Chelan County Natural Resource Department
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Nason Creek Lower White Pine Oxbow Reconnection Project
Final Report

Submitted by: Alan Schmidt
April 14, 2014

Project Description

Construction of the Burlington Northern Sante Fe (BNSF) railroad in the 1890's disconnected Nason Creek from152 acres of floodplain wetland. In addition, the railroad prism blocked access to four perennial tributaries, Coulter, Roaring, Gill and Knutson Creek basins which account for 15% of the flows in the Nason Creek basin.

The Bureau of Reclamation (Reclamation) completed the Nason Creek Tributary Assessment in 2008 and the Lower White Pine Reach Assessment in 2009. These assessments identified anthropogenic impacts to Nason Creek and potential project areas that benefit ESA-listed fish species. Following completion of the Reach Assessments, ICF Jones & Stokes worked with Chelan County Natural Resources Department (CCNRD), the Wenatchee Habitat Sub-Committee, and the Regional Technical Team to complete a prioritization of all potential project areas in Nason Creek. The Lower White Pine floodplain reconnection project ranked as one of three projects in Nason Creek that is anticipated to provide the highest biological benefit to ESA listed salmon. This is the largest single project for floodplain reconnection within the Nason Creek subbasin. Thus, CCNRD has been working with Reclamation to design and obtain permits for project implementation in 2013.

Multiple alternatives were evaluated during project development and design to reconnect the two cut-off meanders. Design for two connection locations (downstream and B+) were taken to 30% design and the downstream connection point was selected as the preferred alternative by the Design Team in March 2011, based on construction feasibility and landowner constraints associated with the B+ upstream location. Project engineering, final design and permitting was completed by the Bureau of Reclamation in the spring of 2013.

Project construction included the following elements:

- Construction of a bridge under the BNSF road prism to replace undersized culverts to reconnect surface waters of Nason Creek and 152 acres of floodplain wetland
- Excavation within the floodplain to enhance the surface water connection between Nason Creek and the floodplain wetland (removal of RR prism)
- Site restoration including revegetation

The project provides the following benefits to ESA listed spring Chinook, steelhead, and bull trout:

- Hydraulic reconnection of the 152 acres of floodplain area which reconnects 39% of the 385 acres of disconnected
  floodplain within the Nason Creek subbasin.
- Hydraulic reconnection of the Coulter, Roaring, Gill, and Knutson creek basins, accounting for a reconnection of
  15% of the Upper Nason Creek subbasin.
- Fish access to 72.7 acres of high flow and 6.8 acres of low-flow rearing and refuge habitat.
- Steelhead access to 1 mile of lower Coulter Creek.
- Steelhead and Chinook access to 0.75 mile of lower Roaring Creek.

The Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan recognizes that the lack of

off-channel/floodplain habitat as a primary habitat-limiting factor for listed salmonids in Nason Creek. Thus, the project goals are to reconnect flows and fish to off-channel refuge and foraging habitat, directly addressing the primary habitat-limiting factor affecting anadromous fish populations in Nason Creek.

Reclamation has funded project design, permitting and project management. CCNRD has facilitated project development and permitting with landowners, stakeholders, and permitting agencies.

Project partners include:

- Bonneville Power Administration – Construction Funding, project support and stakeholder.
- Bureau of Reclamation –Design, engineering, technical studies and project support.
- Burlington Northern Santa Fe Railway - Landowner
- Chelan County Natural Resource Department –Project Sponsor
- Coordination Team (Multiple Agencies) – Funding coordination
- Design Team (Multiple Agencies) – Selection of preferred alternatives
- ICF – Project Manager: Design, technical support, and permitting.
- Private Landowners – Landowners
- Upper Columbia Salmon Recovery Board –
- United States Forest Service –Monitoring plan development
- Yakama Nations -Fish use monitoring.

Project Design and Engineering

Engineering and technical assistance for this project was provided to the CCNRD by the U.S. Bureau of Reclamation (Reclamation) and Reclamation's subcontractors (ICF International, Hanson Professional Services, and CH2M HILL).

The CCNRD has been working with Burlington Northern Santa Fe (BNSF) Railway Company representatives since 2007 to develop feasible methods for reconnecting flows from Nason Creek to abandoned floodplain and habitats adjacent to the BNSF Railway tracks near Merritt, Washington. Throughout this time BNSF provided detailed feedback concerning its requirements, which the project team used during the evaluation of the project alternatives. This concept submittal follows closely the criteria for design and construction as outlined in the Guidelines for Railroad Grade Separation Projects (BNSF – Union Pacific Railroad 2007).

An analysis of connection alternatives identified the location at BNSF MP 1690.58 as the preferred location for reconnection at the downstream end of the historic Nason Creek channel (ICF International 2010, 2011a). This location has several advantages, including the following:

- This bridge would allow the elimination of three 48-inch-diameter, 60-foot-long concrete pipes and provide a vastly improved hydraulic connection for both flood flow conveyance and fish migration between Nason Creek and the disconnected habitats (U.S. Bureau of Reclamation 2011).

- The bed of Nason Creek and the bed of the disconnected oxbow channel are at the same elevation at this location. This allows the excavated opening under the bridge to connect the two sides with a zero slope channel that will have very low-flow velocity.

The Nason Creek channel and oxbow channel are both directly against the railroad embankment at this location so there is no need to create a channel to connect the two waterbodies once the bridge was in place and the embankment fill under the railroad tracks removed.

Biological Benefits associated with the construction of the Downstream bridge:

- The downstream reconnection has low velocities during typical spring flow events thus allowing juvenile fish passage into the Coulter and Roaring Creek habitat complex areas.
- Juvenile fish access during spring flow events from the downstream opening to the upstream Gill Creek Complex is possible due to the wetted channel connection along the BNSF grade, but access is limited due to the length of the channel (appx. 2,000 feet).
- Overall, the removal of the downstream impoundment will provide hydraulic reconnection of the 152 acres of floodplain area - 39% of the 385 acres of disconnected floodplain within the Nason Creek subbasin. This is the largest single project for floodplain reconnection within the Nason Creek subbasin.
- The improved hydraulic connectivity between the Coulter, Roaring, and Gill Creek basins will reconnect 14.9% of the Upper Nason Creek subbasin.
- Fish will have access to 72.7 acres of high flow and 6.8 acres of low flow rearing and refuge habitat.
- Steelhead will have access to 1 mile of lower Coulter Creek.
- Steelhead and Chinook will have access to 0.75 mile of lower Roaring Creek.
- Hydraulic reconnection of 152 acres of Category 1 wetland to Nason Creek (Hurby 2004)
    - 81 acres of Palustrine Forested habitat, 53 acres of Palustrine Scrub-Shrub Habitat, and 18 acres of Palustrine Emergent habitat to Nason Creek.

Public Outreach

BNFS and Landowner Coordination - CCNRD, through a state-awarded Salmon Recovery Funding Board (SRFB) grant and a Cooperative Agreement with Reclamation, began working with Reclamation, BNSF and other stakeholders to assess methods for constructing large openings in the BNSF rail prism to reconnect important and impounded floodplain habitats. CCNRD has focused on coordination efforts with the BNSF Railway, United State Forest Service (USFS) and over 70 total landowners and stakeholders. CCNRD has been working with affected landowners to discuss the project and possible landowner concerns on a regular basis since 2010. In addition to numerous site visits, phone calls and email exchanges with individuals and landowner groups, several public meetings have been held (June 2010, May 2011, May 2012, June 2013) where landowners provided considerable input to the project. Outreach for this

project was targeted to the Sunland Estates landowners, Dardanelle's Road landowners, and other adjacent river front property owners between RM 9.5 and 11.1. Pre-construction outreach and construction related outreach have been summarized in more detail in separate documents available upon request.

Project Elements

The construction consisted of:

a) Construction of a three-span CBG bridge with a total span length of 89 feet (spans between piers of 28 feet, 33 feet, and 28 feet at MP 1690.58).

b) Construction of an access road and working platform.

c) Excavation of the railroad prism material between the pilings/abutments to reconnect the mainstem with the tributaries.

d) Removal of a large beaver dam immediately upstream of the proposed bridge opening.

Principal components of the work included mobilization/demobilization, access road construction, bridge construction, isolation of work areas/coffer dams, fish removal, excavation within the railway prism, site clean-up, and reseeding and planting.

Work isolation and fish salvage has been summarized in a separate memorandum available upon request.

Project Construction Schedule

Construction occurred in the summer of 2013. BNSF was responsible for managing the construction of the bridge elements as funded by the Project Sponsor. The Chelan County Natural Resource Department was responsible for contracting and managing the construction of the access road, excavation of the existing railroad prism under the bridge, and construction of the connector channel and habitat elements as agreed to with BNSF.

Completion of this project required coordination of 2 construction efforts, construction of an access road on the south side of the existing BNSF railroad prism and the driving of 16 piles at the bridge site. Pile driving was accomplished from the top of the rail prism by a BNSF construction crew. Access road construction and pile driving was started on July 2 and completed by August 8 allowing a BNSF bridge construction crew to install the pre-cast concrete bridge structure within the permitted work window.

Following completion of the bridge the earthwork contractor excavated under the newly installed bridge and removed a portion of the access road to construct a connecting channel to Nason Creek. Daily observation logs are provided as a separate document.

Beaver Dam Removal

Immediately to the south of the proposed bridge opening an existing beaver dam was removed from Wetland-1. During typical flow conditions, the beaver dam caused a 2- to 4-foot change in water surface elevations immediately upstream and downstream of the dam. The beaver dam was removed to lower water surface elevations within the work area during construction, and to improve fish migration into the oxbow habitat following reconnection.

Construction Access and Staging

Equipment access for the new bridge site used the newly constructed access road and the rail line for construction of the bridge structure. The excavation of materials from under the bridge was accomplished from the temporary access road. A 1,650-foot-long access road was constructed on the south side of the railroad embankment from the rail crossing at the Dardenelles Road to the east side of the bridge site. The road crossed portions of Wetland-1. The road provided a top width of 12 feet, which is as narrow as possible to allow safe travel for construction equipment while minimizing impacts on wetland vegetation. The road has an average height of 6 feet above the existing ground and has a1.5:1 side slope. Road construction consisted of first cutting shrub vegetation at ground level, then laying a layer of geotextile fabric and a layer of geogrid mat. A minimum of 12 inches of rock was then placed on the geogrid. Native species sedge mat and riparian plants were installed within the impacted area of the project. Equipment and material staging occurred either from the rail or within the vicinity of the Dardenelles Road crossing, outside of sensitive areas.

Construction Equipment

The bridge structure was constructed from the access road and railroad. Equipment included a pile driver to drive the piles for foundations, a crane to lift precast concrete bridge deck pieces into place, an excavator to remove the upper portion of the railroad embankment to allow placement of the bridge components, and railroad vehicles to convey materials and equipment.

Equipment for excavation under the bridge and placement of riprap included a track-mounted excavator, dump trucks, a pump for dewatering the excavation area, and a separate pump to bypass flow from the upstream tributaries around the work area.

Construction

Construction contract was awarded to Hurst Construction on June 24, 2013. Hurst began mobilization of equipment and materials on July 2, 2013. At the same time sections of the H pile began to arrive at the BNSF switch yard at Merritt. BNSF crews began pile driving on July 1. Daily construction logs for pile driving are available in a separate document.

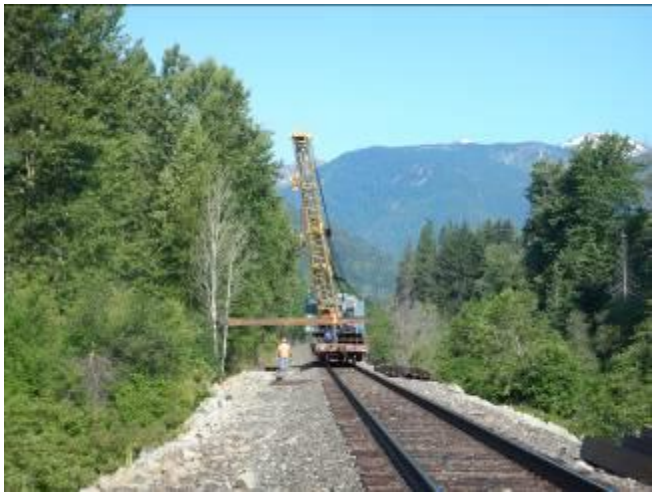
Hurst clearing vegetation and installing geo-grid as base for the access road.


Hurst utilizes 30 Cubic Yard off road hauler to place road ballast material.


Hurst crew installing turbidity curtain to isolate the construction site from Nason Creek.


Construction of the access road required installation of geo-foam blocks adjacent to the bridge.


BNSF stockpiled "H" piles at bridge location. BNSF crew using track mounted pile driver to drive "H" piles.



“H” piles were driven to an average 180 feet below track surface.

Work was completed during “track windows”.

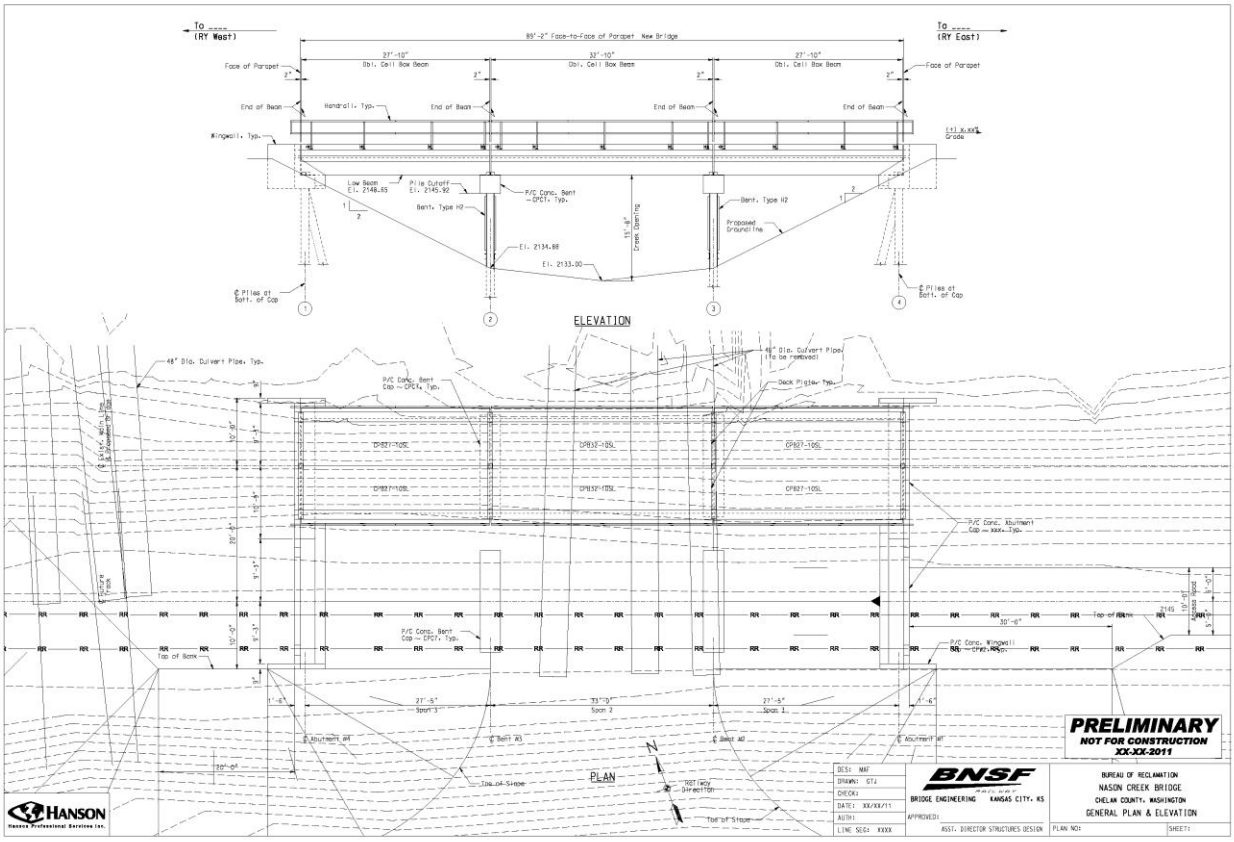

Excavation under the new railroad bridge required construction of a cofferdam isolating the work zone from Nason Creek.


The new bridge superstructure was installed by BNSF crews by September 2, 2014.

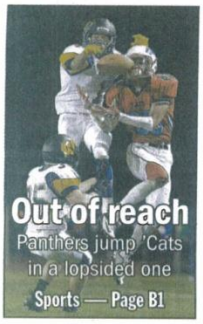

Excavation under the bridge was completed by September 9th, 2014.

Hurst crew removing sandbag cofferdam BNSF crew installing handrail on new bridge

Chelan County and ICF staff complete sedge matt installation and final planting
All construction by Hurst Construction and BNSF was completed by the end of October, 2014.



Plan and Profile of Bridge Design.



Out of reach
Panthers jump 'Cats in a lopsided one
Sports — Page B1

They're cookin'!
Customers are warming up to East Wenatchee's new grill
Business, Ag — Page C1

THE SUNDAY WORLD

SEPTEMBER 29, 2013

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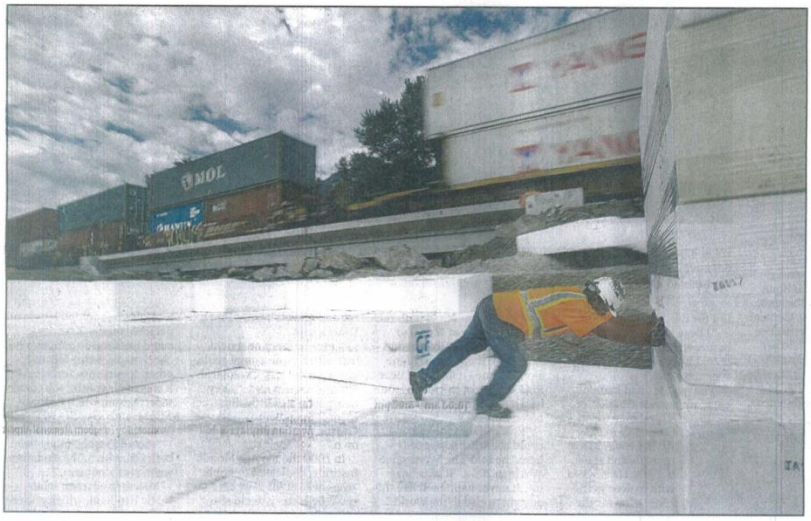
THE WAY BACK HOME



World photo/Don Seabrook

As a train passes by, Marcelo Varragan with Hurst Construction of Wenatchee pushes large Geofoam blocks to be hauled away from the site of a new railroad bridge, earlier this month. The blocks were used as a building platform. At top, a salmon — the main reason for the project — swims up Nason Creek.

Nason Creek railroad bridge will help salmon clear a century-old obstacle, return to wetlands

BY CHRISTINE PRATT
World staff writer

MERRITT — A half-dozen spring chinook nosed against a gentle current in the shallow, crystal waters of Upper Nason Creek early this month just downstream of history in the making.

Their offspring will, for the first time in more than a century, have access to a wetland and five mountain streams cut off when the Great Northern Railroad built its track across Stevens Pass in 1893.

The line severed an oxbow from the mainstem creek at a point that is today just across Highway 2 from the Nason Creek Campground rest area, 42 miles northwest of Leavenworth.

Culverts placed under the railbed let some water through, but have been an obstacle to the spring chinook and steelhead that once spawned in the creek's upper tributaries. Both species are now threatened.

During spring runoff, the culverts concentrated and intensified the waterflow, creating too strong a current for young fish. As the summer warmed and flow ebbed, the culverts were left high and dry, blocking passage entirely.

That will end next month with the completion of the Lower White Pine Project, a restoration effort considered to have the highest potential for benefitting chinook and steelhead in the Wenatchee River subbasin.

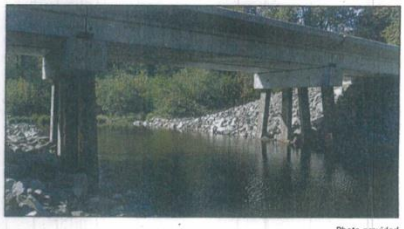


Photo provided

The new bridge takes shape.

BNSF Railway and Chelan County are using nearly $4 million in federal funding to restore flow to the old oxbow and its surrounding 152 acres of wetland. This will make 73 additional acres of streams and wetlands accessible to fish at periods of high flow and nearly 7 acres at low flow.

"This is a historical project. A precedent-setting project, and one of the only salmon-recovery projects that involves the

Please see BRIDGE, Page A7

Wenatchee World feature article September 29, 2013

AIA® Document G704™ – 2000

Certificate of Substantial Completion

PROJECT:
(Name and address)
Nason Creek Lower White Pine Oxbow Reconnection

PROJECT NUMBER: CCNRD 2013-01/
CONTRACT FOR: General Construction
CONTRACT DATE: June 14, 2013

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO OWNER:
(Name and address)
Chelan County
316 Washington Street
Suite 401
Wenatchee, Washingotn 98801

TO CONTRACTOR:
(Name and address)
Hurst Construction LLC
PO Box 990
Wenatchee, Washington 98807

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty — Date of Commencement

ARCHITECT — BY — DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: $0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

Hurst Construction LLC — CONTRACTOR
BY J. Hurst — 02.20.2014 — DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

Chelan County — OWNER
BY Ron Walter — 2/18/14 — DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

The project was declared substantially complete on October 18, 2014. The Chelan County Board of Commissioners approved Final Acceptance on March 20, 2014

Monitoring Plan

The project will be monitored to determine if the following project goals have been achieved:

1. Increase the ecosystem function of Nason Creek.
2. Increase growth and survival of juvenile Chinook salmon, steelhead trout, and bull trout in Nason Creek by providing rearing opportunity and capacity in the Lower White Pine reach.
3. Increase opportunities for spawning of salmon, steelhead trout, and bull trout in Nason Creek.

This monitoring program will be designed to complement and integrate with other long-term efforts in the Wenatchee basin and Nason Creek subbasin. Existing groups are conducting long-term monitoring of physical and biological parameters in Nason Creek to answer questions about population and habitat status and recovery (Maier 2011; Peven 2011), and in addition to the existing status and trends monitoring, the Project Sponsor will conduct implementation monitoring and Level 1 effectiveness monitoring, using methods developed by the CCNRD, USBOR, and UCSRB (Hillman 2005). CCNRD is working with USFS, USBOR, the Yakama Nation and the state and federal permitting agencies to draft performance standards and a monitoring plan applicable to this project. Ultimately, permit conditions will dictate monitoring procedures.

Long-term Stewardship and Maintenance Obligations

A Construction and Maintenance (C&M) Agreement was negotiated between the BNSF Railroad and Chelan County that addresses all the duties and responsibilities of each party regarding the construction of the proposed project and the maintenance requirements after construction of the structure. Projects of this size and scope are covered under the "Guidelines for Railroad Grade Separation Projects" that includes the policies, requirements and standards for the design and construction of this type of project. Under the guidelines it states "The Applicant, at its expense, shall be solely responsible for all costs, design, construction, future replacement, maintenance and serviceability of the proposed Grade Separation Project, except as noted otherwise in the C & M". The guidelines also state "The Applicant shall own, maintain and replace the proposed Underpass Structure at no cost to the Railroad and with no interruption to Railroad operations during construction, maintenance and future replacement of the Underpass Structure. The Railroad shall, at its own expense, be responsible for ownership and maintenance of track components only". BNSF is currently considering site- and area-specific factors to determine if they warrant deviation from the guidelines for grade separation projects; however, it must be emphasized that exceptions to standard guidelines are only granted under special conditions.

The CCNRD will be responsible for maintenance activities associated with the project site, including monitoring and preparation of reports. Coordination with BNSF and BPA will occur throughout the life of the project. In the event the site fails to meet any of the success criteria, the CCNRD will promptly notify BNSF and BPA and any other participating agencies to discuss potential corrective actions.

The CCNRD will take corrective actions as necessary, following the completion of planting, and following the receipt of additional project funding specific to the necessary actions. Corrective actions may include, but are not limited to additional plantings, control of invasive vegetation, and/or reseeding during the 3 years following plant establishment, as necessary.