



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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November 8, 2016

MR. ROMEO GONYEA
17600 147TH STREET SE PMB 22
MONROE, WASHINGTON 98275

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

- **Name:** Hers Industrial Park
- **Address:** 4403 Russell Road, Mukilteo, WA 98275
- **Facility/Site No.:** 127256
- **VCP Project No.:** NW1554
- **Cleanup Site ID No.:** 3971

Dear Mr. Gonyea:

Thank you for submitting documents regarding your characterization and proposed remedial action for the **Hers Industrial Park** facility (Site) for review by the Washington State Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Total petroleum hydrocarbons in the gasoline (TPH-G), diesel (TPH-D) and heavy oil (TPH-O) ranges in Soil;
- Tetrachloroethylene (PCE), trichloroethylene (TCE) and related degradation products, TPH-D, TPH-O and arsenic in Ground Water.

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).



This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding your Site characterization and remediation actions:

1. Aspect Consulting, LLC, 2015. *Remedial Investigation/Feasibility Study, HERS Industrial Park, Mukilteo, Washington*. November 9.
2. The Riley Group, 2012. *Groundwater Sampling Event, 1st Quarter 2012, Russell Road Industrial Park (aka Hers Industrial Park), 4403 Russell Road, Mukilteo, Washington*. February 23.
3. The Riley Group, 2009. *Groundwater Sampling Event – Third Quarter 2009, Russell Road Industrial Park (aka Hers Industrial Park), 4403 Russell Road, Mukilteo, Washington*. October 2.
4. The Riley Group, 2009. *Groundwater Sampling Event – First Quarter 2009, Russell Road Industrial Park (aka Hers Industrial Park), 4403 Russell Road, Mukilteo, Washington*. March 26.
5. The Riley Group, 2008. *Groundwater Sampling Event – Second Quarter 2008, Russell Road Industrial Park (aka Hers Industrial Park), 4403 Russell Road, Mukilteo, Washington*. August 20.
6. The Riley Group, 2005. *Well Installation and Groundwater Sampling Event – Fourth Quarter 2005, HERS Industrial Park, 4403 Russell Road, Mukilteo, Washington*. December 27.
7. The Riley Group, 2005. *Supplemental Phase II Subsurface Investigation, Hers Industrial Park, 4403 Russell Road, Mukilteo, Washington*. June 22.
8. The Riley Group, 2005. *Phase I Environmental Site Assessment, Hers Industrial Park, 4403 Russell Road, Mukilteo, Washington*. June 20.
9. James P. Hurley Company, 1996. *Site Assessment Report, HERS Industrial Park, 4403 to 4493 Russell Road and 4424 to 4480 Chennault Beach Road, Mukilteo, Washington*. September 25.

10. James P. Hurley Company, 1995. *Phase II Environmental Site Assessment Report, 4403 to 4493 Russell Road and 4424 to 4480 Chennault Beach Road, Mukilteo, Washington.* August 3.
11. James P. Hurley Company, 1995. *Combined UST Removal and Petroleum Contaminated Soil Cleanup Summary Report, 4493 Russell Road, Mukilteo, Washington.* July 24.
12. ATC Environmental, Inc. 1994. *Phase I Environmental Site Assessment, Hers Industrial Park, Mukilteo, Washington.* October 25.

The reports listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at (425) 649-7235 or sending an email to: nwro_public_request@ecy.wa.gov.

In addition, the following reference was used:

Smith, Mackey, 1976. *Preliminary Surficial Geologic Map of the Mukilteo and Everett Quadrangles, Snohomish County, Washington.* State of Washington Department of Natural Resources, Geologic Map GM-20.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the releases at the Site, Ecology has determined:**

- The Site is currently the location of comingled plumes in ground water consisting of PCE/TCE and related degradation products, TPH-D/TPH-O and arsenic, at concentrations exceeding Method A cleanup levels. An approximate current Site boundary is provided in the Site Diagrams where a dashed line represents an inferred boundary. Further characterization may aid in refining the Site boundary.
- According to the Remedial Investigation/Feasibility Study (RI/FS), injection well MW-13 was inaccessible due to the monument being silted in so no ground water elevation data was collected. Ecology recommends that the monument/wellhead be excavated and the gasket repaired or replaced on the monument cover to prevent future siltation. MW-13 should be then reestablished as a monitoring point for ground water levels and Site characterization ground water sampling. In addition, injection well MW-14 should be located using a metal detector, uncovered and if

necessary, the casing extended and monument reinstalled. The well would then need to be surveyed in order to restore it as a monitoring and potential injection point.

- The RI/FS report should include a table of all monitoring and injection well specifications that includes at a minimum: the well installation date, top of casing elevation, ground elevation, casing/diameter, total depth, screened interval depths, measured range of depth to water, and a general description of lithologies encountered in the borehole.
- The legends of Figures 8A through 8C indicate that the ground water elevations are relative to the National Geodetic Datum of 1929. However, according to a note at the bottom of Table 4.5, ground water elevation data were calculated using top of casing measuring point elevations that were not surveyed to a United States Geological Survey datum in accordance with WAC 173-340-840(4e). A comparison of the previously established wellhead elevations (Riley Group) and the current ones results in some significant discrepancies. See also Section 4.5 in Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* dated September 2011. The wellhead elevations need to be established by a Washington-state licensed land surveyor.
- The ground water elevation contour maps (Figures 8A through 8C) are inconsistent with regard to flow direction. The January and April 2015 maps use a 1-foot contour interval but the August 2015 map uses a 0.25-foot contour interval. It is preferable that the same contour interval be used so that different measuring events can be compared. The January 2015 ground water contour map, which shows data collected during precipitation events over a two-day period, suggests shallow ground water mounding in the shallow zone presumably due to recharge from the storm water catch basins. Because of this potential localized and temporary effect, Ecology recommends that Site ground water elevation data be collected synoptically following an extended dry period. Also, Figure 8C should not have a 536-foot ground water elevation contour line; there is insufficient data to support it.
- If there is recharge to the water table due to the storm drains as suggested by the January 2015 ground water elevation contours, it indicates that the storm water drainage system leaks and helps to explain how contaminated fluids reportedly poured into the drains became a source of contamination in ground water on the Site.
- Previous ground water elevation data indicated a flow direction to the northeast as does the August 2015 data. Given this possible trend, MW-2 and MW-2D are most likely not located downgradient of the plume, they are cross gradient. So the conclusion that the regional outwash (Esperance sand) aquifer is unaffected by the

Site is inconclusive. However, Ecology does not recommend additional monitoring wells be installed in the Esperance sand at this time.

- In order to show the lateral distribution of chlorinated VOCs, Ecology recommends the preparation of contaminant plume maps on a base map that does not include the Gore sorber data.
- Geologic cross-sections are needed through the impacted areas to demonstrate that the horizontal and vertical extent of contamination has been delineated. The cross-sections should include the recently installed deep monitoring wells MW-2D and MW-16D and show the hydrostratigraphy as well as contaminant concentrations in soil and ground water.
- Appendix C of the RI/FS report contains monitoring well installation logs for MW-2D and MW-16D. It appears that no measures were taken to prevent the potential downward vertical migration of pure-phase PCE along the outer edge of the annular and bentonite seals such as the installation of telescoping or conductor casing to prevent cross-contamination of deep water-bearing zones in the Advance outwash underlying the Vashon till. Any future monitoring wells installed in the intermediate or deep water-bearing zones on the Site need to have this additional construction feature specified and installed as a precaution.
- Ecology requests that both isomers of 1,2-dichloroethene be included as chemicals of concern. Since both are degradation products of TCE, they can help document that the degradation process is occurring especially if different remediation methods are introduced.
- Please provide concentration versus time graphs for monitoring wells that had or have contaminants at concentrations above Method A cleanup levels. The graphs should indicate when injections were conducted and what the injections consisted of. Because the in-situ chemical oxidation injections conducted in 2006 were successful in reducing VOC concentrations in ground water, the graphs are needed in order to support evaluation of the proposed remedial action alternatives. The graphs will also be useful for demonstrating the progress of the selected remedial action.
- Ecology does not recognize the use of silica gel cleanup for NWTPH analyses of ground water (see Ecology publication No. 10-09-057 *Guidance for Remediation of Petroleum Contaminated Sites* dated June 2016; pages 91 and 92 for more detail).
- Except for the planned decommissioning of selected monitoring wells, Ecology agrees either Alternative 2 or 3 is a preferred selection for the cleanup of VOCs in

ground water. Ecology suggests proposing the decommissioning of monitoring wells as the remediation progresses based on quarterly monitoring data trends.

- None of the remedial alternatives in the Feasibility Study address petroleum hydrocarbon contamination and arsenic in ground water above Method A cleanup levels. The FS must address these contaminants.
- Please show and label the surrounding industrial property locations (described in Section 2.3) that are adjacent or near the Site on Figure 2 (Production Plating is shown but two addresses are provided in the text) or on a separate figure. Industrial land uses on adjacent parcels should be described.
- In Table 4.2, please indicate in the notes the meaning of the detections flagged with an 'x'. The last note in the table has a typographical error in the date.
- As noted in Section 5.3.1 of the RI, a vapor intrusion threat may exist at the Site. An evaluation of the soil to vapor pathway is therefore required. MTCA and Ecology's current guidance on soil vapor intrusion do not provide an explicit method for establishing soil cleanup levels protective of indoor air, and instead rely on empirical demonstrations of air quality or modeling. Proof that contamination is not causing an exceedence of air cleanup standards will therefore be the basis for establishing that Site soil and ground water are protective of indoor air.
- Section 11 indicates that the preferred cleanup action, Alternative 2 which includes completed actions, biostimulation and monitored natural attenuation, would require an environmental covenant once a portion of the impacted parcels are cleaned up. Ecology would not be able to issue an environmental covenant for a stable and/or shrinking plume which can be further remediated to below MTCA cleanup levels. A disproportionate cost analysis would be required if an environmental covenant is requested.
- Ecology's recommended Remedial Investigation (RI) report format consolidates all pertinent Site historical information, collected soil and ground water data, and completed soil cleanup data. Ecology requests that all RI reports follow this format. See the following Ecology web page for the RI report format and content requirements: <http://www.ecy.wa.gov/programs/tcp/policies/checklists>
- The completed Site characterization (RI) should be the basis for preparation of a Feasibility Study (FS) that meets the MTCA requirements for selection of a cleanup action. See the following Ecology web page for FS report format and content requirements: <http://www.ecy.wa.gov/programs/tcp/policies/checklists>

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- Electronic submittal of all sampling data collected in or post-2005 into Ecology's electronic Environmental Information Management (EIM) database is a requirement in order to receive a final Ecology opinion for this Site. Erica Fot (email efot461@ecy.wa.gov, or via telephone at 360-407-6692) is Ecology's contact and resource on entering data into EIM.

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site or that no further remedial action will be required at the Site upon completion of the proposed remedial action. To obtain either of these opinions, you must submit appropriate documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me by phone at (425) 649-7064 or via email at heather.vick@ecy.wa.gov.

Sincerely,



Heather Vick, LHg
NWRO Toxics Cleanup Program

cc: Alan Noell, Aspect Consulting, LLC
Sonia Fernandez, VCP Coordinator, Ecology

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Enclosure A

Site Description and Diagrams

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: The Site is defined as total petroleum hydrocarbons in the gasoline (TPH-G), diesel (TPH-D) and heavy oil (TPH-O) ranges released to soil at 4403 to 4480 Russell Road in Mukilteo, Washington. The Site is also defined as tetrachloroethene (PCE) (and related degradation products including trichloroethylene (TCE)) and arsenic that occur in ground water northeast and east of Building 4403 on the Property.

Area and Property Description: The HERS Industrial Park (a.k.a. Russell Road Industrial Park) is an 8.2-acre, irregularly shaped tract of land. The industrial park is comprised of six Snohomish County parcels of land containing seven one-story buildings and one demised building pad (former 4493 Russell Road building). The street addresses and corresponding Snohomish County tax parcel numbers are listed in the following table:

Street Address	Tax Parcel Number	Owner/Taxpayer	Impacted by the Site?
4403 Russell Rd	00441400004600	Russell Rd Industrial Pk	Yes
4433 Russell Rd	00441400004502	Russell Rd Industrial Pk	Yes
4463 Russell Rd	00441400004400	Russell Rd Industrial Pk	Unknown
4493 Russell Rd	00441400004300	Russell Rd Industrial Pk	No?
4351 Chennault Bch Rd	00441400004700	Russell Rd Industrial Pk	Yes
4440 Chennault Bch Rd	00548700001600	Russell Rd Industrial Pk	Yes

In addition, the following two parcels owned by the International Church of Foursquare Gospel are considered to be impacted by the Site:

Address	Tax Parcel Number	Owner/Taxpayer	Impacted by the Site?
4424 Chenault Bch Rd	00548700001700	Int. Church Foresquare Gospel	Yes
4424 Chenault Bch Rd	00548700001701	Int. Church Foresquare Gospel	Yes

The following two parcels are not currently considered as being impacted by the Site:

Address	Tax Parcel Number	Owner/Taxpayer	Impacted by the Site?
4470 Chenault Bch Rd	01031600000200	Gonyea Woodworking Inc.	No?
4480 Chenault Bch Rd	01031600000100	Himalayan Holdings Group LLC	No?

The Property is surrounded by industrial land uses.

Property History and Current Use: The Property was undeveloped land until approximately 1953 when a single-family residence was constructed in the southeast portion of the Property. The six existing Site industrial park buildings were constructed in 1977 and 1978. Site buildings have been occupied by various commercial and light industrial tenants. A tabulated summary of the former and present building tenants is as follows (building numbers correspond to street numbers in above addresses):

Building No./Occupant	Operation Dates	Operations	Hazardous Materials Used/Disposed of
Building 4403 (30,875 SF)			
Intermec Corporation	1978 to 1990	Electronics manufacturer	Chlorinated solvents
King Machine	1990 to late 1990s	Automotive repair and machine shop	Hydraulic oil; machine oil; machine coolants; solvents
Our Gang Motorcycle	1990 to late 1990s	Motorcycle parts, service and repair	Petroleum products; chlorinated solvents
Absolute Cleaning Services	Unknown	Restaurant kitchen exhaust cleaning	Washed PCE-soaked cleaning rags in annex; wash water routed to sanitary sewer
Dansco Cabinetry	Unknown	Woodworking	Stains; glues; adhesives; lacquer thinner
Custom Commercial Cabinets	Unknown	Woodworking	Glues; adhesives; lacquer thinner
Custom Cabling	Unknown	Cable company offices	None
Production Plating	Unknown	Product and stock storage	ERTS 614337; Phase II; cadmium in soil

Building 4433 (15,000 SF)			
Absolute Cleaning Services	Unknown	Restaurant kitchen exhaust cleaning	PCE; kerosene; Smoke-A-Way
Double Bluff Design	Unknown	Oak furniture manufacturer	Stains; glues; adhesives
Coleman Machine Works	Unknown	Machine shop in annex	Hydraulic oil; machine oil; machine coolant; solvents
Exotic Tool Welding, Inc.	Unknown	Welding and metalworking	Acetone; welding gases; propane
Buchanon Companies	Unknown	Offices and storage	None
Building 4463 (11,400 SF)			
Coleman Machine Works	Unknown but space vacant in 2005	Machine shop	Hydraulic oil; machine oil; machine coolant; solvents; oil stains in building and large oil stain in asphalt parking lot
Pacific Planners	Unknown	Woodworking	Wood preservation products
Building 4493 (30,500 SF)			
Adaptive Engineering Lab	Unknown	Manufacturer of hardware and accessories for the physically-challenged	Hydraulic oil; machine oil; machine coolant; adhesive; glues; solvents; deburring compounds; Abandoned 550-gallon heating oil UST on south side of building
Mr. Ed's Bingo & Casino Supply	Unknown	Gaming supply storage (paper products, tables and chairs)	None
Vacant space			
Building 4440 (42,253 SF)			
Franz Bakery	1994 to present	Bakery delivery operations; truck and baked good storage	None
Fiber International	Unknown to present	Services truck fleet vehicles	Waste oil in AST; parts washer uses mineral spirits and 'naphtha'

Building 4470 (20,200 SF)			
Provet of Seattle		Warehouse and distribution of pet and veterinary supplies	Veterinary chemicals
Buffalo Bobs	Unknown	Restaurant	Waste cooking oil and grease
Building 4480 (17,600 SF)			
City of Mukilteo	1992 to unknown	Police Department	Illegal drugs and related items in evidence storage room
Himalayan Corporation	Unknown to present	Dog snack manufacturer	None

Sources of Contamination: An abandoned 550-gallon heating oil underground storage tank (UST) located on the south side of Building 4493 was removed in June 1995.

Former operations of Intermec Corporation and King Machine in the north end of Building 4403 are suspected of causing the releases of PCE and TCE which is thought to have subsequently entered the storm water catch basins northeast and east of the building. The storm water system was identified as a possible point source for the contamination, having the potential to allow unimpeded migration into the subsurface. The mechanism for the release and migration into the storm water system has not been established.

ACS stored 5-gallon containers of PCE and prepared solutions of PCE and kerosene in 55-gallon drums in the 4433 Russell Road building. These mixtures were used as solvents for cleaning restaurant exhaust systems. ACS also laundered used rags in a large commercial washer and dryer in the 4403 Russell Road building. During a 1995 Phase II ESA, it was determined that the washing machine drained to a 2-inch diameter steel pipe connected to the sanitary sewer.

The Property has a private storm water system that locally impacts the hydraulic gradient of shallow ground water. The system is considered a potential release point for contamination generated on the Property and disposed of in storm drains. A 1994 Phase I Environmental Site Assessment recommended that the private storm drains be tight-lined and connected to the City's storm water sewer system. The primary source of VOC contamination appears to have originated from former and existing storm drains D29 and D30 on the east side of the former Intermec lease space in the 4403 Russell Road building.

Physiographic Setting: The **Puget Sound Lowland** physiographic province consists of a broad, low-lying region situated between the Cascade Range to the east and the Olympic Mountains and Willapa Hills to the west. Mukilteo is located on the eastern shore of Puget Sound within the Puget Lowland physiographic province.

Surface/Storm Water System: The closest surface water body to the Site is a wetland area approximately 1,000 feet to the east. The headwaters of an unnamed west-flowing creek are located about 3,500 feet to the south.

The Property is covered almost entirely with impervious surfaces and storm water is captured by 39 catch basins in the asphalt pavement. The system is reportedly a low-impact development, infiltration-type system in which a portion of all storm runoff percolates into the subsurface via leachfields or dry wells. Approximately 39 storm water catch basins are located on the Property. The catch basins were reportedly not tight-lined to an existing sewer main but allowed to discharge directly to the subsurface either at the catch basin or via a series of infiltration galleries extending outward from the catch basin.

Storm Drain System Investigation: The private storm drain system on the Property was investigated in 1995 using test pit excavations in the vicinity of 5 representative catch basins. The storm drains were found to be connected to concrete or masonry catch basins that were connected to perforated polyvinyl chloride discharge pipes. The system was found to distribute storm water and potential contaminants to leach fields located beneath parking areas throughout the Site.

Catch basin #34, located on the east side of Building 4403, was found to be filled with oily sludge and showed signs of leakage of oily water into the underlying soil. In 1996, the remainder of the catch basins were investigated by collection of soil samples with exploratory test pits or borings from the bottom of the catch basins. No indication of contamination exceeding Method A cleanup levels was found. Inlet filter tray inserts (sets of filters), designed to remove sediment and petroleum hydrocarbons from untreated surface run-off, were subsequently installed in most of the storm water catch basins.

Ecological Setting: The Property is located in an industrial area and is surrounded by commercial and light industrial land uses. Some undeveloped land is located on properties north and west of the Property however most of the area is covered by pavement and buildings.

Geology: The Property is mapped as being directly underlain by Vashon glacial till, a dense, poorly-sorted, non-stratified mixture of clay, silt, sand and gravel up to boulder size. According to borehole logs for monitoring wells MW-1 through MW-8, a fine- to medium-grained silty sand with trace gravel (interpreted as fill materials) extends to

approximately 15 feet below the ground surface (bgs) which was the maximum depth explored.

Beneath the fill, Vashon glacial till is encountered which consists of a heterogeneous, non-sorted mixture of clay, silt, sand and gravel. A weathered till was encountered to approximately 15 feet bgs; at that depth the till became much dense. Based on one boring, the Vashon till occurs to a depth of approximately 177 feet thick at the Property and is underlain by Advance glacial outwash deposits (Esperance sand member). The Esperance sand member primarily consists of moderately to well-sorted and well-stratified sand and gravel. The Esperance sand at the Property is estimated to be 120 to 160 feet thick based on geological mapping of the area (Smith, 1976).

Ground Water: Ground water reportedly occurs as a perched zone above the dense glacial till which underlies the fill materials. Ground water occurs at depths ranging from approximately 2 to 7 feet bgs based on water levels recorded in Site monitoring and injection wells. The direction of shallow ground water flow at the Site is to the northeast, toward a wetland area about 1,000 feet east of the Property. A shallow, ground water mound has been observed consistently beneath the northeast portion of the Site. The occurrence of the ground water mound is approximately coincident with the estimated boundary of the PCE/TCE plume. Both the presence of the mound and the plume may be the result of discharge from catch basins located at the north end of an infiltration drainline. Chlorinated solvent wastes may have been disposed of in the storm water catch basins where they then migrated into the subsurface, however the exact release mechanism has not been established.

A deep water-bearing zone is present in the Esperance Sand beneath the Vashon till.

Water Supply: Drinking water for the Property is supplied by the Mukilteo Water and Wastewater District. The City of Mukilteo's water supply is the Spada Reservoir, located approximately 30 miles east of Everett in the Sultan Basin watershed at the headwaters of the Sultan River. According to Ecology's well log database, there are no water supply wells located within 0.5 mile of the Site.

Release and Extent of Soil Contamination:

Intermec/King Machine Floor Drain. A floor drain located in the former Intermec/King Machine tenant space in Building 4403 had a system of trench drains feeding it which were subsequently filled with concrete. Inspection of the floor drain in 1995 indicated that it was connected to a 2-inch diameter steel pipe that appeared to be connected to the sanitary sewer system of the building. A soil sample collected in 1995

from beneath the floor drain at a depth of 1.5 feet bgs did not test positive for petroleum hydrocarbons; however, the sample was not analyzed for VOCs.

Exotic Metals Welding Floor Drain. A floor drain located in the former Exotic Metals Welding tenant space in Building 4433 was investigated in 1995. The drain was found to be connected to a 2-inch diameter steel pipe which appeared to be connected to the storm drainage system on the north side of the building. The floor drain and pipe were determined to be in good condition with no indication of corrosive degradation. The concrete in the immediate vicinity of the drain was stained with what looked like motor oil and appeared to also be etched by corrosive chemicals. An oily staining pattern was identified in the upper 18 inches of soil below the drain and attributed to surface activities. A soil sample collected from beneath the drain contained 1 mg/kg TPH-G.

2005 Phase II Investigation. A 2005 Phase II investigation advanced ten direct-push borings (SP-1 through SP-10) to a maximum depth of 12 feet bgs. A total of 22 soil samples were collected from the 10 borings however based on field screening with a photo-ionization detector, only two samples were analyzed for TPH-G, TPH-D, TPH-O benzene, toluene, ethylbenzene and xylenes (BTEX compounds). The soil sample from SP8 (7.5 to 8 feet bgs), drilled in the former heating oil UST location contained TPH-D and TPH-O at concentrations below the Method A cleanup levels. The soil sample from SP10 (10 to 11 feet bgs) contained only toluene in a trace amount below the Method A cleanup level. One soil sample from SP1 (7 to 8 feet bgs) analyzed for naphthalenes and carcinogenic polycyclic aromatic hydrocarbons (PAHs) contained no detectable levels. One soil sample from SP10 (8 to 9 feet bgs) was analyzed for RCRA 5 metals and contained none that exceeded Method A cleanup levels.

Only one soil sample on the Site has been analyzed for VOCs which was collected in test pit TP-4 excavated adjacent to near catch basin #34.

2015 Remedial Investigation. A remedial investigation conducted in 2015 included installation of shallow monitoring wells MW-16 through MW-22 and deep wells MW-2D and MW-16D where soil samples were collected. Soil samples collected at depths of 55 and 190 feet bgs contained non-detectable levels of VOCs. A soil sample collected at a depth of 15.5 feet bgs in MW-16 contained PCE and TCE at concentrations exceeding Method A cleanup levels. In the boring drilled for MW-16D, soil samples collected to 65 feet bgs contained PCE and/or TCE at concentrations exceeding Method A cleanup levels. In the boring drilled for monitoring well MW-21, TCE was detected at a concentration exceeding the Method A cleanup level at a depth of 9 feet bgs.

Release and Extent of Ground Water Contamination:

Eleven grab ground water samples were collected in the 10 probes advanced as part of the 2005 Phase II investigation. Ground water was encountered at depths of 4 to 7 feet bgs and a sample was collected from each of the 10 locations.

The ground water samples were analyzed for petroleum, BTEX and VOCs. Only one ground water sample, collected at SP10 near the catch basin, contained TPH-G, toluene, ethylbenzene and xylenes, which were all below the Method A cleanup levels.

Ground water samples from 3 of the probes contained detectable levels of PCE, trichloroethylene (TCE) and related compounds and degradation products. The highest levels were in the ground water sample collected at SP10, drilled adjacent to the storm water catch basin north of catch basin #34 and east of Warehouse 4403. The sample contained PCE at a concentration of 300 µg/L and TCE at a concentration of 42,000 µg/L both exceeding Method A cleanup levels.

Eight monitoring wells (MW-1 through MW-8) installed in 2005 were all screened from 5 to 15 feet bgs. Based on ground water samples from the 8 wells, a halogenated volatile organic compound (HVOC) plume in ground water was determined to be situated northeast and east of the 4403 Russell Road warehouse building. The plume was centered north of catch basin #29 where SP10 was sited and MW-7 had been installed. The initial ground water sample collected from MW-7 contained PCE at a concentration of 460 µg/L and TCE at a concentration of 7,000 µg/L.

Seven injection wells (MW-9 through MW-15) were installed between October 2005 and March 2006.

In 2015, 6 shallow (MW-16 through MW-22) and 2 deep (MW-2D and MW-16D) monitoring wells were installed in an effort to delineate the horizontal and vertical extent of contamination in ground water on the Site.

The two deep monitoring wells were paired with shallow monitoring wells MW-2 and MW-16 respectively. Monitoring well MW-2D was drilled through the Vashon till and into the top of the Esperance Sand which was encountered at 177 feet bgs. MW-2D is screened from 176 to 196 feet bgs with 3 feet of sand pack above the top of the screen and a bentonite seal to the ground surface. Monitoring well MW-16D was drilled and installed in a permeable zone with the Vashon glacial till which was encountered at 177 feet bgs. No telescoping or conductor casing was installed in either of the deep monitoring wells in an effort to prevent vertical downward migration and cross-contamination of PCE between the water-bearing zones.

In the new shallow monitoring wells, PCE and TCE were detected at concentrations above Method A cleanup levels in monitoring wells MW16, MW-20 and MW-21.

Soil Remediation:

Former Heating Oil UST. Soil surrounding the former heating oil UST removed in 1995 was over-excavated. Confirmation soil samples collected from the excavation bottom and sidewalls contained TPH-d at levels below the Method A cleanup level. A total of 25 tons of petroleum-contaminated soil was excavated and removed from the Site.

A 2005 soil sample collected at a depth of 7.5 to 8 feet bgs in direct-push boring advanced in the former UST location contained toluene, TPH-D and TPH-O at concentrations below the Method A cleanup level. A grab ground water sample collected in the boring and analyzed for VOCs, petroleum hydrocarbons and BTEX compounds contained only toluene at a concentration well below the Method A cleanup level.

Exotic Tool Welding Floor Drain. Approximately one cubic yard of impacted soil was removed from the vicinity of the Exotic Tool Welding drain. Confirmational soil sampling indicated the hot spot had been removed and remaining soil was in compliance with MTCA.

Catch Basin #34: Based on a soil sample from a test pit (TP-4) adjacent to catch basin #34 that contained TPH-d and TPH-o above Method A cleanup levels as well as detectable PAHs and VOCs, approximately 25 tons (18 cubic yards) of petroleum-contaminated soil was removed from the catch basin.

The source of the contamination was attributed to oily water leaking from a gap between the bricks at the base of the catch basin. However, no confirmational soil samples were collected.

Ground Water Remediation:

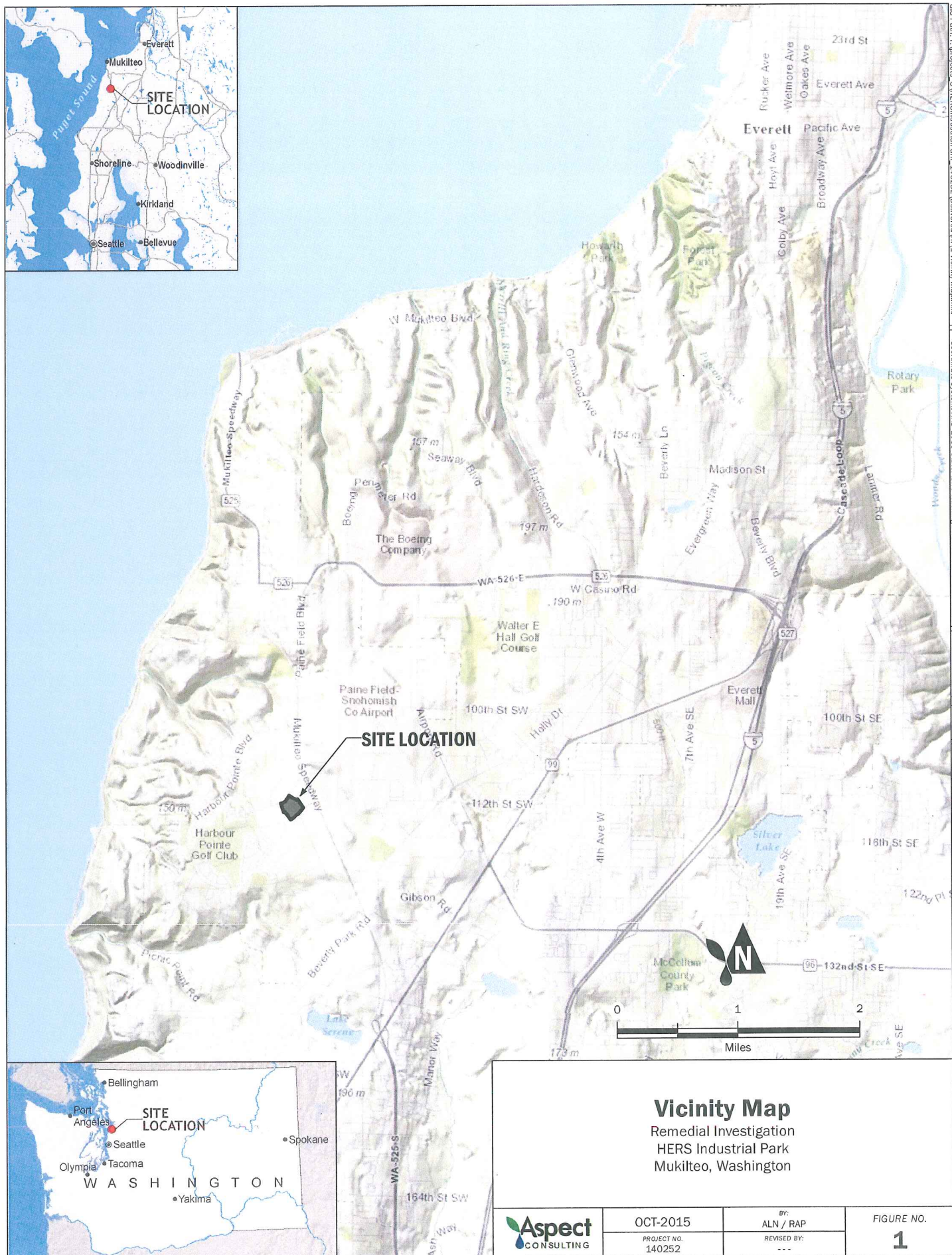
In 2006, three Fenton's Reagent chemical injection events consisting of hydrogen peroxide and ferrous sulfate (in solution with HCL or acetic acid) were conducted in monitoring wells MW-1 and MW-7 and the seven injection wells in March, April and October. The injection locations and volumes are shown in the table below:

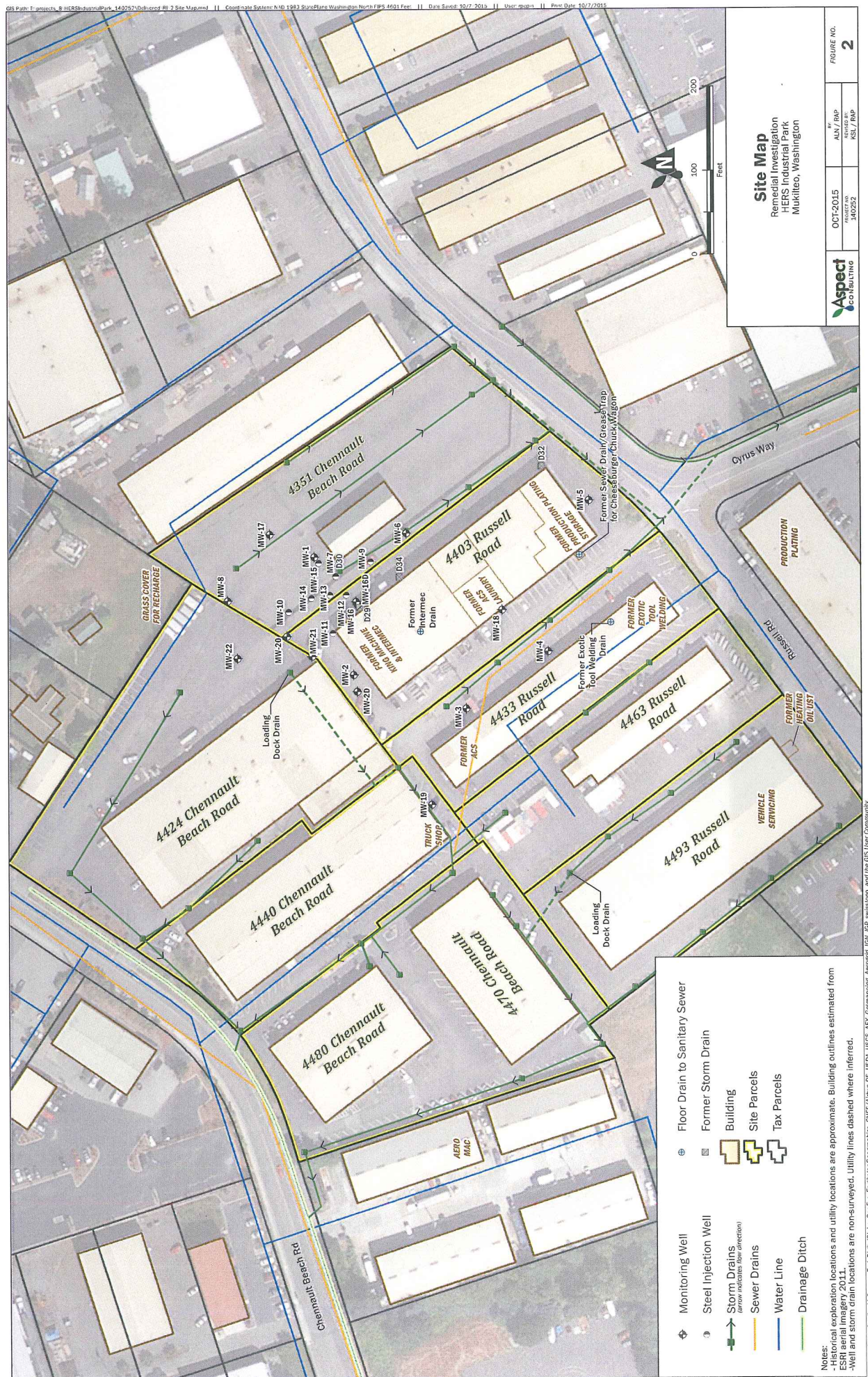
Well Number	Injections in March 2006	Injections in April 2006	Injections in October 2006
MW-1			50 gallons
MW-7	40 gallons	30 gallons	50 gallons
MW-9	40 gallons	20 gallons	
MW-10	30 gallons		
MW-11	30 gallons		
MW-12		30 gallons	50 gallons
MW-13		30 gallons	50 gallons
MW-14		30 gallons	
MW-15		30 gallons	50 gallons

In general, HVOC concentrations in seven of the nine accessible monitoring wells located within the ground water treatment area declined following the 2006 injections. However, in monitoring well MW-1, TCE concentrations increased following the injection and in January 2012, PCE was detected for the first time at a concentration of 15 µg/L exceeding the Method A cleanup level. TCE was also detected in MW-1 at a concentration of 1,100 µg/L, two orders of magnitude above previous detections and exceeding the Method A cleanup level. Since then, concentrations in MW-1 have decreased but are still above the previously lower detected levels.

Mr. Romeo Gonyea
November 8, 2016
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Site Diagrams



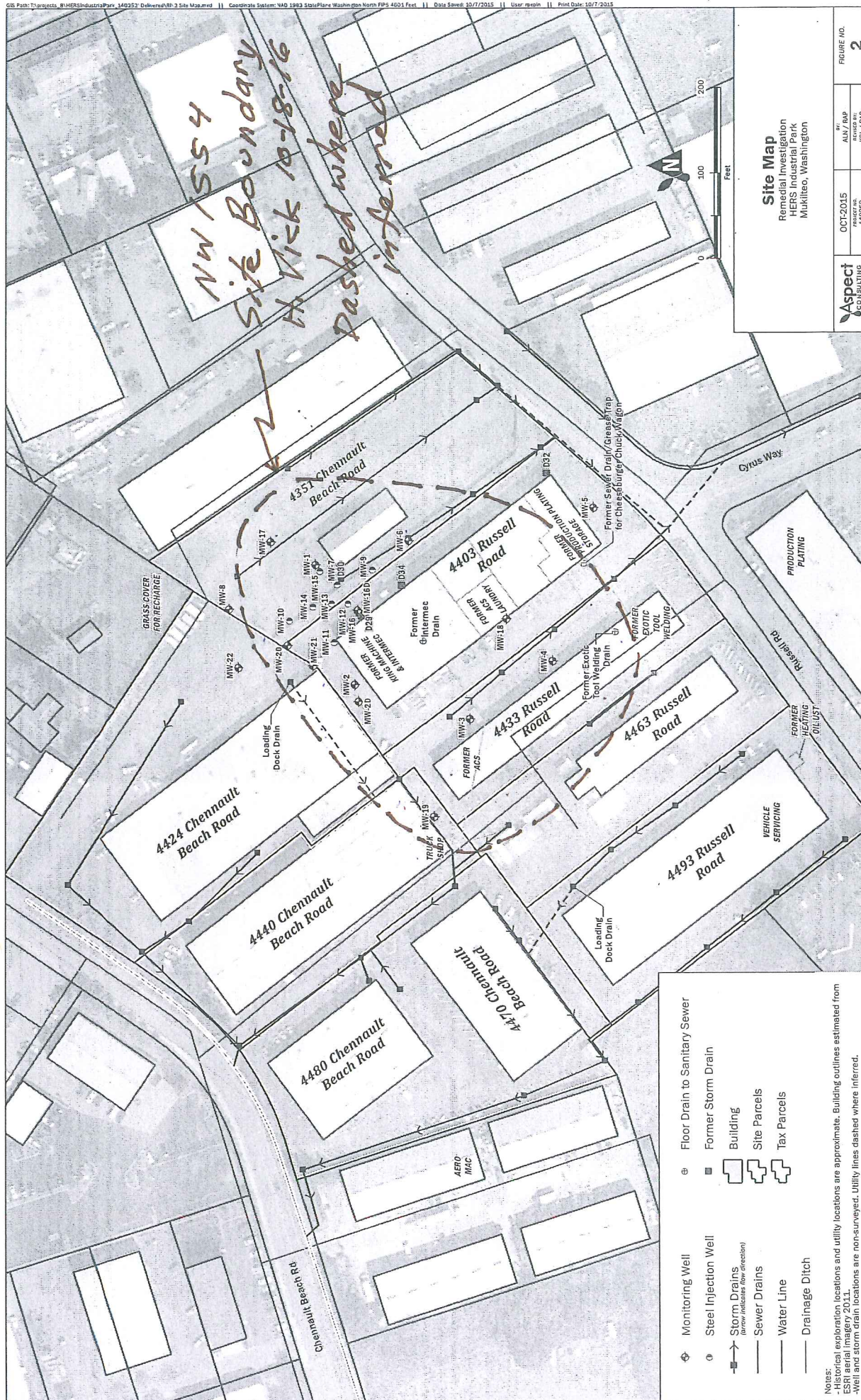


Site Map Remedial Investigation HEPS Industrial Park Mukilteo, Washington

	PROJECT NO.	OCT-2015	FIGURE NO.	2
	REVISED BY	ASL / RNP		

- Monitoring Well
- Steel Injection Well
- Storm Drains (arrow indicates flow direction)
- Sewer Drains
- Water Line
- Drainage Ditch
- Floor Drain to Sanitary Sewer
- Former Storm Drain
- Building
- Site Parcels
- Tax Parcels

Notes:
- Historical exploration locations and utility locations are approximate. Building outlines estimated from ESRI aerial imagery.
- Well and storm drain locations are non-surveyed. Utility lines dashed where inferred.



Remedial Investigation
HERS Industrial Park
Mukilteo, Washington

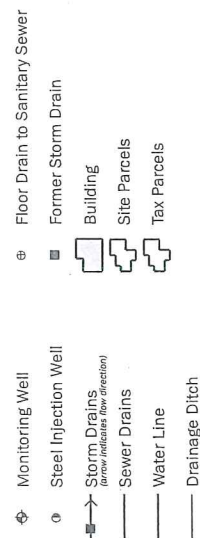


Aspect
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CT-2015

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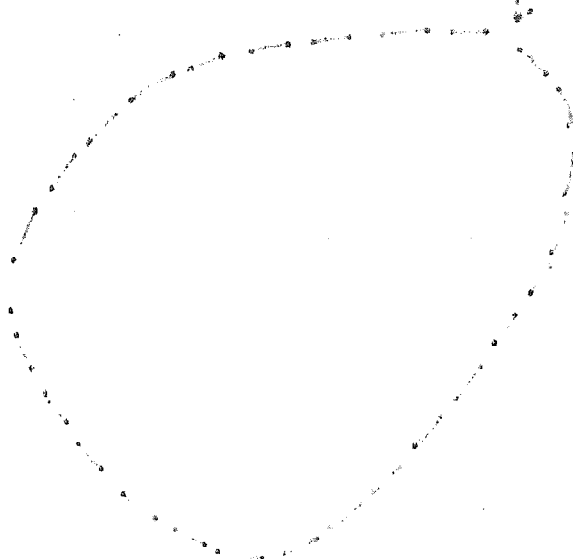


Notes:
 - Historical exploration locations and utility locations are approximate. Building outlines estimated from ESRI aerial imagery 2011.
 - Well and storm drain locations are non-surveyed. Utility lines dashed where inferred.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

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