Parametrix ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

411 108th AVENUE NE, SUITE 1800
BELLEVUE, WA 98004-5571
T. 425 . 458 . 6200 F. 425 . 458 . 6363
www.parametrix.com

PMX# 553-1521-063 (09/02)

October 18, 2005

Lorraine Lai, Supervising Engineer
Project Management and Design Unit
King County Department of Transportation
Road Services Division
201 S. Jackson Street
Seattle, WA 98104-3856

Re: Addendum Tolt Bridge (#1834A) Replacement (CIP 200394) Biological Assessment/
NOAA Fisheries Reference No. 2003-01051/USFWS Reference No. 1-3-03-I-1911

Dear Ms. Lai:

This letter serves as an Addendum to the Biological Assessment (BA) for the Tolt Bridge (#1834A) Replacement (CIP 200394) project. The original Biological Assessment was prepared in July of 2003 and was submitted to National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and United States Fish and Wildlife Service (USFWS). NOAA Fisheries and USFWS issued their Endangered Species Act (ESA) concurrence for the BA on September 17, 2003 and February 13, 2004, respectively. Since that time, changes to the project design have occurred. These design changes have the potential to alter the location and magnitude of impacts on listed species from the proposed project. As required by ESA in cases where project elements have been altered since completion of informal consultation, the King County Department of Transportation Road Services Division (RSD) is reinitiating consultation with the Services on the proposed project by providing this Addendum. This document is intended to supplement and append the original BA and will address substantial changes in project design, timing, impacts, and mitigation. This Addendum will address the effects of the project on bull trout (*Salvelinus confluentus*) and designated critical habitat for bull trout, Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) and designated critical habitat for Chinook salmon, and bald eagles (*Haliaeetus leucocephalus*). In addition, we provide provisional effects determination for Southern resident killer whale (a marine species proposed for listing under the Endangered Species Act (ESA) subsequent to completion of consultation). Also, due to the fact that the Puget Sound/Strait of Georgia ESU coho salmon (*Oncorhynchus kisutch*) are no longer considered as a candidate species for listing under ESA (they are now classified as a federal species of concern), the provisional effects determination for this species is no longer applicable and potential project effects on coho salmon will not be discussed in this Addendum.

The RSD project team participated in a conference call with Jennifer Quan of USFWS, Sean Callahan of NOAA Fisheries, and Brian Bigler and Jim Laughlin of WSDOT on September 8, 2005 to discuss the project changes. The discussion focused on the additional in-water pile driving activities needed to complete the Tolt Bridge Replacement project including impacts, minimization measures, and potential effect determinations. Notes from the conference call were prepared by RSD and forwarded to the meeting participants.

During the conference call Ms. Quan and Mr.Callahan both felt that the Tolt Bridge replacement project, as proposed, was "on the fence" between formal and informal consultation unless the project team could reduce the anticipated pile driving sound impacts. Additionally, it was stated that the project would have fewer impacts if the number of piles was reduced and a shorter work window was available. At that time, the project team felt that the fewest number of piles possible had been proposed. The discussion ended with the conclusion that a formal consultation would need to be initiated to address the project impacts.

Since the meeting, the RSD project team further examined the in-water pile driving activities and was able to significantly reduce the related impacts. The Addendum has been revised and describes a number of methods that will be used to minimize impacts to fish species from pile driving, including:

- Implementation of air bubble curtains during impact hammer pile proofing
- Timing restrictions
- In-stream monitoring requirements
- Using a vibratory hammer for temporary pile installation and removal
- Limiting pile proofing with an impact hammer to a small subset of piles
- Limiting pile proofing to five minutes or less per pile proofing test
- Lowering the energy on the pile proofing hammer if fish are observed in the project area

The Addendum is organized by report section numbers that directly correspond to the section numbers from the July 2003 BA. For all sections of the BA that are not specifically referenced in this Addendum, it is implied that the information contained within that specific section of the July 2003 BA is still complete and accurate to the best of our knowledge (e.g., existing conditions).

Section 1 - Introduction

On April 21 2005, Parametrix requested updated PHS data from WDFW and updated information on rare and endangered plants from the WDNRs Natural Heritage Database. This information was received on May 12 and June 1, 2005, respectively, and indicated no changes in the reported locations of bald eagles from the previous BA. Likewise, the Natural Heritage Database records indicated the there are no reported rare plants or high quality native ecosystems within the project area.

Currently, USFWS provides a species list based on listed species that are present within the county where the project occurs. The majority of the species on the USFWS species list for King County were either not historically distributed within the action area and/or the action area does not contain suitable habitat to support these species. Therefore, those species will not be addressed in this BA Addendum. They include Canada lynx (*Lynx canadensis*), gray wolves (*Canis lupus*), grizzly bears (*Ursus a. horribilis*), marbled murrelets (*Brachyramphus marmoratus*), and northern spotted owls (*Strix occidentalis caurina*).

The NOAA Fisheries has also recently completed an update on the status review of Southern Resident killer whales (*Orcinus orca*) under ESA (NMFS 2004). Based on review of the best available data, NOAA Fisheries is proposing to list the Southern Resident killer whale distinct population segment (DPS) as threatened. Because of the project location (a freshwater river over 40 miles away from marine waters) and the project will not substantially degrade water quality, or result in significant impacts to any killer whale prey species (salmon), the project does not have the potential to present an adverse effect. If listed as threatened, the effect determination for Southern Resident killer whales would be "no effect" and this species will not be further discussed in the Addendum.

Section 2 – Description of Project Site and Action Area

Section 2.3 Aquatic Resources

Section 2.3.1-Snoqualmie River

The mainstem of the Snoqualmie River is not subject to frequent or rapid channel migration anywhere along its length. Even within the context of a relatively stable river, the channel reach in the vicinity of the proposed project has little history or tendency toward channel migration due to the presence of an alluvial fan from the Tolt River that confines the Snoqualmie River between the fan to the east and the west wall of the Snoqualmie River valley (Collins and Sheikh 2002).

In addition to limiting channel migration processes, the Tolt River and its alluvial fan also controls the longitudinal profile of the project reach. Sediment accumulation at the confluence of the Tolt and Snoqualmie Rivers has created a relative high point in the channel, creating a low-gradient, low-energy reach above the confluence. These dynamics within the project area reach, combined with the lack of significant sediment input sources, indicate the Snoqualmie River is carrying little to no coarse sediment in this reach, which therefore limits the possibility of in-channel sediment deposition and bar growth, along with the channel migration that results from the growth of such bars.

Section 2.3.2- Snoqualmie River Tributaries

In the course of completing additional fieldwork, it was discovered that Tributary 1 (located on the east side of the river, north of the existing and proposed bridges) has a second outlet channel that drains through Wetland 4 to the Tolt/Snoqualmie River confluence (see Figures 3). The channel is about 4 to 5 feet wide and flows through Wetland 4, part of which is inundated by impoundment by multiple beaver dams. It appears as if this outlet and the previously identified outlet on the Snoqualmie River (410 feet downstream of the existing bridge) each carry some flows to the mainstem Snoqualmie River. It is likely that the flow contribution of each of the outlet branches varies throughout the year based on rainfall, beaver activity, and flow levels within the Snoqualmie and Tolt Rivers.

Section 2.4 Wetland Resources

The original BA rated wetlands on the 1993 Ecology Rating System. This information has been subsequently updated and project area wetlands have been re-rated according to the 2004 Ecology guidelines (Hruby 2004) (Revised Table 2; Revised Figure 3). In addition, further field investigations indicated that Wetland 4 should be considered a Class 1 wetland based on the King County (2001) ratings system. This increase in rating class (Wetland 4 was previously reported as a King County Class 2 wetland) is due to the quality of the habitat present in the wetland, its connection to a riparian corridor, and its support of off channel habitat for fish during high flows. King County requires a 100-foot buffer on Class 1 wetlands.

Section 3 – Proposed Action and Biological Impacts

Section 3.1 Project Purpose

RSD has redesigned the structure for the Tolt Bridge replacement project. The previous design featured steel-plate girders. Due to RSD's recent experience with the procurement of steel plate girders for the Elliott Bridge replacement project currently under construction (this is a steel plate girder bridge very similar in design to the previous Tolt Bridge design), RSD decided to change the bridge design to a twin steel truss bridge. With the Elliott Bridge replacement project, the current and projected future high demand for structural steel is causing rapidly escalating costs and very uncertain delivery timeframes when procuring these types of girders. In order to minimize risk in terms of construction delays and material costs, RSD decided to build a bridge with steel parts that are more readily available for a much more predictable construction timeline. The project will likely be advertised in 2006, and opened to public use in 2007.

Revised Table 2. Wetlands in the Study Area, Tolt Bridge Replacement

Wetland	Size (Acres)[a]	Ecology Rating[b]	King County Rating[c]	Buffer (ft)[d]	USFWS Classification
1	1.07	IV	2	50	Emergent
2	>3.42 f	I	1	100	Forested/Scrub-Shrub/Emergent/Open Water
3	>0.24 f	III	2	50	Forested
4	>5.0 f	II	1	100	Forested/Emergent
5	0.04	IV	3	25	Emergent
6	0.04	III	3	25	Emergent

a Wetland size within the project area, as surveyed by King County.
b Hruby (2004).
c King County Wetlands Inventory (King County Environmental Division 1990).
d King County Sensitive Areas Ordinance (2001).
e Cowardin et al. (1979). All wetlands are Palustrine.
f Wetland continues off-site.

Section 3.3 Description of Proposed Action

Section 3.3.1- Primary Features

The project scope remains the same, although the designs of the bridge type and stormwater treatment facilities were revised and new flood compensatory storage was added. The scope still includes the replacement of the existing bridge with a new bridge, the realignment of the NE Tolt Hill Road and West Snoqualmie River Road NE intersection with a driveway; and the installation of a stormwater conveyance system and water quality facilities. The horizontal alignment for the twin steel truss bridge is the same as the previous steel plate girder bridge. The bottom of the structure will be a minimum of three feet above the 100-year flood elevation.

Change in Bridge Type: Steel Plate Girders to a Twin Steel Truss:

The redesigned bridge will be about 969 feet in length, approximately 117 feet shorter than the previous bridge design. The bridge redesign has also changed from a six-span, steel-plate girder, open-deck bridge to a five-span, twin steel truss and precast concrete girder bridge. Two 300-foot long steel trusses will span a wetland on the west side and the river. Three 120-foot long concrete girders will span the east side of the river (see attached Revised Plan Set). The truss portion of the bridge will be 47 feet, 5 inches wide while the concrete portion of the bridge will be 43 feet, 1 inch wide. The bridge is approximately four feet wider along the twin trusses than the previous bridge design. The bridge width will accommodate two 12-foot-wide lanes, two 8-foot-wide shoulders, and barriers with an open rail system. The proposed roadway width east and west of the bridge will accommodate two 11-foot-wide lanes and two variable width shoulders (from existing width to 8-feet-wide). Bicyclists and pedestrians will share the shoulders.

The previous design had 7 piers (they are numbered 1 to 7 from west to east), 3 piers were located on the west side of the river. The bridge redesign has six piers (they are also numbered 1 to 6 from west to east) to support the new bridge and its approaches, 2 piers will be located on the west side of the river. There are 4 piers on the east side of the river on both designs. All the bridge piers will be placed outside the ordinary high water mark (OHWM). The following describes specific changes in the bridge pier locations, from west to east (see attached Bridge Pier Layout Figure).

- Old Pier 1: The new bridge design eliminated the westernmost pier (old Pier 1).
- New Pier 1 (Old Pier 2): To reduce impacts to the Class 1 wetland on the west side of the river, the old Pier 2 was relocated from inside the wetland to 115 feet west to the wetland buffer and has been

renumbered to new Pier 1. Impacts to the Class 1 wetland are now reduced to impacts to the buffer of a Class 1 wetland. The new Pier 1 consists of two 6.5-foot-diameter drilled shafts. During its installation, to minimize impacts to the slope adjacent to Pier 1, tree cutting will be performed by hand while clearing and grading activities in the area will be done by mechanical equipment.

- New Pier 2 (Old Pier 3): The old Pier 3 has been moved about 15 feet farther west from the OHWM to reduce its encroachment on the river and has been renumbered to new Pier 2. The new Pier 2 will consist of two 8-foot-diameter oscillated drilled shafts.
- New Pier 3 (Old Pier 4): The old Pier 4 has been moved about 10 feet farther east to reduce its encroachment on the river and has been renumbered to new Pier 3. The new Pier 3 will consist of two 8-foot-diameter oscillated drilled shafts.
- New Pier 4 (Old Piers 5): The old Pier 5 has been moved about 86 feet farther west to avoid a Class 2 wetland and is now located within the buffer of the Class 2 wetland, the new pier has been renumbered to new Pier 4. The new Pier 4 consists of two 6.5-foot-diameter drilled shafts.
- New Piers 5 and 6 (Old Piers 6 and 7): The old Piers 6 and 7 have been moved about 84 feet farther west and has been renumbered to new Piers 5 and 6, respectively. The new Pier 5 is now located within the northern edge of a Class 2 wetland and the new Pier 6 is located at the east end of the bridge. Piers 5 and 6 both consist of two 6.5-foot-diameter drilled shaft.

Additional changes:

- The new bridge is approximately 117 feet shorter than the previous design, requiring additional fill in a Class 2 wetland and its buffer.
- Retaining walls will be used to minimize impacts to the wetland and buffer.
- Due to existing soft soil conditions, a temporary preload will be needed to consolidate the soils for the east side approach and roadway construction. The temporary preload footprint will extend about 20 feet beyond the permanent fill and retaining wall limits and will be in place for approximately five months.
- Temporary trestles and supports are also needed for the construction of the two steel trusses. (see Build Truss in Place Construction Impact Figures). One 440-foot long trestle will be on the left (west) bank on the north side of the new bridge, and will extend waterward by approximately 70 feet. The design plans show two possible locations for the temporary trestles on the right (east) bank to allow the contractor the flexibility to determine the best location for bridge construction. The east bank trestle will be a total of 90 feet long, of which 80 feet will extend waterward. Construction of temporary trestles and truss supports will involve pile installation landward and waterward of the OHWM. General timing for pile installation will be discussed in Section 3.3.3 below. Pile installation waterward of the OHWM will be discussed in more detail in Section 3.3.6.

Changes in Stormwater Treatment

The stormwater wetpond on the west side of the river was enlarged to a stormwater constructed wetland to provide better water quality treatment, which resulted in slightly more impact to the buffer of a Class 1 wetland (see Section 3.3.5 for more discussions).

Addition of Flood Compensatory Storage

In addition to the above changes, RSD has designed a mitigation site to provide additional storage to compensate for fill placed within the floodplain of the Snoqualmie River associated with the new bridge. The mitigation site is located east of the Snoqualmie River, between NE Tolt Hill Road and the Tolt River, just south of the Tolt River dyke access. The mitigation site is located within the buffer of Tributary 1. The mitigation site was chosen due to the limited locations available with appropriate elevations within close proximity to the project site.

3.3.3 - General Project Timing and Sequence

Construction is scheduled to begin in late spring of 2006 and be completed by the end of 2008. Three construction seasons are needed for construction of the new bridge and demolition of the existing bridge.

In general, initial construction activities in 2006 will include realigning West Snoqualmie River Road NE, and building a portion of the temporary trestle needed to erect Steel Truss 1. Once the temporary trestle is built, drilled shafts will be constructed to allow for the erection of Steel Truss 1. In the summer of 2007, the remaining portion of the west trestle along with Steel Truss 2, including in-river piles, bents, concrete form, and deck pour will occur. East approach work will begin in 2006 or 2007.

The new bridge is expected to be open to traffic in October 2007. Removal of the existing bridge is anticipated to occur in summer 2008. If necessary two temporary work trestles will be needed to remove the existing bridge and the east approach as discussed in the original BA Section 3.3.3.6.

Revised Figure 4 shows the anticipated construction schedule. This is only an approximate schedule and variations in work may occur due to contractor delays, difficulties with steel procurement, or adverse weather conditions. All in-water work windows and pile installation windows will be strictly adhered to. Specific in-water work windows for specific construction activities are as follows:

- Pile installation waterward of the OHWM for construction of the work trestles and temporary truss support (see details below) will be completed between June 1 and August 1. This work window corresponds to the time when nearly all smolts have migrated, and there are no or few adult salmonids expected to be present in the river's deeper slots or pools at this location (Pfeifer, personal communication, 2004).
- Pile installation landward of the OHWM within Wetland 2, tributary 3, and their associated buffers will be completed during April and May 2006. This work window is outside the wintering bald eagle window of November 1 to April 1.
- Temporary supports will be removed with a vibratory hammer and be completed by September 15, 2007.

3.3.5 – Stormwater Treatment Facilities

East side: On the east side of the river, approximately 76,000 square feet of impervious roadway stormwater runoff will be treated by a bioswale to be constructed under the existing bridge right-of-way and along the gravel parking lot to the north of the existing bridge. The bioswale will outfall to a conveyance channel more than 100 feet east of the OHWM. Scuppers and pipes on the bridge will collect approximately 7,200 square feet of the bridge surface, which will not be treated, and will outlet directly to the conveyance channel. To compensate for the untreated runoff from the 7,200 square feet of bridge surface, existing ditches along both sides of NE Tolt Hill Road, east of the construction limits will be regraded to discharge to the bioswale. A total of 77,000 square feet of impervious surface area will be treated, which is 1,000 square feet more than required. The conveyance channel outfall under the existing bridge has been improved and now incorporates coir fabric, willow stakes, and vegetation on the adjacent slope. Infiltration of treated stormwater was not considered feasible due to extensive clay soils present in the floodplain.

West side: On the west side of the river, approximately 37,000 square feet of impervious roadway stormwater runoff will be treated by a new stormwater constructed wetland to provide better water quality treatment.

Following completion of the project, RSD Maintenance staff will assume responsibility for maintaining the integrity of the bioswales, ditches and stormwater wetland in perpetuity.

3.3.6 - Construction Details

To form the shafts, a steel casing will be installed to the design depth using a drill rig with an oscillator. A support crane will likely be required to stabilize the casing. As the casing is advanced, a crane with a clamshell bucket or equivalent will be used to remove the earth material from within. Excavated material will be exported from the work area in dump trucks and disposed of at an approved facility. Water will also be removed from the casing and pumped to a Baker Tank and settled out. The water will be treated for pH. The treated water will be discharged into the existing storm drainage system on the west side of the project area or it will be pumped (sprayed) into the agricultural fields on the Foster Farm in accordance with Federal, State and local laws.

Once the casing is installed, a pre-assembled reinforced steel bar cage will be lowered into the hole using a crane and concrete pumped into the casing. The steel casing will be incrementally oscillated back out of the hole commensurate with the filling of concrete. Any additional water displaced by the concrete pour will be pumped to the Baker Tank and discharged as described above.

During the erection of Steel Truss 2, no more than 40 temporary piles will be installed in the river to support the temporary work trestles, and the new truss. Another truss erection option involves using a barge for temporary platform and supports.

To minimize impacts to fish species during the pile installation waterward of the OHWM, all temporary piles in the river will be installed using a vibratory hammer. Vibratory hammers have pairs of rotors with weights attached, using equal force to vibrate piles into place with an up and down motion. A small number of piles, approximately 15 percent (no more than 6 piles) will be proofed using an impact hammer. Pile proofing will be used only in those cases where using this method is absolutely necessary to ensure that the piles reach the appropriate load bearing capacity. To further reduce sound impacts during the pile proofing, contained air bubble curtains will be installed around each pile being tested (see Section 4.4.2 for more details). The energy of the impact hammer will also be lowered if needed. No pile driving will occur directly on the sloped banks of the Snoqualmie River. This will eliminate sedimentation from potential bank sloughing or slumping. Most likely, three to six of the piles associated with the support bents will be inaccessible for removal after the truss is in place. If these piles cannot be removed, then they will be cut off below grade. All other accessible piles will be removed using a vibratory hammer.

In order to protect the nearly vertical 7-foot bank on the east side of the river, a temporary support platform will be installed to distribute the loading from the oscillating equipment. Eight temporary, 18 to 30-inch-diameter piles will be driven during construction of the two-drilled shafts for Pier 3. Four piles will be driven per shaft, and four steel beams will connect the piles to form a temporary support for the oscillating equipment as shown in the attached Pier 3 Conceptual Oscillator Support Detail Figure. Two of the piles will be no more than 5 feet within the top of the riverbank. To further protect the bank from sloughing or slumping during pile installation, all piles will be pre-augured or vibrated in to below river bed elevation. A vibratory hammer will be used to remove all eight piles after Pier 3 is constructed.

Visual monitoring of the riverbank will be performed by a qualified geologist during this shaft construction including support pile placement and removal. If any signs or indications of bank failure appear, containment measures such as anchored turbidity curtains (silt curtains) will be installed to contain turbidity from entering the river through Pier 3 construction. Additionally, survey-monitoring points will be set up adjacent to this bank to monitor any lateral or vertical movement of the bank. After Pier 3 is constructed, if the bank is determined to be destabilized, then the riverbank near Pier 3 will be graded back and flattened to a 4:1 slope to avoid future possibility of bank failure. This regrading will start just above the OHWM and end approximately 25 feet upslope. Riverbank flattening, if required, will occur within the new 100-foot-wide right-of-way only.

In the original BA, RSD proposed cutting blackberries along the top of the east bank adjacent to mitigation areas. This method was chosen to avoid disturbing and destabilizing the nearly vertical 7 to 10-foot high riverbank. Maintenance of blackberry growth will be required through the required mitigation-monitoring period with this approach. Recent on-site meetings with permitting agencies resulted in the requested and probable required condition to remove the blackberry vegetation from the OHWM up and through the top of the riverbank adjacent to the east bank mitigation area. RSD will approach this blackberry removal requirement on an incremental and experimental basis by initially utilizing a Washington Conservation Corp work crew. A 50-foot-wide strip of riverbank from the OHWM landward will have blackberry removed by hand. Following blackberry removal, tensar fabric will be installed over the area where physically practical, and the area will be planted with suitable shrub vegetation.

This experimental approach will start in fall 2005 prior to the start of bridge construction. If this effort does not destabilize the riverbank over the winter flooding seasons of 2005-2006 and 2006-2007, then in the fall of 2007 (year 3), half of the remaining riverbank adjacent to the east side mitigation area will have blackberry removed and the area will be planted with suitable tree/shrub species. The same effort will be applied in fall of 2009 (year 5) to the remaining area, provided the riverbank where the blackberry was removed remains stable. If this riverbank blackberry removal process creates visible riverbank sloughing or failures, this removal effort will cease and the remaining blackberry on the riverbank will be left in place and be maintained by cutting along the top of the riverbank through the 5 or 10 year mitigation planting monitoring period. This proposal by RSD is subject to approval by the permitting agencies.

The floodplain storage excavation site will be accessed from an existing maintenance road located along the south bank of the Tolt River. An excavator will be used to remove the existing soil and loaded into trucks. All excavated material will be hauled offsite and disposed of in an approved facility and no stockpiled material will be left onsite. Subsequent to excavation, the floodplain mitigation site will be re-vegetated with appropriate native trees and shrubs.

Section 3.3.6.3 Removal of the Existing Bridge

Both existing bridge piers are concrete, which will be removed as part of the project. Both piers will be completely removed down to the mud line. Either a wire sawing or vibratory track hoe removal method will be employed as discussed in the original BA. If the existing concrete piers do not fracture exactly at the mud line, there is potential for riverbank material to be dislodged into the river during the removal operation. RSD proposes to isolate the work area and contain turbidity by installing anchored turbidity curtains (silt curtains), versus the sandbagged cofferdams or sheet piles that were previously proposed. The turbidity curtains are silt fencing type material that is anchored by a chain to the riverbed while floats hold up the top of the curtain. Any disturbed sediment will be contained within the curtains, and will be allowed to settle prior to removal of the curtains. This method has the advantage of containing sediment and turbidity, while not requiring driving sheet piles, dewatering or handling of fish. A containment system will be installed to prevent any materials from falling or dropping into the river as mentioned in the original BA.

Section 4 – Biological Impacts

The revised bridge design has three primary project components that have the potential to create new or additional biological impacts. These components, which are discussed in further detail below, are:

1. Changes in the vertical profile of the new twin truss bridge and changes in the pier layout, which will slightly alter the permanent and temporary impacts to wetlands and wetland/stream buffer areas.

2. The installation of temporary work trestles and truss support system during construction of the new twin truss bridge, activities which will require additional in-water work, including pile driving with a vibratory hammer and subsequent pile removal within the OHWM of the Snoqualmie River.

3. Due to the required construction methods for the new twin truss bridge, three to six of the piles waterward and potentially two piles landward may be left in place due to access issues, although these piles will be cut off at the ground surface/mud line.

4.1 – Wetland and Wetland Buffer Impacts, and
4.2 – Stream and Stream Buffer Impacts

Although the new twin truss bridge will be constructed on the same horizontal alignment as proposed for the previous steel plate girder bridge, the dimensions of the bridge are slightly wider and the bridge is shorter in length, resulting in a change in the impacts to project area wetlands, streams, and their buffers. Revised Tables 5, 6, and 8 list the new impact numbers.

Permanent impacts to wetlands increased by 1,726 square feet, including a increase of 199 square feet of fill and 1,527 square feet of clearing (Revised Table 5). Permanent impacts to wetland and stream buffers increased by 2,683 square feet (increased fill and clearing), as compared to the previous bridge design (Revised Table 6). In addition, temporary impacts to wetlands and wetland buffers decreased from the previous bridge design by 1,195 and 1,865 feet, respectively, while temporary impacts to stream buffers increased by 4,172 square feet (primarily due to excavation from the compensatory floodplain mitigation site). Overall, temporary impacts increased by 1,112 square feet to 63,725 square feet.

Revised Table 5. Wetland Impacts in the Tolt Bridge Replacement Study Area [a]

Wetland	Permanent Impacts in Square Feet			Temporary Impacts in Square Feet		
	Fill	Clearing	Total	Fill	Clearing	Total
1	356	7,215	7,571	19,462	0	19,462
2	0	10,513 [b]	10,513	0	12,697 [c]	12,697
3	–	–	–	–	–	–
4	–	–	–	–	–	–
5	–	–	–	–	–	–
6	–	–	–	–	–	–
Total	**356**	**17,728**	**18,084**	**19,462**	**12,697**	**32,159**

a Impact areas based on revised design footprint (King County, April 2005).

b Calculated impact for Wetland 2 includes permanent shading to Tributary 3.

c Temporary clearing impacts shown for Wetland 2 includes temporary shading to Tributary 3.

Revised Table 6. Wetland Buffer Impacts in the Tolt Bridge Replacement Study Area [a]

Wetland Buffer	Permanent Impacts in Square Feet			Temporary Impacts in Square Feet		
	Fill	Clearing	Total	Fill	Clearing	Total
1	3,028	4,727	7,755	7,185	0	7,185
2	3,726	7,791	11,517	0	11,148	11,148
3	—	—	—	—	—	—
4	11,863	—	11,863	—	—	—
5	—	—	—	—	—	—
6	410	0	410	—	—	—
Total	**19,027**	**12,518**	**31,545**	**7,185**	**11,148**	**18,333**

[a] Impact areas based on revised design footprint (King County, April 2005).

Revised Table 8. Stream Buffer Impacts in the Tolt Bridge Replacement Study Area [a]

Buffer	Permanent Impacts in Square Feet			Temporary Impact in Square Feet		
	Fill	Clearing	Total	Fill	Clearing	Total
Snoqualmie River, east bank [b]	100.5	5,038	5,139	5,549	1,384	6,933
Tributary 1	—	—	—	—	6,300	6,300
Tributary 2[c]	—	—	—	—	—	—
Tributary 3[d]	—	—	—	—	—	—
Total	**101**	**5,038**	**5,139**	**5,549**	**7,684**	**13,233**

[a] Impact areas based on revised design footprint (King County, April 2005).
[b] Buffer areas on the west side of the Snoqualmie River have been included with impacts to the Wetland 2 buffer.
[c] Temporary buffer impacts for Tributary 2 have been included in the Snoqualmie River temporary buffer impact calculations.
[d] Temporary buffer impacts for Tributary 3 have been included in the Wetland 2 temporary buffer impact calculations.

Section 4.3 – Pile Driving Impacts

Up to forty (40) steel piles will be driven waterward of the OHWM, using a vibratory hammer, to support a temporary work trestle to build the new bridge and to support the new truss during erection. The piles will be 18 to 30-inch diameter hollow core steel piles. This would result in a maximum of 206 square feet of temporary fill within the Snoqualmie River, which would remain for a maximum duration of four months during the summer fish window. An estimated 15 percent (or less) of the piles (6 maximum) will be briefly tested for bearing capacity (i.e., proofed) using an impact hammer for approximately five minutes per pile. Piles will be removed using a vibratory hammer.

In addition, 78 piles will be located within Wetland 2, Tributary 3, and their buffers west of the Snoqualmie River and eight piles will be used in the riparian zone on the east side of the river. Geologic conditions within the area allows the piles to be placed and removed using a vibratory hammer.

Data on how fish are affected by pile driving is limited and the specific impact on Pacific salmonids is poorly understood. However, initial indication is that sound levels associated with pile driving can modify fish behavior, create temporary and/or permanent hearing loss, increase stress levels, modify cellular physiological processes, result in rectified diffusion (the formation and growth of bubbles in tissue) and cause structural damage including hemorrhaging and rupture of internal organs (Hastings and Popper 2004; Longmuir and

Lively 2001; Stotz and Colby 2001; Vlahakis and Hubmayr 2000; Shin 1995; Feist et al., 1992). The resulting damage and/or death associated with pile driving may occur immediately or several days after exposure. Fishes with swimbladders (this includes salmonids) are sensitive to impulse sounds (sounds with sharp pressure peaks occurring over short time intervals). This sensitivity is due in part to swimbladder resonance that is believed to occur in the 200 to 600 Hz range (Caltrans 2002). When a pressure wave passes through a fish, the swimbladder is first squeezed and then expands in response to the varying pressure components of the sound wave. This repeated contraction and expansion may result in damage to a number of different internal organs.

Impact sounds are due to the release of energy as two objects collide with one another. The characteristics of the sound produced depends upon the mechanical properties of the objects impacting with each other. Pile installation creates sound (pressure) waves that radiate outward from their source propagating through the air, water column and substrate. Underwater sounds from pile driving are characterized by multiple rapid increases and decreases in sound pressure over time (Hastings and Popper 2005). The peak pressure is the highest absolute value of the measured sound wave and can be either positive or negative. The root mean square (rms) level is calculated by taking the square rout of the average of the squared pressures over the time period that comprises the portion of the waveform containing 90 percent of the sound energy (Illingworth and Rodkin 2001).

Sound energy is also used as a measure of the pressure waveform generated by pile driving. As a sound wave moves through the surrounding fluid, it pushes on the fluid causing it to move. This fluid motion is referred to as "acoustic particle velocity". If the sound passes through an aquatic animal, it will create forces and motions inside the organism's body (Hastings and Popper 2005). The damage potential of a sound wave depends on two factors, its energy level and duration. To evaluate the damage potential of sound having varying energy levels, the Equivalent Continuous Sound Level or L_{eq} is often used. To determine $L_{eq,}$ a sound source having variable energy levels is sampled repeatedly over a well defined period of time and the resulting information is averaged. This average value is the L_{eq} value. An alternative measure to L_{eq} is the sound exposure level (SEL). SEL is defined as the constant sound level acting for one second, which has the same amount of acoustic energy as the original sound (Hastings and Popper 2005). SEL is measured in dB (decibels) re 1 $\mu Pa^2/s$. SEL is often used as a measure of energy dosage as it is calculated by summing the cumulative pressure squared over time.

Based upon available information, NOAA Fisheries has established physical harm and behavioral threshold levels for pile driving. A 180 dB_{peak} threshold for physical harm and a 150 dB_{rms} (root mean square) threshold for behavior modification have been used by the agency in recent consultations.

Existing hydro acoustic monitoring data for pile driving is limited. However, current information indicates that pressures associated with pile driving tend to exceed NOAA Fisheries' established thresholds. The highest pressures are associated with the use of impact hammers for both peak and rms measurements. Nedwell and Edwards (2002) found that the use of vibratory hammers, which use pairs of rotors with weights attached, using equal force to vibrate piles into place using an up and down motion, could produce peak pressures that are 17 dB lower than those of impact hammers with the peaks being greater during hammer start-up and shutdown than during operation. Not only do the sounds from the two types of hammers differ in their intensities, but they differ in their frequency and impulse energy (rate of pressure rise) as well. Impact hammers have the greatest concentration of energy in the 100 to 600 Hz range, the frequency thought to be the most harmful to fish. In contrast, the greatest energy concentration from vibratory hammers is in the 20 to 30 Hz range. In addition, Carlson et al. (2001) found that the sound pressure created by an impact hammer rises much more rapidly than that created by a vibratory hammer.

Although the Nedwell and Edwards (2002) study indicated that peak pressure (192 dB_{peak}) generated during the start and stop of pile driving exceeded the threshold for physical harm, the study found that the use of vibratory hammers are less impacting on fish then impact hammers. In addition, vibratory hammers produce sounds in the 20 to 30 Hz range, very near the range of infrasound (less than 20 Hz). It has been shown that fishes tend to avoid infrasound and do not become habituated to the sound even after repeated exposure (Dolat 1997, Knudsen et al. 1997). Sounds created through the use of vibratory hammers may elicit an avoidance response in fish due to their frequency and duration (Carlson et al., 2001). The sound from an impact hammer has too little energy in the infrasound range and is too brief to trigger the avoidance response resulting in fish remaining within the area of potential harm.

Several variables appear to play a key role in the relationship between sound and fish. These include the size of the fish in relationship to the type and intensity of the sound produced, the size and type of hammer, substrate composition, depth of water, the location of the fish in the water column and the distance between the fish and source of the sound (Hastings and Popper 2004; Yelverton et al. 1975).

Habitat in the action area was described in Section 2.3.1 and 2.3.2 of the original BA. Habitat in the mainstem river includes edgewater habitat along both banks of the river associated with LWD and over-hanging vegetation. No pools exist within this reach of the mainstem and the deepest water is associated with the thalwag (approximately 15 feet at summer low flow). Habitat within the tributaries includes cover associated with LWD, undercut banks, overhanging vegetation, pools, and slow water refugia. Fish using these areas could include Chinook, coho, steelhead, bull trout, rainbow and cutthroat.

The local Area Habitat Biologist for the Washington State Department of Fish and Wildlife (WDFW) recommended that RSD install the in-water piles from June 1 to August 1 when it is unlikely that any adult Chinook and bull trout will be in the action area (Pfeifer, Robert. 2005). RSD proposes use a vibratory hammer to install the waterward piles, and will restrict pile-driving proofing with an impact hammer to a minimal number of piles (approximately 15 percent, or less, resulting in six, or less piles total), for approximately five minutes per pile. Pile installation would not occur before sunrise, or after dusk. Pile installation would occur during the summer, when the river water flow is slow, approximately 400 cubic feet per second, and the average depth of the river is 12 to 14 feet.

Section 4.4 – Mitigation for Wetland and Stream Impacts

4.4.1 - Wetland and Buffer Impacts

Compensatory mitigation is required for permanent impacts to wetlands, streams, and their buffers. A total of 36,168 square feet of wetland mitigation is required as well as 36,684 square feet of buffer mitigation (New Table A). RSD proposes 37,202 square feet of wetland mitigation and 39,064 square feet of buffer mitigation as compensation for unavoidable impacts to wetlands and buffers (Revised Table 9). This exceeds the required wetland mitigation by over 1,000 square feet and the required buffer mitigation by nearly 2,400 square feet. All of this mitigation will occur on site (within the project area). In addition, all temporarily disturbed areas 63,725 square feet will be reseeded or replanted. The floodplain storage area (6,300 square feet) is included as a temporary impact because subsequent to excavation, the area will be planted with native plants and trees, providing equivalent or increased function as compared to existing site conditions (see Revised Mitigation Plan Set).

Six locations have been selected to provide compensatory mitigation for project impacts. The individual mitigation areas range in size from approximately 4,000 square feet to over 32,000 square feet (see Revised Table 9). These mitigation sites are located at varying distances from the proposed bridge and approaches, and on both sides of the Snoqualmie River. The selection of multiple mitigation areas allows RSD to more closely replicate the lost wetland, stream, and buffer functions.

In the original BA, RSD proposed cutting blackberries along the top of the riverbank within the mitigation areas located on the east bank of the Snoqualmie River. The new mitigation plan includes incremental blackberry removal in the 10-foot-wide riverbank strip of land parallel with the OHWM of the Snoqualmie River. Removal would be by hand pulling and hand digging methods and is described in detail in Section 3.3.6 of this Addendum. If the riverbank is not de-stabilized by this action, then blackberries will be removed along the riverbank in 2007 and 2009. Following blackberry removal, tensar fabric will be installed where feasible and the area will be planted with suitable shrub species. These actions will aid in the replacement of the existing riparian area with plant communities that addresses riparian functions, as well as decreasing the effort required to maintain the east side mitigation sites.

4.4.2 – Mitigating In-Water Work Impacts

A number of methods will be used to minimize impacts to fish species from pile driving, including:

- Implementation of air bubble curtains during pile proofing.
- Timing restrictions.
- In-stream monitoring requirements.
- Using a vibratory hammer for temporary pile installation and removal.
- Limiting pile proofing with an impact hammer to a small subset of piles.
- Limiting pile proofing to five minutes or less per pile proofing test.
- Lowering the energy on the pile proofing hammer if fish are observed in the project area.

Bubble Curtain

In order to reduce high sound pressure levels produced from impact pile driving, and thereby avoiding or minimizing the risk of significant behavioral or physiological impairment to listed fish species, the project will implement the use of a bubble curtain during all impact pile proofing activities. Bubble curtains were first developed for use in mitigation of underwater explosions (Strange and Miller 1961) and have been used to protect underwater structures from damage caused by demolition blasting. They have also been shown to be successful in protecting fish and marine mammals (Keevin 1995). Bubble curtains are generated by pumping air into a perforated manifold that is anchored on the bottom of the water body. The fundamental principle of using a bubble curtain is to form a compressible, low-density zone within the relatively high-density, incompressible water. Generally, a waveform passing through a curtain of bubbles is modified from its usual sharp rise time as it compresses the air/water mixture and the degree of modification is dependent upon the air content of the bubble curtain, bubble size, curtain thickness and rise time of the wave form (Rickman 2000). Strange and Miller (1961) indicated that wave duration was increased by up to a factor of three after passing through a bubble curtain.

A bubble curtain will be installed prior to any impact pile proofing, and operated during the duration of inwater impact pile driving activities. Where inwater impact proofing is used, it is estimated that each individual pile (5 to 6 piles total) will require only 5 minutes of striking with an impact hammer to adequately seat the piles, for a total of approximately 30 minutes of pile driving, which could occur over the course of one or two days. A figure indicating a potential bubble curtain design is provided as an attachment to this Addendum. The bubble curtain will be used in conjunction with fish presence, acoustic, and water quality monitoring (see below).

New Table A. Compensatory Mitigation Required for Tolt Bridge Replacement Project

		Wetlands				Wetland and Stream Buffers	
Wetland/ Stream	**King County Rating[a]**	**Permanent Fill Impact (sq. ft.)**	**Permanent Clearing Impact (sq. ft.)**	**Mitigation Ratio[b]**	**Required Mitigation Area (sq. ft.)**	**Permanent Impact (sq. ft.)**	**Required Mitigation Area (sq. ft.)[c]**
1	2	356	7,215	2	15,142	7,755	7,755
2	1	0	10,513	2	21,026	11,517	11,517
4	1	—	—	2	0	11,863	11,863
6	3	—	—	1	—	410	410
Snoqualmie River	1	—	—	—	—	5,139	5,139
Totals	—	**356**	**17,728**	—	**36,168**	**36,684**	**36,684**

a King County wetland or stream rating from King County Sensitive Areas Ordinance (2001)
b KCC
c Mitigation ratio of 1:1

Revised Table 9. Proposed Mitigation Locations, Areas, and Functionality for the Tolt Bridge Replacement Project

Mitigation Area	Location	Wetland Area (SF)	Wetland/Stream Buffer Area (SF)	Total Mitigation Area (SF)	What the Proposed Planting Accomplishes
1	West side of Snoqualmie River, underneath and adjacent to the existing western bridge approach.	4,649	994	5,643	Re-vegetates the area under existing bridge to improve community structure once the existing bridge deck and piles are removed
2	West side of the Snoqualmie River, south of the existing bridge and north of the new bridge.	16,121	–	16,121	Infill planting increases plant species and structural diversity of existing wetland and stream buffers to compensate for wetland fill and offset impacts associated with selective vegetation clearing under the west approach of the new bridge
4	West side of Snoqualmie River, between the Snoqualmie River and Tolt River - John MacDonald Park access road.	–	8,484	8,484	Enhances riparian corridor by establishing tree cover and future LWD recruitment along a portion of the river bank that is currently devoid of large trees. Infill planting will supplement existing vegetation in this area.
5	East side of Snoqualmie River in Wetland 1 and its buffer, within the 100-foot wide right-of-way.	16,432	17,752	34,184	Restores area to pre-existing condition. Area east of access road is not available for woody planting based on right-of-way agreement with property owner. Western part will be planted with shrub species while eastern part will be restored using pasture seed mix except areas where bridge height is less than 4 feet above ground.
6	East side of Snoqualmie River, along the river south of the new bridge southerly right-of-way line, not including the area within the 100-foot right-of way, which is part of Mitigation Area 5 (Foster Farm).	–	11,834	11,834	Enhances riparian corridor by establishing tree cover along a portion of the river bank that is dominated by Himalayan blackberry.
Total		**37,202**	**39,064**	**76,266**	

Timing Windows for Pile Driving/Removal

In-water pile driving for construction of the temporary work trestle, temporary trestle construction, and removal of these temporary features will be timed to avoid and minimize impacts to fish species. In addition to completing all in-water work as quickly as possible, RSD will adhere to specific timing commitments including:

- Vibratory hammer pile driving and impact hammer pile proofing **waterward** of the OHWM in the Snoqualmie River will be completed between June 1 and August 1, when nearly all Chinook smolts have migrated, and few juvenile and adult salmonids are expected in the mainstem river's deeper areas or bank side habitats.
- Air bubble noise attenuation devices will be installed around the six or less piles that will be proofed with an impact hammer, prior to proofing that will last approximately five minutes.
- No pile driving will occur before dawn or after dusk when bull trout typically forage.
- Removal of temporary pile supports in the main channel will be done with a vibratory hammer between June 1 and September 15.
- Temporary pile driving **landward** of the main channel OHWM to construct the temporary work trestle on the left (west) bank and to install the eight piles associated with Pier 3 oscillator report will occur without a timing restriction, with the exception of the wintering bald eagle window. However, during pile driving in this location, RSD will monitor Wetland 2 and Tributary 3 for the presence of salmonid smolts or juvenile fish. The monitoring will consist of visual observations from a boat or the shoreline, and be conducted by a qualified biologist. If Chinook salmon or bull trout are observed during pile proofing, the energy on the hammer will be reduced.

Monitoring

In addition to timing restrictions, RSD will conduct monitoring activities prior to and during pile proofing activities in the Snoqualmie River, Wetland 2 and Tributary 3 in order to prevent or minimize potential harm to migratory fish species. A formal monitoring plan will be produced and submitted to WDFW Area Habitat Biologist for review and approval. The plan will then become part of the HPA permit conditions. Monitoring commitments include the following:

Prior to construction

- Just prior to commencing in-river pile proofing activities, pools in the main stem of the Snoqualmie River will be snorkeled and video monitored to verify that no salmonids, particularly adults, are present in the immediate project vicinity. The Snoqualmie River will be snorkeled within the area that the piles will be driven and from about 200 feet upstream and downstream from the area. As the in-water pile-driving activities will occur during summer low flow conditions, visibility in the water column will be adequate for assessment purposes. Qualified County biologists will conduct snorkeling and fish observations. If adult or juvenile salmonids are observed within the survey reach, the impact hammer energy has been reduced.
- RSD will perform pre-construction biological monitoring in the mainstem Snoqualmie River, Wetland 2, and Tributary 3 in order to assess fish use and distribution during the in-water work period June 1 through September 15. RSD will use snorkeling, dipnetting, or visual observations to determine general fish distribution during this time period, and to evaluate the potential presence of

juvenile salmonids in Wetland 2 and Tributary 3 and the presence of juvenile and adult salmonids within the project area during the work window.

- Prior to the start of pile installation work (including equipment mobilization) on the east side of the river, King County will establish five bank-monitoring points. The points will be located at the approximate locations shown on the attached Pier 3 Conceptual Oscillator Support Detail Figure. In addition, two control points will be established that are located well away from the bank, and from all construction activities. Control points should be located so that during and following construction they will be accessible and visible to provide control for instrument set-up for bank monitoring.

During Construction

- Prior to starting pile driving RSD will develop and implement a hydro-acoustic monitoring plan that will measure decibel levels. This plan will be developed to measure sound levels within the water column that are generated using a vibratory hammer for pile placement and an impact hammer for pile proofing. Development of the plan will be undertaken with the assistance of NOAA Fisheries and USFWS staff to ensure the adequacy and appropriateness of the monitoring effort. Monitoring will not only evaluate the effects of pile driving on fish in the Snoqualmie River but also add to our level of knowledge on the relationship between sound and fishes. Monitoring data collected will be shared with WSDOT, WDFW, NOAA Fisheries and USFWS.
- If monitoring in the main stem Snoqualmie River, Wetland 2 and Tributary 3 indicates that adult salmonids are present prior to, during, or after pile proofing activities, the impact hammer energy will be reduced.
- RSD will monitor temperature, turbidity, and pH in addition to in-water decibel levels prior to and during both in-river pile driving and pile removal. RSD will ensure that instream turbidity remains within the levels prescribed by state and federal regulations.
- Bank Monitoring: Once each workday, during installation and removal of temporary pilings near the east river bank, the Engineer will survey bank monitoring points and determine horizontal and vertical movement. The survey locations will be accurate to within 1/10,000 of measured horizontal distances. If any of the monitoring points show more than three inches of cumulative movement during construction, then modifications to the construction methodology and/or bank stabilization will be re-evaluated.
- Bank Fracture Monitoring: At least once each workday during piling installation and removal near the east river bank, a King County geologist or geotechnical engineer will visit the site and look for evidence of bank instability including development of soil cracks. This individual will also review results from the bank monitoring.

Post Pile Driving

Riverbank Re-grading: Following completion of all piling installation on the east bank of the river, survey results and construction inspection results will be evaluated to determine if construction activities have increased the likelihood of a bank failure in the vicinity of the new pilings. If, in the opinion of the Engineer, construction has reduced bank stability, then the riverbank will be re-contoured within the 100-foot wide right-of-way after Pier 3 construction is completed.

Section 5 – Fish Species Evaluations

Section 5.1 – Chinook Salmon

5.1.2 – Pertinent Life History

The following information is provided as an update to the information contained in the original BA.
While some emerging Chinook salmon fry out-migrate quickly, most inhabit the shallow side margins and side channels of the natal streams for up to two months. As these fish mature, many gradually move into the faster water areas to forage and rear, while others out-migrate to the estuary. It has been typically thought that most summer and fall chinook leave their natal streams within their first year of life, but a few stocks (i.e., Snohomish fall chinook) have juveniles that remain in the river for an additional year (WSCC 2002, Marshall et al. 1995). In the Snoqualmie River, the number that remains for this additional year varies from year to year, but ranges between eight and 33 percent (Myers et al. 1998).

5.1.4 – Critical Habitat

The following text replaces language in the existing BA:

On September 2, 2005, NOAA Fisheries (2005b) released its final critical habitat designation for 19 evolutionary significant units of salmon and steelhead in California and the Northwest. Designation obligates federal agencies to give special consideration to their activities when they take place in designated area. The identified action area of this project is within the designated critical habitat for Chinook salmon as identified in NOAA's final rule. Approximately 39.3 miles of the lower Snoqualmie River, from its confluence with the Skykomish River upstream to Snoqualmie Falls is now considered critical habitat for Puget Sound Chinook salmon supporting spawning, rearing, and migration. This includes the project site at RM 25.5.

Section 5.2 – Bull Trout

Section 5.2.4 – Critical Habitat

Replace text in existing BA with the following:

Critical habitat for the Coastal-Puget Sound bull trout distinct population segment (DPS) was recently designated (USFWS 2005). The Snoqualmie River from the mouth upstream approximately 39.3 miles to Snoqualmie Falls (an area which includes the project site at RM 25.1) is designated critical habitat, as is the lower 8.4 miles of the mainstem Tolt River (from the mouth upstream to the confluence of North and South Forks of the Tolt River). These areas provide foraging, migratory, and overwintering habitat for the Snohomish-Skykomish bull trout core area.

Section 6 – Wildlife Species Evaluations

Section 6.1 – Bald Eagles

Section 6.1.3 – Occurrences of Bald Eagles in the Project Areas

Replace text in existing BA with the following:

USFWS indicates that bald eagles occur within King County. Bald eagle occurrence is primarily during the wintering period from October 31 through March 31. Although USFWS indicated that nesting bald eagles are also in the County, PHS data from WDFW show there are no bald eagle nests, territories, or wintering concentration areas within at least 1 mile of the project area. The closest bald eagle nest is located about 1.5 miles south of the project site.

Section 7 – Effects Determinations for Listed Species

Section 7.1 – Effects Analysis for Chinook Salmon

Section 7.1.1 – Direct and Indirect Effects on Chinook Salmon

Potential effects to juvenile Chinook salmon due to the in-water pile driving in the mainstem of the Snoqualmie River will be minimized by strict implementation of in-water work windows, where fish abundance in the action area would be low. Vibratory hammers will install all the piles proposed and only fifteen percent (5 or 6 piles) will be proofed for no more than five minutes per pile. Prior to any inwater impact pile proofing, a sound attenuation device (air bubble curtain) will be installed and operated. Because the work will be performed during the summer months, current river velocities will be relatively low (approximately 400 cfs) within the project area, so bubble curtains are likely to be effective in reducing sound transmission. In addition, pre-pile driving monitoring of fish presence will occur, to ensure no fish are present within the vicinity (approximately 200 feet upstream and downstream)of pile driving activities. Furthermore, throughout the duration of all in-water pile driving activities in the Snoqualmie River, monitors will observe the river for fish. If fish are found to be present within the work area, the pile proofing hammer energy will be turned down.

Exposing adult, juvenile, and embryonic Chinook salmon to degraded water quality associated with the Tolt Bridge (#1834A) replacement will be minimized by using vibratory methods for pile installation and removal and the implementation of appropriate BMPs (see Section 4.5 of original BA) to reduce or eliminate the potential to introduce fine sediment into the river channel. Furthermore, RSD will monitor turbidity and pH prior to and during both in-river pile driving and pile removal. Salmon commonly migrate under freshet conditions, when suspended sediment and turbidity levels are high, much higher than would be expected during summer project construction. Furthermore, RSD will ensure that in-stream turbidity levels are within prescribed limits of background levels, as required by state and federal regulations and the contractor will be required to minimize turbidity and have turbidity screens onsite. All in-water work will temporarily cease if these levels are exceeded, until site conditions (stream flow) or the use of additional BMPs would result in a reduction of in-stream turbidity.

Vibratory hammer pile driving at locations on or adjacent to riverbanks could potentially generate sedimentation from bank fracturing or sloughing. However, no pile driving will occur within five feet of the top of bank, the closest piles to the bank (at Pier 3) will be pre-augured to eliminate disturbance to the bank and BMPs will surround the area to minimize sediment transport. A bank-monitoring plan will be implemented and all temporary piles will be removed with a vibratory hammer.

The temporary piles waterward of the OHWM may have a very minor effect on local flow conditions or channel morphology. However, these piles are only temporary and will be in place only three months during the summer low flow period, when adult Chinook salmon are unlikely to occur within the project site. The site where the piles will be placed does not represent salmonid spawning habitat and will not hinder fish passage. In addition, every effort will be made to restrict the placement of piles in the immediate vicinity of existing LWD and near bank habitats where juvenile salmonids may occur. A maximum total of 206 square feet of temporary in-river fill will result from the project, which is distributed over a wide area (each individual pile results in less than five square feet of fill).

Therefore, no adverse effects to Chinook salmon are expected from the presence of either the temporary piles or trestle. From three to six of the support piles for the new truss bridge will be inaccessible for removal when the truss is in place and will need to remain in the channel because they will be prevented from removal due to access issues. Divers will cut these piles off at or below the riverbed grade, thus effectively removing all in-water structures. All other piles will be removed using a vibratory hammer. No significant short or long-term effects to Chinook salmon are expected from these activities and channel morphology will not be affected. In-stream habitat conditions will improve over the long-term as compared to existing conditions, due the removal of the existing bridge piers, which are located within the OHWM.

The current design also includes the installation of 78 piles during the spring/summer of 2006 landward of the OHWM in Wetland 2 and Tributary 3 and their associated buffers. This installation will be done using a vibratory hammer followed by pile proofing of approximately 15% or less of the piles (maximum of 6) with an impact hammer. Pile proofing will be done to ensure that the piles reach the appropriate load bearing capacity and will take three to five minutes per pile. Wetland 2 and Tributary 3 provide over-wintering, rearing, and refuge habitat for a variety of juvenile salmonids. The area will be monitored and if fish are observed steps will be taken to minimize impacts.

Lastly, due to the new bridge type, the temporary trestle, and the compensatory floodplain storage facility, permanent and temporary impacts within riparian buffers has increased slightly from the original BA. Removal of forest cover in the riparian corridor has the potential to reduce the amount and quality of LWD recruited to the stream, and reduce stream shade that in turn could increase stream temperatures and destabilize stream banks, which could potentially adding to stream bank erosion. However, all temporarily disturbed areas will be replanted with appropriate native vegetation, including tree species where feasible, and all permanent impacts will be mitigated by planting native trees, shrubs, and grasses in multiple onsite areas (see Mitigation Plan Set). For these reasons, the (mostly temporary) removal of riparian vegetation is not expected to have any of the deleterious effects listed above and should not significantly alter LWD recruitment or stream shading in the system.

Section 7.2 – Effects Analysis for Bull Trout

Section 7.2.1 – Direct and Indirect Effects on Bull Trout

Potential direct and indirect effects of the bridge replacement on the bull trout are similar to those described for Chinook salmon in this BA Addendum (see above).

Section 7.4 – Effects Analysis for Bald Eagle

Section 7.4.1 – Direct and Indirect Effects on Bald Eagle

The primary change in the project in terms of its potential effects on bald eagle is an increase in the number of piles that will be driven from the original BA, which could in turn result in a greater amount of disturbance to nesting or wintering eagles. However, PHS data indicates no known winter concentration areas, roost sites, or nest sites within 1.5 miles of the project area. Additionally, all pile driving and pile removal activities within OHWM will be conducted between June 1 and September 15, a timeframe outside the wintering period for eagles. Landward pile driving will occur outside the wintering bald eagle window. Although suitable foraging habitat for bald eagles is present in both Snoqualmie and Tolt Rivers, BMPs and project mitigation should minimize project impacts to aquatic prey species; including salmonids (see Section 7.1 of this Addendum). Therefore, direct and indirect effects to bald eagles are expected to be negligible.

Section 7.5 – Summary of Effects Determinations

Based on field work by natural resource specialists, evaluation of the proposed design, review of pertinent literature, and interviews with fish and wildlife authorities, we conclude that the project will result in a may affect, not likely to adversely affect determination for Chinook salmon and bull trout, and their designated critical habitat and a may affect, not likely to adversely affect determination for wintering bald eagles.

Based on the EFH requirements of Pacific Coast salmon species, the potential direct, indirect, and cumulative effects of the construction of the proposed project will have a limited effect on identified EFH for the project site or action area evaluated. No long-term impacts to EFH are anticipated. Therefore, the affect determination for EFH is no effect.

This concludes the Addendum for Tolt Bridge (#1834A) Replacement (CIP 200394) Biological Assessment. Please call me (425-458-6259) if you require additional information, or have any questions.

Sincerely,

Pete Lawson

Pete Lawson
Parametrix
Fish Biologist

Enclosures: July 2003 Biological Assessment (BA) for the Tolt Bridge (#1834A) Replacement
USFWS/NOAA Fisheries Species List
Updated Project Plan Set
Revised Mitigation Plan Set (Sheets 42 to 48 of Plan Set)
Build Truss in Place Construction Impact Figures
Flood Compensatory Grading Plan and Profile
Potential Bubble Curtain Design Detail
Pier 3 Conceptual Oscillator Support Detail Figure
Bridge Pier Layout Figure
Revised Figure 3 – Existing Wetlands and Streams - Tolt Bridge (#1834A) Replacement Project
Revised Figure 4 - Potential Construction Schedule - Tolt Bridge (#1834A) Replacement Project
Revised Figure 6 - Wetland, Stream, and Buffer Impacts at the Tolt Bridge Replacement

References

Caltrans. 2001. Pile Installation Demonstration Project, Fisheries Impact Assessment, PIDP EA 010281, Caltrans Contract 04A0148. San Francisco – Oakland Bay Bridge East Span Seismic Safety Project.

Caltrans. 2002. Biological Assessment for the Benicia Martinez New Bridge Project for NOAA Fisheries. Prepared by Caltrans for U.S. Department of Transportation. October 2002. 37 p.

Carlson, T. J., G. Ploskey, R. L. Johnson, R. P. Mueller, M. A. Weiland, and P. N. Johnson. 2001. Observations of the behavior and distribution of fish in relation to the Columbia River navigation channel and channel maintenance activities, Prepared for the U.S. Army, Corps of Engineers, Portland District by Pacific Northwest National Laboratory, U.S. Department of Energy, Richland, WA., 35 pp. + appendices.

Collins, B. D., and A. J. Sheikh. 2002. Mapping historical conditions in the Snoqualmie River valley, RM 0 - RM 40, King County, Washington, February 21, 2002. Final project report to King County Department of Natural Resources, 201 South Jackson Street, Seattle, WA 98104.

Dolat, S.W. 1997. Acoustic measurements during the Baldwin Bridge demolition (final, dated March 14, 1997). Prepared for White Oak Construction by Sonalysts, Inc, Waterford, CT.. 34 p. + appendices.

Feist, B.E., J.J. Anderson, and R. Miyamoto. 1992. Potential impacts of pile driving on juvenile pink (Oncorhynchus gorbuscha) and chum (O. keta) salmon behavior and distribution. FRI-UW-9603. Fisheries Resources Institute, University of Washington. Seattle.

Hastings, M. C. and Popper, A. N. 2004. Report on Hydroacoustics, Bioacoustics, and Noise Thresholds for Fish "Best Available Science", Caltrans Contract No. 43A0139, Task 1, Develop Noise Thresholds for Fish.

Hastings, M.C., and A.N. Popper. 2005. Effects of sound on fish. Prepared for Jones & Stokes under California Department of Transportation contract no. 43A0139. Sacramento, CA.

Hruby, T. 2004. Washington State wetland rating system for western Washington – Revised. Washington State Department of Ecology Publications #04-06-025.

Illingworth and Rodkin, Inc. 2001. Noise and vibration measurements associated with the pile installation demonstration project for the San Francisco-Oakland Bay Bridge East Span, Final Data Report prepared for California Department of Transportation, Task Order 2, Contract No. 43A0063, Petaluma, California.

Keevin, T.M. 1995. The Effects of Underwater Explosions on Fish with Techniques to Mitigate Those Effects. PhD. Thesis, University of Illinois at Urbana-Champaign, 1995.

Knudsen, F. R., C. B. Schreck, S. M. Knapp, P. S. Enger, and O. Sand. 1997. infrasound produces flight and avoidance responses in Pacific juvenile salmonids, Journal of Fish Biology, 51:824-829.

Longmuir, C., and T. Lively. 2001. Bubble curtain systems for use during marine pile driving. Report by Fraser River Pile & Dredge Ltd., New Westminster, British Columbia. 9 pp.

Marshall, A.R., C. Smith, R. Brix, W. Dammers, J. Hymer, and L. LaVoy. 1995. Genetic diversity units and major ancestral lineages for chinook salmon in Washington. *In* C. Busack and J. B. Shaklee (eds.), Genetic diversity units and major ancestral lineages of salmonid fishes in Washington, p. 111-173. Wash. Dep. Fish Wildl. Tech. Rep. RAD 95-02.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-35, 443 p.

Nedwell, J., and B. Edwards. 2002. Measurements of underwater noise in the Arun River during piling at County Wharf, Littlehampton. Report submitted by Subacoustech, Ltd. to David Wilson Homes Ltd., 15 Horsham Court, City Business Centre, Brighton Road, Horsham, West Sussex RH14 5BB

NOAA (National Oceanic and Atmospheric Administration) Fisheries. 2005. Endangered and threatened species; designation of critical habitat for 13 evolutionarily significant units of Pacific salmon (Oncorhynchus spp.) and steelhead (O. mykiss) in Washington, Oregon, and Idaho; Final Rule. September 2, 2005. Federal Register 70(170):52630–52858.

NMFS (National Marine Fisheries Service). 2004. Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for Southern Resident Killer Whales. December 22, 2004. Federal Register 69(245):76673-76681.

Pfeifer, Robert. 2005. Personal communication by WDFW Habitat Biologist to RSD Transportation Services Staff and Margaret Clancy, Parametrix Biologist, during onsite visit of April 10, 2005.

Rickman, Denis D. 2000. Analysis of Water Shock Data and Bubble Screen Effectiveness on the Blast Effect Mitigation Test Series, Wilmington Harbor, North Carolina. U.S. Army Corps of Engineers Engineering Research and Development Center, ERDC/SL TR-00-4, August 2000.

Shin, H.O. 1995. Effect of the piling work noise on the behavior of snakehead (*Channa argus*) in the aquafarm. J. Korean Fish. Soc. 28(4) 492-502.

Stotz, T. and J. Colby. 2001. January 2001 dive report for Mukilteo wingwall replacement project. Washington State Ferries Memorandum. 5 pp. + appendices.

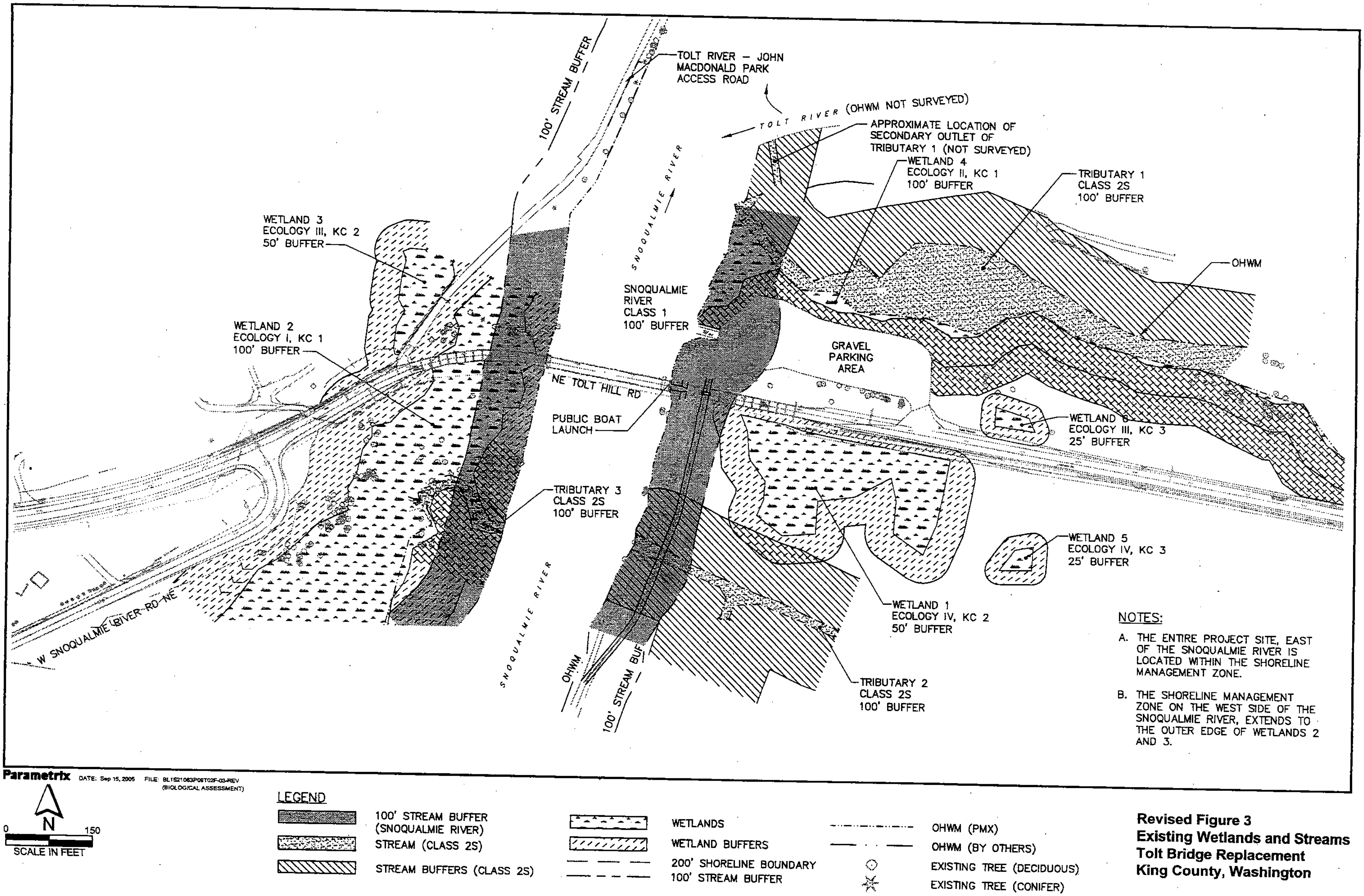
Strange, J.N. and L. Miller. 1961. Shock-Wave attenuation Properties of a Bubble Screen. Technical Report no. 2-564, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

USFWS (United States Fish and Wildlife Service). 2005. Endangered and threatened wildlife and plants; Designation of critical habitat for the bull trout; Final Rule. September 26, 2005. U.S. Fish and Wildlife Service. Federal Register 70(185):56212–56311.

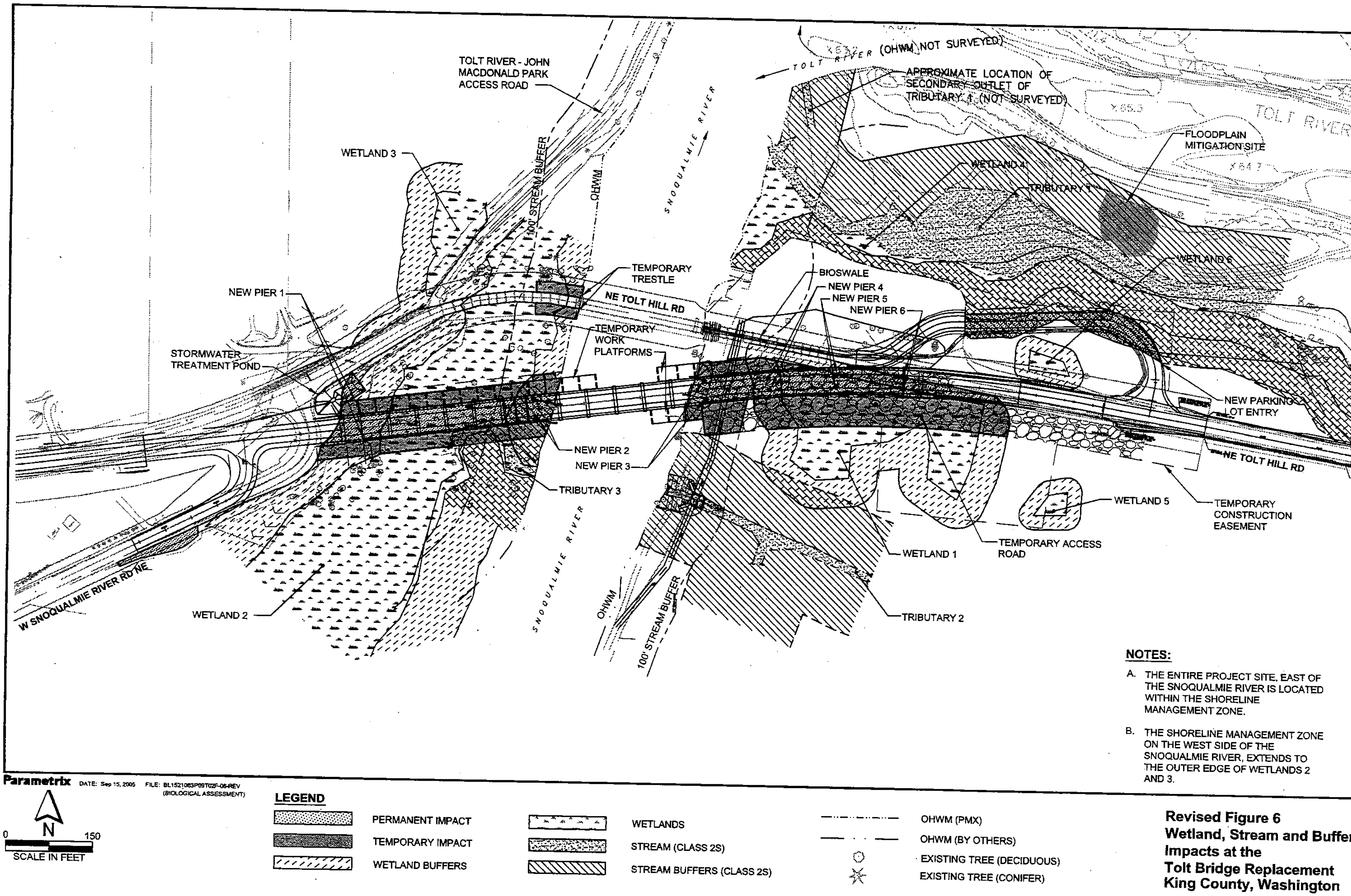
Vlahakis, N.E., and R.D. Hubmayr. 2000. Invited Review: Plasma membrane stress failure in alveolar epithelial cells. Journal of Applied Physiology 89:2490-2496.

WSCC (Washington State Conservation Commission). 2002. Salmonid habitat limiting factory analysis. Snohomish River watershed (WRIA 7) Final Report.

Yelverton, J.T., D.R. Richmond, W. Hicks, K. Saunders, and R. Fletcher. 1975. The relationship between fish size and their response to underwater blast. Topical Report DNA 3677T. Defense Nuclear Agency, Department of Defense, Washington, D.C.



Revised Figure 3
Existing Wetlands and Streams
Tolt Bridge Replacement
King County, Washington



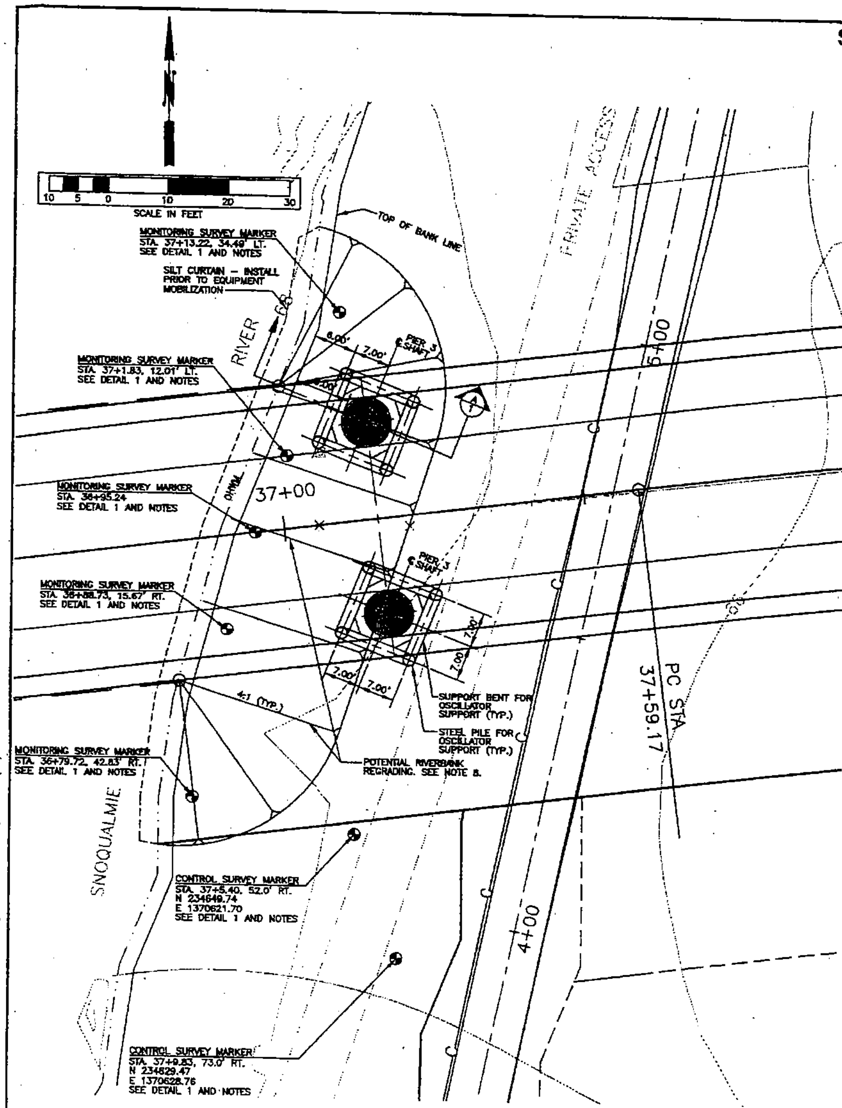
NOTES:

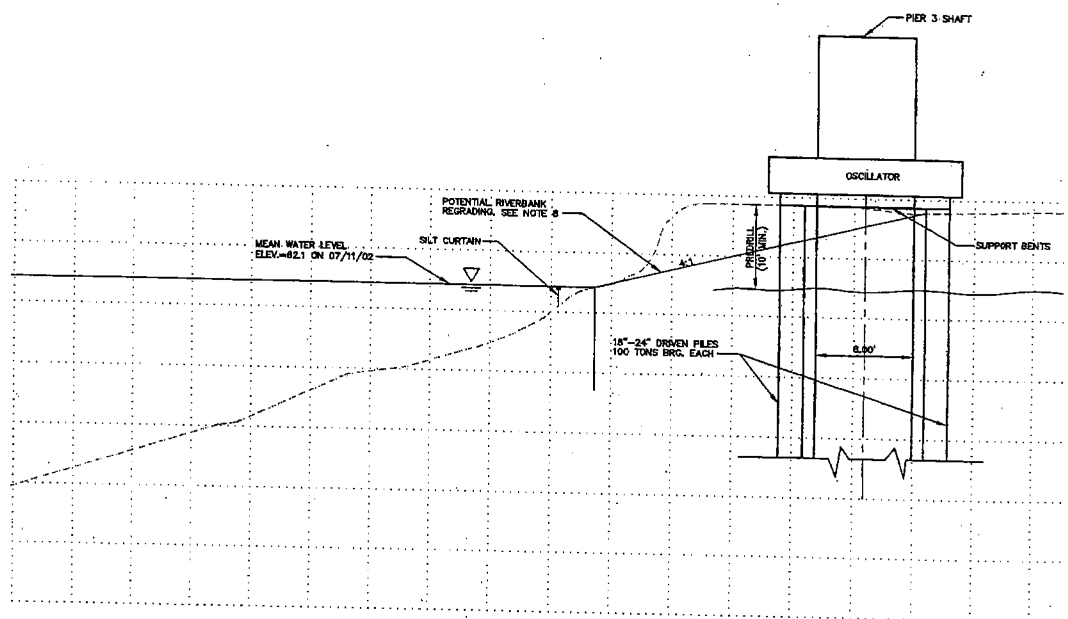
A. THE ENTIRE PROJECT SITE, EAST OF THE SNOQUALMIE RIVER IS LOCATED WITHIN THE SHORELINE MANAGEMENT ZONE.

B. THE SHORELINE MANAGEMENT ZONE ON THE WEST SIDE OF THE SNOQUALMIE RIVER, EXTENDS TO THE OUTER EDGE OF WETLANDS 2 AND 3.

Revised Figure 6
Wetland, Stream and Buffer Impacts at the Tolt Bridge Replacement
King County, Washington

SEC. 20, T. 25 N., R. 7 E., W.M.

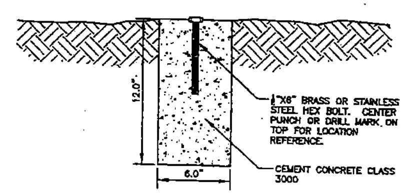




(A) SECTION

NOTES

1. PRIOR TO THE START OF PILE INSTALLATION WORK (INCLUDING EQUIPMENT MOBILIZATION) ON THE EAST SIDE OF THE RIVER, KING COUNTY WILL ESTABLISH FIVE BANK–MONITORING SURVEY POINTS.
2. ONCE EACH WORK DAY DURING THE INSTALLATION AND REMOVAL OF TEMPORARY STEEL PILES FOR OSCILLATOR SUPPORT, THE ENGINEER SHALL SURVEY EACH MONITORING POINT AND DETERMINE HORIZONTAL AND VERTICAL MOVEMENT. IF ANY OF THE MONITORING POINTS SHOW MORE THAN THREE INCHES OF CUMULATIVE MOVEMENT DURING CONSTRUCTION, THEN MODIFICATIONS TO THE CONSTRUCTION METHODOLOGY AND/OR BANK STABILIZATION WILL BE RE–EVALUATED.
3. OSCILLATOR SUPPORT PILES TO BE PRE–DRILLED TO BE BELOW THE WATER LEVEL OF THE RIVER (10 FT. MIN.). PILING TO BE REMOVED WITH A VIBRATORY HAMMER AFTER PIER 3 IS CONSTRUCTED.
4. MONITORING AND CONTROL SURVEY MARKERS TO BE PER THE DETAIL ON THIS SHEET OR AS DIRECTED BY THE ENGINEER.
5. THE LOCATIONS OF THE SURVEY MONITORING POINTS MAY VARY DUE TO CONSTRUCTION ACCESS. LOCATE 3–FEET EAST OF THE TOP OF BANK.
6. THE ENGINEER WILL DETERMINE FINAL LOCATIONS OF THE SURVEY MONITORING AND CONTROL POINTS IN THE FIELD.
7. AT LEAST ONCE EACH DAY WORK DAY DURING OSCILLATOR SUPPORT PILING INSTALLATION AND REMOVAL, A KING COUNTY GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL VISIT THE SITE AND LOOK FOR EVIDENCE OF BANK INSTABILITY INCLUDING DEVELOPMENT OF SOIL CRACKS. THIS INDIVIDUAL WILL ALSO REVIEW RESULTS FROM THE SURVEY MONITORING.
8. FOLLOWING COMPLETION OF ALL PILING INSTALLATION ON THE EAST BANK OF THE RIVER, SURVEY RESULTS AND CONSTRUCTION INSPECTION RESULTS WILL BE EVALUATED TO DETERMINE IF CONSTRUCTION ACTIVITIES HAVE INCREASED THE LIKELIHOOD OF A BANK FAILURE IN THE VICINITY OF THE NEW PILES. IF IN THE OPINION OF THE ENGINEER, CONSTRUCTION HAS REDUCED BANK STABILITY, THEN THE RIVERBANK WILL BE RECONTOURED WITHIN THE 100–FOOT WIDE RIGHT–OF–WAY AS SHOWN ON THIS FIGURE AFTER PIER 3 CONSTRUCTION IS COMPLETED.



(1) DETAIL
SURVEY MARKER FOR RIVERBANK STABILITY MONITORING

CALL 2 WORKING DAYS BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005
SUPERVISOR:	–	–

NUM. | REVISION | BY | DATE

CADD / 70 %
7-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8
MAINTENANCE DIVISION No. 2

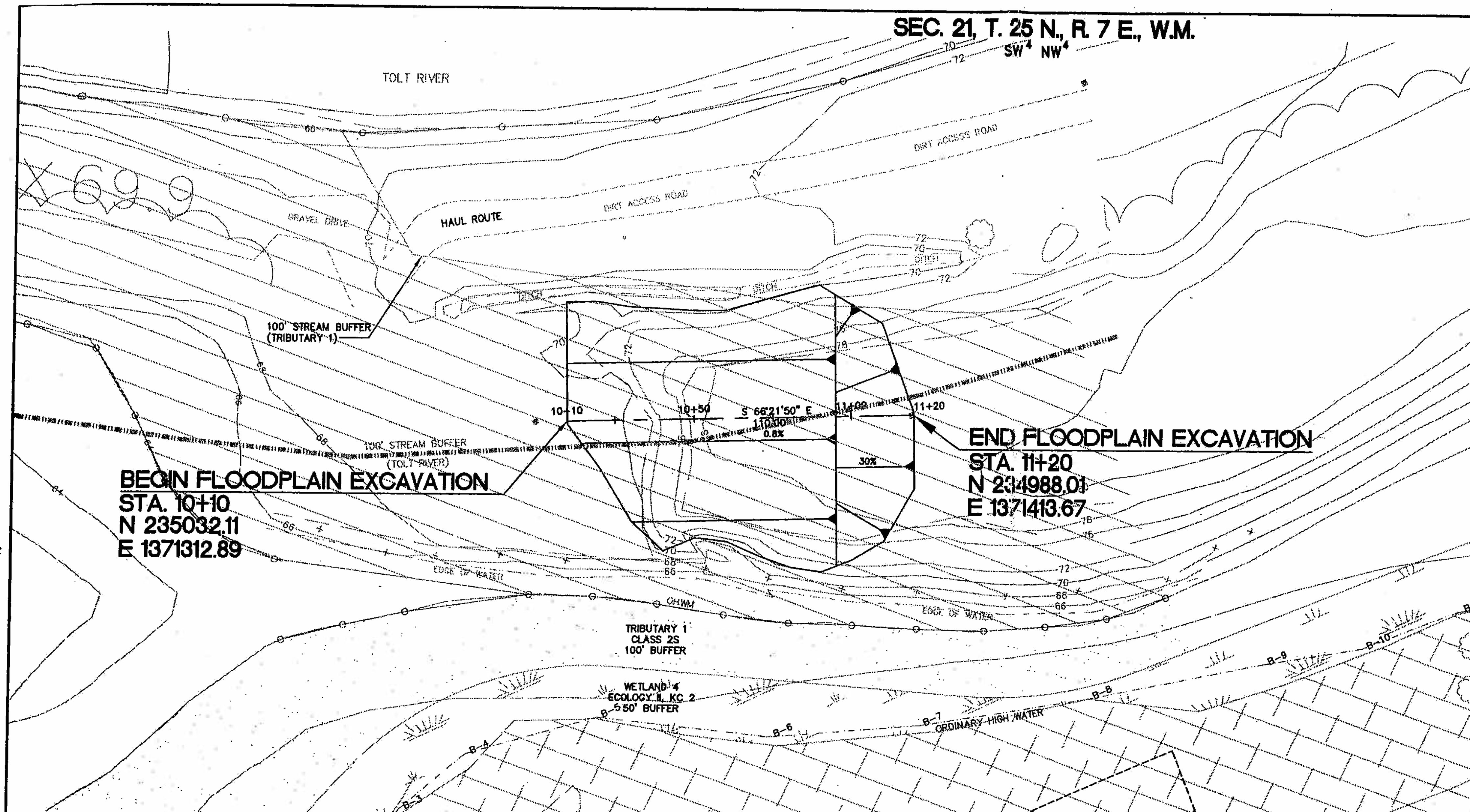
PAULETTE M. NORMAN — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 6/31/07 — COUNTY ROAD ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
PIER 3 CONCEPTUAL OSCILLATOR SUPPORT DETAIL

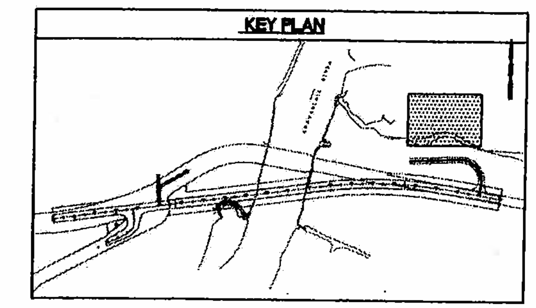
SHEET 1 OF 1 SHEETS

313-55 (1)

SEC. 21, T. 25 N., R. 7 E., W.M.
SW¼ NW¼

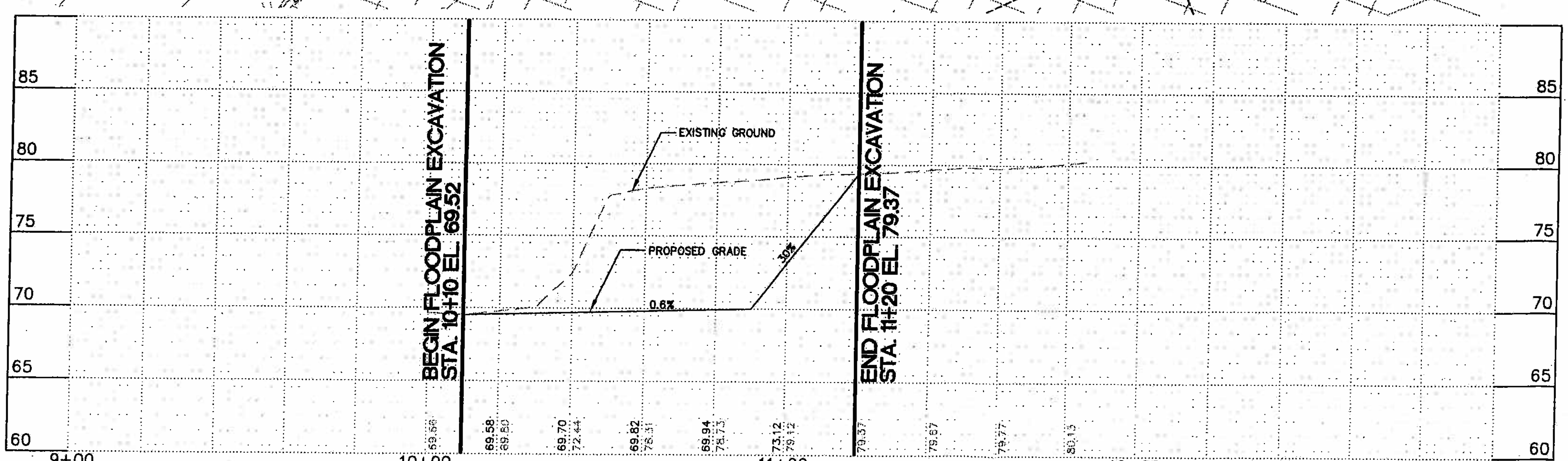


SCALE IN FEET (20 10 0 20 40 60)



NOTES:

1. THIS GRADING OF THE SNOQUALMIE RIVER FLOODPLAIN IS TO PROVIDE COMPENSATING FLOODPLAIN STORAGE FOR NEW ADDITIONAL FILL PLACED IN THE FLOODPLAIN AS PART OF THE TOLT BRIGE #1834A REPLACEMENT PROJECT.
2. SEE SHEET 40-46 FOR MITIGATION PLANTING PLAN.
3. EXCAVATED MATERIAL SHALL BE COMPLETELY REMOVED FROM SNOQUALMIE RIVER 100 YR FLOOD PLAIN.
4. THIS DRAWING HAS A COMPOSITE OF SURVEY DATA AND DNRP DATA.



CALL 2 WORKING DAYS
BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005

CADD / 70 %
8-2005

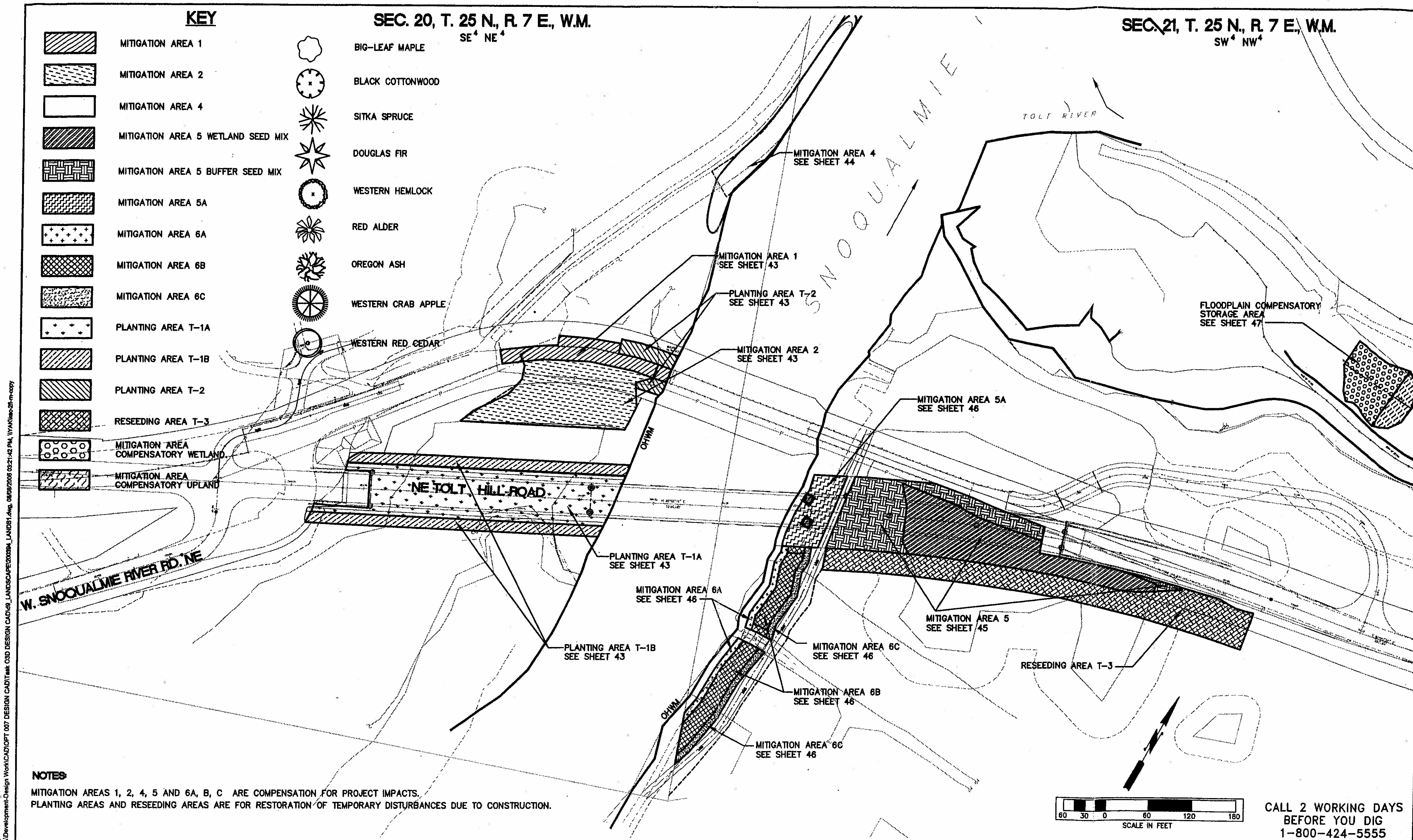
FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8

PAULETTE M. NORMAN, STATE OF WASHINGTON, 29116, REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
FLOOD COMPENSATORY STORAGE

SHEET 27 OF 110 SHEETS

G:\200394-Tolt Bridge #1834A\Development-Design Work\CAD\OPT 007 DESIGN CAD\Task O3D DESIGN CAD\d9_LANDSCAPE\200394_LANDS1.dwg, 08/08/2005 03:21:42 PM, \\YAK\ksc-2fl-m-copy



NOTES:

MITIGATION AREAS 1, 2, 4, 5 AND 6A, B, C ARE COMPENSATION FOR PROJECT IMPACTS.
PLANTING AREAS AND RESEEDING AREAS ARE FOR RESTORATION OF TEMPORARY DISTURBANCES DUE TO CONSTRUCTION.

CALL 2 WORKING DAYS BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005

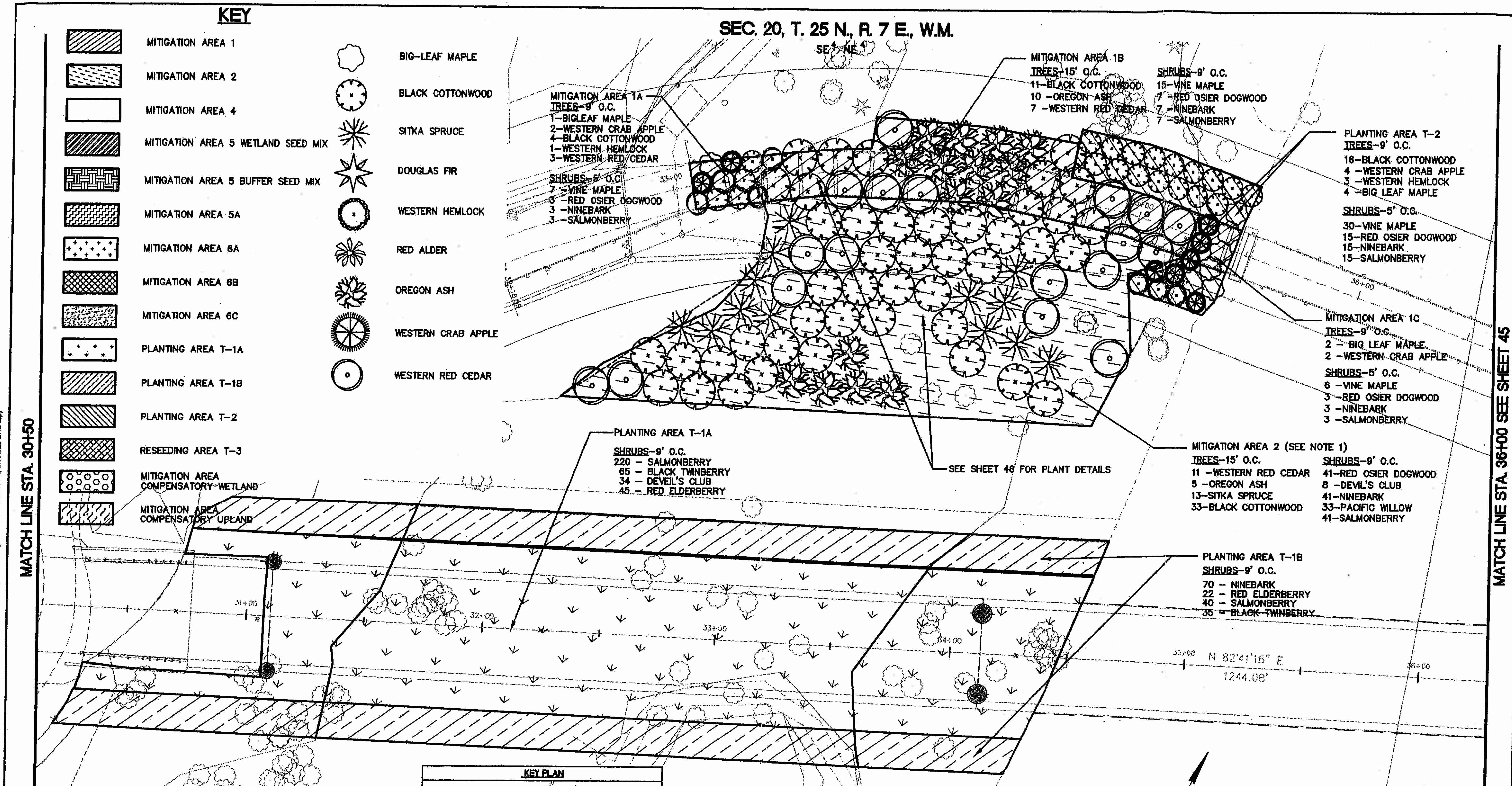
CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8
MAINTENANCE DIVISION No. 2

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER, 29116

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A

SHEET 42 OF 110 SHEETS



NOTES:

1. A QUALIFIED KING COUNTY ROAD SERVICES DIVISION BIOLOGIST SHALL PROVIDE ON-SITE INSTALLATION OVERSIGHT OF THE WETLAND, WETLAND BUFFER, AND STREAM BUFFER PLANTINGS.
2. ALL PRESERVED AREAS AND PLANTS MUST BE FLAGGED OR OTHER WISE IDENTIFIED.

CALL 2 WORKING DAYS
BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005

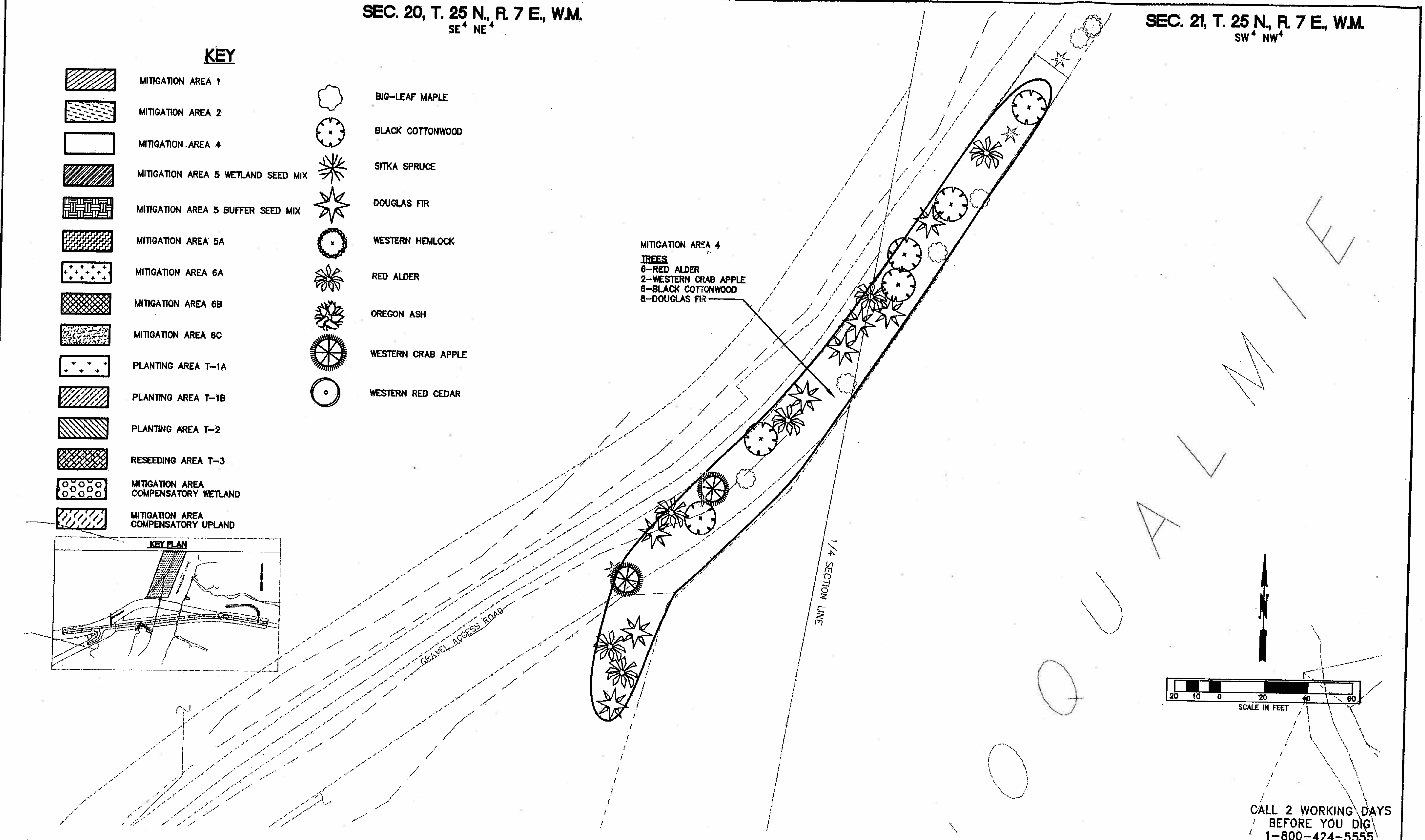
CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8

PAULETTE M. NORMAN
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

SHEET 43 OF 110 SHEETS



G:\200394-Tolt Bridge #1834A\Development-Design Work\CAD\OPT 007 DESIGN CAD\Task O3D DESIGN CAD\d9_LANDSCAPE\200394_LANDS3.dwg, 08/08/2005 03:23:26 PM, \\YAK\kso-25-m-copy

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005

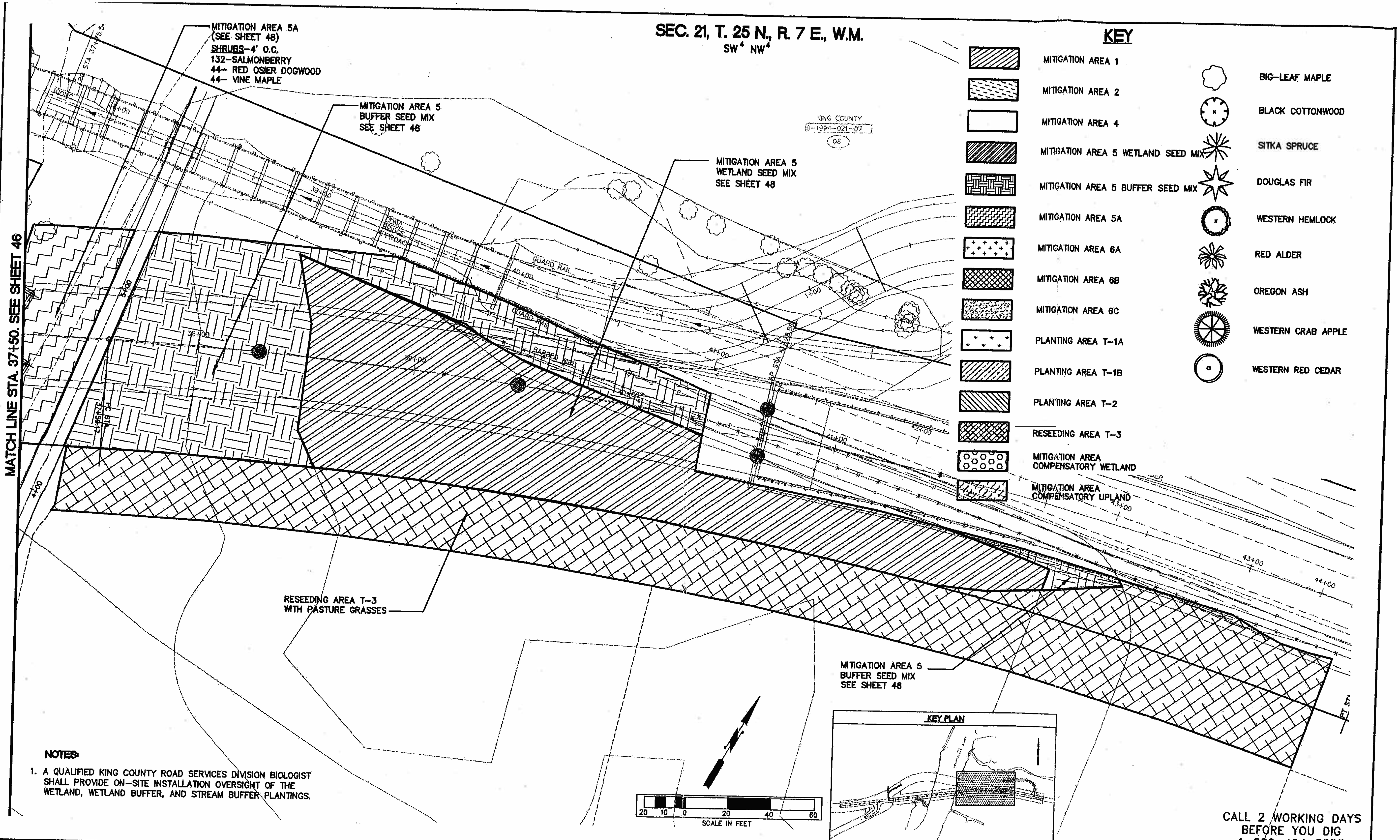
CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

SHEET 44 OF 110 SHEETS



NOTES:

1. A QUALIFIED KING COUNTY ROAD SERVICES DIVISION BIOLOGIST SHALL PROVIDE ON-SITE INSTALLATION OVERSIGHT OF THE WETLAND, WETLAND BUFFER, AND STREAM BUFFER PLANTINGS.

CALL 2 WORKING DAYS BEFORE YOU DIG 1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005
SUPERVISOR:	-	-

NUM. REVISION BY DATE

CADD / 70 % 8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8
MAINTENANCE DIVISION No. 2

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

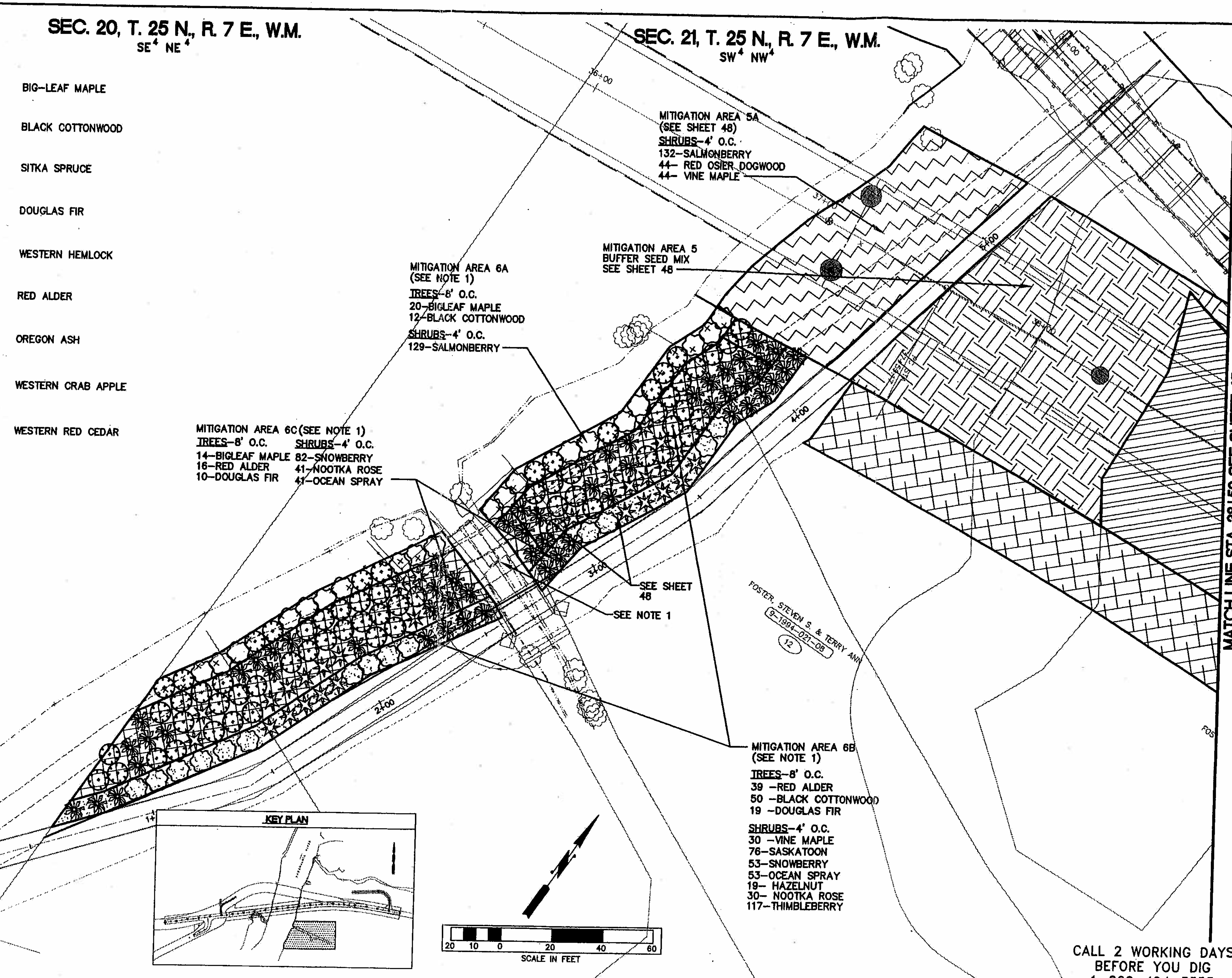
SHEET 45 OF 110 SHEETS

G:\200394-Tolt Bridge #1834A\Development-Design Work\CAD\OPT 007 DESIGN CAD\Task O3D DESIGN CAD\d9_LANDSCAPE\200394_LANDS5.dwg, 08/08/2005 03:03:21 PM, \\YAK\kso-2ft-m-copy

KEY

- MITIGATION AREA 1
- MITIGATION AREA 2
- MITIGATION AREA 4
- MITIGATION AREA 5 WETLAND SEED MIX
- MITIGATION AREA 5 BUFFER SEED MIX
- MITIGATION AREA 5A
- MITIGATION AREA 6A
- MITIGATION AREA 6B
- MITIGATION AREA 6C
- PLANTING AREA T-1A
- PLANTING AREA T-1B
- PLANTING AREA T-2
- RESEEDING AREA T-3
- MITIGATION AREA COMPENSATORY WETLAND
- MITIGATION AREA COMPENSATORY UPLAND

- BIG-LEAF MAPLE
- BLACK COTTONWOOD
- SITKA SPRUCE
- DOUGLAS FIR
- WESTERN HEMLOCK
- RED ALDER
- OREGON ASH
- WESTERN CRAB APPLE
- WESTERN RED CEDAR



NOTES:

1. DO NOT PLANT TREES ON CULVERT.
2. DIMENSIONS MAY CHANGE. FIELD CONDITIONS WILL DETERMINE PLANT PLACEMENT. A QUALIFIED KING COUNTY ROAD SERVICES DIVISION BIOLOGIST SHALL PROVIDE ON-SITE INSTALLATION OVERSIGHT OF THE WETLAND, WETLAND BUFFER, AND STREAM BUFFER PLANTINGS.

CALL 2 WORKING DAYS BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005
SUPERVISOR:	-	-

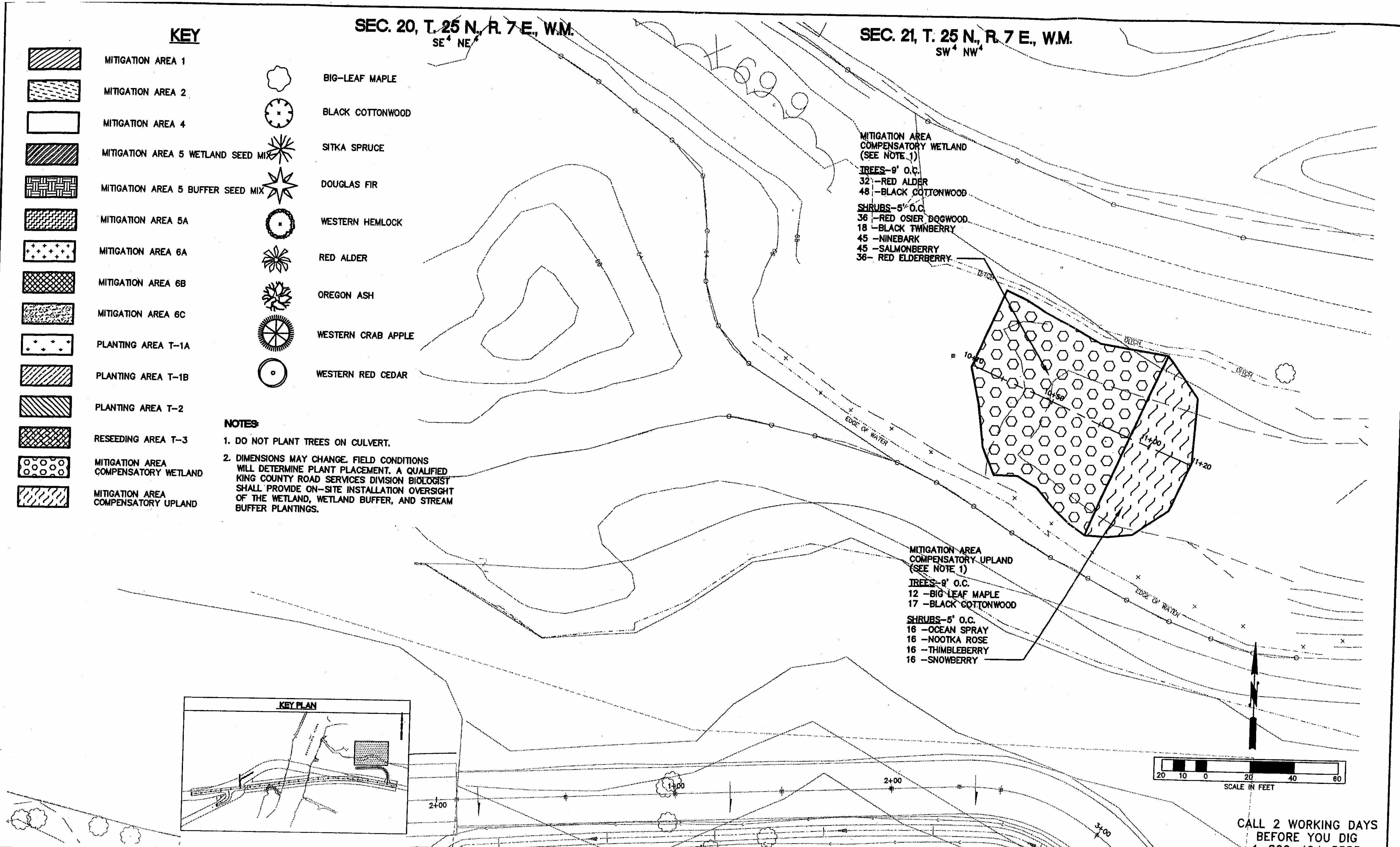
CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8
MAINTENANCE DIVISION No. 2

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

SHEET 46 OF 110 SHEETS



FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005
SUPERVISOR:	-	-

NUM. REVISION BY DATE

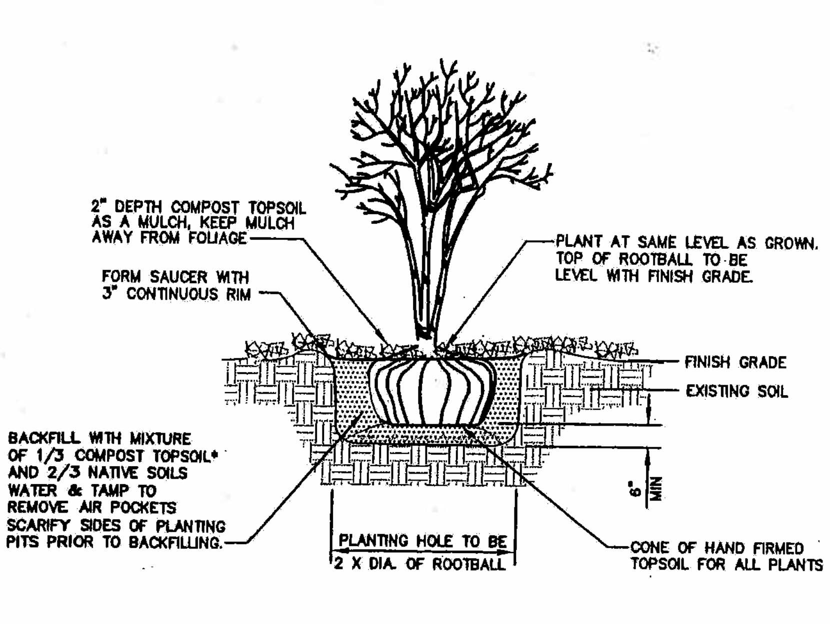
CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8
MAINTENANCE DIVISION No. 2

PAULETTE M. NORMAN — STATE OF WASHINGTON — 28116 — REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

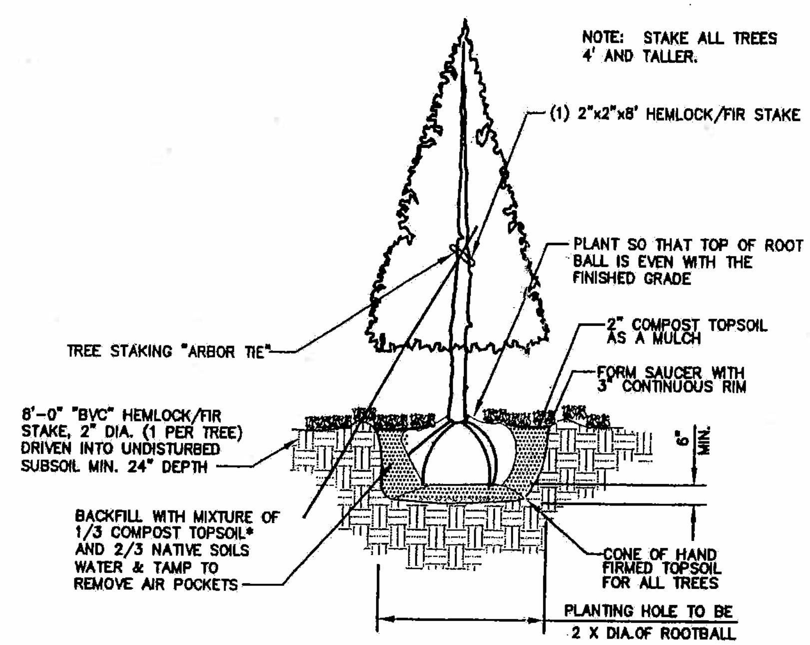
SHEET **47** OF **110** SHEETS



1 SMALL TREE AND SHRUB PLANTING

NTS

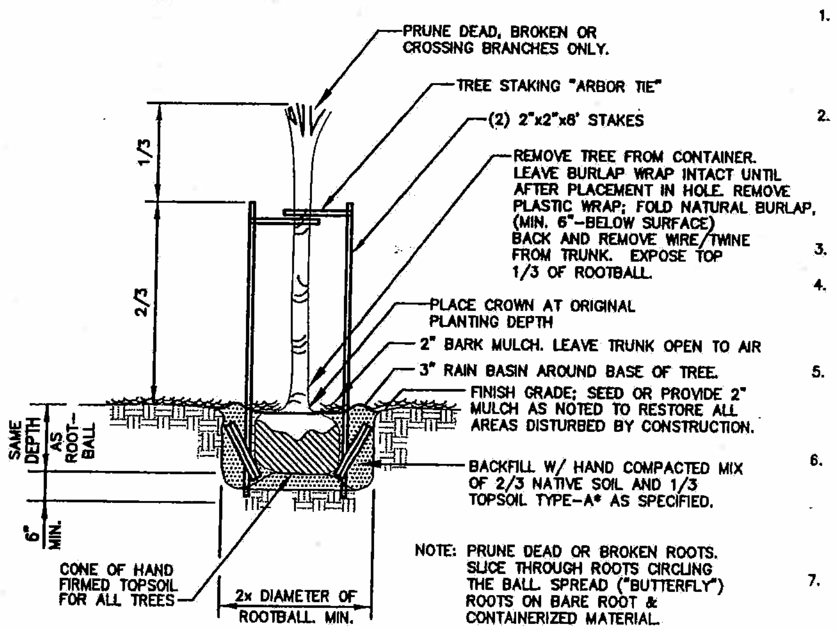
*NOTE: OMIT COMPOST TOPSOIL FOR IN-FILL PLANTINGS AS DIRECTED BY THE RSD BIOLOGIST.



2 CONIFEROUS TREE PLANTING

NTS

*NOTE: OMIT COMPOST TOPSOIL FOR IN-FILL PLANTINGS AS DIRECTED BY THE RSD BIOLOGIST.



3 DECIDUOUS TREE PLANTING

NTS

*NOTE: OMIT TOPSOIL TYPE-A FOR IN-FILL PLANTINGS AS DIRECTED BY THE RSD BIOLOGIST.

MITIGATION PLAN NOTES:

1. PRIOR TO MITIGATION CONSTRUCTION, CLEARING LIMITS SHALL BE CLEARLY IDENTIFIED WITH ORANGE PLASTIC FENCING. KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST SHALL VERIFY AND APPROVE FENCE LOCATIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL ARRANGE TO MEET ON SITE WITH ENGINEER AND BIOLOGIST PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO DISCUSS ACCESS, LIMITS OF WORK AND METHODS. CONSTRUCTION ACTIVITIES SHALL NOT COMMENCE UNTIL ACCESS, LIMITS OF WORK, AND METHODS ARE APPROVED BY THE ENGINEER OR KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST.
3. SEE CIVIL PLANS FOR GRADING INFORMATION.
4. MITIGATION PLANTING PLANS REPRESENT A CONCEPTUAL PLANT LAYOUT. FINAL PLANT LOCATIONS SHALL BE DETERMINED AT THE TIME OF PLANTING BY KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST.
5. WITHIN ALL DISTURBED AREAS TO BE PLANTED OR SEEDED, PROVIDE AND INSTALL FOUR (4) INCH DEPTH OF COMPOST (PER SPEC) ROTOTILLED TO A TWELVE (12) INCH MIN. DEPTH.
6. ALL PLANTS SHALL BE NURSERY GROWN A MINIMUM OF ONE YEAR. PLANT MATERIAL IS TO BE SUPPLIED BY COMMERCIAL NURSERIES THAT SPECIALIZE IN PLANTS NATIVE TO THE PACIFIC NORTHWEST. PLANT SUBSTITUTIONS ARE SUBJECT TO APPROVAL BY KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST.
7. MITIGATION PLANTING SHALL TAKE PLACE DURING THE DORMANT SEASON (NOVEMBER 1ST AND FEBRUARY 28TH). PLANTING MAY BE ALLOWED AT OTHER TIMES AFTER REVIEW AND WRITTEN APPROVAL BY KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSING OF ALL DEBRIS AND EXCESS SOIL OCCASIONED BY THIS PROJECT.
9. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION.
10. THE ENGINEER SHALL APPROVE GRADING PRIOR TO PLANT INSTALLATION.
11. ALL DIMENSIONS FOR PLANT SIZES ARE MINIMUM REQUIREMENTS.
12. EXISTING AREAS DISTURBED BY CONSTRUCTION ACTIVITIES AND NOT SHOWN TO BE RE-VEGETATED ON THESE PLANS SHALL BE RESTORED AND SEEDED.
13. DISCREPANCIES BETWEEN THE PLANS AND SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND KING COUNTY'S DEPARTMENT OF TRANSPORTATION BIOLOGIST PRIOR TO PROCEEDING.
14. NO TACKIFIER, HERBICIDE OR FERTILIZER SHALL BE USED IN THE WETLAND/STREAM PLANTING AREAS.
15. SEE CIVIL DWG'S FOR TEMPORARY EROSION CONTROL MEASURES.

PLANT MATERIAL LIST

SCIENTIFIC NAME	COMMON NAME	QUANTITY	SIZE	CONDITION
ACER MACROPHYLLUM	BIGLEAF MAPLE	53	1 IN. CAL., 5-6 FT. MIN.	BALL & BURLAP
ALNUS RUBRA	RED ALDER	93	1 IN. CAL., 5-6 FT. MIN.	BALL & BURLAP
FRAXINUS LATIFOLIA	OREGON ASH	15	1 IN. CAL., 5-6 FT. MIN.	BALL & BURLAP
MALUS FUSCA	WESTERN CRAB APPLE	10	1 IN. CAL., 5-6 FT. MIN.	BALL & BURLAP
PICEA SITCHENSIS	SITKA SPRUCE	13	5-6 FT. MIN. HT.	BALL & BURLAP
POPULUS TRICHOCARPA	BLACK COTTONWOOD	197	5-6 FT. MIN. HT.	BALL & BURLAP
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	37	5-6 FT. MIN. HT.	BALL & BURLAP
TSUGA HETEROPHYLLA	WESTERN HEMLOCK	4	5-6 FT. MIN. HT.	BALL & BURLAP
THUJA PLICATA	WESTERN RED CEDAR	21	5-6 FT. MIN. HT.	BALL & BURLAP
SHRUBS				
ACER CIRCINATUM	VINE MAPLE	132	18 IN. NOT LESS THAN 2 CANES	CONTAINER
CORNUS SERICEA VAR. SERICEA	RED-OSIER DOGWOOD	149	18 IN. NOT LESS THAN 2 CANES	CONTAINER
CORYLUS CORNUTA	HAZELNUT	19	18 IN. NOT LESS THAN 2 CANES	CONTAINER
OPLOPANAX HORRIDUS	DEVIL'S CLUB	42	18 IN. NOT LESS THAN 2 CANES	CONTAINER
PHYSOCARPUS CAPITATUS	NINEBARK	184	18 IN. NOT LESS THAN 2 CANES	CONTAINER
LONICERA INVOLUERATA	BLACK TWINBERRY	118	18 IN. NOT LESS THAN 2 CANES	CONTAINER
SAMBUCUS RACEMOSA	RED ELDERBERRY	103	18 IN. NOT LESS THAN 2 CANES	CONTAINER
ROSA NUTKANA	NOOTKA ROSE	87	18 IN. NOT LESS THAN 2 CANES	CONTAINER
RUBUS PARVIFLORIS	THIMBLEBERRY	133	18 IN. NOT LESS THAN 2 CANES	CONTAINER
RUBUS SPECTABILIS	SALMONBERRY	635	18 IN. NOT LESS THAN 2 CANES	CONTAINER
SALIX LASIANDRA	PACIFIC WILLOW	33	18 IN. NOT LESS THAN 2 CANES	CONTAINER
SYMPHORICARPOS ALBUS	SNOWBERRY	151	18 IN. NOT LESS THAN 2 CANES	CONTAINER
HOLODISCUS DISCOLOR	OCEAN SPRAY	110	18 IN. NOT LESS THAN 2 CANES	CONTAINER
AMELANCHIER ALNIFOLIA	SASKATOON	76	18 IN. NOT LESS THAN 2 CANES	CONTAINER

WETLAND SEED MIX		**PERCENT BY WEIGHT**
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	50
FESTUCA RUBRA "CHEWINGS"	RED FESCUE	20
CALAMAGROSTIS CANADENSIS	BLUEJOINT REEDGRASS	15
DECHAMPSIA CESPITOSA	TUFTED HAIRGRASS	10
CALAMAGROSTIS CANADENSIS	CANADA REED	3
TRIFOLIUM REPENS	WHITE DUTCH CLOVER	2
BUFFER SEED MIX		
FESTUCA RUBRA "CHEWINGS"	RED FESCUE	40
ELYMUS GLAUCUS	BLUE WILDRYE	20
FESTUCA IDAHOENSIS	IDAHO FESUE	30
TRIFOLIUM REPENS	WHITE DUTCH CLOVER	3
DECHAMPSIA CESPITOSA	TUFTED HAIRGRASS	7

CALL 2 WORKING DAYS
BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:	1641 & 1641B	
SURVEYED:	DIXON	07/02
SURVEY BASE MAP:	FG	08/02
DESIGN ENTERED:	NAK	07/2005
DESIGNED	L. NGUYEN	07/2005
CHECKED:	R. SHULAR/L. LAI	07/2005

CADD / 70 %
8-2005

FED. AID No. BROS-2017(037)
PROJECT No. 200394
SURVEY No. 21-25-7-8

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
HAROLD TANIGUCHI, DIRECTOR
TOLT BRIDGE NO. 1834A
NE TOLT HILL ROAD

SHEET 48 OF 110 SHEETS

Revised Figure 4. Potential Construction Schedule - Tolt Bridge (#1834A) Replacement Project

Item ID	Name	Duration	Early Start	Early Finish	Late Start	Late Finish	Total Slack	Notes
1	NOTICE TO PROCEED	1 day	1/16/06	1/16/06	8/9/06	8/9/06	145 days	
2	CONSTRUCTION FISH WINDOW 2006	107 days	6/1/06	9/15/06	6/1/06	9/15/06	0 days	
3	CONSTRUCTION FISH WINDOW 2007	107 days	6/1/07	9/15/07	6/1/07	9/15/07	0 days	
4	CONSTRUCTION FISH WINDOW 2008	107 days	6/1/08	9/15/08	6/1/08	9/15/08	0 days	
5	2005-06 BALD EAGLE WINTERING SEASON-NO PILE DRIVING/REMOVAL	88 days	10/31/05	3/1/06	10/31/05	3/1/06	0 days	
6	2006-07 BALD EAGLE WINTERING SEASON-NO PILE DRIVING/REMOVAL	83 days	10/31/06	3/1/07	10/31/06	3/1/07	0 days	
7	MOBILIZATION	6 days	3/2/06	3/9/06	9/29/06	10/6/06	148 days	
8	FLOOD PLAIN EXCAVATION AND LANDSCAPE	45 days	8/15/06	10/17/08	10/20/08	12/19/08	559 days	
9	CONSTRUCT TRESTLE	319 days	3/10/06	6/12/07	10/9/06	6/22/07	8 days	
10	Temporary Trestle - West Side	20 days	3/10/06	4/6/06	10/9/06	11/3/06	148 days	Will be left in place over winter 2006-07
11	Temporary Trestle in River - includes pile driving in river	12 days	6/1/07	6/12/07	6/11/07	6/22/07	10 days	Calendar Days
12	STEEL PROCUREMENT	121 days	2/1/06	7/21/06	8/10/06	2/1/07	134 days	
13	Order Steel	1 day	2/1/06	2/1/06	8/10/06	8/10/06	134 days	
14	Steel procurement and fabrication	120 days	2/2/06	7/21/06	8/11/06	2/1/07	134 days	
15	EAST SIDE SURCHARGE LOADING - Including fill and 1st stage MSE Wall	100 days	7/10/06	11/29/06	2/26/07	7/16/07	159 days	
16	DRILLED SHAFTS	36 days	4/28/06	6/19/06	11/29/06	3/22/07	148 days	
17	Mobilization - West Side	4 days	4/28/06	5/3/06	11/29/06	12/4/06	148 days	
18	Pier 1	2 days	5/4/06	5/5/06	12/5/06	12/6/06	148 days	
19	Pier 2	8 days	5/8/06	5/17/06	12/7/06	12/18/06	148 days	
20	Mobilization - East Side	2 days	5/18/06	5/19/06	1/5/07	1/8/07	159 days	
21	Pier 6	6 days	5/22/06	5/30/06	1/9/07	1/16/07	159 days	
22	Pier 5	3 days	5/31/06	6/2/06	3/5/07	3/7/07	191 days	
23	Pier 4	3 days	6/5/06	6/7/06	3/8/07	3/12/07	191 days	
24	Pier 3	8 days	6/8/06	6/19/06	3/13/07	3/22/07	191 days	In water work only after June 1
25	COLUMNS	27 days	5/24/06	6/30/06	12/26/06	4/11/07	148 days	
26	Pier 5	5 days	6/9/06	6/15/06	4/5/07	4/11/07	207 days	
27	Pier 4	5 days	6/14/06	6/20/06	4/5/07	4/11/07	204 days	
28	Pier 3	5 days	6/26/06	6/30/06	3/29/07	4/4/07	191 days	
29	Pier 2	5 days	5/24/06	5/31/06	12/26/06	1/2/07	148 days	
30	PIER CAPS	54 days	5/17/06	8/2/06	1/12/07	5/4/07	165 days	
31	Pier 1 Abutment	12 days	5/17/06	6/2/06	1/17/07	2/1/07	168 days	
32	Pier 2	15 days	6/12/06	6/30/06	1/12/07	2/1/07	148 days	
33	Pier 6 Abutment - Includes form/pour/strip/cure	20 days	6/9/06	7/7/06	1/26/07	2/23/07	159 days	
34	Pier 5	10 days	6/27/06	7/11/06	4/23/07	5/4/07	207 days	
35	Pier 4	10 days	6/30/06	7/14/06	4/23/07	5/4/07	204 days	
36	Pier 3	15 days	7/13/06	8/2/06	4/16/07	5/4/07	191 days	
37	EAST APPROACH SPAN	158 days	3/2/06	10/12/06	2/8/07	7/16/07	191 days	
38	Order girders	60 days	3/2/06	5/24/06	6/8/07	8/30/07	322 days	
39	Girders delivered on-site	1 day	8/2/06	8/2/06	5/7/07	5/4/07	191 days	
40	Place Girders	10 days	8/3/06	8/16/06	5/5/07	5/18/07	191 days	
41	Form/Pour/Strip Deck	40 days	8/17/06	10/12/06	5/21/07	7/16/07	191 days	
42	TRUSS BRIDGE CONSTRUCTION	303 days	7/24/06	9/30/07	2/2/07	10/15/07	11 days	
43	Erection and Placement of West Side - Steel Truss #1	45 days	7/24/06	9/25/07	2/2/07	4/6/07	134 days	
44	Form and pour deck span, Span #1	30 days	9/26/06	11/6/07	4/9/07	5/18/07	134 days	
45	Paint steel Truss #1	30 days	11/21/06	1/5/07	6/5/07	7/16/07	134 days	
46	Approach slabs, utilities, drainage, barrier, surfacing, Stage 2 MSE wall, etc.	65 days	1/8/07	4/9/07	7/17/07	10/15/07	134 days	
47	Erection and Placement of Steel Truss #2 over Snoqualmie River	35 days	6/13/07	7/17/07	6/23/07	6/27/07	10 days	Calendar Days
48	Form and pour deck, Span #2	35 days	7/18/07	8/21/07	7/28/07	8/31/07	10 days	Calendar Days
49	Paint steel Truss #2	30 days	9/1/07	9/30/07	9/12/07	10/15/07	11 days	Calendar Days
50	REMOVE TEMP TRESTLE IN RIVER AND SPAN #2 SUPPORT BENTS	15 days	8/22/07	9/5/07	9/1/07	9/15/07	10 days	Calendar Days
51	REMOVE WEST SIDE TEMP TRESTLE (SPAN #!)	10 days	9/6/07	9/15/07	12/8/08	12/19/08	366 days	Calendar Days
52	TRAFFIC ON NEW BRIDGE	0 days	9/30/07	9/30/07	10/15/07	10/15/07	11 days	
53	MITIGATION PLANTING 2007	30 days	10/1/07	11/9/07	11/10/08	12/19/08	287 days	
54	REMOVE EXISTING BRIDGE	23 days	6/2/08	7/2/08	8/13/08	9/12/08	52 days	
55	MITIGATION PLANTING AND FINAL LANDSCAPING 2008	70 days	9/15/08	12/19/08	9/15/08	12/19/08	0 days	
56	PROJECT COMPLETE	0 days	12/19/08	12/19/08	12/19/08	12/19/08	0 days	

*All durations are working days except as noted