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STATE OF WASHINGTON  
**DEPARTMENT OF ECOLOGY**

Northwest Region Office  
PO Box 330316, Shoreline, WA 98133-9716 • 206-594-0000

May 5, 2022

Tucker Thomas  
AvtechTye  
6500 Merrill Creek Parkway  
Everett, WA 98203  
([tthomas@avtechttye.com](mailto:tthomas@avtechttye.com))

**Re: Opinion pursuant to WAC 173-340-515(5) on Remedial Action for the following Hazardous Waste Site:**

- **Site Name:** Tye Aircraft McKechnie Group
- **Site Address:** 3008 100th Street SW, Everett, WA 98204
- **Facility/Site No.:** 91865744
- **Cleanup Site ID No.:** 1217
- **VCP Project No.:** NW2193

Dear Tucker Thomas:

The Washington State Department of Ecology (Ecology) received your request for an opinion on the interim remedial action completed at the Tye Aircraft McKechnie Group facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70A.305 RCW.

#### **Issue Presented and Opinion**

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Pursuant to completion of the work described in the Interim Remedial Actions Report, is further remedial action necessary to clean up contamination at the Site?

**YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site. Ecology appreciates your efforts in conducting interim actions as a step towards a Site cleanup action.**

#### **Description of the Site**

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This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following releases:

- Oil-Range Total Petroleum Hydrocarbons (TPH-O), Trichloroethene (TCE), and Toluene into the Soil.

- TCE, Vinyl Chloride, 1,1-Dichloroethane (1,1-DCA), 1,2-Dichloroethene (1,2-DCE), and cis-1,2-Dichloroethene (cis-1,2-DCE) into the Groundwater.
- TCE, Vinyl Chloride, 1,1-DCA, Acrolein, Chloroform, Xylenes, Benzene, Carbon Tetrachloride, Tetrachloroethylene (PCE), and 1,2-Dichloropropane into the Air.

Enclosure A includes a detailed description and diagrams of the Site, as currently known to Ecology.

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel associated with this Site is affected by other sites.

### **Basis for the Opinion**

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This opinion is based on the information contained in the documents listed in **Enclosure B**.

A number of these documents are accessible in electronic form from the [Site web page](#)<sup>[1]</sup>. The complete records are kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Visit our [Public Records Request page](#)<sup>[2]</sup> to submit a public records request or get more information about the process. If you require assistance with this process, you may contact the Public Records Officer at [publicrecordsofficer@ecy.wa.gov](mailto:publicrecordsofficer@ecy.wa.gov) or 360-407-6040.

This opinion is void if any of the information contained in those documents is materially false or misleading.

### **Analysis and Opinion**

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Based on a review of the 2022 Interim Remedial Actions Report, Ecology has determined:

1. Two potential contamination sources at the Site were removed, including the former oil sump in the former oil storage area of the building, former septic tank on the west side of the building, and some of the associated contaminated soils. Soil amendments consisting of a mixture of emulsified vegetable oil (EVO) and zero-valent iron (ZVI) were placed in the excavations to promote reductive dechlorination by naturally occurring bacteria prior to backfilling the excavations. In addition, remedial injections of EVO and a bacterial inoculum (to enhance naturally occurring bioremediation by anaerobic bacteria) were conducted on the south side of the building (south of the former oil storage area). Ecology concurs that these interim actions are important steps in addressing potential source areas that may be impacting groundwater and/or indoor air, and support the process of ultimately evaluating and selecting a cleanup action for the Site.

RPS requested that Ecology approve the Interim Remedial Actions Report. Please note that Ecology does not approve actions or reports in the Voluntary Cleanup Program. Ecology provides opinions.

2. Confirmation soil sampling from the excavations indicate that the extent of contaminated soil

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<sup>[1]</sup> <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=1217>

<sup>[2]</sup> <https://ecology.wa.gov/publicrecords>

has not been characterized. MTCA requires that a cleanup action must use permanent solutions to the maximum extent practicable. Permanent solutions are actions in which cleanup standards can be met without further action being required, such as monitoring or institutional controls.

In this case, the contaminated soil is accessible and therefore should be remediated, which may require additional excavation. If soil amendments in the excavation is the proposed approach to remediating these contaminated soils, confirmation soil sampling would need to be completed that shows the remaining soils meet cleanup levels.

In addition, groundwater is still impacted in these areas and other areas of the Site. Cleanup action alternatives to address both soil and groundwater contamination (and impacts to indoor air) need to be evaluated in a feasibility study (FS).

The FS checklist provides expectations for reports and is available at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Cleanup-report-checklists-and-templates>.

Please note that the FS and selection of a cleanup action should not proceed until the Site characterization data gaps identified by Ecology in the May 19, 2020 and April 12, 2021 VCP opinion letters have been resolved. RPS indicated via email on January 6, 2021 that they will respond to these data gaps at a later date.

3. The Interim Remedial Actions Report indicates that groundwater monitoring and soil vapor sampling are planned to evaluate if additional active groundwater remediation and/or vapor intrusion mitigation may be required at the Site. Ecology concurs that soil vapor and indoor air confirmation sampling is needed, and recommends a minimum of two confirmation events. Ecology also concurs that groundwater monitoring needs to continue since groundwater exceeds cleanup levels. Sufficient monitoring wells should be in place to assess groundwater compliance near cleanup areas as well.
4. Planimetric and cross-section diagrams that outline the estimated extent of contaminated groundwater and the extent of contaminated soil that has been left in place during interim actions should be included in future reports (see Ecology's May 19, 2020 VCP opinion letter).

### **Limitations of the Opinion**

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#### **1. Opinion does not settle liability with the state.**

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

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To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70A.305.040(4).

**2. Opinion does not constitute a determination of substantial equivalence.**

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. See RCW 70A.305.080 and WAC 173-340-545.

**3. State is immune from liability.**

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70A.305.170(6).

**Contact Information**

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Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: [www.ecy.wa.gov/vcp](http://www.ecy.wa.gov/vcp). If you have any questions about this opinion, please contact me by phone at (206) 594-0090 or email at [tamara.welty@ecy.wa.gov](mailto:tamara.welty@ecy.wa.gov).

Sincerely,



Tamara Welty, LG, LHG  
NWRO Toxics Cleanup Program

Enclosures (2):     A – Description and Diagrams of the Site  
                          B – Basis for the Opinion: List of Documents

cc:     Michael Duet, RPS, [Michael.Duet@rpsgroup.com](mailto:Michael.Duet@rpsgroup.com)  
       John H. Yang, RPS, [John.Yang@rpsgroup.com](mailto:John.Yang@rpsgroup.com)  
       Andrew C. Rardin, Paine Field/Snohomish County Airport, [andrew.rardin@co.snohomish.wa.us](mailto:andrew.rardin@co.snohomish.wa.us)  
       Sonia Fernandez, Ecology, [sonia.fernandez@ECY.WA.GOV](mailto:sonia.fernandez@ECY.WA.GOV)

**Enclosure A**

**Description and Diagrams of the Site**



## Site Description

*This section provides Ecology's understanding and interpretation of Site conditions, and is the basis for the opinions expressed in the body of the letter.*

**Site Definition:** The Site is associated with the former Tye Aircraft facility located within the Paine Field Airport at 3008 100<sup>th</sup> Street SW, Everett, Snohomish County, Washington (the "Property"; **Figure 1**). The "Site" is defined as petroleum hydrocarbons and chlorinated solvents that were released to soil, groundwater, and air as a result of improper handling and storage of hazardous materials, used in the manufacturing of machined and formed aluminum and stainless steel structural parts for the aerospace industry.

**Area/Property Description:** The Property consists of approximately 3 acres of land that were developed in 1965/1966 as the eastern portion of Paine Field, which, at that time, was an active non-commercial airport (Snohomish County Airport). Paine Field is located in unincorporated Snohomish County, between Mukilteo and Everett, Washington.

The Property corresponds to Snohomish County tax parcel account 28042200100102, which is located within parcel 28042200100100. The Property has a one-story, 28,000-square foot building and a 1,078-square foot metal pole building (**Figure 2**), also known as Paine Field Building C-71. The Property is located between 30<sup>th</sup> Avenue W and 31<sup>st</sup> Avenue W on the south side of 100<sup>th</sup> Street SW.

**Property History and Current Use:** The eastern portion of Paine Field was constructed in 1936. An emergency power house was located on the Property in the 1940s and 1950s. A small aircraft hangar was present at the Property in the 1950s and 1960s. Tye Aircraft built on the Property in 1965/1966 and operated at this location until 2009.

Previous industrial processes at the Property included milling, metal forming, machining, swaging, degreasing, threading, and aluminum heat treating. All of the industrial machinery and related hazardous materials previously utilized by Tye have been removed from the building.

The Property has been occupied since 2010 by the Washington Aerospace Training and Research Center, which is an aerospace vocational school associated with Edmonds Community College.

**Contaminant Sources and History:** Contamination on the Site is the result of various discharges from Tye's manufacturing processes that utilized and generated residual waste streams associated with coolants, cutting oils, lubricating oils, chlorinated solvents, and non-chlorinated solvent-based cleaning liquids.

An old, inactive, underground tank (referenced in many documents as the "western septic tank" and located on the west side of the building) appears to have been previously used to collect floor drain fluids and spills from the former metal finish room, and is also a potential contaminant source (see **Figure 2**). Elevated levels of vinyl chloride have been identified in water in the tank. A former oil storage area in the southern portion of the building and a nearby former oil sump pit (that may have contained oils impacted by chlorinated solvents) has been identified as another potential source area. This area is within the building, but is open to outdoor air on one side. The "western septic tank" and the oil sump pit were removed in 2021.

**Physiographic Setting:** The Site is located within the Puget Sound Lowland physiographic province, a north-south oriented topographic depression. The Site is situated on top of the Intercity Plateau physiographic subdivision, which is characterized by an extensive upland with rolling hills. The topography was flattened as development of Paine Field continued in the 1940s and 1950s, when a layer of fill was placed across the Site to varying depths. The Site is at an elevation of about 593 feet above mean sea level. Although the area topography tends to slope west, the Site is relatively flat with a slight slope to the northeast.

**Ecological Setting:** The Site is surrounded by commercial properties. There is no significant undeveloped land within 500 feet of the Property. Property access roads (30<sup>th</sup> Avenue W, 31<sup>st</sup> Avenue W, and 100<sup>th</sup> Street SW) are all paved roads. The building on the Property is surrounded by landscaped areas with a parking lot on the north side of the building. Natural and manmade wetland habitat can be found south and northeast of the Paine Field boundary, approximately ¾ to 1 mile from the Site.

**Geology:** The Site is directly underlain by fill material typically consisting of brown to gray silty sand ranging from 2 to 11 feet thick. The native geologic materials beneath the fill consist of a very dense, non-sorted mixture of clay, silt, sand, and gravel, which is interpreted to be Vashon glacial till. The Vashon till deposit is reportedly 120 to 140 feet thick. Advance outwash underlies the Vashon till and is typically gray, fine to medium sand with increasing amounts of gravel higher in the section.

**Groundwater:** A perched zone of saturation underlying the Site occurs within the fill and permeable areas of the Vashon till between 3.1 and 8.5 feet below ground surface (bgs). The occurrence of perched groundwater fluctuates seasonally. The direction of perched groundwater flow is to the northeast, based on water levels measured in groundwater monitoring wells at the Property (see **Figure 2**).

Water levels in monitoring wells MW-7 and MW-10 (completed to depths of 50 feet bgs in the Vashon till) compared with wells screened in the perched zone indicate a vertically downward hydraulic gradient within the till. Groundwater in a regional Advance outwash aquifer is confined and occurs at depths of 120 to 140 feet bgs in the vicinity of the Property.

**Storm/Surface Water:** Storm water flows across the Site from west to east, and south to north, and is captured in perimeter ditches and directed into a perimeter storm drain system located north of the Site, running parallel to 100<sup>th</sup> Street NW. Storm water flows through the drainage system and discharges to a wetland east of Airport Road, which drains to the east towards Swamp Creek. The Site is approximately 1 mile east of Big Gulch Creek, which discharges to the west into Possession Sound.

**Water Use/Water Supply:** Potable water for the Property and Snohomish County Airport is supplied by the Mukilteo Water & Wastewater District, which obtains water from the Spada Reservoir 30 miles east of Everett, through interconnection with the City of Everett. No existing water supply wells were found within 0.5 miles of the Site on Ecology's well log database.

**Release and Extent of Contamination – Soil:** TCE, TPH-O, and toluene have been identified as contaminants of concern in soil. Interim remedial actions have been conducted in five areas of the Site: "Injection Area #1" on the south side of building, "Injection Area #2" on the west side of building, "TPH Excavation Area" on the east side of the Property, the former oil sump excavation in the former oil storage area of the building, and the former septic tank excavation on the west side of the building.

Figures associated with interim remedial actions completed in 2021 are included as **Figures 3, 4, and 5** (from RPS's 2022 Interim Remedial Actions Report). Figures associated with interim remedial actions completed in prior years are included in RPS's 2017 Interim Corrective Action Completion Report and RPS's 2019 Supplemental Site Investigation Report.

Confirmation soil sampling indicates that the contaminants of concern were remediated by means of excavation and/or injections to below cleanup levels in the following areas: Injection Area #1, Injection Area #2, TPH Excavation Area, and the former septic tank area. Confirmation soil sampling in the former oil sump cleanup area (located in the former oil storage area of the building) indicates that contaminated soils remain that exceed the Method A cleanup level for TCE (in samples Sump-1, Sump-2, Sump-5, and SB-103B), with one of the samples also exceeding the Method A cleanup level for toluene (Sump-5) (see **Figure 3**). The extent of contaminated soil in the former oil storage area has not been characterized.

**Extent of Contamination – Groundwater:** Elevated concentrations of TCE, vinyl chloride, 1,2-DCE, cis-1,2-DCE, and 1,1-DCA that exceed groundwater cleanup levels have been identified beneath the Site and are attributed to degradation of TCE, which was used by Tye for metal finishing. The contaminant plume was originally observed in the shallow perched groundwater south and west of the building (sampling locations MW-3, MW-4, GP-13), and is believed to extend under the building, based on groundwater samples collected from sampling locations GP-1 and T-12.

Groundwater samples were collected at the north and west sides of the Property to define the extent of contamination. Two monitoring wells were installed in September 2012 (MW-5 and MW-6), three monitoring wells were installed in October 2014 (MW-7, MW-8, and MW-9), and two monitoring wells were installed in August 2019 (MW-10 and MW-11), to further delineate the horizontal and vertical extent of groundwater impacts.

Groundwater impacts identified to date are confined to sampling locations MW-2, MW-3, MW-4, GP-1, T-12, GP-7, and GP-13, which are located in the western portion of the Property. Elevated levels of chlorinated solvents were not detected at off-Property sampling locations GP-19, GP-20, MW-5, MW-6, and MW-11, and it appears that contamination has not migrated off-Property. Elevated levels of chlorinated solvents were not detected in the two monitoring wells screened deeper in the glacial till from 40 to 50 feet bgs (MW-7 and MW-10).

Petroleum products and metals have not been identified above groundwater cleanup levels during past investigations.

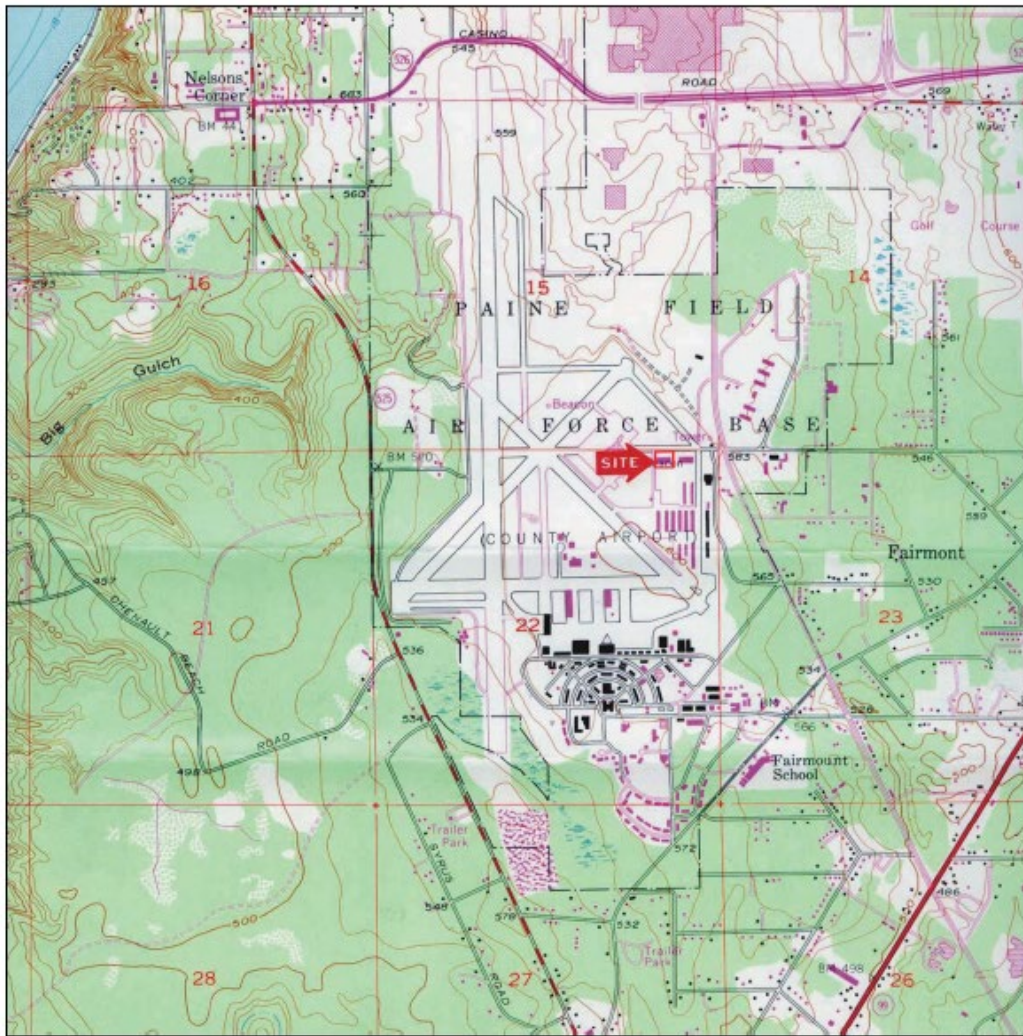
**Extent of Contamination – Air:** In July 2009, benzene concentrations from three indoor air samples, and TCE and 1,2-DCA from an outdoor air sample, exceeded MTCA Method B cleanup levels. In February 2010, five ambient air samples were collected from around the Site to determine the source of TCE and 1,2-DCA, and to establish background conditions. Benzene, 1,2-DCA, methylene chloride, PCE, TCE, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, m&p-xylene, and o-xylene were detected at concentrations above Method B indoor air cleanup levels.

In 2019, concentrations of TCE, vinyl chloride, 1,1-DCA, 1,1-DCE, ethyl chloride, 1,1,1-trichloroethane, and acrolein exceeded MTCA Method B screening levels for sub-slab soil gas beneath the building (figure included in RPS's 2019 Supplemental Site Investigation Report). Concentrations of TCE exceeded the

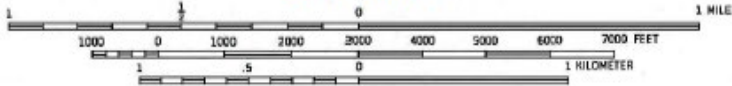
non-residential sub-slab soil gas vapor intrusion screening level for short-term exposures to TCE. A Tier II Assessment to assess vapor intrusion impacts on indoor air quality was requested by Ecology.

In 2020, a vapor intrusion assessment was conducted throughout the building that included one sampling event for sub-slab soil gas and three sampling events for indoor air (Figures included in RPS's 2020 Vapor Intrusion Assessment Report). The results indicated that indoor air does not exceed the indoor air action level for short-term exposures to TCE. However, the results did indicate that the building is being impacted by vapor intrusion from contamination beneath the Site. Concentrations of TCE, vinyl chloride, 1,1-DCA, acrolein, chloroform, xylenes, benzene, carbon tetrachloride, PCE, and 1,2-dichloropropane all exceeded Method B indoor air cleanup levels.

## Site Diagrams



Scale 1: 24 000  
Contour Interval 10 Feet



UNITED STATES GEOLOGICAL SURVEY  
MUKILTEO QUADRANGLE  
WASHINGTON  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1953  
PHOTOREVISED 1968 AND 1973

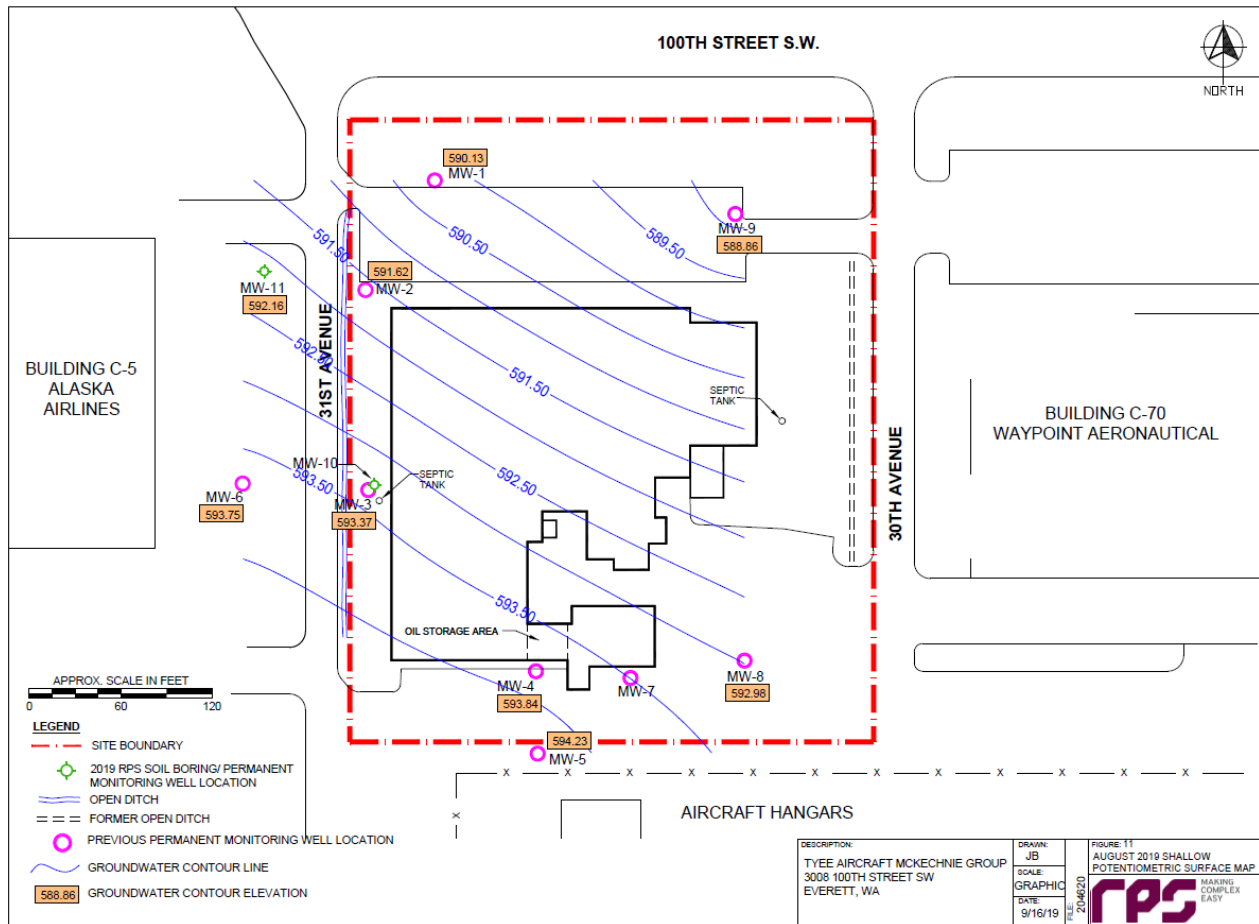


Tyee Aircraft McKechnie Group  
3008 100th Street SW  
Everett, Washington  
Project Number 204620

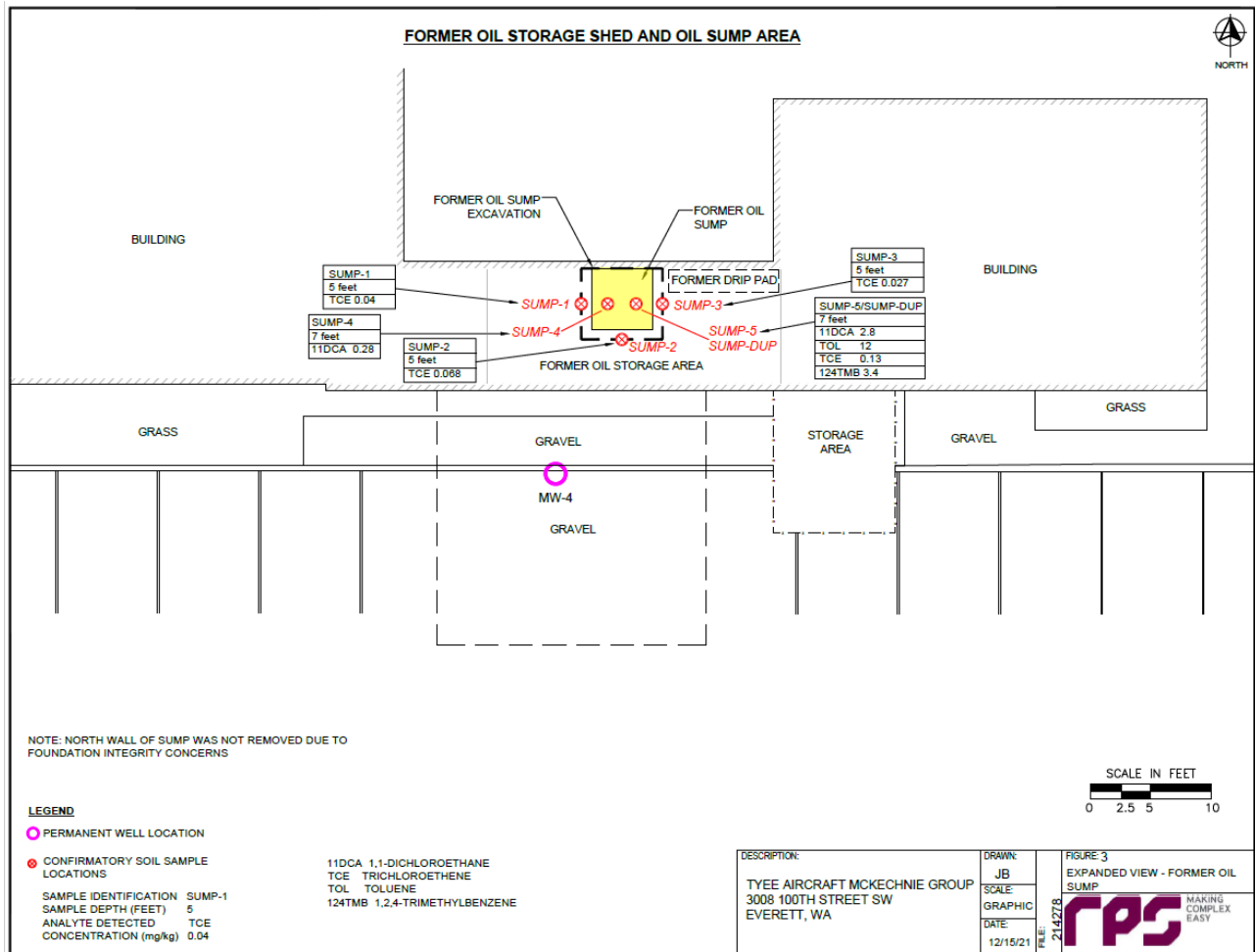
FIGURE 1  
SITE LOCATION



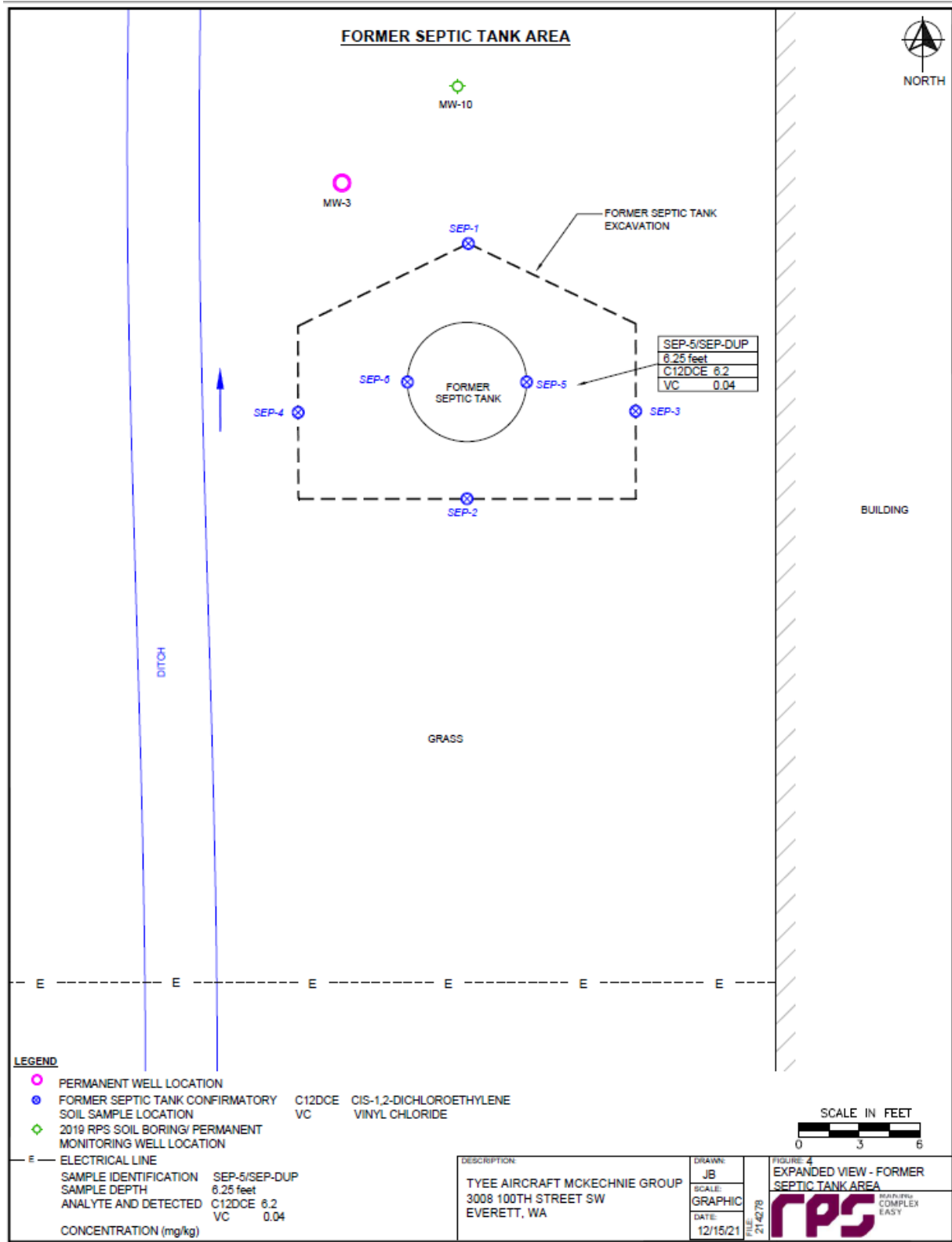
Enclosure A, Figure 1



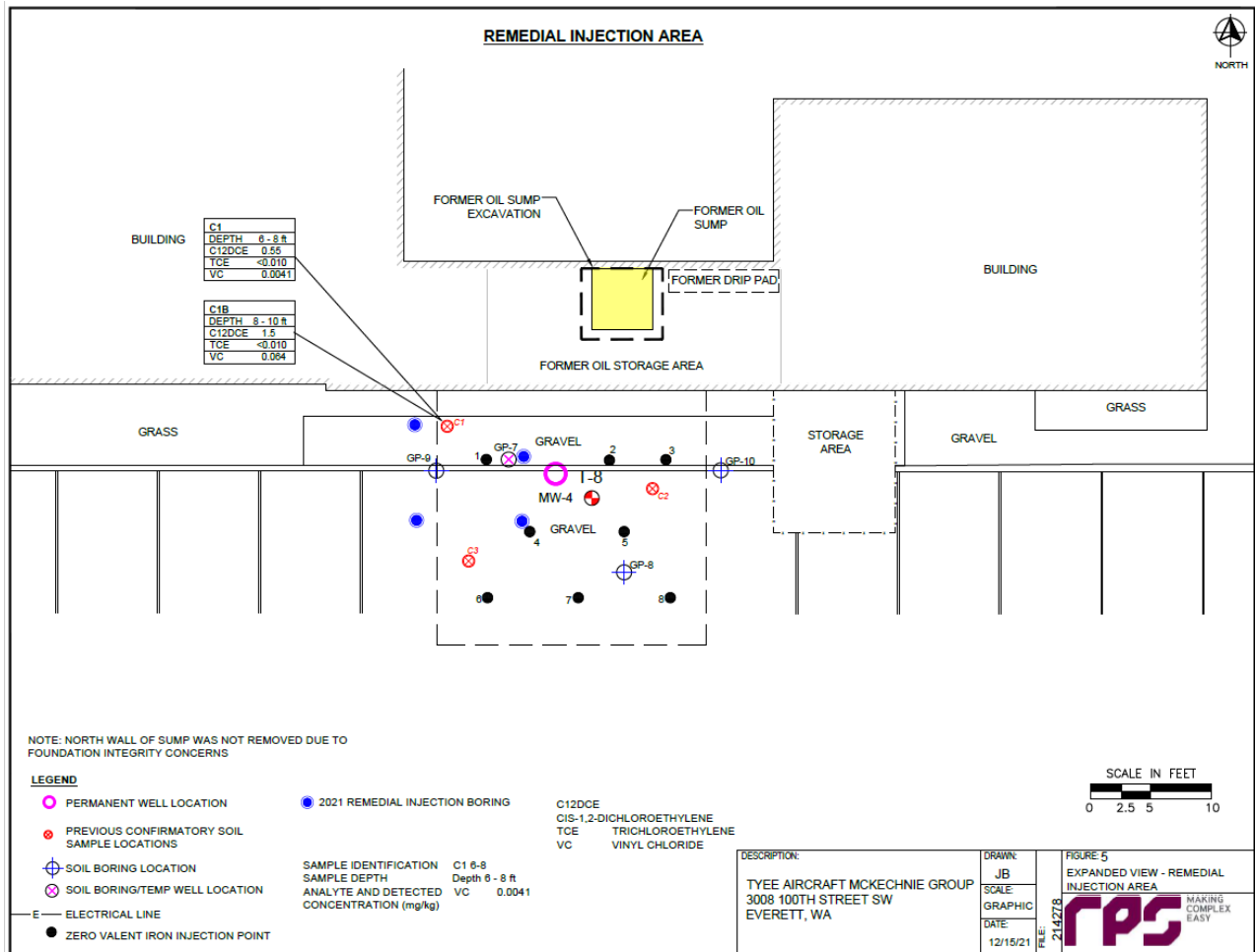
Enclosure A, Figure 2



Enclosure A, Figure 3



Enclosure A, Figure 4



**Enclosure A, Figure 5**



**Enclosure B**

**Basis for the Opinion:  
List of Documents**

1. RPS, *Interim Remedial Actions Report, Tyee Aircraft McKechnie Group*, January 4, 2022.
2. Ecology, *Opinion Letter on Remedial Action at Tyee Aircraft McKechnie Group*, April 12, 2021.
3. RPS, *Vapor Intrusion Assessment Report, Tyee Aircraft McKechnie Group*, October 23, 2020, revised March 15, 2021.
4. RPS, *Terrestrial Ecological Evaluation Form*, January 6, 2021.
5. Ecology, *Opinion Letter on Remedial Action at Tyee Aircraft McKechnie Group*, May 19, 2020.
6. RPS, *Soil Gas Sampling and Analysis Plan – Tier II Vapor Intrusion Assessment Work Plan, Tyee Aircraft McKechnie Group*, June 9, 2020.
7. Ecology, *Request for Evaluation of Trichloroethene Risks at Tyee Aircraft McKechnie Group*, February 20, 2020.
8. RPS, *Supplemental Site Investigation Report, Tyee Aircraft McKechnie Group*, November 21, 2019.
9. RPS, *Responses to February 21, 2019 Comments Letter*, May 24, 2019.
10. Ecology, *Further Action Letter for Tyee Aircraft McKechnie Group*, February 21, 2019.
11. RPS, *1-Year Groundwater Performance Monitoring Program – 4<sup>th</sup> Quarter 2017, Former Tyee Aircraft McKechnie Group Facility*, January 19, 2018.
12. RPS (Formerly Gaia Tech), *Interim Corrective Action Completion Report, Tyee Aircraft McKechnie Group*, May 2017.
13. RPS Gaia Tech, *Supplemental Groundwater Delineation and Quarterly Monitoring Report, Tyee Aircraft McKechnie Group*, December 16, 2014.
14. Ecology, *Opinion Letter on Proposed Remedial Action of Tyee Aircraft McKechnie Group*, July 2, 2014.
15. Gaia Tech, *Response to Comments and Work Plan*, March 28, 2014.
16. Ecology, *Further Action Letter for Tyee Aircraft McKechnie Group*, July 24, 2013.
17. Gaia Tech, *Supplemental Site Investigation and Attenuation Modeling Report*, April 2013.
18. Ecology, *Opinion Letter on Proposed Cleanup of Tyee Aircraft McKechnie Group*, July 17, 2012.
19. Gaia Tech, *Revised Remedial Investigation/Feasibility Study of Tyee Aircraft Facility*, October 2011.
20. Gaia Tech, *Remedial Investigation/Feasibility Study of Tyee Aircraft Facility*, April 10, 2010.
21. Ecology, *Opinion Letter on Draft Remedial Investigation/Feasibility Study at Tyee Aircraft McKechnie Group*, June 21, 2010.
22. Ecology, *Opinion Letter on Proposed Remedial Action at Tyee Aircraft Building C-71 Paine Field*, November 3, 2009.

23. Camp Dresser & McKee Inc., *Phase I and II Environmental Assessment, Tyee Aircraft*, July 2, 2001.