Conceptual Design Report
USG Interiors Highway 99 Site
Milton, Washington

Prepared for:
USG Corporation
550 West Adams Street
Chicago, Illinois 60661-3676

April 16, 2020

CDM Smith

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MILTON, WASHINGTON

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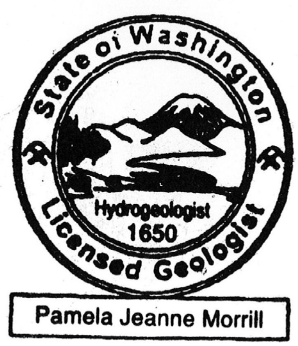

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Section 1

Introduction

This report presents the proposed conceptual design and modifications to the cleanup actions at the USG Interiors, LLC (USG) Highway 99 site property located in Milton, Washington (referred to herein as the property or site). The site location is shown on **Figure 1**. CDM Smith Inc. (CDM Smith) has completed this work on behalf of USG in support of the Cleanup Action Plan (CAP) issued by the Washington State Department of Ecology (Ecology) on June 23, 2016. This work is being performed in accordance with Agreed Order No. DE 11099 (current Order) between Ecology and USG. The work presented in this report was completed as a follow-up to the Conceptual Design presentation held with Ecology and USG on December 20, 2019.

1.1 Site History and Background

The USG Highway 99 site is located between Pacific Highway East and Interstate 5 in Milton, Washington. It is located in a commercial area situated along the east side of Pacific Highway East. Residences are located west of the property across Pacific Highway East, as indicated on Figure 1. The northern portion of the site is currently occupied by a truck canopy sales business (Kanopy Kingdom) and the southern portion by a used recreational vehicle (RV) sales business (Discount RV). Kanopy Kingdom presently owns the property and leases to Discount RV.

The historical description that follows is based on CDM Smith's interpretation of historical aerial photographs, Ecology documents, and a title search.

Interstate 5 was constructed in this area in 1961. Hylebos Creek was re-routed to its current location as part of the construction. The freeway construction and re-routing of Hylebos Creek cut the site off from the adjoining agricultural land to the east.

Fill was imported to bring the site up to grade with Pacific Highway East. This fill included industrial waste from USG's Tacoma mineral fiber production plant. From 1971 to 1972, waste from USG's Tacoma plant was reportedly used as fill at the Highway 99 site, a period of time in which ASARCO slag was being used as a raw material. ASARCO slag is known to contain high concentrations of metals, most particularly arsenic, and as a result, so did the waste products from the USG Tacoma plant.

In the early 1980s, USG became aware of the association between ASARCO slag and arsenic contamination. Subsequently, in 1982 USG purchased what is now the Kanopy Kingdom property. That same year USG voluntarily approached Ecology to negotiate an administrative process to govern removal of fill from the property. Soil and groundwater cleanup standards had not been established in Washington State at this time. Accordingly, Agreed Order No. DE 84-506 established project-specific arsenic cleanup standard of 0.5 milligrams per liter (mg/L) for soil by the Environmental Protection Agency (EPA) Toxicity (leaching) method and the same concentration groundwater. The 1984 Order also required USG to conduct post-cleanup groundwater monitoring.

A source removal action which primarily involved excavation of industrial fill soils occurred between October 1984 and January 1985. Detailed records of the cleanup have not been located. Ecology estimated that 20,000 to 30,000 cubic yards (CY) of material was excavated and disposed of offsite. In addition, native soil exceeding the project-specific cleanup standard was reportedly excavated in the southern portion of the property.

According to Ecology, approximately 10 percent of the total waste that was excavated and disposed of offsite was baghouse dust. It is inferred that the 20,000 to 30,000 CY of waste included soil fill mixed with waste insulation, baghouse dust, and native soil exceeding the cleanup standard excavated from the Kanopy Kingdom property.

1.2 Remedial Investigation and Feasibility Study

USG sold the property to Herbert Rendell in 1986. This site subsequently underwent commercial development and by 1989 had been developed to its current owner configuration, as shown on **Figure 2**. USG maintained responsibility for verification monitoring at wells 99-1 and 99-2 (Figure 2), as specified in Agreed Order No. DE87-506 issued in 1987. The 1987 Order retained the 0.5 mg/L groundwater cleanup level for the site. Post-source removal action verification groundwater sampling was performed by USG from June 1985 to April 2006.

In early 2006, Arsenic concentrations in well 99-1, situated within the source area, exceeded the Model Toxics Control Act (MTCA) Method A cleanup standard and Ecology required that USG conduct a soil and groundwater assessment for arsenic in the vicinity of well 99-1. This assessment showed that arsenic in soil and groundwater exceeded MTCA Method A cleanup standards. This led to Agreed Order No. DE 6333, which required USG to perform a Remedial Investigation/Feasibility Study (RI/FS). Agreed Order No. 6333 became effective on October 19, 2009.

Remedial Investigation (RI) fieldwork was conducted between 2010 and 2012 and characterized the nature and extent of arsenic in soil, sediment, groundwater, and surface water. The Feasibility Study screened remedial technologies for the various impacted media and developed remedial action alternatives.

1.3 Summary of the CAP and Subsequent Investigations

The Cleanup Action Plan, issued on June 23, 2016 (Ecology, 2016) for the Highway 99 site presented the preferred alternative (Remedial Action Alternative 2) and included the following components:

1. In-situ solidification and stabilization (ISS) of the fill/soils exceeding 500 parts per million (ppm) by injection of a reagent via auger mixing.

2. Groundwater treatment by in-situ chemical oxidation (ISCO), installing permeable pavement in the core remediation area, monitored natural attenuation (MNA), and institutional controls.

3. Excavation and offsite disposal of impacted sediment in Hylebos Creek. No modification of the sediment cleanup is presently proposed and is therefore not discussed further in this conceptual design.

The CAP included the need for the following studies prior to full scale implementation:

1. Delineation of the fill/soil hot spot.
2. Conduct a bench scale study to assess the optimal solidification/stabilization (S/S) mix design.
3. Conduct bench scale and pilot testing to assess soil oxidant demand, select the best oxidant, and determine the delivery system for groundwater treatment with ISCO.

CDM Smith completed the Hot-Spot Characterization and Bench Scale Testing Report, issued on March 15, 2018 to satisfy implementation of the Fill/Soil Hot Spot delineation and bench scale testing. Results from the study indicated that cement-based S/S mixtures containing Portland cement (20 percent), bentonite (1 percent), and a 4:1 iron (FeII) to arsenic mass ratio were most effective in reducing arsenic mobility in soil. Recommendations from the bench scale testing included conducting a pilot study to determine the effects of ISCO to remediate site groundwater.

The ISCO pilot study field work at the Highway 99 was conducted in January through March 2019 and was found to be highly complicated to implement and did not reduce arsenic in groundwater to the levels desired. Based on this CDM Smith undertook consideration of an alternative approach to the cleanup actions that would be less reliant on ISCO. This included enlarging the area for ISS, particularly targeting high arsenic concentration soils situated in the saturated zone.

1.4 Objective and Scope of Work

The purpose of this report is to present the proposed CAP modifications, conceptual design and to identify data needs for the remedial implementation at the Highway 99 site. The specific objectives of this report for the Highway 99 site are presented below.

It should be noted that in addition to the Highway 99 site, similar site work is ongoing at USG's nearby Puyallup site. Due to proximity and commonality of the Highway 99 site with the Puyallup site, portions of the future data gathering needs may be conducted as a joint effort. This joint effort will be further discussed within Section 4 of this report.

1. Provide a summary of the conceptual site model and introduce the 3-Dimentional (3-D) visualization software used to develop modifications to the CAP;
2. Provide a summary of the proposed Cleanup Action Plan Modifications and updated Conceptual Design, which includes conducting ISS over a larger area in an effort to treat residual source material;
3. Provide a data gap assessment and identify data needs for the proposed Conceptual Design. The data gap assessment will also identify common elements between the USG Puyallup and Highway 99 sites that may be conducted as a joint effort; and

4. Provide an updated schedule for implementation of the proposed Conceptual Design.

1.5 Report Organization

The Conceptual Design report is organized into 5 sections, as summarized below:

- **Section 1:** Introduction – Presents a description of the site, background and presents the proposed changes to the CAP.
- **Section 2:** Conceptual Site Model – Presents a description of the site geology and hydrogeology, nature and extent of contamination in site soil and groundwater, and fate and transport mechanisms. A description of the Leapfrog model used to develop the conceptual model of arsenic concentrations in soil is provided. The results of the model are presented by including printouts of 3-D representations of the affected area and selected cross sections to show the total extent of the affected area.
- **Section 3:** Conceptual Design - A recommended conceptual design of the ISS treatment areas is provided. The proposed areas of treatment are overlain on the modeled arsenic plume provided by the Leapfrog model. Similarly, the plan views and representative cross sections are presented in the report.
- **Section 4:** Data Gap Evaluation - Assesses the data gaps and provides an overview of future data gathering needs that will need to be fulfilled prior to initiating work on the final design.
- **Section 5:** Conceptual Design Schedule - Presents a conceptual design schedule that incorporates the proposed changes to the CAP.

Section 2

Conceptual Site Model

A brief description of the site-specific conceptual site model including the geology and hydrogeology, nature and extent of contamination in site soil and groundwater, fate and transport mechanisms, and Leapfrog model overview is provided herein.

2.1 Geology and Hydrogeology

Information relevant to site geology and hydrogeology is presented in the following sub-sections.

2.1.1 Geology

The site is situated in a north-trending valley that is the floodplain of Hylebos Creek and its tributaries. The valley is located just north of the lower Puyallup River Valley. Alluvium associated with Hylebos Creek and the lower Puyallup River forms the uppermost native soil at the site. The alluvium consists predominantly of overbank flood, slack water, and bar accretion deposits. Glacially consolidated glacial drift and interglacial deposits hundreds to thousands of feet thick underlie the alluvial deposits. Generalized stratigraphy consists of fill overlying alluvium, over glacial drift. Each of these units is described in more detail below.

2.1.1.1 Fill

The property was originally low-lying farmland. Fill was brought in during the 1960s and 1970s to bring the site up to grade with Highway 99 for development purposes. Fill at the site is differentiated into three units, described from youngest to oldest:

- Fill-3: Fill used as backfill for the 1984/1985 source removal action.
- Fill-2: Fill containing industrial waste from USG's Tacoma plant.
- Fill-1: Undifferentiated fill.

Fill-3 was placed during remedial excavation backfilling in 1985. The soil consists of fine- to coarse-grained silty sand with gravel and silty sand (SM). The Fill-3 unit soil extends from the ground surface to depths ranging from 4.5 to 14 feet below ground surface (bgs) at the site.

Fill-2 includes soil mixed with manmade materials. Fill-2 is likely residual fill representative of material not excavated in 1984/1985 during USG's removal action. Fill-2 contains what appears to be ASARCO slag, black and green glassy needle-like grains, glass-like gravel-sized particles, and insulation debris. The ASARCO slag material does not appear to be processed like the other manmade materials. The soil types in Fill-2 include poorly graded sand (SP) and sandy silt (ML). The Fill-2 was encountered in some borings at depths ranging between 4.5 to 12.5 feet bgs.

Fill-1 includes soil that was placed during initial development of the site and surrounding area. It consists of silt (ML), sandy silt (ML), organic silt (OH), and silty sand (SM) with traces of debris, including wood chips and gravel. The Fill-1 soil extends to a maximum depth of 9 feet bgs.

2.1.1.2 Alluvium

Alluvium underlies the fill at the site and pinches out to the west beyond Highway 99. The alluvium can be subdivided into two units based on soil type and hydraulic properties, including:

- Upper Silt Unit
- Alluvial Aquifer

The Upper Silt Unit is the uppermost alluvial unit. Soil in this unit is comprised of dark brown to gray brown silt and sandy silt (ML), often with bedding laminations. Minor amounts of wood fragments and rootlets are typically present. The Upper Silt Unit ranges from 1 to 6 feet thick. The presence of silt and organic matter indicates deposition in a lower energy depositional environment, such as wetlands.

The Alluvial Aquifer extends from the bottom of the Upper Silt Unit to the top of the Lower Silt Aquitard. Soil in the Alluvial Aquifer consists of fine-grained silty sand (SM), fine- to medium-grained sand (SP), and well-graded sand (SW). The soil includes minor silt (ML) interbeds, which are typically less than 0.25 inch thick. The thickness of the Alluvial Aquifer is approximately 30 feet at the center of the property.

2.1.1.3 Glacial Units

Glacial sediments underlie the alluvium east of Pacific Highway East. At monitoring well MW-12, located across Pacific Hwy E from the site, glacial sediments occur directly beneath fill. The glacial sediments are subdivided into the following units based on hydraulic properties:

- Lower Silt Aquitard
- Glacial Aquifer

Lower Silt Aquitard: The Lower Silt Aquitard underlies the Alluvial Aquifer. Soil in this unit consists of greenish-gray silt. The fine-grained nature of the soil indicates a low energy lacustrine (or possibly glacio-marine) depositional environment. The total thickness of the Lower Silt Aquitard ranges from approximately 5 to 15 feet. The Alluvial Aquifer/Lower Silt Aquitard contact dips sharply to the east and is as much as 160 feet deep on the eastern side of the site.

Glacial Aquifer: Water-bearing sand (SP), silty gravel (GM), and silty sand with gravel (SM) underlie the Lower Silt Aquitard. This soil is classified as glacial drift based on texture and low organic content. The upper 10 feet of this soil is not consolidated and may have been deposited in a glaciofluvial depositional environment (recessional outwash). Below 52.5 feet bgs at MW-9, the soil changes to very dense silty sand (SM) and silty gravel that is interpreted as glacial till. The different hydraulic and geochemical characteristics of the Glacial Aquifer and the Alluvial Aquifer indicate that the two aquifers are not in hydraulic communication.

2.1.2 Hydrogeology

Groundwater occurs under semi-confined conditions within sand and silty sand of the Alluvial Aquifer. The low permeability soil of the Lower Silt Aquitard acts as a lower confining layer to the Alluvial Aquifer, restricting vertical flow. During the RI, groundwater was encountered at depths ranging from 4 to 14 feet bgs. The groundwater flows east toward Hylebos Creek and south parallel to the creek. The horizontal hydraulic gradient ranges from 0.003 foot/foot in the central area of the site, steepening to 0.03 foot/foot at the west bank of Hylebos Creek.

The predominant soil types in the Alluvial Aquifer are fine-grained silty sand (SM) and sand (SP). The hydraulic conductivity of these soils ranges from 0.3 to 30 feet/day, based on literature-derived hydraulic conductivity values for silty sand and fine sand (Anderson and Woessner, 1992).

Layers of coarse-grained sands (SP and SW) are also present within the Alluvial Aquifer. These sands have hydraulic conductivities ranging from 130 to 200 feet/day, based on an estimate using the Hazen (1911) method and the grain size distribution results for representative soil samples.

The average linear velocity (seepage velocity) of groundwater flow in the Alluvial Aquifer is estimated to range from 2 feet/day in the central area of the site. This is considered to be a maximum seepage velocity estimate and is based on a hydraulic conductivity of 200 feet/day, which is the maximum hydraulic conductivity estimated for the layers of coarser-grained sand present within the deeper Alluvial Aquifer. The seepage velocity for the fine-grained silty sand (SM) and sand (SP), typical of the shallow Alluvial Aquifer, is expected to be much lower.

2.2 Nature and Extent of Contamination

2.2.1 Soil

Industrial waste fill that served as the original source of arsenic at the site was largely removed in 1984/1985, along with some of the impacted native soil in the southern portion of the property in the vicinity of monitoring well 99-1. However, some residual fill containing industrial waste, which exists as a relatively thin layer, remains in some areas of the site.

Soil boring data indicate that the highest arsenic concentrations at the site occur with depth. This reflects the 1984/1985 contaminant source removal action as the shallower industrial waste fill was removed and replaced with soil fill. Arsenic concentrations in the residual Fill-2 are highly variable. However, elevated arsenic concentrations at depth are most typically encountered in Fill-2 or alluvium underlying the base of the 1984/1985 contaminant source removal action. The arsenic in the alluvium is interpreted to have leached out of the Fill-2 unit and adsorbed onto the underlying soil.

2.2.2 Groundwater

The highest arsenic concentrations, identified as the groundwater hot spot, occur in the area bound by wells MW-4, MW-5, 99-1, MW-1, and MW-3. The dissolved arsenic concentrations in these wells ranged from 630 to 2,490 micrograms per liter (μg/L) in 2010 (CDM Smith, 2016a). The highest concentrations of arsenic in groundwater are observed in well 99-1, which is located in the original contaminant source area. From there, arsenic migrates in the direction of groundwater flow to the east and south and attenuates with distance from well 99-1.

Arsenic concentrations in groundwater in the deeper Alluvial Aquifer (MW-7 and MW-8) are two (2) orders of magnitude lower than arsenic concentrations in groundwater from the shallow Alluvial Aquifer and just slightly above the MTCA Method A cleanup level, indicating that arsenic attenuates rapidly with depth within this aquifer. Dissolved arsenic was detected at a concentration of 44 μg/L in the Glacial Aquifer (MW-9).

2.3 Contaminant Fate and Transport

Arsenic fate and transport at the site were evaluated in the RI report (CDM Smith, 2016a). The fate and transport findings are summarized below:

- Arsenic in groundwater exists predominantly in the reduced arsenite (As III) form at the site, although over time the arsenic is predicted to oxidize to the less mobile arsenate (As V) form.
- Iron and arsenic concentrations in groundwater at the site are likely controlled by ferric oxyhydroxides based on site-specific geochemical modeling performed for the RI.
- Redox conditions at the site are not in equilibrium with arsenic, dissolved oxygen, or total organic carbon due to the presence of a redox gradient.
- Arsenic transport in the Alluvial Aquifer is at least 34 times slower than the groundwater velocity, resulting in long travel times for arsenic to migrate downgradient from the contaminant source area. This is a result of adsorption of arsenic to the surfaces of iron-bearing minerals and co-precipitation with iron hydroxides, which retards the transport of arsenic relative to groundwater. Using the minimum partitioning coefficient (Kd) of 4 liters per kilogram (L/kg), it would take approximately 17 years for arsenic to travel 50 feet from well 99-1 to the groundwater beneath Hylebos Creek and using the median Kd of 44 L/kg, it would take approximately 25 years for arsenic to travel this distance.

Shallow groundwater from the site appears to discharge into Hylebos Creek. Sediment data collected from the bank and center of Hylebos Creek show elevated arsenic concentrations downgradient of where the highest concentrations of arsenic were detected in groundwater at the site. This indicates that dissolved arsenic in groundwater is either adsorbing onto sediment or co-precipitating with iron onto sediment at the groundwater/surface water interface.

2.4 Leapfrog Model

A three-dimensional model of the site was created using Leapfrog Works® (Leapfrog) software version 3.0.1. The Leapfrog conceptual site model (CSM) incorporated the following datasets: environmental borings, well screen intervals, depth to water data, arsenic analytical results of soil samples, topographic data, an aerial photo, historical plan view figures, and historical cross sections.

The arsenic soil analytical data was interpolated using Leapfrog's radial basis function (mathematically equivalent to kriging) to create iso-value surfaces of the arsenic impacted soils. These interpolated volumes were used to develop the conceptual design and will be further discussed in the following sections. The plan and cross-section A-A' of the interpolated plume is presented on **Figure 3** and **Figure 4**. Please note that the Leapfrog software is limited in presenting three-dimensional plume data for two-dimensional visualization. Colors associated with the plume concentrations in Figure 3 may not directly reflect those identified in the legend due to overlying data. For the most accurate correlation between the plume colors and the legend colors, please refer to the cross-section Figure 4.

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Section 3

Summary of CAP Modifications and Conceptual Design

As presented in Section 1, the objectives of this report are to present the proposed modifications to the CAP and the resulting conceptual design for the site. A summary of proposed CAP modifications and conceptual design is presented here:

3.1 Summary of CAP Modifications

The CAP, issued on June 23, 2016 (Ecology, 2016) for the Hwy 99 site included implementation of the cleanup objectives as follows:

1. Remediate Hot-Spot Fill/Soil – Treat hot-spot soils by ISS of the fill/soils exceeding 500 ppm by injection of a reagent via auger mixing.
2. Remediate Arsenic in the Groundwater Hot Spot – The conceptual approach was to address groundwater contamination within the vicinity of monitoring well 99-1 with ISCO.
3. Remediate Arsenic in Groundwater in the Core Remediation Area - The conceptual approach was to address groundwater contamination with ISCO by injection trenches.
4. Remediate Sediment in the Hylebos Creek – Sediment will be remediated by excavation and offsite disposal. This cleanup objective and approach are unchanged.
5. Remediate Arsenic in Groundwater Outside the Core Remediation Area – The primary approach in these areas is remediation by MNA. This cleanup objective and approach are unchanged.
6. Long-Term Compliance Monitoring – Compliance monitoring to be conducted in accordance with the requirements of WAC 173-340-410 and will include protection, performance, and long-term confirmation monitoring. This cleanup objective and approach are unchanged.

Based on the unfavorable results from the ISCO pilot study, CDM Smith is proposing modifications to the implementation of the site cleanup objectives. The proposed modifications include conducting ISS over a larger area of the site. The extension of the ISS area zone will now include the majority of the core remediation area that was previously identified for groundwater remediation with ISCO. The following subsection presents the extents and volume of the proposed ISS area.

CDM Smith determined that targeting high arsenic concentrations in soils within the saturated zone would not only be cost effective, but would also provide a much greater level of treatment in the groundwater, greatly reducing and potentially even eliminating the need for treatment by ISCO.

Groundwater monitoring after implementation of the ISS will be used to evaluate the effectiveness of the ISS on the groundwater contaminant plume. When sufficient groundwater data has been obtained to evaluate the effectiveness of the ISS, the need for implementation of ISCO or other groundwater treatment methods around the ISS treatment zone will be evaluated.

3.2 Proposed Conceptual Design

Based on the proposed modifications to the CAP, this section presents the updated conceptual design for the site, which includes enlarging the area for ISS to target soils highly impacted by arsenic in the saturated zone.

To develop the proposed extents and volume of ISS treatment, CDM Smith used the 3-D Leapfrog model. The data input into this model included site survey, groundwater, and soil arsenic concentrations. Using this model, CDM Smith evaluated various soil volumes required for ISS treatment based on different arsenic concentration limits (e.g., 90 milligrams per kilogram [mg/kg], 250 mg/kg, 500 mg/kg). The proposed ISS treatment area encompasses all of the impacted soils (saturated and unsaturated) with concentrations greater than 500 mg/kg arsenic and was split up into two sub-areas (B1 and B2) to optimize the depths and extents of treatment. The extents of the proposed ISS treatment areas (B1 and B2) are presented on **Figures 5** and **6**.

Table 3-1 presents the physical data for each treatment area including volume, top and bottom of treatment zone, treated areas thickness, and pre-excavation depth. Since impacted soils are shown starting at depths exceeding 5-feet bgs, the top 5-feet of material will be excavated prior to conducting ISS. This will reduce the total volume of ISS at the site and will provide future allowance for the treated soils to swell post mixing.

Table 3-1 Summary of Proposed ISS Treatment Areas and Volumes

Area ID	Volume (CY)	Average Ground Surface Elevation (ft)[1]	Groundwater Elevation (ft)[1]	Top of Treatment Zone		Bottom of Treatment Zone		Treated Area Thickness (ft)	Pre-Excavation Depth (ft bgs)
				(El)	(ft bgs)	(El)	(ft bgs)		
Site Location - HWY 99									
B1	819.6	23.0	13.1	15.2	7.8	8.5	14.5	6.7	5.0
B2	1,535.0	21.0	13.1	15.2	5.8	5.5	15.5	9.7	5.0
Total	**2,354.6**	--	--	--	--	--	--	--	--

Notes:
[1.] Elevations referenced are based on the North American Vertical Datum of 1988 (NAVD 88).

Table 3-2 presents a summary of the total volume treated in the proposed ISS treatment area for site soils exceeding 90 mg/kg, 250 mg/kg, and 500 mg/kg. Based on the proposed extents of ISS, approximately 99.9 percent of site soils exceeding 500 mg/kg of arsenic will be treated, which is in accordance with the originally established site cleanup goals. The majority of the areas where ISCO was originally proposed are now located within the footprint of the ISS treatment area.

Table 3-2 Summary of Impacted Soil Treatment for Arsenic Concentrations >90 ppm

Arsenic Exceedance Criteria (ppm)	Impacted Soil Volume (CY)	Proposed Treated Soil Volume	
		Volume (CY)	% Treated
Site Location - HWY 99			
>90	1166	496	42.5%
>250	309	245	79.3%
>500	205	205	99.9%

Notes:
Volume of impacted soils are interpreted based on available analytical data and 3-D interpolated volumes.

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Section 4

Data Gap Evaluation

One of the objectives of this report is to perform a review of the existing site data and identify outstanding data needs for implementation of the proposed conceptual design. The remedy for the Highway 99 site is expected to include ISS for the target areas discussed in Section 3. The purpose of this section is to summarize the existing data, data gaps, and proposed additional data needs required to successfully implement the conceptual design. As indicated in Section 1.4, data gathering needs identified within this section may be conducted as a joint effort with the nearby Puyallup site and will be discussed in further detail herein.

4.1 Design Data Needs

Prior to the remedial design phase at the Highway 99 site, specific data are required for the proposed conceptual design to further support the preparation of the design package. A list is presented below identifying each of the design data needs and why they are important to the overall design:

- Site Survey – The site survey provides the vertical and horizontal reference datum for the project and is used to establish site topography, provide a reference datum for the site lithology and groundwater levels, and to estimate the volume of soil removal.

- Existing Site Obstructions and Utilities – Information on existing site obstructions and utilities will help to identify areas that could potentially impact the subsurface investigation and future ISS implementation. This information will be beneficial to the future contractor.

- Summary of Subsurface Conditions – A summary of the subsurface conditions includes a subsurface soil profile, physical characterization of site soils, analytical characterization of site soils and groundwater, existing groundwater elevations, and hydrogeologic profile within the remedial footprint. Physical characterization of site soils should include Standard Penetration Testing (SPT) and geotechnical index testing. The SPT will identify soil stiffness/density, which will help to assess the means and methods for conducting the ISS. Geotechnical index testing will be helpful for planning the construction sequencing and the ISS approach. Analytical characterization of the site soils and groundwater should be conducted to delineate the extents of contamination for the site contaminants of concern.

  Bench Scale Study – A bench scale study should be performed in the laboratory to determine the trial mix designs for ISS pilot study implementation. Soils used in the bench scale study should be analytically and physically characterized. Physical characterization should be conducted with geotechnical index testing for moisture content, grain size, specific gravity, bulk density, and organic content. Physical and analytical characteristics of the in-situ soils and site groundwater greatly influence the effectiveness of ISS. The mix design generated from the bench scale study will be used to develop a full-scale pilot study and to develop aspects of the design, such as the ISS specification and future site redevelopment goals. A bench scale study will be performed for both the Highway 99 and the Puyallup sites to confirm similarity in site conditions, prior to development of the pilot study.

- Pilot Study – A pilot study should be performed in the field to determine if the proposed conceptual design is feasible and compatible with site conditions. Pilot studies are used to "scale up" results from the bench scale tests and to understand how implementation affects construction aspects such as auger diameter, rate of mixing, number of passes, column overlaps, etc. This is required to develop appropriate quality assurance procedures to assess compliance with project performance specifications. Depending upon the physical and analytical characterization of soils at the Highway 99 and Puyallup sites, only one pilot study may be performed if similar site conditions are confirmed from the geotechnical investigation.

4.2 Review of Existing Data

A series of investigations were conducted at the Highway 99 site between 1985 and 2012. CDM Smith has reviewed the following reports to identify available subsurface information, data gaps, and evaluate if any supplemental geotechnical data are needed for this project:

1. Groundwater Monitoring Program, CDM Smith (formerly AGI Technologies), 1985 – 2006.
2. Subsurface Investigation, CDM Smith (formerly AGI Technologies), 2007.
3. Remedial Investigation Report, CDM Smith, June 23, 2016.
4. Remedial Investigation Report Addendum, CDM Smith, June 23, 2016.
5. Feasibility Study, CDM Smith, June 23, 2016.
6. Cleanup Action Plan, Washington State Department of Ecology Toxics Cleanup Program, Southwest Regional Office, June 23, 2016.
7. Hot Spot Characterization and Bench-Testing, CDM Smith, March 23, 2018.
8. Field Pilot Study Work Plan, CDM Smith, July 25, 2018.

CDM Smith (formerly AGI Technologies) Groundwater Monitoring Program (1985-2006)

CDM Smith (formerly AGI Technologies) implemented a groundwater monitoring program following completion of the 1984/1985 source removal action to comply with the original Order. Groundwater was monitored on a monthly basis between 1985 through 2005, and on a semi-annual basis from 2005 to 2006. Two existing groundwater monitoring wells (99-1 and 99-2) were monitored. During the monitoring program, groundwater samples were analyzed for dissolved arsenic. Boring logs from the installation of these historic monitoring wells were not available for review.

CDM Smith (formerly AGI Technologies) Subsurface Investigation (2007)

CDM Smith (formerly AGI Technologies) conducted a subsurface investigation to evaluate soil and groundwater quality in close proximity to groundwater monitoring well 99-1. Nine (9) direct push technology (DPT) borings were advanced at the site to a depth of approximately 16 feet bgs. Soil and groundwater samples were collected for analysis.

Remedial Investigation Report (RI) (CDM Smith, 2016)

The RI Report presents the results of site reconnaissance, surface and subsurface sediment and surface and groundwater testing. The site reconnaissance included identifying all site businesses currently operating, as presented in **Figure 7**. The surface and subsurface sediment samples were analyzed for total arsenic by field portable x-ray fluorescence (XRF) and laboratory methods. Six (6) surface samples and thirty (30) soil borings were advanced to depths ranging from 12 feet to 24 feet bgs. Subsurface soil samples were classified according to the Unified Soil Classification System (USCS). Nine (9) new groundwater monitoring wells were installed: six shallow wells, two (2) intermediate wells, and one deep well. Surface water and groundwater samples were analyzed for arsenic. Fourteen (14) sediment samples collected from Hylebos Creek were analyzed for total arsenic by field XRF and laboratory methods. Additional groundwater reconnaissance borings were extended based on the results of the groundwater sampling to further define the extent of arsenic exceeding cleanup standards in the groundwater and soil. Soil borings were installed by direct push methods and did not include the SPT or collection of physical samples for geotechnical testing. The monitoring wells were installed using hollow-stem augers and SPT was conducted at 5-foot intervals. A total of four (4) physical samples were collected for grain size analysis at borings A9 and MW9. Numerous cobbles were recorded in the boring logs at depths between 0 to 5 feet bgs.

Remedial Investigation Report Addendum (CDM Smith, 2016)

The RI Addendum Report presents the results of the supplemental groundwater assessment. Two (2) new groundwater monitoring wells were installed. The monitoring wells were installed using hollow-stem augers and SPT was conducted at 5-foot intervals. No physical samples were collected for geotechnical testing.

Feasibility Study (FS) (CDM, 2016)

The FS presents remedial action objectives (RAO) to achieve cleanup of the site and provides remedial action alternatives that address all the RAOs. Alternative 2 was selected as part of the Cleanup Action Plan for the Highway 99 site.

Cleanup Action Plan (CAP) (USG, 2016)

The CAP, issued on June 23, 2016 (Ecology, 2016) for the Highway 99 site presented the preferred alternative (Remedial Action Alternative 2) and included the components discussed in Section 1. As part of the implementation plan, the CAP required hot spot soil/fill delineation, bench scale testing for ISS, and bench scale testing for ISCO.

Hot Spot Characterization and Bench Scale Testing (CDM, 2018)

CDM Smith delineated the extent of the arsenic soil hot spot area (soils containing greater than 500 ppm arsenic, presented in Figure 7), assessed the concentrations of specific metals in soil and groundwater, evaluated the effectiveness of soil solidification/stabilization (S/S) with multiple reagents, and determined the dosing requirements for several ISCO agents. The soil borings installed at this phase were conducted by direct push methods and did not include SPT or collection of physical samples for geotechnical testing. The bench scale testing was conducted based on analytical characterization of site soils and did not include physical characterization of site soils. Tap water was used to mix the cement-based S/S agents and not site groundwater.

ISCO Pilot Study (CDM Smith, 2019)

A pilot study was performed in general accordance with the work plan (CDM Smith, 2018) to demonstrate the effectiveness in removing dissolved arsenic in site groundwater to below the target cleanup level using ISCO. During the radius of influence test (ROI), it was observed that connection of the wells was highly variable, and treatment was following preferential pathways based on the semi-confined field conditions.

Following the initial ROI testing, the injection was amended with iron (Fe), followed by air sparging. Results showed that the concentrations of the dissolved Fe were lower than anticipated and the Fe was coming out of the solution as it was being injected. Sampling results indicated some initial reduction in arsenic concentrations at some locations, but not as much as was initially expected. Given all the difficulties in the iron injection, the need for continual periodic injections, anisotropic conditions, proximity to the creek, and the lack of substantial reduction in arsenic concentrations. It was determined that CAP could be modified to achieve better results in meeting the cleanup objectives of the site.

4.3 Data Requirements

The following information was identified as being required for the future remedial design of ISS at the Highway 99 site, along with an assessment of the current available data:

- Site survey
    - A valid site survey was identified as part of the RI and RI Addendum and was used to develop a 3-D model of the site. This will most likely require a new topographic site survey before starting the design phase.
- Existing site obstructions and utilities
    - Site obstructions and utilities were not identified as part of the RI. An updated survey that includes site features, such as utilities, should be updated prior to starting the design phase.
- Summary of Subsurface Conditions

- Groundwater and Hydrogeologic Profiling – Monitoring well installation, groundwater level collection and sampling and vertical hydrogeologic profiling were identified as part of the RI report summarized above. Extensive site groundwater data is available for the remedial footprint.

- Existing Soil Data – The boring data summarized in the previous investigations and reports predominantly consists of visually classified soils collected by direct push sampling methods. This information is useful for identifying site stratigraphy and establishing a soil profile. It was observed during the review of existing data that very limited SPT and physical soil data exists within the remedial footprint. Numerous cobbles were identified on the boring logs from the RI between 0 to 5 feet bgs. Additional geotechnical data for the Highway 99 site will be required to compare with the geotechnical data collected from the Puyallup site to determine the amount of bench scale and pilot testing to successfully implement the ISS at each facility.

- Analytical Characterization – Based on the reports reviewed, adequate data was collected to delineate the contaminants of concern in the soil and groundwater at the Highway 99 site.

- Bench Scale Testing
  - The bench scale testing conducted at the Highway 99 site was based on analytical characterization of site soils and did not include physical characterization of site soils. Tap water was used to mix the cement-based S/S agents and not site groundwater. This information is required to determine the compatibility of the selected ISS approach with the site conditions.

- Pilot Study
  - Pilot study activities at the Highway 99 site were only conducted for groundwater treatment with ISCO. At this time, it is proposed that one ISS pilot study will be conducted at the Puyallup site. Following -confirmation of similar site conditions from the supplemental geotechnical investigation at the Highway 99 site, the pilot study at the Puyallup site will be used to develop the ISS treatment methodology at the Highway 99 site.

4.4 Pre-Design Geotechnical Data Needs for Highway 99

As discussed above, additional geotechnical data will need to be collected prior to implementation of the proposed conceptual design. **Table 4-1** presents a summary of pre-remedial design data needs. Data needs are presented for each element of the proposed conceptual design.

Table 4-1 Highway 99 Preliminary Remedial Design Elements and Data Needs

Remedy Component	Data Need	Why is this needed?
ISS	▪ Known Obstruction/Utility Identification ▪ Standard Penetration Testing ▪ Physical Soil Classification by conducting Geotechnical Index Testing ▪ Bench Scale Testing ▪ Pilot Study	▪ Existing Obstructions/Utilities need to be identified to confirm the feasibility of the proposed ISS implementation method. ▪ The SPT will identify soil stiffness/density, which will help to assess the means and methods of ISS and provide physical characterization before the bench scale study. ▪ Geotechnical index testing will be required for proper design of the bench scale testing and for future planning of ISS implementation methodology. ▪ Testing needs to be conducted based on physical and analytical site soil characterization and using site groundwater to determine the trial mix design. This mix design will be scaled up to use for the future pilot study. ▪ A pilot study needs to be conducted to evaluate feasibility and compatibility with the site for the selected remedy. This will be conducted at the Puyallup site after confirmation of similar site conditions at Highway 99 and Puyallup.

4.5 Proposed Geotechnical Investigation and Data Gathering

A work plan will be developed to perform a geotechnical investigation, ISS bench scale study, and ISS pilot study. Work plans will be developed for both the Highway 99 and Puyallup sites concurrently and two separate work plans will be prepared; one for the field investigation/bench scale study and a second for the pilot study. Pending confirmation of similarity in site conditions between the Highway 99 and Puyallup sites, only one pilot study will be conducted, which will occur at the Puyallup site.

The geotechnical investigation will consist of test borings with continuous sampling using SPT procedures (ASTM D1586) to a specified proposed termination depth that extends a minimum of 10-feet below the proposed depth of ISS treatment. Soil samples collected for geotechnical characterization will also be screened with an XRF to confirm analytical properties. In addition to the test borings, one to two test pits may be excavated to evaluate potential subsurface obstructions and gather bulk sample material. The bulk soil samples, and site groundwater will be collected as part of the geotechnical investigation for the ISS bench scale study. Geotechnical laboratory testing will be conducted to establish the index engineering properties, which will include, but not be limited to:

- Unified Soil Classification System (USCS), Visual Soil Classification (ASTM 2488);
- Grain Size Analysis with Hydrometer (ASTM D6913);
- Organic Content (ASTM 2974);
- Atterberg Limits (ASTM 4318);
- Moisture Content (ASTM D2216);
- Specific Gravity (ASTM D854); and
- Bulk Density (ASTM D7263).

The physical data collected as part of the geotechnical investigation will be used to complete the bench scale studies and to develop the work plan for the pilot testing. As indicated above, bench scale studies will be performed for both the Highway 99 and Puyallup sites and, pending confirmation of similar site conditions, only one pilot study will be conducted at the Puyallup site.

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Section 5

Conceptual Design Schedule

Based on the data needs identified in Section 4, an updated project schedule has been modified to include the proposed geotechnical field investigation and subsequent design tasks. The schedule includes the allowances for joint efforts between the Highway 99 and Puyallup sites. The updated project schedule is presented as **Figure 8**. The major milestones and schedule assumptions are summarized in the following subsections.

5.1 Conceptual Design Report

Two separate conceptual design reports will be prepared for both Highway 99 and the Puyallup sites. The conceptual reports for each site will be submitted to Ecology for review and approval prior to completion of the data gap field investigation work plans. The date for the anticipated completion of the conceptual design report task for the Highway 99 and Puyallup sites is presented below:

- Conceptual Design Highway 99 Task March 14, 2020

5.2 Data Gap Field Investigation

The data gap field investigation will include development of the work plan, completion of the field investigation, completion of the bench scale studies, and completion of the data gap analysis. One work plan will be developed to satisfy the data needs for both the Highway 99 and Puyallup sites and that the field investigations at both sites will be conducted within the same subcontractor mobilization. The work plan will include the scope of work for the field investigation and bench scale studies at each site. A bench scale study will be conducted for each site and will be conducted as part of the field investigation. The date for the anticipated completion of the joint data gap field investigation task is presented below:

- Data Gap Field Investigation Task August 24, 2020

5.3 Pilot Study

The pilot study task will include development of the pilot study work plan, contractor procurement, pilot study implementation, and reporting. Only one pilot study will be conducted and that it will occur at the Puyallup site. This assumption will be dependent upon completion of the data gap field investigation and bench scale studies to confirm similarity in site conditions. The date for the anticipated completion of the pilot study task is presented below:

- Pilot Study Task February 4, 2021

5.4 Design and Construction

The design and construction task will include development of the engineering design report, permit acquisition, contractor procurement, implementation, and certification. This will be two separate tasks for the Highway 99 and Puyallup sites with one mobilization by the contractor. The date for the anticipated completion of the design and construction task for the Highway 99 site is presented below:

- Design and Construction September 3, 2021

Section 6

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Anderson, M.P., and Woessner, W.W. 1992. *Applied Groundwater Modeling – Simulation of Flow and Advective Transport.* San Diego: Academic Press, Inc.

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CDM Smith

Distribution

1 Hard Copy 1 Electronic Copy	USG Corporation 500 West Adams Street, Department 176 Chicago, Illinois 60661-3676 Attention: Ms. Jennifer Brennan
2 Hard Copies 1 Electronic Copy	Washington Department of Ecology Toxics Cleanup Program Post Office Box 47775 Olympia, Washington 98504-47775 Attention: Mr. Andy Smith

Quality Assurance Review by:

Jagrut Jathal
Principal Geotechnical Engineer

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Figures

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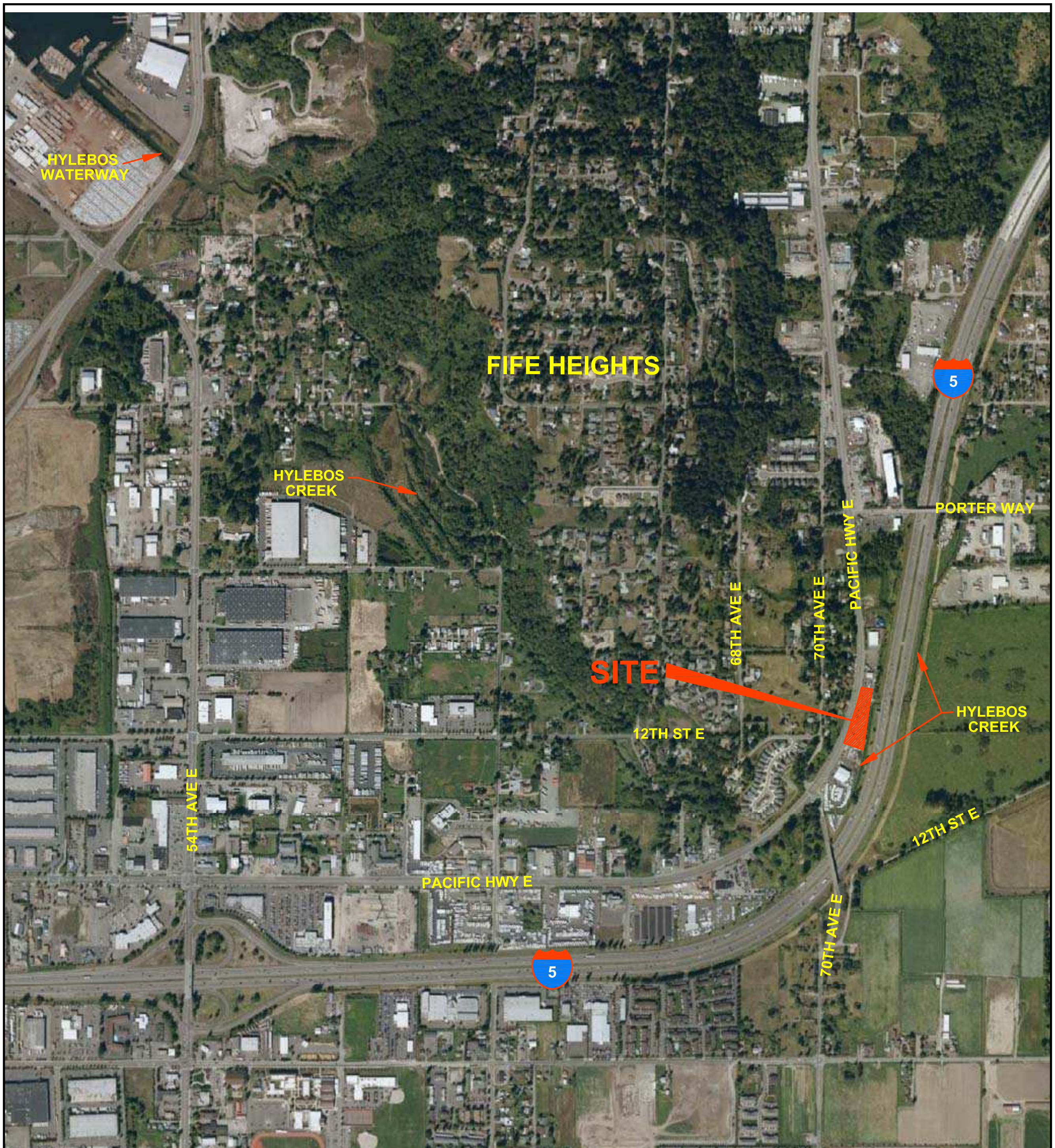

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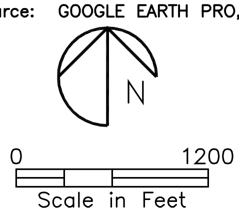

CDM Smith	**VICINITY MAP** USG Interiors, Inc. - Highway 99 Site Milton, WA	FIGURE NO. 1

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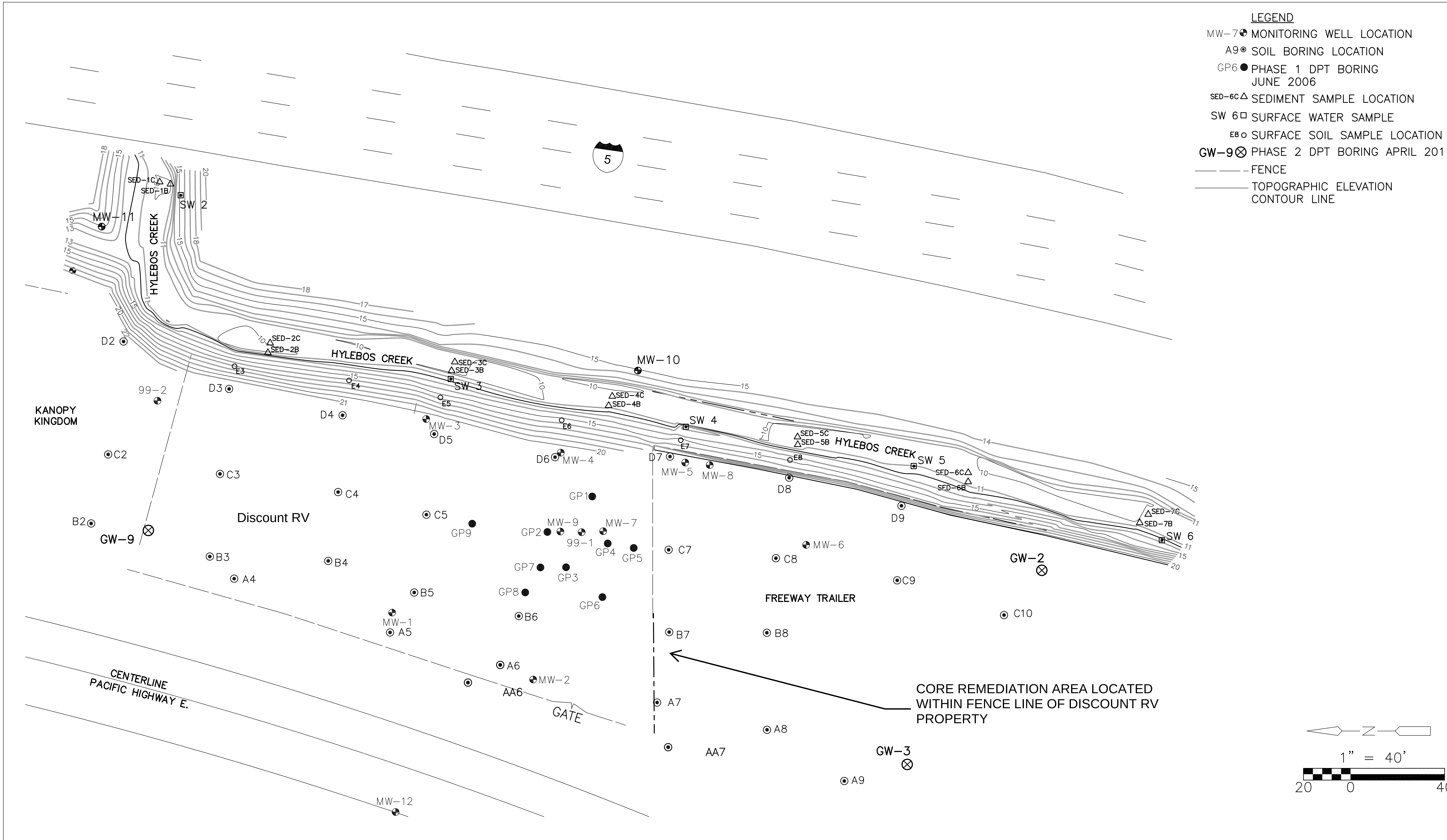
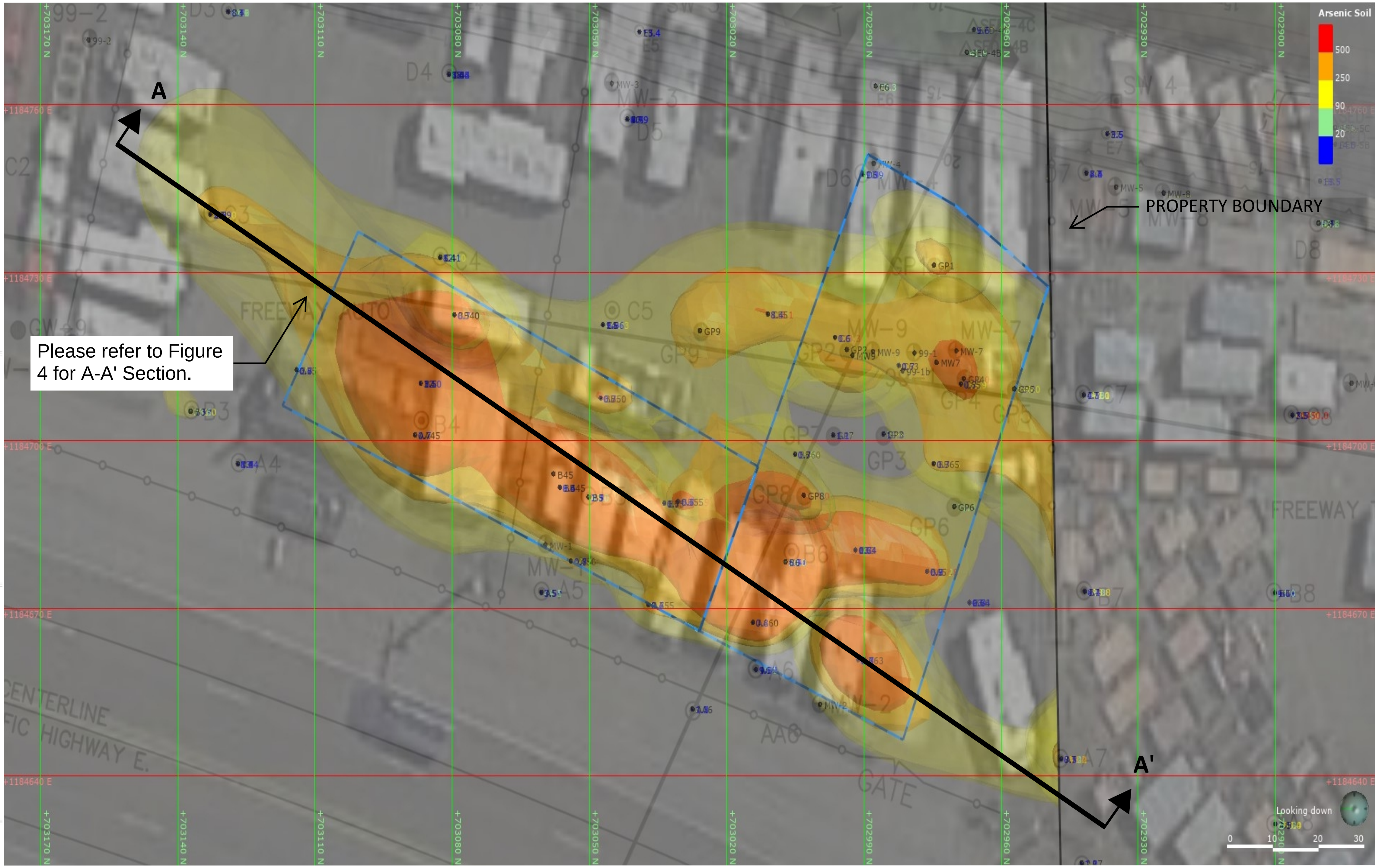


SITE PLAN

USG Interiors, Inc. - Highway 99 Site
Milton, WA

FIGURE NO. 2

CDM Smith



LEGEND:

ARSENIC CONCENTRATION > 500 PPM

ARSENIC CONCENTRATION > 250 PPM

ARSENIC CONCENTRATION > 90 PPM

SURFACE AREAS OF PROPOSED ISS EXTENTS

NOTE:

1. CLEANUP ACTION LEVEL FOR ARSENIC AT THE HIGHWAY 99 SITE IS FILL/SOILS EXCEEDING 500 PPM.

2. PLEASE NOTE THAT THE LEAPFROG SOFTWARE IS LIMITED IN PRESENTING THREE-DIMENSIONAL DATA FOR TWO-DIMENSIONAL VISUALIZATION. COLORS ASSOCIATED WITH THE PLUME CONCENTRATIONS MAY NOT DIRECTLY REFLECT THOSE IDENTIFIED IN THE LEGEND. FOR THE MOST ACCURATE DEPICTION OF THE PLUME COLORATION ASSOCIATED WITH THE PLUME CONCENTRATIONS, PLEASE REFER TO THE CROSS-SECTION ON FIGURE 4.

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION PERFORMED BY CDM SMITH ON JUNE 23, 2016.

CDM Smith

EXTENTS OF ARSENIC IN SOIL - PLAN VIEW

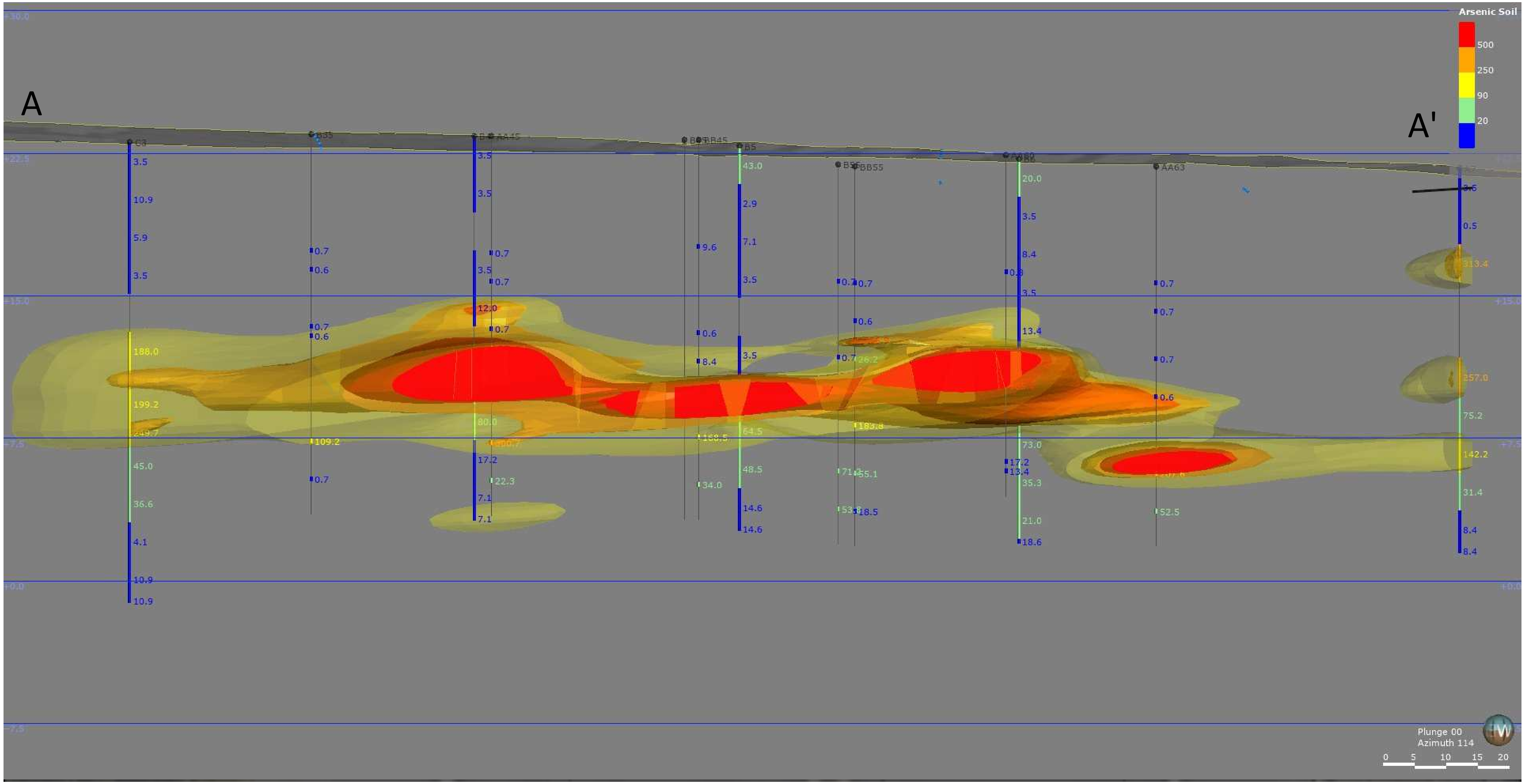
LEAPFROG MODEL

USG Interiors, Inc. - Highway 99 Site

Milton, WA

DATE: FEBRUARY 2020

FIGURE NO. 3



LEGEND:

(red)	ARSENIC CONCENTRATION > 500 PPM
(orange)	ARSENIC CONCENTRATION > 250 PPM
(yellow)	ARSENIC CONCENTRATION > 90 PPM

NOTE:

1. CLEANUP ACTION LEVEL FOR ARSENIC AT THE HIGHWAY 99 SITE IS FILL/SOILS EXCEEDING 500 PPM.

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION PERFORMED BY CDM SMITH ON JUNE 23, 2016.

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EXTENTS OF ARSENIC IN SOIL - CROSS-SECTION A-A'

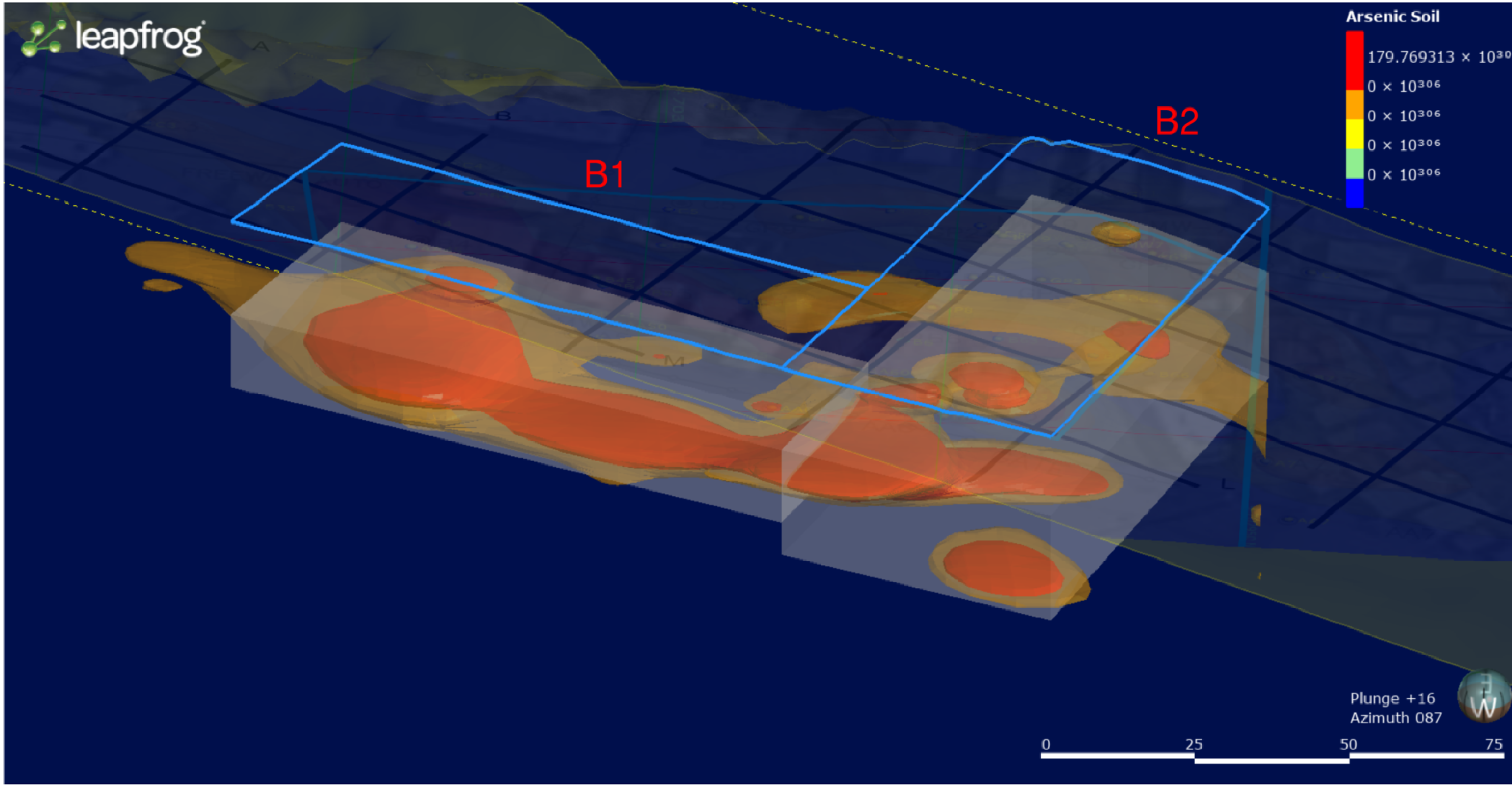
LEAPFROG MODEL

USG Interiors, Inc. - Highway 99 Site

Milton, WA

DATE: FEBRUARY 2020

FIGURE NO. 4



LEGEND:

- ARSENIC CONCENTRATION > 500 PPM
- ARSENIC CONCENTRATION > 250 PPM
- ARSENIC CONCENTRATION > 90 PPM
- SUBSURFACE EXTENTS OF PROPOSED ISS
- SURFACE AREAS OF PROPOSED ISS EXTENTS

NOTE:

1. CLEANUP ACTION LEVEL FOR ARSENIC AT THE HIGHWAY 99 SITE IS FILL/SOILS EXCEEDING 500 PPM.

2. BOUNDARIES OF PROPOSED EXTENTS OF ISS TREATMENT AREAS ARE IDENTIFIED BY AREA B1 AND AREA B2.

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION PERFORMED BY CDM SMITH ON JUNE 23, 2016.

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PROPOSED EXTENTS OF ISS REMEDIATION

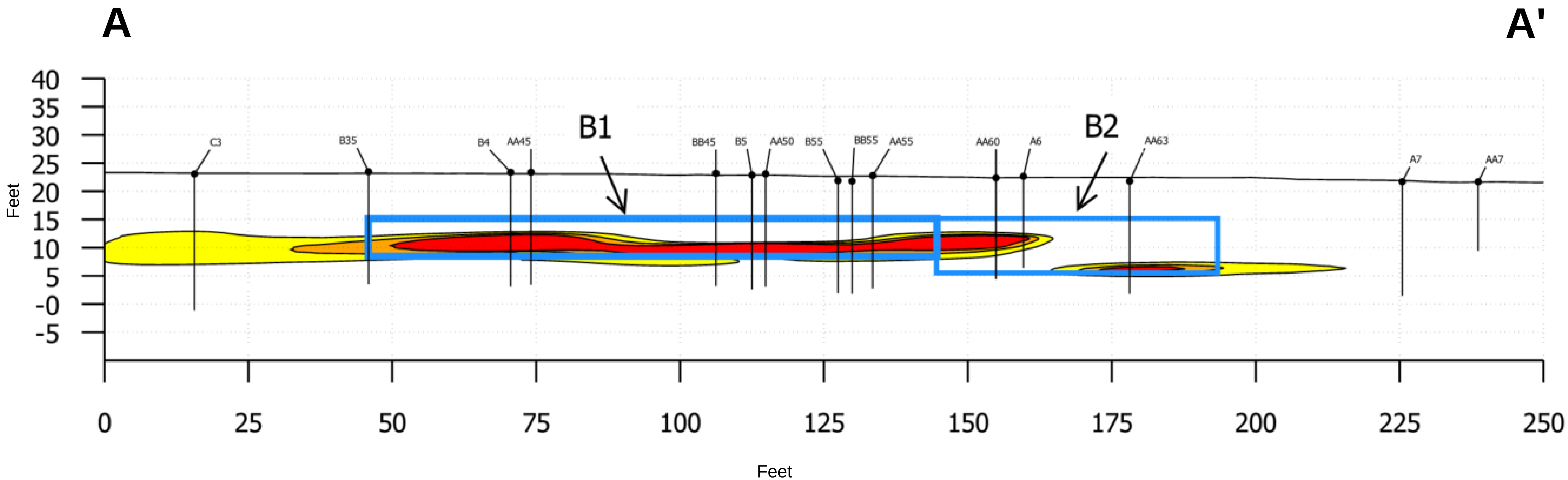
LEAPFROG MODEL

USG Interiors, Inc. - Highway 99 Site

Milton, WA

DATE: FEBRUARY 2020

FIGURE NO. 5



LEGEND:

- ARSENIC CONCENTRATION > 500 PPM
- ARSENIC CONCENTRATION > 250 PPM
- ARSENIC CONCENTRATION > 90 PPM
- BOUNDARY LINE FOR PROPOSED ISS TREATMENT AREAS B1 AND B2

NOTE:

1. CLEANUP ACTION LEVEL FOR ARSENIC AT THE HIGHWAY 99 SITE IS FILL/SOILS EXCEEDING 500 PPM.

2. BOUNDARIES OF PROPOSED EXTENTS OF ISS TREATMENT AREAS ARE IDENTIFIED BY AREA B1 AND AREA B2.

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION PERFORMED BY CDM SMITH ON JUNE 23, 2016.

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PROPOSED EXTENTS OF ISS REMEDIATION - CROSS-SECTION A-A'

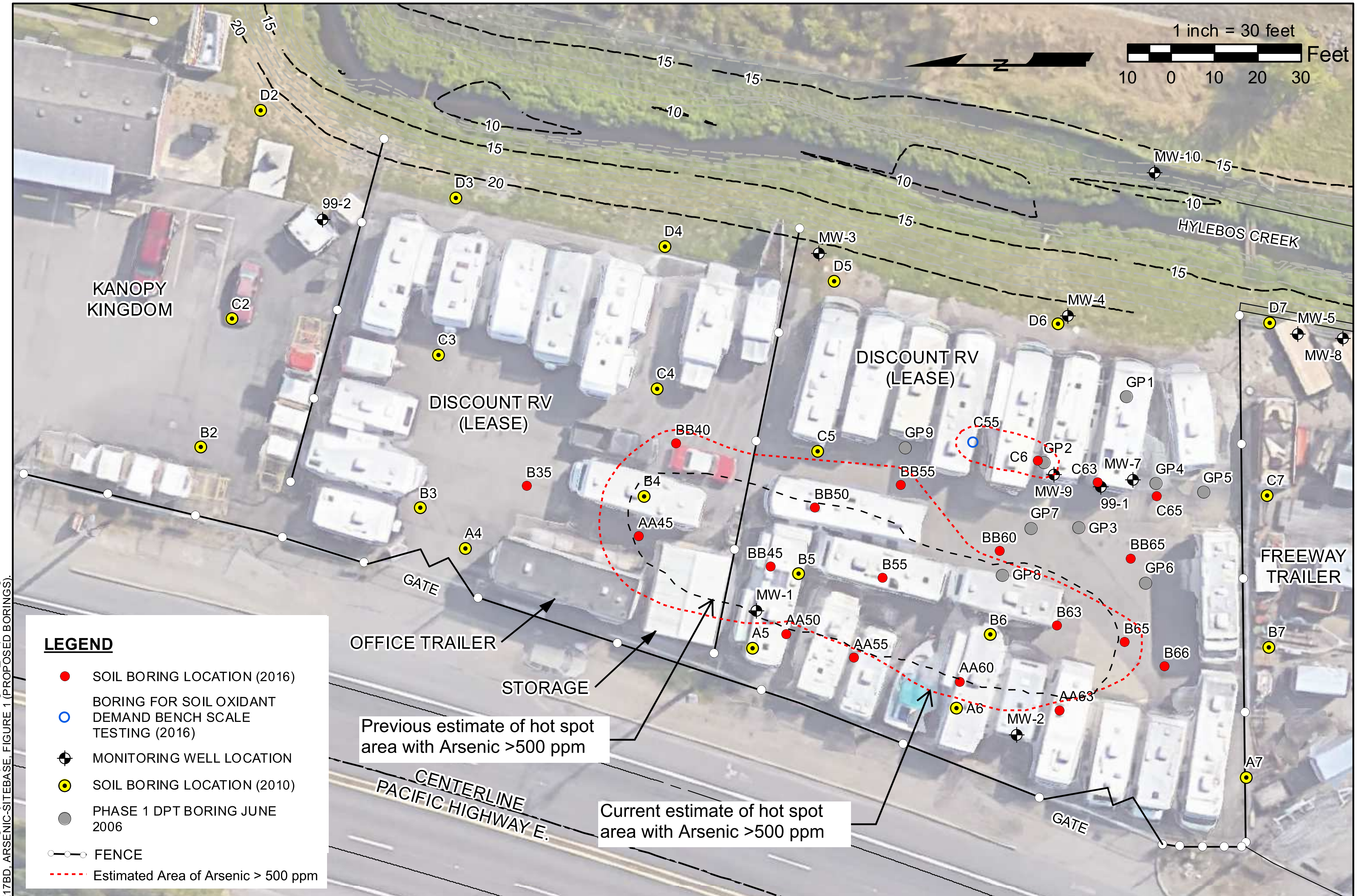
LEAPFROG MODEL

USG Interiors, Inc. - Highway 99 Site

Milton, WA

DATE: FEBRUARY 2020

FIGURE NO. 6



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CAD XREFS: ARSENIC-11X17BD, ARSENIC-SITEBASE, FIGURE 1 (PROPOSED BORINGS).

SOURCE: GOOGLE EARTH PRO,

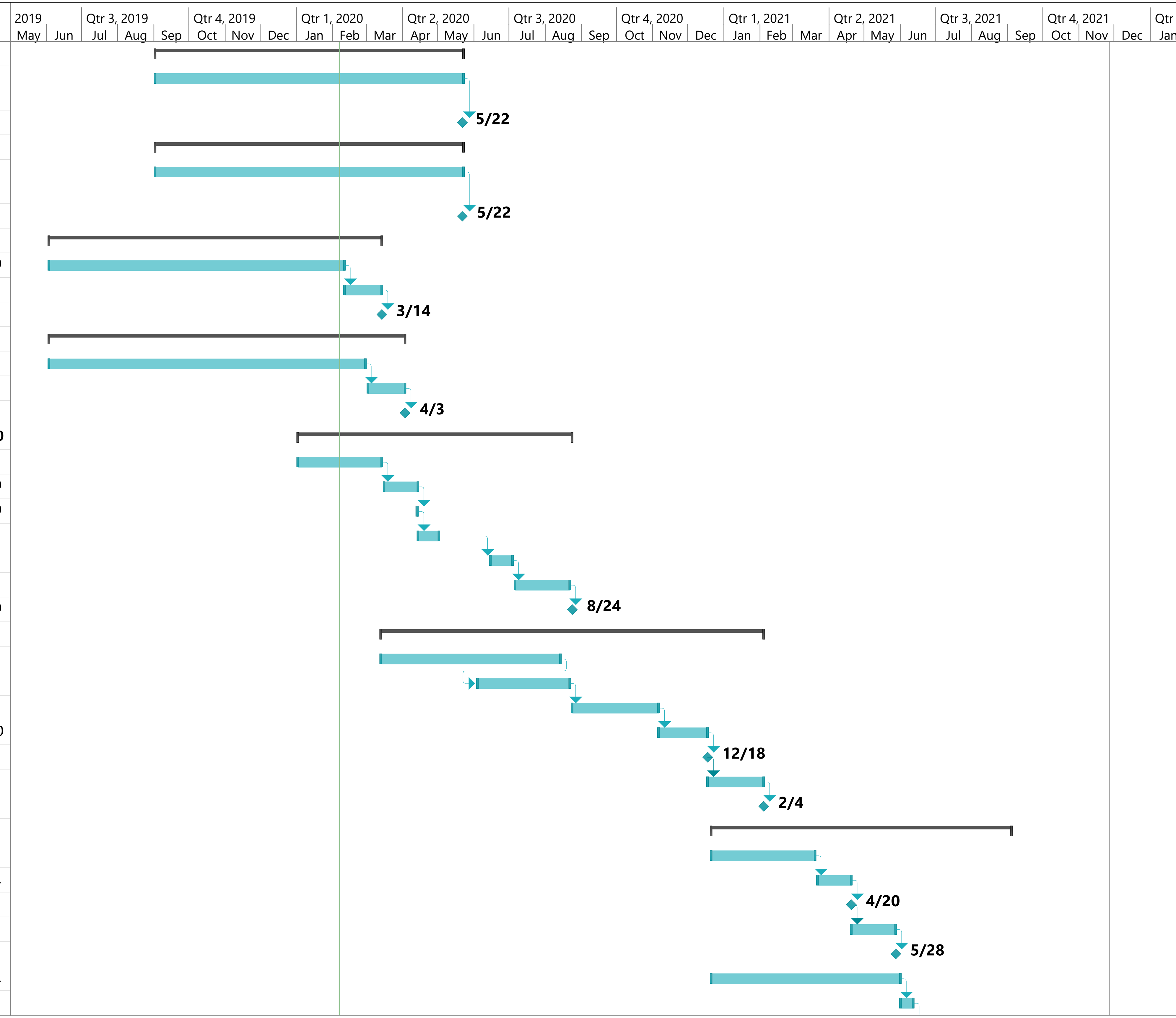
CDM Smith

HOT SPOT DELINEATION

USG Interiors, Inc. - Highway 99 Site
Milton, WA

FIGURE NO. 7

Task Name	Duration	Start	Finish
Access Agreements - HWY 99	**190 days**	**Mon 9/2/19**	**Fri 5/22/20**
Obtain Access Agreements from the County and adjacent property owners	190 days	Mon 9/2/19	Fri 5/22/20
Access Agreements Recorded	0 days	Fri 5/22/20	Fri 5/22/20
Access Agreements - Puyallup	**190 days**	**Mon 9/2/19**	**Fri 5/22/20**
Obtain Access Agreements from the County and adjacent property owners	190 days	Mon 9/2/19	Fri 5/22/20
Access Agreements Recorded	0 days	Fri 5/22/20	Fri 5/22/20
Conceptual Design - HWY 99	**205 days**	**Mon 6/3/19**	**Sat 3/14/20**
Conceptual Design Development for ISS	181 days	Mon 6/3/19	Mon 2/10/20
Ecology Review	24 days	Tue 2/11/20	Fri 3/13/20
Ecology Approval of Conceptual Design	0 days	Sat 3/14/20	Sat 3/14/20
Conceptual Design - Puyallup	**219 days**	**Mon 6/3/19**	**Fri 4/3/20**
Conceptual Design Development for ISS	195 days	Mon 6/3/19	Fri 2/28/20
Ecology Review	24 days	Mon 3/2/20	Thu 4/2/20
Ecology Approval of Conceptual Design	0 days	Fri 4/3/20	Fri 4/3/20
Data Gaps Field Investigation - Joint	**167 days**	**Thu 1/2/20**	**Mon 8/24/20**
Develop Work Plan for Field Investigation	52 days	Thu 1/2/20	Fri 3/13/20
Ecology Review	21 days	Mon 3/16/20	Mon 4/13/20
Ecology Approval of Work Plan	1 day	Mon 4/13/20	Mon 4/13/20
Land Clearing	14 days	Tue 4/14/20	Fri 5/1/20
Field Investigation	15 days	Mon 6/15/20	Fri 7/3/20
Data Gap Analysis	35 days	Mon 7/6/20	Fri 8/21/20
Submit Data Gap Analysis to Ecology	0 days	Mon 8/24/20	Mon 8/24/20
Pilot Study - Joint	**234 days**	**Fri 3/13/20**	**Thu 2/4/21**
Pilot Study Work Plan and Develop RFP for Pilot Study	110 days	Fri 3/13/20	Thu 8/13/20
Contractor Procurement for Pilot Study	57 days	Thu 6/4/20	Fri 8/21/20
Implement Pilot Study	54 days	Mon 8/24/20	Thu 11/5/20
Report of Pilot Study Findings	30 days	Fri 11/6/20	Thu 12/17/20
Submit Pilot Study Findings to Ecology	0 days	Fri 12/18/20	Fri 12/18/20
Ecology Review	34 days	Fri 12/18/20	Wed 2/3/21
Ecology Response	0 days	Thu 2/4/21	Thu 2/4/21
Design and Construction - HWY 99	**185 days**	**Mon 12/21/2**	**Fri 9/3/21**
Engineering Design Report (drawings/specs)	65 days	Mon 12/21/2	Fri 3/19/21
Ecology Review	21 days	Mon 3/22/21	Mon 4/19/21
Ecology Approval	0 days	Tue 4/20/21	Tue 4/20/21
Contractor Procurement	28 days	Tue 4/20/21	Thu 5/27/21
Establish Contract with Contractor	0 days	Fri 5/28/21	Fri 5/28/21
Permitting	116 days	Mon 12/21/2	Mon 5/31/21
Land Clearing	9 days	Tue 6/1/21	Fri 6/11/21

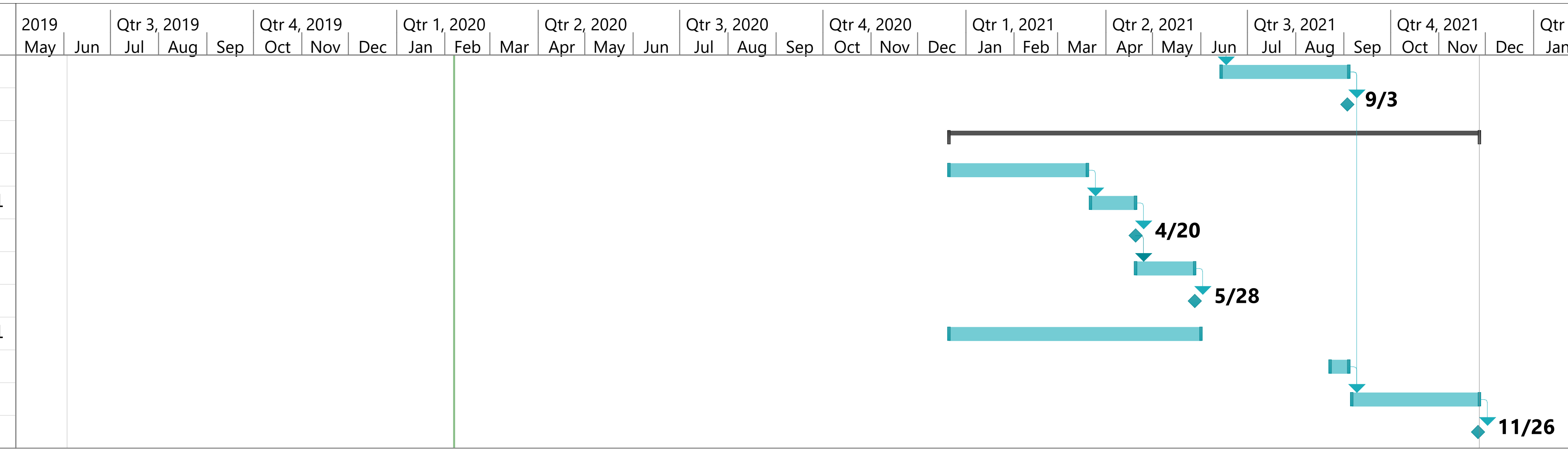


Project: USG HWY 99 - Puyallup Joint Conceptual Schedule
Date: Fri 2/7/20

Summary | Task | Milestone

FIGURE NO. 8

Task Name	Duration	Start	Finish
ISS Construction	60 days	Mon 6/14/21	Fri 9/3/21
Construction Complete	0 days	Fri 9/3/21	Fri 9/3/21
Design and Construction - Puyallup	**245 days**	**Mon 12/21/2**	**Fri 11/26/21**
Engineering Design Report (drawings/specs)	65 days	Mon 12/21/2	Fri 3/19/21
Ecology Review	21 days	Mon 3/22/21	Mon 4/19/21
Ecology Approval	0 days	Tue 4/20/21	Tue 4/20/21
Contractor Procurement	28 days	Tue 4/20/21	Thu 5/27/21
Establish Contract with Contractor	0 days	Fri 5/28/21	Fri 5/28/21
Permitting	116 days	Mon 12/21/2	Mon 5/31/21
Land Clearing	10 days	Mon 8/23/21	Fri 9/3/21
ISS Construction	60 days	Mon 9/6/21	Fri 11/26/21
Construction Complete	0 days	Fri 11/26/21	Fri 11/26/21



Project: USG HWY 99 - Puyallup Joint Conceptual Schedule
Date: Fri 2/7/20

Summary | Task | Milestone

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