STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action by:	AGREED ORDER
City of Bothell at Bothell Paint & Decorating MTCA Site	No. DE 15748

TO: Jennifer Phillips
City Manager
City of Bothell
18415 - 101st Avenue NE
Bothell, WA 98011

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I. INTRODUCTION

The mutual objective of the State of Washington, Department of Ecology (Ecology) and the City of Bothell (City) under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the City to implement a Cleanup Action Plan (CAP) (Exhibit B) and Compliance Monitoring Plan (Exhibit C) at the Bothell Paint & Decorating Model Toxics Control Site (Site) that include engineering controls, institutional controls and monitored natural attenuation. Ecology believes the actions required by this Order are in the public interest.

II. JURISDICTION

This Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050(1).

III. PARTIES BOUND

This Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such party to comply with this Order. The City agrees to undertake all actions required by this Order. No change in ownership or corporate status shall alter the City's responsibility under this Order. The City shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

IV. DEFINITIONS

Unless otherwise specified herein, the definitions set forth in RCW 70.105D.020 and WAC 173-340-200 shall control the meanings of the terms in this Order.

A. Site: The Site is referred to as the Bothell Paint & Decorating Site. The Site constitutes a facility under RCW 70.105D.020(8). The Site is defined by where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located. Based upon factors currently known to Ecology,

the Site is generally located near the intersection of SR 522 and 98th Avenue NE in Bothell, WA as shown in the Site Location Diagram (Exhibit A-1). The Remedial Investigation and Feasibility Study dated August 10, 2017 (RI/FS) documented the release of hazardous substances in the area shown in the Site Diagram (Exhibit A-2). The boundaries shown in Exhibit A-2 do not necessarily reflect the boundaries of the Site as defined in MTCA.

B. Parties: Refers to the State of Washington, Department of Ecology and the City.

C. Potentially Liable Person (PLP): Refers to the City.

D. Agreed Order or Order: Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order.

V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the City:

A. The City acquired the Site in 2008. As a result of the relocation of SR 522 the Site is bifurcated by SR 522. The City still owns the Site, including the land under SR 522. The Site was formerly a paint store, had a former sandblasting operation, and contained one underground petroleum storage tank.

B. The Site was originally defined as the extent of contamination caused by the release of hazardous substances from a former 0.97-acre property generally located at 18004 and 18005 Bothell Way NE (former King County Tax Parcel Nos. 945720-0081 and 945720-0072) and the adjacent parcel to the east. The 0.79-acre parcel was re-platted in 2011 and no longer exists in its original configuration, although the City still currently owns that land, which includes public right-of-way for the newly constructed and re-aligned SR 522, and portions of the former SR 522 and NE 180th street roadways, which now lie on two newly formed parcels north (Lot C) and south (the City Parcel) of the new roadway. The RI/FS establishes the Bothell Paint and Decorating Site boundaries as depicted in Exhibit A-2. The new parcel boundaries are depicted in Figure 2A of the CAP (Exhibit B).

A. Pursuant to Agreed Order DE 6296, the City completed an RI/FS dated August 10, 2017. A copy of the RI/FS is available at Ecology's offices and through the City.

B. Pursuant to Agreed Order DE 6296, the City completed a series of interim remedial actions that are more fully described in the RI/FS and CAP (Exhibit B).

C. Following the interim remedial actions, soil remains contaminated with petroleum hydrocarbons and ground water remains contaminated with petroleum hydrocarbons and arsenic. The nature and extent of residual contamination in soil and groundwater is more fully described in the RI/FS.

VI. ECOLOGY DETERMINATIONS

Ecology makes the following determinations, without any express or implied admissions of such determinations (and underlying facts) by the City.

A. The City is an "owner or operator" as defined in RCW 70.105D.020(22) of a "facility" as defined in RCW 70.105D.020(8).

B. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(32) and (13), respectively, has occurred at the Site.

C. Based upon credible evidence, Ecology issued a PLP status letter to the City dated November 20, 2008, pursuant to RCW 70.105D.040, .020(26), and WAC 173-340-500. By letter dated November 25, 2008, the City voluntarily waived its rights to notice and comment and accepted Ecology's determination that the City is a PLP under RCW 70.105D.040.

D. Pursuant to RCW 70.105D.030(1) and .050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

E. The City has completed the remedial activities required by Agreed Order No. DE 6296 to Ecology's satisfaction, as memorialized in the Satisfaction of Agreed Order letter dated February 5, 2018.

VII. WORK TO BE PERFORMED

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the City take the following remedial actions at the Site. The area within the Site where remedial action pursuant to this Order is necessary under RCW 70.105D is described in the Site Diagram (Exhibit A-2). These remedial actions must be conducted in accordance with WAC 173-340:

A. The City will implement the CAP (Exhibit B) and Compliance Monitoring Plan (Exhibit C) in accordance with the Schedule of Deliverables (Exhibit D) and all other requirements of this Order. The following naming conventions shall be used for documents: Agency Review Draft (designation for the first time Ecology receives a document); Public Review Draft (designates a document ready for public comment); and Final (designation for a document after public comment and Ecology approval).

B. The City shall submit to Ecology written quarterly Progress Reports unless Ecology authorizes less frequent reporting. The Progress Reports shall describe the actions taken during the previous reporting period to implement the requirements of this Order. All Progress Reports shall be submitted by the tenth (10th) day of the month in which they are due after the effective date of this Order. Unless otherwise specified by Ecology, Progress Reports and any other documents submitted pursuant to this Order shall be sent by certified mail, return receipt requested, to Ecology's project coordinator. The Progress Reports shall include the following:

a. A list of on-site activities that have taken place during the reporting period;
b. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests;
c. Description of all deviations from the Schedule of Deliverables (Exhibit D) during the current reporting period and any planned deviations in the upcoming reporting period;

d. For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the Schedule of Deliverables (Exhibit D);

e. All raw data (including laboratory analyses) received by the City during the past reporting period and an identification of the source of the sample; and

f. A list of deliverables for the upcoming reporting period if different from the Schedule of Deliverables (Exhibit D).

C. All plans or other deliverables submitted by the City for Ecology's review and approval under the Schedule of Deliverables (Exhibit D) shall, upon Ecology's approval, become integral and enforceable parts of this Order.

D. If Ecology determines that the City has failed to make sufficient progress or failed to implement the remedial action, in whole or in part, Ecology may, after notice to the City, perform any or all portions of the remedial action or at Ecology's discretion allow the City opportunity to correct. The City shall reimburse Ecology for the costs of doing such work in accordance with Section VIII.A (Remedial Action Costs). Ecology reserves the right to enforce requirements of this Order under Section X (Enforcement).

E. Except where necessary to abate an emergency situation, the City shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

VIII. TERMS AND CONDITIONS

A. Payment of Remedial Action Costs

The City shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under RCW 70.105D, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). For all Ecology costs incurred, the City shall pay the required amount within thirty (30) days of receiving

from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief, pursuant to RCW 19.16.500, Ecology may utilize a collection agency and/or, pursuant to RCW 70.105D.055, file a lien against real property subject to the remedial actions to recover unreimbursed remedial action costs.

B. Designated Project Coordinators

The project coordinator for Ecology is:

Jerome Cruz
Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452
Phone: (425) 649-7094
Email: jcru461@ecy.wa.gov

The project coordinator for the City is:

Nduta Mbuthia
Senior Capital Project Engineer
City of Bothell, Public Works Department
18415 - 101st Avenue NE
Bothell, WA 98011
Phone: (425) 806-6829
Email: Nduta.Mbuthia@bothellwa.gov

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the City, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

Any party may change its respective project coordinator. Written notification shall be given to the other party at least ten (10) calendar days prior to the change.

C. Performance

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist or hydrogeologist licensed by the State of Washington or under the direct supervision of an engineer registered by the State of Washington, except as otherwise provided for by RCW 18.43 and 18.220.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered by the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered by the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrogeologic, or engineering work shall be under the seal of an appropriately licensed professional as required by RCW 18.43 and 18.220.

The City shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

D. Access

Ecology or any Ecology authorized representative shall have access to enter and freely move about all property at the Site that the City either owns, controls, or has access rights to at all reasonable times for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the City's progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the City.

The City shall make all reasonable efforts to secure access rights for those properties within the Site not owned or controlled by the City where remedial activities or investigations will be performed pursuant to this Order. Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site property owned or controlled by the City unless an emergency prevents such notice. All persons who access the Site pursuant to this section shall comply with any applicable health and safety plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

E. Sampling, Data Submittal, and Availability

With respect to the implementation of this Order, the City shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the City shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the City pursuant to implementation of this Order. The City shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the City and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section VIII.D (Access), Ecology shall notify the City prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under WAC 173-50 for the specific analyses to be conducted, unless otherwise approved by Ecology.

F. Public Participation

Ecology shall maintain the responsibility for public participation at the Site. However, the City shall cooperate with Ecology, and shall:

1. If agreed to by Ecology, develop appropriate mailing lists and prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

2. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before meetings related to remedial action work to be performed at the Site with the interested public and/or local governments. Likewise, Ecology shall notify the City prior to the issuance of all press releases and fact sheets related to the Site, and before meetings related to the Site with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the City that do not receive prior Ecology approval, the City shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

3. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions or as a presenter.

4. When requested by Ecology, arrange and/or continue information repositories to be located at the following locations:

a. King County Bothell Library
18215 98th Ave. NE
Bothell, WA 98011

b. Ecology's Northwest Regional Office
3190 160th Ave. SE
Bellevue, WA 98008-5452

Call for an appointment:
Sally Perkins
Phone: (425) 649-7109
Fax: (425) 649-4450
E-mail: nwro_public_request@ecy.wa.gov

c. City of Bothell – City Hall
18415 – 101st Ave NE
Bothell, WA 98011
Phone: (425) 486-7811

At a minimum, copies of all public notices, fact sheets, and documents relating to public comment periods shall be promptly placed in these repositories. A copy of all documents related to this Site shall be maintained in the repository at Ecology's Northwest Regional Office in Bellevue, Washington.

G. Retention of Records

During the pendency of this Order, and for ten (10) years from the date of completion of work performed pursuant to this Order, the City shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. Upon request of Ecology, the City shall make all records available to Ecology and allow access for review within a reasonable time.

Nothing in this Order is intended to waive any right the City may have under applicable law to limit disclosure of documents protected by the attorney work-product privilege and/or the attorney-client privilege. If the City withholds any requested records based on an assertion of privilege, the City shall provide Ecology with a privilege log specifying the records withheld and the applicable privilege. No Site-related data collected pursuant to this Order shall be considered privileged.

H. Resolution of Disputes

1. In the event that the City elects to invoke dispute resolution the City must utilize the procedure set forth below.

a. Upon the triggering event (receipt of Ecology's project coordinator's written decision or an itemized billing statement), the City has fourteen (14) calendar days within which to notify Ecology's project coordinator in writing of its dispute (Informal Dispute Notice).

b. The Parties' project coordinators shall then confer in an effort to resolve the dispute informally. The parties shall informally confer for up to fourteen (14) calendar days from receipt of the Informal Dispute Notice. If the project coordinators cannot resolve the dispute within those 14 calendar days, then within seven (7) calendar days Ecology's project coordinator shall issue a written decision (Informal Dispute Decision) stating: the nature of the dispute; the City's position with regards to the dispute; Ecology's position with regards to the dispute; and the extent of resolution reached by informal discussion.

c. The City may then request regional management review of the dispute. This request (Formal Dispute Notice) must be submitted in writing to the Northwest Region Toxics Cleanup Section Manager within seven (7) calendar days of receipt of Ecology's Informal Dispute Decision. The Formal Dispute Notice shall include a written statement of dispute setting forth: the nature of the dispute; the disputing Party's position with respect to the dispute; and the information relied upon to support its position.

d. The Section Manager shall conduct a review of the dispute and shall issue a written decision regarding the dispute (Decision on Dispute) within thirty (30) calendar days of receipt of the Formal Dispute Notice. The Decision on Dispute shall be Ecology's final decision on the disputed matter.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

4. In case of a dispute, failure to either proceed with the work required by this Order or timely invoke dispute resolution may result in Ecology's determination that insufficient progress is being made in preparation of a deliverable, and may result in Ecology undertaking the work under Section VII.D (Work to be Performed) or initiating enforcement under Section X (Enforcement).

I. Extension of Schedule

1. The City's request for an extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

a. The deadline that is sought to be extended;

b. The length of the extension sought;

c. The reason(s) for the extension; and

d. Any related deadline or schedule that would be affected if the extension were granted.

2. The burden shall be on the City to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

a. Circumstances beyond the reasonable control and despite the due diligence of the City including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the City;

b. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

c. Endangerment as described in Section VIII.K (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the City.

3. Ecology shall act upon any City written request for extension in a timely fashion. Ecology shall give the City written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII.J (Amendment of Order) when a schedule extension is granted.

4. At the City's request, an extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

a. Delays in the issuance of a necessary permit which was applied for in a timely manner;

b. Other circumstances deemed exceptional or extraordinary by Ecology; or

c. Endangerment as described in Section VIII.K (Endangerment).

J. Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII.L (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the City. Ecology will provide its written consent to a formal amendment only after public notice and opportunity to comment on the formal amendment.

When requesting a change to the Order, the City shall submit a written request to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request is received. If Ecology determines that the change is substantial, then the Order must be formally amended. Reasons for the disapproval of a proposed change to this Order shall be stated in writing. If Ecology does not agree to a proposed change, the disagreement may

be addressed through the dispute resolution procedures described in Section VIII.H (Resolution of Disputes).

K. Endangerment

In the event Ecology determines that any activity being performed at the Site under this Order is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the City to cease such activities for such period of time as it deems necessary to abate the danger. The City shall immediately comply with such direction.

In the event the City determines that any activity being performed at the Site under this Order is creating or has the potential to create a danger to human health or the environment, the City may cease such activities. The City shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction, the City shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the City's cessation of activities, it may direct the City to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to this section, the City's obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section VIII.I (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

L. Reservation of Rights

This Order is not a settlement under RCW 70.105D. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the City to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional

enforcement actions against the City regarding remedial actions required by this Order, provided the City complies with this Order.

Ecology nevertheless reserves its rights under RCW 70.105D, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health or the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

By entering into this Order, the City does not admit to any liability for the Site. Although the City is committing to conducting the work required by this Order under the terms of this Order, the City expressly reserves all rights available under law, including but not limited to the right to seek cost recovery or contribution against third parties, and the right to assert any defenses to liability in the event of enforcement.

M. Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the City without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the City's transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the City shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, the City shall notify Ecology of said transfer. Upon transfer of any interest, the City shall notify all transferees of the restrictions on the activities and uses of the property under this Order and incorporate any such use restrictions into the transfer documents.

N. Compliance with Applicable Laws

1. All actions carried out by the City pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits or approvals, except as provided in RCW 70.105D.090. At this time, no federal,

state, or local requirements have been identified as being applicable to the actions required by this Order. The City has a continuing obligation to identify additional applicable federal, state, and local requirements which apply to actions carried out pursuant to this Order, and to comply with those requirements. As additional federal, state, and local requirements are identified by Ecology or the City, Ecology will document in writing if they are applicable to actions carried out pursuant to this Order, and the PLP must implement those requirements.

2. All actions carried out by the City pursuant to this Order shall be done in accordance with relevant and appropriate requirements identified by Ecology. At this time, no relevant and appropriate requirements have been identified as being applicable to the actions required by this Order. If additional relevant and appropriate requirements are identified by Ecology or the City, Ecology will document in writing if they are applicable to actions carried out pursuant to this Order and the PLP must implement those requirements.

3. Pursuant to RCW 70.105D.090(1), the City may be exempt from the procedural requirements of RCW 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 and of any laws requiring or authorizing local government permits or approvals. However, the City shall comply with the substantive requirements of such permits or approvals. For permits and approvals covered under RCW 70.105D.090(1) that have been issued by local government, the Parties agree that Ecology has the non-exclusive ability under this Order to enforce those local government permits and/or approvals. At this time, no state or local permits or approvals have been identified as being applicable but procedurally exempt under this section.

4. The City has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the City determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or the City shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the City shall promptly consult with the appropriate state

and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the City and on how the City must meet those requirements. Ecology shall inform the City in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The City shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency that is necessary for the state to administer any federal law, the exemption shall not apply and the City shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits or approvals.

O. Land Use Restrictions

As detailed in the CAP (Exhibit B), institutional controls are required at the Site. Environmental (Restrictive) Covenants will be used to implement the institutional controls. In consultation with the City, Ecology will prepare the Environmental (Restrictive) Covenants consistent with WAC 173-340-440, RCW 64.70, and any policies or procedures specified by Ecology. The Environmental (Restrictive) Covenants shall restrict future activities and uses of the Site as agreed to by Ecology and the City.

The City shall record the Environmental (Restrictive) Covenant for affected properties it owns with the office of the King County Auditor as detailed in the Schedule of Deliverables (Exhibit D). The City shall provide Ecology with the original recorded Environmental (Restrictive) Covenants within thirty (30) days of the recording date.

P. Financial Assurances

Pursuant to WAC 173-340-440(11), the City shall maintain sufficient and adequate financial assurance mechanisms to cover all costs associated with the operation and maintenance

of the remedial action at the Site, including institutional controls, compliance monitoring, and corrective measures.

Within sixty (60) days of the effective date of this Order, the City shall submit to Ecology for review and approval an estimate of the costs under this Order for operation and maintenance of the remedial actions at the Site, including institutional controls, compliance monitoring and corrective measures. Within sixty (60) days after Ecology approves the aforementioned cost estimate, the City shall provide proof of financial assurances sufficient to cover all such costs in a form acceptable to Ecology.

The City shall adjust the financial assurance coverage and provide Ecology's project coordinator with documentation of the updated financial assurance for:

1. Inflation, annually, within thirty (30) days of the anniversary date of the entry of this Order; or if applicable, the modified anniversary date established in accordance with this section, or if applicable, ninety (90) days after the close of the City's fiscal year if the financial test or corporate guarantee is used.

2. Changes in cost estimates, within thirty (30) days of issuance of Ecology's approval of a modification or revision to the CAP (Exhibit B) that result in increases to the cost or expected duration of remedial actions. Any adjustments for inflation since the most recent preceding anniversary date shall be made concurrent with adjustments for changes in cost estimates. The issuance of Ecology's approval of a revised or modified CAP will revise the anniversary date established under this section to become the date of issuance of such revised or modified CAP.

Q. Periodic Review

As remedial action, including groundwater monitoring, continues at the Site, the Parties agree to review the progress of remedial action at the Site, and to review the data accumulated as a result of monitoring the Site as often as is necessary and appropriate under the circumstances. At least every five (5) years after the initiation of cleanup action at the Site the Parties shall meet to discuss the status of the Site and the need, if any, for further remedial action at the Site. At least ninety (90) days prior to each periodic review, the City shall submit a report to Ecology that

documents whether human health and the environment are being protected based on the factors set forth in WAC 173-340-420(4). Ecology reserves the right to require further remedial action at the Site under appropriate circumstances. This provision shall remain in effect for the duration of this Order.

R. Indemnification

The City agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action (1) for death or injuries to persons, or (2) for loss or damage to property, to the extent arising from or on account of acts or omissions of the City, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the City shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

IX. SATISFACTION OF ORDER

The provisions of this Order shall be deemed satisfied upon the City's receipt of written notification from Ecology that the City has completed the remedial activity required by this Order, as amended by any modifications, and that the City has complied with all other provisions of this Agreed Order.

X. ENFORCEMENT

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

A. The Attorney General may bring an action to enforce this Order in a state or federal court.

B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

C. A liable party who refuses, without sufficient cause, to comply with any term of this Order will be liable for:

1. Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply.

2. Civil penalties of up to twenty-five thousand dollars ($25,000) per day for each day it refuses to comply.

D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: _____

CITY OF BOTHELL

_____

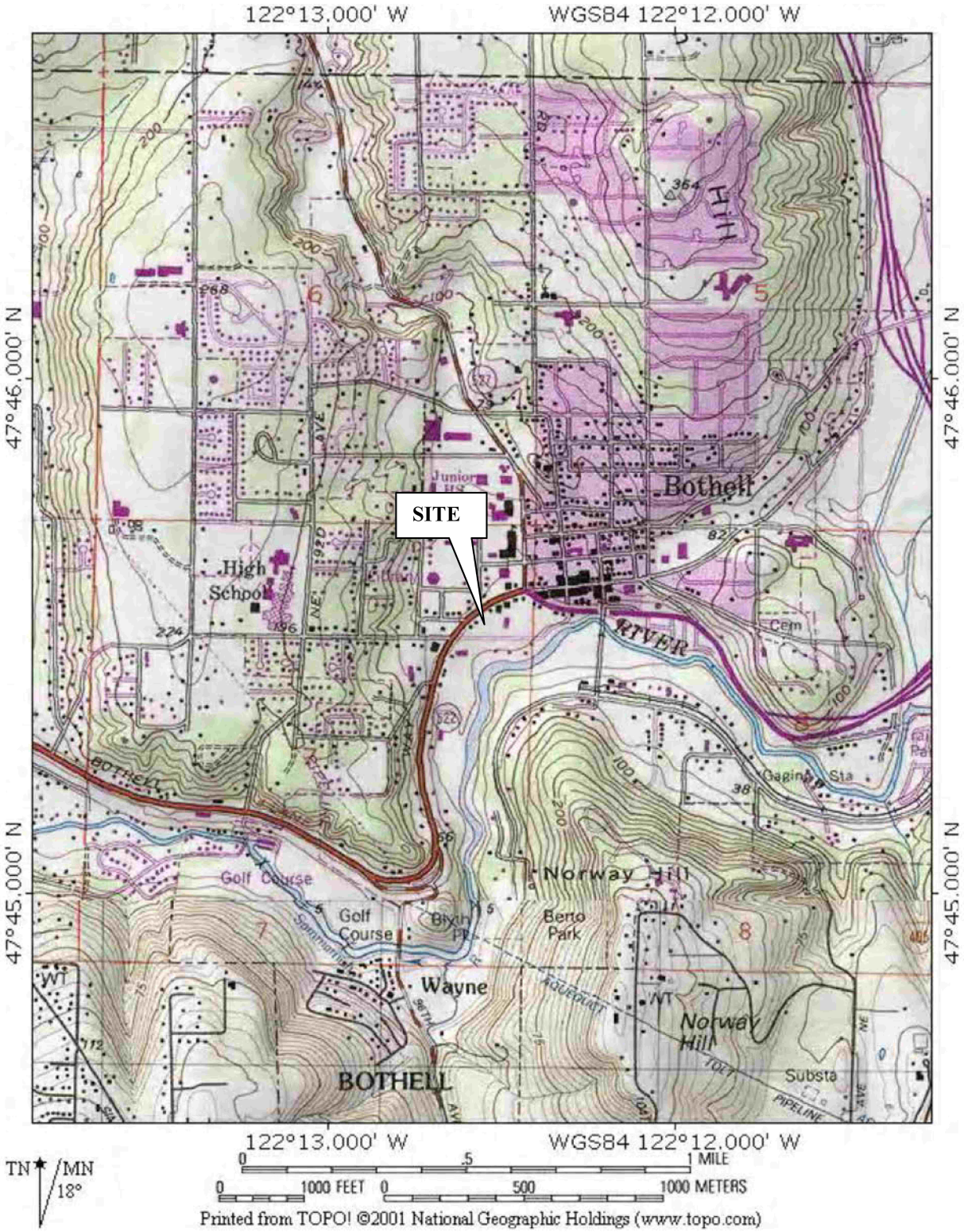
Jennifer Phillips
City Manager
Bothell, WA
(425) 806-6100

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

_____

Robert W. Warren
Section Manager
Toxics Cleanup Program
Northwest Regional Office
(425) 649-7054

EXHIBIT A-1



SITE VICINITY

BOTHELL PAINT RI/FS REPORT
BOTHELL, WASHINGTON

HWA GEOSCIENCES INC.

EXHIBIT **A-1**

PROJECT NO. 2007098-2021

EXHIBIT A-2

EXPLANATION OF SYMBOLS

- MW — AREA WIDE WELLS MONITORED
- UCCMW — ULTRA CUSTOM CARE CLEANERS WELL MONITORED
- MW — RIVERSIDE WELLS MONITORED
- MW — BOTHELL PAINT WELLS MONITORED
- MW — WELLS NOT MONITORED
- MW — DECOMMISSIONED WELLS
- SB — SOIL BORINGS
- CLEANUP CONFIRMATION SOIL SAMPLE > MTCA
- SOIL CLEANUP AREAS
- SITE
- HVOC PLUMES
- ORIGINAL PARCELS
- NEW PARCELS

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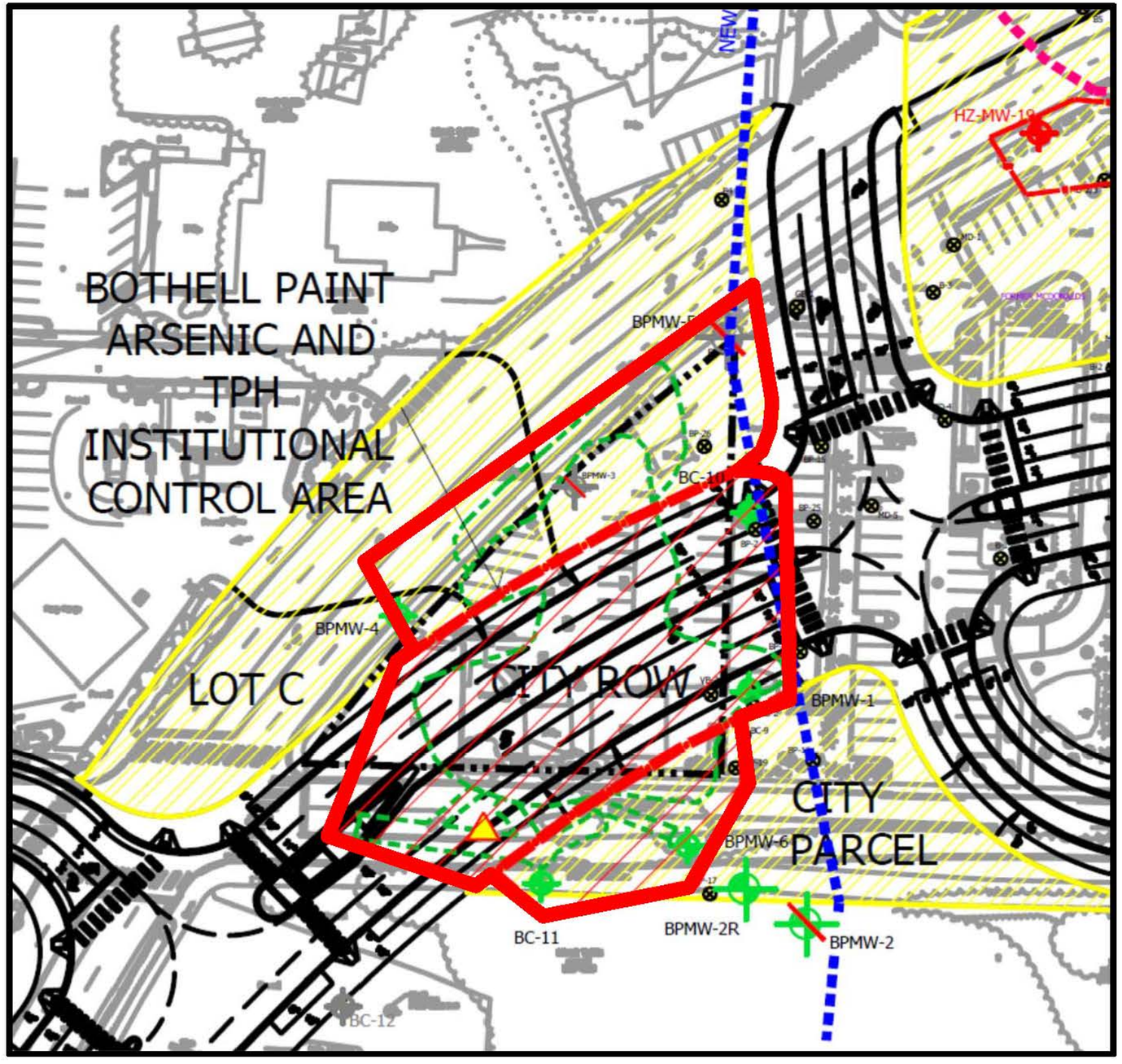


HWA GeoSciences Inc.

DETAIL OF SITE LOCATION

BOTHELL PAINT RI/FS
BOTHELL, WASHINGTON

EXHIBIT A-2

PROJECT NO. 2007-098-T2020

EXHIBIT B

DRAFT FINAL CLEANUP ACTION PLAN
BOTHELL PAINT AND DECORATING SITE
BOTHELL, WASHINGTON

City of Bothell

August 10, 2017

Issued by:

Washington State
Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, Washington 98008

Table of Contents

LIST OF TABLES

LIST OF FIGURES (FOLLOWING TEXT)

EXECUTIVE SUMMARY

This document presents the draft Cleanup Action Plan for the Bothell Paint and Decorating Site in Bothell, Washington. This draft Cleanup Action Plan was prepared by the Washington State Department of Ecology (Ecology) in collaboration with the City of Bothell (City). This plan has been prepared to meet the requirements of the Model Toxics Control Cleanup Act administered by Ecology under Chapter 173-340 of the Washington Administrative Code. This plan describes Ecology's proposed cleanup action for this site and sets forth the requirements that the cleanup must meet.

Background

The Bothell Paint and Decorating Site is located along Bothell Way NE / SR 522 west of 98th Avenue NE in Bothell, Washington. The Site was formerly a paint store, had a former sandblasting operation, and contained one petroleum underground storage tank. The City acquired properties on which the Site lies in 2008 for construction of the SR 522 realignment, and entered into an Agreed Order with Ecology in 2009. Remedial investigation activities were initiated in 2009, and finalized in 2016. Interim action soil cleanups for petroleum hydrocarbons and metals were conducted in 2010, 2013 and 2014 at the Site. Chemicals of concern at the Site following the two interim action cleanups are:

- Soil: Gasoline- and motor oil-range petroleum hydrocarbons
- Ground water: Diesel- and oil-range petroleum hydrocarbons, and arsenic

Cleanup Action Overview

The selected remedy for the Site is a combination of excavation of contaminated soils (already completed as interim actions), engineering controls (capping under roadway), institutional controls (environmental covenants restricting access to soil and ground water), and ground water monitoring for natural attenuation to achieve compliance, with the possibility of contingency action if natural attenuation does not occur at a rate and in a timeframe that is acceptable to Ecology, as described below:

a. Lot C Parcel (labeled "LOT C" in Figure 2B)

   (i) TPH (Total petroleum hydrocarbons) contaminated soil on site prior to interim actions - adopt soil excavation interim actions as the final cleanup.

b. City ROW Parcel (labeled "CITY ROW" in Figure 2B)

   (i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as part of the final cleanup action.

(ii) Remnant TPH contaminated soil under roadway – leave in place and implement:

- Engineering controls – paved SR 522 roadway capping TPH-impacted soils.
- Institutional controls – implement environmental covenant.

(iii) Arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document arsenic and the possibility of TPH contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.
- Monitored Natural Attenuation (MNA)
- Compliance and MNA monitoring under a Compliance Monitoring Plan.
- A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

c. City Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as the final cleanup action.

(ii) TPH and arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document TPH and arsenic contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.
- Monitored natural attenuation (MNA)
- Compliance and MNA monitoring under a Compliance Monitoring Plan.
- A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end if the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

DRAFT CLEANUP ACTION PLAN
BOTHELL PAINT AND DECORATING SITE
BOTHELL, WASHINGTON

1 INTRODUCTION

1.1 PURPOSE

This document is the draft Cleanup Action Plan (dCAP) for the Bothell Paint and Decorating Site (Site) generally located in Bothell, Washington. Per the Model Toxics Control Act (MTCA), a MTCA site is "any site or area where a hazardous substance … has been deposited, stored, disposed of, or placed, or otherwise come to be located." The general location of the Site is shown in Figures 1, 2A and 2B. A dCAP is required as part of the site cleanup process under Chapter 173-340 of the Washington Administrative Code (WAC), MTCA Cleanup Regulations. The purpose of the dCAP is to identify the proposed cleanup action for the Site and to provide an explanatory document for public review. More specifically, this plan:

- Describes the Site
- Summarizes current site conditions;
- Summarizes the cleanup action alternatives considered in the remedy selection process;
- Describes the selected cleanup action for the Site and the rational for selecting this alternative;
- Identifies site-specific cleanup levels and points of compliance for each hazardous substance and medium of concern for the proposed cleanup action;
- Identifies applicable state and federal laws for the proposed cleanup action;
- Identifies residual contamination remaining on the Site after cleanup and restrictions on future uses and activities at the Site to ensure continued protection of human health and the environment;
- Discusses compliance monitoring requirements; and
- Presents the schedule for implementing the CAP.

Ecology has made a preliminary determination that a cleanup conducted in conformance with this CAP will comply with the requirements for selection of a remedy under WAC 173-340-360.

1.2 PREVIOUS STUDIES

Previous studies at the Site include the following:

HWA GeoSciences, 2008a, *Phase I Environmental Site Assessment, Victory Development Property, 18004 Bothell Way NE, Bothell, Washington*. Prepared for City of Bothell, April 24, 2008.

HWA GeoSciences, 2008b, *Phase I Environmental Site Assessment, Giannola Parcel / Parcel No. 9457200072, 18004 Bothell Way NE, Bothell, Washington*. Prepared for City of Bothell, April 25, 2008.

HWA GeoSciences, 2008c, *Phase II Environmental Site Assessment, Giannola Parcel/Parcel No. 9457200072, Bothell, Washington*. Prepared for City of Bothell, April 30, 2008.

HWA GeoSciences, 2008d, *Phase II Environmental Site Assessment, Victory Development Property Parcel No. 9457200081, Bothell, Washington*. Prepared for City of Bothell, April 30, 2008.

HWA GeoSciences, 2009a, *Remedial Investigation and Feasibility Study Work Plan, Bothell Paint and Decorating Facility, Bothell, Washington*. Prepared for City of Bothell, August 26, 2009. Compiled by Parametrix. As amended in Parametrix *Amendment to Remedial Investigation and Feasibility Study Work Plan, Bothell Paint and Decorating Facility, Bothell Washington* dated August 26, 2009.

HWA GeoSciences, 2009b, *Aquifer Testing and Permeability Estimates, Bothell Crossroads RI/FS, Bothell, Washington*. Prepared for City of Bothell, October 6, 2009.

HWA GeoSciences, 2011. *Documentation of Interim Action at Former Bothell Paint & Decorating Site* Prepared for City of Bothell, January 14, 2011.

HWA GeoSciences, 2014a, *Interim Action Cleanup Report, Former Bothell Paint and Decorating Site, Bothell, Washington*, Prepared for City of Bothell, March 26, 2014.

HWA GeoSciences, 2014b, Area Wide Ground Water Monitoring Network, Bothell Agreed Order Sites, Bothell, WA. Letter Dated August 20, 2014.

HWA GeoSciences, 2014c, *Interim Action Cleanup Action Report, Bothell Landing Site, Bothell, WA*, Dated September 2, 2014.

HWA GeoSciences, 2014d, *Area Wide Ground Water Monitoring, Second Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated October 17, 2014.

HWA GeoSciences, 2015a *Area Wide Ground Water Monitoring, Third Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated January 16, 2015.

HWA GeoSciences, 2015b, *Area Wide Ground Water Monitoring, Fourth Round Results, Bothell Agreed Order Sites, Bothell, WA.* Letter Dated April 16 2015.

Parametrix, 2009, *Bothell Paint and Decorating Remedial Investigation/Feasibility Study, Revision No. 0*. Prepared for City of Bothell, November 2009.

Parametrix, 2010a, *Technical Memorandum to Nduta Mbuthia - City of Bothell, From Ken Fellows, P.E. – Parametrix, Subject: Bothell Paint and Decorating January 2010 Chromium Sampling - Agreed Order DE 6296,* Revision 0, February 15, 2010

Parametrix, 2010b, *Interim Action Work Plan, Bothell Paint and Decorating Site, Revision No. 2*. Prepared for City of Bothell, April 2010.

1.3 REGULATORY FRAMEWORK

The dCAP is being conducted under Agreed Order DE 6296, dated February 3, 2009, as amended by Amendment No. 1 to Agreed Order, dated June 9, 2010, between the City and Ecology to address soil and ground water contamination related to historical releases of hazardous substances at the Site. Requirements under the Agreed Order include performance of a remedial investigation/feasibility study (RI/FS) and development of a dCAP.

There are no other local, state or federal regulatory actions at the site.

2 SITE DESCRIPTION

2.1 SITE HISTORY

Details of historic property use and the several site assessments performed to date at the Site can be found in HWA (2008a, b, c, d), HWA (2009b), and Parametrix (2009). The following is a summary of those assessments, some of which were carried out before the property became a formal MTCA site.

Based on studies conducted prior to the Agreed Order, a former tenant conducted sandblasting operations in the southern portion of the Site resulting in shallow soils containing metals and petroleum hydrocarbons in concentrations exceeding MTCA cleanup levels. Locations of sandblast grit from these operations are shown on Figure 3. Heavy metals in soil were from surficial deposition of sandblast grit and paint residue. Shallow petroleum soil impacts were from an air compressor blowdown pipe discharging to the ground surface in the south portion of the Site (see Figure 3). One soil sample collected in the sandblast area contained cadmium exceeding Washington State Dangerous Waste requirements (Chapter 173-303 WAC) (Ecology, 2010). Ground water samples collected in the sandblast area had lead and arsenic concentrations exceeding MTCA cleanup levels (HWA, 2008c, d).

A 1,000-gallon underground storage tank (UST) was removed in the western area of the Site in 1988 (see Figure 3). A hole in the UST was observed at the time of removal. Petroleum liquid (free product) was reported in the excavation on the surface of ground water. A soil sample collected from the sidewall of the excavation during tank removal contained petroleum hydrocarbons above MTCA cleanup levels (HWA, 2008a). Further environmental investigations were conducted by HWA (2008c, d) and Parametrix (2009) at the property. During those investigations, low concentrations of volatile organic compounds (VOCs) not exceeding MTCA cleanup levels were detected in ground water adjacent to the former leaking UST.

Interim action petroleum hydrocarbon soil cleanups were conducted in two phases; the first one in 2010; and the second one in 2013/2014, after the realignment of the SR522 roadway now crossing the Site. This phasing was necessary in order to effectively manage access to contaminated soils beneath the old (operational in 2010) and the new (operational in 2013) roadways, with minimal impacts to traffic.

2.2 HUMAN HEALTH AND ENVIRONMENTAL CONCERNS

2.2.1 Conceptual Site Model

The conceptual model for the Site identifies the primary contaminant sources, release mechanisms, transport mechanisms, secondary contaminant sources, potential pathways, and exposure routes. Existing chemical data, site characterization data, and identification of potential human and ecological receptors were used to develop the model are shown on Figure 4.

2.2.2 Primary Sources of Contamination and Primary Release Mechanisms

The primary contaminant sources are the former sand blasting facility (metals), including the compressor blowdown pipe (petroleum) and residual contamination from a leaking UST (petroleum). The primary contaminants associated with the sand blasting business include metals (cadmium, lead, chromium) and petroleum hydrocarbons (Parametrix, 2009).

Dust is the primary potential release mechanism for contaminants associated with metals in the surface soil. The source of arsenic in ground water at the Site may be surficially deposited arsenic at the Site, a naturally occurring background condition, or due to effects from petroleum hydrocarbon contamination in ground water.

2.2.3 Secondary Sources and Release Mechanisms

Secondary sources and release mechanisms, based on the RI data are limited to leaching from soil to ground water of petroleum hydrocarbons and possibly arsenic, as no air or surface water impacts were identified.

2.2.4 Pathways and Potential Receptors

Potential exposure routes for human and ecological receptors include the following:

Dermal/Direct Contact – Exposure to chemicals in soil may occur through direct contact with soil. Direct contact is a potential exposure route for current and future on-site workers or visitors. Burrowing or ground-dwelling mammals and invertebrates may be exposed directly to the soil contaminants.

Inhalation – Particulates from soil can be transported by air and inhaled by potential on-site and off-site receptors. Emissions of volatile chemicals from soil and ground water may also be transported as vapors by air. Terrestrial biota could also be exposed to chemicals volatilizing to outdoor air, but if this exposure actually occurs the duration of exposure would be expected to be relatively short. Burrowing animals may be exposed to volatile air contaminants in underground stagnant air while spending time within the burrow.

Ingestion – Ingestion of chemicals in Site soil is a primary exposure route for human and ecological receptors. Uptake by plants is also a potential exposure route.

Potentially complete exposure pathways after completion of the Interim Actions are:

Soil - TPH:

- Current/future construction/utility worker
    - Incidental soil ingestion and dermal contact

Remaining soil impacts are located under an active roadway, therefore the only potential receptors are future construction workers.

Ground water – TPH and arsenic:

- Current/future construction/utility worker:
    - Direct ingestion of contaminated ground water
- Ecological receptors
    - Dermal contact with ground water in a burrow

Remaining ground water impacts are TPH and arsenic in ground water, which is generally greater than 6 feet below grade in the areas impacted, therefore park visitors or others are unlikely to be exposed to any ground water, as there are no drinking water wells and it is not planned or legal to install any in the impacted area. The only potential human receptors would be future construction workers involved in excavation below ground water level or dewatering work.

Vapor - TPH:

- Current/future construction/utility worker:
    - Inhalation of vapors from the subsurface (ground water and soil) in outdoor air
- Ecological receptors
    - Inhalation of vapors from the subsurface (ground water and soil) in a burrow

Remaining vapor impacts are located under an active roadway, therefore the only potential human receptors would be future construction workers involved in excavation or dewatering work. Arsenic in ground water does not pose a vapor risk, therefore there are no vapor-related risks in park-zoned areas.

2.3 CLEANUP STANDARDS

2.3.1 Contaminants of concern (COCs)

2.3.1.1 Soil COCs

Based on the studies before the interim cleanups, chemicals of potential concern (COPCs) in Site soil were:

- Total petroleum hydrocarbons (TPH, gasoline-, diesel-, and motor oil-range)
- Metals (arsenic, cadmium, lead, barium, chromium silver, mercury)
- Aromatic hydrocarbons (benzene)
- Halogenated volatile organic compounds (HVOCs)
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)

cPAHs and benzene were detected exceeding cleanup levels during initial RI activities in 2009, at depths of 0 to 2 feet, in sample BP-26. Two samples (P-TP-24 and P-TP-27) were collected in 2012 a few feet away from BP-26 on the east and west sides, respectively, at the same depth. No cPAHs or benzene were detected above laboratory reporting limits, indicating that the original detection in BP-26 was likely surficial and localized (e.g., drips from a vehicle).

cPAHs, cadmium, lead, and mercury were detected in soils excavated during the interim actions, but no confirmation samples contained any of these compounds exceeding Site cleanup levels.

Because barium, chromium, silver, mercury, HVOCs, and cPAHs were never detected in Site soil at concentrations exceeding MTCA Method A or B cleanup levels or natural background concentrations during the two interim action cleanups, they were dropped as COPCs during subsequent RI activity. Hexavalent chromium was not detected above laboratory reporting limits (Parametrix, 2010a) and was also dropped as a COPC.

Following both interim soil cleanups, only one sample remained on Site with cleanup level exceedances: sample 180th 2-14 (shown on Figure 5) and having gasoline and oil-range petroleum hydrocarbon concentration exceeding Site cleanup levels. Sample 180th 2-14 was located under realigned SR 522 and beneath an active sewer pipe. Following the cleanups, no soil contamination remains on either Paint City Parcel or Paint Lot B (see Figures 2A and 2B for the lot locations).

Based on the above evaluation, the remaining chemicals of concern (COCs) for soil at the Site following the two interim action cleanups are:

- Total petroleum hydrocarbons (TPH) (gasoline- and motor oil-range)

2.3.1.2 Ground Water COCs

COPCs for ground water in the RI area before the interim cleanups were:

- TPH (gasoline-, diesel- and motor oil-range)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Arsenic
- Lead

One ground water sample collected from monitoring well BPMW-6 had a lead concentration exceeding Site cleanup criteria. Samples from the other three rounds of monitoring were below cleanup levels. The one ground water sample having an elevated lead concentration is thought to be a quality control issue, therefore lead is not considered to be a COC at the Site (see Section 4.3 above).

Ground water monitoring data following the soil cleanups indicate the following COCs remain on Site:

- Diesel- and oil-range TPH
- Arsenic

2.3.2 Cleanup Levels

Cleanup levels for COCs that need to be addressed by the cleanup in affected media at the site (soil and ground water) are presented in Section 4.3.

3 CLEANUP ACTION ALTERNATIVES AND ANALYSIS

3.1 CLEANUP ACTION ALTERNATIVES

The initial technologies screened for petroleum contaminated soil and ground water at the Site were:

- Excavation and removal
- In-situ bioremediation
- Monitored natural attenuation
- Engineering and institutional controls

The initial technologies screened for arsenic contaminated ground water at the Site were:

- Excavation and removal
- In-situ chemical fixation
- Institutional controls

Cleanup alternatives considered for the remaining petroleum contaminated soil and ground water at the Site were:

- Excavation and removal with monitored natural attenuation
- In-situ bioremediation with monitored natural attenuation and engineering / institutional controls
- Engineering and institutional controls with MNA-based compliance monitoring

Cleanup alternatives considered for arsenic contaminated ground water at the Site were:

- In-situ chemical fixation with institutional controls
- Institutional controls with compliance monitoring

A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period.

3.2 INITIAL SCREENING OF ALTERNATIVES

The selected alternative for both petroleum and arsenic impacts was engineering and institutional controls and natural attenuation with compliance monitoring, and to adopt interim actions as the final cleanup for petroleum soil impacts. The other alternatives (additional excavation and removal with monitored natural attenuation, in-situ bioremediation with monitored natural attenuation and engineering / institutional controls, and in-situ chemical fixation with

institutional controls) were eliminated during the screening process due to efficacy, and cost-to-benefit ratios evaluated via a disproportionate cost analysis.

3.3 DETAILED EVALUATION OF ALTERNATIVES

The preferred alternative was recommended in accordance with remedy selection requirements under MTCA, and meets all threshold and other requirements specified in WAC 173-340-360.

The selected alternative was evaluated for compliance with the following, as detailed in the RI/FS:

- The minimum requirements in WAC 173-340-360(2)(a)&(b)
    - Protection of human health and the environment
    - Compliance with cleanup standards
    - Compliance with applicable or relevant and appropriate requirements (ARARs)
    - Provide for compliance monitoring
    - Use of permanent solutions to the maximum extent practicable (see also WAC 173-340-360(3))
    - Provide for a reasonable restoration timeframe (see also WAC 173-340-360(4))
    - Consideration of public concerns
- WAC 173-340-360(2)(c) Requirements for ground water cleanup actions
- WAC 173-340-360(2)(e) Requirements for institutional controls (see also WAC 173-340-440)

4 DESCRIPTION OF SELECTED REMEDY

4.1 SITE DESCRIPTION

The Site was defined in the Agreed Order (prior to completion of the RI) as consisting of the extent of contamination caused by the release of hazardous substances from a former 0.79-acre property generally located at 18004 and 18005 Bothell Way NE (former King County Tax Parcel Nos. 945720-0081 and 945720-0072) and the adjacent parcel to the east. The 0.79-acre parcel was re-platted in 2011and no longer exists in its original configuration (as depicted in the Agreed Order), although the City still currently owns that land, which includes public right-of-way for the newly constructed and re-aligned SR 522, and portions of the former SR 522 and NE 180th street roadways, which now lie on two newly formed parcels north (Lot C) and south (the City Parcel) of the new roadway. Whereas the Site was originally defined as including a 0.79-acre property (which no longer exists due to re-platting of parcels and construction of the new roadway) the findings of the RI establish the Bothell Paint and Decorating Site boundaries as shown on Figures 2A and 2B.

4.2 DESCRIPTION OF THE CLEANUP ACTION

4.2.1 Parcels within the Site

As described below, upon road construction and reparceling by the City of Bothell in 2011, the Site now lies on three separate parcels of land: the Lot C Parcel, the City Parcel, and one public roadway (the City ROW Parcel).

- **Lot C Parcel** - The north portion of the Site lies on part of a tax parcel (Parcel number 9457200081) called LOT C on Figure 2B (zoned General Commercial). The Lot C parcel has no remaining soil or ground water impacts exceeding cleanup levels.

- **City ROW Parcel** - The central portion of the Site is not a tax parcel and lies on a portion of a City Right-of-Way (new SR 522 roadway) called CITY ROW on Figure 2B. The Right-of-Way is owned by the City. The City ROW has TPH impacts to soil and arsenic impacts to ground water that exceed cleanup levels.

- **City Parcel** - The south portion of the Site lies on a portion of a tax parcel (Parcel number 9457200072) called CITY PARCEL on Figure 2B (zoned partly for park and open space use, and partly as SR522 Corridor). The City Parcel has TPH and arsenic impacts to ground water that exceed cleanup levels.

Based on the results of the remedial investigation and feasibility study conducted under MTCA and the application of the selection of remedy criteria, the preferred cleanup alternatives for

contaminated soil and ground water at each area of the Site (developed in accordance with WAC 173-340-350 through 173-340-390) are:

a. Lot C Parcel

(i) TPH contaminated soil on site prior to interim actions - adopt soil excavation interim actions as the final cleanup.

b. City ROW Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as part of the final cleanup action.

(ii) Remnant TPH contaminated soil under roadway – leave in place and implement, in accordance with Section (2) below:

- Engineering controls – paved SR 522 roadway capping TPH-impacted soils.
- Institutional controls – implement environmental covenant.

(iii) Arsenic contaminated ground water – leave in place and implement:

- Institutional controls – implement environmental covenant. The covenant will document arsenic and the possibility of TPH contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.
- Monitored Natural Attenuation (MNA).
- Compliance and MNA monitoring under a Compliance Monitoring Plan.
- A Contingency Plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

c. City Parcel

(i) TPH contaminated soil on site prior to interim actions – adopt soil excavation interim actions as the final cleanup action.

(ii) TPH and arsenic contaminated ground water – leave in place and implement, in accordance with Section (2) below:

- Institutional controls – implement environmental covenant. The covenant will document TPH and arsenic contamination in ground water, prohibit withdrawal and use for any purpose other than monitoring, site investigation, or construction-related activities without prior notification and approval by Ecology.

- Monitored natural attenuation (MNA).

- Compliance and MNA monitoring under a Compliance Monitoring Plan.

  A contingency plan for ground water will be part of the cleanup remedy in case the ground water has not reached compliance at the end of the compliance monitoring period and statistical and MNA-based analysis indicates that compliance will not be reached in a reasonable restoration timeframe.

4.2.2 Compliance Monitoring, Monitored Natural Attenuation (MNA), Compliance with Cleanup Standards, Statistical and MNA-Based Analysis, Contingency Planning, and Five Year Periodic Site Reviews

a. **Compliance monitoring** – The City will implement the Compliance Ground Water Monitoring Plan in accordance with the schedule to be laid out in the final Agreed Order executed for the site.

b. **Monitored Natural Attenuation (MNA)** - Monitored Natural Attenuation (MNA) means the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remedial objectives within a time frame that is reasonable compared to that offered by more active cleanup methods. Natural attenuation refers to a variety of physical, chemical, and/or biological processes that under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of hazardous substances in the environment. These in situ processes include: natural biodegradation; dispersion; dilution by recharge; sorption; volatilization; chemical or

biological stabilization, transformation or destruction of hazardous substances (WAC 173-340-200).

(i) The main MNA performance parameters will be ground water TPH and arsenic concentrations.

(ii) MNA parameters will also be tested for, including dissolved oxygen, redox potential, pH, conductivity , temperature, nitrate, manganese (soluble), ferrous iron (soluble), sulfate, methane, and alkalinity.

c. **Compliance with cleanup standards**

(i) Compliance with cleanup levels in ground water is defined as eight (8) consecutive quarters at or below MTCA cleanup levels adopted in this cleanup plan.

(ii) If compliance with site cleanup levels for arsenic and TPH in ground water at the Site is reached within or at the end of five years, the City will not be required to conduct additional sampling, data analysis, or modeling for arsenic and TPH at the City ROW Parcel and the City Parcel.

At that time, the City may request modification of the environmental covenants for arsenic and TPH in ground water at the City ROW Parcel. The City may request lifting the environmental covenant at the City Parcel.

(iii) If compliance with site cleanup levels for arsenic and TPH at the Site is not reached within or at the end of five years the City shall take the following actions:

- If arsenic only exceeds cleanup levels, the City shall carry out the requirements of a Statistical and MNA-Based Analysis for arsenic in accordance with Section (d) below.

  The City will not be required to conduct additional sampling, data analysis, or modeling for TPH in the ground water at the City ROW Parcel and the City Parcel.

  At that time, the City may request modification of the environmental covenants to remove TPH as a chemical of concern in ground water at the City ROW Parcel and City Parcel.

- If TPH only exceeds cleanup levels, the City shall carry out the requirements of a Statistical and MNA-Based Analysis for TPH in accordance with Section (d) below.

  The City will not be required to conduct additional sampling, data analysis, or modeling for arsenic at the City ROW Parcel and the City Parcel.

  At that time, the City may request modification of the environmental covenants to remove arsenic as a chemical of concern at the City ROW Parcel and the City Parcel.

- If both TPH and arsenic exceed cleanup levels, the City shall confer with Ecology, and Ecology will decide whether the City shall carry out the requirements of a Statistical and MNA-Based Analysis in accordance with Section (d) below, or carry out the requirements of a Contingency Plan in accordance with Section (e) below.

d. **Statistical and MNA-Based Analysis.**

(i) Purpose**.** The purpose of a Statistical and MNA-Based Analysis is to ascertain whether MNA is occurring at a rate, and in a restoration timeframe, that is acceptable to Ecology.

(ii) Plan and schedule**.** The City will prepare a Statistical and MNA-Based Analyses plan and schedule for Ecology's approval. The City's plan may include one or more of the following analyses options:

- Determining the plume status with non-parametric statistical tests, graphical and regression analysis
- Estimating the bulk attenuation rate constant
- Estimating the biodegradation rate constant
- Estimating the restoration time
- Evaluating the geochemical indicators of biodegradation or other natural attenuation processes

The City may also propose additional options for Ecology's consideration.

Ecology's ultimate choice of appropriate analytic methods is not restricted to those listed above.

(iii) Implementation by City for Ecology's Approval. Upon Ecology's approval of the City's Statistical and MNA-Based Analysis plan and schedule, the City

will carry out the plan and present its results to Ecology for Ecology's consideration and approval.

- If Ecology concludes, based on the City's Statistical and MNA-Based Analysis, and/or other information, that MNA is not progressing at the Site at a rate achievable in a restoration time frame that is acceptable to Ecology, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

- If Ecology concludes, based on the City's Statistical and MNA-Based Analysis, and/or other information, that MNA is progressing at the Site at a rate achievable in a restoration time frame that is acceptable to Ecology, Ecology may extend the MNA monitoring periods as appropriate. For exceedances of ground water arsenic only or ground water TPH only, Ecology currently expects such extended monitoring to occur as follows:

  - **Ground water arsenic exceedances only**. If only arsenic remains above cleanup levels when TPH reaches compliance, the City will perform two additional years of monitoring for arsenic.

    If compliance with site cleanup levels for arsenic at the Site is reached within or at the end of that two year period, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for arsenic at the City ROW Parcel and the City Parcel. The City may request modification of the environmental covenants for arsenic in ground water at the City ROW Parcel. The City may request lifting the environmental covenant at the City Parcel.

    If, at the end of two years, arsenic levels at the Site remain above cleanup levels, the City may attempt to demonstrate to Ecology that elevated levels of arsenic in the ground water represent locally high natural background levels of arsenic or are related to some other naturally-occurring variable (e.g., precipitation).

    If Ecology finds that arsenic levels at the Site represent locally high natural background levels or are related to some other naturally-occurring variable, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for arsenic at the City ROW Parcel and the City Parcel. At that time, the City may request modification of the environmental covenants to remove arsenic in ground water as a chemical of concern at the City ROW Parcel.

The City may request lifting the environmental covenant for the City Parcel.

If Ecology finds that arsenic levels at the Site do not represent locally high natural background levels and are not related to some other naturally-occurring variable, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

- **Ground water TPH exceedances only.** If only TPH remains above cleanup levels at the Site, the City will perform additional monitoring for TPH for a duration that is expected to achieve the restoration time frame calculated in the Statistical and MNA-Based Analyses.

  If, within that restoration time frame, eight successive quarters of measurements at the Site are below cleanup levels, the City will not be required to conduct additional sampling and Statistical and MNA-Based Analysis for TPH in the ground water at the City ROW Parcel and the City Parcel. At that time, the City may request modification of the environmental covenants for to remove TPH in ground water as a chemical of concern at the City ROW Parcel. The City may request lifting the environmental covenant for the City Parcel.

  If, at the end of that restoration time frame, eight successive quarters of measurements at the Site are not below cleanup levels, the City will carry out the requirements of a Contingency Plan in accordance with Section (e) below.

  Table 1 summarizes the actions to be taken based on the results of the compliance monitoring

e. **Contingency Planning**

(i) **Purpose.** A Contingency Plan for ground water is part of the cleanup remedy if MNA is not occurring at a rate, and in a restoration timeframe, that is acceptable to Ecology.

(ii) **Plan and Schedule.** If a Contingency Plan is required, the City will prepare, for Ecology's approval, a recommended plan and schedule for achieving cleanup at a rate, and in a restoration timeframe, that is acceptable to Ecology. The City's plan may include one or more of the following options:

- Continued monitoring based on a recalculated/recalibrated restoration timeframe.
- In situ bioremediation
- Chemical stabilization of arsenic. Chemical stabilization is expected to require additional laboratory testing of site ground water to speciate the arsenic, bench/lab scale testing to select appropriate treatment chemicals, pilot and tracer testing to verify cleanup viability, etc.

The City may also propose additional options for Ecology's consideration.

Ecology's ultimate choice of contingency remedial action is not restricted to those listed above.

(iii) **Work Plans and schedules.** Upon Ecology's approval of a Contingency Plan, the City will provide Ecology with one or more work plans and schedules for Ecology's consideration and approval.

(iv) **Implementation.** Upon Ecology's approval of the City's work plan(s) and schedule(s), the City will carry out the work plan.

f. **Five year periodic site reviews.** Five year periodic site reviews are a MTCA requirement for sites with environmental covenants. Ecology will assess ground water compliance at that time, in addition to the assessments described above.

4.3 CLEANUP STANDARDS AND POINT OF COMPLIANCE

Cleanup standards consist of appropriate cleanup levels applied at a defined point of compliance that meet applicable state and federal laws (WAC 173-340-700). Cleanup levels are described below.

4.3.1 Soil

Soil remediation levels proposed in the *Interim Action Work Plan* (Parametrix, 2010b) include:

- MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340, Table 740-1).
- MTCA Method B TPH Soil Cleanup Levels for direct contact and protection of ground water

An evaluation of Method B risk-based petroleum contaminated soil cleanup levels for the Site was specified in Section 3.1.1.1 of the *Compliance Monitoring Quality Assurance Project Plan* (CMQAPP) appendix of the *Interim Action Work Plan* (Parametrix, 2010b). The CMQAPP called for characterization of petroleum-impacted soil via analysis of petroleum hydrocarbon

fractionation and other target compounds in order to evaluate whether the standard MTCA Method A soil cleanup levels were appropriate for the Site compared to MTCA Method B risk-based soil petroleum hydrocarbon cleanup levels. The results of the petroleum hydrocarbon fractionation analyses (NWVPH/NWEPH analysis) were input into Ecology's MTCATPH11.1 spreadsheet model to determine petroleum hydrocarbon soil cleanup levels protective of human health via direct contact and via leaching to a source of potable ground water. Evaluation of MTCA Method B risk-based cleanup levels for petroleum-impacted soil at the Site is presented in the RI. The calculated Method B cleanup levels for petroleum hydrocarbons at the Site range between 581 and 39,709 milligrams per kilogram (mg/kg) depending on the mixture of hydrocarbon fractions and specific compounds. The Method B TPH cleanup level of 581 mg/kg is a calculated value for protection of potable ground water from contamination by cPAHs based upon Ecology's three-phase partitioning model (Equation 747-1 in WAC 173-340-747). The MTCA Method A cleanup level for gasoline-range petroleum hydrocarbons without detectible benzene in soil such as at the Site is 100 mg/kg. The calculated Method B cleanup levels for diesel- and oil-range petroleum hydrocarbons at the Site range between 999 and 1,505 mg/kg depending on the mixture of hydrocarbon fractions and specific compounds.

The resulting soil remediation levels used (i.e., the more stringent of Method A or B) meet all the requirements of WAC 173-340-720 through 173-340-760 and should be considered the Site cleanup levels. Soil cleanup levels are summarized below:

Compound	Cleanup level (mg/kg)	
TPH Diesel	999	B
TPH Oil	999	B
TPH Gasoline	100/30	A*

A – MTCA Method A soil cleanup level
B - MTCA Method B soil cleanup level
* Gasoline mixtures without benzene and the total of ethyl benzene, toluene and xylene are less than 1% of the gasoline mixture = 100 mg/kg
All other gasoline mixtures = 30 mg/kg

4.3.2 Ground Water

Appropriate levels of cleanup for ground water are determined by the highest beneficial use of that ground water. Shallow ground water present at the Site is not currently used for drinking water, and no water wells are located downgradient of the Site. The appropriate ground water cleanup levels for the Site are MTCA Method A for ground water for almost all the COCs; however, for ground water arsenic, a cleanup level of 10.0 micrograms per liter (µg/L) will be used based on the drinking water standard. Ground water cleanup levels are summarized below:

Compound	Cleanup level (µg/L)
TPH Gas	800
TPH Diesel	500
TPH Oil	500
Benzene	5
Toluene	1000
Ethylbenzene	700
Xylenes	1000
Arsenic	10

4.3.3 Point of Compliance

The point of compliance is the specific location(s) at which a particular cleanup level must be met in order to demonstrate compliance of a cleanup action. MTCA defines standard and conditional points of compliance.

4.3.3.1 Soil

The standard soil point of compliance under MTCA (WAC 173-340-740 (6)(b-(d))) is:

- For soil cleanup levels based on protection of ground water, the point of compliance shall be established throughout the Site
- For soil cleanup levels based on protection from vapors, the point of compliance shall be established throughout the Site from the ground surface to the uppermost ground water saturated zone
- For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the Site from the ground surface to 15 feet below ground surface.

MTCA recognizes that, for cleanup actions that involve containment or capping, cleanup levels may not be met at the standard point of compliance, but the cleanup action would be determined to comply with cleanup standards provided:

- The selected remedy is permanent to the maximum extent practicable
- The cleanup action is protective of human health and terrestrial ecological receptors
- Institutional controls are implemented to limit activities that could interfere with the long-term integrity of the containment system
- Compliance monitoring and periodic reviews are conducted
- The capped or contained COCs and measures to prevent migration and contact with them are specified in a CAP

The cleanup alternatives are evaluated based on standard soil point of compliance for removal and treatment alternatives (WAC 173-340-740(6)(a)-(e), and for containment remedies (WAC 173-340-740(6)(f)).

4.3.3.2 Ground Water

The standard ground water point of compliance under MTCA (WAC 173-340-720(8)(b)) is in ground water throughout the Site from the uppermost level of the saturated zone to the lowest depth which could potentially be affected.

For this Site, the standard ground water point of compliance is proposed for petroleum hydrocarbon and arsenic impacts, i.e., ground water throughout the Site.

4.4 APPLICABLE, RELEVANT AND APPROPRIATE REQUIREMENTS

Cleanup actions under MTCA (WAC 173-340-710) require the identification of all applicable or relevant and appropriate requirements (ARARs). These requirements are defined as:

"Applicable" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site.

"Relevant and appropriate" requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

The potential ARARs for the Site include three types:

- Chemical-specific
- Location-specific
- Action-specific

Chemical-specific ARARs are typically health- or risk-based values that when applied to site-specific conditions represent cleanup standards. Location-specific ARARs are related to the geographical position and/or physical condition of the site and may affect the type of remedial action selected. Action-specific ARARs are usually technology-based or activity-based

requirements or limitations on actions or conditions taken with respect to specific hazardous substances. The action-specific requirements do not determine the selected remedial alternative, but indicate how or to what level a selected alternative must perform.

Potential ARARs were identified for each medium of potential concern. These potential ARARs are shown in Table 2.

4.5 RESTORATION TIMEFRAME

TPH in soil and ground water - The interim action soil cleanups (which are adopted as the final soil cleanup) were completed in 2014. The engineering controls (i.e., capping) were implemented during final SR 522 roadway construction, in 2013. Institutional controls (environmental covenant) are anticipated to be implemented once a final CAP is approved, sometime in 2017. MNA is expected to reach cleanup levels within 5 years for ground water.

Arsenic in ground water - Institutional controls (environmental covenant) and monitoring are anticipated to be implemented after the CAP is issued and approved, sometime in 2017.

If monitoring shows elevated arsenic persisting after petroleum hydrocarbon impacts have diminished for an appropriate period of time (currently expected to be two years after five years of combined TPH and arsenic monitoring), the City may attempt to demonstrate to Ecology that arsenic can be attributed to a background condition, and a request can be made to Ecology to remove the institutional controls for ground water at the site.

A contingency plan will be implemented if compliance is not achieved in the compliance monitoring period.

4.6 COMPLIANCE MONITORING

Compliance monitoring requirements (specified in WAC 173-340-410) include the following elements:

- Protection monitoring to confirm that human health and the environment are adequately protected during implementation of an alternative
- Performance monitoring to confirm that cleanup standards or other performance standards are met
- Confirmational monitoring to monitor the long-term effectiveness of the remedy after completion of the alternative

Petroleum in ground water – The engineered containment and institutional control remedy is currently expected to include MNA-based compliance monitoring by ground water monitoring

for five years. Remaining diesel- and oil-range petroleum hydrocarbon impacts to ground water are in well BPMW-6. Ground water from BC-10 has been below cleanup levels and mostly non-detect for petroleum hydrocarbons for the last four quarterly monitoring events. Concentrations are low, sporadic, and isolated; therefore, limited monitoring is anticipated in order to demonstrate compliance with ground water cleanup levels.

Petroleum in storm water – Surface or storm water were not identified as a suspected or confirmed contaminated medium for this Site during the RI. However, after the RI and Interim Actions were completed, a stormwater facility consisting of a culvert and artificial stream was constructed on the Site. Some of the flow from the historic Horse Creek drainage, which was formerly mostly conveyed in stormwater pipes several hundred feet east of the Site, was diverted to a new stormwater conveyance also called Horse Creek, part of which now crosses the Site. The new Horse Creek facility (not a real creek) includes multiple segments constructed variously as pipes, lined ditches, culverts, ponds, and created or artificial streams. Some segments are lined with bentonite or polyethylene membranes to hydraulically isolate the water feature from native ground water and soil. The lined areas were selected based on the presence of known soil and ground water contamination. The segments north of the Site to the south end of the culvert under SR522 are lined.

As part of confirmation monitoring, storm water samples will be collected from the new Horse Creek facility in three locations, one upgradient of and two on the Site. Samples will be analyzed for TPH-G/BTEX, and TPH-Dx. Sampling for HVOCs may be completed as part of the Bothell Service Center site, by others. Sampling locations and details are provided in the Compliance Monitoring Plan.

Sample results from moving surface water are expected to have a high degree of variability. If the upgradient sample contains similar contaminants at similar (+/- 50%) concentrations to the on Site samples, it can be assumed that the contaminants are coming from upgradient sources, most likely urban stormwater runoff, and no further sampling or action will be taken. If results are ambiguous, additional sampling events will be conducted to obtain a more robust data set. The likelihood that any contamination is coming from soil or ground water from Paint or another MTCA site is very low, compared to the known presence of TPH in urban stormwater.

Arsenic in Ground Water - The institutional control remedy for arsenic in ground water provides for compliance monitoring by ground water monitoring for up to seven years. The frequency for arsenic will follow TPH for five years (i.e., quarterly), then (unless TPH decreases to below detection limits) will be quarterly for another two years of monitoring to determine if arsenic is naturally elevated or not. Remaining arsenic impacts to ground water are in wells BC-10, BC-11, BPMW-1, and BPMW-6.

A Compliance Monitoring Plan will be submitted as part of the Cleanup Action Plan which describes the monitoring. Compliance monitoring for the remaining petroleum hydrocarbon

contamination in ground water will be statistical and MNA-based. Compliance monitoring for arsenic is currently expected to be concurrent with petroleum hydrocarbon compliance monitoring (five years), but with an extended period of quarterly monitoring to determine if the arsenic is naturally occurring or induced by the petroleum contamination (two years). Wells to be monitored are:

TPH-D, TPH–O, MNA parameters - BPMW-6, BPMW-2R (which will replace BPMW-2), BC-10

Arsenic - BPMW-6, BPMW-1, BC-10, BC-11

4.7 SCHEDULE FOR IMPLEMENTATION

TPH in soil and ground water - The interim action soil cleanups (which are adopted as the final soil cleanup) were completed in 2014. The engineering controls (i.e., capping) were implemented during final SR 522 roadway construction, in 2013. Institutional controls (environmental covenant) are anticipated to be implemented once a final CAP is approved. Monitoring for MNA will be conducted in accordance with the schedule and process in Section 4.2.2. Combined TPH/MNA/Arsenic monitoring reports will be prepared and submitted to Ecology annually.

Arsenic in ground water - Institutional controls (environmental covenant) and monitoring are anticipated to be implemented after the CAP is issued and approved, sometime in 2017. Monitoring for MNA will be conducted in accordance with the schedule and process in Section 4.2.2. Combined TPH/MNA/Arsenic monitoring reports will be prepared and submitted to Ecology annually.

4.8 INSTITUTIONAL/ENGINEERING CONTROLS

Institutional Controls will be applied to the petroleum in soil and arsenic in ground water impacts. See Section 4.2 above.

4.9 PUBLIC PARTICIPATION

The dCAP will be distributed for public review and comment, with a 30-day comment period. Public participation procedures will be outlined in a Public Participation Plan prepared by Ecology.

Table 1
Decision Table for Ground Water Compliance Monitoring of TPH and Arsenic

Within or at the end of five years, if:	**Actions to be taken:**	**Comments**
TPH and Arsenic are in compliance*	LIFT environmental covenant for City Parcel. Terminate ground water compliance monitoring.	City Parcel will have an environmental covenant only for ground water.
	MODIFY environmental covenant for City ROW Parcel to take out TPH and arsenic as COCs in ground water and remove ground water restrictions.	City ROW Parcel will have an environmental covenant for soil and ground water. Residual petroleum contaminated soil remains.
TPH only in compliance	MODIFY environmental covenant for City ROW Parcel and City Parcel to take out TPH as COC in ground water.	City ROW Parcel will have an environmental covenant for soil and ground water. Residual petroleum contaminated soil remains.
	Conduct additional two years quarterly ground water monitoring for arsenic to determine if high concentrations are natural background or not. Use statistical and MNA based analysis for next steps (below).	
	Following additional monitoring, if determined to be natural, MODIFY City Parcel and City ROW Parcel environmental covenants to take out arsenic as COC. Terminate ground water compliance monitoring. If not, implement contingency plan to remediate arsenic.	

Arsenic only in compliance	MODIFY environmental covenant for City ROW Parcel and City Parcel to take out arsenic as COC in ground water only.	
	Implement statistical and MNA analysis for TPH.	
	Based on analysis, if Ecology determines reasonable restoration time can be achieved and compliance monitoring is appropriate remedy, continue TPH monitoring until compliance is achieved. If not, implement contingency plan to remediate TPH.	
Neither TPH or arsenic in compliance	Implement statistical and MNA analysis. Based on results, either implement continued compliance monitoring if a reasonable restoration time is demonstrated, or implement contingency plans to remediate TPH and arsenic.	Requires discussion and approval from Ecology.

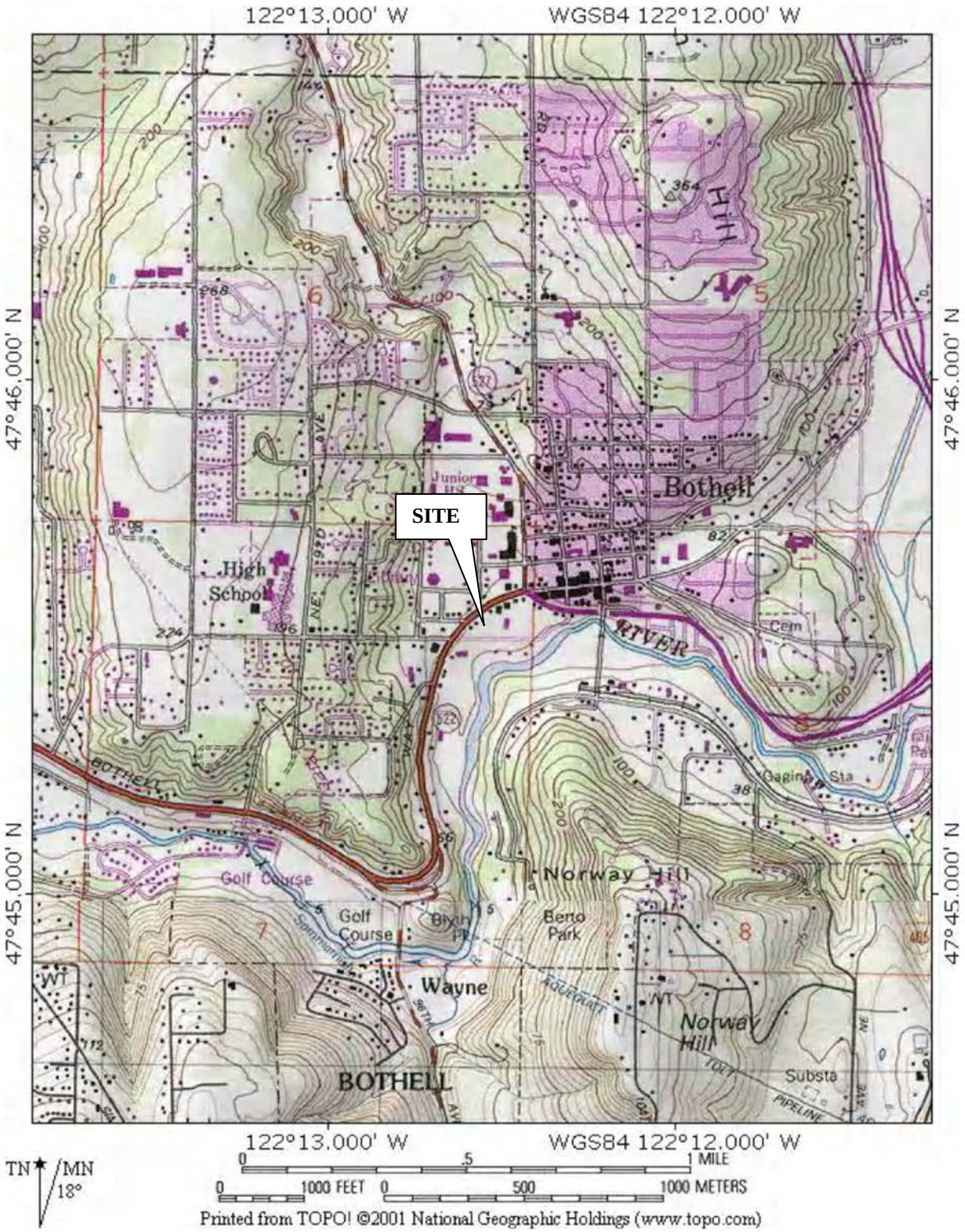
* Compliance with cleanup levels in ground water is defined as eight (8) consecutive quarters at or below MTCA cleanup levels adopted in this cleanup plan.

Table 2. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Soil		
Model Toxics Control Act (WAC 173-340-740, -747)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for soil, including derivation of soil concentrations protective of groundwater.	MTCA cleanup levels are applicable to Site soil.
Groundwater		
Safe Drinking Water Act, Primary Drinking Water Regulations (40 Code of Federal Regulations [CFR] 141.50 and 141.61(a))	These regulations protect the quality of public drinking water supplies through regulation of chemical parameters and constituent concentrations as maximum concentration limits (MCLs).	MCLs are potentially relevant and appropriate where groundwater is a potential source of drinking water.
Model Toxics Control Act (WAC 173-340-720)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for groundwater.	MTCA cleanup levels are applicable to Site groundwater.
Surface Water		
Clean Water Act, Section 304, National Recommended Water Quality Criteria, EPA Office of Science and Technology (4304T, 2004).	There are no ambient water quality criteria for PCE for protection of freshwater organisms.	Surface water quality criteria are potentially relevant and appropriate to ambient surface water quality for point-source discharges to Horse Creek.
Clean Water Act, National Pollutant Discharge Elimination System (40 CFR Part 122) and Washington State National Pollutant Discharge Elimination System Permit Program (WAC 173-220).	The National Pollutant Discharge Elimination System (NPDES) program requires that permits be obtained for point-source discharges of pollutants to surface water. Under this regulation, a point-source discharge to a surface water body cannot cause an exceedance of water quality standards in the receiving water body outside the mixing zone.	Substantive regulatory requirements of the NPDES permit program are potentially applicable to the direct discharge of treated groundwater to a surface water body such as Horse Creek or Sammamish River.
Clean Water Act's National Toxics Rule (NTR) (40 CFR 131.36)	Provides values that have to be met for point-source discharges to surface water.	Potentially applicable to point-source discharges to Horse Creek should remedial activities cause release to surface water. If applicable, these values would have to be met at the mixing zone boundary established for the discharge.
Clean Water Act, General Pretreatment Regulations (40 CFR Part 403).	The regulations limit pollutants in wastewater discharges to sanitary sewer systems to protect publicly owned treatment works (POTWs) from accepting wastewater that would damage their system or cause them to exceed their NPDES permit discharge limits.	These regulations are potentially applicable to the discharge of treated groundwater to City of Bothell POTWs.
Washington State Water Quality Standards for Surface Waters (WAC 173-201A)	Washington State water quality standards protect freshwater aquatic life by specifying protection criteria by stretch of surface waters. WAC 173-201A provides limitations on other parameters such as turbidity, temperature, dissolved oxygen, and pH for protection of organisms. Tributaries of waters whose uses are designated salmon and trout spawning, core rearing and migration, or extraordinary primary contact recreation are protected at the same level as the waters themselves.	The substantive requirements of this regulation are potentially applicable for remedial actions affecting Horse Creek.
Washington Surface Water Quality Standards, Short-Term Modifications (WAC 173-201A-410)	Washington State provides for short-term modifications of standards for specific water bodies on a short-term basis when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest.	These would be potentially applicable to remedial actions affecting Horse Creek.
Model Toxics Control Act (WAC 173-340-730)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for surface water.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to surface water.
Air		
National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 261)	Establishes specific emissions levels allowed for toxic air pollutants.	Applicable to treatment alternatives that may emit toxic pollutants to the air.
Washington Clean Air Act and Implementing Regulations (WAC 173-400; WAC 173-460; WAC 173-490)	WAC 173-400 requires air emissions at the Site boundary to fall below the acceptable source impact limit (ASIL). WAC 173-400 also requires control of fugitive dust emissions during construction and defines general emission discharge treatment requirements. WAC 173-460 requires systemic control of new sources emitting air pollutants. WAC 173-490 sets emission standards and source control for volatile organic compounds.	Applicable for air stripping/sparging remedial technology.
Model Toxics Control Act (WAC 173-340-750)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for air.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to air.

Table 2. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Miscellaneous		
Protection of Wetlands, Executive Order 11990 (40 CFR Part 6, Appendix A)	This executive order mandates that response actions taken by federal agencies must be designed to avoid long- and short-term impacts to wetlands. If remediation activities are located near/in wetlands, the activities must be designed to avoid adverse impact to the wetlands wherever possible, including minimizing wetlands destruction and preserving wetland values.	This Act would be potentially applicable to remedial activities at the Site.
Endangered Species Act (50 CFR Parts 17, 402)	Section 7 of the Endangered Species Act (ESA) and 40 CFR Part 402 require that federal agencies consider the effects of their proposed actions on federal listed species. It requires consultation between the agency proposing the action and the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration (NOAA) Fisheries, as appropriate. Preparation of a biological assessment is conducted, addressing the potential effects to listed species in the area and methods to minimize those effects.	The ESA is potentially applicable to remedial actions at the Site because the USFWS has determined that federal threatened species (bald eagle and bull trout) may use the project area. Therefore, they could potentially be affected by these actions.
Native American Graves Protection and Repatriation Act (43 CFR Part 10)	Native American Graves Protection and Repatriation Act regulations protect Native American burials from desecration through the removal and trafficking of human remains and “cultural items,” including funerary and sacred objects.	This Act is potentially applicable to remedial actions at the Site because it is possible that the disturbance of Native American materials could occur as a result of work in the stream bed or subsurface excavations elsewhere at the Site. Such materials are not known to be present at the Site, but could be inadvertently uncovered during soil or sediment removal.
National Historic Preservation Act (36 CFR Parts 60, 63, and 800)	National Historic Preservation Act (NHPA) regulations require federal agencies to consider the possible effects on historic sites or structures of actions proposed for federal funding or approval. Historic sites or structures as defined in the regulations are those on or eligible for the National Register of Historic Places, generally at least 50 years old.	This Act is potentially applicable to stream bed or other subsurface work at the Site. No such sites are known to be present in the area.
Washington Hazardous Waste Management Act (WAC 173-303)	Establishes standards for the generation, transport, treatment, storage, or disposal of designated dangerous waste in the state.	This regulation is potentially applicable to alternatives that would involve handling of contaminated media at the Site. The area of contamination policy allows contaminated media to be consolidated within the same area of a site without triggering Resource Conservation and Recovery Act or Washington dangerous waste regulations.
Department of Transportation of Hazardous Wastes (49 CFR 105 – 180)	Establishes specific U.S. Department of Transportation rules and technical guidelines for the off-site transport of hazardous materials.	Applicable to remedial activities that involve the off-site transportation of hazardous waste.
Washington Solid Waste Handling Standards (WAC 173-350)	Establishes standards for handling and disposal of solid non-hazardous waste in Washington.	These regulations are potentially applicable to solid nonhazardous wastes and are potentially relevant and appropriate to on-site remedial actions governing contaminated media management.
Washington Water Well Construction Act Regulations (WAC 173-160)	Provides requirements for water well construction.	These regulations are potentially applicable to the installation, operation, or closure of monitoring and treatment wells at the Site.



HWA GeoSciences Inc.

SITE VICINITY

BOTHELL PAINT RI/FS REPORT
BOTHELL, WASHINGTON

FIGURE NO.
1

PROJECT NO.
2007098-2021

EXPLANATION OF SYMBOLS

- MW — AREA WIDE WELLS MONITORED
- UCCMW — ULTRA CUSTOM CARE CLEANERS WELL MONITORED
- MW — RIVERSIDE WELLS MONITORED
- MW — BOTHELL PAINT WELLS MONITORED
- MW — WELLS NOT MONITORED
- MW — DECOMMISSIONED WELLS
- SB — SOIL BORINGS
- CLEANUP CONFIRMATION SOIL SAMPLE > MTCA
- SOIL CLEANUP AREAS
- SITE
- HVOC PLUMES
- ORIGINAL PARCELS
- NEW PARCELS

N W E S

0 25 50 75 100

ULTRA CUSTOM CARE CLEANERS

Ultra Custom Care Cleaners HVOC Plume

BOTHELL SERVICE CENTER

Bothell Service Center HVOC Plume

BOTHELL LANDING SITE TPH INSTITUTIONAL CONTROL AREA

Riverside HVOC Plume

BOTHELL PAINT ARSENIC AND TPH INSTITUTIONAL CONTROL AREA

LOT D

BOTHELL LANDING

LOT E,F,G

LOT C

BOTHELL HERTZ

BOTHELL LANDING SITE ARSENIC INSTITUTIONAL CONTROL AREA

RIVERSIDE TPH

RIVERSIDE HVOCs

CITY ROW

CITY PARCEL

NEW HORSE CREEK CHANNEL

FORMER HORSE CREEK CHANNEL

SR-522 BOTHELL WAY NE

NE 183rd ST

MAIN ST

HWA GEOSCIENCES INC.

BOTHELL PAINT RI/FS
BOTHELL WASHINGTON

SITE LOCATION AND ADJACENT PROPERTIES

DRAWN BY EFK

CHECK BY NN

DATE

FIGURE NO. 2A

PROJECT NO. 2007-098 T2020

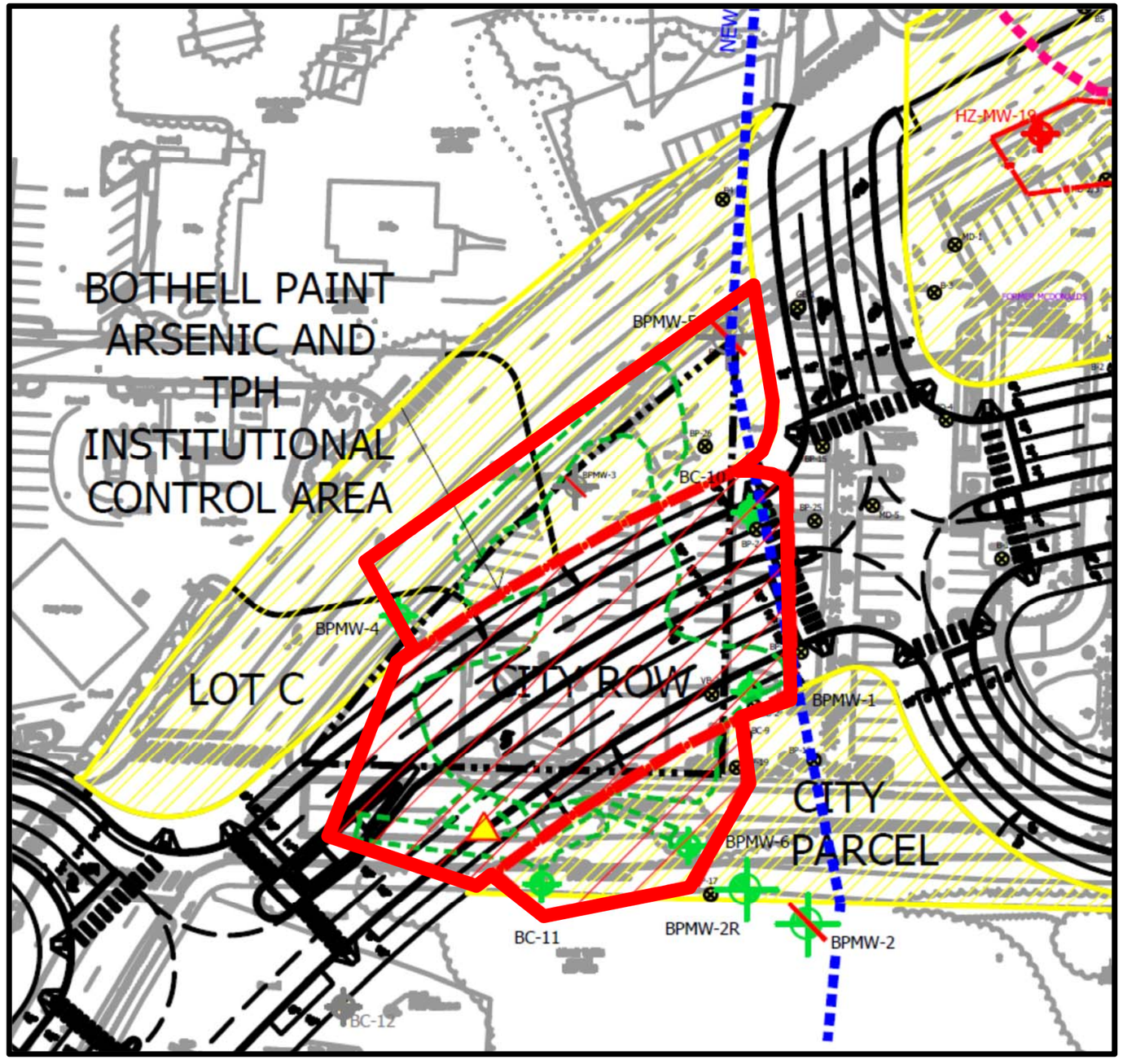
C:\USERS\COMPUTER\GOOGLE DRIVE\COMPANIES\CLIENTS\HWA GEOSCIENCES\05_04_2016\HWA 2007-098-21 T2020 (FIG2).DWG <11x17 all wells (2)> Plotted: 5/22/2015 9:11 AM

EXPLANATION OF SYMBOLS

- MW — AREA WIDE WELLS MONITORED
- UCCMW — ULTRA CUSTOM CARE CLEANERS WELL MONITORED
- MW — RIVERSIDE WELLS MONITORED
- MW — BOTHELL PAINT WELLS MONITORED
- MW — WELLS NOT MONITORED
- MW — DECOMMISSIONED WELLS
- SB — SOIL BORINGS
- CLEANUP CONFIRMATION SOIL SAMPLE > MTCA
- SOIL CLEANUP AREAS
- SITE
- HVOC PLUMES
- ORIGINAL PARCELS
- NEW PARCELS

N / W / E / S

0 25 50 75 100



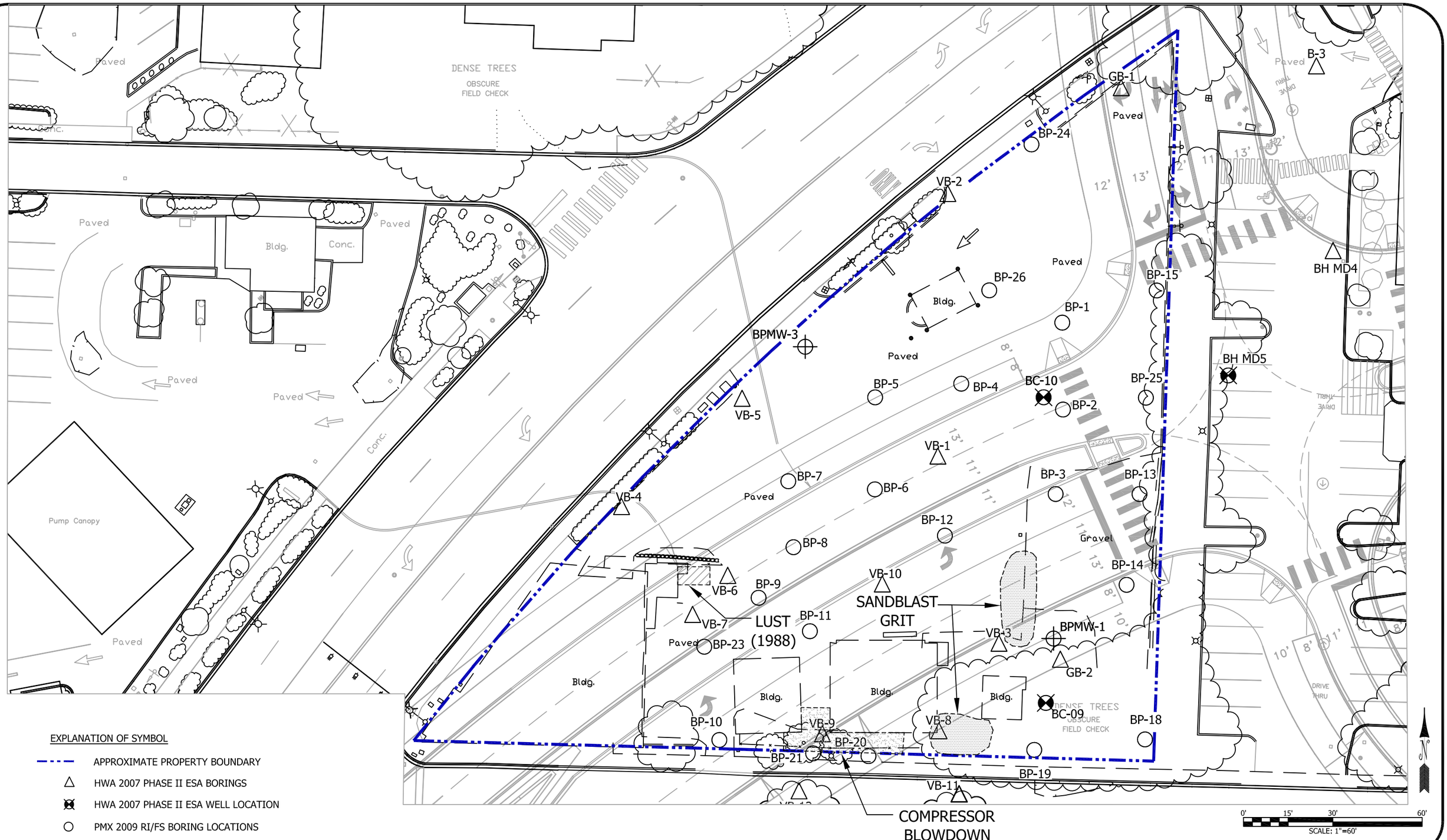
HWA GeoSciences Inc.

DETAIL OF SITE LOCATION

BOTHELL PAINT RI/FS
BOTHELL, WASHINGTON

FIGURE NO.
2B

PROJECT NO.
2007-098-T2020



EXPLANATION OF SYMBOL

- APPROXIMATE PROPERTY BOUNDARY
- △ HWA 2007 PHASE II ESA BORINGS
- ⊠ HWA 2007 PHASE II ESA WELL LOCATION
- ○ PMX 2009 RI/FS BORING LOCATIONS
- ⊕ PMX 2009 RI/FS WELL LOCATIONS
- ■ CDM ROW BORING LOCATIONS

BASE MAP PROVIDED BY PARAMETRIX

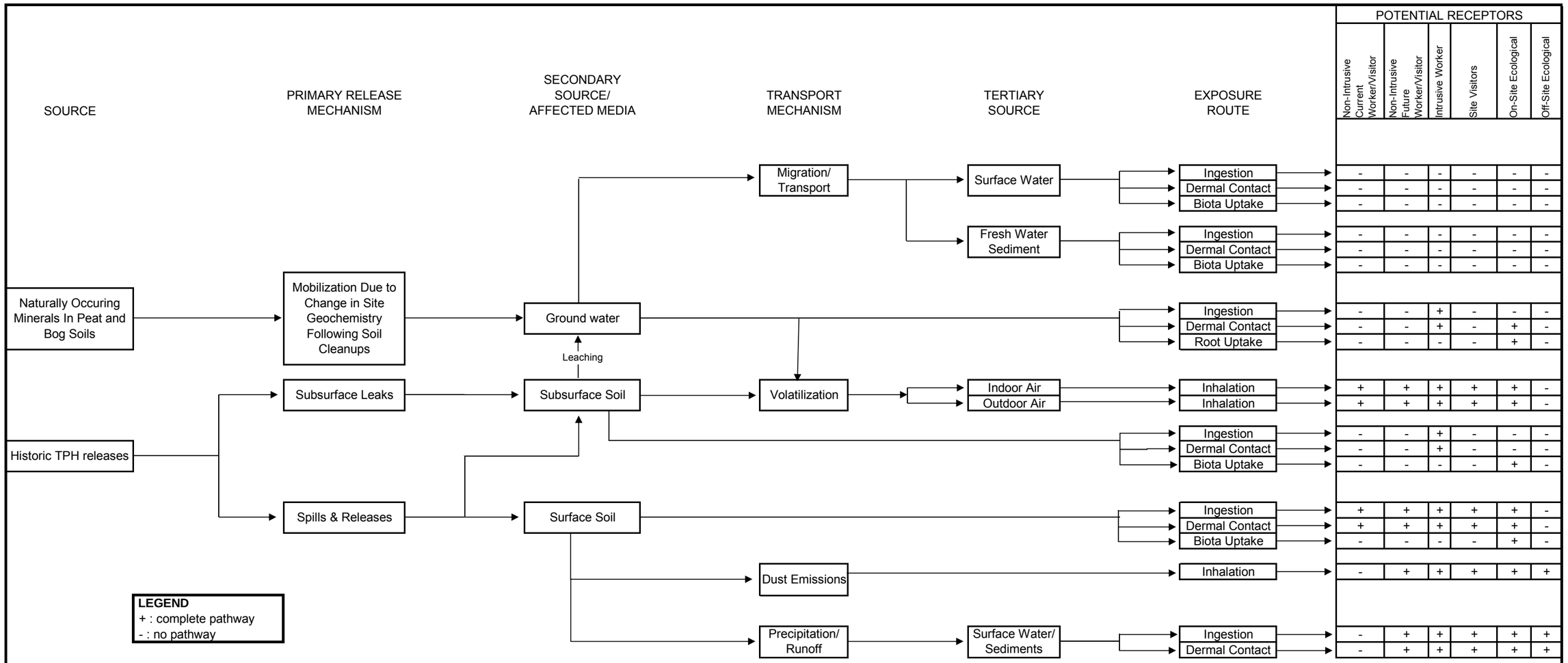
HWA GEOSCIENCES INC.

BOTHELL PAINT AND DECORATING SITE
INTERIM ACTION CLEANUP
BOTHELL, WASHINGTON

SITE PLAN
PRIOR TO CLEANUP

DRAWN BY EFK	FIGURE NO. 3
CHECK BY NN	PROJECT NO. 2007-098 T922
DATE 11.16.10	

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T210.DWG <BOTHELL PAINT GPS F3> Plotted: 12/16/2010 9:16 AM



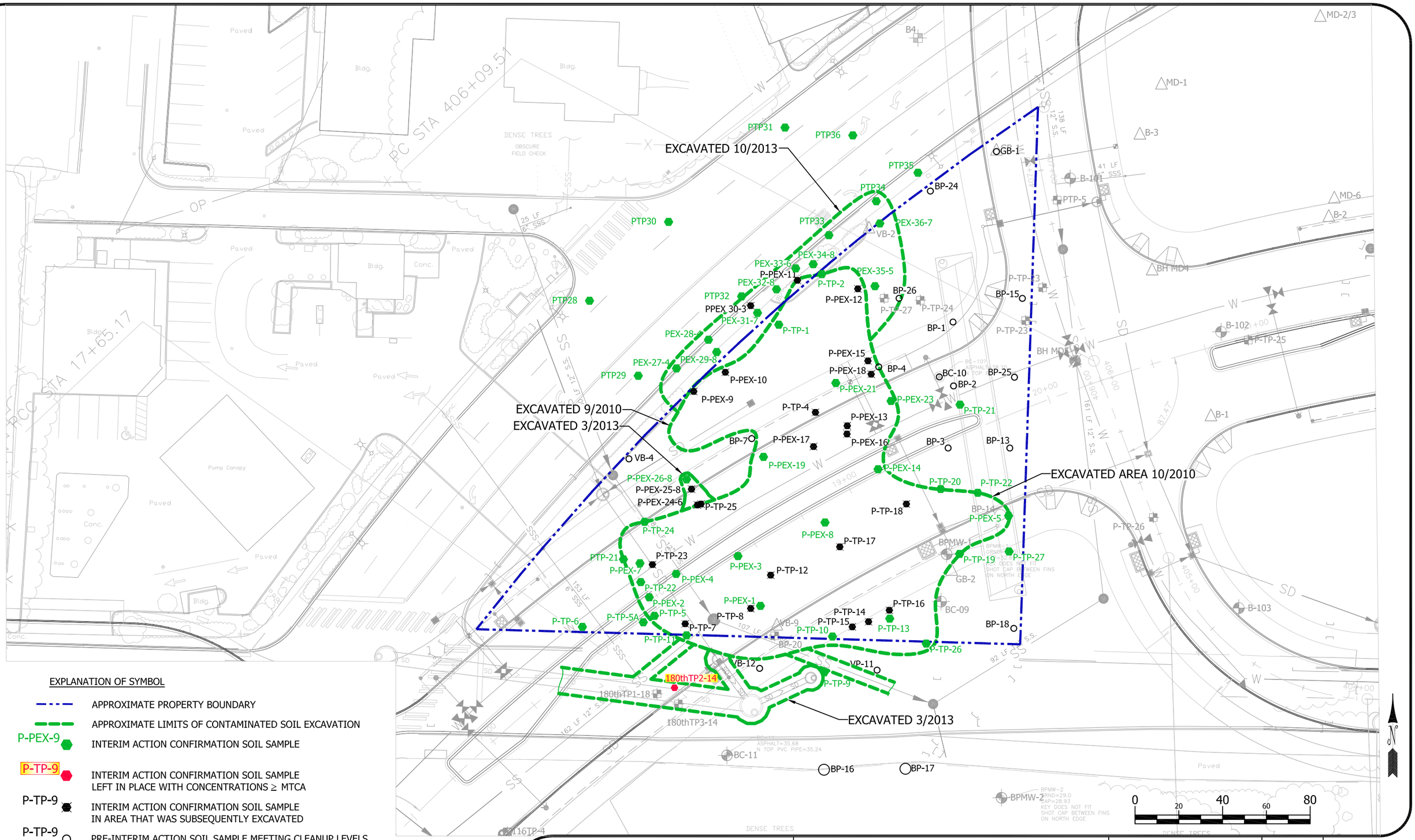
HWA GeoSciences Inc.

CONCEPTUAL SITE MODEL

BOTHELL PAINT AND DECORATING SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
BOTHELL, WASHINGTON

FIGURE NO. 4

PROJECT NO. 2007-098-2021



EXPLANATION OF SYMBOL

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE LIMITS OF CONTAMINATED SOIL EXCAVATION
- P-PEX-9 — INTERIM ACTION CONFIRMATION SOIL SAMPLE
- P-TP-9 — INTERIM ACTION CONFIRMATION SOIL SAMPLE LEFT IN PLACE WITH CONCENTRATIONS ≥ MTCA
- P-TP-9 — INTERIM ACTION CONFIRMATION SOIL SAMPLE IN AREA THAT WAS SUBSEQUENTLY EXCAVATED
- P-TP-9 — PRE-INTERIM ACTION SOIL SAMPLE MEETING CLEANUP LEVELS
- PTP-21 — UTILITY TEST PIT SOIL SAMPLE MEETING CLEANUP LEVELS

BASE MAP PROVIDED BY PARAMETRIX

HWA GEOSCIENCES INC.

BOTHELL PAINT AND DECORATING SITE
INTERIM ACTION CLEANUP
BOTHELL, WASHINGTON

EXTENT OF INTERIM ACTION SOIL CLEANUP

DRAWN BY EFK
CHECK BY AS
DATE 04.21.15

FIGURE NO. 5

PROJECT NO. 2007-098 T995

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T995A.DWG <BOTHELL PAINT GPS F5> Plotted: 4/21/2015 8:32 AM

EXHIBIT C

COMPLIANCE GROUND WATER MONITORING PLAN
BOTHELL PAINT AND DECORATING SITE
BOTHELL, WASHINGTON
HWA Project No. 2007-098

January 2, 2018

Prepared for:
City of Bothell

HWA GeoSciences Inc.
• Geotechnical Engineering
• Hydrogeology
• Geoenvironmental Services
• Inspection & Testing

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COMPLIANCE GROUND WATER MONITORING PLAN
BOTHELL PAINT AND DECORATING SITE
BOTHELL, WASHINGTON

1.0 INTRODUCTION

This compliance monitoring plan has been prepared for the Bothell Paint and Decorating site (Site) in Bothell, Washington (Figure 1). The Site is under an Agreed Order between the City of Bothell (City) and the Washington State Department of Ecology (Ecology). Remedial investigations and feasibility studies (RI/FS) have been completed for the Site. The Site has remaining impacts to ground water which were addressed with remedies that included ground water monitoring. This plan describes the ground water monitoring to be conducted at the Site.

This compliance monitoring plan has been prepared to fulfill the requirements of the Agreed Order per Washington Administrative Code (WAC) 173-340-410(1)(b), and WAC 173-340-820 (sampling and analysis plans).

This plan describes the sample collection procedures, analysis, and defines the Data Quality Objectives (DQOs) and criteria for the project. HWA GeoSciences Inc. prepared this plan in accordance with the U.S. Environmental Protection Agency (EPA) and Ecology requirements contained in the following:

- EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans, Final, March 2001
- EPA QA/G-5, EPA Guidance for Quality Assurance Project Plans, December 2002
- EPA QA/G-4, EPA Guidance on Systematic Planning Using the Data Quality Objectives Process, February 2006
- Ecology Model Toxics Control Act (Ecology 2007)

2.0 PROJECT ORGANIZATION AND MANAGEMENT

2.1 PROJECT ORGANIZATION

Specific project roles and responsibilities for oversight and sampling are described in Table 2-1.

Table 2-1
Project Roles and Responsibilities

Personnel	Responsibilities
Department of Ecology (Agency)	Provides regulatory oversight
City of Bothell (Owner) Project Manager	Provides project oversight and performs contract administration
Owner's Representative (Environmental Consultant)	Conducts compliance sampling; coordinates analytical laboratory testing of samples; prepares reports

2.2 PROBLEM DEFINITION/BACKGROUND

The Bothell Paint and Decorating Site is located along Bothell Way NE / SR 522 west of 98th Avenue NE in Bothell, Washington. The Site was formerly a paint store, had a former sandblasting operation, and contained one petroleum underground storage tank (UST). The City acquired properties on which the Site lies in 2008 for construction of the SR 522 realignment, and entered into an Agreed Order with Ecology in 2009. Remedial investigation activities were initiated in 2009, and finalized in 2016. Interim action soil cleanups for petroleum hydrocarbons and metals were conducted in 2010, 2013 and 2014 at the Site. Chemicals of concern (COCs) for the Site following the two interim action cleanups are:

- Soil: Gasoline- and motor oil-range petroleum hydrocarbons
- Ground water: Diesel- and oil-range petroleum hydrocarbons, and arsenic

The selected remedy for the Site is a combination of excavation of contaminated soils (already completed as interim actions), engineering controls (capping under roadway), institutional controls (environmental covenants restricting access to soil and ground water), and ground water monitoring for natural attenuation to achieve compliance, with the possibility of contingency action if natural attenuation does not occur at a rate and in a timeframe that is acceptable to Ecology. Institutional controls for petroleum hydrocarbons and arsenic include ground water monitoring, which is detailed in this document.

This monitoring plan describes sample collection procedures and quality assurance and quality control (QA/QC) methods to ensure representative data is collected after the interim and final cleanup action are implemented.

Horse Creek - Surface or storm water were not identified as a suspected or confirmed contaminated medium for this Site during the RI. However, after the RI and Interim Actions

were completed, a stormwater facility consisting of a culvert and artificial stream was constructed on the Site. Some of the flow from the historic Horse Creek drainage, which was formerly mostly conveyed in stormwater pipes several hundred feet east of the Site, was diverted to a new stormwater conveyance also called Horse Creek, part of which now crosses the Site. The new Horse Creek facility (not a real creek) includes multiple segments constructed variously as pipes, lined ditches, culverts, ponds, and created or artificial streams. Some segments are lined with bentonite or polyethylene membranes to hydraulically isolate the water feature from native ground water and soil. The lined areas were selected based on the presence of known soil and ground water contamination. The segments north of the Site to the south end of the culvert under SR522 are lined.

2.3 QUALITY OBJECTIVES AND CRITERIA

2.3.1 Data Quality Objectives

Data quality objectives (DQOs) were developed according to EPA's DQOs Process (EPA 2006), to provide data of known and appropriate quality. The DQO process is a seven-step planning approach to develop sampling designs for data collection activities that support decision-making. It provides a systematic procedure for defining the criteria that a data collection design should satisfy. The DQOs for the project are shown in Table 2-2.

Table 2-2
Design Characterization Sampling DQOs

DQO	Description
State the Problem	Is contaminated ground water present?
Identify the Goal of the Study	Reduce contaminant concentrations in ground water Is the collected chemical data adequate to identify and determine if contamination still exists?
Identify Information Inputs	Analytical results (what are the detected concentrations? are they above cleanup levels? was QA/QC criteria met?). Actual sample locations (correct location and depth?).
Define the Study Boundaries	The selected locations.
Develop the Analytic Approach	Sampling and analysis strategies will be developed to support the decision making process. Analytical results will be used to determine the presence or absence of contamination. Results will be compared to site specific cleanup levels established in the interim action work plan
Specify Performance or Acceptance Criteria	The tolerable limits of uncertainty regarding the cleanup of contamination at the site will be based on exceedance or non-exceedance of cleanup levels. Tolerable limits on analytical results are determined by the Quality Assurance/Quality Control (QA/QC) criteria defined in this plan.

DQO	Description
Develop the Plan to Obtain Data	Presented in this plan.

2.3.2 Data Quality Indicators

Data quality and usability are evaluated in terms of performance criteria. Performance and acceptance criteria are expressed in terms of data quality indicators (DQIs). The principal indicators of data quality are precision, accuracy, bias, sensitivity, completeness, comparability, and representativeness. Table 2-3 provides a description of project DQIs.

Table 2-3
General Description of DQIs

DQI	Description
Precision:	A measure of agreement among repeated measurements of the same property under identical conditions. Usually assessed as a relative percent difference (RPD) between duplicate measurements. RPD guidelines for laboratory duplicate analyses are contained in the standard operating procedures (SOPs) for each analytical method and will be obtained from the laboratory for validation purposes.
Accuracy:	A measure of the overall agreement of a measurement to a known value. Analytical accuracy is assessed as percent recovery from matrix spike or reference material measurements. Percent recovery guidelines are contained in laboratory SOPs for each analytical method.
Bias:	The systematic or persistent distortion of a measurement process that causes error in one direction. Usually assessed with reference material or matrix spike measurements. Bias as reported by the laboratory will be used to assess data validity.
Sensitivity:	The capability of a method or instrument to meet prescribed reporting limits. Assessed by comparison with risk-based reporting limits, method reporting limits, instrument reporting limits, or laboratory quantitation limits, as appropriate. In general, reporting limits for the analytical methods used will be at or below applicable criteria.
Completeness:	A measurement of the amount of valid data needed to be obtained for a task. Assessed by comparing the amount of valid results to the total results set. Project requirements for completeness are 90%.
Comparability:	A qualitative term that expresses the measure of confidence that one data set can be compared to another. Assessed by comparing sample collection and handling methods, sample preparation and analytical procedures, holding times, reporting units, and other QA protocols. To ensure comparability of data collected to previous data, standard collection and measurement techniques will be used.
Representativeness:	A qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variation at a sample point, or environmental condition. To ensure representativeness, the sampling design will incorporate sufficient samples so that contamination is detected, if present. Additionally, all sampling procedures detailed in this plan will be followed.

2.4 SPECIAL TRAINING AND CERTIFICATION

All personnel conducting sampling activities on the project site must be 40-hour Hazardous Waste Operation (HAZWOPER) trained per 29 Code of Federal Regulations (CFR) 1910.120 and be current with their annual 8-hour refresher course.

All personnel working at the project site will be briefed on potential site hazards, health and safety procedures, and sampling procedures. Following completion of this training, all personnel will be required to sign an acknowledgement form verifying that they have completed the task-specific training.

2.5 SAMPLING DOCUMENTATION AND RECORDS

Sampling documentation will be accomplished according to the procedures provided in Table 2-4.

Table 2-4
Sampling and Sample Handling Records

Record	Use	Responsibility/Requirements
Field Notebook	Record significant events and observations.	Maintained by field sampler/geologist; must be bound; all entries must be factual, detailed, objective; entries must be signed and dated.
Sampling Field Data Sheet	Provide a record of each sample collected (Appendix A).	Completed, dated, and signed by sampler; maintained in project file.
Sample Label	Accompanies sample; contains specific sample identification information.	Completed and attached to sample container by sampler.
Chain-of-Custody Form	Documents chain-of-custody for sample handing (Appendix A).	Documented by sample number. Original accompanies sample. A copy is retained by QA Manager.
Chain-of-Custody Seal	Seals sample shipment container (e.g., cooler) to prevent tampering or sample transference. Individual samples do not require custody seals, unless they are to be archived, before going to the lab for possible analysis at a later date.	Completed, signed, and applied by sampler at time samples are transported.
Sampling and Analysis Request	Provides a record of each sample number, date of collection/transport, sample matrix, analytical parameters for which samples are to be analyzed.	Completed by sampler at time of sampling/transport; copies distributed to laboratory project file.

2.5.1 Field Logs and Forms

A bound field notebook will be maintained to provide daily records of significant events and observations that occur during field investigations. All entries are to be made in waterproof ink, signed, and dated. Pages of the field notebook are not to be removed, destroyed, or thrown away. Corrections will be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction will be initialed and dated. Most corrected errors will require a footnote explaining the correction.

If an error made on a document is assigned to one person, that individual may make corrections simply by crossing out the error and entering the correct information. The erroneous information should not be obliterated. Any error discovered on a document should be corrected by the person who made the entry.

All field logs and forms will be retained in the project files.

2.5.2 Photographs

All photographs taken of field activities will be documented with the following information noted in the field notebook:

- Date, time, and location of photograph taken
- Description of photograph taken
- Reasons photograph was taken
- Viewing direction

Digital photographs will be reviewed in the field to assess quality and need to re-shoot the photograph.

2.6 REPORTING

Following completion of the sampling and analysis, the results will be included in brief reports, to be submitted annually by the City to Ecology. Reporting will include the following:

- Summary of field activities completed.
- Figures showing sampling locations.
- Summary of laboratory analytical results and a comparison to relevant regulatory criteria.
- Field log forms and sampling forms.
- Laboratory data sheets and the results of data review/validation.
- Recommendations for further sampling, if needed.

3.0 SAMPLING PROCESS DESIGN

3.1 SAMPLING APPROACH

Compliance monitoring after the cleanup will include existing monitoring wells with documented past impacts, as summarized in Table 3-1. A one-time sampling event of the Horse Creek stormwater facility will also be conducted.

Table 3-1A
Sampling Approach – Ground Water
INITIAL ROUND

Sample type	Sampling location	Sampling Frequency / Rationale	Analytes
Point of Compliance	BPMW-6 BPMW-2R* BC-10	Initial Round	Total petroleum hydrocarbons, diesel and oil range (TPH-D, TPH-O) Nitrate, manganese (soluble), sulfate, methane, alkalinity Volatile Organic compounds (VOCs) Semivolatile Organic compounds (SVOCs) Total and dissolved metals (arsenic, cadmium, chromium, lead, mercury) Field parameters: dissolved oxygen, redox potential, pH, conductivity, temperature, ferrous iron

Table 3-1B
Sampling Approach – Ground Water
SUBSEQUENT ROUNDS

Sample type	Sampling location	Sampling Frequency / Rationale	Analytes
Petroleum hydrocarbons – Ground Water			
Point of Compliance	BPMW-6 BPMW-2R* BC-10	Quarterly for two years, then modify based on results and consultation with Ecology Duration: 5 years BC-10 will be monitored for two quarters to confirm compliance, if results exceed cleanup levels, monitoring will be the same as other wells.	Total petroleum hydrocarbons, diesel and oil range TPH-D, TPH-O, nitrate, manganese (soluble), sulfate, methane, alkalinity. Field parameters: dissolved oxygen, redox potential, pH, conductivity, temperature, ferrous iron
Petroleum hydrocarbons – Storm Water			
1 sample upgradient of Site, 2 samples on Site	See Figure 2	One time event	Total petroleum hydrocarbons, gasoline, diesel and oil range, BTEX TPH-G/BTEX, TPH-D, TPH-O, HVOCs
Arsenic – Ground Water			
Point of compliance	BPMW-1 BPMW-6 BC-10 BC-11	Same as petroleum hydrocarbon, but with additional quarterly monitoring for two years if TPH decreases to be in compliance** BC-10 will be monitored for two quarters to confirm compliance, if results exceed cleanup levels, monitoring will be the same as other wells.	Total Arsenic Dissolved Arsenic Field parameters

* BPMW-2R is a replacement well to be installed 30 to 35 feet northwest of BPMW-2, which was located in the middle of the newly constructed Horse Creek and therefore decommissioned.

** If compliance monitoring from the Site shows that the arsenic remains at elevated concentrations for eight quarters of monitoring, with no other detections of petroleum hydrocarbon or solvent contamination, this data can be used to demonstrate that the elevated concentrations represents a locally high natural

background for arsenic. Based on this evidence, a request can be made to remove the institutional controls for ground water at the site and discontinue monitoring.

Figure 1 shows the well locations; Figure 2 shows the storm water sampling locations. The objective of the ground water sampling is to confirm that all COCs have met cleanup levels in ground water. Cleanup levels are provided in the cleanup action plan. The initial round of sampling will include a wider suite of analytes, to confirm the COC list.

The objective of the storm water sampling is to confirm that soil or ground water from the site has not impacted storm water passing through the site.

Descriptions of the specific sampling methods for the above activities are presented in Sections 3.2. In addition, all sampling will be conducted in accordance with standard operating procedures.

3.2 SAMPLING METHODS AND PROCEDURES

Descriptions of the specific sampling and laboratory methods for the project are presented in this section.

3.2.1 Ground Water Sampling Procedures

Monitoring wells will be purged before sample collection to obtain ground water samples that are representative of the formation water rather than stagnant water from the well casing. Ground water that has occupied the well casing is often under oxidizing conditions, and thus may be chemically different from true formation water.

Monitoring wells will be purged and sampled using low-flow purging methods (Barcelona et al. 1994). Sampling staff will measure ground water levels to the nearest 0.01-foot using a decontaminated electronic well probe prior to collection of samples. Prior to collection of ground water samples, the wells will be purged by pumping a small volume of water to ensure sampled water represents aquifer conditions. The volume pumped will be determined in the field based on stabilization of field parameters: specific conductance, dissolved oxygen, and pH. Wells will be purged by very slowly lowering semi-rigid polyethylene tubing to a depth corresponding to roughly the midpoint of the screen, securing the tubing to prevent vertical movement, connecting it to a peristaltic pump, and then pumping at a rate not to exceed 0.5 liters/minute (0.132 gallons/minute). At a minimum, two pump and tubing volumes will be purged (1/2" I.D. tubing = 0.010 gallon/lineal foot). Samples from all wells will be collected once the parameter values have stabilized over the course of three sets of measurements as follows:

specific conductance	10 uS
dissolved oxygen	2 mg/L
pH	0.1

If a well can be pumped dry prior to reaching the desired purge volume, it will be allowed to recover prior to sampling, using the minimum time between purging and sampling that would allow collection of sufficient sample volume. Samples will be pumped directly into the appropriate containers, as provided by the laboratory. A Field Data Sampling Sheet (provided in Appendix A) will be filled out for each well. New tubing will be used for each well.

After collection, all samples will be labeled, chilled in a cooler to 4oC, and shipped to the testing laboratory for analysis. Full chain-of-custody and field documentation procedures will be employed, as described in Section 2.5. The laboratory will analyze the water samples for the constituents listed on Table 3-2.

3.2.2 Storm Water Sampling Procedures

As part of confirmation monitoring, storm water samples will be collected from the new Horse Creek facility in three locations, one upgradient of and two on the Site. Samples will be analyzed for TPH-G/BTEX, and TPH-Dx. Samples will be collected during a period of no major precipitation, to minimize the effects of stormwater runoff. Samples will be collected directly from the open channel portions of the stormwater facility, using precleared dipper bottles or the laboratory provided bottles for each analyte, making sure to not displace any of the preservative, if present.

Sample results from moving surface water are expected to have a high degree of variability. If the upgradient sample contains similar contaminants at similar (+/- 50%) concentrations to the on Site samples, it can be assumed that the contaminants are coming from upgradient sources, most likely urban stormwater runoff, and no further sampling or action will be taken. If results are ambiguous, additional sampling events will be conducted to obtain a more robust data set.

3.2.3 Sample Collection

When filling the sample bottles, the following procedures and precautions will be adhered to:

- Sample bottles will be filled directly from dedicated pump tubing or sampling ports with minimal air contact.

- Bottle caps will be removed carefully so that the inside of the cap is not touched. Caps must never be put on the ground. Caps for volatile organic compound (VOC) vials will contain a Teflon-lined septum. The Teflon side of the septum must be facing the sample to prevent contamination of the sample through the septum.

- The sampling team will wear appropriate nonpowdered latex or nitrile gloves (PVC or vinyl gloves can leave trace levels of phthalate or vinyl chloride). Gloves will be changed between wells or more often if needed.

- Tubing or hoses from the sampling systems must not touch or be placed in the sample bottles.

- VOC vials must be filled so that they are headspace-free. These sample bottles therefore need to be slightly overfilled (water tension will maintain a convex water surface in the bottle). The caps for these bottles will be replaced gently, to eliminate air bubbles in the sample. The bottles must then be checked by inverting them and tapping them sharply with a finger. If air bubbles appear, open the bottle, add more water, and repeat the process until all air bubbles are gone. Do not empty the bottle and refill it, as VOC bottles already contain preservatives.

- Sample bottles, caps, or septums that fall on the ground before filling will be discarded.

3.2.4 Water Level Monitoring

Samplers will measure ground water levels at each of the monitoring wells at the start of each sampling round in order to monitor changes in seasonal or long-term water elevations and ground water flow directions.

3.2.5 Sample Containers, Preservation, and Holding Times

Table 3-2 provides a summary of sample analyses and specifications for containers, preservation, and holding times. The analytical laboratory will provide the sample containers and necessary preservation.

Table 3-2
Sample Containers, Preservation, and Holding Times

Analysis	Method	Matrix	Container	Preservation	Holding Time
TPH-Dx	NWTPH-Dx	Water	(2) 500mL amber	HCl pH<2 Cool to 6°C	14 days to extract, 40 days to analyze after extraction
Nitrate	EPA 353.2	Water	(2) 500 ml HDPE	Cool to 6°C	48 hrs to analyze
Alkalinity	SM 2320B	Water		Cool to 6°C	14 days to analyze
Sulfate	ASTM D516-07	Water		Cool to 6°C	28 days to analyze
Methane	RSK 175	Water	(3) 40mL glass vial (VOA)	HCl pH<2 Cool to 6°C	14 days to analyze
Manganese (dissolved)	EPA 6010D	Water	500mL HDPE	Field filtered HNO3 pH<2 Cool to 6°C	6 months to analyze
Arsenic (dissolved)	EPA 200.8	Water			6 months to analyze
Arsenic (total)	EPA 200.8	Water	500mL HDPE	HNO3 pH<2 Cool to 6°C	6 months to analyze
HVOCs	EPA 8260	Water	(3) 40mL glass vial (VOA)	HCl pH<2 Cool to 6°C	14 days to analyze
VOCs	EPA 8021/8260	Water	(3) 40mL glass vial (VOA)	HCl pH<2, 6oC	14 days to analyze
SVOCs	EPA 8270	Water	1 liter amber	Cool to 6oC	7 days to extract, 40 days to analyze after extraction

3.2.6 Decontamination Procedures

Decontamination of all non-disposable tools and equipment will be conducted prior to each sampling event and between each sampling location in accordance with the standard operating procedures. The following steps will be taken during decontamination of sampling equipment used during field investigations:

- Scrub with non-phosphate detergent (i.e., Alconox or similar)
- Rinse with tap water
- Rinse thoroughly with deionized water
- Allow to air dry and place in a new plastic bag for storage

3.2.7 Investigation-Derived Waste

Water – Well purge water will be filtered through an activated granular carbon filter and discharged to the ground, or collected and discharged to sanitary sewer.

Solid waste - All disposable sampling materials and personal protective equipment, such as disposable coveralls, gloves, and paper towels used in sample processing will be placed inside polyethylene bags or other appropriate containers. Disposable materials will be placed in a normal refuse container and disposed of as normal solid waste.

3.3 SAMPLE HANDLING AND CUSTODY

The following sections describe sample handling and custody procedures.

3.3.1 Sample Identification and Labeling

Prior to the field investigation, each sample location will be assigned a unique code. Each sample collected at that location will be pre-assigned an identification code using the sampling site followed by other specific information describing the sample. The sample numbering protocol is shown in Table 3-3.

Table 3-3
Sample Numbering Protocol

Sample designations	BP = Bothell Paint Site MW= Monitoring well DUP= blind duplicate sample
Examples	BPMW-1-030517: Monitoring well BPMW-1, collected on 03/05/2017 DUP-1-030517: Blind duplicate collected on 03/05/2017

3.3.2 Sample Storage, Packaging, and Transportation

Samples will be placed in a cooler following collection and chilled to approximately 6ºC. Following completion of each days sampling, all samples will be transported and/or shipped to the analytical laboratory, as appropriate. Samples which are routinely delivered to the laboratory on the same day as collection may not have sufficient time to chill to 6ºC.

3.3.3 Sample Custody

The chain-of-custody procedures used for this project provide an accurate written or computerized record that can be used to trace the possession of each sample from the time each is collected until the completion of all required analyses. A sample is in custody if it is in any of the following places:

- In someone's physical possession
- In someone's view
- In a secured container
- In a designated secure area

The following information will be provided on the chain-of-custody form:

- Sample identification numbers
- Matrix type for each sample
- Analytical methods to be performed for each sample
- Number of containers for each sample
- Sampling date and time for each sample
- Names of all sampling personnel
- Signature and dates indicating the transfer of sample custody

All samples will be maintained in custody until formally transferred to the laboratory under a written chain-of-custody. Samples will be kept in sight of the sampling crew or in a secure, locked vehicle at all times. Samples that leave the custody of field personnel will be sealed by placing a signed and dated Custody Seal across the seam of the shipping container.

3.4 ANALYTICAL METHODS

All samples will be submitted to a commercial analytical laboratory certified by Ecology to perform the required analyses. Analytical methods are listed in Table 3-2. Laboratory reporting limits will be verified prior to analyses to ensure that, at a minimum, reporting limits for each analyte are equal to or lower than MTCA Method A cleanup levels. Matrix interferences may make it impossible to achieve the desired reporting limits and associated QC criteria. In such instances, the laboratory shall report the reason for noncompliance with QC criteria or elevated detection limits.

3.5 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC checks consist of measurements performed in the field and laboratory. The analytical methods referenced in Section 3.4 specify routine methods required to evaluate data precision and accuracy, and determine whether the data are within acceptable limits.

3.5.1 Field Methods

Guidelines for minimum samples for field QA/QC sampling are summarized in Table 3-4.

Table 3-4
Guidelines for Minimum QA/QC Samples for Field Sampling

Media	Field Duplicate	Trip Blank	Equipment Blank
Water	1 per batch, including other sites sampled during same event (Max 20 samples)	None – no volatile analyses planned	None – no reusable equipment

Field Duplicates

A minimum of one blind field duplicate will be analyzed per 20 samples, including other nearby sites (i.e., Bothell Hertz, Bothell Landing) sampled during the same event. Field duplicates will be collected following field samples. Duplicate samples will be coded so the laboratory cannot discern which samples are field duplicates.

Trip Blanks

No trip blanks will be collected because no volatile organic analyses are planned. Diesel range petroleum hydrocarbons and arsenic are unlikely to cause cross-contamination of samples.

Equipment Rinsate Blanks

No equipment blanks will be collected because no non-disposable sampling equipment will be used.

3.5.2 Laboratory Methods and Quality Control

Specific procedures and frequencies for laboratory QA procedures and QC analyses are detailed in the laboratory's QA Plan and SOPs for each method. QC analyses will be performed by the laboratory according to their Ecology-approved SOPs.

Accuracy and precision are determined through QC parameters such as surrogate recoveries, matrix spikes, QC check samples, and blind field duplicates. A blind field duplicate sample will be analyzed as a QC sample for verification of precision and accuracy. If results of the blind field duplicate are outside the control limits, corrective action and/or data qualification will be determined after review by the Data QA Manager or his/her designee. Blind field duplication can be of poor quality because of sample heterogeneity. Therefore, the Data QA Manager will determine corrective action. QC sample requirements are listed in Table 3-4.

All analyses performed for this project must reference QC results to enable reviewers to validate (or determine the quality of) the data. Sample analysis data, when reported by the laboratory, will include QC results. All data will be checked for internal consistency, transmittal errors, laboratory protocols, and for complete adherence to the QC elements.

3.5.3 Laboratory Instruments

All instruments and equipment used during analysis will be operated, calibrated, and maintained according to manufacturer's guidelines and recommendations, and in accordance with procedures in the analytical method cited, as documented in the laboratory QA plan. Properly trained personnel will operate, calibrate, and maintain laboratory instruments. Calibration blanks and check standards will be analyzed daily for each parameter to verify instrument performance and calibration before beginning sample analysis.

Where applicable, all calibration procedures will meet or exceed regulatory guidelines. The Data QA Manager must approve any variations from these procedures before beginning sample analysis.

After the instruments are calibrated and standardized within acceptable limits, precision and accuracy will be evaluated by analyzing a QC check sample for each analysis performed that

day. Acceptable performance of the QC check sample verifies the instrument performance on a daily basis. Analysis of a QC check standard is also required. QC check samples containing all analytes of interest will be either purchased commercially or prepared from pure standard materials independently from calibration standards. The QC check samples will be analyzed and evaluated according to the EPA method criteria.

Instrument performance check standards and calibration blank results will be recorded in a laboratory instrument logbook that will also contain evaluation parameters, benchmark criteria, and maintenance information. If the instrument logbook does not provide maintenance information, a separate maintenance logbook will be maintained for the instrument.

3.6 FIELD INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

The types of field instruments and equipment that are anticipated to be used during sampling include:

- Water level meters
- Sampling pumps
- Field parameter instrument (pH, dissolved oxygen, specific conductance, temperature, oxidation reduction potential

Equipment maintenance will be performed according to manufacturers' specifications. The frequency of inspection, testing, and maintenance will be established, based on operation procedures and manufacturers' specifications. Field personnel will be responsible for inspection, testing, and maintenance of field equipment. A hard copy of procedures and manufacturer's specifications will be provided to all field personnel working with the equipment. All equipment will be inspected and tested prior to use.

The results of inspection and testing, as well as any problems encountered and corrective actions, will be documented in the activity field notebook. The equipment serial number and date of activity will be included in notebooks so that a complete record is maintained. If problems are encountered, they will be reported to the Manager.

3.7 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Field supplies such as sample containers and trip/rinsate blank water shall be obtained from reputable suppliers and shall be certified analyte-free. Records of certification shall be kept by the laboratory (for laboratory-supplied supplies) or by the Owner's Representative in the project file.

3.8 DATA MANAGEMENT

The objectives of data management are to assure that large volumes of information and data are technically complete, accessible, and efficiently handled.

3.8.1 Field Data

The original hard (paper) copies of all field notes and laboratory reports will be stored in the project file. Photocopies of these documents should be prepared for working copies as needed.

Field data should be recorded in bound notebooks or individual sampling sheets. The field team members should review the field data for completeness prior to placing it in the files. All filed data will be digitized (scanned) to electronic media and placed in the project file.

3.8.2 Laboratory Data

The laboratory data reports will be archived in the project files. The electronic data will be incorporated into Excel spreadsheets and archived on electronic media and placed in the project file.

4.0 DATA VERIFICATION AND VALIDATION

Data verification is confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. Validation is confirmation by examination and provision of objective evidence that the particular requirement for a specific intended use have been fulfilled. Techniques for data verification and validation will be in accordance with the Guidance on Environmental Data Validation and Verification (EPA 2001b).

4.1 DATA REVIEW, VERIFICATION AND VALIDATION

All data packages provided by the laboratory must provide a summary of quality control results adequate to enable reviewers to validate or determine the quality of the data. The Data QA Manager is responsible for conducting checks for internal consistency, transmittal errors, and for adherence to specified quality control elements.

Field measurements (pH, dissolved oxygen, specific conductance, temperature, oxidation reduction potential) will be verified and checked through review of instrument calibration, measurement, and recording procedures.

A verification level validation will be performed on all field documentation and analytical data reports. The data validation process will be used to verify the data quality. The following QC elements will be reviewed, as appropriate:

- Trip blank results.
- Analytical holding times.
- Preparation blank contamination.
- Check standard precision.
- Analytical accuracy (blank and matrix spike recoveries and laboratory control sample recoveries).
- Analytical precision (comparison of replicate sample results, expressed as relative percent difference [RPD]).
- Each data package will be assessed to determine whether the required documentation is of known and verifiable quality. This includes the following items:
  - Field chain-of-custody record is present, complete and signed.
  - Certified analytical report.
  - QA/QC sample results.

Data will be qualified using guidance provided in the Contract Laboratory Program (CLP) functional guidelines for assessing data (EPA 1994a, 1994b).

The Data QA Manager will prepare a quality assurance text section for each report deliverable describing the results of the data validation and describing any qualifiers that are added to the data.

4.2 VERIFICATION AND VALIDATION METHODS

The Data QA Manager will review the following:

- Chain-of-custody documentation
- Holding times
- Trip blank results
- Field Duplicate results
- Method blank results

A limited review (minimum 10 percent) of the following laboratory QC data results will be conducted:

- Laboratory matrix spike/matrix spike duplicate (MS/MSD) and/or matrix duplicate results
- Laboratory surrogate recoveries
- Laboratory check samples

Based on this limited review, if the QC data results indicate potential data quality problems, further evaluations will be conducted.

4.2.1 Precision

Precision measures the mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. QA/QC sample types that measure precision include field duplicates, MSD, and matrix duplicates. The estimate of precision of duplicate measurements is expressed as a RPD (Relative Percent Difference), which is calculated:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2) \div 2} \; x \; 100$$

Where D1 = First sample value
D2 = Second sample value.

The RPDs will be routinely calculated and compared with DQOs.

4.2.2 Accuracy

Accuracy is assessed using the results of standard reference material, linear check samples, and MS analyses. It is normally expressed as a percent recovery, which is calculated:

$$\text{Percent Recovery} = \frac{\text{(Total Analyte Found - Analyte Originally Present)} \times 100}{\text{Analyte Added}}$$

The percent recovery will be routinely calculated and checked against DQOs.

4.2.3 Bias

Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. Bias will be assessed with field duplicate and laboratory matrix spike samples, similar to that described for accuracy. Bias measurements are usually carried out with a minimum frequency of 1 in 20, or one per batch of samples analyzed, under the same sampling episode.

4.2.4 Sensitivity

Sensitivity expresses the capability of a method or instrument for meeting prescribed measurement reporting limits. Sensitivity will be assessed by comparing data reporting limits with applicable cleanup criteria and analytical or instrument method reporting limits.

4.2.5 Completeness

The amount of valid data produced will be compared with the total analyses performed to assess the percent of completeness. Completeness will be routinely calculated and compared with the DQOs.

4.2.6 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data will be comparable with other measurement data for similar samples and sample conditions. Comparability of the data will be maintained by using consistent methods and units.

4.2.7 Representativeness

Sample locations and sampling procedures will have been chosen to maximize representativeness. A qualitative assessment (based on professional experience and judgment) will be made of sample data representativeness based on review of sampling records and QA audit of field activities.

4.3 RECONCILIATION AND USER REQUIREMENTS

The Data QA Manager will prepare a text section for each report deliverable describing the results of the data review and describing any qualifiers that were added to the data. The QC section will also summarize the laboratory's QC criteria and will include recommendations on whether additional actions such as re-sampling are necessary.

4.4 DATA REPORTING

Reporting to Ecology is described in Section 2.6. Reporting from the laboratory to the consultant is described below.

All laboratory data packages will contain the following information:

- Cover letter
- Chain-of-custody forms
- Summary of sample results
- Summary of QC results
- Ecology Environmental Information Management (EIM) electronic data deliverable (EDD)

The minimum information to be presented for each sample for each parameter or parameters group:

Client sample number and laboratory sample number

- Sample matrix
- Date of analysis
- Dilution factors (as reflected by practical quantitation limits (PQL)
- Analytical method
- Detection/quantitation limits
- Definitions of any data qualifiers used

Additionally, sample weights/volumes used in sample preparation/analysis and identification of analytical instrument will not be reported but will be kept in laboratory records for future reference.

The minimum QC summary information to be presented for each sample for each parameters or parameter group will include:

- Surrogate standard recovery results
- Matrix QC results (matrix spike/matrix spike duplicate, duplicate)

- Method blank results

EIM EDDs will be in accordance with the most recent version of the results spreadsheet submittal capable of being quickly uploaded into the Ecology EIM database.

5.0 REFERENCES

Ecology. 1995. Guidance for Remediation of Petroleum Contaminated Soils. November 1995.

Ecology. 2007. Model Toxics Control Act Cleanup Regulations. Washington Administrative Code (WAC) 173-340. November 2007.

EPA. 1983. Methods for chemical analysis of water and wastes.

EPA. 1984. NEIC procedures manual for the evidence audit of enforcement investigations by contractor evidence audit teams. Technical Report EPA-330/9-81-003-R. U.S. Environmental Protection Agency, Washington, D.C.

EPA. 1986. Test methods for evaluating solid waste, 3rd edition. U.S. Environmental Protection Agency, Washington, D.C. November 1986, as updated.

EPA. 1994a. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. Office of Emergency and Remedial Response. USEPA, Washington, D.C.

EPA. 1994b. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. Office of Emergency and Remedial Response. USEPA, Washington, D.C.

EPA. 2001a. EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5, EPA/240/B-01/003, March 2001.

EPA. 2001b. Guidance on Environmental Data Validation and Verification. EPA QA/G-8.

EPA. 2002. Guidance for Quality Assurance Project Plans. EPA QA/G-5. EPA/240/R-02/009, December 2002.

EPA. 2004. Contract Laboratory Program (CLP) Guidance for Field Samplers. Appendix B. EPA/540/R-00003. August 2004.

EPA. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA QA/G-4. February 2006.

HWA, 2008a Phase I Site Assessment, Hertz Rentals Property, Bothell, WA.. Prepared by HWA Geosciences, Inc. October 8, 2008

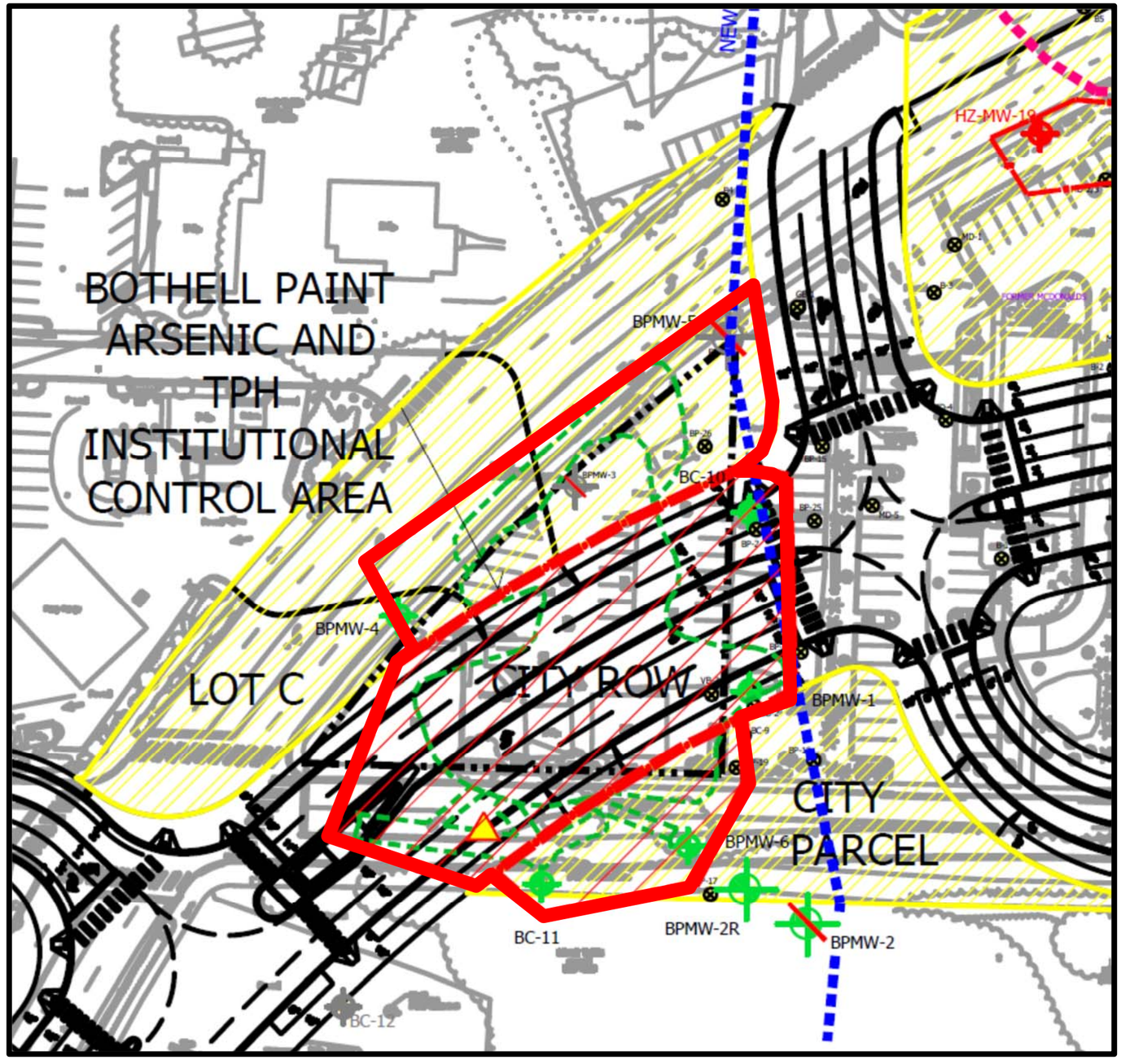
HWA, 2008b. Phase II Site Assessment, Hertz Rentals Property, Bothell, WA.. Prepared by HWA Geosciences, Inc. October 10, 2008

EXPLANATION OF SYMBOLS

- MW — AREA WIDE WELLS MONITORED
- UCCMW — ULTRA CUSTOM CARE CLEANERS WELL MONITORED
- MW — RIVERSIDE WELLS MONITORED
- MW — BOTHELL PAINT WELLS MONITORED
- MW — WELLS NOT MONITORED
- MW — DECOMMISSIONED WELLS
- SB — SOIL BORINGS
- CLEANUP CONFIRMATION SOIL SAMPLE > MTCA
- SOIL CLEANUP AREAS
- SITE
- HVOC PLUMES
- ORIGINAL PARCELS
- NEW PARCELS

N W E S

0 25 50 75 100



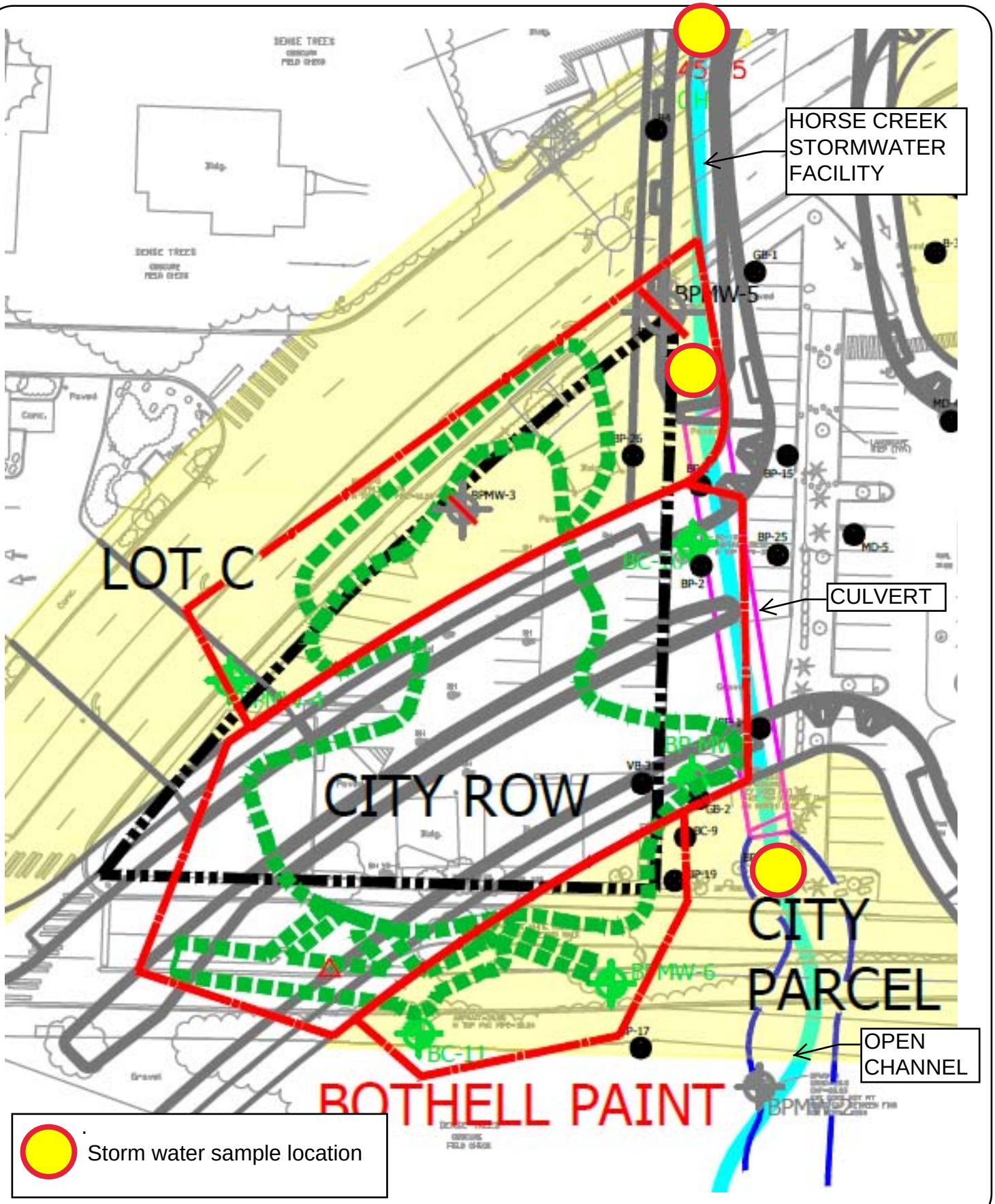
HWA GeoSciences Inc.

DETAIL OF SITE LOCATION

BOTHELL PAINT RI/FS
BOTHELL, WASHINGTON

FIGURE NO. **1**

PROJECT NO. 2007-098-T2020



HWA GeoSciences Inc.

PROPOSED STORM WATER SAMPLING LOCATIONS

BOTHELL PAINT SITE
BOTHELL, WASHINGTON

FIGURE NO. 2

PROJECT NO. 2007-098

APPENDIX A

OF COMPLIANCE MONITORING PLAN

Chain of Custody Form

Field Sampling Data Sheet

HWA GeoSciences Inc.
21312 30th Drive SE, Suite 110, Bothell, Washington 98021-7010
Tel 425.774.0106 Fax 425.774.2714 www.hwageo.com

Chain of Custody and Laboratory Anaylsis Request

DATE: _____
PAGE: ___ of ___

PROJECT NAME: _____ #: _____
SAMPLERS NAME: _____ PHONE: _____
SAMPLERS SIGNATURE: _____ DATE: _____
HWA CONTACT: _____ PHONE: _____

HWA SAMPLE ID	DATE	TIME	MATRIX	LAB ID	# OF BOTTLE

ANALYSIS REQUESTED

														EDD

TURNAROUND TIME
☐ DAYS
☐ STANDARD

REMARKS

PRINT NAME	SIGNATURE	COMPANY	DATE	TIME	REMARKS
Relinquished by:					
Received by:					
Relinquished by:					
Received by:					

DISTRIBUTION: WHITE - Return to HWA GeoSciences; YELLOW - Retain by Lab; PINK - Retain by Sampler

HWA GEOSCIENCES INC.
21312 30th Drive SE, Suite 110, Bothell, WA 98021
Tel: 425-774-0106 / Fax: 425-774-2714

FIELD SAMPLING DATA SHEET

Project Name: _____ Well Number:_____

Project Number:_____ Sample Number:_____

Project Location:_____ Weather: _____

Client/Contact:_____ Date:_____

WELL MONITORING:

Time	Pump Depth	Depth to Water	Measuring Point (TOC?)	Measuring Point Elevation	Water Level Elevation	Gallons in Well (Case Volume)

(2" dia=0.163 gal/ft)
(4" dia=0.653 gal/ft)

WELL PURGING:

Time	Method	Gallons	Case Volume	pH	Conductivity	Temperature	Dissolved Oxygen		

WELL SAMPLING:

Time	Sampling Method	Sample Analysis	Container Number	Container Volume	Container Type	Field Filtered (Y/N)	Preservative	Iced (Y/N)

COMMENTS/NOTES: (Include equipment used: Bailers, Filters, Well Probe, pH/Conductivity, Meter, etc.)

Total # of Bottles:_____ Sampler**:**_____ Signature:_____

EXHIBIT D

Bothell Paint & Decorating Facility
Schedule of Deliverables

Deliverables.	**Due Date**
Draft Institutional Control (IC) Plan; Draft Environmental Covenant(s); and a Title Report	Within 120 days after the effective date of the Agreed Order
Final IC Plan and Final Environmental Covenant(s)	Within 30 days of receipt of Ecology comments on the Draft IC Plan and Draft Environmental Covenant(s).
Record Final Environmental Covenant(s) with King County Auditor	Within 5 days after Ecology's approval of the Final IC Plan or Ecology's signature as grantee of the Final Environmental Covenant(s), whichever occurs last.
Start ground water monitoring	Within 90 days after final CAP is approved
Combined TPH/MNA/Arsenic ground water monitoring	Quarterly for two years, then modify based on results and consultation with Ecology Duration: 5 years unless a different action is triggered by the decision tree shown in table 1 of the dCAP
Combined TPH/MNA/Arsenic ground water monitoring reports	90 days after 4th quarter sampling Annually for a minimum of 5 years unless a different action is triggered by the decision tree shown in table 1 of the dCAP
Progress reports	Every 3 months unless Ecology authorizes less frequent reporting