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DEPARTMENT OF ECOLOGY

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August 6, 2018

Katie Moxley
Manager, Environmental Remediation
The Boeing Company
P.O. Box 3707
MC 9U4-26
Seattle, WA 98124-2207

**Re: The Boeing Everett Site
Final Decision to Submit a Supplemental Feasibility Study
Agreed Order DE96HS-N274**

Dear Ms. Moxley:

The Department of Ecology (Ecology) and The Boeing Company (Boeing) have been engaged in informal discussions on disputed issues related to completion of a Feasibility Study (FS) for the Boeing Everett site. Ecology is appreciative of Boeing's engagement throughout this process. In writing this letter, Ecology is clarifying its position on issues raised in the informal discussions and is bringing to a close the informal dispute process. Additionally, this letter communicates Ecology's determination that Additional Work is required under the Agreed Order – specifically, drafting a Supplemental FS report to complete the Remedial Investigation/Feasibility Study (RI/FS) process for the Boeing Everett Site.

Background

Boeing initiated informal dispute resolution by letter dated September 19, 2016 pursuant to Agreed Order No. DE 96HS-N274 (Agreed Order) to resolve several issues related to the upland FS for the Boeing Everett Site. Boeing invoked formal dispute resolution by letter dated September 8, 2017, when the parties were unable to come to an agreement. Following the start of formal dispute resolution, the parties agreed to pause the formal dispute resolution process and hold informal discussions. It has been almost two years since Boeing first invoked informal dispute resolution, which involved several meetings in a mutual effort to come to consensus. The informal discussions have afforded Ecology the opportunity to express our concerns regarding the need for additional trichloroethene (TCE) groundwater source area and downgradient treatment and to discuss Boeing's ideas for an additional downgradient groundwater remedy alternative. While the parties have made some progress on the disputed issues, and there may still be some points of



disagreement; it is important that Ecology make decisions that move the dispute resolution process forward and toward the initiation of field cleanup actions.

Ecology's action in bringing the informal dispute resolution to a close with this letter means that Boeing (if desired) may reengage in formal dispute resolution for the remaining disputed issues.

Outcomes from Discussion

Ecology and Boeing's informal discussions centered around the primary issues which were identified in the formal dispute resolution request¹. Those include Boeing's disagreement with (1) Ecology's requirement for inclusion of a remedy using bioinjections near the groundwater extraction and treatment (GET) system both on and off Boeing property, (2) application of a groundwater cleanup level throughout the site which is protective of the surface water cleanup level, and (3) Ecology's denial of use of conditional point of compliance for groundwater.

In our discussions on the first issue, Boeing responded to Ecology's concern that a remedy must address, as effectively and quickly as possible, the cleanup of all contaminated groundwater and the transport of contamination from the groundwater plume to surface water in the creek both on and off Boeing property, and that such a remedy should involve more than just continued operation of the current interim action groundwater extraction system. Boeing proposed a new groundwater remedy alternative not previous included in the Draft Feasibility Study. The proposed additional alternative consists of, in concept:

- Enhanced in-situ bioremediation (EISB) of the TCE groundwater source area; and
- Converting the existing interim groundwater pump and treat system to a dynamic groundwater recirculation (DGR) to treat all downgradient TCE groundwater.

Ecology would revise this proposed additional alternative by adding groundwater extraction and injection wells to the interior of the groundwater plume on Boeing and City of Everett property to maximize the effectiveness of the system. These additions will further minimize the amount of TCE groundwater discharging to the creek and reduce the groundwater restoration timeframe.

Ecology agrees in concept that the Boeing proposed additional alternative (with the additions suggested by Ecology) has the potential to be effective as source area and downgradient in-situ bioremediation both technically and from a cost perspective. We believe the Boeing proposed additional alternative (with the additions suggested by

¹ Boeing identified six primary issues in its formal dispute resolution request. Several of those issues were briefly discussed during the informal discussions and both parties agreed that once the more significant issues were addressed, an agreement could likely be reached on the remaining issues.

Ecology) should help further minimize the discharge of TCE (in groundwater) to the creek as well as reduce the groundwater restoration timeframe. Protectiveness, permanence of the remedy and restoration timeframe are significant factors Ecology will consider when evaluating this alternative in the Supplemental FS report. Ecology is willing to consider the DGR groundwater technology in lieu of in-situ bioremediation of all downgradient TCE groundwater. Ecology anticipates that EISB in the TCE groundwater source area concurrent with use of the DGR system, as modified by Ecology, in all downgradient TCE groundwater, will be its preferred treatment technology for groundwater at the Site – with the understanding that a final cleanup action plan for the Site is subject to review and comment by the Environmental Protection Agency (EPA) and the public, and Ecology may revise its approach (in consultation with Boeing) in response to those comments².

As part of the informal discussion on the second issue, Ecology reviewed with Boeing the preliminary groundwater cleanup level for the site. Under the Model Toxics Control Act (MTCA), groundwater cleanup levels are set using the criteria in WAC 173-340-720. For a Standard Method B potable groundwater cleanup level based on a drinking water beneficial use, the cleanup level must be at least as stringent as concentrations established in setting MTCA surface water cleanup levels (WAC 173-340-730) protecting surface water beneficial uses. *See* WAC 173-340-720(4)(b)(ii). For TCE, a cleanup level protective of drinking water would be set at 4 µg/L, while a cleanup level as stringent as the surface water cleanup level would be set at 0.3 µg/L. Based on its current knowledge, Ecology has determined that for this Site³, the 0.3 µg/L TCE cleanup level does not need to be met in groundwater throughout the entire Site. Ecology anticipates that groundwater throughout the site will meet a groundwater cleanup level protective of drinking water (4 µg/L TCE), and for the TCE contaminated groundwater area of the Site, the groundwater must meet a cleanup level as stringent as the surface water cleanup level (0.3 µg/L TCE) at one of four points of compliance within the contaminated groundwater body. As described further below, additional information is required before Ecology can determine which of the four locations at the Site to measure compliance with the 0.3 µg/L TCE cleanup level.

² Based on the previous Draft FS report that evaluated four groundwater treatment options: (1) Continued operation of the interim action groundwater pump and treatment system; (2) Source area EISB only; (3) Source area and downgradient in-situ chemical oxidation; and (4) Source area and downgradient groundwater EISB treatment. Ecology previously determined that options (1) and (2) did not meet WAC 173-340-360(2)(a) or (b) requirements and options (3) and (4) are roughly equivalent permanent cleanup options and expected to achieve relatively shorter restoration timeframes compared to other FS technologies evaluated and both rely more on destruction of the contaminant in-situ rather than dispersion and dilution. Ecology is now willing to accept DGR as downgradient groundwater treatment instead of EISB downgradient groundwater treatment. Ecology considers the EISB/DGR hybrid approach as a modified option (4) and equivalent to option (4) – Ecology's previously selected groundwater cleanup technology.

³ A determination by Ecology of the applicable cleanup standards for the Site will be document in the final Cleanup Action Plan. Until the Cleanup Action Plan is finalized, cleanup standards are considered preliminary. Final cleanup standards for the Site, as set out in the Cleanup Action Plan, are subject to review and comment by the EPA and the public and Ecology may revise its approach in response to those comments.

For the informal discussion on the third issue, while Ecology has not made a final decision on the location at which the 0.3 µg/L TCE cleanup level must be met, the agency can discuss with Boeing the four potential locations which Ecology has identified (*see* Attachment B, Figures 2a-2d). The information that Ecology is requesting in the Supplemental FS report will help the agency to determine which of the four options, is the appropriate location of the point of compliance for the groundwater cleanup level of 0.3 µg/L for TCE. In the Supplemental FS report review, EISB source area groundwater treatment and Ecology modified DGR downgradient groundwater treatment would be used equivalently in review of all four point of compliance location options to show which of the options meet the requirements of the MTCA (RCW 70.105D and Chapter 173-340 WAC).

Rather than amending the existing FS which has been submitted to Ecology, the agency is asking Boeing to provide additional information in a Supplemental FS report, after which Ecology can discuss with Boeing which site cleanup remedial alternatives should be written up in the draft Cleanup Action Plan⁴.

Additional Work under the Agreed Order

Under the terms of the Agreed Order, Section VII.6, Ecology has determined that Additional Work is necessary to complete work on an FS for the Site. This letter and Attachment A detail the work required and Ecology's basis for determining that a Supplemental FS report is needed. Boeing should notify Ecology within fifteen calendar days in writing of whether it is willing to perform the Additional Work or if Boeing would like a meeting with Ecology's Project Coordinator. If after the meeting Boeing disagrees with Ecology's request for Additional Work, then Boeing may invoke formal dispute resolution on that issue. If Boeing is not in disagreement, then it should submit a supplemental FS report to Ecology for review within thirty days.

If you have any regulatory or technical questions regarding the information in this letter or next steps for the Site, please contact Dean Yasuda at (425) 649-7264. If you have any legal questions regarding the information in this letter, please contact Ivy Anderson at (360) 586-4619.

Sincerely,



Raman Iyer
Section Manager
Hazardous Waste and Toxics Reduction Program

⁴ While Ecology may approve a Remedial Investigation and Feasibility Study for public review, the documents are not "final" until after EPA review and a public review and comment period. One option is for Ecology to public notice the RI/FS (including the Supplemental FS) before asking Boeing to complete a draft Cleanup Action Plan (dCAP). The other option is to public notice the RI/FS and dCAP together.

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Ivy Anderson, Assistant Attorney General, Attorney for Department of Ecology
Dean Yasuda, Ecology
Thea Levkovitz, Ecology
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Attachment A

Supplemental Feasibility Study-Scope of Work

The Supplemental FS report will evaluate a new remedial alternative for remediating groundwater contamination at the Site by implementing EISB at the TCE groundwater source area and converting the existing interim groundwater pump and treat system to a dynamic groundwater recirculation (DGR) to treat all downgradient TCE groundwater. The Supplemental FS report will also provide information regarding four potential locations for a groundwater point of compliance (Attachment B, Figures 2a-2d) to meet a cleanup level of 0.3 µg/L for TCE and how those location options do or do not meet the requirements of the MTCA (RCW 70.105D and Chapter 173-340 WAC).

Review of an Additional Remedial Alternative

The Supplemental FS report will include an evaluation of a new remedial alternative for compliance with the applicable requirements of WAC 173-340-360 (Selection of Cleanup Actions) including a detailed evaluation of the remedial alternative relative to the following criteria:

- Compliance with Cleanup Standards and Applicable Laws
- Protection of Human Health
- Protection of the Environment
- Provision for a Reasonable Restoration Time Frame
- Use of Permanent Solutions to the Maximum Extent Practicable
- The Degree to which Recycling, Reuse, and Waste Minimization are Employed
- Short-term Effectiveness
- Long-Term Effectiveness
- Net Environmental Benefit
- Implementability
- Provision for Compliance Monitoring
- Cost-Effectiveness
- Prospective Community Acceptance

Review of Locations for Groundwater Point of Compliance for a Cleanup Level of 0.3 µg/L TCE

WAC 173-340-350(8)(c)(i)(F) requires that an FS must evaluate use of a remedial alternative with a standard point of compliance compared to any conditional point of compliance options. Therefore, the Supplemental FS report shall evaluate use of the new groundwater remedial alternative to meet a groundwater cleanup level of 0.3 µg/L TCE using a “standard point of compliance” and each of the three conditional points of compliance (different locations as discussed below). Based on the results of the technical and regulatory evaluation in the Supplemental FS report, Ecology is willing to consider use of a conditional point of compliance for the groundwater cleanup level of 0.3 µg/L TCE at the Site.

The options for a groundwater point of compliance for the second groundwater cleanup level are as follows:

- i. Groundwater “Standard Point of Compliance” throughout the TCE groundwater source area and throughout the downgradient plume (see Attachment B, Figure 2a);
- ii. Groundwater conditional point of compliance immediately downgradient of the TCE groundwater source area – on Boeing property (see Attachment B, Figure 2b);
- iii. Groundwater conditional point of compliance at the Boeing property boundary and within groundwater⁵ immediately upgradient of the creek on Boeing property (see Attachment B, Figure 2c); and
- iv. Groundwater conditional point of compliance immediately upgradient⁶ of the creek on Boeing property and City of Everett property (see Attachment B, Figure 2d).

The Supplemental FS evaluation of the four groundwater point of compliance options will need to look at the requirements and criteria in WAC 173-340-360 and options (ii) thru (iv) must meet all MTCA factors to qualify for a groundwater conditional point of compliance as set out in WAC 173-340-720(8)(c) and (d).

In summary, for completion of the FS requirement of the Agreed Order, Ecology is requiring Boeing to complete the following in a Supplemental FS report:

1. Using WAC 173-340-360, evaluate the new remedial alternative for groundwater contamination using EISB in the TCE groundwater source area and Ecology modified-DGR for all downgradient TCE groundwater contamination (on Boeing property and on City of Everett property) using the four groundwater points of compliance.
2. Include a Disproportionate Cost Analysis (DCA) looking at use of the new remedial alternative to meet all four potential groundwater point of compliance options to determine which of those are permanent to the maximum extent practicable under WAC 173-340-360(3).
3. Using the new remedial alternative, demonstrate under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level of 0.3 µg/L for TCE throughout the Site within a reasonable restoration timeframe (i.e, the Site qualifies for use of a groundwater conditional point of compliance).
4. Discuss how the factors in WAC 173-340-720(8)(c)(d) are met for use of an on-property and off-property conditional point of compliance.

⁵ This is defined by Ecology as a buffer zone in the groundwater adjacent to the creek, but not the transition zone where groundwater mixes with surface water, or where groundwater enters the creek.

⁶ This is defined by Ecology as a buffer zone in the groundwater adjacent to the creek, but not the transition zone where groundwater mixes with surface water, or where groundwater enters the creek.

Attachment B
Groundwater Point of Compliance Figures

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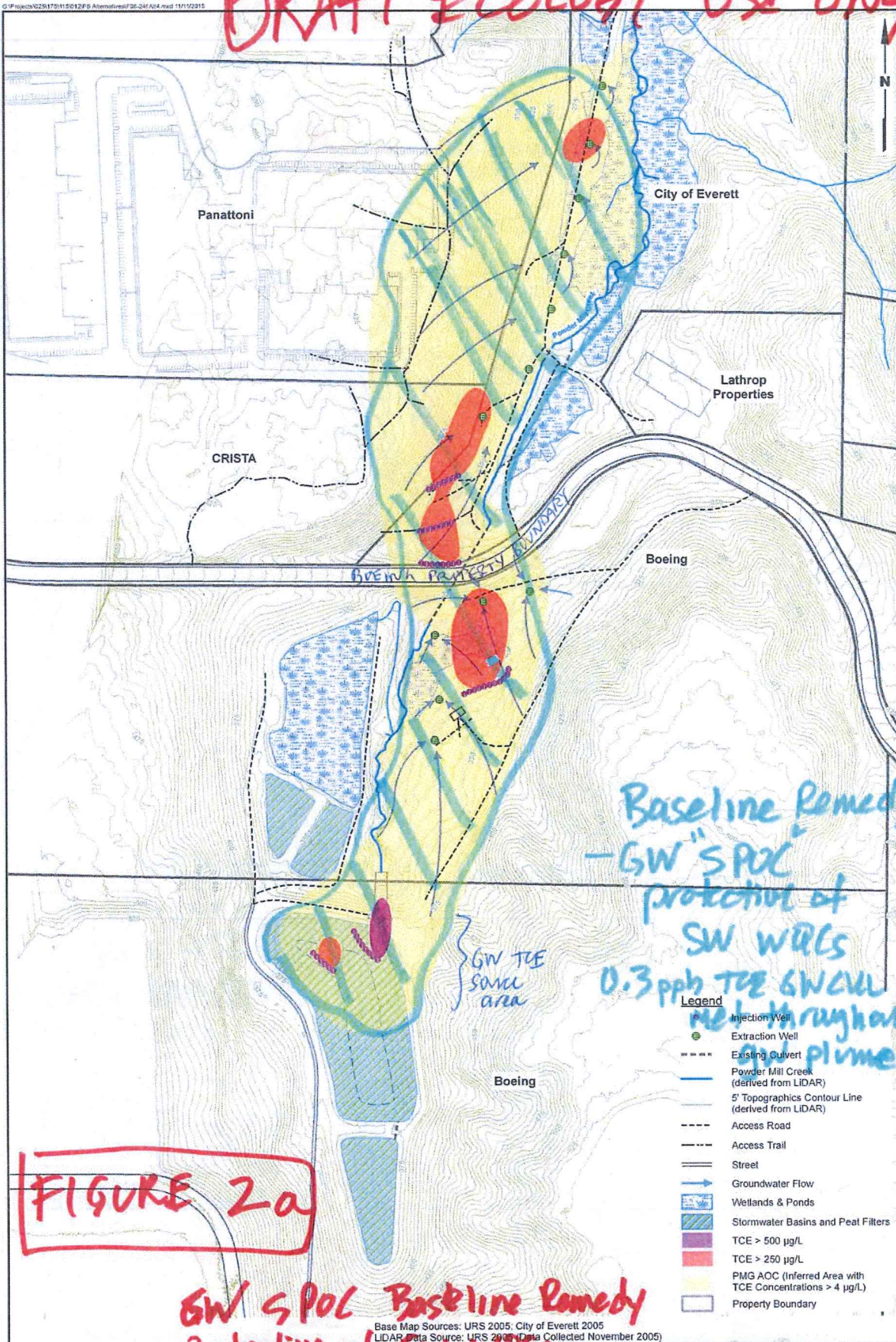


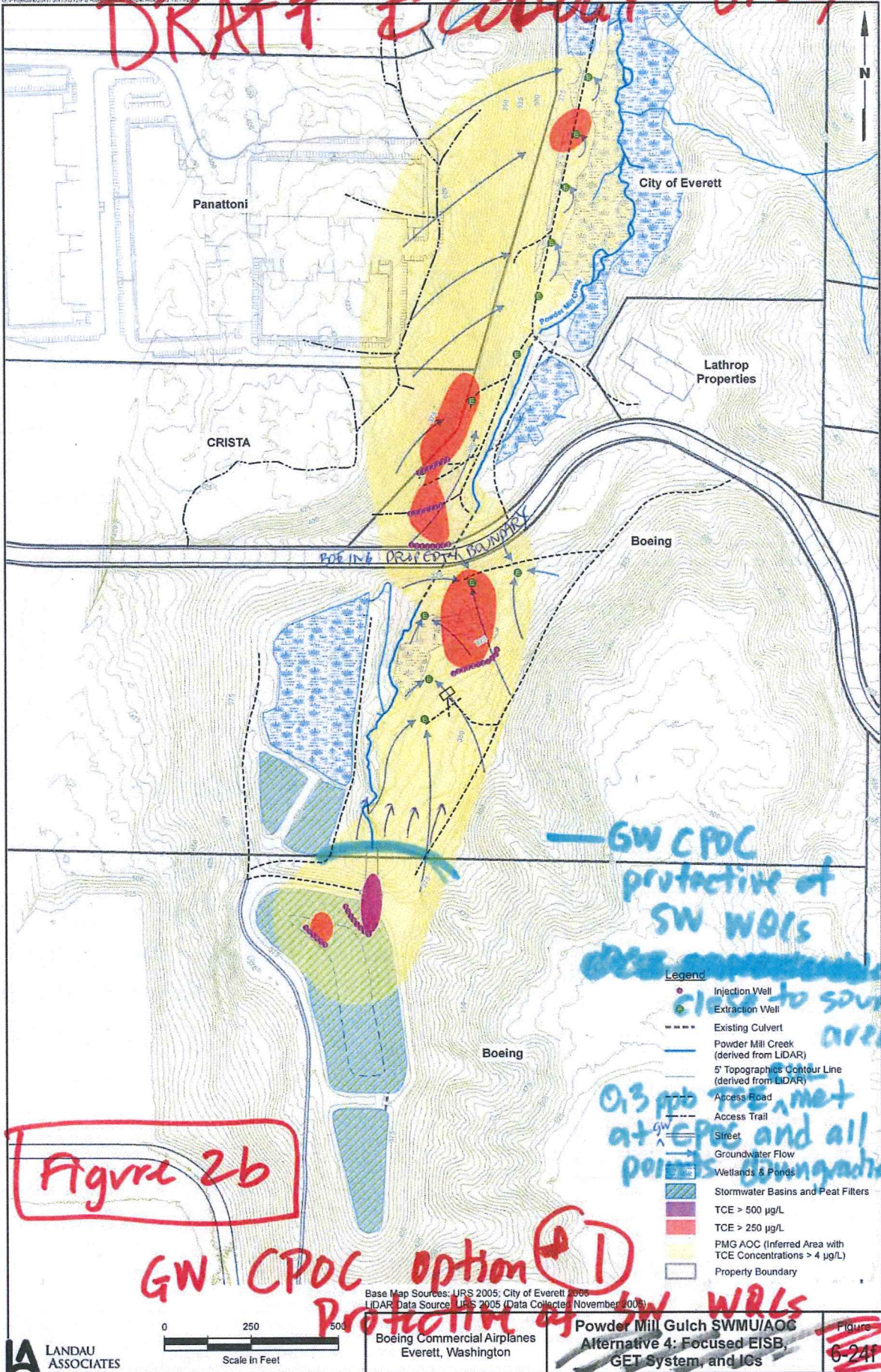
FIGURE 2a

GW SPOC Baseline Remedy
Protective of SW WALS

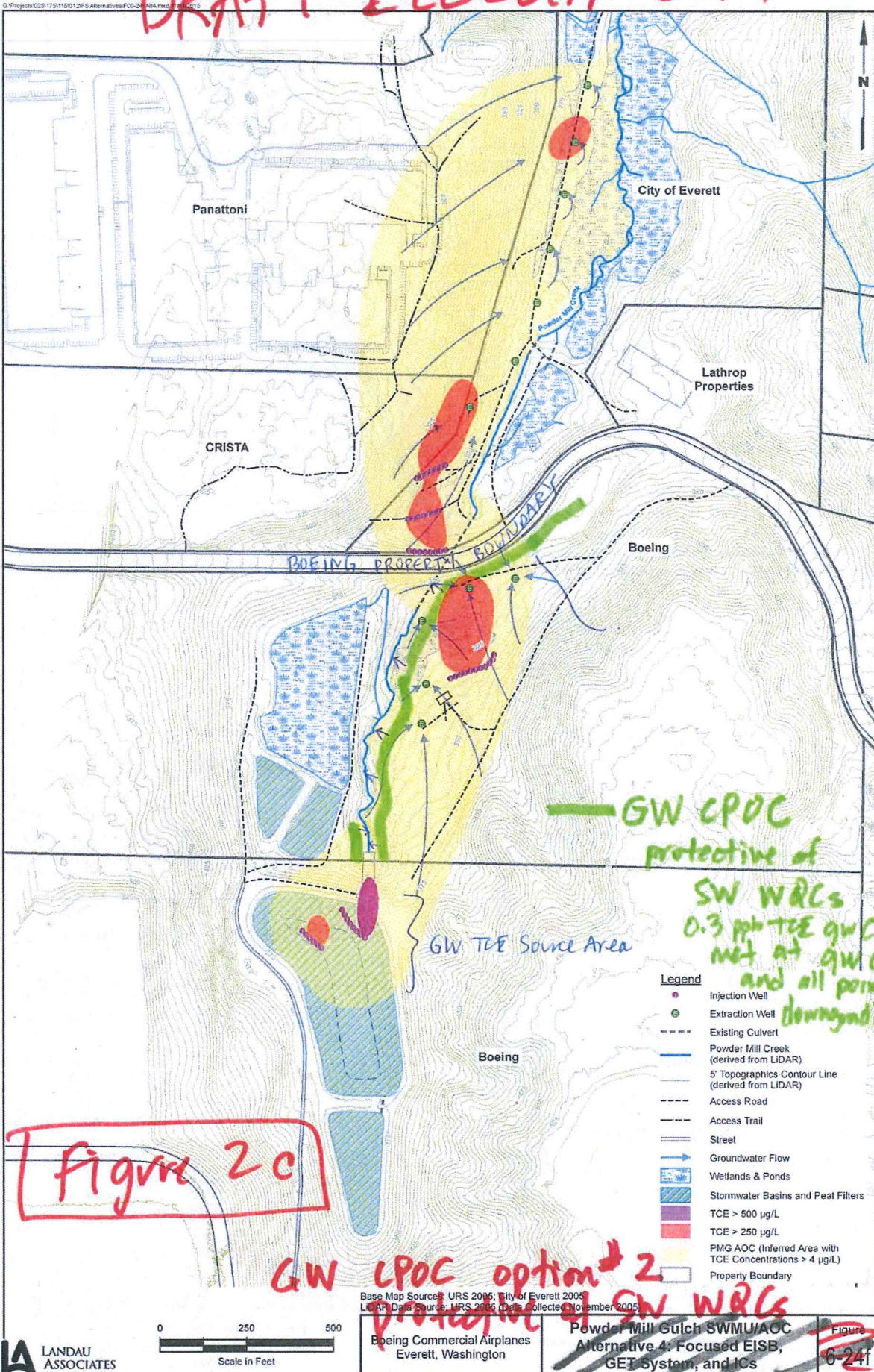
Baseline Remedy
- GW "SPOC"
protective of
SW WALS
0.3 pph TCE GWCL
throughout
plume

Base Map Sources: URS 2005; City of Everett 2005
LIDAR Data Source: URS 2005 (Data Collected November 2005)

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