CONCEPTUAL MITIGATION PLAN

Mary Olson Farm
Olson Creek Pedestrian Bridge
Auburn, Washington

May 12, 2015

RAEDEKE ASSOCIATES, INC.

Raedeke Associates, Inc.

Wetland & Aquatic Sciences
Wildlife Ecology
Landscape Architecture

Report To:	Patricia Cosgrove White River Valley Museum 918 H Street SE Auburn, WA 98002
Title:	Conceptual Mitigation Plan for the Mary Olson Farm Olson Creek Pedestrian Bridge Auburn, Washington
RAI Project Number:	2014-022-004
Prepared by:	RAEDEKE ASSOCIATES, INC. 9510 Stone Avenue North Seattle, Washington, 98103 (206) 525-8122
Date:	May 12, 2015

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Wildlife Ecology
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Signature

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1.0 INTRODUCTION

1.1 PURPOSE

Raedeke Associates, Inc. was retained by the White River Valley Museum to prepare this conceptual mitigation plan for buffer impacts to Olson Creek and adjacent wetlands from a proposed pedestrian bridge crossing of Olson Creek within the Mary Olson Farm in Auburn, Washington (Figure 1).

Raedeke Associates, Inc. (2015) previously investigated the project area and delineated the ordinary high water mark (OHWM) of Olson Creek and the boundaries of two wetlands, one within the OHWM of the creek and a second wetland just south of the creek and east of the project area. Direct impacts to the stream channel or two wetlands are not proposed by the White River Valley Museum; however, the bridge and a portion of trail would be within the buffer for Olson Creek and the two wetlands. The City of Auburn (2015) requires mitigation for impacts to sensitive areas and/or their buffers.

1.2 PROPERTY LOCATION

The Mary Olson Farm is located at 28728 Green River Road in Auburn, Washington (Figure 1). Specifically, the project site is located in the southwest quarter of the southwest quarter of Section 5, Township 21 North, Range 5 East, W.M. and the northwest quarter of the northwest quarter of Section 32, Township 22 North, Range 5 East, W.M.

The study area is located within the southern portion of the farm, east of Green River Road and south of the farmhouse. The study area encompasses the area extending approximately 100 feet upstream and downstream of the current location of the proposed bridge (Figure 2). The study area also includes the area within 200 feet of the proposed bridge and road/pathway approach on the north and south of stream bank.

1.3 RESPONSIBLE PARTIES

The White River Historical Museum and/or their designees would be responsible for the implementation of this mitigation plan.

Project Proponent:
White River Valley Museum
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Ms. Patricia Cosgrove
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1.4 PROJECT SITE DESCRIPTION

The 60-acre Mary Olson Farm is located adjacent to the east bank of the Green River, on east side of Green River Road. The farm is operated as a partnership between the White River Valley Museum and the City of Auburn. The working farm includes several historic buildings and is open to the public for guided tours and other events.

1.4.1 Olson Creek

Olson Creek, a City of Auburn (2015) Class II stream, flows through Mary Olson Farm property on the east and south sides of the farm entrance road into the property (Figure 2). Raedeke Associates, Inc. (2015) delineated a portion of the OWHM of Olson Creek within approximately 100 feet east and west of the proposed bridge location on April 29, 2014 (Figure 2).

1.4.2 Wetlands

Raedeke Associates, Inc. (2015) also identified and delineated portions of two wetlands within the project area (Figure 2).

Wetland 1 is located entirely within the OHWM of Olson Creek on several vegetated sandbars, just east and upstream of the proposed bridge location. The wetland extends approximately 150 feet upstream to a point where sandbars are not present and the stream channel consists solely of pools and riffles. Wetland vegetation in the vicinity of the proposed bridge crossing consists of red alder (*Alnus rubra*) trees and an understory of salmon raspberry (*Rubus spectabilis*), subarctic lady fern (*Athyrium filix-femina*), common velvet grass (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), creeping buttercup (*Ranunculus repens*), and small enchanter's nightshade (*Circaea alpina*). Wetland 1 meets criteria to be regulated as Category III and is provided a buffer range of 25 to 50 feet under City of Auburn (2015) code (Raedeke Associates, Inc. 2015).

Wetland 2 is a seep area, south of Olson Creek, that extends to the east of the proposed bridge crossing. Wetland 2 is separated from Olson Creek by a small natural levee along the east and south banks of the creek. The wetland extends to the south along the toe of slopes, east of a pasture area in the south portion of the Mary Olson Farm property. Wetland vegetation in the vicinity of the bridge crossing consists of red alder primarily of Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalaris arundinacea*). Portions of the wetland farther to the east and extending south along the base of a slope include forested and emergent vegetation communities. Wetland 2 meets criteria to be regulated as Category III and is provided a buffer range of 25 to 50 feet under City of Auburn (2015) code (Raedeke Associates, Inc. 2015).

1.4.3 Wetland and Stream Buffers

Buffers for Olson Creek, Wetland 1, and Wetland 2 overlap considerably in the proposed location of the pedestrian bridge. The entrance road for the farm and associated mowed grass shoulder extends within the north stream and wetland buffer in the vicinity of the proposed bridge. A 15- to 30-foot-wide zone of native trees and shrubs is situated between the entrance road grass shoulder and the creek.

Buffer on the south side of the creek consists of fenced pasture that is actively grazed within a portion of the wetland and stream buffer. As with the buffer on the north side of the creek, a 15- to 30-foot-wide zone of native trees and shrubs is between the grazed pasture and the creek. Invasive Himalayan blackberry is also prevalent within the buffer on the south side of the creek.

1.5 Project Overview

The White River Valley Museum proposes to construct a pedestrian and livestock bridge across Olson Creek. The bridge would (1) provide access from a fenced pasture area south of the creek to barns located north of the creek and (2) provide a viewpoint for students and other visitors to the farm to view stream ecology, particularly during the fall when thousands of students visit the farm to observe spawning salmon.

Construction of the bridge would eliminate the current practice of fording the cattle through the creek and would allow students to observe salmon without trampling delicate stream bank areas. Therefore, it is likely that construction of the bridge would substantially reduce impacts to stream channel and riparian habitat that currently occur.

1.5.1 Bridge Design and Construction Concept

The proposed pedestrian bridge would be a 40-foot-long span with a 5-foot-wide surface. The bridge would be supported by poured-in-place concrete footings located outside the OHWM. The approach to the north end of the bridge would be gravel trail or ramp leading up to the bridge deck on a 1:12 slope to allow handicap access to the bridge deck for stream viewing. Access to the south end of the bridge would also be by a gravel ramp; however, in order to minimize wetland and stream buffer impacts on the south side of the creek, it would be more steeply sloped and not constructed to meet handicap access standards as it would only be needed to provide a means for movement of cattle back and forth across the creek.

Construction access for construction of the bridge footings would be from the north side of the creek. The concrete slab bridge deck would be lowered into place from the north side using a small crane or similar equipment. Temporary access across the creek to the south bank by laborers would be provided by a plank elevated above the stream channel to allow laborers to cross the creek repeatedly without entering the stream.

1.6 Impacts to Streams and Wetlands

Buffers for Olson Creek and Wetlands 1 and 2 substantially overlap in the location of the proposed pedestrian bridge. Approximately 500 square feet (sq. ft.) of wetland and stream buffer would be permanently removed in order to construct the bridge. The location of the bridge has been sited to entirely avoid removal of trees greater than 4 inches diameter-breast-height (dbh) within the buffer and limit removal woody vegetation to a single western red cedar sapling and two small willow shrubs.

Per ACC 16.10.100, all impacts to wetlands and streams and their buffer must be mitigated according to standards mitigation standards as identified in ACC 16.10.110, and the performance standards of ACC 16.10.120 and the monitoring requirements of ACC 16.10.130. Therefore, mitigation for proposed impacts to wetland and stream buffers would be provided as described in Sections 2 through 6 below, and includes an area of buffer enhancement adjacent to Olson Creek that substantially exceeds the area of buffer impacts that would occur in order to construct the proposed bridge.

2.0 MITIGATION OVERVIEW

Mitigation has been defined by the State Environmental Policy Act (SEPA) (WAC 197-11-768; cf. Cooper 1987), and more recently in a Memorandum of Agreement between the Environmental Protection Agency and the COE (Anonymous 1989). In order of desirability, mitigation may include:

- Avoidance - avoiding impacts by not taking action or parts of an action;
- Minimization - minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Compensatory Mitigation - may involve:
  a) repairing, rehabilitating, or restoring the affected environment;
  b) replacing or creating substitute resources or environments;
  c) mitigation banking.

2.1 MITIGATION APPROACH AND SEQUENCE

2.1.1 Avoidance of Impacts

Direct impacts to Olson Creek, Wetland 1, and Wetland 2 would be avoided. The proposed pedestrian bridge would result in the loss of a small area of buffer for Olson Creek, Wetland 1, and Wetland 2.

2.1.2 Minimization of Impacts

The grading plan incorporates a number of design features that would minimize or limit impacts to Olson Creek, Wetland 1, and Wetland 2, and their buffers, including:

- Align bridge and approach pathways on the north and south sides of the creek channel to avoid removal trees and minimize removal of sapling trees or shrubs. This would limit removal of sapling trees to a single western arborvitae (*Thuja plicata*, f.k.a. western red cedar) and one Sitka willow (*Salix sitchensis*) shrub;
- Clearly mark the limits of stream and wetland boundaries prior to construction activities to prevent inadvertent or unnecessary encroachment;
- Use of spill control measures during mixing of concrete, and cleanup after use of the concrete, for the footings at the site;
- Install and maintain temporary and permanent soil erosion control measures (TESC Plan) during and after construction, consistent with best management practices, as required by the City of Auburn, including placement of straw bales and silt fencing between work activities and adjacent wetlands or stream channels, designed to prevent sediment from entering these surface waters during and after construction. Soil excavated for the footings will be hauled off-site or temporarily covered by plastic sheeting away from the stream;

- No work would occur below the OHWM of Olson Creek;
- Install a temporary plank across the stream to allow laborers to cross the creek repeatedly without entering the stream;
- All site grading and buffer restoration/enhancement would be done during the dry season or the anticipated fish work window as designated by Washington Department of Fish and Wildlife;
- Employ spill control measures during concrete mixing, and cleanup for the footings at the site;
- All site grading and buffer restoration/enhancement would be done during the dry season (approximately April 1 through October 31;
- All work adjacent to Olson Creek would be completed with clean equipment in good condition with no evidence of petroleum product leakage. All equipment would be inspected, serviced, and cleaned off-site to prevent leakage or any contamination of the water;
- Emergency spill response and clean-up equipment would be available on site during all work activities. At a minimum, this kit will include material for containment and clean-up of petroleum product;
- No fueling or servicing of construction vehicles would be permitted within the project work area;
- Telephone numbers of appropriate agency/department contacts would be readily available on-site in case a spill should occur (e.g., Washington Department of Ecology, City of Auburn Fire Department Hazmat Team, City of Auburn Fire and Rescue).

2.1.3 Compensatory Mitigation Overview

Direct Impacts to Wetlands and Streams

Direct stream and wetland impacts would be avoided under the proposed development plan; therefore, in-stream mitigation or wetland mitigation through creation, re-establishment, rehabilitation, or enhancement is not proposed.

Wetland and Stream Buffer Impacts

Approximately 500 sq. ft. of wetland and stream buffer would be removed in order to construct the proposed bridge and approach paths on the north and south sides of the creek. The City of Auburn (2015) requires compensatory mitigation for any proposed loss or alteration of stream or wetland buffers. A total of approximately 2,525 sq. ft. within three separate areas of stream and wetland buffer would be enhanced through removal of Himalayan blackberry and/or installation of native trees and shrubs as compensatory mitigation for the proposed buffer impacts.

2.2 Mitigation Goals and Objectives

The overall goal of the compensatory mitigation would be to increase the existing level of protection provided by the buffer for wetland and stream functions.

The enhanced/restored wetland buffer is designed to be a low maintenance, self-sustaining community resembling native forest habitat typical of the Puget Sound lowlands. Evaluation and performance standards for these goals are found in Section 5.0.

The specific objectives of the buffer enhancement plan are the following:

1) Enhance approximately 140 sq. ft. of wetland and stream buffer through installation of 4 additional native coniferous trees within Area A;
2) Enhance approximately 1,595 sq. ft. of wetland and stream buffer through removal of existing non-native Himalayan blackberry within Area B;
3) Enhance approximately 790 sq. ft. of wetland and stream buffer through removal of existing non-native Himalayan blackberry and installation of 8 additional native coniferous trees and 32 additional native shrubs within Area C.

3.0 BUFFER ENHANCEMENT PLAN

Compensatory mitigation for 500 sq. ft. of impacts to Olson Creek, Wetland 1, and Wetland 2 buffers would consist of a total of 2,525 sq. ft. of buffer enhancement along the north and south banks of Olson Creek (Figure 3).

The overall goal of the compensatory mitigation is to increase the existing level of protection provided by the buffer for wetland and stream functions. The enhanced and restored wetland/stream buffers are designed to be a low maintenance, self-sustaining community consisting of plant species typical of native forest habitat typical of the Puget Sound lowlands. Evaluation and performance standards for these goals are found in Section 5.0.

3.1 SITE PREPARATION

Prior to site preparation, the limits of the buffer planting areas would be clearly marked (staked) in the field by appropriate means with the assistance of the project biologist. Prior to commencement of construction activities, Olson Creek, Wetland 1, and Wetland 2 would be protected through installation of a silt fence consistent with Best Management Practices, as required by the City of Auburn, in order to limit the potential for sediment deposition or erosion within the wetland/stream buffers. Following excavation and grading for construction of the bridge foundations and planting within the wetland/stream buffers, all bare soil areas would be stabilized through installation of sterile straw, shredded bark mulch, or native grass seed.

All Himalayan blackberry and other invasive species within the wetland/stream buffer enhancement areas, including root mass, would be removed prior to planting. Existing native trees and shrubs would be marked by the project biologist for retention prior removal of Himalayan blackberry and other invasive species.

Grading and other construction activities within the wetland/stream buffers adjacent to the creek would occur only within areas that are above the OHWM.

3.2 PLANT SPECIES COMPOSITION

Tree and shrub plantings would consist of Douglas fir, western arborvitae (f.k.a. western red cedar), beaked hazelnut, red elderberry, snowberry, Nootka rose, four-line honeysuckle (f.k.a. black twinberry), oso-berry (f.k.a Indian plum) and Pacific ninebark (Figure 4).

3.3 PLANT SPECIFICATIONS, AND INSTALLATION

All plant materials would be locally grown and be of local provenance. Tree stock would be two or five gallon container, 3- to 4-feet tall, and well-rooted and branched. Trees would be planted on approximately 9-foot centers or as field located by the project biologist. Shrub stock would be one gallon, 18- to 24-inches tall, well-rooted and

branched. Shrub plantings would be field located by the project biologist and spaced on 5-foot centers.

All plantings would be installed in pits that are approximately twice the diameter of the root ball. Soil amendment consisting of compost from a permitted solid waste composting facility would be added to planting backfill in order to promote tree and shrub establishment and vigorous growth. Shredded bark mulch would be installed in 24-inch collars around each planting in order to prevent or minimize establishment of invasive plant species and to conserve soil moisture.

The project biologist would review plant materials, soil amendment, and mulch quality and quantity for consistency with the approved plans, as well as review and approve plant locations and supervise installation procedures. Review and approval by the project biologist is required prior to installation of tree and shrub plantings, soil amendments, or mulch within the buffer enhancement areas.

3.4 Planting Schedule

All soil disturbing activities for removal of Himalayan blackberry would occur between March 1 and September 30 unless otherwise specified by state or federal agencies for permits that may be required for project implementation. All such work at any time of the year during inclement weather will not be permitted to occur without prior approval by the project biologist.

Planting would occur between October 1 and March 1 to take advantage of seasonal rains and greater availability of plant material. Planting at any other time or during periods of abnormally hot, dry, or freezing weather conditions would not occur without prior approval by the project biologist and may require plant substitutions and supplemental irrigation.

4.0 MONITORING PROGRAM

Because of the variable success of wetland mitigation projects in the Pacific Northwest, the City of Auburn (2015) requires that mitigation areas be monitored in order to evaluate their success in replacing lost wetland values and functions. Therefore, this plan includes a systematic monitoring program of the enhanced and restored upland buffers to evaluate the success of the mitigation efforts. The results of the monitoring will be used to develop needed modifications to or alterations of the site in subsequent years.

The purposes of the monitoring program are as follows: (1) to document physical and biological characteristics of the enhanced and restored wetland buffers, and (2) to ensure that the goals and objectives comply with permit specifications (Josselyn et al. 1990).

The monitoring process would consist of three distinct phases: (1) construction monitoring; (2) compliance monitoring; and (3) long-term monitoring. Construction monitoring serves to ensure proper site preparation and plant placement relative to actual site conditions. The "time-zero" or baseline composition, structure, and cover abundance would be documented during the compliance monitoring phase. The long-term monitoring program would document the survival of planted vegetation and rates of colonization by other plants (i.e., in bare soil areas) over a three-year period after implementation of the mitigation plant is completed.

4.1 CONSTRUCTION MONITORING

The project biologist would be present on-site during the various stages of construction in order to: (1) demark the limits of the areas to be planted; (2) review and approve the plant materials and recommend their final placement before planting; (3) make adjustments in planting plans, as needed, in response to field conditions; (4) ensure that construction activities are conducted per the approved plan; and (5) resolve problems that arise during construction, thus lessening problems that might occur later during the long-term monitoring phase.

4.2 COMPLIANCE MONITORING

Compliance monitoring consists of evaluating the buffer enhancement/restoration areas immediately after grading and planting activities are completed. The objectives would be to verify that all design features, as agreed to in the buffer enhancement plan, have been correctly and fully implemented, and that any changes made in the field are consistent with the intent and the design of the approved plan. Evaluation of the planting areas after implementation would be done by the landscape architect and project biologist using evaluation standards and criteria detailed in Section 5.0.

After grading and planting of the buffer areas are completed, two fixed sample plots would be established randomly within Area C. Rather than establishment of fixed sample plots within Areas A and B, the entirety these areas would be evaluated due to their small size. The same sample plots would be utilized during each subsequent monitoring of the

site during the three-year long-term monitoring. During compliance monitoring, a quantitative assessment of the plants established in the buffer would be recorded in representative sample plots for baseline data. Photos would be taken from each sample plot. This information would be used to document "time-zero" conditions from which the long-term monitoring period would begin.

The compliance monitoring phase would conclude with the preparation of a brief compliance report by the project biologist. The report would document whether all design features have been correctly, fully, and successfully implemented. Substantive changes made in the planting plans would be noted in the compliance report and on the drawings for use during the long-term monitoring phase. Locations of monitoring sample plots established for the compliance monitoring would be identified on the as-built plans.

The planting plans along with the compliance report, would document "as-built" conditions at the time of construction compliance. The compliance report and as-built plan would be submitted to the City of Auburn for approval.

4.3 Long-Term Monitoring

Long-term monitoring would be conducted over three growing seasons following approval of the compliance report and as-built plan by the City of Auburn. Long-term monitoring would evaluate the establishment and maintenance of the plant communities in the enhanced and restored wetland buffers to determine if the goals and objectives of the mitigation plan have been met.

At each sample plot, plant species would be identified and plant counts would be made during the each year of the long-term monitoring in order to document the percent survival of each planted species. Plant identifications would be made according to standard taxonomic procedures described in Hitchcock and Cronquist (1976), with nomenclature as updated by the U.S. Army Corps of Engineers National Wetland Plant List (Lichvar and Kartesz 2009). Signs of planting stress or damage, presence of invasive species, as well as signs of vigor, and rates of colonization by other plants (i.e., in bare soil areas) would be documented during each year of the long-term monitoring.

Photos would be taken annually to provide physical documentation of the condition of the mitigation areas. Photographs would be taken from all locations established during the compliance monitoring site visit and each year thereafter of the monitoring period from the established location points.

4.4 Monitoring and Reporting Schedule

Formal monitoring of the enhanced and restored wetland buffers would occur after the season's growth is virtually complete (recommended during August or September). In addition, spring and mid-summer site checks would be conducted during each year of the three-year long-term monitoring period to assess site progress and to determine whether site maintenance is needed.

Monitoring reports would be prepared following the completion of the growing season of each year of the three-year long-term monitoring period for submittal to the City of Auburn. The long-term monitoring period will commence following acceptance of the compliance report and "as-built" drawings by the City of Auburn.

Monitoring reports would be submitted for review and approval by the City of Auburn as soon as possible after the monitoring has been completed, with a target date of December 31 of each monitoring year. The report would document conditions within the enhanced and restored areas and make recommendations for correcting any problems encountered.

5.0 EVALUATION AND PERFORMANCE STANDARDS

Specific performance standards to be used in the three-year long-term monitoring are the following:

- 100% survival of all planted shrubs and trees following completion of the first year after planting. All plantings that do not survive during the first year must be replaced with the same or similar species and specifications. Upon installation of replacement plantings at the conclusion of the first year, the 100% survival performance standard will be considered to be met;
- 85% survival of all planted shrubs and trees following completion of the third year after planting. Sufficient plantings will be replaced, as necessary, with the same or similar species and specifications in order to meet the 85% survival standard. If the mitigation site fails to meet this performance standard, the reason for the failure will be evaluated, replacement plantings will be provided, and additional monitoring may be required by the City to verify that a self-sustaining native plant community has been established;
- There will be no more than 10% cover by Himalayan blackberry or other invasive plant species within the buffer enhancement areas, as identified by the project biologist at any time during the three-year monitoring period;
- Erosion control grass or mulch will have a cover of more than 80% following completion of the first growing season and thereafter for the duration of the 3-year long-term monitoring period within the buffer enhancement areas and other bare soils areas that are graded for bridge construction.

6.0 MAINTENANCE PLAN

6.1 IRRIGATION

Supplemental water will be provided to all tree and shrub plantings during the first two growing seasons following installation. Hand watering or a temporary irrigation system may be used. Irrigation will occur from May 1 through September 30 or other periods of hot, dry weather and will deliver approximately 1 inch of water per week throughout the buffer enhancement area. If watered by hand, then the minimum watering requirements will be 1 to 3 gallons of water for small shrubs and 3 to 5 gallons per week for sapling trees and large shrubs. These minimum requirements are guidelines that may vary depending on plant location, exposure, soil condition, and presence of existing vegetation. Any erosion will be rectified immediately upon discovery.

6.2 SITE MAINTENANCE

The enhanced buffer is designed to be self-sustaining. To ensure the success of the plantings, additional replanting and control of undesirable plant species may be necessary after initial installation. This maintenance plan includes all actions required to maintain plants free of insects and disease, control competition with grasses and weeds, and limit die-back or mortality due to inadequate soil moisture to be within performance standards specified above in Section 5.0.

Upon completion of installation of the pedestrian bridge and buffer enhancement plantings, all surplus material, equipment, and debris shall be removed from the mitigation site. All silt fences will be removed from within the enhanced/restored buffer after the adjacent herbaceous vegetation is well-established or as approved by the City of Auburn.

The site maintenance program would commence upon approval of the compliance report and as-built plan by the City. The site would be regularly maintained for the duration of the long-term monitoring period specified above in Section 4.3. The project biologist would inspect the site during spring (March-April) and mid-summer (June-July) during each year of the long-term monitoring period to identify any developing problems within the mitigation site. Items to be evaluated within the buffer enhancement and restoration areas include irrigation system operability (if applicable), presence of invasive species, plant health, animal damage to plantings, and presence of trash.

The project biologist would submit a written summary of his/her findings along with maintenance recommendations to the project proponent and the City within 7 days after completion of his/her inspection. Maintenance recommendations would be implemented by the project proponent within 14 days of receipt from the project biologist.

Invasive species would be controlled by methods that do not compromise the rest of the buffer plantings. Unless otherwise authorized by the project biologist, removal of

invasive species will be done by hand, with hand pulling of all weeds within the drip ring of any installed shrub or tree. No weed-whipping with mechanized line trimmers will be allowed between woody plants within cluster or clumped plantings.

7.0 CONTINGENCY PLAN

Contingency plans are needed if post-buffer enhancement monitoring shows that objectives and performance standards have not been met. It should be noted, however, that it is not possible to develop a detailed contingency plan until the specific problems that need to be addressed are known. It would be unproductive to try to anticipate all possible problems and their solutions at this time.

However, common problems, both human and natural, that might arise can be identified and general remedial recommendations proposed. For example, if after the second year, area cover or species composition by planted trees and shrubs is not at an acceptable level, it may be necessary to replant with new or different stock, provide additional watering or irrigation during critical seasons, or augment the soil. Table 1 lists factors that might adversely affect wetland buffers or wetland hydrology, and contingencies to ensure the success of the project.

As noted in Section 6.2, spring and mid-summer site checks will be made during each year of the long-term monitoring to determine if there are any developing problems within the mitigation site prior to the long-term monitoring site visits. With early identification, plant replacement, additional irrigation, or maintenance can be accomplished prior to the long-term monitoring site visits and thus, development of the mitigation site can be better assured.

Implementation of a contingency plan may require extension of the monitoring phase of the project, especially if major changes in the plan are required. The project biologist should make recommendations for identified problems. All contingency measures must be reviewed and approved by the City of Auburn.

8.0 LIMITATIONS

We have prepared this report for the exclusive use of White River Valley Museum and their consultants. No other person or agency may rely upon the information, analysis, or conclusions contained herein without permission from the White River Valley Museum.

The determination of ecological system classifications, functions, values, and boundaries is an inexact science, and different individuals and agencies may reach different conclusions. With regard to wetlands, the final determination of their boundaries for regulatory purposes is the responsibility of the various agencies that regulate development activities in wetlands. We cannot guarantee the outcome of such determinations. Therefore, the conclusions of this report should be reviewed by the appropriate regulatory agencies.

We warrant that the work performed conforms to standards generally accepted in our field, and prepared substantially in accordance with then-current technical guidelines and criteria. The conclusions of this report represent the results of our analysis of the information provided by the project proponent and their consultants, together with information gathered in the course of the study. No other warranty, expressed or implied, is made.

9.0 LITERATURE CITED

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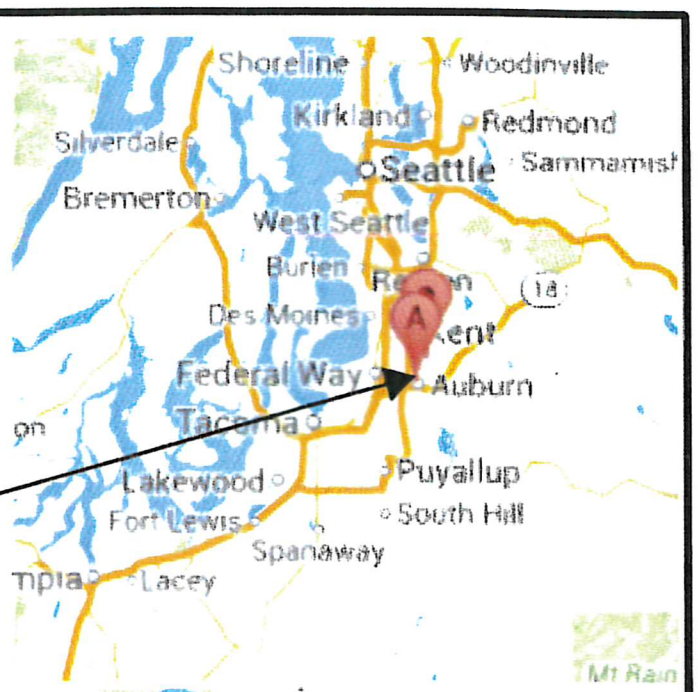
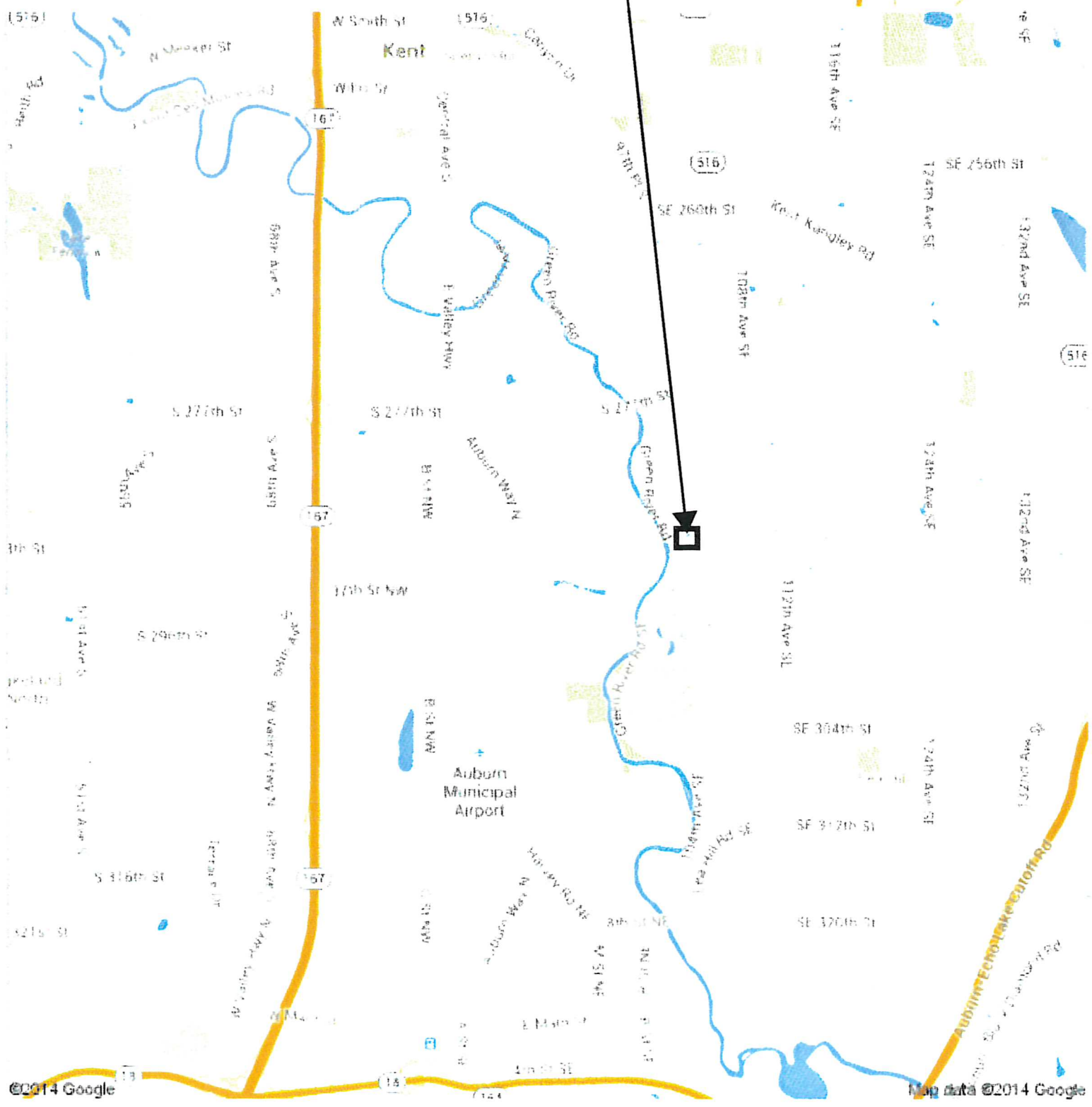
FIGURES AND TABLES

PROJECT LOCATION





Maps from Google (accessed 5/27/14). Available at https://maps.google.com.

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FIGURE 1

REGIONAL & VICINITY MAP

MARY OLSON FARM

AUBURN, WA

Raedeke Associates, Inc.

RAI # 2014-022

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FIGURE 2

WHITE RIVER VALLEY MUSUEM

MARY OLSON FARM

CONCEPTUAL MITIGATION PLAN

EXISTING CONDITIONS

LEGEND

- EXISTING CONTOURS
- OHW-# ORDINARY HIGH WATER (OHW) FLAG LOCATIONS
- ORDINARY HIGH WATER LINE
- OLSON CREEK
- WETLAND
- WL1-# WETLAND FLAG LOCATION
- SP-# SAMPLE PLOT LOCATIONS

GUARDRAIL

FENCE

GRAVEL ROAD ENTRANCE ROAD

CREEK

OHW-N-9
OHW-N-8
OHW-N-7
OHW-N-6
OHW-N-5
OHW-N-4A
OHW-N-4
OHW-N-3
OHW-N-2
OHW-N-1
OHW-S-9
OHW-S-8
OHW-S-7
OHW-S-6
OHW-S-5
OHW-S-4
OHW-S-3
OHW-S-2
OHW-S-2A
OHW-S-1

SP-12
SP-11
SP-10
SP-9
SP-8
SP-7
SP-6
SP-5
SP-4
SP-3
SP-2
SP-1

2-1 2-2 2-3 2-4 2-5 2-6 2-7 2-8 2-12 2-13 2-14 2-15 2-16 2-17

OLSON CREEK

EX. CULVERT

WETLAND 1
LOCATED WITHIN
CREEK CHANNEL

WIRE FENCE

WETLAND 2

GREEN RIVER ROAD

GREEN RIVER

(Wetland continues to the South.)

NORTH 0 20' 40' 80'

SCALE: 1" = 40'

Raedeke Associates, Inc.
9510 Stone Avenue North
Seattle, WA 98103

RAI PROJECT: 2014-022	
DATE: MAY 12, 2015	
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BASE INFORMATION:
PROVIDED BY CITY OF AUBURN & PARAMETRIX

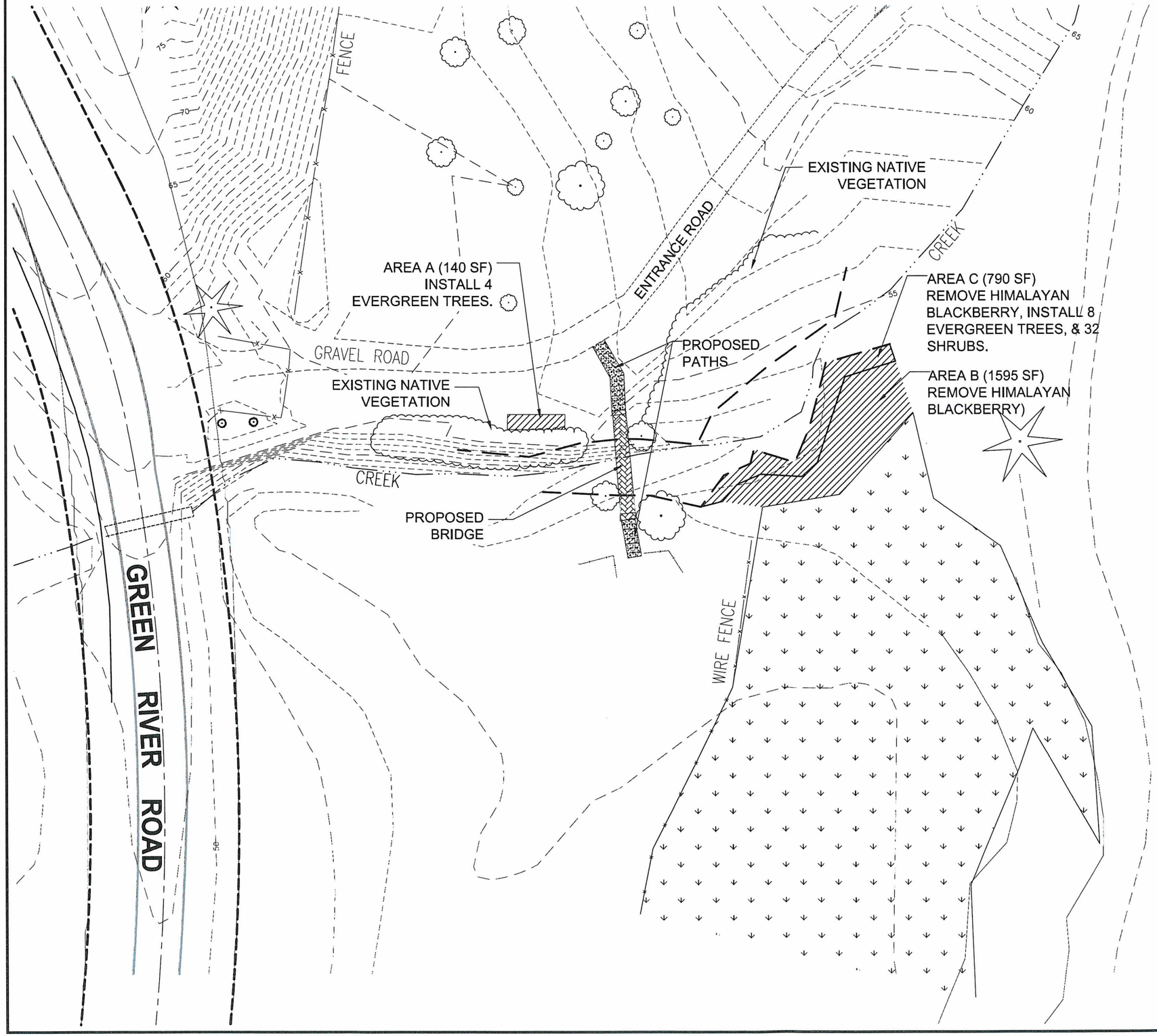
FIGURE 3

WHITE RIVER VALLEY MUSUEM

MARY OLSON FARM

CONCEPTUAL MITIGATION PLAN

SITE PLAN, IMPACTS & MITIGATION



LEGEND

- ORDINARY HIGH WATER LINE
- OLSON CREEK
- WETLAND
- STREAM & WETLAND BUFFER IMPACT 500 SF
- BUFFER ENHANCEMENT 2,525 SF
- APPROXIMATE BOUNDARY OF EX. NATIVE VEGETATION

NORTH 0 20' 40' 80'

SCALE: 1" = 40'

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FIGURE 4
WHITE RIVER VALLEY MUSUEM
MARY OLSON FARM
CONCEPTUAL MITIGATION PLAN
PLANT SCHEDULE & DETAILS

PLANT LEGEND

TREES

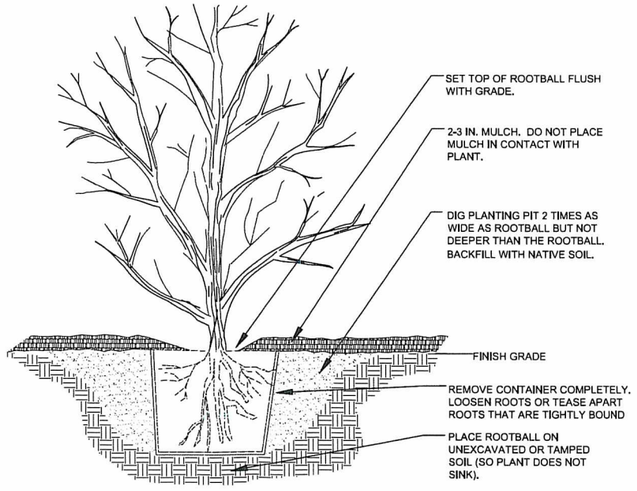
SCIENTIFIC NAME	COMMON NAME	WIS STATUS	MIN. SIZE	QTY.	REMARKS	SPACING
Pseudotsuga menziesii	Douglas Fir	FACU	4' tall	6	MUST HAVE LEADER & BE IN GOOD HEALTH	FIELD LOCATED
Thuja plicata	Western red Arborvitae	FAC	4' tall	6	MUST HAVE LEADER & BE IN GOOD HEALTH	FIELD LOCATED

SHRUBS

SCIENTIFIC NAME	COMMON NAME	FAC STATUS	MIN. SIZE (container)	QTY.	REMARKS	SPACING
Corylus cornuta	Beaked Hazelnut	FACU	5 gal.	5	FULL & BUSHY	FIELD LOCATED
Lonicera involucrata	Four-line Honeysuckle	FAC	1 gal.	5	FULL & BUSHY	FIELD LOCATED
Oemleria cerasiformis	Osoberry	FACU	2 gal.	4	FULL & BUSHY	FIELD LOCATED
Physocarpus capitatus	Pacific Ninebark	FACW	3 gal.	4	FULL & BUSHY	FIELD LOCATED
Rosa nutkana	Nootka Rose	FAC	1 gal.	5	FULL & BUSHY	FIELD LOCATED
Sambucus racemos	Red Elder	FACU	2 gal.	4	FULL & BUSHY	FIELD LOCATED
Symphoricarpos albus	Common Snowberry	FACU	1 gal.	5	FULL & BUSHY	FIELD LOCATED

PLANTING NOTES:

1. Remove all garbage and debris from buffer enhancement areas A, B, & C.
2. Dig out and remove all non-native, invasive plant species from buffer enchantment areas A, B, & C.
3. All plants to be placed in the field by the project biologist.
4. Install plants per detail. All plants must be locally grown and in good condition.
5. Apply at least 1" of water to plants following installation.
6. After all plants have been installed, spread 3" of a good quality bark mulch around the newly installed plants in the buffer enhancement areas.



1 CONTAINER TREE OR SHRUB PLANTING DETAIL
NTS

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Table 1. Factors that may adversely affect wetland creation or enhancement and potential contingencies to ensure success.

Problem	Potential Remedial Action[1]
Plant Performance	
- low survival	Replant, water, weed, replant with different species
- low plant vigor	Amend soil
- noxious weeds invade	Manual weed removal
- predation by animals	Fencing to be removed once plants are established
Undesirable Plant Community	Evaluate value, remove and replant, if necessary
Vandalism	Evaluate source, whether one-time or continuing problem
- dumping of debris	Remove debris & educate public
- damaged plant material	Replant first year, post signs, fence access
- foot or bike traffic	Replant first year, post signs, fence access
Erosion	Evaluate source, cause; install appropriate erosion control measures; plant with species that have dense root systems; regrade, if necessary.
Excessive soil water	Evaluate response and adaptability of plants, communities; replant with vegetation adapted to corresponding moisture regime, if needed.

Table 1. Continued.

Problem	Potential Remedial Action[1]
Inadequate soil water	Evaluate conditions, cause; divert water to wetland, regrade, or irrigate as appropriate.
Drought	Irrigate

1 The potential actions listed are those commonly employed. No contingency plan can foresee all problems and appropriate solutions. For each site, problems encountered need to be evaluated on a case-by-case basis. If a more effective remedy than those listed is identified, it will be considered.