Connell Rail Interchange

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FREIGHT FLOW

Technical Memorandum

Date	Friday, April 01, 2016
Project	City of Connell – Connell Rail Interchange Study
To	Jed Crowther (City of Connell)
From	Mark Hemphill and Paul Weber (HDR)
Subject	City of Connell, WA – Rail Freight Flow; Current State and Forecast

Introduction

This memo describes existing freight railroad traffic and patterns across the BNSF Railway (BNSF) and Columbia Basin Railroad (CBRW) interchange in the City of Connell, Washington, and forecasts potential future freight railroad traffic and patterns for a 10-year horizon. The City of Connell is served by two freight railroads: BNSF, a Class I railroad with a 32,500-mile network that spans the Western United States, and CBRW, a locally owned and operated short line that extends west from Connell with an 86-mile network of lines serving Moses Lake, Wheeler, Schrag, and Othello, Washington. The 10-year horizon was chosen as freight railroad traffic is volatile in response to global, national, and regional economic activity and patterns, and commodity flows may shift drastically depending on demand, costs of production, technological innovation, and regulatory changes

Summary

Railroad freight traffic through the Connell interchange between BNSF and CBRW has grown approximately 10 percent annually during the last five years. This compares to a national average for rail traffic of approximately zero growth during the last five years (AAR, Annual U.S. Rail Tons). Connell interchange rail traffic growth is due to expansions of commodity processing, conversion of transportation from truck to rail, and improvements in rail service that reduce transportation costs, enabling shippers and receivers in the CBRW service are to expand their markets and production.

While agricultural production in the CBRW service area is not anticipated to show substantial growth in the next ten years, growth in agricultural commodity processing, growth in manufacturing, and truck conversion to railroad transportation is expected to continue to occur.

Regionally, rail traffic is expected to grow at approximately 1.5 to 2 percent annually during the next ten years. This growth will be driven by increased exports of agricultural, mineral, and energy commodities, increased regional manufacturing, increased import and export of consumer goods and heavy capital goods, and increased conversion of freight from truck to rail (Washington State Rail Plan; Federal Railroad Administration)

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Regional rail transportation service and needs

BNSF Railway

Connell is located on BNSF's 149-mile Lakeside Subdivision, which connects Spokane and Pasco, Washington. Both Spokane and Pasco are railroad articulation points of regional and national significance, with multiple lines converging on both cities. The Lakeside Subdivision is a component in a high-density freight main line that funnels traffic between the Midwest and Pacific Northwest. This main line is one of six so-called "transcontinental" railroad lines in the U.S., that connect Central U.S. railroad hubs such as Chicago, St. Louis, Kansas City, Memphis, and New Orleans with the west coast urban areas and major ports of Seattle/Tacoma, Portland, San Francisco/Oakland, and Los Angeles/Long Beach. The BNSF main line is one of two main lines that provides direct connectivity between Chicago and Seattle/Tacoma and Portland, along with a Union Pacific Railroad (UP) main line that enters Portland from the east, then travels north to Seattle/Tacoma. The BNSF main line is the principal railroad infrastructure component of the Great Northern Corridor Coalition, a public-private partnership that promotes transportation improvement and economic development in the states served by the corridor.

West of Pasco, the BNSF route follows the north bank of the Columbia River on a low-grade alignment to Vancouver, Washington and Portland, Oregon, serving the major ports in both cities. It connects to a north-south BNSF line between Vancouver, Washington, and Seattle/Tacoma (shared with UP), that provides alternative routes for east-west freight traffic as well as serving the major grain and bulk commodity export/import ports on the lower Columbia River, and Grays Harbor, Washington. The low grades on the BNSF line makes it a preferred route for heavy unit trains of agricultural products, coal, minerals, and other bulk commodities traveling west from loading points in the Midwest to export facilities in the Pacific Northwest. The route is also used by high-priority intermodal trains and merchandise trains traveling in both directions, as well as empty grain, coal, and other bulk commodity trains cycling back east. One Amtrak passenger train also makes a daily round trip between Spokane, Washington, and Portland, Oregon, part of a route between Chicago and both Seattle and Portland. The closest passenger rail station to Connell served by Amtrak is in Pasco.

The 2014 Washington state rail plan stated recent trains per day frequency and trains per day capacity for BNSF's Lakeside Subdivision. The state rail plan indicates that in 2010 an average of 32 trains per day operated between Spokane and Pasco. The state rail plan estimated the maximum capacity of the Lakeside Subdivision in 2010 was approximately 37 trains per day. Since the rail plan's publication, traffic volumes have increased slightly on the line, notably with the introduction of unit trains of crude oil loaded in North Dakota destined for West Coast refineries, and BNSF has made recent infrastructure improvements on the Lakeside Subdivision as well as throughout the Great Northern Corridor to increase the capacity for additional trains to operate over it. **Current volumes range between 30 and 40 trains per day.**

Columbia Basin Railroad

The Columbia Basin Railroad (CBRW) provides a direct connection to BNSF from shippers in central Washington that otherwise would have lengthy truck hauls to reach BNSF. CBRW has grown its traffic to become the busiest short line in eastern Washington State, according to the Washington State Freight and Goods Transportation System Report released by Washington State Department of Transportation in November 2014. The railroad has 60 active shippers and handles more than 10,000 carloads per year, carrying more than 1 million tons (all tons in this document are U.S. short tons of 2,000 lbs. each) of freight annually. The Washington State Department of Transportation (WSDOT) in 2014 designated the CBRW as an "R2" Freight Rail Corridor, i.e., a corridor which handles between 1 million and 5 million tons per year. Most other Washington State short lines are classified as R3 or R4 lines that handle much less tonnage.

Traffic volumes on CBRW grew with the opening of a unit train unloading facility at the Port of Warden in November 2013. The terminal allowed CBRW to begin receiving 110-car unit trains of canola seed from BNSF for delivery to a Pacific Coast Canola crushing and oil refining facility at the Port of Warden. The facility is the first commercial-scale canola seed crushing operation west of the Rocky Mountains. In addition to unit trains, local freights operated by CBRW serve new and expanding industrial sites and facilities in Moses Lake, as well as the agricultural shipping centers of Bruce and Schrag.

Originally formed in 1986 as the Washington Central Railroad, today's Columbia Basin Railroad is headquartered in Yakima, under the management of Brig Temple, along with an affiliated short line, the Central Washington Railroad.

Major commodities handled by CBRW include canola, agricultural products such as grain and animal feed, inbound fertilizer and chemicals, and outbound frozen potatoes, and vegetables. CBRW interchanges its cars with BNSF at Connell. In an interview for this report, CBRW provided the traffic breakdown in Table 1, based on an annual volume of 10,200 carloads in 2014. (Note: a typical carload of agricultural bulk commodities or chemicals varies from 100 to 110 net tons; a typical carload of frozen or refrigerated perishables ranges from 60 to 100 tons.)

CBRW operates as-needed. Typically, one local freight operates each way daily to serve local customers, and unit trains of canola operate once monthly, operating westward loaded and eastward empty.

Table 1: CBRW Freight Commodities, 2014

Commodity	Percentage of total traffic
Outbound frozen potato products	20%
Inbound fertilizer	15%
Inbound canola seed (for PCC crushing)	15%
Chemicals (mostly inbound, some outbound)	10%
Inbound paper (rolls)	5%
Cooking oil (inbound and outbound)	5%
Outbound canola meal	5%
Inbound feed	5%
Outbound grain (primarily wheat)	5%
Other traffic (inbound and outbound)	15%

Current Operations and Interchange at Connell

BNSF and CBRW interchange cars in Connell. Typically, each railroad operates a train to Connell, with both trains attempting to arrive near the same time to exchange cars. BNSF operates a train from Pasco called the "Connell Turn" that delivers cars to CBRW, as well as switches local BNSF-served industries between Pasco and Connell. CBRW originates a train at the Port of Warden that delivers cars to BNSF, as well as provides selected service to rail shippers in Bruce.

The interchange of cars occurs on BNSF trackage at Connell. BNSF has a 5-track yard approximately 0.4 miles long, and a controlled siding 1.5 miles long, all located east of the switch where the CBRW connects with BNSF. The CBRW main line comes railroad-eastward down a 1% grade to reach the interchange with BNSF at Connell. BNSF's Lakeside Subdivision has a descending westbound grade of up to 0.7% in Connell.

During the 1990s, the trains were timed to meet at Connell in the early morning. More recently, in the 2010s, the trains are timed to arrive at Connell in mid to late morning. In recent years, the interchange between local BNSF and CBRW freights has occurred 5 to 6 times a week, an increase from the 4 to 6 times per week the interchange took place a decade ago. The overall average number of cars interchanged is approximately 40 per interchange, but fluctuates greatly depending on shipping levels and service needs of CBRW's rail shippers.

Historically, CBRW interchanged unit trains of sugar beets and grain with BNSF, but the sugar beet traffic ended in the late 1990s, and unit grain trains have only been operated occasionally over the years. (Unit train flows consisted of inbound trains of feed and outbound trains of export grain.)

The current interchange yard at Connell was not built to serve as an interchange between two railroads, since the CBRW was originally built as a branch line by Northern Pacific, the BNSF predecessor that also built the Spokane-Pasco main line. **Nor was the interchange constructed with the concept of unit-train volumes in mind, but staging of 25 to 30 car trains.** The introduction of inbound unit trains of canola seed in late 2013 placed additional capacity demands on the Connell interchange. The unit trains originate in south central Canada and operate through Spokane. Because of the track configuration of the Connell interchange, BNSF prefers to operate the unit canola trains from Spokane west past Connell to BNSF's yard in Pasco, where the operating

end is changed from the west end to the east end, to run back east to Connell. This enables the unit trains to enter CBRW directly from BNSF without switching at Connell. BNSF operates unit trains in this fashion because of the configuration of the Connell interchange, and because the Lakeside Subdivision's train frequency is too great to allow for a 110-car unit train to occupy the main line for an extended period of time to allow for a change of operating ends and reconfiguration of power. When empty unit trains come off the CBRW, they must operate west to Pasco before changing direction to head east past Connell to Spokane and Canada for reloading. **The inefficiency of this interchange adds approximately 70 additional miles to each unit train move.**

Rail Transportation Needs of the CBRW

Interviews with CBRW indicate that a **reconfiguration and expansion of the Connell interchange with BNSF is needed to improve efficiency, lower operating costs, and enhance the competitiveness of freight rail for shippers in eastern Washington.** A primary goal of the reconfiguration and expansion is to enable long trains operating westward on BNSF's Lakeside Subdivision to be interchanged to the CBRW without the need for breaking the train apart, time-consuming switching, or extensive roadway grade-crossing blockages. The interchange reconfiguration, per CBRW and BNSF, should further allow for operations such as switching arriving BNSF trains, or repositioning or reconfiguring motive power, to occur without blocking the BNSF Lakeside Subdivision main line. The interchange reconfiguration should allow for the simultaneous accommodation of an inbound and an outbound train between BNSF and CBRW, without one blocking the path of the other. The minimum number of tracks required to allow this type of operation to take place is three with a desired clear length of 8,600 feet (7,500 feet minimum) each, to enable unit trains that typically are 7,400 feet long to arrive or depart from any track, with adequate stopping and clearance distance in each track. It is not anticipated that the interchange allow for the simultaneous arrival and departure of two 7,400-foot unit trains.

The Great Northern Corridor Coalition has identified the Connell interchange as a necessary project to enhance economic development. According to the Coalition, "*Four inland ports in Washington are directly affected by the interchange at Connell. As a result, the rail interchange and its configuration need to be upgraded and improved to accommodate the tremendous growth in traffic [at Connell and on the CBRW].*" WSDOT in its State Short Line Rail Inventory and Needs Assessment further stated, "*While most, if not all of the CBRW is capable of handling 286K cars, the line faced a need for track rehabilitation as well as a significant need for an interchange upgrade. … The interest by the [Great Northern Corridor Coalition] in the status of the CBRW line is but one of several entities expressing interest in improvement and expansion of the reach and connectivity of the line.*" ("286K" refers to the gross rail weight in thousands of pounds of a typical four-axle freight railcar; most railcars in use in North America are 286K cars. Cars with a lighter weight are in service principally for lines that are not 286K-capable, but these lighter cars effectively penalize the shippers that must use them, as the transportation charge is similar for the light and heavy cars, but less freight is delivered with the lighter car.)

WSDOT also identified the economic importance of rail service in eastern Washington in the Washington State Short Line Rail Inventory and Needs Assessment. "*The economic base of the region significantly revolves about agricultural production,*" noted the report. "*Aside from state and local government employment, the agricultural sector makes up substantial portions of the local*

employment, led by grain farming and frozen food manufacturing. … Fruit and vegetable farming are also top-10 employment sectors in the region. In fact, the agricultural and support sectors make up 34 percent of the region's economic output."

The Connell Interchange Project was identified by State Legislators as a priority in 2014. In the 2015-2017 biennium the State allocated $10 million towards further design, permitting, and construction. The direct benefits to Connell include: less interruption to automobile traffic at city grade crossings and concentrating railroad operations to the southwest outskirts of Connell. Regional benefits include a modern interchange that does not limit the potential growth of rail shipping on the CBRW which serves three (3) counties in Washington State.

Volume/value of agricultural products shipped by rail

Table 2 below indicates the value of freight shipped by CBRW and other Washington State railroads. Note that canola has 1.7 times the value per pound of grain (mostly wheat and some barley, rye, and grain sorghum), and canola oil has 3.8 times the value of grain. Thus, **the Connell interchange is supporting one of the most valuable transportation patterns in eastern Washington on a per-ton basis.**

Table 2: Value of freight moving by rail in Eastern Washington

Commodity	Value ($)	Unit	Source and Notes
Paper	$0.40	lb	Index Mundi (wood pulp)
Canola oil	$0.38	lb	USDA (canola oil)
Steel	$0.33	lb	Steel on the Net (cold rolled steel coil)
Fertilizer	$0.21	lb	Index Mundi
Seed	$0.17	lb	USDA (canola seed)
Scrap	$0.16	lb	USGS.gov (2013, iron and steel scrap)
Feed	$0.12	lb	USDA (Barley No. 3)
Grain	$0.10	Lb	Index Mundi (wheat)
Cement	$0.04	Lb	USGS.gov (2012 value)
Chemicals	Too general		n/a
Frozen food	Too general		n/a

BNSF and CBRW Freight Growth and Infrastructure Development

In its 2014 rail plan, Washington state expects the tonnage handled by its railroads to reach 260 million tons by 2035, more than double the volume moved in 2010, driven by a tripling of export grain and other export bulk commodities, as well as a doubling of imported goods shipped in containers and imported motor vehicles that will be transloaded from vessel to rail at Washington state ports. Historically, secular GDP growth in the U.S. on its own adds 1.5% to 2% annual growth in railroad freight traffic. Over the 25 year period of 2010-2035, this would mean that freight traffic in Washington is likely to increase by a factor of 1.65 independent of growth in import/export traffic. Accordingly, if the Connell interchange mirrors national patterns, it would be expected to have traffic growth of 1.65 times current volumes by 2035.

BNSF

In 2014, BNSF completed a capacity improvement project that added 20 miles of new sidings and second main track on its line between Spokane and Pasco. The project was part of a package of

investments totaling $235 million that the railroad made on its lines in Washington State in 2014. In early 2015, BNSF announced it would make investments of $189 million to expand capacity on its rail lines in Washington State in calendar year 2015. Although much of the work focused on improvements to lines between Portland, Seattle, and Vancouver, B.C., funding was also allocated to begin the replacement of a rail bridge on its line between Spokane and Vancouver, Washington.

CBRW

In 2015, the Washington State Senate passed a $15 billion transportation package (funded by an increase in the state gasoline tax) that includes $21 million for the Northern Columbia Basin Railroad Project. The project is will promote economic development in the Moses Lake area by expanding CBRW trackage to reach industrial areas of Moses Lake. The purpose of the project is to provide rail service to lands designated for industrial development in the northern part of the City of Moses Lake as well as to the south and east of the Grant County International Airport, in order to enhance opportunities for economic development and attract new rail-dependent businesses to those areas. The project will provide shippers with an alternate, lower-cost transportation mode for freight that currently moves in and out of the area by truck. The project is critical to preserving existing manufacturing jobs and related investment in the area, while helping to attract new business opportunities, job creation, and economic development.

Columbia Basin Railroad has also cited the importance of improving service to the agricultural shipping centers of Bruce and Schrag, in Adams County. The railroad transports grain and fertilizer for shippers in these communities. Further, the WSDOT report citing the designation of CBRW as a R2 corridor noted "Columbia Basin Railroad believes that these locations have tremendous potential for increased economic growth, and is working with Adams County and the Port of Othello on improving rail infrastructure at Schrag and Bruce, respectively."

In the same $15 billion transportation package, the state also designated $2 million in funding for the Port of Warden Rail Infrastructure Expansion Project. The project will increase rail capacity and improve rail service at the Port of Warden by constructing approximately 1 mile of new storage siding track. In addition to the canola seed crushing facility that now receives unit trains at the Port, the Port of Warden has attracted other businesses, including fresh produce packing and frozen and dehydrated food processing, along with warehousing for these operations. The new operations have leveraged the existing rail capacity at the Port of Warden, making the additional rail storage track essential to maintain efficient operations on the CBRW and allow shippers to efficiently load and unload railcars.

Future rail growth opportunities

Interviews were conducted with shippers located along CBRW, through contacts provided by CBRW, and the Grant County Economic Development Council. The shippers that agreed to be interviewed, and their responses, are as follows.

Wilbur-Ellis Company

Wilbur-Ellis is an international marketer and distributor of agricultural products, animal feed, fertilizer and agricultural chemicals, and specialty chemicals and ingredients. Wilbur-Ellis distributes fertilizer from terminals at Warden, Othello, and Moses Lake. This fertilizer is delivered by railroad from origins in the central and western U.S. and Canada. Wilbur-Ellis stated that their current annual

volume is approximately 220 dry fertilizer carloads and 110 liquid fertilizer carloads. Wilbur-Ellis stated it may expand to seven locations in the CBRW service territory, but it does not yet know if this will increase annual carloadings.

Akzo Nobel Pulp and Performance Chemicals, Inc.

Akzo Nobel is a large multinational chemical company that distributes chemicals to the agriculture industry in eastern Washington at Moses Lake. Akzo Nobel stated that volumes have been consistent for the past 25 years; approximately 900 carloads per year (weekly volumes range from 15 to 20 carloads). Akzo Nobel receives salt and ships sodium chloride solution and salt. Akzo Nobel has no expansion plans in the CBRW service area and does not have expectations of a volume increase.

Pacific Coast Canola

Pacific Coast Canola (PCC) is a canola processor in Warden. Its Warden facility has a nameplate crushing capacity of 385,000 tons annually, producing approximately 150,000 tons of canola oil per year. Canola, also known as rapeseed, produces a high-quality, high-value cooking oil and processed food ingredient. PCC receives canola in unit train volumes from western Canada, and ships canola oil and canola meal in carload volumes. Canola meal is used as an animal feed.

PCC in 2014 received 1745 carloads of canola seed (as well as 21 cars of corn), and shipped 610 carloads of canola oil and 399 carloads of canola meal. The inbound canola seed equated to 16 unit trains, or approximately one unit train every three weeks. PCC has no specific immediate expansion plans.

Grant County Economic Development Council

The Grant County Economic Development Council (GCEDC) detailed initiatives and trends that are expected to increase rail traffic on the CBRW and through the Connell interchange:

- An industrial park, which will emphasize manufacturing and distribution of industrial machinery, agricultural machinery, and agricultural and industrial chemicals, is expected to be constructed near to the airport at Moses Lake. This industrial park will be rail served. The activities at the industrial park would require long-haul rail transportation to deliver machinery, steel shapes, chemicals, and other raw materials from the Midwest, and would require rail transportation for outbound machinery and chemical shipped to other market basins.

- Between two and three new food processors are considering construction of new facilities at locations including Bruce, Warden, and western Moses Lake. These companies would receive raw materials by rail and ship processed food by truck and rail to local and regional markets, similar to PCC.

- Truck conversion to rail is likely to continue to grow as truck transportation costs continue to rise relative to rail transportation costs. In particular, outbound processed foods such as

canola oil and potato products that are at present moved by truck to regional consumption markets, and to the ports of Seattle and Tacoma for export, are amenable to conversion to rail. This conversion could include both carload freight and containerized freight. At present, a substantial portion of the agricultural commodities harvested in the CBRW market area are moving by truck to export at Seattle and Tacoma. These commodities, which include potatoes, peas, wheat, barley, and corn, are increasingly converting to containerization for export, both due to the growth of preference of customers for identity-protected grains, and due to the growth of containerized freight in Pacific Rim countries.