JACOBS

ALTERNATIVES ANALYSIS

SANDPOINT JUNCTION CONNECTOR PROJECT

BNSF Montana Division, Kootenai River Subdivision, Line Segment 45, MP 2.9 +/- to 5.1+/- Bonner County, Idaho

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Pierre Bordenave, Director - Environmental

Jacobs Engineering Group, Inc.
101 North Fourth Avenue, Suite 203
Sandpoint, ID 83864
T +1.208.263.9391
F +1.208.263.7013
www.jacobs.com

Contents

Project Overview

BNSF Railway Co. (BNSF) proposes to construct a second mainline track connection between its Algoma Siding track and the Sandpoint Junction, where BNSF and the Montana Rail Link (MRL) mainlines join. This project is known as the “Sandpoint Junction Connector” (SJC).

BNSF has multiple projects on their Northern Tier rail line at any given time. Projects are selected based on maintenance requirements for existing track to ensure safe and efficient rail operations, improvements to interstate commerce efficiencies, and new track or infrastructure construction that addresses specific conditions that currently result in delays to passenger and freight service. The SJC project is an independent project that meets these selection criteria for improvements to rail operations in and through Sandpoint, Idaho, and the greater Sandpoint area.

The SJC project is not dependent upon any other BNSF maintenance, infrastructure, or rail capacity improvement project. This project has full independent utility and function for improving freight and passenger rail operations, both locally and regionally.

The purpose of this alternatives analysis is to evaluate and describe alternatives for the SJC project and determine if they are practicable and capable of meeting the project purpose.

The Corps Section 404(b)(1) guidelines are the criteria used to evaluate discharges of dredged or fill material into waters of the United States, including jurisdictional wetlands, under Section 404 of the Clean Water Act. A fundamental principle of the Section 404(b)(1) guidelines is that dredged or fill material should not be discharged into wetlands and other waters, unless it can be demonstrated that the discharge will not have unacceptable adverse impacts on those waters. The following criteria are to be followed:

1. The project is the least environmentally damaging practicable alternative (LEDPA),
2. The project will not cause or contribute to the violation of applicable Federal or state laws, e.g.: water quality standards, Endangered Species Act, Section 106 of the National Historic Preservation Act, Wild and Scenic River or designated Study River;
3. The project will not result in significant degradation of waters of the United States, and
4. Appropriate and practicable steps have been taken to minimize the adverse impacts of the project on wetlands and other waters. (U.S. Army Corps of Engineers, Seattle District, ‘Alternative Analysis Guidance,’ 10/23/2003).

The Office of Bridge Programs, US Coast Guard ‘Bridge Permit Application Guide requires: that new bridge proposals over navigable waters will be thoroughly reviewed for environmental aspects and impact consideration. The proposal(s) must describe the purpose and need of the bridge project along with significant cumulative impacts on the human environment, substantial controversy or change to existing environmental conditions; or inconsistencies with Federal, State, or local laws relating to the environment.

1. Project Purpose

Basic: The basic project purpose is to provide improvements for freight and passenger rail transportation to meet capacity needs.

Overall: The overall project purpose is to provide improved rail operations on the BNSF Kootenai River Subdivision Mainline by constructing a second mainline track connection between the BNSF Algoma Siding track south of Lake Pend Oreille, and the Sandpoint Junction, where BNSF and the Montana Rail Link (MRL) mainlines join just north of the Sandpoint Amtrak Station.

FIGURE 1. – PROJECT OVERVIEW

2. Project Need

The project need is based on continued growth of freight rail service demands in the BNSF northern tier, high-volume traffic corridor between the Midwest (Chicago Terminus) and the West Coast. The single mainline and portions of the over-water rail bridges date from the early 1900s. Rail traffic volumes have risen steadily for the past three decades in this portion of the interstate mainline becoming a constraint to interstate commerce in this region. This project will relieve system congestion of rail traffic, and reduce hold times on sidings and wait times at grade crossings, both locally and regionally.

3. Project Site Description and Setting

The project is located in the BNSF Montana Division, Kootenai River Subdivision, Line Segment 45, from BNSF Milepost 2.9+/- to 5.1+/- in Bonner County, Idaho; in portions of Sections 15, 22, 23, 25, 26, and 36, Township 57 North, Range 2 West, Boise Meridian; and is partially within the City of Sandpoint. Latitudinal and longitudinal coordinates for the north end (MP 2.9) of the project are 48°16'54.10"N, 116°32'49.35"W, and for the south end (MP 5.1) are 48°14'56.24"N, 116°31'24.02"W.

The study area vicinity is within Hydrological Unit Code (HUC) 17010214–Pend Oreille Lake. The north end of the project is a Transportation Corridor within the City of Sandpoint designated as Urban. From BNSF MP 2.9 – 3.9, the existing tracks are surrounded by the BNSF maintenance road, the Sandpoint Amtrak Depot, US Highway 95, and Sandpoint Marina to the west; and Sandpoint Avenue, Seasons of Sandpoint Condominiums, Best Western Edgewater Resort, Sandpoint Edgewater RV Park, and a portion of the Sandpoint City Beach Marina to the east. BNSF Bridge 3.0 spans over Bridge Street in Sandpoint. BNSF Bridge 3.1 spans over Sand Creek in Sandpoint. BNSF Bridge 3.9 spans over the open water of Lake Pend Oreille from MP 3.9 to 4.9. The south end of the project from BNSF MP 4.9 – 5.1 is a Transportation Corridor designated as Rural Residential (Bonner County, 2017).

The current track configuration includes two mainline tracks that switch to a single track from the north end of the Algoma Siding (Algoma Switch), through the bridges over Lake Pend Oreille, Sand Creek and Bridge Street, and up to the Sandpoint Junction of the BNSF Main line and Montana Rail link Main line, just north of the Sandpoint Amtrak Station.

Lake Pend Oreille

Lake Pend Oreille (LPO) is a natural, temperate, oligotrophic lake. It is the largest natural lake in Idaho and the fifth deepest lake in the United States, with a mean depth of 538 feet, a maximum depth of 1,152 feet at its southern end, and a surface area of 94,720 acres. It is fed by over 20 streams originating in the Selkirk Mountains to the northwest, the Cabinet Mountains to the northeast, and the Coeur d'Alene Mountains to the east. The shoreline is comprised mostly of the largely undeveloped, steep rocky terrain. The remaining littoral zone at the lake's northern end and bays consists of gradual or moderately sloping bottom, surrounded by level to gently sloping uplands and floodplain.

The Clark Fork River, originating in western Montana, is the largest tributary into the lake providing 92% of the lake's inflow at the river's mouth near the City of Clark Fork, east of Sandpoint.

The Pend Oreille River is the lake's only surface water outlet west of Sandpoint near the City of Dover. The river flows approximately 27 miles from LPO in Idaho into eastern Washington, then north into Canada where it joins the Upper Columbia River. The Pend Oreille River (and Lake) is impounded by the Albeni Falls hydroelectric dam, constructed in 1955 near the Idaho/Washington border, which regulates the lake's surface elevation/pool at 2062.5 feet from approximately mid-June through September, and at 2051 to 2056 feet from October through May.

Sand Creek

The Sand Creek watershed covers 38 square miles or 24,209 acres, and includes Jack Creek, Little Sand Creek, Swede Creek, and Schweitzer Creek northeast of Sandpoint. Sand Creek generally flows from north to south for approximately 16 miles and discharges into LPO within the City of Sandpoint, where it is subject to the regulated levels of LPO. The average gradient of Sand Creek in the project vicinity is 1% and the primary channel substrate is sand.

4. Alternatives Analysis

Geographic Scope

The geographic scope/study area for this alternatives analysis is defined as the BNSF right-of-way (ROW) located in the BNSF Montana Division, Kootenai River Subdivision, Line Segment 45, between BNSF Milepost (MP) 2.9 and MP 5.1.

Site Criteria

The project location must be able to provide a rail corridor connection between the two tracks at the north end of the BNSF Algoma Siding (MP 5.1) to the BNSF Sandpoint Junction (MP 2.9) where the BNSF mainline and MRL mainlines converge. The corridor must be of sufficient width to accommodate a second track that enables safe, adjacent operations for freight and passenger trains within the BNSF ROW. A minimum of 15-foot track centers is required for adjacent simultaneous train operations on upland rail grade areas, and from 30 to 50 feet centers are needed at bridge locations to ensure the support pilings on the new bridges do not impact the integrity of existing bridge support pilings.

Alternative 1 – Preferred Alternative:

New Track West of the Existing Mainline Track

The preferred alternative would construct 2.2 miles new track west of the existing BNSF mainline all within the BNSF ROW and connecting the Algoma Siding (MP 5.1) to the Sandpoint Junction switch (MP2.9) where the BNSF mainline and MRL mainlines converge. This work would include infrastructure improvements as follows:

- A new mainline track to the west of the existing BNSF mainline track;
- Track, switch and signal upgrades;
- A new bridge over Lake Pend Oreille (Bridge 3.9) west of the existing rail bridge (Figure 2);
- A new bridge over Sand Creek (Bridge 3.1) west of the existing rail bridge (Figure 2);
- A new bridge over Bridge Street (Bridge 3.0) west of the existing rail bridge;
- 0.88-acre of permanent and 0.38-acre of temporary nearshore fill below the jurisdictional ordinary high water mark (OHWM) of 2062.5 feet, associated with bridge abutments and the south switch.
- 0.28-acre of wetland fill in one location between the railgrade and the pedestrian path south of the Sand Creek Bridge 3.1.

Sources for the structural rock fill will be from local commercial quarries and brought to the work site via trucks. Bridge materials for the most part will be manufactured off site and brought to the site by rail and trucks. Construction methods will be typical of large scale road and railroad construction, involving earth moving/grading equipment, cranes, and track laying equipment, and support vehicles/trucks.

FIGURE 2. – Conceptual Renderings of the PREFERRED ALTERNATIVE

Conceptual Renderings* of New Bridges 3.1 over Sand Creek (left) and 3.9 over Lake Pend Oreille (right).

Bridge 3.0 – Over Bridge Street

Bridge 3.1 - over Sand Creek

Bridge 3.9 – From Dog Beach (north end)

Bridge 3.9 – Aerial View (north end)

**Concepts developed for BNSF by inVision Studios, Inc.*

Alternative 2:

New Track East of the Existing Mainline Track

Alternative 2 would have essentially all of the same work elements described under the Preferred Alternative, but places the tracks on the east side of the existing mainline. The following are the primary reasons this alternative was determined to not be practical, nor have the least impact to the environment:

- For a new mainline track to the east of the existing BNSF mainline track, access to all the work by large equipment within Sandpoint City Limits is either limited to Bridge Street, or would need to be barged in from the lake. Additionally, approximately 0.5 miles of railgrade was already constructed at the time of the Highway 95 Sandpoint Bypass project on the west side of the existing tracks. To provide an equivalent area on the east side of the existing tracks would require approximately 2.9 acres nearshore fill from Bridge 3.1 to Bridge 3.9;
- Track, switch and signal upgrades would remain generally the same as the Preferred Alternative;
- To construct a new bridge over Lake Pend Oreille (Bridge 3.9) adjacent to (east of) the existing rail bridge would require significant additional nearshore fills for staging and landing of materials from work barges. The cranes necessary would need to be brought in by barge and require a large assembly and staging area. Pilings and bridge decks would also need to be barged to the site and require landing and staging areas. The estimated additional nearshore fill for the minimal staging required is approximately 1.2 acres. Additionally, a large barge landing area would be required for this staging access resulting in both lake bottom excavations and adjacent fill of undetermined quantity up to 2 acres;
- A new bridge over Sand Creek (Bridge 3.1) adjacent to (east of) the existing rail bridge would have approximately the same nearshore fills as the Preferred Alternative, and 0.28 acres less fill to the wetlands just south of the bridge on the west side;
- A new bridge over Bridge Street (Bridge 3.0) would be approximately the same as with the Preferred Alternative. However, significant disruptions to existing public road access to residents east of the tracks, and to the Edgewater Hotel would be required adjacent to (east of) the existing rail bridge;
- The proposed 0.88-acre of permanent and 0.38-acre of temporary nearshore fill below the jurisdictional ordinary high water mark (OHWM) of 2062.5 feet, associated with bridge abutments and the south switch would remain approximately the same; and
- As identified above, the 0.28-acre of wetland fill in one location between the rail grade and the pedestrian path south of the Sand Creek Bridge 3.1 would not be required under this alternative.

Alternative 3:

Off Site / Outside of Existing BNSF ROW

This alternative would require incorporation of property outside of the proposed project limits and need to purchase or acquire new ROW to meet up with the existing track configuration. This alternative is not preferred or viable for the following reasons:

- Large tracts of property to build new tracks outside of the BNSF transportation corridor are not available;
- Social and environmental displacement risks to develop a new rail transportation corridor would be high; and
- Environmental impacts at new acquired properties would still require crossing of the lake and Sand Creek, are unlikely to be less than either Alternative 1 or 2, and those impacts would be outside of an existing transportation corridor.

Alternative 4:

No Action

The no action alternative would result in no impacts to wetlands or other waters of the U.S. Under the no action alternative the current track configuration would stay the same (two mainline tracks that switch to a single track at the bridges over Sand Creek and Lake Pend Oreille). The no action alternative does not meet the purpose or need of the project, and does not address specific conditions that currently result in delays to passenger and freight service or delays of traffic at local and regional road crossings.

TABLE 1. SUMMARY OF ALTERNATIVES

ALTERNATIVE	MEETS PROJECT PURPOSE & NEED	IMPACTS TO AQUATIC ECOSYSTEMS	MEETS SITE CRITERIA
Alternative 1 – PREFERRED New Track and New Bridges over Sand Creek and Lake Pend Oreille West of the Existing Track	Yes	Minimizes the impacts to 1.54 acres overall, with 1.16 acres being permanent.	Passes
Alternative 2 – New Track and New Bridges over Sand Creek and Lake Pend Oreille East of the Existing Track	Yes	3.82 – 5.82 acres of additional nearshore impacts over Alternative 1.	Passes
Alternative 3 – Off Site	No	Requires significant property acquisitions and displacements. Likely to have at least the equivalent amount of jurisdictional impacts as Alternative 1.	Fails
Alternative 4 – No Action	No	None	Fails

5. Jurisdictional Fill: Design Alternatives Review

The figure below (Figure 3) is an overview of the project with the locations of the unavoidable jurisdictional fills (temporary and permanent) that were reviewed along with clarification of reviewing agency by impact.

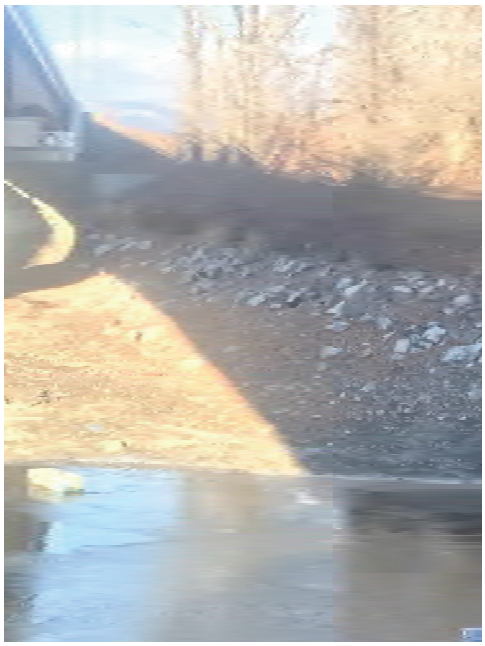
FIGURE 3. – JURISDICTIONAL IMPACTS OVERVIEW

Alternative 1 is the preferred alternative that fully met the purpose and need of the project, while having the least environmental impacts. Table 2 below summarizes the Design options that were reviewed at each of these locations. The area reduction of nearshore fill through design adjustments resulted in a total reduction of 1.97 acres of permanent fill and 0.17 acres of temporary fill.

TABLE 2. SUMMARY OF JURISDICTIONAL FILL ALTERNATIVES

LOCATION (SEE FIGURE 3)	AREA OF IMPACT (ACRES = AC)	AVOIDANCE MEASURES EVALUATED THROUGH DESIGN
Bridge 3.1 – Temporary Nearshore Impact	0.05 AC	Original design was to fill nearshore area north of 3.1 for a total of 0.32 acres of permanent fill. Concerns over settlement and ability to control the fill below the OHWM resulted a design change to a trestle bridge extension, no permanent fill, and .05 acres of temporary incidental fill for safe access during the installation of the piers along the shoreline. **Reduction of 0.32 AC of permanent nearshore fill.**

View of proposed temporary nearshore fill north of Br. 3.1 from the north.



View of temporary nearshore fill north of Br. 3.1 from the south.

Location (See Figure 3)	Area of Impact (acres = AC)	Avoidance Measures Evaluated Through Design
Bridge 3.1, South End – Permanent Wetland Fill	0.28 AC	Due to the extent of the fill needed for support of the new track, no reduction could be made to the fill of the wetland perched between the Multi Use Pathway along the highway and the existing rail grade south of Br. 3.1. Long term structural stability and both near and long term construction / maintenance access to the Bridge 3.1 required the toe of the fill to extend across the entire wetland, and a small portion of the nearshore area.
Bridge 3.1, South End - Permanent Nearshore Fill	0.01 AC	Original plan design called for a near shore fill that extended further into nearshore area by approximately 0.15 acres. By slightly extending the structure, the near shore fill was reduced from 0.15 to 0.01 acre. **Reduction of 0 .14 AC of permanent nearshore fill.**

Wetland fill viewed to south from the location of nearshore fill near the south end of Br 3.1

View towards the east of permanent nearshore fills north of Wetland A near the south end of Br 3.1.

LOCATION (SEE FIGURE 3)	AREA OF IMPACT (ACRES = AC)	AVOIDANCE MEASURES EVALUATED THROUGH DESIGN
Bridge 3.9, North End – Permanent Nearshore Fill 0.57 AC 		Original design plans called for the fill in this location to be all permanent fill; combining the 0.57 acre permanent and the 0.30 acre temporary. Review of the design and project approach resulted in a reduction to the 0.57 acres for permanent nearshore fill. **Reduction of 0.30 AC of permanent nearshore fill.** BNSF and the design team considered extending the north end of the new bridge to the upland area to eliminate all fills to this area. However, safety and security concerns associated with having a structure under which public access would be difficult to control, with potential camping and campfires, as well as boats mooring, precluded building a structure in this shallow near shore area. Additionally, creating a near shore area of similar structure, strata, and vegetation as what is presently there, creates a more naturalized shoreline and ability to use natural barrier vegetation to prevent public access up to the tracks.
Bridge 3.9, North End – Temporary Nearshore Fill 0.30 AC 		This temporary fill was originally a permanent fill. Design and project approach adjustments reduced this permanent fill to a temporary fill to be removed at the end of the bridge construction. As above, the use of an extended temporary bridge structure in this location was also evaluated. The issues of safety and security are similar, if not greater due to the fact the temporary bridge will be wood decked. Access to and under this bridge at this location would be hard monitor and control during non-work periods.

LOCATION (SEE FIGURE 3)	AREA OF IMPACT (ACRES = AC)	AVOIDANCE MEASURES EVALUATED THROUGH DESIGN
Bridge 3.9, South End – Permanent Nearshore Fill	0.01 AC	Original design resulted in up to 0.1 acre of nearshore permanent fill. By extending the last span of the permanent bridge, this fill was reduced to .01 acre. **Reduction of 0.9 AC of permanent nearshore fill.**
 Location of the permanent nearshore fill at south end of Br 3.9 (Looking North)		
Bridge 3.9, South End – Temporary Nearshore Fill	0.03 AC	Original temporary fill for transition from upland to the construction bridge was 0.2 acre. By extending the last span of the work bridge the temporary near shore fill was reduced to 0.03 acre. **Reduction of 0.17 AC of temporary nearshore fill.**
 Location of the temporary nearshore fill at south end of Br 3.9. (Looking south)		

LOCATION (SEE FIGURE 3)	AREA OF IMPACT (ACRES = AC)	AVOIDANCE MEASURES EVALUATED THROUGH DESIGN
Algoma Switch – Permanent Nearshore Fill	0.29 AC	Several iterations of design were evaluated to avoid and minimize this fill. Switching the tracks to the east side of the main line avoid fills, but would require extensive blasting of the adjacent hillside. Due to the close proximity of homes and Bottle Bay Road up-hill from the potential blasting, it was determined that safety risk to them and the rail structure were unacceptable. Fills for the switch and signals at this south end of the project were originally defined as requiring an extension of almost 60 feet from the existing shoreline and resulting in 0.6 acres of impact. By reviewing the specific needs of the fill for safety purposes, this was reduced to approximately 40 feet and a 0.29 acre permanent nearshore fill. **Reduction of 0.31 AC of permanent nearshore fill.**

Overview of the proposed nearshore fill and hillside and rock cut that would be needed to build track on the east side of existing main.

LOCATION (SEE FIGURE 3)	AREA OF IMPACT (ACRES = AC)	AVOIDANCE MEASURES EVALUATED THROUGH DESIGN
Algoma Switch – Permanent Nearshore Fill	0.29 AC	**Additional existing conditions photos to help illustrate how the project site was analyzed for design.**

Location of Algoma Switch nearshore fill over existing riprapped area shown. (Looking east from the water)

View towards the south from existing pad area of proposed Algoma Switch nearshore fill.

View to the north from the south end of the proposed switch fill.

Looking north from north end of proposed switch nearshore fill towards existing pad (where new track is proposed). Note extensive rock cut necessary for track on east side

6. Conclusion

Alternatives 1 (Preferred) and 2 (New Track East of Existing Track) are the only alternatives that could meet the purpose and need of the project.

However, Alternative 2 significantly increases both temporary and permanent impacts to Waters of the U.S.

Alternative 3 and 4 do not meet the project purpose and need.

Alternative 1 is the least environmentally damaging alternative that meets the project purpose while addressing geographic and BNSF design and safe operations constraints.

7. References

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