the Calendar of Events for submission. Companies mailing bids should allow adequate delivery time to ensure timely receipt of their bid.

The bid must be received by 3 p.m., on the due date shown in the Calendar of Events. Bids will be opened immediately after the 3 p.m. deadline on the due date. Any bids received after this due date and time will be time-stamped and returned. If, due to inclement weather, natural disaster, or any other cause, the PAUSTIF's third party administrator, ICF's office is closed on the bid due date, the deadline for submission will automatically be extended to the next business day on which the office is open. The PAUSTIF's third party administrator, ICF, may notify all companies that attended the Mandatory Pre-Bid Site Meeting of an extended due

date. The hour for submission of bids shall remain the same. Submitted bid responses are subject to the Pennsylvania Right-to-Know Law.

Bid Requirements

The Solicitor wishes to execute a mutually agreeable contract with the selected consultant ("Remediation Agreement"). The Remediation Agreement is included as Attachment 1 to this RFB. The bidder must identify and document in their bid any modifications that they wish to propose to the Remediation Agreement language in Attachment 1 other than obvious modifications to fit this RFB (e.g., names, dates, and descriptions of milestones). The number and scope of any modifications to the standard agreement language will be one (1) of the criteria used to evaluate the bid. **Any bid that does not clearly and unambiguously state whether the bidder accepts the Remediation Agreement language in Attachment 1 "as is", or that does not provide a cross-referenced list of requested changes to this agreement, will be considered non-responsive.** This statement should be made in a Section in the bid entitled "Remediation Agreement". Any proposed changes to the agreement should be specified in the bid; however, these changes will need to be reviewed and agreed upon by both the Solicitor and the PAUSTIF.

The selected consultant will be provided an electronic copy (template) of the draft Remediation Agreement in Microsoft Word format to allow agreement-specific information to be added. The selected consultant shall complete the agreement-specific portions of the draft Remediation Agreement and return the document to the Technical Contact within 10 business days from date of receipt.

The Remediation Agreement fixed costs shall be based on unit prices for labor, equipment, materials, subcontractors/vendors, and other direct costs. The total cost quoted in the bid by the selected consultant will be the maximum amount to be paid by the Solicitor unless a change in scope is authorized and determined to be reasonable and necessary. There may be deviations from and modifications to this SOW during the project. The Remediation Agreement states that any significant changes to the SOW will require approval by the Solicitor, PAUSTIF, and PADEP. NOTE: Any request for PAUSTIF reimbursement of the reasonable costs to repair or replace a well will be considered on a case-by-case basis.

The bidder shall provide its bid cost using the Bid Cost Spreadsheet (included as Attachment 2) with descriptions for each task provided in the body of the bid document. Please note, if costs are provided within the text of the submitted bid and there is a discrepancy between costs listed in the Bid Cost Spreadsheet and in the text, the costs listed within the Bid Cost Spreadsheet will be used in the evaluation of the bid and in the Remediation Agreement with the selected consultant. Bidders are responsible to ensure spreadsheet calculations are accurate. The technical score for bids will be based solely on those tasks represented as milestones included in the Bid Cost Spreadsheet and the total bid cost. Any optional bidder-defined tasks,

milestones, or cost adders that are not requested as part of this RFB will not be considered by the Bid Evaluation Committee in the technical review and technical score for the bid.

In addition, the bidder shall provide:

1. The bid unit cost rates for each expected labor category, subcontractors, other direct costs, and equipment;

2. The bid markup on other direct costs and subcontractors (if any);

3. The bid total cost by task consistent with the proposed SOW identifying all level-of-effort and costing assumptions; and

4. The bid unit rate schedule that will be used for any out of scope work on this project.

Each bid will be assumed to be valid for a period of up to 120 days after receipt unless otherwise noted. The costs quoted in the Bid Cost Spreadsheet will be assumed to be valid for the duration of the Remediation Agreement.

Please note that the total fixed-price bid must include all costs, including those cost items that the bidder may regard as "variable". These variable cost items will not be handled outside of the total fixed-price quoted for the SOW unless the RFB requests costing alternatives for specific items or services. Any bid that disregards this requirement will be considered non-responsive to the bid requirements and, as a result, will be rejected and will not be evaluated.

The RFB is requesting a total fixed-price bid (unless the RFB requests costing alternatives for specific items or services). PAUSTIF will not agree to assumptions (in bids or the selected bidders executed Remediation Agreement) referencing a level of effort and/or hours. Costs provided in your bid should be developed using your professional opinion, experience, and the data provided. PAUSTIF will not reimburse costs for additional hours to complete activities included as part of the base bid/contract price.

Each bid response document must include at least the following:

1. Demonstration of the bidder's understanding of the Site information provided in this RFB, standard industry practices, and objectives of the project.

2. A clear description, specific details, and original language of how the proposed work scope will be completed for each milestone. The bid should specifically discuss all tasks that will be completed under the Remediation Agreement and what is included (e.g., explain groundwater purging/sampling methods, which guidance documents will be followed, what will be completed as part of the Site specific work scope/SCR/RAP

implementation). Recommendations for changes/additions to the Scope of Work proposed in this RFB shall be discussed, quantified, and priced separately; however, failure to bid the SOW "as is" may result in a bid not being considered. Bids should include enough original language conveying bidder's thought such that the understanding of site conditions, closure approach (if applicable), and approach to addressing the scope of work can be evaluated. Since bidders are not prequalified, the bid response must provide the Bid Evaluation Committee and Solicitor enough information to complete a thorough review of the bid and bidder.

3. A copy of an insurance certificate that shows the bidder's level of insurance consistent with the requirements of the Remediation Agreement. Note: The selected consultant shall submit evidence to the Solicitor before beginning work that they have procured and will maintain Workers Compensation, commercial general and contractual liability, commercial automobile liability, and professional liability insurance commensurate with the level stated in the Remediation Agreement and for the work to be performed.

4. The names and brief resumes/qualifications of the proposed project team including the proposed Professional Geologist and Professional Engineer (if applicable) who will be responsible for overseeing the work and applying a professional seal to the project deliverables (including any major subcontractor(s)).

5. Responses to the following specific questions:

    a. Does your company employ a Pennsylvania-licensed Professional Geologist or Professional Engineer that is designated as the proposed project manager? How many years of experience does this person have?
    b. How many Pennsylvania Chapter 245 projects is your company currently the consultant for in the PADEP Region where the Site is located? Please list up to 10.
    c. How many Pennsylvania Chapter 245 Corrective Action projects involving an approved SCR, RAP, and RACR has your company and/or the Pennsylvania-licensed Professional Geologist or Professional Engineer closed (i.e., obtained Relief of Liability from the PADEP) using any standard?
    d. Has your firm ever been a party to a terminated PAUSTIF-funded Fixed-Price (FP) or Pay-for-Performance (PFP) contract without attaining all of the milestones? If so, please explain.

6. A description of subcontractor involvement by task. Identify and describe the involvement and provide actual cost quotations/bids/proposals from all significant specialized subcontracted service (e.g., drilling/well installations, laboratory, etc.). If a bidder chooses to prepare its bid without securing bids for specialty subcontract

services, it does so at its own risk. Added costs resulting from bid errors, omissions, or faulty assumptions will not be considered for PAUSTIF reimbursement.

7. A detailed schedule of activities for completing the proposed SOW including reasonable assumptions regarding the timing and duration of Solicitor reviews (if any) needed to complete the SOW. Each bid must provide a schedule that begins with execution of the Remediation Agreement with the Solicitor and ends with completion of the final milestone proposed in this RFB. Schedules must also indicate the approximate start and end date of each of the tasks/milestones specified in the Scope of Work, and indicate the timing of all proposed key milestone activities (e.g., within 30 days of the contract being executed).

8. A description of how the Solicitor, ICF, and the PAUSTIF will be kept informed as to project progress and developments and how the Solicitor (or designee) will be informed of and participate in evaluating technical issues that may arise during this project.

9. A description of your approach to working with the PADEP. Describe how the PADEP would be involved proactively in the resolution of technical issues and how the PADEP case team will be kept informed of activities at the Site.

10. Key exceptions, assumptions, or special conditions applicable to the proposed SOW and/or used in formulating the proposed cost estimate. Please note that referencing extremely narrow or unreasonable assumptions, special conditions, and exceptions may result in the bid response being deemed “unresponsive”.

11. The name and contact information of the person who is to be contacted in the event the bid is selected by the Solicitor and/or a Right to Know request is received by PAUSTIF.

Bid Review and Evaluation

1. Bid Review and Scoring

   Bidders' submissions that are administratively qualified (i.e., attended the mandatory pre-bid site meeting and submitted the bid in strict accordance with instructions by the designated due date and time) will be evaluated.

   Technical Scoring

   Bids are evaluated for technical viability before bid cost is considered. Bids that have technical scores that fall within 75% of the highest technical score will advance to cost scoring. Bids with technical scores below 75% of the highest technical score are eliminated from further consideration.

   Numerical values will be assigned to each of three categories to derive the technical score for this bid-to-result solicitation:

   - Problem Understanding
   - Technical and Regulatory Approach to Remediation
   - Qualifications and Experience

   Cost Scoring

   Cost scores are determined by a cost formula. The bid(s) with the lowest total cost receives the maximum cost points available. The remaining bids are scored by applying the following cost formula: (1-((B-A)/A)) x C = D

   A = the lowest bid cost
   B = the bidder's cost being scored
   C = the maximum number of cost points available
   D = bidder's cost score (points)

   If a bid cost is equal to, or greater than, twice the amount of the lowest bid cost, the formula calculation will result in a negative number and the bid will be assigned zero cost points.

2. Evaluation of Bids

   A committee comprised of at least two members of the USTIF staff, two members of ICF staff, and the TPR who assisted in developing the bid package will score all bids that are administratively qualified based on the above criteria. USTIF recognizes that several bids may be acceptable and receive similar numerical scores. At the conclusion of the

scoring process, Solicitor will receive those bids with numerical scores placing them in the category of meeting Reasonable and Necessary criteria and acceptable for USTIF funding. Solicitor may select any of the consulting firms that submitted a qualified bid package to implement the tasks described in the bid; however, USTIF will only provide funding up to the highest fixed price of those bids determined to be Reasonable and Necessary for USTIF funding.

General Site Background and Description

Each bidder should carefully review the existing information and documentation provided in Attachment 3. The information and documentation has not been independently verified. Bidders may wish to seek out other appropriate sources of information and documentation specific to this Site. If there is any conflict between the general Site background and description provided herein and the source documents within Attachment 3, the bidder should defer to the source documents.

Summary of Site Background and Features

The Vennard's Crossroads Convenience (VCC) facility is located at 4985 Lucerne Road, White Township, Indiana County, Pennsylvania and is currently operated as a retail gasoline and diesel fuel service station and convenience store (c-store). Available information indicates that the Solicitor is the property owner and operator of the VCC facility and is responsible for the environmental cleanup.

Existing features on this approximate 0.6-acre sub-rectangular-shaped parcel consist of a single-story c-store building with full below-ground basement constructed in the western portion of the property. A sump was installed outside the northeast corner of the c-store building when the building was constructed to control potential flooding of the basement during seasonal wet periods. Historically, only a minimal amount of water has accumulated in the basement (reportedly only in low spots and less than ½-inch), and pumping of the sump was discontinued. As discussed in more detail below, a limited number of high vacuum extraction events were completed in the c-store sump during 2017 to address elevated dissolved contaminant concentrations and separate-phase hydrocarbon (SPH) sheen. When historically used to control basement water, groundwater was reportedly pumped from the c-store sump to a drainage channel located beyond the northern property boundary of the adjacent Young Engineering parcel. The c-store sump and drainage channel locations are depicted on the Site Map in Attachment 3a. Information regarding the location of the former discharge point along the drainage channel is unavailable. Since use of the sump has been discontinued, any limited water accumulation in the building basement is said to be mopped from the floor (hearsay).

The property is also improved with a fuel dispensing island located east of the c-store building with three product dispensers and canopy cover, and one (1) 12,000-gallon compartmentalized underground storage tank (UST) located north of the dispenser island.[1] Additional information regarding the facility UST system and release history is provided in the next subsection. The ground surface at the VCC facility is mostly covered with asphalt and concrete pavement with limited grass-covered areas along the facility perimeter.

[1] The UST has three compartments storing two grades of gasoline and diesel fuel.

As part of the site characterization activities conducted at the VCC site, a total of 27 on- and off-property groundwater monitoring and remedial feasibility testing wells were installed including the following:[2]

On-property overburden: MW-1 through MW-9, MW-13, MW-14 and EW-1;
On-property shallow bedrock: MW-1BR through MW-4BR, MW-9BR and EW-1BR;
Off-property overburden: MW-10, MW-11, MW-12, MW-15 and MW-16; and
Off-property shallow bedrock: MW-5BR through MW-8BR.

In addition to the groundwater wells, two soil vapor sampling points, VP-1 and VP-2, were installed adjacent to the northern side of the c-store building and adjacent to the southern side of the commercial Young Engineering building located on an adjacent property[3] north of the VCC facility, respectively. Attachment 3a of this RFB provides a "Site Map" figure depicting the general facility layout, site features including monitoring wells and soil vapor sampling points, and adjoining parcels. In general, land use in the vicinity of the VCC facility consists of residential and commercial properties.

Subsurface utilities located beneath the VCC facility include natural gas, municipal water, electric, a communications line, storm sewer and sanitary sewer. In addition, overhead electric and utility lines extend along the eastern property boundary. Approximate locations of subsurface utilities are depicted on the "Utility Map" figure provide in Attachment 3a.

Historical Petroleum Storage and Dispensing Operations and Release History

Available information indicates that the VCC property was first developed sometime between the mid-1980s to 1990 with construction of the c-store building and installation of the UST storage and dispensing systems currently located on the property. Before that time, the subject property consisted of undeveloped land.

Subsurface petroleum impacts were discovered during a limited Phase II Environmental Site Assessment (ESA) conducted in September 2015. During the Phase II ESA, petroleum constituents were identified in soil and groundwater samples collected adjacent to the UST field at concentrations exceeding regulatory standards. The source of these petroleum impacts was believed to be a chronic release from a failed fitting on the diesel fuel dispenser located beneath the canopy east of the c-store building. Reportedly, the fitting was repaired shortly after the release was identified. After the subsurface petroleum impacts were discovered, Mountain Research, LLC (MRLLC) completed an initial phase of site characterization activities and submitted a preliminary Site Characterization Report (SCR) to the PADEP in November 2016

[2] Overburden wells range in depth from approximately 7 (MW-16) to 22 (MW-10) feet below grade (ft-bg), and shallow bedrock wells range in depth from approximately 19 (MW-9BR) to 30 (MW-2BR) ft-bg.
[3] Owned by Walnut Development Group, LLC and leased by Young Engineering.

(Attachment 3b). Based on the data presented in the SCR (and in the Phase II ESA report), the distribution of soil and groundwater impacts seemed to be related more to a gasoline release associated with the UST field. This was indicated by sustained to increasing petroleum contaminant concentrations in wells located near the UST field and SPH in the tank field sump more than 1.5 years after the diesel dispenser was repaired.

In early 2017, about 0.6 feet of SPH was discovered in well MW-2 located adjacent to the UST field (first time SPH was observed in this well) and the dissolved petroleum contaminant concentrations in this well that had been gradually increasing spiked during the 1/12/17 sampling event. Dissolved concentrations of target petroleum compounds had also been increasing in wells MW-4, MW-7 and MW-8 installed near & downgradient of the UST field along with SPH sheen in some tank field area wells. Based on this information, a new release from the UST field was suspected. Integrity testing of the UST system (single compartmentalized UST) was subsequently performed and the results indicated that the UST tested tight, although there were reportedly technical problems with the testing of other system components. The Solicitor speculated that there may have been an overfill event at the UST field but offered no supporting observations or documentation. High vacuum extraction events were conducted as an interim remedial measure, after which the SPH thicknesses diminished significantly. The relatively rapid reduction in SPH suggested an overfill event might be a more likely spill mechanism than a chronic, ongoing source.

Several phases of supplemental site characterization activities were then conducted to further delineate the subsurface impacts which included, in part, advancing / installing and sampling several additional soil borings and on- and off-property monitoring wells and conducting remedial pilot testing involving vacuum enhanced groundwater extraction (VEGE). The supplemental site characterization work concluded in early- to mid-2018 after which MRLLC submitted a Supplemental SCR (SSCR) to the PADEP in September 2018 (Attachment 3c). A Remedial Action Plan (RAP) was then submitted for PADEP review in January 2019 (Attachment 3d). The RAP remedial approach generally involves a combination of soil excavation in the area of the UST field and VEGE applied to overburden and shallow bedrock (described in more detail below). The SSCR and RAP were unconditionally approved by the PADEP in a letter issued by the Department in early March 2019 (Attachment 3e).

Overview of Site Characterization Activities and Results

The following sections summarize the results obtained from key site investigation activities. Bidders are directed to the November 2016 preliminary SCR (Attachment 3b) and September 2018 SSCR (Attachment 3c) for additional site characterization information.

Overview of Site Geology, Hydrogeology and Hydrology

Based on available drilling / subsurface logging data, unconsolidated materials beneath the VCC site and vicinity generally consist of a near-surface layer of heterogeneous fill materials comprised of a variable mixture of sandy clay, silty clay, sand, gravel, cobbles, dark rooted soil and brick fragments. The average thickness of the fill materials across the site is approximately 1.9 feet with a maximum thickness of about 5 feet observed in one boring near the dispenser island. Beneath the fill materials is natural residual soil consisting predominantly of sandy and silty clay with lesser amounts of clay, sand and various hybrid mixtures (e.g., clayey sand, silty sand, etc.). Sandstone gravel and cobbles appear to be common in the soil horizon and are derived from weathering of the underlying bedrock. Overburden thickness is unusually variable beneath the site which could be related to differential weathering of the bedrock surface and other possible factors including historical excavation of shallow weathered bedrock or mine subsidence.[4] More specifically, a bedrock surface depression exists in the central portion of the site in the general vicinity of the c-store, dispenser island and UST field where overburden soil reaches a thickness of up to approximately 22 feet (soil boring SB-11 near the UST field). Overburden thickness in other parts of the site is typically on the order of ~11 to 14 feet with an average thickness of ~12.5 feet. Bedrock encountered immediately beneath the overburden consists primarily of fractured, weathered to competent sandstone. Minor occurrences of siltstone, limestone, shale and thin, laterally discontinuous coal seams were also logged. Drilling logs for the soil borings, logs / construction details for the monitoring wells and geologic cross sections are provided in the September 2018 SSCR (Attachment 3c).

A geophysical survey was performed in June 2016 using ground penetrating radar across all accessible areas of the VCC property to identify possible historic USTs and buried utilities. The geophysical survey identified several utility lines and the existing 12,000-gallon compartmentalized UST, but no undocumented USTs. The geophysical report is provided in Appendix F of the September 2018 SSCR. Geotechnical soil sampling was also performed to assist with overburden contaminant fate & transport analysis which involved the collection of one sample from soil boring SB-4 located near the dispenser island. The geotechnical soil sample was analyzed for several parameters with the following results: bulk density (1.6 grams / cm^3); fraction organic carbon (2.42%); total porosity (0.39); and specific gravity (2.64 grams / cm^3).[5]

Hydrogeologic data for the site has been provided through gauging and testing of the previously identified network of on- and off-property overburden and shallow bedrock monitoring wells. Groundwater gauging data indicate that the depth to the unconfined water table aquifer in site overburden averages about 7.7 ft-bg. Historically, the shallowest depth to groundwater in the

[4] According to the Pennsylvania Mine Map Atlas, an abandoned deep coal mine (room & pillar) is present at a depth of ~100 feet beneath the VCC site.

[5] The fraction organic carbon sample from SB-4 represents background conditions (i.e., non-petroleum impacted soil).

overburden has been measured in well MW-12 (~2.3 ft-bg) located on the adjacent Young Engineering property, and the lowest depth to overburden groundwater has been measured in on-property well MW-13 (~12.6 ft-bg).[6] Within the UST field source area where remedial excavation of petroleum impacted soil is proposed, the depth to the zone of permanent groundwater saturation is approximately 10.5 ft-bg. The depth to groundwater in the shallow bedrock wells has averaged about 8.1 ft-bg which is comparable to the average depth to water in the overburden suggesting hydraulic continuity between these two horizons. Within the tank field and c-store sumps, the depth to water has averaged approximately 6.1 and 7.3 ft-bg, respectively.[7] Tabulated historical groundwater gauging data through the first quarter 2019 is provided in Attachment 3f.

The horizontal hydraulic gradient calculated for the shallow water table aquifer has generally been on the order of 0.03 ft/ft. Groundwater flow in the overburden is generally toward the west in the direction of lower surface topography. Groundwater flow in shallow bedrock has ranged from west to southwest.

Hydraulic characteristics in the overburden have been estimated through conducting single-well aquifer characterization testing (i.e., rising and falling head slug tests). Slug testing was performed in on-property shallow monitoring wells MW-2, MW-3, MW-4, MW-6 and MW-7. Results from the slug tests indicate a geometric mean hydraulic conductivity value of 0.028 ft/day and an average transmissivity of 0.6 ft^2/day. These results are consistent with the low-permeability clay soil. Additional hydraulic data for the overburden *and* shallow bedrock horizons were provided during remedial pilot testing as described in more detail below.

Soil Quality

During the various phases of site investigation, a total of 34 soil samples were collected from 22 soil borings advanced at on- and off-property locations (B1 through B4 and SB-1 through SB-18). All soil samples were submitted for laboratory analysis of the current PADEP short-list of unleaded gasoline and diesel fuel compounds. Based on historical depth to groundwater measurements, it appears the majority of soil samples impacted above the SHS were collected from unsaturated and periodically saturated soil (i.e., smear zone) with the remainder obtained from permanently saturated soil. Excessively impacted soil was identified within the approximate depth range of 3 to 12 ft-bg.

[6] Excludes distant, outlying off-property overburden wells MW-15 and MW-16 installed near a drainage channel at the Young Engineering northern property boundary where anomalous hydraulic conditions appear to exist that are not representative of site conditions.

[7] The tankfield sump is located at the northeast corner of the tankfield. Construction details for the tankfield sump are not available. Available information regarding the c-store sump indicates that it is located near the northeast corner of the c-store building, is constructed of corrugated metal pipe, was used to assist with controlling water in the building basement and is still accessible for groundwater gauging and sampling but is no longer used. Groundwater previously pumped from the c-store sump was reportedly discharged to the drainage channel at the Young Engineering northern property boundary. The sump locations are depicted on the Site Map in Attachment 3a.

The soil analytical dataset reveals that the primary constituents of concern (COCs)[8] in site soil are benzene and 1,2,4-trimethylbenzene (TMB) which are the only two compounds detected at concentrations exceeding the PADEP Act 2 SHS MSCs in unsaturated or saturated soil for a used aquifer in a non-residential (NRUA) setting. All other target unleaded gasoline and diesel fuel compounds, except MTBE, were detected in the soil samples but were below the applicable standard. Maximum concentrations for the primary soil COCs benzene (5,650 micrograms per kilogram [ug/kg]) and 1,2,4-TMB (78,300 ug/kg) were reported for the shallow soil sample collected from boring SB-9 / MW-8 at a depth of approximately 10.5 ft-bg.[9] This soil boring was advanced near the eastern side of the UST field.

Observed soil impacts exceeding the SHS are most prevalent adjacent to, and in the area of the UST field. Less severe soil contamination was identified beneath and adjacent to the product dispenser pad. Based on the separate-phase hydrocarbons (SPH) historically observed in the UST field sump (as discussed below), it's probable that the tank cavity backfill materials are also impacted and serve as an ongoing source of contamination to groundwater. Overall, adsorbed contamination exceeding the NRUA soil standards appears to have been reasonably delineated. Boring logs for the soil borings and monitoring well borings, site plans depicting the boring locations, and soil analytical data tables can be found in the September 2018 SSCR (Attachment 3c) and in the September 2015 Limited Phase II Environmental Site Assessment Report (Attachment 3g).

Groundwater Quality

Groundwater quality has been assessed through collecting and analyzing aqueous samples from the network of 27 on- and off-property overburden and shallow bedrock groundwater monitoring and remedial feasibility testing wells previously identified. Groundwater samples have also been collected from the tank field and c-store sumps and from the drainage channel bordering the northwest property boundary of the Young Engineering parcel. Point of Compliance (POC) and off-property attainment wells identified in the January 2019 RAP include MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-2BR and MW-3BR (POC) and MW-10, MW-11, MW-5BR, MW-6BR and MW-8BR located off-property on the adjacent Young Engineering parcel. Groundwater samples have historically been analyzed for the current PADEP short list of unleaded gasoline and diesel fuel parameters. Historical groundwater analytical results through the first quarter 2019 sampling event are provided in Attachment 3f. Figures depicting the site monitoring well locations can be found in Attachment 3a (Site Figures), Attachment 3c (September 2018 SSCR) and Attachment 3d (January 2019 RAP). The SSCR also contains dissolved-phase contaminant plume maps and monitoring well boring logs / construction details.

[8] Compounds exceeding the PADEP Act 2 non-residential used aquifer SHS MSCs.
[9] Available depth to groundwater data for well MW-8 suggest this sample was collected from periodically saturated soil near the base of the smear zone.

Overburden Groundwater Quality

Consistent with historical groundwater analytical data, the first quarter 2019 analytical results indicate that the COCs in overburden groundwater consist of benzene, toluene, ethylbenzene, xylenes, naphthalene and 1,2,4-TMB. Concentration ranges for the overburden monitoring points in which these compounds were detected above the PADEP NRUA SHS MSCs during the first quarter 2019 are summarized below:

- Benzene: wells MW-4, MW-8, MW-9, MW-10, MW-14 and EW-1, and the tank field and c-store sumps at concentrations ranging from **22.1 ug/l** (MW-9) to **5,710 ug/l** (c-store sump).
- Toluene: wells MW-8 and MW-14 and the tank field and c-store sumps at concentrations ranging from **1,960 ug/l** (MW-8) to **16,600 ug/l** (c-store sump).
- Ethylbenzene: wells MW-8 and MW-14 and the c-store sump at concentrations ranging from **709 ug/l** (c-store sump) to **1,300 ug/l** (MW-8).
- Xylenes: detected only above the SHS in the c-store sump during the first quarter 2019 at a concentration of **10,500 ug/l**.
- Naphthalene: wells MW-8, MW-14 and the c-store sump at concentrations ranging from **317 ug/l** (MW-14) to **382 ug/l** (c-store sump).
- 1,2,4-TMB: wells MW-8, MW-14 and EW-1 and the tank field and c-store sumps at concentrations ranging from **355 ug/l** (MW-4) to **1,930 ug/l** (c-store sump).[10]

Concentrations of all other target unleaded gasoline and diesel fuel compounds were either not detected or were below the applicable SHS MSCs for the first quarter 2019 sampling event.

Contaminant concentration trends are unstable and increasing in several overburden monitoring wells including MW-2 (benzene, toluene, naphthalene and 1,2,4-TMB), MW-4 (benzene and 1,2,4-TMB), MW-8 (benzene, ethylbenzene, naphthalene and toluene) and MW-14 (toluene, naphthalene and 1,2,4-TMB). Additionally, the concentration trend for benzene in well MW-14 is flat. The shallow overburden dissolved-phase contaminant plume originates in the UST field area and generally extends to the north and onto the Young Engineering property.

Shallow Bedrock Groundwater Quality

COCs in shallow bedrock groundwater consist of benzene, naphthalene and 1,2,4-TMB which were detected only in wells MW-1BR and MW-5BR at levels above the NRUA SHS during the most recent first quarter 2019 sampling event. Concentrations of benzene during that sampling event ranged from 28.8 ug/l in MW-1BR to 523 ug/l in MW-5BR. Naphthalene and 1,2,4-TMB

[10] Note that overburden well MW-2 was not sampled during the first quarter 2019 but has historically contained concentrations of benzene, toluene, ethylbenzene, xylenes, naphthalene and 1,2,4-TMB which significantly exceeded the SHS during the previous fourth quarter 2018 sampling event.

were detected only in MW-5BR during the first quarter 2019 at concentrations of 128 and 654 ug/l, respectively. Note that shallow bedrock well EW-1BR was not sampled during the first quarter 2019 but has historically contained elevated concentrations of benzene and 1,2,4-TMB through the second quarter 2018 (most recent sampling event for this well). MW-1BR and EW-1BR are located adjacent to the UST field and MW-5BR is located on the Young Engineering property about 30 feet north of the UST field.

Surface Water Quality

Over the past ~2.5 years, at least nine surface water samples have been collected from the drainage channel bordering the northwest property boundary of the Young Engineering parcel. Analytical results for these samples have all been below the laboratory method detection limits except for a very low concentration of benzene (3.39 ug/l) reported for the 1/12/17 sampling event)

Inorganic Groundwater Analyses

During remedial pilot testing conducted in 2018 (as discussed in more detail below), groundwater samples were collected for inorganic analyses including total iron, total manganese and total suspended solids (TSS). Maximum concentrations of these analytes in overburden test wells MW-14 and EW-1 were: total iron (141 milligrams per liter [mg/l]; MW-14), total manganese (26.8 mg/l; EW-1) and TSS (22,200 mg/l; MW-14). Maximum concentrations in shallow bedrock test well EW-1BR were: total iron (39.6 mg/l), total manganese (8.84 mg/l) and TSS (441 mg/l). These values indicate that some form of metals treatment / sequestration and enhanced sediment filtering appear necessary for the in-situ remediation system to help minimize excessive fouling & maintenance of groundwater treatment equipment. Additionally, the elevated iron and manganese concentrations will need to be accounted for in identifying a suitable treated water discharge alternative. The sanitary sewer may be the most feasible option.

<u>Separate Phase Hydrocarbons and Recovery</u>

Measureable thicknesses of SPH have often been observed in monitoring well MW-2 located near the tank field and in the tank field sump. The maximum thicknesses of SPH historically measured in these monitoring points was approximately 1.5 feet in MW-2 (January 2019) and 0.21 feet in the tank field sump (October 2016). A hydrocarbon sheen was observed in wells MW-1BR and MW-7 during the January 2017 gauging event, in wells MW-4, MW-2BR and EW-1 during the March 2018 gauging event, and in the c-store sump during the March and May 2018 and January 2019 events. As discussed in more detail below under the *Interim Remedial Actions s*ection, high-vacuum extraction events were previously conducted to remove impacted groundwater and SPH from the tank field sump, well MW-2 and the c-store sump. The most recent first quarter 2019 SPH gauging data indicate that measureable SPH was observed only

in well MW-2 (1.5 feet) while a petroleum sheen remained in the c-store sump. Historical SPH gauging data through the first quarter 2019 is provided in Attachment 3f.

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Vapor Intrusion Assessment

Two near-source soil vapor monitoring points, VP-1 and VP-2, were installed and sampled to assess the potential for vapor intrusion risk in the two on- and off-property commercial buildings. Soil vapor monitoring point VP-1 was installed adjacent to the southeast side of the Young Engineering building near impacted overburden well MW-10, and monitoring point VP-2 was installed near the northeast corner of the c-store building adjacent to the impacted building sump.[11]

Soil vapor monitoring points VP-1 and VP-2 were sampled in May and July 2018. Soil vapor samples were analyzed for the current PADEP short-list of unleaded gasoline and diesel fuel parameters via EPA Method TO-15.

Laboratory analytical results provided from the two rounds of soil vapor sampling indicate detections of benzene, ethylbenzene, toluene, 1,2,4-TMB and 1,3,5-TMB (duplicate sample only) at concentrations below their respective non-residential near-source SHS soil gas screening values. Results for all other compounds were reported below the laboratory method detection limits. Based on the two rounds of soil vapor analytical results and the pending site remediation to the SHS NRUA soil and groundwater standards, the September 2018 SSCR concluded that current and future vapor intrusion risk to commercial building receptors is acceptable. However, conduct of a follow-up vapor intrusion study (indoor air sampling) is a component of this RFB scope of work given the elevated dissolved contaminant concentrations recently reported for the c-store exterior sump, SPH sheen historically observed in the exterior sump and shallow groundwater conditions in the c-store vicinity.

Additional information regarding the historical vapor intrusion assessment including screening methods / results for potential vapor intrusion sources, a summary of site-specific vapor intrusion assessment options, vapor monitoring point integrity testing methods (helium gas), analytical results and a site plan depicting the locations of VP-1 and VP-2 can be found in the September 2018 SSCR. Construction logs for VP-1 and VP-2 were not provided in the SSCR.

[11] Information regarding the depth of VP-1 is not available. VP-2 was installed as a nested pair for discrete soil vapor sampling at depths of ~3.5 ft-bg and ~5 ft-bg in the event that the deeper point became submerged during periods of elevated groundwater levels.

Overview of Interim Remedial Actions and Remedial Feasibility Testing

Interim Remedial Actions

Interim remedial actions historically conducted at the VCC facility have included high-vacuum extraction events to remove impacted groundwater and SPH from the tank field sump, monitoring well MW-2 located adjacent to the tank field, and the abandoned sump located near the northeast corner of the c-store building. Information regarding the vacuum extraction events is limited in the available site record which indicates only that three events were completed via vacuum truck on 5/17/17, 6/22/17 and 8/15/17, and that each event yielded between 1,790 to 2,000 gallons of total fluids consisting primarily of groundwater.

Remedial Feasibility Testing

Remedial feasibility testing was conducted in late March 2018 to evaluate the effectiveness of groundwater extraction and vapor enhanced groundwater extraction (VEGE) for addressing adsorbed- and dissolved-phase petroleum contamination in the low-permeability clay overburden and shallow fractured bedrock. A total of four tests were completed in the overburden using MW-14 and EW-1 located near the UST field contaminant source as the test wells. Two tests were completed in the shallow bedrock with source area well EW-1BR serving as the test well. During each testing phase, groundwater extraction was completed first (i.e., no applied vacuum) which locally dewatered the area surrounding the test well to assist with determining vacuum influence during the subsequent VEGE testing. Also, near the end of each testing phase, groundwater samples were collected and analyzed for the PADEP shortlist of unleaded gasoline and diesel fuel compounds, total iron and manganese, TSS and oil & grease (select wells). Analytical results for the total metals and TSS analyses were discussed under the *Groundwater Quality* section above. Vapor samples were also collected during the VEGE feasibility testing and results for the vapor-phase unleaded gasoline and gasoline-range organic compounds (GRO C_5-C_{12}) analyses are summarized below. The following discussion provides a brief overview of the feasibility testing conducted at each test well location. More detailed testing information including field methods, analytical results, observations and conclusions can be found in the January 2019 RAP (Attachment 3d).

Groundwater Extraction (without vacuum) - MW-14 (overburden): Groundwater extraction feasibility testing in MW-14 was conducted over a period of two hours. Groundwater drawdown was measured in four wells using transducers (MW-2, MW-4, MW-7 and MW-8) and in five wells via hand gauging (MW-11, MW-12, EW-1, MW-9 and MW-2BR). During the testing, significant turbidity (TSS) was observed in the extracted groundwater. The measured groundwater extraction rate was ~0.2 gallon per minute (gpm) and a hydraulic radius of influence (ROI) of approximately 30 feet was estimated based on groundwater drawdown in the observation wells.

Groundwater Extraction (vacuum enhanced) - MW-14 (overburden): VEGE feasibility testing in MW-14 was performed in progressive steps of increased applied vacuum including one hour at low vacuum (~5 inches of mercury [in. Hg]), two hours at medium vacuum (~10 in. Hg) and 1.5 hours at high vacuum (~25 in. Hg). Wells used for observation purposes were the same as those monitored during the groundwater extraction testing in MW-14. During the VEGE feasibility testing, the extracted groundwater was extremely turbid which resulted in failure of the totalizer.[12] The estimated groundwater extraction rate and the related hydraulic ROI for the applied vacuums were: low vacuum (~0.2 gpm / 30 feet); medium vacuum (~0.4 gpm / 31 feet); and high vacuum (~0.2 gpm / 41 feet)[13]. Pneumatic influence was measured only in well MW-2 during the VEGE feasibility testing at a very low vacuum of ~0.03 inches of water (in. H_2O). Based on laboratory analyses, unleaded gasoline and C_5-C_{12} hydrocarbons in the extracted vapor stream were reported at the concentrations indicated in the following table:

Vacuum Level	UNL Gasoline Total VOCs (ug/m^3)	GRO C_5-C_{12} (ug/m^3)
Low	184,400	9,240,000
Mid	147,080	4,541,000
High	100,400	5,687,000

Groundwater Extraction (without vacuum) - EW-1 (overburden): Groundwater extraction feasibility testing in EW-1 was conducted over a period of two hours. Groundwater drawdown was measured in four wells using transducers (MW-2, MW-4, MW-8 and MW-9) and in two wells (MW-13 and MW-1BR) and the tank field sump via hand gauging. During the testing, elevated TSS was observed in the extracted groundwater. The measured groundwater extraction rate was ~0.4 gpm and a hydraulic ROI of approximately 21 feet was estimated based on groundwater drawdown in the observation wells.

Groundwater Extraction (vacuum enhanced) - EW-1 (overburden): VEGE feasibility testing in EW-1 was performed in progressive steps of increased applied vacuum including 2.5 hours at low vacuum (~5 inches in. Hg), two hours at medium vacuum (~10 in. Hg) and 1.5 hours at high vacuum (~25 in. Hg). Wells used for observation purposes were the same as those monitored during the groundwater extraction testing in EW-1. During the VEGE feasibility testing, the extracted groundwater was extremely turbid.[14] The estimated groundwater extraction rate and the related hydraulic ROI for the applied vacuums were: low vacuum (~0.8 gpm / 30 feet); medium vacuum (~0.6 gpm / 46 feet); and high vacuum (~1.4 gpm / 62 feet)[15]. Pneumatic

[12] Attempts at cleaning / back-flushing the totalizer were unsuccessful and groundwater flow rates were estimated from the batch tank volumes in the testing trailer.
[13] The groundwater extraction rate estimated for the high vacuum VEGE test is suspect due to observed syphoning of the batch flow tank during which an unknown volume of groundwater was treated and discharged. The high vacuum VEGE groundwater extraction rate was believed to be much higher than ~0.2 gpm.
[14] As mentioned above, the totalizer failed due to high sediment in the extracted groundwater and flow rate measurements were estimated from the batch tank volumes in the testing trailer.
[15] The groundwater extraction rate estimated for the medium vacuum VEGE test is suspect due to observed syphoning of the batch flow tank during which an unknown volume of groundwater was treated and discharged. The medium vacuum VEGE groundwater extraction rate was believed to be much higher than ~0.6 gpm.

influence was not measured in any of the observation wells. Samples of extracted vapor were not collected from EW-1 for laboratory analysis during the feasibility testing.

Groundwater Extraction (without vacuum) - EW-1BR (shallow bedrock): Groundwater extraction feasibility testing in EW-1BR was conducted over a period of two hours. Groundwater drawdown was measured in four wells using transducers (MW-1BR, MW-4BR, MW-5BR and MW-8) and in three wells (MW-9, MW-9BR and MW-13) via hand gauging. During the testing, elevated TSS was observed in the extracted groundwater. The measured groundwater extraction rate was ~0.5 gpm and a hydraulic ROI of approximately 23 feet was estimated based on groundwater drawdown in the observation wells.

Groundwater Extraction (vacuum enhanced) - EW-1BR (shallow bedrock): VEGE feasibility testing in EW-1BR was performed in progressive one hour steps of increased applied vacuum including: low vacuum (~5 inches in. Hg), medium vacuum (~10 in. Hg) and high vacuum (~25 in. Hg). Wells used for observation purposes were the same as those monitored during the groundwater extraction testing in EW-1BR. During the VEGE feasibility testing, the extracted groundwater was extremely turbid and flow rates were again estimated from the batch tank volumes. The estimated groundwater extraction rate and the related hydraulic ROI for the applied vacuums were: low vacuum (~0.5 gpm / 29 feet); medium vacuum (~0.6 gpm / 32 feet); and high vacuum (~0.6 gpm / 34 feet). Pneumatic influence was not measured in any of the observation wells. Based on laboratory analyses, unleaded gasoline and C_5-C_{12} hydrocarbons in the extracted vapor stream were reported at the concentrations indicated in the following table:

Vacuum Level	UNL Gasoline Total VOCs (ug/m^3)	GRO C_5-C_{12} (ug/m^3)
High	31,050	55,600

Solicitor's Selected Site Closure Standard

The Solicitor intends to pursue site closure for unleaded gasoline and diesel fuel constituents in soil and groundwater by demonstrating attainment of the PADEP NRUA SHS with a TDS concentration of less than or equal to 2,500 mg/l.

Overview of Remedial Actions Proposed in the PADEP-Approved RAP

The January 2019 RAP proposes soil excavation surrounding the UST field source area combined with on- and off-property VEGE in overburden and shallow bedrock to attain the NRUA SHS for soil and groundwater. The RAP identifies two separate, irregularly-shaped areas for soil excavation adjacent to the UST field. One area is delineated beyond the western side of the tank field from which unsaturated soil impacts will be removed to an estimated target depth of ~6 ft-below grade. The second area delineated for soil excavation wraps around the southern, eastern and northern sides of the UST field from which saturated soil (smear zone

and permanently saturated soils) will be removed. The proposed excavation depth in this area appears to be ~12 ft-bg, although this is indirectly rather than explicitly stated in the RAP. Additional details regarding the proposed soil excavation activities can be found in the January 2019 RAP (Attachment 3d).

A total of eight (8) VEGE recovery wells are proposed including overburden wells EW-1 (existing), EW-4, EW-5 and EW-6 and shallow bedrock well EW-1BR (existing) on the VCC property, and overburden wells EW-2 and EW-3 and shallow bedrock well EW-2BR on the adjacent Young engineering property. The VEGE wells will be trenched and piped to a remediation shed or trailer located along the northwest side to the c-store building. In general, the proposed VEGE system equipment includes: (a) air compressor; (b) vacuum pump; (c) vapor liquid separator; (d) vapor phase carbon vessels; (e) liquid phase carbon vessels; (f) sediment filters; (g) transfer pumps; (h) telemetry; (i) environmental controls; (j) equalization tank; (k) automated control equipment; and (l) pneumatic well pumps. As discussed above, due to the continued presence of SPH, and the elevated concentrations of total metals and TSS observed during the remedial pilot testing, bidders are encouraged to consider including an oil-water separator, provisions for metals sequestration and enhanced sediment filtering in the proposed VEGE system final design. **Responsive bids shall include a discussion of the bidder's consideration of these treatability issues**. Additional details regarding the RAP-proposed VEGE system equipment specifications, recovery well locations, trenching piping layout, system piping & instrumentation diagrams, etc. can be found in the January 2019 RAP.

Other Information

To the extent there is any discrepancy between the summary of site conditions provided above and the source documents, bidders shall rely on the source document information. Bidders should carefully consider what information, analyses and interpretations contained in the background documents can be used in developing the scope of work for their bid in response to this RFB.

Scope of Work (SOW)

This RFB seeks competitive bids from qualified contractors to perform the activities in the SOW specified herein. The PADEP case manager at the Department's Northwest Regional Office (NWRO) did not choose to review / comment on the SOW provided within this RFB.

Objective & Remedial Alternatives

As described above, a combination of soil excavation and VEGE is proposed in the January 2019 RAP to achieve a Relief of Liability (ROL) for the VCC site under the NRUA SHS MSCs for soil and groundwater. Through remedial actions, the successful bidder will be expected to attain these site closure standards. The PADEP, the Technical Contact and the PAUSTIF have agreed that any of the following remedial approaches offers a technically viable and cost effective means of attaining the SHS cleanup goals.

1) **Alternative #1 – Soil excavation, extraction from c-store exterior sump and VEGE (RAP approach).** Soil excavation shall be conducted around the UST field to remove source material (unsaturated, smear-zone and permanently saturated soils) according to the two excavation areas delineated and to the depths proposed in the RAP. Water management may be necessary. VEGE shall be applied to on- and off-property overburden and fractured bedrock as described in the RAP to assist with remediating residual soil and groundwater impacts in other areas of the site. Additionally, groundwater and vapor (as necessary) shall be extracted from the c-store exterior sump via the remediation system with the goals of: (a) keeping the sump dewatered; (b) ensuring that sump water is treated before being discharged; and (c) addressing any excessive vapor intrusion risks while the site is being remediated; or

2) **Alternative #2 – Soil excavation, oxygen delivery product (ODP)[16] application, soil vapor extraction (SVE) / venting, extraction from c-store exterior sump and VEGE (modified RAP approach).** Soil excavation shall be conducted around the UST field within the four areas depicted in Attachment 3h which reflect modifications to the excavation areas proposed in the RAP. Water management may be necessary. ODP shall be applied to the sidewalls and base of the excavated areas prior to backfilling to provide additional remedial benefits via enhanced biodegradation. Contaminated UST field backfill materials shall be addressed through SVE and venting to eliminate this secondary contaminant source. VEGE shall be applied to on- and off-property overburden and fractured bedrock within the areas depicted in Attachment 3h including extraction from the c-store exterior sump as described under Alternative #1. Bidders

[16] ODP refers to a host of alternative commercially available products designed to impart oxygen to the subsurface in order to enhance aerobic biodegradation and sequential chemical / biological destruction of residuals.

selecting Alternative #2 shall propose these modifications in a RAP Addendum (RAPA) to be prepared under Milestone C; or

3) **Alternative #3 – Soil excavation, ODP application, SVE / venting, extraction from c-store exterior sump and dual-phase extraction (DPE) (modified RAP approach).** Soil excavation shall be conducted around the UST field, ODP shall be applied to the open excavations, and SVE / venting shall be applied to the UST field as described under Remedial Alternative #2. However, DPE shall be applied to on- and off-property overburden and fractured bedrock within the areas depicted in Attachment 3h in lieu of VEGE and shall include extraction from the c-store exterior sump as described under Alternative #1. Bidders selecting Alternative #3 shall propose these modifications in a RAPA to be prepared under Milestone C; or

4) **Alternative #4 - Soil excavation, ODP application, SVE / venting, extraction from c-store exterior sump, VEGE and carbon-based product (CBI) injection[17](modified RAP approach).** Soil excavation shall be conducted around the UST field, ODP shall be applied to the open excavations, and SVE / venting shall be applied to the UST field as described under Remedial Alternatives #2 and #3. However, VEGE will only be applied adjacent to the UST field and CBI will be applied off-property, in lieu of VEGE, based on the areas delineated in Attachment 3h. As described under Alternative #1, extraction from the c-store exterior sump shall also be incorporated into the VEGE system design. Bidders selecting Alternative #4 shall propose these modifications in a Revised RAP (RRAP) to be prepared under Milestone C.

Bidders shall propose one of these four remedial approaches in their bid response.

Solicitor seeks competitive, fixed-price bids for this Bid to Result RFB to complete the eleven (11) milestones outlined below intended to take this Site to closure. To be deemed responsive, each bid *must* respond *in detail* to each of the milestones, including describing the bidder's understanding of the conceptual site model and how that model relates to the bidder's proposed approach to executing the SOW. "Bid to Result" RFBs identify task goals and rely on the bidders to provide a high level of project-specific detail on how they will achieve the goal. Each bid must detail the approach and specific methods for achieving the milestone objectives. In reviewing the quality of bids submitted under Bid to Result solicitations, there is an increased emphasis placed on technical approach and reduced emphasis on cost (as compared to bids for "Defined Scope of Work" RFBs). As mentioned above, the Solicitor has elected to pursue environmental closure based on demonstrating attainment of the PADEP Act 2 NRUA SHS MSCs for soil and groundwater.

[17] CBP refers to a range of alternative commercially available pulverized / amended activated carbon products designed to sorb and provide surfaces to facilitate in-situ biodegradation of residual organic contaminants.

Selecting one of the remedial approaches defined above shall be the basis for preparing a SOW and presenting a competitive fixed-price bid. The selected bidder shall perform pilot testing to confirm the bid remedial technologies can feasibly meet the remedial goals for this site in general accordance with bidder's assumptions.

Constituents of Concern (COCs)

Soil, groundwater and soil gas samples collected at the VCC site have been analyzed for the current PADEP Act 2 short-list of unleaded gasoline and diesel fuel compounds (benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene, 1,2,4-TMB and 1,3,5-TMB). Based on these analyses, the COCs present in site environmental media include the following:

Soil – Adsorbed-phase impacts exceeding the NRUA soil to groundwater SHS MSCs have been identified in soil beneath the VCC property primarily adjacent to, or in the vicinity of, the UST field source area. Limited soil impacts at lower concentrations above the applicable standards were also identified near the pump island and product conveyance line. Petroleum compounds exceeding the NRUA SHS in soil include benzene and 1,2,4-TMB. All other target unleaded gasoline and diesel fuel compounds, except MTBE, were detected in the soil samples but were below the NRUA SHS. It is suspected that the UST field backfill is also contaminated and remains an ongoing secondary source of groundwater impacts.

Groundwater – Dissolved-phase contaminants exceeding the NRUA SHS MSCs have historically included all of the target PADEP short-list unleaded gasoline and diesel fuel compounds except cumene. Based on the most recent groundwater analytical data available (first quarter 2019), compounds exceeding the applicable standards included benzene, toluene, ethylbenzene, xylenes, naphthalene and 1,2,4-TMB in overburden and benzene, naphthalene and 1,2,4-TMB in shallow bedrock.

Soil gas – Analytical results from the May and July 2018 sampling of soil vapor monitoring points VP-1 and VP-2 installed adjacent to the Young Engineering building and northeast corner of the c-store building, respectively, indicated detections of benzene, ethylbenzene, toluene, 1,2,4-TMB and 1,3,5-TMB (duplicate sample only) at concentrations below their respective non-residential near-source SHS soil gas screening values. Results for all other compounds were reported below the laboratory method detection limits.

General SOW Requirements

The bidder's approach to completing the SOW shall be in accordance with generally accepted industry standards/practices and all applicable federal, state, and local rules, regulations, guidance, and directives. The latter include, but are not limited to, meeting the applicable requirements of the following:

- The Storage Tank and Spill Prevention Act (Act 32 of 1989, as amended);
- Pennsylvania Code, Title 25, Chapter 245 - Administration of the Storage Tank Spill and Prevention Program;
- The Land Recycling and Environmental Remediation Standards Act of 1995 (Act 2), as amended);
- Pennsylvania Code, Chapter 250 - Administration of Land Recycling Program; and
- Pennsylvania's Underground Utility Line Protection Law, Act 287 of 1974, as amended by Act 121 of 2008.

During completion of the milestone objectives specified below and throughout implementation of the project, the selected consultant shall:[18]

- Conduct necessary, reasonable, and appropriate project planning and management activities until the project (i.e., Remediation Agreement) is completed. Such activities may include Solicitor communications/updates, meetings, record keeping, subcontracting, personnel and subcontractor management, quality assurance/quality control, scheduling, and other activities (e.g., utility location). Project planning and management activities will also include preparing and implementing plans for health and safety, waste management, field sampling/analysis, and/or other plans that are necessary and appropriate to complete the SOW, and shall also include activities related to establishing any necessary access agreements. [19] Project planning and management shall include identifying and taking appropriate safety precautions to not disturb Site utilities including, but not limited to, contacting Pennsylvania One Call as required prior to any ground-invasive work. As appropriate, project management costs shall be included in each bidder's pricing to complete the milestones specified below.
- Be responsible for coordinating, managing, and completing the proper management, characterization, handling, treatment, and/or disposal of all impacted soils, water, and derivative wastes generated during the implementation of this SOW. The investigation-derived wastes, including purge water, shall be disposed in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Waste characterization and disposal documentation (e.g., manifests) shall be maintained and provided to the Solicitor and the PAUSTIF upon request. All investigation derived wastes shall be handled and disposed per PADEP's

[18] As such, all bids shall include the costs of these activities and associated functions within the quote for applicable tasks/milestones.
[19] MRLLC previously entered into an access agreement with the owners of an adjacent commercial property (leased by Young Engineering from Walnut Development Group, LLC) for installing / sampling monitoring wells. Bid responses shall assume that reestablishing the access agreement with this property owner will be necessary.

Regional Office guidance. It is the selected consultant's responsibility to conform with current PADEP Regional Office guidance requirements in the region where the Site is located.

- Be responsible for providing the Solicitor / facility owner with adequate advance notice prior to each visit to the property. The purpose of this notification is to coordinate with the Solicitor / facility owner to ensure that appropriate areas of the property are accessible. Return visits to the Site will not constitute a change in the selected consultant's SOW or result in additional compensation under the Remediation Agreement.

Site-Specific Guidelines

As part of this RFB, the selected consultant will need to consider the following site-specific guidelines:

On-Property Access. Given that the VCC property is bordered on two sides by roadways, customer traffic can be heavy at times and maneuverability can be challenging – especially during peak business hours. As such, safety precautions should be carefully considered prior to and during any field activities along with an elevated level of attentiveness. Should it be necessary to temporarily disrupt business operations to complete any of the milestones within this RFB, the Solicitor / facility operator requires at least two (2) weeks advance notice and coordination with site personnel.

Off-Property Access. Selected consultant will be responsible for securing off-property access where needed to implement the remedial approach. Work required to negotiate and secure off-property access shall be included within the fixed price for Milestone C. It is reasonable to assume that Solicitor will assist, as needed, with this effort.

Field Activities. All on- and off-property work shall be conducted during the normal business days and hours of 8:00 AM to 5:00 PM from Monday through Friday, unless work outside of these normal business days and hours is authorized by the property owner / operator. The selected consultant will be responsible for determining and adhering to other restrictions that may apply to the VCC facility or surrounding properties.

Responsibility. The selected consultant will be the consultant of record for the site. The selected consultant will be required to take ownership of the project and will be responsible for representing the interests of the Solicitor / property owner and ICF / PAUSTIF with respect to the project. This includes utilizing professional judgment to ensure reasonable, necessary and appropriate actions are recommended and undertaken to protect sensitive receptors and carry out adequate remedial actions in order to move the site toward closure.

Field Instrumentation. Each bidder should state in its bid response the appropriate field instrumentation (e.g., pumps, meters, photoionization detectors, etc.) to be used during the completion of the SOW. Specifically, the products associated with the regulated releases at this site are unleaded gasoline and diesel fuel. As such, any field-screening instrumentation used at the site should be able to detect the presence of hydrocarbons associated with these types of products.

Safety Measures. Each bidder should determine the safety measures necessary to appropriately complete the milestones. Specifically, if a consultant feels that it is appropriate and necessary to complete utility clearance using an air knife, the cost should be included in its fixed-price cost. If a bidder includes costs to conduct specific safety measures or activities, the bidder should specify it in the bid response and discuss why it is appropriate and necessary and indicate which methods will be utilized and to what extent. As discussed in the RFB, cost is not the only factor when evaluating bid responses and other factors are taken into consideration during the bid evaluation process, including appropriate safety measures.

Waste Disposal. The investigation derived waste (including, but not limited to, soil/rock cuttings, used carbon, well development / purging liquids, and groundwater removed during pilot testing activities) shall be disposed per the instructions included in the "*General SOW Requirements*" section of the RFB. Bidders will be responsible for arranging any off-site waste disposal (if required) and including costs in their bid response to cover the disposal of all potential waste related to the milestones included in the SOW. Containerized soil and groundwater may be temporarily stored on the VCC property at a location approved by the property owner, but should be removed from the property as quickly as possible. Each bidder should estimate the volume of waste using its professional opinion, experience and the data provided. **ICF and PAUSTIF will not entertain any assumptions from the selected bidder in the Remediation Agreement with regards to a volume of waste. Invoices submitted by the selected bidder to cover additional waste disposal costs as part of activities included under the fixed-price Remediation Agreement for this site will not be paid.**

Site-Specific Milestones

Milestone A - Supplemental Site Characterization Activities. This milestone provides bidders the opportunity to identify which additional site characterization work that will be completed in advance of finalizing the remedial approach design and moving ahead with its implementation. Conducting supplemental investigative activities under this milestone is mandatory. PAUSTIF will be reimbursing up to $10,000 for supplemental site characterization and documentation costs under this milestone. Bidders are to describe what supplemental site characterization will be completed, the rationale for the work and how the derived data will be used. For purposes of bidding, and to ensure consistent cost scoring of bids, each bidder will enter exactly $10,000 as the bid price for Milestone A in the Bid Cost Spreadsheet. PAUSTIF will only reimburse up to $10,000 of reasonable and necessary costs for those tasks actually

performed. The selected bidder must provide time and material documentation in addition to supporting documentation required (in Exhibit B of the executed Remediation Agreement) to support the requested reimbursement and completion of this milestone.

Bidders may use this opportunity to: 1) confirm any elements of the site characterization completed by a previous consultant; 2) address any perceived data gaps in the existing site characterization work; 3) assist in the evaluation and determination of remedial technologies and system design that are characterization-type activities (e.g. analysis for C_4-C_{12}); or 4) assist with refining the cleanup timeframe estimate and/or other reasons related to validating the bidder's remedial approach and design (e.g. additional sampling to better determine contaminant mass in place).

Milestone A activities shall be conducted as soon as possible following execution of the Fixed-Price Remediation Agreement.

Each bidder shall describe in detail its scope of work for additional site characterization activities along with corresponding technical justification to support the need for each additional activity. When considering what additional site characterization activities may or may not be necessary, bidders are strongly encouraged to review the November 2016 SCR (Attachment 3b), September 2018 SSCR (Attachment 3c) and the other documents provided in Attachment 3, rather than relying solely on the summary information presented in this RFB.

Example potential activities for bidders to consider may include tasks such as: i) advancing and sampling additional soil borings to further assess the extent and magnitude of impacted unsaturated and smear zone soils on- and off-property; ii) performing additional geotechnical sampling / analyses to assist with determining excavation sidewall stability; iii) conducting additional well gauging to refine the vertical limits of unsaturated, smear zone and permanently saturated soils; and / or iv) waste characterization / profile sampling. Any and all Milestone A activities that are proposed with your firm's bid shall be accompanied by the following:

- The purpose and need for each Milestone A activity and an appropriate breakdown;
- A detailed scope description of each activity including the use and incorporation of any pre-existing site data;
- The timing and schedule of each activity relative to the overall project schedule; and
- A description of the anticipated results of each activity and how such results may impact your proposed conceptual remedial action plan.

Following completion of the additional site characterization activities, these Milestone A activities shall be documented as discussed in Milestone C.[20]

Milestone B – Pilot Testing and Reporting. Pilot testing shall be proposed to support the feasibility and appropriateness of the bidder's proposed remedial technology and approach. More specifically, the purpose of the pilot testing is to:

- Confirm that bidder's proposed technology is technically viable;
- Confirm that bidder's proposed remedial approach can be expected to be efficient & cost-effective;
- Confirm that bidder's proposed technology will achieve the remedial objective within a reasonable timeframe; and
- Confirm remedial design criteria assumed in the bid.

The bidder shall provide a detailed description of the proposed pilot testing, objectives and rationale including any concerns with historical pilot testing data, perceived existing data gaps, proposed methods, the use of existing or installation of new data monitoring / collection points, proposed equipment to be used, and the data that is proposed to be collected.[21] Each bid shall also describe how the data / information would be evaluated. In formulating its pilot testing proposal, bidders shall also consider the following:

- Pilot testing at more than one test well location to account for differences in subsurface permeability across the extent of the groundwater plume which could include heterogeneity of overburden materials and variation in bedrock fracture characteristics.
- Results provided from the prior March 2018 VEGE pilot testing that were documented in the January 2019 RAP (Attachment 3d).

For pilot testing proposed in this milestone, bidders shall also specify up to five key pilot test outcome criteria that establish whether the bidder's proposed remedial action is feasible. These "critical criteria" shall be listed with an upper and lower limit that will define the range of acceptable results (i.e., pilot testing results) relevant to the bidder's proposed remedial approach. These critical criteria must be tightly-controlled measurements or calculations that could be independently measured or verified by others during the pilot test.

[20] In order to receive reimbursement under this task, thorough documentation of the additional site characterization activities must be provided to PAUSTIF.

[21] During the previous remedial pilot testing conducted by MRLLC in March 2018, extracted & treated groundwater was discharged to the local sanitary sewer system under permit with the Borough of Indiana (industrial discharge permit).

For example, bids shall include language such as, “For our proposed remedial action approach to be successful and for the technology(ies) used thereby to operate as planned and meet our proposed clean up schedule, the pilot testing must show:

1. A hydraulic conductivity greater than X ft/day, but not more than Y ft/day;
2. A groundwater yield rate exceeding X gpm at the end of Y hours of vacuum-enhanced pumping under a vacuum of Z in. Hg;
3. The capacity to generate a soil vapor extraction vacuum of at least X in. Hg while not exceeding an air flow rate of Y scfm;
4. An effective VEGE or DPE pneumatic ROI of X feet and hydraulic ROI of Y feet.
5. A vacuum of X in. Hg and air flow of Y scfm in the UST field backfill materials.
6. Iron and manganese hardness within groundwater at or below X mg/l.”

This is only an example. Actual bid language and the associated critical criteria will vary by bidder.

The critical criteria identified in each bid and their associated acceptable range of testing results will be evaluated as part of the bid review. Unrealistic critical criteria, or critical criteria that are unreasonably narrow, will reduce the favorability of the bid. Please note that all bidders shall propose to perform pilot testing covering the applicable technologies prescribed under either remedial Alternative #1, #2, #3 or #4 to confirm that the remedial approach proposed in the RAP or to be proposed in the selected bidder’s RAPA or RRAP will be feasible, safe and effective.

The Milestone B proposal shall reflect an understanding that the selected bidder will prepare a Pilot Test Report and submit it to the Solicitor and PAUSTIF. The Pilot Test Report shall show that the pilot test was conducted according to the selected consultant’s bid and shall constitute documentation for payment of Milestone B regardless of the result. If the results of the pilot testing show that the proposed remedial action is feasible based on the specified critical criteria and ranges, and is safe and effective, then the selected consultant shall be expected to move forward with the project under the contract. The Milestone B activities shall also be included in the reporting for Milestone C.

“Pilot Test Off-Ramp” – The selected consultant and the Solicitor are protected from being obligated to move forward with a remedial action under the executed Remediation Agreement if the proposed remedial approach cannot be safely or efficiently implemented as proposed in the conceptual design based on critical criteria outside the bidder’s defined ranges from the pilot test data from Milestone B. Exhibit A of the Remediation Agreement (Attachment 1) will contain a provision that if the selected consultant’s proposed remedial approach is not reasonable based solely on pilot test results indicating that it cannot be implemented as proposed in the

conceptual design based on critical criteria outside the bidders defined ranges from the pilot test data from Milestone B, then one of the following conditions will apply:

1) With advance Solicitor and PAUSTIF approval, the selected bidder may elect to modify the remediation plan and continue with the project at no additional cost; that is, for the same total fixed price found in the bid response or a lesser fixed-cost. If selected consultant's modified plan is approved by Solicitor and by PAUSTIF for funding, the executed Remediation Agreement may be amended, if necessary, to agree with the modified remediation plan and costs; however, the total fixed price of the Remediation Agreement shall not be increased.
2) If the Solicitor or PAUSTIF choose not to approve the selected consultant's revised remediation plan adjusting to the new data, the Remediation Agreement for the project will terminate.
3) If the selected consultant adequately demonstrates the site conditions revealed by the results of pilot testing performed under Milestone B could not have reasonably been expected prior to conducting the Milestone B activities, the selected consultant may elect to not proceed and to terminate the Remediation Agreement for the project.

If either party elects to cancel the Remediation Agreement, the PAUSTIF will have complete discretion with regard to the use of the information obtained during Milestone B activities and/or in the Pilot Test Report. The PAUSTIF may use the data as the basis for rebidding the project; however, it will be specified that any use that a third party makes of the supplemental site characterization data and/or Pilot Test Report will be at the sole risk of the third party.

Pilot Test Bid Cost – For consistency, bidders shall budget a maximum of 10% of the total bid cost for this Milestone, with a maximum of $50,000. For example, if the total proposed cost for Milestones A through K (excluding B) is determined to be $300,000, the fixed-price cost of Milestone B specified in the bid cost spreadsheet shall be up to, but not exceed $30,000. However, if the total proposed cost for Milestones A through K (excluding B) is determined to be $550,000, the fixed-price cost of Milestone B specified on the bid cost spreadsheet shall be up to, but not exceed $50,000.

Milestone C – Documentation of Findings: Preparation of an Expanded Remedial Action Progress Report (RAPR), or Preparation, Submittal and PADEP Approval of a RAPA or RRAP. Upon completing Milestones A and B described above, there are three possible documentation scenarios for Milestone C based on the selected remedial alternative. Each bidder shall choose the appropriate documentation scenario for inclusion in its bid response. The scenarios, triggers for each, and minimum required components are summarized as follows:

(1) **Expanded RAPR (Remedial Alternative #1).** Bidders proposing to implement the PADEP-approved RAP with no modification shall document and report the additional site characterization conducted under Milestone A and the pilot testing completed under Milestone B to the PADEP in a concurrent quarterly RAPR that shall be supplemented to describe the Milestones A and B activities, methods and results. The expanded RAPR shall first be submitted in draft form to the Solicitor and PAUSTIF for review and comment. At Solicitor's sole discretion, the expanded RAPR will be finalized and submitted to the PADEP. Each bidder's project schedule shall provide two (2) weeks for Solicitor and PAUSTIF review of the draft document. The final report shall address comments received from the Solicitor and PAUSTIF on the draft report before it is submitted to the PADEP for its review.

The expanded RAPR shall describe and provide evaluations of all findings generated under Milestones A and B above, updating the conceptual site model (CSM) for the Site and its vicinity. The report shall incorporate information and relevant findings from the previous site documentation (as necessary), and contain all necessary and appropriate figures, tabulated data and appendices to comply with the regulatory requirements.

The expanded RAPR shall be signed and sealed by the appropriate environmental professional (i.e., a Professional Geologist and / or Professional Engineer, licensed in the Commonwealth of Pennsylvania). Bidders shall refer to state licensing laws to determine if the Professional Engineer seal is required based on the work performed for and documented in the report. The fixed-price cost shall also include responding to any PADEP questions or comments on the expanded RAPR; or

(2) **RAPA (Remedial Alternatives #2 and #3).** If a bidder proposes to implement the PADEP-approved RAP with the modifications described above for remedial Alternatives #2 and #3 (modified excavation footprint boundaries/ODP application, SVE/venting of UST field, or DPE in lieu of VEGE) then the selected bidder shall prepare and submit a RAPA for PADEP review and approval. In general, the RAPA shall: i) document the supplemental site characterization and pilot testing activities and findings; ii) discuss the details of the modified remedial approach; iii) contain all necessary information required under 25 PA Code §245.311; and iv) be of sufficient quality and content to reasonably expect PADEP approval. The RAPA shall first be submitted in draft form to the Solicitor and PAUSTIF for review and comment before being finalized and submitted to the PADEP. Each bidder's project schedule shall provide two (2) weeks for Solicitor and PAUSTIF review of the draft document. The final report shall address comments received from the Solicitor and PAUSTIF on the draft report before it is submitted to the PADEP for its review; or

(3) **RRAP (Remedial Alternative #4).** If a bidder proposes to implement an alternative remedial technology than was proposed in the PADEP-approved RAP, as described

under remedial Alternative #4 (modified excavation footprint boundaries/ODP application, SVE/venting of UST field, VEGE on-property and CBP injection off-property), then the selected bidder shall prepare and submit a RRAP for PADEP review and approval. In general, the RRAP shall: i) document the supplemental site characterization and pilot testing activities and findings; ii) discuss the details of the alternative remedial approach; iii) contain all necessary information required under 25 PA Code §245.311; and iv) be of sufficient quality and content to reasonably expect PADEP approval. The RRAP shall first be submitted in draft form to the Solicitor and PAUSTIF for review and comment before being finalized and submitted to the PADEP. Each bidder's project schedule shall provide two (2) weeks for Solicitor and PAUSTIF review of the draft document. The final report shall address comments received from the Solicitor and PAUSTIF on the draft report before it is submitted to the PADEP for its review.

The Expanded RAPR, RAPA or RRAP shall describe and provide an evaluation of all findings generated under Milestones A through B, updating the conceptual site model (CSM) for the Site and its vicinity based on evaluating the results from the additional site characterization and pilot testing tasks outlined above, and detailing the proposed modified or alternative remedial approach. The report shall incorporate information and relevant findings from the previous site documentation (as necessary), and contain all necessary and appropriate figures, tabulated data, and appendices to comply with the regulatory requirements for and to obtain PADEP approval of the RAPA or RRAP reports.[22] Securing formal PADEP approval of the Expanded RAPR should not be necessary since the remedial approach proposed in the PADEP-approved RAP will not be modified under Remedial Alternative #1.

The Expanded RAPR, RAPA or RRAP shall be signed and sealed by a Professional Geologist licensed in the Commonwealth of Pennsylvania, and may also require the signature and seal of a Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine if the Professional Engineer seal is required based on the work performed for and documented in the combined report). The fixed-price cost shall also include addressing any PADEP comments on the RAPA or RRAP.

If a RAPA or RRAP is prepared depending on the remedial alternative selected, the successful bidder will be eligible to receive payment for 75% of the bid amount for Milestone C when there is proof the document has been completed and submitted to PADEP. The 25% balance will be due for reimbursement once proof has been provided that PADEP has approved the Milestone C deliverable document.

[22] All figures included in the Expanded RAPR, RAPA or RRAP (e.g., site plan, etc.) shall be available in electronic format to the Solicitor upon request.

Milestone D – Pre-Remediation Quarterly Groundwater Monitoring, Sampling & Reporting. Under this task, bidders shall provide a firm fixed-price to continue with quarterly groundwater monitoring, sampling, and reporting events while performing the supplemental site characterization activities under Milestone A, conducting remedial pilot testing under Milestone B, preparing a RAPA or RRAP (and PADEP approval) under Milestone C, and completing preparations leading up to implementation of the RAP, RAPA or RRAP (e.g., scheduling, coordination & site preparation). For the purposes of this RFB, it is assumed the Milestone D activities will be required for three (3) quarters. However, each bid must specify the number of quarterly events that will be needed prior to implementation of the remedial approach (Milestone E) along with supporting rationale. Any additional quarterly monitoring, sampling and reporting events, beyond the three quarters specified in this RFB, shall be defined on the Bid Cost Spreadsheet and shall be incorporated in the Remediation Agreement as per event Optional Cost Adder Milestone D4.[23]

Each groundwater monitoring and sampling event shall include the on- and off-property overburden and shallow bedrock monitoring well network currently sampled consisting of MW-1 through MW-16 and MW-1BR through MW-9BR (25 wells total).[24] Also during each quarterly groundwater monitoring and sampling event, samples shall be collected from the UST field sump and the c-store building sump given the elevated dissolved concentrations of target petroleum compounds and SPH historically observed at these locations. The conduct and results of each event shall be documented in quarterly RAPRs. During each quarterly groundwater monitoring and sampling event, the depth to groundwater shall be gauged in all existing monitoring wells and sumps, and before purging the wells / sumps designated above for sample collection. Groundwater level measurements shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient.

Each of the monitoring points designated for sample collection shall be purged and sampled in accordance with the PADEP Groundwater Monitoring Guidance Manual and standard industry practices. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with PADEP NWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short-list of unleaded gasoline and diesel fuel parameters (benzene, toluene, ethylbenzene, xylenes, MTBE, cumene, naphthalene, 1,2,4-TMB and 1,3,5-TMB) by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected

[23] The Remediation Agreement includes a Provision that the pre-remedial quarterly site monitoring, sampling & reporting events will be limited to the three quarters under Milestone D plus the number of additional events under Optional Cost Adder Milestone D4 as defined in the selected bid. If additional events are required under Milestone D4, pre-approval from Client and PAUSTIF (for funding) is required.

[24] The fixed price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestone A (if any).

during each event and analyzed for the same parameters.[25] In addition, each quarterly event shall include field measurements for the following parameters: pH, temperature, specific conductance, dissolved oxygen (measured in-situ), oxidation/reduction potential, and total dissolved solids (TDS).

The RAPRs describing the sampling methods and results will be provided to the PADEP on a quarterly basis and within 30 days of the end of the current quarter. At a minimum, each RAPR shall contain the following:

- A summary of site operations and remedial progress made during the reporting period;
- Narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored points documenting the depth to groundwater and thickness of any free product encountered. This data shall be presented on the same table as the historical quantitative groundwater analytical results mentioned below;
- Groundwater elevation contour maps depicting groundwater flow direction in the overburden and shallow bedrock;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[26]
- For each well exceeding SHS, a graphical depiction of historical key contaminant concentrations and groundwater elevations to provide an assessment of correlations between fluctuating water levels / precipitation events and contaminant concentrations;
- For each well exceeding SHS, a graphical depiction of recent key contaminant concentration trends;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, contracting, or expanding plume;
- Treatment and disposal documentation for waste generated during the reporting period; and

[25] Each bidder's approach to implementing Milestone D shall clearly identify the number of sampling events, number of wells / samples per event, well purging and sampling method(s), QA/QC measures, analytes, purge water management methods, and other key assumptions affecting the bid price.

[26] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format to the Solicitor upon request.

- Demonstration of compliance with the required Federal, State, and local permits and approvals.

PAUSTIF will only reimburse for the necessary quarterly groundwater sampling / reporting events actually completed under this milestone (e.g., this milestone shall be considered completed with the initiation of Milestone E). Each RAPR shall be sealed by a Professional Geologist and / or Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the quarterly RAPRs).

Milestone E – RAP, RAPA or RRAP Implementation. Under this milestone, bidders shall provide a fixed-price cost inclusive of all the manpower, machinery, materials, and other costs needed to fully implement the remedial solution for the VCC site as described in the PADEP-approved RAP, or in the bidder's RAPA or RRAP, once approved by the PADEP. The cost breakdown for implementing the remedial approach described in the RAP, RAPA or RRAP shall follow the format prescribed by sub-Milestones E1 through E8 below, as appropriate, based on the remedial alternative selected. Again, bidders shall bid on implementing one of the four remedial alternatives summarized in the "*Objectives and Remedial Alternatives*" section above.

Additional information regarding the remedial alternatives and related bid details for implementation of the RAP, RAPA or RRAP are provided in sub-Milestones E1 through E8 below.

Milestone E1 – Pre-Remediation Preparation Activities (Remedial Alternatives #1 through #4). The selected consultant shall complete preparatory activities in advance of the soil excavation and remedial system installation. These activities may include coordination and scheduling with subcontractors / vendors, procuring equipment and materials, securing required construction and operational permits (e.g., air and water discharge) / permit exemptions, negotiating off-property access agreements and providing notifications to Solicitor and other stakeholders.

Before mobilizing to the site, a mark-out of buried utilities or other subsurface features shall be completed within and in the general vicinity of the areas designated for intrusive activities and PA One Call notification shall be made and documented.

The selected consultant shall also coordinate with the electrical service provider to bring and provide appropriate electrical service to the location of the remediation equipment. Payment of the electrical service connection shall be the responsibility of the selected consultant and accounted for in the fixed-price bid.

Milestone E2 - Installation of VEGE, SVE or DPE Remediation Wells (Remedial Alternatives #1 through #4). Under this task, bidders shall provide a firm fixed-price cost for installing a network

of VEGE, SVE or DPE remediation wells depending on which remedial alternative is selected by the bidder. For the purpose of this RFB, each bidder shall base its bid response on the following:

Alternative #1: VEGE in overburden and shallow bedrock (on- and off-property): Each bidder shall specify the anticipated number of VEGE wells and depict their locations to remediate the impacted areas beyond the designated excavation boundaries. Preliminary well construction details shall also be provided.

Alternative #2: Combination VEGE in overburden and shallow bedrock (on- and off-property) and SVE/venting in UST field: Each bidder shall specify the anticipated number of VEGE wells and depict their locations to remediate the impacted areas beyond the designated excavation boundaries and the expected number of SVE wells necessary to address the impacted UST field backfill. Preliminary well construction details shall also be provided.

Alternative #3: Combination DPE in overburden and shallow bedrock (on- and off-property) and SVE/venting in UST field: Each bidder shall specify the anticipated number of DPE wells and depict their locations to remediate the impacted areas beyond the designated excavation boundaries and the expected number of SVE wells necessary to address the impacted UST field backfill. Preliminary well construction details shall also be provided.

Alternative #4: Combination VEGE in overburden and shallow bedrock (on-property only), off-property CBP and SVE/venting in UST field: Each bidder shall specify the anticipated number of VEGE wells and depict their locations to remediate the impacted on-property areas beyond the designated excavation boundaries and the expected number of SVE wells necessary to address the impacted UST field backfill. Bids shall specify and depict the anticipated off-property CBP injection locations, frequency, volumes and protocols for application and performance monitoring. Preliminary well construction details shall also be provided.

Again, for preparing bid responses, bidders shall assume the modified excavation boundaries and areas for application of VEGE, SVE/venting, DPE or CBP for remedial Alternatives #2, #3 and #4 as depicted in Attachment 3h. Those bidders selecting remedial Alternative #1 shall follow the remedial approach proposed in the PADEP-approved RAP.

The borings for the remediation wells shall be advanced using appropriate drilling methods based on subsurface conditions and the expected well depth / materials encountered (e.g., hollow-stem auger, air-rotary, air-hammer, etc.). During drilling activities, bidders shall examine and describe the drill cuttings for lithology, groundwater occurrence and potential staining / odor

indicative of hydrocarbon contamination.[27] The remediation wells shall be constructed in general accordance with the PADEP Groundwater Monitoring Guidance Manual. Each bid response shall state the drilling methods used to advance the boreholes, the total depth for each well, and well construction details (i.e. well casing diameter, screened interval, sand pack, etc.). Final construction of the remediation wells must ensure that placement of the screened interval will facilitate remediation of the target horizons. When considering the locations and construction of the remediation wells, bidders must take precautions to ensure that no short-circuiting will occur to atmospheric air or more permeable backfill materials (where applicable).

Each bid response shall describe and account for the following in the fixed-price: (i) identifying subsurface utilities and other buried features of concern including, but not necessarily limited to, contacting PA One Call and clearing the borehole locations to a minimum depth of 5 feet using vacuum excavation or hand auger, as necessary; (ii) well development activities; (iii) management of IDW; and (iv) professional surveying of the new well locations and ground surface / top-of-casing elevations. Well drilling / installation and development along with supporting documentation (e.g., waste manifests, boring logs and construction details, etc.) shall be documented in a quarterly RAPR (Milestone F).

The SOW and fixed-price cost for Milestone E2 shall also state / provide the following:

- The remedial design shall take into account existing site constraints such as the UST infrastructure. **Note that extreme caution must be exercised during any intrusive work within or near the UST field and product piping.**
- A site plan depicting the proposed locations for the remediation wells / injection points (as applicable).

Milestone E3 – In-situ Remedial System Final Design, Equipment Purchase and Assembly (Remedial Alternatives #1 through #4). Any equipment[28] that has moving parts or is part of the electronic control system (e.g. pumps, blowers, gauges, electrical sensors & switches) necessary to implement the RAP, RAPA or RRAP shall be purchased new, and other equipment (e.g. holding tanks, trailer/shed) is not required to be purchased new provided that such used equipment is guaranteed to properly function for the life of the contract. The remedial system (VEGE, SVE, or DPE) shall be pre-assembled and tested as much as possible as a turn-key prefabricated system prior to site deployment. Under this approach, the purchased equipment is to be fully integrated and tested electrically and mechanically inside an enclosure (properly insulated with appropriate lighting, heating & ventilation systems) meeting applicable NFPA/NEC codes before being shipped to the site. After delivery and setting in place, final

[27] The collection of soil samples for laboratory analysis will not be required during the drilling activities. Soil sampling to better define the contamination can be proposed in Milestone A.

[28] All equipment purchased under this contract will become the property of the Solicitor. The selected consultant shall be responsible for operating and maintaining the equipment for the specified number of years included within their bid beginning from the date of successful remediation system startup.

connections shall be made to the electrical service and subsurface piping / conduits. Electrical equipment shall meet NEC classification requirements (e.g., Class I, Div 2, where appropriate). Bidders shall contact the local electric service provider to determine the type of service available to the VCC facility. Bidders shall consider the compatibility of this type of electrical service with the remediation system equipment proposed for the final system design. Temporary power supply alternatives may be available which would need to be determined through inquiry with the electric service provider. Clear and legible copies of all equipment manuals and warranties shall be provided to Solicitor.[29]

Given the history of SPH observed at the VCC site, including 1.5 feet of product recently measured in monitoring well MW-2 during the January 2019 gauging event, bidders shall assume that groundwater treatment will require an oil-water separator (OWS). Bidders shall also assume that groundwater treatment will require metals sequestration and enhanced sediment filtration based on the March 2018 pilot testing observations and laboratory analyses of groundwater samples. The magnitude of vapor-phase contaminant mass that will initially be extracted is unclear and shall be estimated during the pilot testing conducted under Milestone B above. For the purpose of this RFB, bidders shall assume that two ~300 pound vapor-phase granular activated carbon (VGAC) vessels will be sufficient for treating system off-gas. However, should it be demonstrated that temporary use of a catalytic oxidizer (CatOx) unit may be more efficient / economical to treat system off-gas during the first few months of remedial system operation based on the vapor-phase contaminant mass being extracted, related costs will be covered under Optional Cost Adder Milestone UC1.

Given the excessive dissolved- and free-phase (hydrocarbon sheen) contamination observed in the c-store sump, shallow groundwater and potential vapor intrusion risk in the c-store building, bidders shall also assume that the VEGE (Alternatives #1, #2 and #4) or DPE (Alternative #3) remedial system design shall incorporate the necessary trenching, piping, connections and other components / hardware (e.g., appropriately sized groundwater pump) to allow continuous groundwater extraction / treatment and vapor extraction / treatment[30] from the sump.

Please note that the proposed remedial system shall be equipped with telemetry. The selected consultant shall coordinate with the telephone, cable or internet service provider to bring and provide appropriate service to the location of the remediation equipment to allow remote communications and document up-time. Payment of the service connection shall be the responsibility of the selected consultant and shall be accounted for in the quoted fixed-price bid.

[29] As mentioned under Milestone B above, extracted & treated groundwater generated during the March 2018 pilot testing was discharged to the local sanitary sewer system under permit with the Borough of Indiana (industrial discharge permit).

[30] Vapor extraction from the sump shall be engaged, as necessary, based on the indoor air sampling results provided under Milestone I).

Milestone E4 – In-situ Remediation Equipment Shed / Trailer Location, Trenching, Subsurface Piping, Mechanical, and Electrical (Remedial Alternatives #1 through #4). Under this task, the selected consultant shall coordinate with the property owner to agree on a suitable area on-property for locating the remedial system shed / trailer, off-gas treatment equipment, etc. For the purpose of this RFB and to avoid business disruption, bidders shall assume that the remediation shed / trailer will be positioned adjacent to the northwest wall of the c-store building. On the figure requested per Milestone E2 above, bidders shall also depict the proposed location for the remediation equipment compound and the proposed piping / trenching configuration.

Required and appropriately sized piping and electrical conduit/wiring shall be trenched and buried (below the frost line for water conduits) extending between the remediation equipment location and the extraction wells and c-store sump based on the selected remedial alternative. Buried piping shall be installed with tracer wire to facilitate locating the subsurface lines after the trenches have been backfilled. Buried piping shall be tested for integrity and documented before trench backfilling. Buried piping and conduit stub-ups shall be terminated and secured in the remediation equipment area to facilitate final connections to remediation equipment. Above-grade piping designed to carry or having the potential to carry water shall be properly winterized to prevent freezing and pipe breakage. Surface restoration from all trenching and well head completions shall be similar to current conditions.

Milestone E5 – Final Connections and Startup / Trouble-Shooting of the In-situ Remediation System (Remedial Alternatives #1 through #4). The selected consultant shall make the final connections between piping / conduit stub ups, power drop / meter and the manifold(s) / conduits on the interior of the pre-assembled and tested treatment system. Any sections of above-grade water piping located outside of the equipment enclosure will need to be freeze-protected (e.g., by insulation and heat tracing).

The selected consultant shall start up and demonstrate proper operation of the remediation system equipment, and each bid response shall describe start-up / trouble-shooting procedures. At a minimum, such demonstration shall include written “startup documentation” to the Solicitor and ICF/PAUSTIF that: (a) all below- and above-grade equipment is operational; (b) the design parameters are achievable at the treatment system and at the well heads; (c) all safety and control switches function properly; and (d) the system can operate automatically (without manual intervention). To the extent problems are identified during the site work preparation and/or remediation system installation and start-up phases, the successful bidder shall repair these problems and repeat the proper system operation demonstration.

Also as part of this task, the selected consultant shall prepare an operations and maintenance (O&M) Plan, and as part of the O&M Plan, the selected consultant shall also be responsible for developing a checklist to be completed by field technicians during subsequent O&M visits that will provide key information deemed necessary to evaluate remediation performance, permit compliance, and system maintenance on a continuing basis. Each bid response shall include

an appropriate example of an O&M checklist that identifies typical minimum data requirements to be recorded during each O&M site visit.

The selected consultant shall provide the Solicitor with a copy of the O&M Plan prior to remediation system startup, and a hard copy of as-built drawings for the remediation system upon completion of the successful system startup.

Bidders shall assume that Solicitor and the PAUSTIF will inspect and confirm that the system has been installed as described in the fixed-price agreement and in the remedial system final design, and is in daily operation as described in the remedial system final design. The selected bidder shall contact ICF/PAUSTIF immediately following completion of start-up / trouble-shooting and when the system is fully operational to schedule an independent inspection visit by PAUSTIF or its agents.

Milestone E6 – Soil Excavation (Remedial Alternatives #1 through #4) and ODP Application (Remedial Alternatives #2 through #4). Under this milestone, bidders shall provide a firm fixed-price cost to complete excavation of impacted source soil along with pre-backfilling ODP application, backfilling and surface restoration consistent with pre-existing surface conditions. For bidding purposes, bidders selecting remedial Alternative #1 shall base the excavation dimensions on those depicted in the January 2019 RAP and bidders selecting remedial Alternatives #2, #3 or #4 shall base the excavation dimensions on those illustrated in Attachment 3h. Bid responses shall consider appropriate precautionary measures when excavating near the UST field such as the use of shoring or trench boxes, and possibly retaining the services of a certified UST installer to be present during digging around the UST.

Should the horizontal and/or vertical boundaries of one or more of the excavation areas need to be expanded based on field screening / observations, and after written consultation with PAUSTIF / ICF, the costs of the added digging, backfilling, surface restoration and management will be addressed via bid optional unit cost adders (discussed below).

Accumulating groundwater during excavation can be expected and will require proper management. Since the volume of impacted groundwater that would require management for disposal cannot be precisely determined at this time, compensation to the successful bidder will be based on a fixed, per-gallon unit cost for the management, sampling, loading, transportation and disposal (or on-site treatment & regulatory permitted discharge) of impacted groundwater removed from the soil excavations. The successful bidder will only be reimbursed for the actual gallons of water removed from the excavations and properly disposed. The successful bidder is expected to follow normal industry practices when scheduling the work to avoid excessive precipitation events to the extent possible and to conduct the excavation and backfilling work as quickly and efficiently as possible to minimize water production.

As previously mentioned, subsurface utilities beneath and adjacent to the VCC facility include natural gas, municipal water, electric, a communications line, storm sewer and sanitary sewer. Given the locations of these underground utilities as depicted in the figure provided in Attachment 3a, and the assumed soil excavation footprints delineated in the figures provided in the January 2019 RAP (remedial Alternative #1) or in Attachment 3h (remedial Alternatives #2, #3 and #4), soil removal activities could potentially encounter the sanitary sewer line that extends along the southern property boundary of the Young engineering parcel. Excavation activities may also encounter a communications line located beyond the northern side of the UST field.[31] Should the sanitary sewer line need to be temporarily disconnected, cut and repaired, these activities shall be covered under optional cost adder Milestones E6A. The selected bidder shall determine the nature of the communications line before initiating the soil excavation activities to determine the service provider, the exact location and type of line, and whether the line is still in service. In the unlikely event that the communications line might be a fiber optic cable, relocating the cable for the excavation would be considered a Changed Condition under the contract. Otherwise, the successful bidder will be expected to break and restore full operation of the communication utility to enable the remediation work to be completed. Additionally, the RAP and alternative soil excavation footprints will each intersect the UST field vent lines which will need to be temporarily disconnected and repaired.

For remedial alternatives #2 through #4, the bidder's fixed-price cost for this milestone shall describe how the bidder will apply the ODP to the base and sides of the excavations including applied volumes / mass and focus zones. Each bid shall provide details regarding the proposed manufacturer and product model / product composition, the volume / mass to be used (and basis), and the basis of design for the material mass proposed to be applied.

Fixed-price bids shall also include backfilling and mechanically compacting in lifts the excavated volumes. Backfill shall consist of a combination of reused "clean" site soil and imported clean fill. Excavated material stockpiled on site for re-use shall be sampled prior to backfilling, and the fixed-price bid shall include costs for the sampling and laboratory work in accordance with PADEP guidance documents. The successful bidder shall place all backfill materials into the excavation in 1-foot lifts.

Excavated "clean" soil determined to be acceptable for re-use through sample analysis, and any imported soil, shall be placed into the excavation first. Each soil lift shall be mechanically compacted to within 95% of the maximum density of the backfill material, as determined through standard Proctor analysis. In-situ density testing of each individual compacted soil lift shall be completed by a qualified subcontractor using Nuclear Density Gauge testing methods. If supplemental gravel backfill is used, it shall also be mechanically compacted to preclude settlement. Mechanical compaction of backfill shall be conducted by means capable of

[31] Information regarding the depth to the sanitary sewer and communications lines is not available. Also, only a small segment of the buried communications line has been delineated.

achieving the soil criteria specified above (e.g., tamping rollers, sheep foot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers that are appropriate for the material being compacted). The backfill materials shall be free of vegetation, stone exceeding gravel dimensions, trash, lumber, and other unsuitable materials to ensure adequate compaction and eliminate voids & future settlement. The backfill material characteristics, combined with the placement / compaction methods described above, shall result in a stabilized subsurface condition capable of supporting normal traffic and use loads at this commercial facility. Bids shall also include surface paving and other completion / restoration (e.g., revegetation) to restore the excavated areas to pre-excavation conditions.

Fixed-price bids for the excavation work shall include any waste profiling (including any sampling & laboratory work) and securing waste facility acceptance prior to beginning the soil excavation.

The SOW and fixed-price cost for Milestone E6 shall state / provide the following:

- Only excessively impacted soil (i.e., excavated soil exceeding the stated PID screening threshold) shall be transported and disposed off-site;
- Several monitoring wells are anticipated to be destroyed during the excavation work. Bids shall identify the wells within the excavation footprint to be destroyed. These wells will need to be decommissioned in accordance with PADEP guidance as part of this task prior to initiating the excavation activities. Any destroyed monitoring or observation well shall be replaced at, or as close as possible to its original location. Construction details for the replacement wells shall be identical, or as close as possible to the original wells. Note that the number of wells requiring decommissioning / replacement will vary depending on whether a bidder chooses remedial Alternative #1, or Alternatives #2, #3 or #4;
- A detailed discussion regarding the excavation approach; groundwater management; soil screening and segregation techniques (including the PID screening threshold for determining “clean” versus excessively impacted soil); clean fill sampling and plans for reuse; waste management and profiling; plans for soil staging; the possibility for direct loading of excessively impacted soil; type of backfill; backfilling / compaction methods; plans for surface restoration; records keeping, etc.;
- **A comprehensive and complete fixed-price bid for Milestone E6 that shall *only* <u>exclude</u> the costs for (1) excessively contaminated soil transportation and disposal ($/ton); (2) clean fill importation ($/ton); and (3) contaminated water transportation and disposal ($/gal).** Bidders shall provide fixed-cost unit rates for these tasks under Optional Cost Adder Milestones UC2, UC3, and UC4, respectively; and
- A schedule for implementing and completing the excavation work.

In addition to providing a fixed-price bid for excavating, backfilling, restoring the defined excavation area, and well abandonment and replacement activities, bidders shall also provide excavation-related unit costs (included on the Attachment 2, Bid Cost Spreadsheet) to accommodate variable quantities and changes that may be required. These unit costs are:

UC2 Management, loading, transportation and proper off-site disposal of excessively contaminated soils (cost per ton);

UC3 Purchase, transportation and on-site management of clean imported fill to replace exported excessively contaminated soil (cost per ton);

UC4 Management, sampling / analysis, loading, transportation and disposal of impacted groundwater removed from the soil excavation (cost per gallon);

UC5 Additional excavation beyond identified excavation limits and additional backfilling & compaction, excluding excessively contaminated soil transportation / disposal costs since these are captured under UC2 (cost per in-place cu yard);[32] It shall also exclude UC3, UC4, and UC6 / UC6A cost components as these would be accounted for under these other unit cost factors;

UC6 Surface restoration of asphalt areas beyond identified target excavation limits (cost per square foot); and

UC6A Surface restoration of vegetated soil areas beyond identified target excavation limits (cost per square foot).

When evaluating the cost component of technically qualified bid responses, the bidders unit costs for UC2, UC3, and UC4 will be added to the bidders total fixed price provided in Attachment 2 using the following assumed totals – 660 tons (remedial Alternative #1) and 1,000 tons (remedial Alternatives #2, #3 & #4) for T&D of impacted soils (assumed fraction of the excavated soil requiring off-property T&D and same amount of clean fill importation), and 4,000 gallons (remedial Alternative #1) and 6,000 gallons (remedial Alternatives #2, #3 & #4) of impacted groundwater for disposal.

The details of the soil removal activities shall be documented in a contemporaneous quarterly RAPR (Milestone F) and the RACR (Milestone J) and, at a minimum, shall include the following: scaled drawings depicting the lateral and vertical dimensions of the completed excavations superimposed on the site plan; all field observations and PID readings; the volume of soil excavated, disposed off-site, used as backfill, and imported for backfill; waste profiling documentation; soil waste disposal manifests and disposal facility; source and amount of imported fill; quantity of added ODP and emplacement details; impacted groundwater management; systematic random soil sampling locations & depths and laboratory analyses;

[32] The successful bidder cannot count on reimbursement of excavation beyond the limits depicted in the figure provided in the RAP (Alternative #1) or in Attachment 3h (Alternatives #2, #3 and #4) without having obtained prior written approval of the supplemental work by Solicitor and PAUSTIF or their agents before completing the supplemental excavation work.

dated photographs taken before breaking ground, throughout the excavation, and after restoration; and documentation (boring logs / well construction diagrams and survey information) for any replacement monitoring wells.

Milestone E7 – Post-Excavation Soil Attainment Sampling. After the soil excavation work has been completed for remedial Alternatives #1 through #4, and prior to backfilling the excavations, soil samples shall be collected from the excavation sidewalls for demonstrating attainment of the SHS. The selected bidder shall develop and implement a program for systematic random soil sampling (SRSS) to be applied along the perimeter of the excavation sidewalls and span the depth interval of unsaturated *and* smear zone soils where excessive contamination was found during characterization. The SRSS grid shall not extend into the zone of permanent saturation. Each bidder ***must*** describe in detail its approach to addressing soil attainment, and include the depth interval, a drawing showing the locations where the sampling grid, or grids, would be applied, and the number of samples needed to demonstrate soil attainment.

The location / depth of the soil samples shall be determined using PADEP's SRSS procedures, assuming one soil sample per random grid point shall be submitted for laboratory analysis. Alternate SRSS points shall be selected for any primary SRSS sample location that could possibly encounter an existing below grade utility or other possible subsurface obstruction. Soil samples shall be analyzed for the current PADEP short-list of unleaded gasoline and diesel fuel parameters by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate quality assurance/quality control (QA/QC) samples shall also be obtained for laboratory analysis of the same parameters.[33] The soil sampling results shall be evaluated using PADEP's 75%/10x or 75%/2x Ad Hoc Rules, as appropriate. Soil attainment sampling methods and results shall be documented in the RACR.[34]

Milestone E8 – In-Situ Sorption / Bioremediation via CBP Injection Technology (Remedial Alternative #4). Under this milestone, bidders shall provide a detailed work scope and fixed-price cost for the injection of a sorption / bioremediation CBP media to address residual groundwater impacts exceeding the NRUA SHS MSCs in overburden and shallow bedrock on the Young Engineering property in lieu of VEGE or DPE. The area of CBP injection assumed for bidding purposes is delineated on the figure provided in Attachment 3h for remedial Alternative #4. Bidders shall assume that the CBP media would be injected after the excavation is completed and shall be applied to smear zone soil and the zone of permanent groundwater saturation extending to a depth at least equivalent to the total depth of the most impacted off-property shallow bedrock well (MW-5BR; 26.5 ft). Each bid must provide a figure depicting the proposed CBP injection area, the proposed number of injection points and injection point grid, details regarding the proposed manufacturer and product model / composition, volume of

[33] Each bidder's approach to the collection of soil samples shall clearly identify the number of samples, QA/QC measures, analytes, and other key assumptions affecting the bid price.
[34] If the soil data do not allow for attainment of the selected standard, a new condition would exist under the Remediation Agreement.

material to be used (and basis), how the injectant will be applied to the subsurface and volume per injection location, and depth interval(s) for injectant delivery.

For the purpose of this RFB, it is assumed that only one injection event will be required to reduce off-property groundwater concentrations to below the NRUA SHS MSCs over the contract period of performance. However, each bid must specify the timeframe along with supporting rationale for when a potential second CBP injection event would occur, if a second event is eventually determined to be necessary, to achieve and demonstrate attainment of the SHS in off-property groundwater. An additional CBP injection event beyond the event specified in this RFB shall be defined on the Bid Cost Spreadsheet and shall be incorporated in the Remediation Agreement as Optional Cost Adder Milestone E8A.[35]

Each bid response shall describe and include in the fixed-price cost for this milestone: (i) identifying subsurface utilities and other buried features of concern including, but not necessarily limited to, contacting PA One Call and clearing the injection borings using vacuum excavation; (ii) borehole abandonment and surface restoration; and (iii) management of IDW. Detailed descriptions of this work and any supporting documentation (e.g., waste manifests, etc.) shall be documented in a quarterly RAPR (Milestone F).

Milestone F – Remediation System O&M and Groundwater Monitoring, Sampling & Reporting (Remedial Alternatives #1 through #4). For this milestone, bidders shall provide the Solicitor and PAUSTIF with firm quarterly fixed-price unit costs that would include routine O&M of the VEGE system (Alternative #1), VEGE and SVE/venting systems (Alternatives #2 and #4), or DPE and SVE/venting systems (Alternative #3),[36] quarterly groundwater monitoring and sampling of the monitoring well network, and reporting. The quarterly fixed price cost shall also include responding to any unexpected telemetry-triggered O&M visits.

For the purpose of this RFB, it is assumed the Milestone F remedial system O&M activities will be required for:

Alternative #1: 20 quarters (5 years) of remediation system O&M;
Alternative #2: 12 quarters (3 years) of remediation system O&M;
Alternative #3: 12 quarters (3 years) of remediation system O&M; or
Alternative #4: 12 quarters (3 years) of remediation system O&M.

However, each bid *must* specify the remediation timeframe (i.e., number of O&M quarters) that the bidder's proposed remedial approach will need in order to achieve the project goal of demonstrating stability of the contaminant plume and reducing soil and groundwater

[35] The Remediation Agreement includes a Site Specific Assumption that the CBP injection events will not exceed the one event under Milestone E8 plus one additional event under Optional Cost Adder Milestone E8A.
[36] Electric usage; telephone, cable, internet service; and any discharge to the local treatment facility will be reimbursed as time-and-material cost adders to the Remediation Agreement.

contaminant concentrations to below the NRUA SHS standards, enabling initiation of the groundwater attainment demonstration.[37,38] The bidder's realistic assessment of remediation timeframe (total number of operating quarters) shall be defined on the Bid Cost Spreadsheet and shall include the additional number of remediation quarters, beyond the assumed quarters specified in this RFB (e.g., if a bidder believes it can complete the remediation in a total of 16 quarters of O&M when the RFB assumed quarters is 12, then the additional number of quarters to be included on the Bid Cost Spreadsheet is four (4) quarters). If the bidder's O&M remediation timeframe exceeds the RFB assumed quarters, the number of quarters exceeding the RFB assumption will be incorporated in the Remediation Agreement as Optional Cost Adder Milestone F13 through F*n* (Alternatives #2, #3 and #4) or F21 through F*n* (Alternative #1).

Bidders shall assume that the remediation will need to continue until the NRUA SHS MSCs for the target unleaded gasoline and diesel fuel compounds in the POC and off-property attainment wells have been met for at least two consecutive quarterly monitoring and sampling events. Under these conditions, it is deemed reasonable to initiate the groundwater attainment demonstration. Each bid must explicitly state the bidder's understanding of the project goal for when O&M of the remedial system would be discontinued and attainment sampling shall begin.

If the Consultant decides to discontinue O&M activities before all 12 (Alternatives #2, #3 and #4) or all 20 (Alternative #1) Milestone F quarterly events are completed in order to initiate groundwater attainment early, the Consultant will bear some risk if groundwater contaminant concentrations rebound during subsequent attainment monitoring. More specifically, if the remedial system is shut down before all of the Milestone F quarterly events are completed, the Consultant will be required to wait a minimum of two months before initiating the groundwater attainment demonstration (Milestone H). If during the first quarter of groundwater attainment, concentrations of contamination rebound above the NRUA SHS MSCs, the Consultant shall be obligated to restart the system within 7 days and continue with the residual quarterly Milestone F activities. Then, **when all the RFB-assumed O&M quarters of the Milestone F activities have been completed (plus any or all of the Cost Adder Milestone F quarters) and groundwater attainment activities are re-initiated, the Consultant who initially pre-maturely idled the remediation system will be obligated to perform the first of the restarted series of quarterly attainment events at no cost**. Responsive bids will explicitly state an understanding of the possible consequences of early termination of the RFB-assumed quarters of O&M under Milestone F.

[37] During the bidder's specified timeframe of site operations, maintenance, and monitoring subsequent to remediation system startup, the selected consultant, at its own expense, including **all** associated labor, shall be responsible for repairing or replacing equipment purchased for the RAP, RAPA or RRAP implementation that becomes damaged, destroyed, or defective.

[38] If the groundwater data allows for discontinuing remedial activities prior to reaching the bidders specified timeframe for remedial system operation, the selected consultant will only be reimbursed for O&M events that have been completed.

Each bid must specify the number of site visits to occur each quarter. O&M tasks will be primarily focused on data collection and evaluations to: (1) determine, demonstrate, and document remediation performance; (2) properly maintain the system equipment; and (3) demonstrate compliance with permits and other applicable regulatory requirements.

- *Performance monitoring* shall include data collection and evaluations geared toward evaluating how well the remedial strategy is working and making necessary adjustments to the system operational configuration to optimize system performance. As applicable, depending on the type of remediation system installed, performance monitoring activities are to include, but not necessarily be limited to, measurements that: i) show the design vacuum, air pressure, groundwater flow rate and vapor flow rate is achieved at the injection / extraction well heads; ii) demonstrate the target zone of contamination is being pneumatically and hydraulically influenced; and iii) provide for contaminant mass recovery quantification. The selected consultant shall report quarterly concerning its evaluations of system performance and system optimizations performed.

- *System maintenance & related monitoring* shall include monitoring and routine maintenance as specified by the equipment manufacturer(s) to ensure warranties are not voided and the equipment is kept in good working order. Operational time shall be logged by system instrumentation and reported quarterly to the Solicitor. The selected consultant is expected to maintain at least an 85% uptime on the system during each quarter. Failure to meet this minimum expectation over two consecutive quarters will constitute, at the Solicitor's sole discretion, a breach of contract and the Solicitor may choose to terminate the contract.

- *Compliance monitoring* shall include system and site sampling needed to demonstrate compliance with permits and other applicable regulatory requirements. Documentation of compliance shall be provided to the Solicitor in quarterly RAPRs and in any other reporting required by permitting agencies (e.g., local POTW).

Each Milestone F quarterly groundwater monitoring and sampling event shall include the on- and off-property overburden and shallow bedrock monitoring well network and sumps previously identified under Milestone D (MW-1 through MW-16, MW-1BR through MW-9BR and the UST field and c-store sumps).[39] During each event, the depth to groundwater and any potential SPH shall be gauged in all available monitoring points prior to purging and sampling. Groundwater level measurements obtained from the monitoring points shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient. The conduct and

[39] The fixed price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestone A (if any).

results of each event shall be documented in RAPRs. Bidders shall manage purged groundwater and other derived IDW generated by the purging and sampling activities in accordance with the PADEP NWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short-list of unleaded gasoline and diesel fuel parameters by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and analyzed for the same parameters.[40] In addition, each event shall include field measurements for these water quality parameters: pH, temperature, specific conductance, dissolved oxygen (measured in-situ), oxidation / reduction potential, and TDS.

The RAPRs describing the sampling methods and results shall be provided to the PADEP on a quarterly basis and within 30 days of the end of each quarter. At a minimum, each RAPR shall contain the following:

- A summary of site operations and remedial progress made during the reporting period, including dissolved and vapor-phase contaminant mass recovery estimates;
- Narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored wells documenting the depth to groundwater and thickness of any free product. This data shall be presented on the same table as the historical quantitative groundwater analytical results;
- Groundwater elevation contour maps depicting groundwater flow direction in the overburden and shallow bedrock;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[41]
- For each well exceeding SHS, a graphical depiction of historical key contaminant concentrations and groundwater elevations to provide an assessment of correlations between fluctuating water levels / precipitation events and contaminant concentrations;
- For each well exceeding SHS, a graphical depiction of recent key contaminant

[40] Each bidder's approach to implementing Milestone F shall clearly identify the number of sampling events, number of wells / samples per event, well purging and sampling method(s), QA/QC measures, analytes, purge water management methods, and other key assumptions affecting the bid price.
[41] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format to the Solicitor upon request.

concentration trends;

- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, shrinking, or expanding plume;
- Evaluation of system performance including contaminant mass recovery quantification and system optimizations performed;
- Operational time shall be logged by system instrumentation and reported in the RAPRs. If less than 85% uptime has been achieved, documentation of operational problems shall be provided along with the changes / modifications implemented to improve performance consistency;
- Treatment and disposal documentation for waste generated during the reporting period; and
- Demonstration of compliance with the required Federal, State, and local permits and approvals.

PAUSTIF will only reimburse for the necessary quarterly O&M and groundwater sampling / reporting events actually completed under this milestone (e.g., this milestone shall be considered completed with the initiation of Milestone H (Groundwater Attainment Demonstration). If, in order to achieve the cleanup goals, it is necessary to extend the period of O&M beyond the RFB-specified number of quarters, each additional quarter, up to the total number of Consultant's bid O&M remedial timeframe, will be addressed via Optional Cost Adder Milestone F13 through F*n* or F21 through F*n*. Consultant shall seek and obtain written approval from Solicitor and PAUSTIF to continue operation of the remedial system (Milestone F13 through F*n* or F21 through F*n*).[42]

Each quarterly RAPR shall be signed and sealed by a Professional Geologist and / or Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the RAPR).

To provide added incentive for the successful bidder to regularly scrutinize remedial system performance and optimize system operations for maximal efficiency in completing the remedial O&M to achieve closure as expeditiously and cost effectively as possible, **10% of each quarterly payment for this milestone (and Optional Cost Adder Milestone F13 through F*n* or F21 through F*n*, if implemented) will be withheld and accumulated pending successful completion of remediation and initiation of groundwater attainment activities (Milestone H).** When this condition has been met, the accumulation of 10% holdback payments, for the

[42] The Remediation Agreement includes a Site Specific Assumption that remediation will be complete and groundwater attainment activities will be initiated within the O&M timeframe Consultant has bid.

Milestones actually completed, will be reimbursed in one lump sum to the successful bidder.[43] The 10% hold-back milestone will not be paid for an in-situ remediation system that has not attained the cleanup goal within the Consultant's bid remediation timeframe.

Milestone G – Performance Evaluation of RAP, RAPA or RRAP Remedial Approach (Remedial Alternatives #1 through #4). Under this milestone, the selected bidder shall complete a performance evaluation of its remedial approach based either on the January 2019 RAP or the PADEP-approved RAPA or RRAP, depending on the remedial alternative selected. The performance evaluation shall determine if the remedial approach is efficiently and effectively remediating residual adsorbed- and dissolved-phase contamination and achieving the intent of the RAP, RAPA or RRAP design. The remedial performance evaluation shall be conducted within 6 to 9 months (i.e., two to three quarters) after the selected bidder has fully implemented the proposed site remedy. Milestone G shall culminate in a written report presenting the testing performed, conclusions reached and recommendations to address all discovered deficiencies and to improve remediation effectiveness. Recommendations may include both changes to operations and modifications / augmentations to the remedial design. All recommendations shall include estimated costs to implement and Solicitor may decide to accept or reject any or all recommendations. Should the selected consultant identify deficiencies and recommend actions to optimize remedial effectiveness, and the stakeholders agree with the necessity and appropriateness of one or more of the recommendations, then enabling contracting mechanisms will be explored at that time.

More specifically, the purposes of the performance evaluation shall include a critical analysis of:

- Hydraulic and pneumatic influence measurements for the operating in-situ remediation system to ensure the RAP, RAPA or RRAP design is being achieved;
- Quantified dissolved- and vapor-phase contaminant mass recovery estimates;
- Changes in groundwater quality and chemistry; and
- How the remedial approach is working relative to the plan and any deficiencies / planned corrective measures.

The bidder shall provide a detailed description of the: i) proposed performance evaluation and rationale for testing; ii) proposed methods; iii) use of existing or installation of new data monitoring / collection points; iv) proposed equipment to be used; and v) data that is proposed to be collected. Each bid shall also describe how the data / information would be evaluated.

[43] Lump sum payment request shall be made prior to the on-set of initiating groundwater attainment activities.

The Milestone G proposal shall reflect an understanding that the selected bidder will prepare a draft and final version of the Remedial Performance Evaluation Report (RPER) for Solicitor and ICF/PAUSTIF independent engineering review and comment. The final RPER shall show that the performance evaluation testing was conducted according to the selected consultant's bid and shall constitute documentation for payment of Milestone G. As previously discussed, the RPER shall include recommended actions to address any operational deficiencies or remedial ineffectiveness / inefficiencies along with implementation capital and operational cost addition or reduction estimates. The written report shall be provided to Solicitor and PAUSTIF for review within three months of completing the remedial performance evaluation and shall serve as the basis for making decisions on the need for optimization of the remedial approach. Again, if the stakeholders agree that one or more of the recommendations are reasonable, necessary and appropriate, enabling contracting mechanisms will then be considered. The Milestone G activities shall also be reported in a concurrent RAPR.

Milestone H – Groundwater Attainment Demonstration. Under this task, bidders shall provide a firm fixed-price to conduct up to eight quarters of groundwater attainment monitoring, sampling and reporting after the criteria specified above under Milestone F for initiating the attainment demonstration have been met. [44] Each attainment groundwater monitoring and sampling event shall include the POC and off-property attainment wells defined in the PADEP-approved RAP (MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-2BR and MW-3BR [POC] and MW-10, MW-11, MW-5BR, MW-6BR and MW-8BR [off-property on adjacent Young Engineering parcel])l.[45] The conduct and results of each event shall be documented in quarterly RAPRs.[46] Any additional quarterly attainment monitoring and reporting events, beyond the eight quarters specified in this RFB, shall be defined on the Bid Cost Spreadsheet and shall be incorporated in the Remediation Agreement as Optional Cost Adder Milestone H9 through H12.

During each quarterly groundwater attainment monitoring and sampling event, the depth to groundwater shall be gauged in all available existing monitoring wells and prior to purging any of the designated monitoring wells for sampling. Groundwater level measurements obtained from the monitoring wells shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient.

Each of the monitoring wells designated for sample collection shall be purged and sampled in accordance with the PADEP Groundwater Monitoring Guidance Manual and standard industry

[44] Bidders shall include language in their bid that if groundwater data in the POC and off-property attainment wells have been either non-detect or below SHS for four consecutive quarters, the PADEP will be petitioned to approve a reduction in the number of groundwater attainment sampling events.

[45] The fixed price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestone A (if any) that may qualify as a POC or off-property attainment well.

[46] If it becomes evident anytime during the groundwater attainment demonstration (initiated subsequent to completing at least the twelve [12] or twenty [20] Milestone F quarters of remedial O&M) that the attainment demonstration will not be successful within the allotted 8 quarters (plus any additional quarters under Optional Cost Adder Milestone H) in one or more of the POC or off-property attainment wells (e.g., a greater than 10X result or more than two SHS exceedances, etc.), this will represent a New Condition under the contract.

practices. Any well exhibiting a measurable thickness of SPH shall not be purged and sampled. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with the PADEP NWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short-list of unleaded gasoline and diesel fuel parameters by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and analyzed for the same parameters.[47] In addition, each event shall include field measurements for the following parameters: pH, temperature, specific conductance, dissolved oxygen (measured in-situ), oxidation / reduction potential, and TDS.

The groundwater attainment demonstration reports describing the sampling methods and results shall be provided to the PADEP on a quarterly basis and within 30 days of the end of the current quarter. At a minimum, each attainment demonstration report shall contain the following:

- A summary of site operations and remedial progress made during the reporting period;
- Narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored wells documenting the depth to groundwater and thickness of any free product encountered. This data shall be presented on the same table as the historical quantitative groundwater analytical results;
- Groundwater elevation contour maps depicting groundwater flow direction in the overburden and shallow bedrock;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[48]
- For each well exceeding SHS, a graphical depiction of historical key contaminant concentrations and groundwater elevations to provide an assessment of correlations between fluctuating water levels / precipitation events and contaminant concentrations;

[47] Each bidder's approach to implementing Milestone H shall clearly identify the number of sampling events, number of wells / samples per event, well purging and sampling method(s), QA/QC measures, analytes, purge water management methods, and other key assumptions affecting the bid price.

[48] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format to the Solicitor upon request.

- For each well exceeding SHS, a graphical depiction of recent key contaminant concentration trends and results of any qualitative and quantitative analysis;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, shrinking, or expanding plume;
- Treatment and disposal documentation for waste generated during the reporting period; and
- Demonstration of compliance with the required Federal, State, and local permits and approvals.

Each groundwater attainment demonstration report shall be sealed by a Professional Geologist and / or Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the groundwater attainment demonstration report).

Milestone I – Indoor Air Vapor Intrusion Study. In the General Site Background and Description section of this RFB, a brief discussion was included regarding the historical soil vapor sampling conducted during May and July 2018 for which all target analytes were below their respective non-residential near-source SHS soil gas screening values. However, additional vapor intrusion (VI) assessment work appears necessary to further evaluate potential risk within the c-store building given: i) free product sheen was reportedly historically observed and recovered from the sump; ii) dissolved concentrations for some analytes in samples collected from the c-store exterior sump significantly exceeded the SHS during the May 2018 and January 2019 sampling events; and iii) shallow groundwater conditions exist in the area of the c-store and may periodically rise to elevations slightly above the basement slab during wet periods). A minimum of five feet of acceptable soil or soil-like material does not appear to be present between the groundwater and basement foundation level and the groundwater may intrude through preferential pathways.

Under Milestone I, each bidder shall describe its approach and provide a firm fixed-price cost for conducting a VI study consistent with the requirements of the revised PADEP Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil Under Act 2 (effective 1/18/17). The VI study shall determine if there are any current or future potentially excessive indoor air exposure risks that may need to be controlled via engineering and/or intuitional controls. Given the potential for basement sub-slab vapor sampling points to be flooded, the VI study shall consist of indoor air sampling in the c-store basement once all indoor commercial & incidental sources for potential sample interference have been removed consistent with the revised PADEP guidance.[49] The vapor intrusion study shall be completed

[49] Indoor air sampling shall not be conducted within the first floor c-store given the proximity of fueling activities to the front doors of the building which, due to the doors frequently opening and closing, could result in interferences resulting in false-positive vapor analytical results.

before Milestone B (Pilot Testing and Reporting). One initial and one confirmation indoor air sampling events shall be included. Results of the VI study shall be used to determine if excessive indoor air human health risks may exist requiring mitigation via engineering and institutional controls.[50] Each bidder shall provide a detailed description of its proposed methods, number and location of indoor air sampling points, sampling techniques and analysis, and number / timing of sampling events.

Vapor samples shall be submitted to a PADEP-accredited laboratory for analysis of the current PADEP short-list of unleaded gasoline and diesel fuel parameters using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and analyzed for the same parameters (e.g., blind duplicate). Results from the vapor intrusion assessment shall be taken into account when preparing the expanded RAPR, RAPA or RRAP (Milestone C).

Milestone J – Preparation, Submittal and PADEP Approval of Remedial Action Completion Report (RACR). Under this milestone, the bidder shall provide a fixed-price cost to prepare a draft and final RACR following the completion of Milestones E through I and related optional cost adder milestones, as necessary. The RACR shall be prepared in accordance with Section 245.313. At a minimum, the RACR shall provide the details for Milestones A through I, and any optional cost adder milestones. The RACR shall also discuss the selected closure criteria for the site, provide proof of soil and groundwater attainment, and request permanent closure for the site for the current release under an Act 2 Relief of Liability (ROL). The project schedule should allow two (2) weeks for Solicitor and PAUSTIF review and comment on the draft RACR before a final version is submitted to the PADEP. The selected consultant shall then prepare and submit the final RACR to the PADEP in accordance with Section 245.313, and the report shall be sealed by a Professional Geologist and / or Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the RACR). The fixed-price cost shall also include addressing any PADEP comments on the RACR.

The successful bidder will be eligible to receive payment for 75% of the bid amount for Milestone J when there is proof the document has been completed and submitted to PADEP. The 25% balance will be due for reimbursement once proof has been provided that PADEP has approved the Milestone J deliverable document.

Milestone K – Site Closure / Restoration Activities. Under this milestone, the bidder shall describe and provide a fixed-price bid for properly closing the site, including: removal of the remedial system and proper disposal of any remaining wastes; in-place abandonment of remedial system below grade piping; in-place abandonment of monitoring wells, remediation

[50] Should vapor mitigation be required on the current commercial c-store building, the design and implementation of such a vapor mitigation system would be considered a New Condition under the contract.

wells and soil vapor sampling points consistent with PADEP guidelines; well head removals; and surface re-vegetation and concrete / asphalt repairs, as applicable, for areas that have been disturbed by site characterization or remedial action activities. This milestone shall also include photo–documenting the site restoration work and completing well abandonment forms to be submitted to the appropriate regulatory agencies. Copies of these photographs and forms shall also be provided for the Solicitor's files.

Each bid shall specify the estimated number of days between PADEP approval of the RACR and initiating the Milestone K site restoration work. Site restoration activities shall be conducted in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Conduct of all site closure / restoration activities shall be coordinated with the Solicitor and property owner.

The selected consultant shall determine whether the Solicitor wishes to maintain any components of the remedial system, as applicable, before removing them from the Site.

Optional Cost Adder Milestones

A number of optional cost adders may come into play at this site. Therefore, bidders shall provide unit pricing for these contingencies outside the base RFB scope. Note that before any work associated with these unit cost adders is conducted, the selected consultant shall provide a written request and detailed technical explanation for ICF / its technical agent review and consideration ahead of any written authorization to proceed.

Optional Cost Adder Milestone D4 – Additional Pre-Remediation Quarterly Groundwater Monitoring, Sampling & Reporting. Under this milestone, bidders shall provide Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include the quarterly groundwater monitoring, sampling, analysis and reporting beyond the three quarters specified in Milestone D. The SOW for this unit cost adder milestone shall follow Milestone D guidelines. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone E6A – Remove / Replace Affected Section of Sanitary Sewer Line. Under this milestone, bidders are requested to provide a firm, comprehensive fixed-price unit cost to remove and replace the affected segment of sanitary sewer line should the line potentially be encountered during the soil excavation work. The fixed-price unit cost for this milestone shall also include notifying / securing approval from the local POTW and any subcontractor costs, as necessary.

Optional Cost Adder Milestone E8A – Conduct One Additional CBP Injection Event. Under this milestone, bidders shall provide Solicitor and PAUSTIF with a firm fixed-price unit cost for implementing one supplemental round of CBP injections. The SOW for this unit cost

adder milestone shall follow the scope of work prescribed under Milestone E8. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone F13 through F*n* or F21 through F*n* – Additional Remediation System O&M and Groundwater Monitoring, Sampling, & Reporting. Under this milestone, bidders shall provide Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include routine O&M of the remedial system, quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells, and reporting beyond the timeframe specified in Milestone F. The SOW for this unit cost adder milestone shall follow Milestone F guidelines. As described in Milestone F, a 10% holdback will be applied to each Optional Cost Adder Milestone F payment. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone H9 through H12 – Additional Groundwater Attainment Demonstration. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include the quarterly groundwater monitoring, sampling and analysis of the on-property POC wells and off-property attainment wells and reporting beyond the eight quarters as specified under Milestone H. The SOW for this unit cost adder milestone shall follow Milestone H guidelines. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone CA1 through CA*n* – Monthly Utilities & Discharge Fees. Bidders shall utilize this optional cost adder milestone for invoicing "as-billed" time and materials costs incurred for utilities (e.g., electric, telephone) or POTW discharge fees on either a monthly or quarterly basis, as appropriate.

Optional Cost Adder Milestone UC1 – Temporary Operation of CatOx Unit. Under this milestone, bidders shall provide a firm fixed-price unit cost incorporating charges for delivery and subsequent return of a CatOx unit, installation and removal of the CatOx unit from the remedial system, and CatOx unit rental and operational charges (e.g., electric usage) for a period of three months. Before implementing this optional milestone, Consultant must provide system data to PAUSTIF and Solicitor demonstrating the need for a CatOx unit and shall secure PAUSTIF/Solicitor approval. The fixed-price unit cost shall be inclusive of all labor, subcontractor costs, any permitting fees, and waste handling / disposal items. Bidder's shall also identify the mass recovery rate threshold / criterion for switching from CatOx treatment to VGAC (e.g., once TPH as gasoline mass recovery rates decrease to below X pounds per day, the CatOx unit will be replaced with VGAC).

Optional Cost Adder Milestone UC1A – Additional Months of CatOx Unit Rental. Bidders shall utilize this optional cost adder milestone for invoicing monthly rental of the CatOx unit beyond the period of three months specified under Optional Cost Adder Milestone UC1 above.

Any additional months of CatOx rental beyond the three months specified under Milestone UC1 will require PAUSTIF/Solicitor approval and shall adhere to the unit costs specified for Milestone UC1 in the Remediation Agreement. Note that charges for delivery and subsequent return of the CatOx unit, and installation / removal of the CatOx unit from the remedial system, will be fully captured under Milestone UC1.

Optional Cost Adder Milestone UC2 – Excessively Contaminated Soil Transportation and Disposal. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/ton) for managing, loading, transporting and properly disposing excessively contaminated soil at a facility approved for accepting this waste stream.

Optional Cost Adder Milestone UC3 – Clean Fill Importation. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/ton) for importing clean fill material (purchase, transport and on-site management) for use in backfilling the excavation. The imported clean fill will be used to supplement any excavated soil that is determined to be suitable for reuse based on sampling and laboratory analysis.

Optional Cost Adder Milestone UC4 – Contaminated Water Transportation and Disposal. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/gallon) for managing, sampling / analysis, loading, transporting and disposing excessively contaminated excavation water at a facility approved for treating this waste stream.

Optional Cost Adder Milestone UC5 – Expansion of Soil Excavation. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/in-place cubic yard) should expansion of the soil excavation beyond the dimensions defined in this RFB become necessary as warranted by field screening and other appropriate observations. The cost for this milestone shall exclude excessively contaminated soil transportation / disposal costs since these are captured under milestone UC2.[51] It shall also exclude UC3, UC4, and UC6 / 6A cost components as these would be accounted for under these other unit cost factors.

Optional Cost Adder Milestone UC6 – Surface Restoration (Asphalt). Under this milestone, bidders shall provide a firm fixed-price unit cost ($/square foot) for surface restoration of asphalt areas beyond the designated target excavation limits.

Optional Cost Adder Milestone UC6A – Surface Restoration (Vegetated Soil). Under this milestone, bidders shall provide a firm fixed-price unit cost ($/square foot) for surface restoration of vegetated soil areas beyond the designated target excavation limits.

[51] The successful bidder cannot count on reimbursement of excavation beyond the limits depicted in the January 2019 RAP or in Attachment 3h, depending on the remedial alternative selected, without having obtained prior written approval of the supplemental work by Solicitor and PAUSTIF or their agents before completing the supplemental excavation work.

Optional Cost Adder Milestone UC7 – LGAC Change-Out. Under this milestone, bidders shall provide a firm fixed-price unit cost for each LGAC change-out event of the "primary" LGAC vessel, placing the vessel with the fresh virgin GAC in the secondary position. Bidders shall detail the size of the LGAC units (pounds / type of GAC), scope of work and provide the criteria or "trigger(s)" that would be used in determining when the LGAC needs to be replaced (e.g., once the carbon in the LGAC unit has adsorbed 3 to 5% of its weight in TPH as gasoline contamination determined by mass recovery calculations). The fixed-price cost shall be inclusive of all labor, subcontractor costs, LGAC replacement, and waste handling / disposal items.

Optional Cost Adder Milestone UC8 – VGAC Change-Out. Under this milestone, bidders shall provide a firm fixed-price unit cost for each VGAC change-out event of the "primary" VGAC vessel, placing the vessel with the fresh virgin GAC in the secondary position. Bidders shall detail the size of the VGAC units (pounds / type of GAC), scope of work and provide the criteria or "trigger(s)" that would be used in determining when the VGAC needs to be replaced (e.g., once the carbon in the VGAC unit has adsorbed 15 to 20% of its weight in TPH as gasoline contamination determined by mass recovery calculations). The fixed-price cost shall be inclusive of all labor, subcontractor costs, VGAC replacement, and waste handling / disposal items.

Optional Cost Adder Milestone UC9 - Post-Remediation Vapor Intrusion Assessment. Under this milestone, bidders shall provide a firm fixed-price to conduct a post-remediation VI assessment if requested by the PADEP. Bidders shall assume that the follow-up VI assessment shall be limited to comparing any post-excavation residual soil and/or groundwater contamination to the screening criteria established in the revised PADEP VI guidance (effective January 2017) to verify that all constituent concentrations are below the screening criteria and pose no human health risk related to VI. Should additional VI evaluation be required by the PADEP (e.g., additional soil vapor sampling), then this would represent a Changed Condition under the Remediation Agreement and would be handled according to those terms and conditions of the contract.

Additional Information

In order to facilitate PAUSTIF's review and reimbursement of invoices submitted under this claim, the Solicitor requires that project costs be invoiced by the milestone identified in the executed Remediation Agreement. Actual milestone payments will occur only after successful and documented completion of the work defined for each milestone. The selected consultant will perform only those tasks/milestones that are necessary to reach the Objective identified in this RFB. Selected consultant will not perform, invoice, or be reimbursed for any unnecessary work completed under a milestone.

Any “new conditions”, as defined in Attachment 1, arising during the execution of the SOW for any of the milestones may result in termination of or amendments to the Remediation Agreement. Modifications to the executed Remediation Agreement will require the written approval of the Solicitor and the PAUSTIF (for funding consideration). PADEP approval may also be required.

List of Attachments

1. Remediation Agreement
2. Bid Cost Spreadsheet
3. Site Information / Historic Documents

    a. Site Figures
    b. Site Characterization Report – November 2016
    c. Supplemental Site Characterization Report – September 2018
    d. Remedial Action Plan – January 2019
    e. PADEP SSCR / RAP Approval Letter – March 2019
    f. Groundwater and SPH Gauging Data and Groundwater Analytical Data Through 1Q19
    g. Limited Phase II Environmental Site Assessment Report – September 2015
    h. Remedial Alternatives Figure