

Memorandum



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From:

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Subject: Analysis of Potential Impacts from Sound Transit on
Mercer Slough

Project No.: 31723

This memorandum presents our findings regarding the potential wetland and habitat impact to Mercer Slough from two alignments of the Sound Transit East Link line relative to Mercer Slough in the City of Bellevue. Our analysis is based on the information currently available from the City and Sound Transit (ST) on the B2M alignment vs. B7 alignment of the ST rail line. Our scope of work included a task to analyze potential impacts to the Slough and its habitats using the Ecology Washington State Functional Assessment Method (WFAM) as an objective quantifiable tool to differentiate the effects of each alignment. In addition we were tasked with conducting a qualitative assessment of impacts based on our Best Professional Judgment (BPJ) and our knowledge of the Best Available Science of wetland ecosystem function.

Materials Reviewed

The following documents and plan sets were reviewed for this summary:

- Bellevue City Code in regards to Critical Areas
- CH2Hill; 112th Avenue Light Rail Options Concept Design Report; June, 2010
- National Wetlands Inventory web page for Mercer Slough
- NRCS (Natural Resource Conservation Service) on-line Soils Mapper for Mercer Slough
- Sound Transit, East Link Project. Draft EIS. December, 2008
 - Technical Appendices: G1 Drawings: Segment B: B-7 (10/16/08)
 - Technical Appendices: H3: Ecosystems Technical Report
- Sound Transit, Preliminary Engineering Plans: Segment B: I-90 and Bellevue Way SE Interchange to SE 6th St. February 26, 2010
- Washington State Dept of Ecology, Wetland Functional Assessment for Western Washington. July, 1999
- WSDOT. Interstate 90: Mercer Slough Bridges Geotechnical Report. October, 2005

Washington State Functional Assessment Method

The Washington State Functional Assessment Method (WFAM) was developed by Ecology (1999) as a tool to be able to quantify the potential and opportunity of a wetland performing a series of functions based on identifiable biological, physical, and chemical characteristics of the wetland and its watershed.

Ecology's WFAM page (<http://www.ecy.wa.gov/programs/sea/wetlands/wfap/index.html>) states, "The Wetlands Function Assessment Project was a statewide effort to develop relatively rapid, scientifically acceptable methods of assessing how well wetlands perform functions such as improving water quality, reducing floods, and providing wildlife habitat." The method was designed to provide a "rapid", quantifiable assessment of the functions a wetland may be able to provide.

Study Area

We started our assessment by first reviewing the technical guidance for the WFAM to determine how to assess a wetland complex as large as Mercer Slough. Our question revolved around the issue of whether or not to differentiate smaller assessment units within the Mercer Slough wetland complex or to assess the system as a whole. The guidance from Ecology's WFAM is clear: when assessing large wetland complexes, like the Slough, you only break the large complexes into smaller assessments units based on a distinction in the source of hydrology or the hydroperiod within the wetland. For example, if there is a large wetland complex associated with a river and part of the wetland gets most of its water from periodic flooding of the river, some of the wetland is right along the river and gets its water from the river directly; and some of the wetland is located a distance from the river and gets its water from seeps and springs coming down a valley wall.....then you would divide the large complex into three (at least) segments which you'd differentiate by their sources of water.

Our analysis of the Mercer Slough wetland complex is that the primary sources of hydrology are: the controlled water fluctuation of Lake Washington; input from Kelsey creek and other named and unnamed drainages and culverts that enter from the north, west and east sides; and precipitation. We assumed there was high probability that there may be relatively shallow groundwater that enters the complex beneath the existing road surfaces and fill prisms of 112th and 118th Avenue, however we did not have technical data to substantiate that, and we also assumed those sources were likely quite modest compared to the influences of the lake and culverted flows. We also did not have sufficient data, nor was there any particular evidence that the sources of water from Kelsey Creek or the upper dredged Slough was able to be differentiated from the Lake's influence.

By evaluating the known existing conditions of Mercer Slough we could not justify any rationale for sub-dividing the Slough wetland complex into smaller segments or assessment units. We did not have any source of sufficiently refined data to inform such a hydrologic distinction. Therefore following the guidance of the Ecology WFAM we determined the entire Slough complex to be one wetland.

The boundary of the Slough, for our analysis was 112th and Bellevue Way on the west; SE 8th on the north; 118th on the east; and south to include the wetland habitats south of I-90 to Newport Shores. We did not include the wetland complex associated with Sturtevant Creek, north of SE 8th.

Wetland Functional Assessment

We ‘ran’ the WFAM informally simultaneously on the existing and proposed conditions to determine whether or not the outcomes would differentiate the presence of either alignment. In other words, we verbally walked through each question, answering them for “existing”, B2M, and then B7, sequentially. We confirmed that the answers to the WFAM questions did not vary regardless of the chosen alignment, nor did they vary from existing conditions.

As predicted in our earliest conversations with City staff, some Council members, and the Mayor, the WFAM assessment tool has proven to not be of fine enough resolution to discern changes to functions from pre to post project conditions. The anticipated impacts are very small relative to the size of the wetland complex, and the impacts are generally located on the outside edges of the wetland. The WFAM was never intended to be a tool to be used to assess potential impacts to a wetland. We agreed to try to apply it in this context as a means to attempt to illustrate, objectively, the potential effects of the various ST alignments in a quantifiable manner with a methodology that was regionally accepted. We ran our comparison rapidly in an effort to not waste time or budget on the process; therefore we did not complete all the forms and data entry necessary to generate numeric values for our findings...but more simply, we noted that as we asked each question from the WFAM and answered it from the perspective of each Alternative, the answers did not vary.

One note of ‘caution’ regarding assessing the wetland complex in Mercer Slough for ratings, impact assessments or for compensation actions. We noted that in the DEIS (pg. 4.8-7, Table 4.8-1) the authors called out individual wetlands within the Mercer Slough complex (e.g., WR1, WR2, etc). This notation is carried into the DEIS from Technical Appendix H: Ecosystem Resources. Technical Appendix H, in Section 4.3 Wetland Resources mischaracterizes Mercer Slough as having different “subsets” of wetland within it. Ecologically the Slough is one wetland complex; it is comprised of multiple Cowardin vegetation classes; however there is no rationale for dividing the Slough into distinct and separate individual wetlands. In addition the Technical Appendix mis-identifies portions of Mercer Slough as a “bog”. Mercer Slough wetland may contain species of plants such as Labrador tea and even sphagnum which are commonly found in bog communities; and it has peat soils which are remnant from the pre-Chittendon Locks era of Lake Washington. However the existing wetland complex is not a bog; in spite of having some features which are remnant from historic conditions from nearly 100 years previous. Lastly the Technical Appendix provides “functional ratings” of the “individual” wetlands within Mercer Slough; however it does not clearly identify what rating system or method was used to devise the numeric values of functions. One may surmise that it is Ecology’s Wetland Rating System, but in the text that is not clearly evident. By dividing the Mercer Slough wetland complex into multiple individual wetlands,

and attributing characteristics to some of those wetlands (e.g. “bog”), the ratings which have been provided may be skewed.

In addition Figure 4.8-1 in the DEIS misrepresents the presence and extent of wetland within Mercer Slough in three very significant areas. Along I-90, in the location of the expected crossing of Alternative B7, the Figure indicates the majority of the habitat immediately north of I-90 as “Urban Mostly Vegetated-Deciduous Forest”. It is wetland and it would be directly impacted by the B7 alignment. Also, immediately south of the intersection of Bellevue Way and 112th; on the east side of the road, the Figure also maps this zone with the same, non-wetland designation, as well as east of the South Bellevue Way Park and Ride lot. In addition, the Figure indicates the entire area within the Bellefield Office Park as not wetland. At the time of our field work in late July, 2010, roads within the office park were closed due to flooding, there was standing water in many of the ‘open spaces’ between paved roads and parking lots; and soils remained as organic peats with wetland plants dominating in those areas not maintained as lawn or landscaping. None of these zones are mapped as wetlands. It is understood that the information in the DEIS is not used for permit decisions; however, it should be noted that the estimates of wetland impacts for either Alternative cannot be considered accurate until the wetland edges are determined to be accurate by the City of Bellevue and the Army Corps of Engineers who issue a Jurisdictional Determination.

Best Professional Judgment Analysis

After our attempt at using the WFAM, we conducted a comparison of the B2M and B7 alignments based on the materials that are available, and our best professional judgment of wetland function, buffer function, and potential of impacts from anticipated construction impacts. Out of necessity we have had to assume certain conditions for construction and alignments (particularly for B7). Please see the discussion in the Discussion Section, below.

Data Availability and Extent of Designs

Our ability to compare/contrast the implications of the two alignment Alternatives is informed and limited by the type, quality, and extent of design and analysis information that is available for our review. Alternative B2M is at approximately 15% design completion. The February, 2010 Preliminary Plan set provides some detailed engineering, cross-sections and plan views of the proposed grades, delineated wetland boundaries, notations regarding presence of shallow groundwater, anticipated elevations of the structures relative to existing grades, and areas of wetland impacts.

The 2008 DEIS provides conceptual alignments for Alternative B7 with estimated ‘standard’ cross-sections; estimated extent of Right-of-Way and construction limits; and estimated route alignment. These concepts would be considered to be at or less than %5 complete in engineering terminology: meaning that they are conceptual alignments only, with very little benefit of detail technical data to inform the design or the reader. Please note, this is not a criticism of this Alternative; this is a ‘design

standard' for a project of this complexity with this many Alternatives to consider. Please see the Discussion Section for further discussion of this topic.

Our comparative analysis therefore was between one plan set developed to roughly 15% completion with some additional technical information (e.g., surveyed delineated wetland boundaries, some geotech borings and groundwater data, detailed topography, plan and profile views of the anticipated structures, etc.) compared to a 5% or less concept with none of the technical backup that is provided for Alternative B2M.

Impacts

We have divided impacts into the following categories based on assumptions of future conditions and construction impacts. We have not provided a summary of wetland impacts (by square foot or by acre) in this analysis because we assume that the Army Corps of Engineers has not yet confirmed the delineations, and we believe that there may be areas within Bellefield office Park that are wetland which are not mapped as such on the drawings for B2M. We have assumed impacts based on the drawings we have at this stage; see the Discussion Section for further discussion regarding the likelihood of some of these impacts being avoided or minimized.

Permanent Direct Impacts:

Losses that will be caused by either construction, the physical presence of the structure, or ongoing operation of the ST alignment that will result in a permanent loss or reduction in acreage. Using the standard that WSDOT (Washington State Department of Transportation), Ecology and the Corps of Engineers have established for major highway projects, any construction impact that lasts longer than one growing season is considered permanent from the perspective of what compensatory mitigation needs to be provided. We will not discuss or assess whether any proposed compensatory mitigation would "mitigate" for these losses; that is outside the scope of our current work.

Permanent Indirect Impacts:

Changes to a physical process that creates or maintains a function in the wetland. These are not direct 'footprint' of fill or excavation impacts, but affects/changes that have a high probability of occurring *because* of the project. Examples would be the influence of shading on vegetation presence/absence or its richness/diversity; or a physical interruption or change in groundwater movement that could affect the presence/extent of wetland in future conditions.

Temporary Impacts:

Losses that are temporary in nature are those that are in place for only one growing season, or less. For example, a temporary bridge deck built in order to construct the permanent structure which is 'in the ground' from October Year 1 to October Year 2 would be considered 'temporary'. Any structure or alternation that affects wetlands for longer than one single growing season would be considered 'permanent' (see above).

Provided below is a summary of the issues identified from our evaluation to date of the February, 2010 plans for the B2M alignment and the DEIS descriptions of the B7, by Alignment. It should be understood that we are evaluating these alignments based on the available documents, which reflect a “point in time”. Thus, we have summarized “conclusions” here as to impacts...which may indeed be modified over the logical course of project design and refinement; please see the Discussion Section that follows this summary.

Alignment B2M

Permanent Impacts

- Acreage of wetland impacts from direct fill or cut from the construction of the alignment. It is assumed that all wetland impacts, as shown on the Feb, 2010 plan sheets, within the Construction Limits have a high probability of being permanently lost due to the project.
- Loss of wetland community types due to the need to cut down trees within the ROW to assure long-term operation of the trains. This aspect assumes that the wetlands in question may not be graded (filled or cut) but that the alignment passing over some habitats has a high probability of the forest being removed permanently.
- Acreage of lost mature upland forest and shrub buffer that may fall beneath an elevated portion of the alignment and not be permitted to regain full height and also loss in those areas where the alignment is constructed by cut/cover methods and it is assumed will not be permitted to be re-established forest over the ‘lid’ of the cut/cover alignment.(contrary to language in the DEIS, the buffer impacts cannot be mitigated in a “mitigation bank” offsite: the buffers have to buffer the wetland *in situ* to be functional....)
- Conversion of wetlands to stormwater ponds, as depicted on the February, 2010 drawings, may not be permitted by the regulatory agencies; but if approved, all such conversions would be assumed to be permanent loss of wetland. The portions of the February, 2010 plan sets we reviewed do not identify if these are proposed construction sediment ponds or permanent stormwater facilities.

Indirect Permanent Impacts

- Acreage of permanently lost wetland downslope of the alignment north of the blueberry farm buildings due to the interception of the groundwater that feeds and maintains these wetlands. Intercepting the springs (shallow groundwater) has a high probability of effectively dewatering the wetlands in an elongated stretch north from the Blueberry farm to the vicinity of 112th intersection. The February, 2010 plan sheets clearly indicate high-water tables in two distinct locations along the alignment, north of the Blueberry Farm. The wetland edge ‘climbs’ to an elevation of nearly 30 feet in these locations, corresponding to the high groundwater table that feeds the wetland from the west.

- Change in vegetation community composition caused by shading where the structure ‘comes down to earth’ in the vicinity of wetland or buffer habitats. This could result in a change in Cowardin classification of the wetland community in the impact area.

Alignment B7

Permanent Impacts

- Acreage of wetland impacts from direct fill or cut from the construction of the alignment. It is assumed that all wetlands, within the Construction Limits have a high probability of being permanently lost due to the project. This includes the direct ‘fill’ from each support pylon within the wetlands of the Slough. It also would include all the wetlands within the identified Construction Limits. The DEIS identifies that a temporary construction trestle would need to be built in order to construct the permanent structure. It is assumed that this structure would be 100 feet wide (the width the DEIS identifies as the Construction Limits and notes that the woody vegetation would be required to be removed) and would be less than 10 feet off the surface of the water or wetland surface (in order to effectively support the equipment necessary to install the auger cast piles for the permanent pylons). It is also assumed that this construction across the Slough would last more than one growing season; therefore it is assumed the impact would be considered permanent.
- Acreage of lost mature upland forest buffer beneath the permanent structure within the alignment. Trees beneath the future elevated structure may not be allowed to reach full mature heights to avoid physical contact with the elevated structure.

Indirect Permanent Impacts

- The height of the structure above the Slough on the B7 ‘south crossing’ has a high probability of not adversely affecting vegetation because the height will not lead to shading or physical height limitations of the vegetation.
- It is assumed that a stormwater pond would be required for the proposed 118th Park and Ride at the north end of this Segment and that SW pond would discharge into the Slough. It is not assumed that such a pond would be proposed to be built in the wetland as proposed on Segment B2M. Discharge from the SW pond may have some potential to cause adverse impacts to the adjacent wetland.
- Crossing of Kelsey Creek at lower elevations could shade riparian vegetation and create sharp shade/sunlight contrast which are inhibiting to the movement of various species of salmon smolts.
- The alignment of the tracks over the small wetland east of 118th, south of the proposed west-side park and ride could influence vegetation and wetland classes and therefore functions. Without more detailed information it is not appropriate to speculate on extent or type of impacts in this location.

Discussion

Communication with Sound Transit staff in the course of gathering and reviewing information on the proposed East Link Light Rail has informed the authors that Sound Transit has previously addressed some of the potential issues raised in this memorandum. We have chosen to not modify this memo based on that correspondence, but to include the existing analysis based on the publically available plans and documents identified in the beginning of the memo. As noted in the Discussion below, it is understood and assumed that Sound Transit will make modifications to the designs as they are progressed to avoid and minimize avoidable impacts. However our analysis must be based on information publically available at the time of our work in order to maintain the credibility of objectivity.

One cannot draw substantial conclusions in comparing and contrasting these two alignments and their potential to adversely impact wetlands for the following reasons:

1. The B2M alignment is far more developed from an engineering standpoint which means that there is far more detailed information available about the existing conditions and the potential of adverse impacts. It does not mean that this Alternative has more impacts; it means that this Alternative currently has more information which allows greater scrutiny.
2. Without detailed information regarding Alternative B7, one is left to postulate construction methods, extent of physical impacts, and duration of construction as a framework by which to postulate future conditions. This is an unsound and ill advised context to draw significant conclusions from.
3. It is not known if the current wetland delineation boundaries shown on the February, 2010 plan sheets have even been confirmed and accepted by the Corps and City of Bellevue. As noted, in our field work, we saw clearly that much of the un-built lands within the Bellefield Office park appeared to support wetland soils, hydrology, and vegetation...leading to a conclusion that much of that area may be wetland; as may the western edge of the dredged channels of the Slough in this location. Until the wetland edges are confirmed by the Corps, estimating impacts from physical alterations is an incomplete exercise.
4. Perhaps most significant in this exercise is an understanding of the 'typical' sequence of engineering design with extremely complex projects. We are currently looking at sets of drawings that represent a "moment in time" in the iterative engineering design process. Consider the example of the proposed B2M alignment intercepting shallow groundwater in the vicinity of the Bellevue Way/112 intersection. The current 15% design identifies that the proposed structure will intercept the shallow groundwater. One has to assume that one of two things will ensue: either the design team will recognize this situation and propose a means to avoid, minimize or rectify the problem as required by law (SEPA mitigation sequencing). OR, the reviewing agencies will recognize the potential adverse effects, and require ST's design team to redesign to avoid, minimize or rectify the potential dewatering of downstream wetlands. In either scenario, the current 15% designs do not represent an 'end product' but instead represent a stage in a long iterative process of design which is required to avoid and minimize adverse effects.

5. At this stage of design one cannot adequately assume which of the Alternatives would have the largest physical impact on the wetlands or which of those impacts could be 'mitigated' over time through appropriate design and implementation of effective restoration and enhancement actions within the Slough.