

This chapter provides an overview of the existing environment in the area of the proposed project. Existing conditions are described so that the potential environmental impacts of the proposed project may be assessed. (See Chapter Five, Potential Environmental Impacts).

This chapter includes information about the project corridor and the surrounding areas that was provided by federal, state, and local agency contacts, as well as data from field work and site visits conducted by scientists and planners from the project team.

The following Technical Memoranda and Reports¹ were prepared for the proposed project:

- Air Quality Memorandum
- Cultural Resources Report
- Fish, Wildlife, and Vegetation Report
- Energy Memorandum
- Hazardous Materials Memorandum
- Land Use, Farmland, and Relocation Report
- Noise and Vibration Report
- Social Elements and Environmental Justice Memorandum
- Soils and Geology Memorandum
- Traffic Memorandum
- Visual Quality Memorandum
- Water Resources Memorandum
- Wetlands Report

¹ Technical Memoranda and Reports are prepared by technical experts in a variety of disciplines to ensure that the affected environment and potential environmental impacts of a project are accurately represented in the EA. The complete Technical Memoranda and Reports may be obtained from the Washington State Department of Transportation (WSDOT) Rail & Marine Office. Contact information is provided on the back of the cover page.

What is the physical setting of the project area?

The proposed Northern Columbia Basin Railroad (NCBR) Project is located in Grant County, Washington, primarily within the greater City of Moses Lake. The proposed rail alignment would extend from the community of Wheeler (the east end of the corridor) to Grant County International Airport (GCIA) (the west end of the corridor).

Grant County is located in central Washington and has an estimated population of 83,047. Moses Lake is the largest city in Grant County, with an estimated population of 17,932.² Major industries in the project vicinity include commercial agriculture and associated processing, as well as manufacturing associated with the aerospace industry. Most of the land in the project area is zoned for industrial uses.

The climate in the project vicinity is mild and dry. The average annual daily temperatures range from 61 degrees Fahrenheit to 36 degrees Fahrenheit, although the temperature can rise above 100 degrees and fall below minus 20 degrees.³ From September 2007 to August 2008, the highest monthly average temperature was 88 degrees; the lowest average monthly temperature was 22 degrees.⁴ The average total annual precipitation is 7.87 inches. The project area is situated on an upland plateau and is relatively flat, with elevations ranging from 1,050 to 1,220 feet above sea level. The project area is located near Moses Lake in the Crab Creek Watershed.⁵

Air Quality

How was the air quality study area defined?

The air quality study area included all areas within 0.25 miles of the centerline of the proposed rail corridor. The air quality study area was based on an assessment of the project area, existing emission sources in the area, the air quality of the area, and environmental review of similar rail projects.

Existing air quality information for the study area was collected from reports published by the U.S. Environmental Protection Agency (USEPA) and the Washington State Department of Ecology (Ecology). A review of aerial

² City Data.com, Detailed Profile for Moses Lake, Washington, Population, July 2007. Accessed at: http://www.city-data.com/county/Grant_County-WA.html

³ Western Regional Climate Center, Historical Climate Information, Moses Lake, Washington, Station Moses Lake 3E. Accessed at <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wasmose>

⁴ Weather.Com, Local Weather, Monthly Averages for Moses Lake, Washington. Accessed at <http://www.weather.com/weather/wxclimatology/monthly/graph/USWA0285>

⁵ A watershed is the area draining into a particular river, stream, or lake. In this case, all of the area where the proposed project corridor would be located drains into Crab Creek and Moses Lake.

photography was also performed to identify potentially sensitive receptor populations, such as individual residences along Segment 3.⁶

What is the air quality in the project area?

Air pollutants within the air quality study area include windblown dust and particulates from exposed agricultural soil, emissions from agricultural equipment and traffic on nearby roads, and emissions from occasional locomotives on the existing rail corridor. There are few industrial operations in the project vicinity, and emissions from these facilities are considered a minor component of the total air pollution in the region. Vehicle and diesel emissions are common throughout the study area; however, emission levels are low because traffic volumes are low. Agricultural activity (for example, crop planting and harvesting), which creates dust that can be carried by wind, is spread over the growing season and, as a result, concentrations of dust emissions are relatively low at any given time.

The USEPA has established National Ambient Air Quality Standards (NAAQS) for the following six air pollutants, known as criteria pollutants: sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen oxide (NO_x), lead (Pb), ozone (O₃), and particulate matter (PM₁₀ and PM_{2.5}).⁷ The standards were established to protect the public from exposure to harmful amounts of pollutants. When the pollutant levels in an area have caused a violation of a particular standard, the area is classified as a “non-attainment area.” If emissions in an area do not exceed the standards, the area is considered to be in attainment of the standards for each of the criteria pollutants. The proposed project would be constructed in Grant County, Washington, which is in attainment for all of the criteria pollutants.

Are there any sensitive receptors in the vicinity of the project?

Sensitive receptors along Segment 3 include the Longview Elementary School, located approximately 190 feet north of the existing rail line, and the Longview neighborhood, where the closest residence is approximately 45 feet from the existing rail line. The Millerville neighborhood is within 500 feet of the proposed alignment at the eastern end of Segment 1, and the closest residence would be approximately 210 feet from the proposed track. Effects to these sensitive receptors are evaluated in Chapter Five.

⁶ The term “sensitive receptors” includes members of the population who are most sensitive to adverse health effects of air pollution. The term sensitive receptors includes specific population groups, such as children, the elderly, and the chronically ill. Commonly identified sensitive land uses include residences, schools, retirement homes, and hospitals. .

⁷ National Ambient Air Quality Standards (NAAQS). www.epa.gov/air/criteria.html. Accessed September 20, 2007.

Cultural, Historic, and Archaeological Resources

What are cultural and historic resources?

Cultural and historic resources provide an important link to the past, serving as memories of a community's accomplishments and representing the distinctive history of a region. Cultural resources are properties that reflect the heritage of local communities, states, and nations. Properties judged to be significant in American history, architecture, or archaeology, that possess integrity and that have achieved significance within the past 50 years, are considered "historic properties." Such historic properties are afforded certain considerations in accordance with state and federal regulations.

Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. 470f, requires federal agencies to take into account the effects of their undertakings on historic properties⁸ and defines an "historic property" as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).⁹ The proposed project is subject to the NHPA's Section 106 historic review process because the Port of Moses Lake (Port) is seeking the Surface Transportation Board's (STB's) authorization for the proposed rail project.

How was the cultural resources study area defined?

For the purpose of identifying cultural, historic, or archaeological resources in the project area, the STB's Section of Environmental Analysis (SEA) and the Washington State Department of Transportation (WSDOT) defined the cultural resources study area or the "Area of Potential Effect" (APE) as the area within the proposed rail right of way. See 36 CFR 800.16(d). SEA and WSDOT determined that the APE extends 50 feet from the centerline of the proposed rail line for the entire length of the project. This 100-foot-wide corridor allows a buffer between the track itself and adjacent uses, and takes into consideration the possibility of noise and vibration issues with regard to historic buildings or structures. The APE includes approximately 200 acres. The Washington State Department of Archaeology and Historic Preservation (State Historic Preservation Office or SHPO) concurred with this APE determination in a letter dated October 31, 2007 (Appendix A).

To identify any documented or NRHP-eligible cultural, historic, or archaeological resources within the APE, the project team conducted a preliminary reconnaissance survey of the project area, a record search of the database at the Washington SHPO, and archival research. In addition, the project team contacted Native American representatives, the SHPO, and other

⁸ See 36 CFR 800.1(a).

⁹ The term "historic property" includes artifacts, records, and remains that are related to and located within such properties. The term also includes properties of traditional religious and cultural importance to an Indian Tribe or Native Hawaiian organization and that meet the National Register criteria. See 36 CFR 800.16(l)(1).

interested parties. For the proposed project, surveys were undertaken and documentation prepared in accordance with the Secretary of Interior's Standards and Guidelines for Identification of Historic Properties (48 FR 44716), using personnel who meet the Secretary of Interior's Professional Standards (48 FR 22716) in the fields of prehistoric archaeology, historic archaeology, architectural history, and history.¹⁰ On July 30, 2008, the Cultural Resources Discipline Report/Survey (Cultural Resources Report and Survey) was sent to the SHPO for review and comment. In response to comments from the SHPO, additional research was conducted and a revised Cultural Resources Report and Survey was sent to the SHPO for review in October 2008.

What Tribal consultation was included?

Pursuant to 36 CFR 800.2(c), SEA and WSDOT initiated Tribal consultation by sending letters describing the proposed project to Native American Tribes that may have ancestral connections to the project area. Accordingly, consultation letters were sent to the designated cultural representatives of the federally-recognized Colville Confederated Tribes, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Warm Springs Reservation of Oregon, as well as to the non-federally-recognized Wanapum Tribe.

In April 2008, the Cultural Resources Report and Survey¹¹ was sent to the above-listed Tribes for review and comment. The Warm Springs Tribe and the Colville Confederated Tribes had no comments on the Report,¹² and the Wanapum Tribe declined to comment. The Confederated Tribes and Bands of the Yakama Nation is currently reviewing the Cultural Resources Report and Survey.

Are there cultural, historic, or archaeological resources in the project area?

No prehistoric archaeological sites or traditional cultural properties were identified within the APE. However, 20 potential historic resources were identified within the cultural resources study area (**Exhibit 4.1**). One of those resources, the Columbia Basin East Low Canal Feeder Canals system has been determined to be eligible for listing on the NRHP.

¹⁰ The project team contacted property owners and attempted to access all properties within the APE. Although repeated requests were made, access to two parcels was denied. The two parcels are located east of Parker Horn and are the following: Parcel No. 170543000 and Parcel No. 170545000.

¹¹ The Cultural Resources Report and Survey may be obtained from the WSDOT Rail & Marine Office. Contact information is provided on the back of the title page.

¹² Sally Bird, Warm Springs Tribe, Telephone communication with Elizabeth Phinney, WSDOT Rail & Marine Office, July 22, 2008. Camille Pleasants, Colville Tribes, Telephone communication with Elizabeth Phinney, WSDOT Rail & Marine Office, July 22, 2008.

Three specific features of the canal system (Canal EL20, EL20U1, and RCD 180+182) are contained within the project's APE:

EL (East Low) 20: This earthen irrigation canal is approximately 10 feet wide and four feet deep, and about 100 linear feet of it lie within the APE. It runs through a cast concrete culvert under Wheeler Road (Road 3 NE). Herbicides are used to prevent plant growth and maintain water flow.

EL (East Low) 20U1: This irrigation canal is approximately two feet wide and 16 to 18 inches deep. About 100 linear feet lie within the APE. Although it was originally earth-lined, it has since been lined with poured-in-place cast concrete and now has steps to help regulate water flow. These improvements altered its historic integrity.

RCD (Rocky Coulee Diversion) 180+182: About 100 linear feet of this eight-foot-wide and five-foot-deep earthen canal are located within the APE. It is generally overgrown with plants.

The three canal segments described above are part of the Columbia Basin East Low Canal system. The need for irrigation and electricity in Washington resulted in the U.S. Government's embarking on what is known as the Columbia Basin Project. It began with the construction of the Grand Coulee Dam, the largest concrete structure ever built in the U.S. The project has been called the largest Bureau of Reclamation project since the establishment of the Bureau. A total of 671,000 acres of farmland were brought under irrigation through the construction of the Main, West, East High, and East Low Canals, and associated irrigation ditches. Canals EL20, EL20U1, and RCD 180+182 were constructed between 1946 and 1951.

Exhibit 4.1 Potential Historic Resources Identified and Evaluated within the Area of Potential Effects

ID No.	Historic Name	Address	Parcel No.	Year Built	Preliminary NRHP Determination	Section (S), Township (T) and Range (R)
1	10973 Road 4	10973 Road 4	170543000	C. 1957	Ineligible	S14:T19:R28
2	4199 Miller Street	4199 Miller Street	120498000	1943	Ineligible	S10:T19:R28
3	4255 Miller Street	4255 Miller Street	120503000	1943	Ineligible	S10:T19:R28
4	4267 Miller Street	4267 Miller Street	120504000	1943	Ineligible	S10:T19:R28
5	4279 Miller Street	4279 Miller Street	12505000	1943	Ineligible	S10:T19:R28
6	4289 Miller Street	4289 Miller Street	120506000	1943	Ineligible	S10:T19:R28
7	4301 Miller Street	4301 Miller Street	120508000	1943	Ineligible	S10:T19:R28

ID No.	Historic Name	Address	Parcel No.	Year Built	Preliminary NRHP Determination	Section (S), Township (T) and Range (R)
8	4321 Longview Street	4321 Longview Street	120513000	1943	Ineligible	S10:T19:R28
9	4321 Miller Street	4321 Miller Street	120508000	1943	Ineligible	S10:T19:R28
10	4325 Miller Street	4325 Miller Street	120509000	1943	Ineligible	S10:T19:R28
11	4335 Miller Street	4335 Miller Street	120510000	1943	Ineligible	S10:T19:R28
12	4359 Miller Street	4359 Miller Street	120512000	1943	Ineligible	S10:T19:R28
13	4890 Grape Drive NE	4890 Grape Drive NE	170325000	c. 1940	Ineligible	S10:T19:R28
14	8 Place Hangar drainage ditch	8 Place Hangar drainage ditch	171016013	c. 1952	Ineligible	S27:T20:R28
15	9930 Parkway Drive NE	9930 Parkway Drive NE	110279000	1943	Ineligible	S10:T19:R28
16	9972 Sunny Drive	9972 Sunny Drive	120405000	1954	Ineligible	S10:T19:R28
17	Chicago, Milwaukee, St. Paul & Pacific Railroad Building	Chicago, Milwaukee, St. Paul & Pacific Railroad Building	Chicago, Milwaukee, St. Paul & Pacific Railroad right of way	c. 1920	Ineligible	S10:T19:R28
18	Columbia Basin East Low Canal Feeder Canals: EL20; EL20U1; and RCD 180+182	Columbia Basin East Low Canal Feeder Canals: EL20; EL20U1; and RCD 180+182	East Columbia Basin Irrigation District Easement	1946-1951	Eligible	S19 and 24:T19:R28
19	Storm drainage ditch adjacent to Alert Center Building	Storm drainage ditch adjacent to Alert Center Building	17100600	c. 1952	Ineligible	S27:T20:R28
20	Chicago, Milwaukee, St. Paul & Pacific Railroad Branch Line	Railroad ROW Between 22nd Ave NE and Kinder Rd NE	Chicago, Milwaukee, St. Paul & Pacific Railroad right of way	c. 1942	Ineligible	S03:T19:R28, S04:T19:R28, S10:T19:R28, S11:T19:R28, S14:T19:R28, S33:T20:R28

The canals are eligible for listing on the NRHP under Criterion A, for their association with events that have made a significant contribution to the broad patterns of our history. The canals are part of the potentially NRHP-eligible Columbia Basin Project historic district and appear to be part of the original design of the Columbia Basin Project. In addition, the canals are important because of the impact irrigation has had on the economic development of the City of Moses Lake.

Energy

How was the study area for energy consumption defined?

The study area for energy consumption was generally defined as the location of the proposed rail corridor, including the location of rail crossings (where vehicles might be delayed and thus consume more energy).

The energy consumed by freight trains was estimated as part of the operations analysis prepared for the proposed project. Information collected for the operations analysis included the diesel fuel consumed by trains along the existing route and along the proposed route. Data such as train speed, length of track, number of train trips, and number of train cars were collected from the design engineers and used to calculate diesel fuel consumption. Bureau of Transportation Statistics provided the gallons of diesel fuel per mile consumed by freight trains.¹³

How much energy is used by the current operation of the trains in the project area?

Because a locomotive generally uses 7.33 gallons per mile, the project team estimated that trains running on the existing 16.8-mile route to the southern edge of the GCIA currently use approximately 246 gallons of diesel fuel for each round trip (**Exhibit 4.2**).

Exhibit 4.2
Fuel Used by Existing Freight Trains (Diesel Fuel)

Description	Monthly Average	Annual Average
Number of trains	2	24
Total miles traveled (miles)	33.6	403
Total energy used (gallons)	246	2,954

Freight train traffic is so infrequent on the existing route that the fuel consumed by vehicles waiting for trains to pass is negligible and was not quantified for this project.

Electrical energy is also used on the right of way to operate switches, crossing arms, and communication devices. The amount of energy consumed for electrical devices and equipment is negligible and was not quantified.

¹³ Bureau of Transportation Statistics (BTS). National Transportation Statistics 2006. <http://www.bts.gov>. 2006.

Fish, Wildlife, and Vegetation

How was the fish, wildlife, and vegetation study area defined?

The study area for fish, wildlife, and vegetation included all areas within 200 feet of the proposed rail corridor, as well as aquatic and riparian areas 0.5 miles downstream of the northern and southern project alignment crossings of Parker Horn. The limits of the study area were chosen to provide a basis for the analysis of potential construction and operational impacts on fish, wildlife, and vegetation, as well as on water quality.

Technical staff then reviewed the existing information on fish, wildlife, and vegetation presence, as well as habitat conditions, in the study area. Sources included written reports and databases, discussions with local experts, and field visits to the project area, where biologists made direct observations.

Field visits were performed on June 19 and 20, 2007, to assess habitat conditions along the proposed project corridor and to record observations. Field visits were restricted to portions of the project corridor where landowners granted rights of entry. Permission to enter three parcels along Segment 1 and its northern and southern Parker Horn crossing alternatives could not be obtained for the following: (1) Parcel 190483000 at Reference Point (RP) 2, (2) Parcel 170543000 just east of RP 4, and (3) Parcel 178545000 at RP 4. Where possible, the project team made a visual survey of these areas from the nearest public right of way. Aerial photographs were reviewed to supplement the observations made during the field visits. The following category-specific information was used:¹⁴

Fish

- Priority Habitats and Species (PHS)¹⁵ data provided by Washington Department of Fish and Wildlife (WDFW)
- Published WDFW stock reports
- StreamNet database (www.streamnet.org)
- Field visit
- Published literature (listed in Chapter Ten)
- Interview with the WDFW area habitat biologist

Wildlife

- PHS data provided by WDFW

¹⁴ For additional detail, the Fish, Wildlife, and Vegetation Technical Report may be obtained from the WSDOT Rail & Marine Office. Contact information is provided on the back of the title page.

¹⁵ State priority species include game species and species that the state lists as endangered, threatened, or sensitive. This generally includes those species listed as threatened or endangered by the federal government under the Endangered Species Act.

- Interview with the WDFW area habitat biologist
- Field visit
- Published literature (listed in Chapter Ten)

Vegetation

- PHS data provided by WDFW
- Washington Department of Natural Resources (WDNR) Natural Heritage Program database
- Field visit
- Visit to the University of Washington Herbarium to review collections and literature
- Published literature (listed in Chapter Ten)

What types of vegetation are found in the project area? What plant species are listed as rare, threatened, or endangered in the project area?

The most common vegetation types in the study area are row crops of corn, wheat, and peas. The second most common type of vegetation consists of disused field and range areas, where the vegetation is dominated by non-native weed species. Close to Parker Horn and Crab Creek, there are moist sites that support wetland and riparian (streamside) vegetation.

No plant species on the federal or state lists of rare, threatened, or endangered species¹⁶ are likely to occur in the study area. Ute ladies'-tresses (*Spiranthes diluvialis*), a federally-listed threatened species, could grow in Grant County, but this plant requires special gravel soils in abandoned river or stream channels that do not occur in the vicinity of this project. Northern wormwood (*Artemisia campestris* spp. *borealis* var. *wormskioldii*) (a federal candidate and state endangered species) grows in Grant County but only within the floodplain of the Columbia River. Directed surveys for these two species were not conducted because their required soils and hydrology are not present in the study area. Gray cryptantha (*Cryptantha leucophaea*), Hoover's desert-parsley (*Lomatium tuberosum*), and Wanapum crazyweed (*Oxytropis campestris* var. *wanapum*) are federally-listed species of concern that are present in Grant County, although these species were not found in the study area.

Piper's daisy (*Erigeron piperianus*), a state sensitive species, was identified as possibly occurring in the study area. However, during the June 2007 field visits, project biologists did not find any evidence of the species. In addition, the areas within the study area where this plant might be found are highly

¹⁶ The term endangered species means any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

disturbed and degraded, with little to no native vegetation; therefore, habitat for Piper's daisy within the project area would be of relatively poor quality.

What is the condition of fish and wildlife habitat in the study area?

The majority of the upland habitat¹⁷ within the study area has been highly modified, mainly for agricultural use. While agricultural lands can provide habitat for some wildlife species, agricultural fields in general tend to support fewer wildlife species than natural habitats.

The remaining undeveloped upland habitats have a predominant cover of non-native vegetation and display signs of former anthropogenic modifications (modifications caused by humans) such as litter, debris, and wheel ruts. The study area contains habitats suitable for ground bird nesting by raptors and burrowing owls.

Riparian habitat¹⁸ along Moses Lake has been reduced and its functions impaired by development and by decreased water levels in winter, which expose the roots of riparian vegetation to wave erosion and freezing. Higher quality riparian habitats are located along the shores of islands in Moses Lake and wetlands found along Crab Creek.

The sections of Parker Horn and Crab Creek over which both Segment 1 and Alternative 1A would cross have been designated by the WDFW as a priority habitat for waterfowl, shorebirds, bald eagles (*Haliaeetus leucocephalus*), and mink (*Mustela vison*).

What priority fish are present in or around the project area? Are there any fish listed as rare, threatened, or endangered?

Parker Horn and Crab Creek are the only water bodies within the study area that are identified as containing priority fish species.^{19,20} Priority fish species found in the project vicinity include redband rainbow trout (*Oncorhynchus mykiss*), walleye (*Stizostedion vitreum*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieu*). The redband rainbow trout is designated as a federal species of concern; the other priority species have no federal designation, but all are designated by the state of Washington as priority game fish (**Exhibit 4.3**).

¹⁷ Upland habitat is the dry habitat adjacent to water bodies and wetlands, beginning with the riparian zone immediately adjacent to the surface water and gradually merging into other habitat types, such as forest and grassland.

¹⁸ Riparian habitat is the vegetative zone immediately adjacent to a water body, often characterized by thick vegetation, including shrubs, vines, trees, and grasses.

¹⁹ In addition to state endangered, candidate, or species of concern, priority species include game fish, such as resident trout, perch, bass, and other species.

²⁰ WDFW. 2007. *Priority Habitat and Species Maps and Polygon Reports for Townships T20R28E, T19R28E, and T19R29E*. August 24, 2007.

Exhibit 4.3
Washington State Priority Fish Species Present
in the Study Area and their Federal and State Status

Species	Federal Status	State Status
Redband Rainbow Trout (<i>Oncorhynchus mykiss</i>)	Species of Concern (native Columbia River Basin fish only)	Game Fish
Walleye (<i>Stizostedion vitreum</i>)	None	Game Fish
Largemouth Bass (<i>Micropterus salmoides</i>)	None	Game Fish
Smallmouth Bass (<i>Micropterus dolomieu</i>)	None	Game Fish

WDFW conducted surveys for walleye in Moses Lake in 2005, and walleye are known to heavily utilize the habitat in Parker Horn and Crab Creek for spawning in April and May. Both of the Build Alternative's proposed water crossings (Segment 1 and Alternative 1A) would cross walleye spawning habitat in Parker Horn and Crab Creek.

WDFW also operates a fish-stocking program in Moses Lake. Rainbow trout are raised in net pens within the lake south of I-90, and released in mid-April.

There are no federal or state rare, threatened, or endangered fish species in the study area.

What priority wildlife are present in the project area? Are there any wildlife species listed as rare, threatened, or endangered?

No federally-listed rare, threatened, or endangered wildlife species are found in the study area. The Columbia Basin pygmy rabbit (*Brachylagus idahoensis*), a federally-listed endangered species, relies on tall, dense big sagebrush cover to provide food and shelter, a habitat that does not occur in the study area, and relatively deep, loose soils that allow burrowing.²¹ Neither the greater sage grouse (*Centrocercus urophasianus*) nor the Washington ground squirrel (*Spermophilus washingtonii*), both federal candidate species, occur in the study area due to a lack of suitable habitat (big sagebrush for the grouse, and a

²¹ USFWS (United States Fish and Wildlife Service). *Draft Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (Brachylagus idahoensis)*. Portland, OR. 2007.

particular type of silty loam soil for the squirrel).^{22,23} During the June 2007 field visits to the study area, project biologists did not find any evidence that these species reside in the study area.

Other priority wildlife species are found in the study area (**Exhibit 4.4**). Species with a defined federal status include the bald eagle, burrowing owl (*Athene cunicularia*), Yuma or long-eared myotis (bat) (*Myotis evotis*), Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), and the northern leopard frog (*Rana pipiens*).

Bald eagles winter along Parker Horn. Bald eagles are a species monitored by the federal government, and are listed as threatened by Washington State. On average, three to four bald eagles spend the winter in the project area and bald eagles can be found perching on shoreline trees, islands, or ice shelves, often in association with waterfowl concentrations.

Burrowing owls, a federal species of concern and a state candidate species, may occur throughout the study area in upland areas. Within approximately one mile of Segment 1, there are three known burrowing owl nest sites: one near the Moses Lake Municipal Airport, which is outside of the study area, and two within the study area (approximately two miles and three miles west of the community of Wheeler, respectively). Project biologists did not observe any burrowing owls along Segment 1 or Alternative 1A, but they did observe one along Segment 2 and Alternative 2A near the GCIA.

Yuma myotis, a small, insect-eating bat that is a federal species of concern, is more closely linked to water than the Townsend's big-eared bat. Yuma myotis were documented in the area during June site visits, and there are likely to be roosts in the vicinity. Foraging Yuma myotis found in the study area would likely be concentrated in the Parker Horn area.

The northern leopard frog is also a federal species of concern. These frogs are found in marshes, wet meadows, and riparian areas, and in moist, open woods. They prefer water bodies with dense vegetation such as cattail or sedge marshes for breeding, and in the study area, this species would be limited to Parker Horn and the wetlands east of Parker Horn located between RP 3.0 and RP 3.5.

²² Finger, R., G. J. Wiles, J. Tabor, and E. Cummins. *Washington Ground Squirrel Surveys in Adams, Douglas, and Grant Counties, Washington, 2004*. Washington Department of Fish and Wildlife, Olympia, WA. 2007.

²³ Schroeder, M.A, D. Stinson, and M. Tirhi. Greater Sage-Grouse. In E. Larsen, J. M. Azerrad, N. Nordstrom (eds.): *Management Recommendations for Washington's Priority Species*. Volume IV: Birds, pp. 17-1 – 3-13. Washington Department of Fish and Wildlife, Olympia, WA. 2003.

Exhibit 4.4
Washington State Priority Wildlife Species Present
in the Study Area and their Federal and State Status

Species	Federal Status	State Status
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Monitor Species ¹	Threatened ³
Burrowing owl (<i>Athene cunicularia</i>)	Species of Concern ²	Candidate ⁴
Townsend's big-eared bat (<i>Corynorhinus townsendii pallescens</i>)	Species of Concern ²	Candidate ⁴
Yuma or long-eared myotis (<i>Myotis evotis</i>)	Species of Concern ²	Monitor Species ⁵
Northern leopard frog (<i>Rana pipiens</i>)	Species of Concern ²	Endangered ⁶
Western grebe (<i>Aechmophorus occidentalis</i>)	None	Candidate ⁴
Great blue heron (<i>Ardea herodias</i>)	None	Monitor Species ⁵
Mink (<i>Mustela vison</i>)	None	Game Species ⁷

Notes

1. "The Secretary shall implement a system in cooperation with the States to monitor effectively for not less than five years the status of all species which have recovered to the point at which the measures provided pursuant to this Act are no longer necessary" (16 U.S.C. § 1533(4)(g)(1)).

2. Species of concern are defined as those species whose conservation status is of concern to the U.S. Fish and Wildlife Service, but for which further information is still needed. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.²⁴

3. State threatened species is defined in the Washington Administrative Code (WAC) 232-12-297, Section 2.5, to include "any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats."

4. State candidate species is defined in WDFW Policy M-6001 to include fish and wildlife species that the WDFW will review for possible listing as state endangered, threatened, or sensitive. A species will be considered for designation as a state candidate if sufficient evidence suggests that its status may meet the listing criteria defined for state endangered, threatened, or sensitive.

5. State monitor species are not considered species of concern, but are monitored for status and distribution. They are managed by the WDFW, as needed, to prevent them from becoming endangered, threatened, or sensitive.²⁵

6. A state endangered species is defined in WAC 232-12-297, Section 2.4, to include "any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state."

7. Game species are native and non-native fish and wildlife species of recreational or commercial importance.²⁶

²⁴ USFWS. 2008. *Federally Listed, Proposed, Candidate, Delisted Species and Species of Concern Which May Occur Within Oregon*. Available at <http://www.fws.gov/oregonfwo/Species/Lists/Documents/OregonStateSpeciesList.PDF>. Accessed on April 8, 2008.

²⁵ WDFW (Washington Department of Fish and Wildlife). *WDFW - Species of Concern: Status Definitions*. Available at <http://wdfw.wa.gov/wlm/diversty/soc/definitn.htm>. Accessed on April 8, 2008.

²⁶ WDFW (Washington Department of Fish and Wildlife). *WDFW - Priority Habitat and Species List*. Available at <http://wdfw.wa.gov/hab/phsdef.htm>. Accessed on April 8, 2008.

The Townsend's big-eared bat is a federal species of concern and is known to live in the Moses Lake area. Bats in the study area would likely be foraging from summer roost or nursery sites and might use buildings along each segment of the project as day roosts.

The western grebe (*Aechmophorus occidentalis*), great blue heron (*Ardea herodias*), and mink (*Mustela vison*) are state priority species that likely use the area around Parker Horn. Western grebes, a species of migratory water bird, use large lakes and open wetlands. No nesting colonies have been documented in the study area, and any western grebe present within the study area would likely be a foraging individual.

During the June 2007 field visits, project biologists noted an individual great blue heron foraging along Parker Horn near the crossing of State Route (SR) 17. The rookery²⁷ nearest to the study area is located at Potholes Reservoir, approximately 17 miles southwest of Moses Lake. Individual birds that breed near Potholes Reservoir could use Parker Horn as a foraging area. Breeding individuals can forage up to 18 miles from their nest sites, but predominantly forage within a one- to three-mile radius.

Mink, which are a Washington State priority species, utilize suitable feeding and breeding habitat at Rocky Ford Creek and Crab Creek, which are north of Moses Lake and Parker Horn. The species can be found in these areas throughout the year.

Are there any state parks or forests, national parks or forests, or wildlife refuges or sanctuaries in the study area?

There are no state parks or forests, national parks or forests, or wildlife refuges or sanctuaries within the study area. However, Crab Creek connects Moses Lake with the Gloyd Seeps Wildlife Area (Gloyd Seeps), which is located approximately five miles to the north of the project alignment. Gloyd Seeps is an 8,000-acre area within the historic flood channels of Crab Creek.

Numerous wetlands, ponds, and seeps are surrounded by older shrub steppe uplands and basalt scablands. Fires have created grasslands on most of the area along the west side of Crab Creek. It is one of several state wildlife areas in the Columbia Basin that the WDFW considers to be the most important waterfowl breeding grounds in the state. Millions of other birds also use the waters and marshes for resting and feeding on their annual migrations along the Pacific Flyway. WDFW manages Gloyd Seeps and other wildlife areas to protect and preserve wildlife habitat in the state.²⁸

The existing wildlife habitats of Crab Creek and Parker Horn are degraded by poor water quality, weedy species cover, and human presence; nevertheless, it

²⁷ A rookery is a breeding place or colony of gregarious birds or animals.

²⁸ WDFW. 2008. *Wildlife Areas and Access Points, Gloyd Seeps Wildlife Area*. Available at <http://wdfw.wa.gov/lands/r2glydsp.htm>. Accessed July 30, 2008.

is the largest riparian corridor draining to Moses Lake and is likely to serve as a wildlife connection between the lake and Gloyd Seeps. Crab Creek and Parker Horn are vegetated by a mix of native and exotic vegetation, with little upland buffering.

Hazardous Materials

How was the hazardous materials study area defined?

For the hazardous materials analysis, the project team identified and evaluated known hazardous waste sites or potentially contaminated sites in the area of the proposed project. For data collection purposes, the initial hazardous materials study area was defined as a one-mile radius around the proposed project area.

The project team requested that Environmental Data Resources, Inc. provide environmental regulatory records from 39 federal, 19 state and local, three Tribal, and eight other databases. In addition, the team identified and reviewed historical aerial photos (1954, 1976, 1982, and 1996) and undertook a search for Sanborn Fire Insurance Rate Maps and historical city directories. The team also conducted an Internet search to obtain additional information and to verify database search results.

Site files from Ecology and USEPA were reviewed to determine the nature and extent of hazardous materials released into the environment and the status of cleanup activities at identified sites. Once information from all sources was reviewed, the team conducted a site visit on September 23, 2007, to the proposed rail corridor area to: (1) identify current conditions at known contaminated or potentially contaminated sites, and (2) identify any current site conditions along the corridor that had not been described in any database or document records.

Were hazardous materials or potentially contaminated sites identified in the project area?

Eighty-six potentially contaminated sites were identified in the study area through database and Internet searches. Of the 86 sites identified, all but 19 were eliminated from further review based on several screening criteria. Sites were screened in accordance with WSDOT guidance²⁹ to determine which sites warranted file reviews and site visits. The following types of sites were eliminated from further consideration:

- Sites listed only on the Resource Conservation and Recovery Information System (RCRIS) (Small and Large Quantity Generators), Facility Index

²⁹ WSDOT. *Draft Guidance and Standard Methodology for WSDOT Hazardous Material Discipline Reports*. Available at <http://www.wsdot.wa.gov/NR/rdonlyres/79415778-FC82-4924-8C82-D69524EF9669/0/HazMatMethodologyDisciplineRpts.pdf>. June 2007.

System (FINDS), and/or the FIFRA³⁰ and TSCA³¹ Tracking System (FTTS) databases.

- Sites listed only on the Emergency Response Notification System (ERNS) or Hazardous Materials Information Resource System (HMIRS) databases.
- Sites listed only on the underground storage tank (UST) database and located greater than 0.125 (1/8) mile from the project footprint.
- Sites located a sufficient distance downstream from the project footprint, based on the judgment of a qualified Environmental Professional (as defined by ASTM International and USEPA).

Of these 19 sites, 13 were determined to pose a low risk to the project and were not evaluated further, four were determined to pose a moderate risk, and two were determined to pose a high risk. **Exhibit 4.5** shows the location of these sites along the project corridor.

Thirteen of the sites are located along Segment 1 and Alternative 1A and six of the sites are located along Segment 2 and Alternative 2A. No sites were identified along Segment 3. Risk levels were determined in accordance with WSDOT guidance.³²

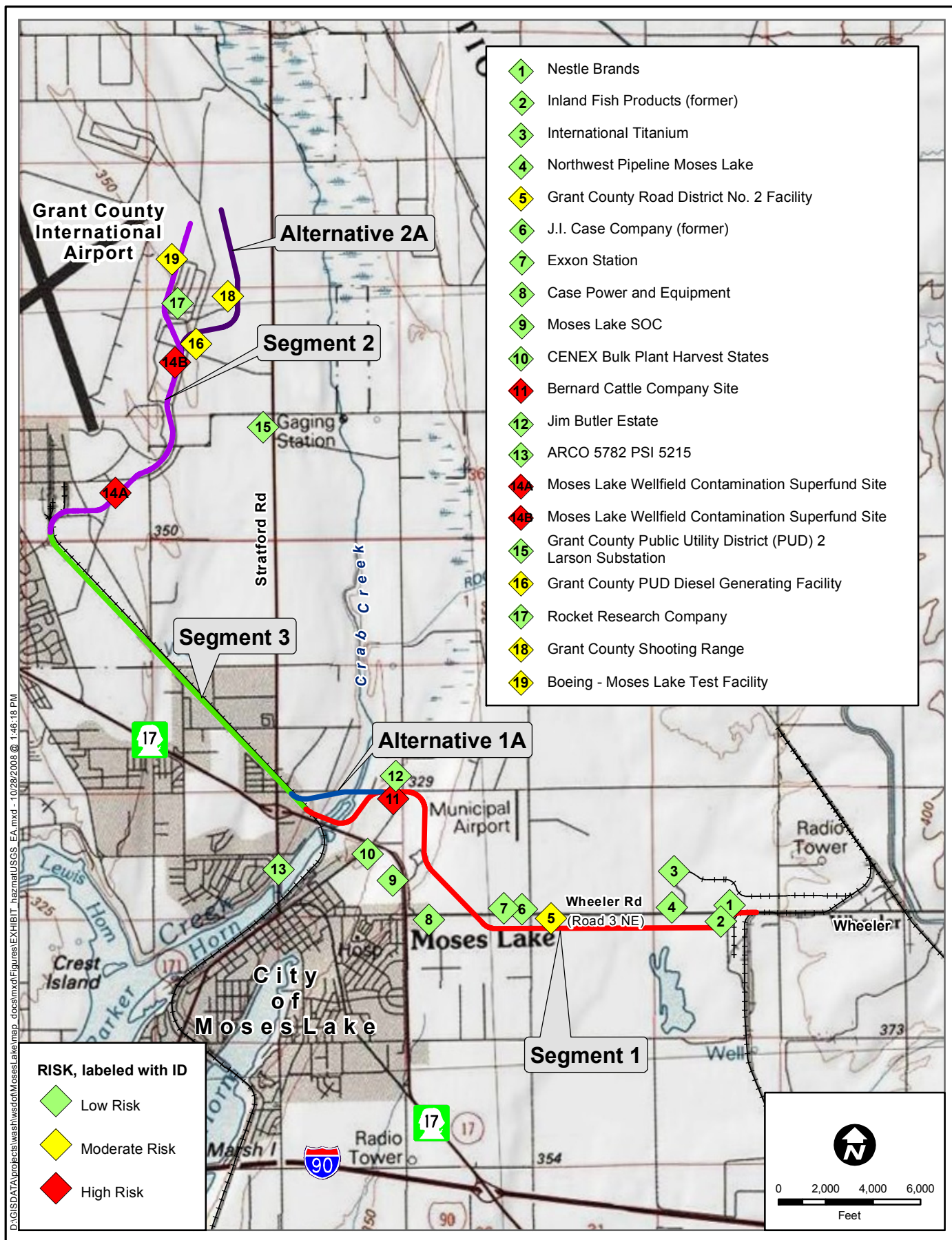
Low to Moderate Impact: This risk level identifies sites where the nature of potential contamination is known based on existing investigation data, or where it can be reasonably predicted based on observations of the site or experience at a similar site or best engineering judgment. Potentially low to moderate impact sites are typically small to medium in size, the potential contaminants are not extremely toxic or difficult to treat, and remediation approaches are generally straightforward.

High Impact: This risk level identifies sites that may be substantially contaminated and that could create a major liability either in construction liability or by virtue of acquiring all or a portion of the site. If the site has undergone a detailed investigation and a feasibility study, the impacts and remediation costs may already be predicted. Nonetheless, the site is identified as a high impact site because of its potentially substantial impact or liability. In general, high impact sites are properties that possess a potential for substantial soil, groundwater, or sediment contamination, or the information necessary to predict remedial costs is lacking and/or the contaminants are persistent, or expensive to manage. The site may be contaminated over a large area by a single contaminant or over a smaller area by multiple contaminants. Potentially high impact sites are typically large, have large volumes of contaminated materials, or have a long history of industrial or commercial use.

³⁰ Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 U.S.C. § 136 et seq.).

³¹ Toxic Substance Control Act of 1976 ([15 USC \(C. 53\) 2601-2692](#)).

³² WSDOT. *Draft Guidance and Standard Methodology for WSDOT Hazardous Material Discipline Reports*. Available at <http://www.wsdot.wa.gov/NR/rdonlyres/79415778-FC82-4924-8C82-D69524EF9669/0/HazMatMethodologyDisciplineRpts.pdf>. June 2007.



The moderate- and high-risk sites identified in the study area are described below.

Segment 1 and Alternative 1A

One site poses a high risk to both Segment 1 and Alternative 1A of the proposed project. This site, the Bernard Cattle Company site (Site 11), comprises an area of approximately three to five acres and is located on the southwest corner of Broadway and Road 4 NE (Cherokee Road) in the vicinity of the Municipal Airport. This land is known as Grant County Parcel Number 170543000. The property appears to be a storage yard for abandoned vehicles and heavy equipment. Piles of tires and other extraneous material are scattered throughout the area. At least one tank was observed from the right of way.

The ground surface is very uneven, implying potential fill of unknown origin on the property. The proposed rail corridor would cross this property. Based on observations from the September 2007 site visit, there is a high potential that releases of hazardous materials may have occurred on this site. In addition, the site contains fill of unknown origin, resulting in the high ranking.

One site poses a moderate risk to both Segment 1 and Alternative 1A of the proposed rail corridor. The Grant County Road District No. 2 (Site 5) facility is the County Road Department vehicle parking, fueling yard, and equipment storage area. Three above-ground storage tanks were identified during the September 2007 site visit and appeared to be in good condition. The south side of this facility abuts the proposed rail corridor. Based on maps from the 1950s, the area appears to have been used as a borrow pit³³ and then later filled with unknown materials.

Segment 2 and Alternative 2A

Segments 2 and Alternative 2A lie within the Moses Lake Wellfield Superfund site. Of the 39 potential source areas identified for chemical releases in the Superfund site, seven of them are along Randolph Road. Of these seven, two are considered high risk to the project: the Randolph Road Base Dump (Site 14A), and the Paint Hangar Leach Pit (Site 14B). These sites are adjacent to both Segment 2 and Alternative 2A. The USEPA plans to conduct investigations and remediation in these areas in the next two years, and coordination with the USEPA's Superfund office is recommended for any construction activities to avoid interference with planned investigation or remedial activities.

One site close to the northern end of Segment 2 was identified as a moderate risk to the proposed project, the Boeing – Moses Lake Test Facility's PCB-contaminated soil cleanup area (Site 19). Although the records currently do

³³ A borrow pit is an area where gravel or soil is removed for use at another location, often for major construction projects like highways or large buildings.

not show the full extent of the contamination, ongoing cleanup activities, which began in fall 2007, will identify it in the future.

Two sites along Alternative 2A were identified as moderate risks to the proposed project. These include the Grant County shooting range used by law enforcement officers for firearms training, and the Grant County PUD Diesel Generating Facility.

The Grant County shooting range (Site 18) is an active law enforcement training area. It is possible that lead or other heavy metals that become pulverized during the discharge of a firearm may be encountered in soils. In addition, this site was used during the active era of the Larson Air Force Base, and it is unknown what, if any, chemicals may have been used or disposed of there.

The Grant County PUD Diesel Generating Facility (Site 16) has soils that contain petroleum compounds typically found in diesel fuel. This site may also have underlying groundwater contamination. The extent of any soil contamination is not known.

Segment 3

No hazardous materials sites were identified along Segment 3.

Land Use

How was the land use study area defined?

For the purposes of the land use analysis, the study area was defined as the area within 0.25 miles from the centerline of the proposed corridor. The study area is intended to capture the rail corridor and adjacent areas that could be affected by the proposed project.

Information on existing and planned land use was gathered through review of maps, aerial photography, preliminary engineering drawings, and comprehensive plans and zoning for Grant County and the City of Moses Lake. The project team reviewed the following comprehensive plans and community codes and ordinances:

- Grant County Zoning Map and Geographic Information System (GIS) data;
- Grant County Zoning Code;
- Grant County International Airport Master Plan;
- City of Moses Lake Zoning Map and GIS data;
- City of Moses Lake Municipal Zoning Code; and

- City of Moses Lake Comprehensive Plan.

The project team conducted a windshield survey on August 21, 2007, to view current land use along the project corridor, and interviewed staff members at the City of Moses Lake to verify the data. In addition, information was collected using GIS maps, aerial photographs, preliminary maps of the proposed rail line, Grant County public records and tax assessor's information, and the 2006 feasibility study.³⁴

What are the existing land uses in the project area?

The majority of land in the study area is zoned for industrial uses; however, much of the land is currently used for agricultural purposes. Crops observed in the study area included onions, corn, beans, and alfalfa. Other existing land uses in the study area include residential and commercial. Grant County is served by the Moses Lake Municipal Airport and GCIA, both of which are located in the vicinity of the proposed project.

What are the planned land uses in the study area?

Land uses in the study area are regulated by the City of Moses Lake and Grant County. Both jurisdictions have approved zoning ordinances and comprehensive plans that identify land uses planned for the future.^{35 36}

In the study area, land in the City of Moses Lake is zoned for the following uses: Heavy and Light Industrial, General Commercial, Public, and Rural Urban Reserve. The Rural Urban Reserve zoning designation is given to areas that are transitioning from rural to urban uses. Several parcels in the study area near Segment 2 and Alternative 2A are owned by the Port of Moses Lake and are designated specifically as the GCIA zone, which is intended to maintain and enhance aviation-compatible industries.

A small island within Parker Horn (in the corridor for Segment 1) is zoned for Conservation to protect water quality while encouraging recreational uses of Moses Lake. The shoreline of Parker Horn is protected by the *City of Moses Lake Shorelines Management Master Plan*.³⁷ This plan applies to shoreline areas within 200 feet of the Ordinary High Water Mark (OHWM), and places special restrictions on construction practices to protect shorelines.

³⁴ WSDOT. *Northern Columbia Basin Railroad Project Feasibility Study*. February 2006.
<http://www.wsdot.wa.gov/freight/images/Northern%20Columbia%20Basin%20Railroad%20Project%20Feasibility%20Study.pdf>.

³⁵ City of Moses Lake Comprehensive Plan 2002 Amendment.

³⁶ Grant County Municipal Code Title 23 Zoning (current ordinance December 2006).

³⁷ The City of Moses Lake is in the process of updating the 1988 Shorelines Management Master Plan. The updated version of the plan, which will be called the Shoreline [sic] Management Master Plan, would likely apply if the proposed project is constructed.

The existing rail line (Segment 3) passes between Longview Elementary School, which is located approximately 190 feet to the north, and the Longview neighborhood, which is located to the south (RP 5). The closest residence in the Longview neighborhood is 45 feet from the existing rail line. The Longview neighborhood is located within the city limits of Moses Lake and is zoned for Single and Multi-Family Residential uses, which allow for four to eight dwelling units and six to fifteen dwelling units per acre, respectively.

Land in the County's jurisdiction is zoned for Urban Commercial, Urban Heavy Industrial, Industrial Park, Urban Residential, Urban Residential 2, and Rural Residential. The Millerville neighborhood, at the western end of Segment 1, is located in unincorporated Grant County and is zoned by the County as Rural Residential 3.

Does the study area include any agricultural lands considered prime, unique, or of state or local significance?

Farmlands defined as prime, unique, or of state or local significance are protected by federal and state legislation. Soils are categorized and evaluated by the Natural Resources Conservation Service (NRCS).

According to the City of Moses Lake and Grant County, there are no agricultural lands that are considered prime, unique, or of long-term significance located within the study area.^{38, 39} There is no land in the study area zoned for agricultural use by either the City of Moses Lake or Grant County. There are several parcels in the study area that are currently farmed for crops such as onions, corn, beans, and alfalfa; these parcels are primarily zoned for Light or Heavy Industrial, Commercial, or Rural Urban Reserve uses by either the City or the County.

On August 20, 2008, the NRCS concurred with the determination that no prime or unique farmlands or farmlands of long-term significance are present in the project corridor.

Noise and Vibration

How was the noise and vibration study area defined?

The study area for the noise and vibration analysis included all potential sensitive receptors (e.g., schools, libraries, hospitals, residences, retirement communities and nursing homes) residential and institutional properties within 750 feet of the proposed rail corridor. This distance takes into account all potential sensitive receptors for a train traveling at 25 mph, including horn noise.

³⁸ City of Moses Lake Comprehensive Plan 2002 Amendment.

³⁹ Grant County Municipal Code Title 23 Zoning (current ordinance December 2006).

Existing noise was estimated by conducting several measurements in the proposed project area as part of a site visit on August 13, 2007. The measurements consisted of one 16-hour measurement (Alma Road) and three 30-minute measurements, one along each of the three project segments. The sites were chosen to be representative of populated areas in the study area.

What are the existing noise and vibration levels in the project area?

Sound amplitude is expressed in decibels (dB), which is a logarithmic scale that compresses the wide range of pressure amplitudes that humans can hear to a more manageable range. Environmental noise is almost always characterized using the A-weighted sound level in decibels (dBA). A-weighted noise-monitoring equipment “hears” similarly to how humans perceive sounds of low to moderate magnitude. The letter “A” indicates that the sound has been filtered to reduce the strength of the very low and very high-frequency sounds, much as the human ear does. If the noise readings were taken without the A-weighting noise-monitoring equipment, the results would include the noises that are out of human hearing range.

Short-term measurements taken at three sites (Cherokee Road NE, Randolph Road NE, and Miller Drive NE) within the study area indicated that there are relatively low existing noise levels throughout the project corridor.

Background noise levels were typically in the 35 to 40 dBA range. The primary noise sources are intermittent traffic on local roads and occasional over-flights by aircraft from the GCIA or the Moses Lake Municipal Airport.

Building occupants rarely experience perceptible vibration from external sources unless the building is near a construction site, a mining operation where blasting is used, or a rail line. Although vehicular traffic always generates vibration, the vibration is usually below the threshold of human perception unless the roadway has potholes, wide expansion joints, or other significant surface irregularities. Existing train traffic along Segment 3 is the only source of perceptible vibration in that area, and that there are few perceptible sources of vibration along the other segments of the proposed project.

Social Elements and Environmental Justice

The economic setting and demographics of an area provide indicators of local and regional economic strength, population trends, and population characteristics. For the social elements and environmental justice analysis, the project team reviewed the population and income characteristics of the project area and vicinity and considered potential environmental justice effects of the proposed project on low-income and minority populations. In addition, the analysis included a review of social elements, such as community cohesion, recreation, and public services and the potential project-related impacts on those elements.

How was the social elements study area defined?

The social elements study area was defined as the area within 500 feet of the proposed right of way, based on an assessment of the project area; the location of existing residences, schools, parks and other social elements; and review of similar rail projects. For the environmental justice study area, the study area was larger and boundaries were matched to the areas for which census data was available. Census block group data was used to define the boundaries for low-income populations and census block level data was used to define the boundaries for minority populations.

Information was collected from aerial photographs, computer-aided design (CAD) and GIS maps, local sources, and the project Technical Memoranda and Reports.

The project team used 2000 U.S. Census block group and block level data to assess population, minority, and income characteristics in the study area. Demographics for Grant County were also reviewed. “Census block groups” are geographic subdivisions of counties, with population within the block group typically ranging from 600 to 3,000 people. The study area included seven block groups.

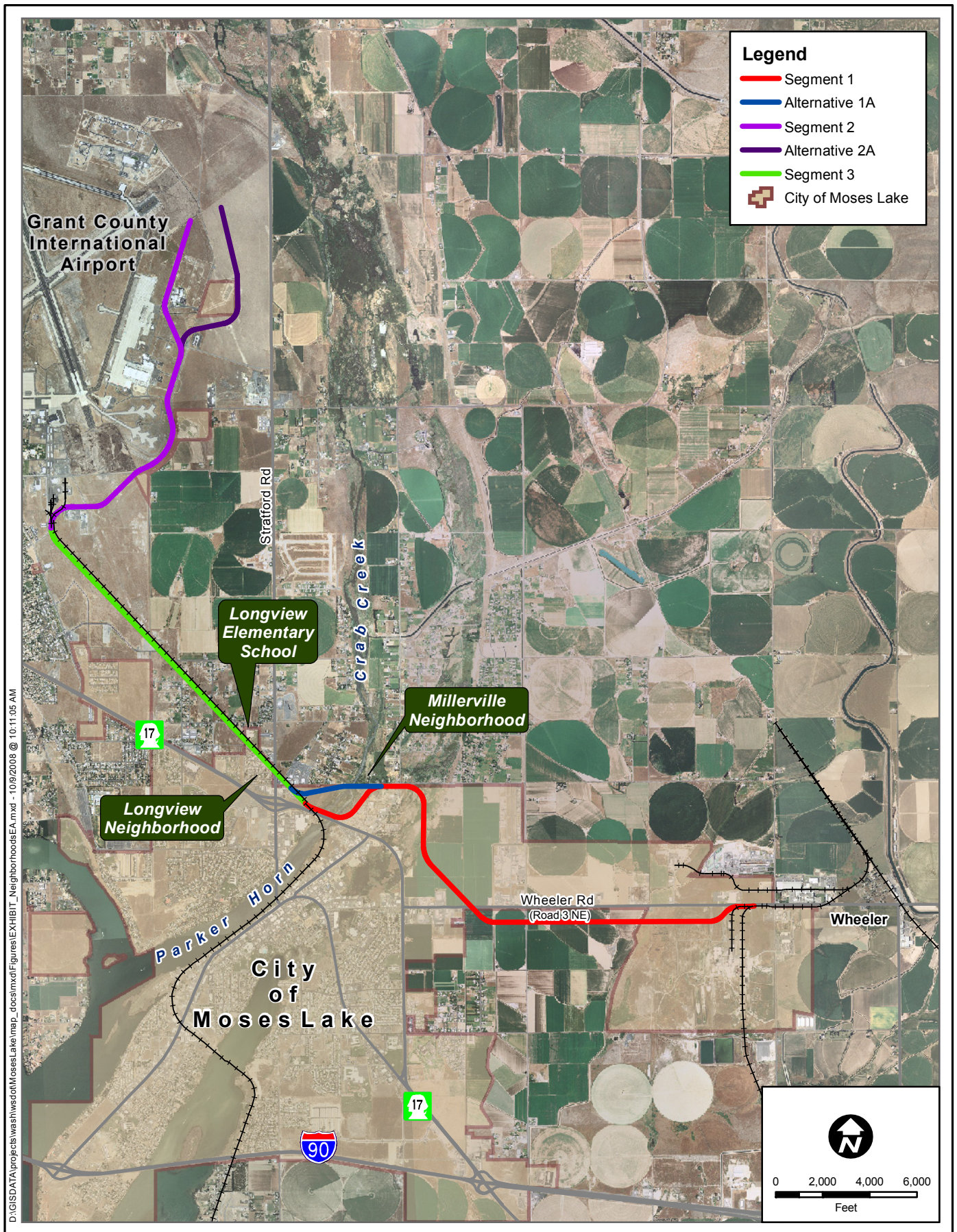
Residential areas and neighborhoods within the proposed project area were identified by reviewing municipal zoning, comprehensive plans, and aerial photographs, as well as through communication with both Grant County and the City of Moses Lake. The project team conducted site visits on August 21 and August 27, 2007, to view proposed segment locations and neighborhoods within the study area. Information about local services was obtained from the two local governments. Additional minority data was obtained from the National Center for Education Statistics.

What are the characteristics of the neighborhoods in the study area?

The City of Moses Lake covers 10.2 square miles and averages 1,758 persons per square mile. The population of the City of Moses Lake grew 54 percent between 1990 and 2006, increasing from 11,235 to 17,272 people. In 2007, the city’s population was 17,932.⁴⁰

As shown on **Exhibit 4.6**, there are two neighborhoods within 500 feet of the proposed right of way. The Millerville neighborhood is located directly north of Road 4 NE (Cherokee Road) and north of proposed Segment 1 and Alternative 1A. The Longview neighborhood is located directly adjacent to the existing rail alignment along Segment 3. No other residences are found within 500 feet of the right of way.

⁴⁰ City Data.com, Detailed Profile for Moses Lake, Washington, Population, July 2007. Accessed at: http://www.city-data.com/county/Grant_County-WA.html



What are the existing economic conditions in the study area?

Data in this section is derived from government and local sources including the U.S. Census Bureau, Economic Census, U.S. Department of Labor (DOL), Washington State Employment Security Department (ESD), Washington State Office of Financial Management (OFM), and the Grant County Economic Development Council.

Housing

According to the 2000 U.S. Census, there were 6,263 housing units in the City of Moses Lake, of which 90 percent were occupied. The total number of housing units increased by 35 percent from 1990 to 2000, and occupied units increased by 31 percent in the same time period.⁴¹

Employment

The most recent data from the ESD indicate that the total number of jobs in the City of Moses Lake increased by 22.1 percent from 2001 to 2006, an annual rate of 4.4 percent.⁴² However, the total number of firms decreased by 2.3 percent.

According to the DOL, the unemployment rate has gone down considerably since 2000. As illustrated in **Exhibit 4.7**, the unemployment rate has been dramatically decreasing since 2002. In 2000, the unemployment rate was 7.7 percent. In 2002, it peaked at 9.5 percent and continues to decrease. As of 2007, the unemployment rate for the Moses Lake Micropolitan Statistical Area⁴³ (consisting of all of Grant County) was 5.8 percent, which is 1.3 percentage points higher than the state of Washington as a whole at 4.5 percent. As of September 2008, unemployment in the Moses Lake Micropolitan Statistical Area was 5.3 percent.⁴⁴

Major Employment Industries

According to 2000 U.S. Census data, 6,358 people were employed in the City of Moses Lake. Employment in the educational, health, and social services sector dominated the labor market, encompassing 22.2 percent of the employed

⁴¹ U.S. Census Bureau. 2000. <http://www.census.gov>.

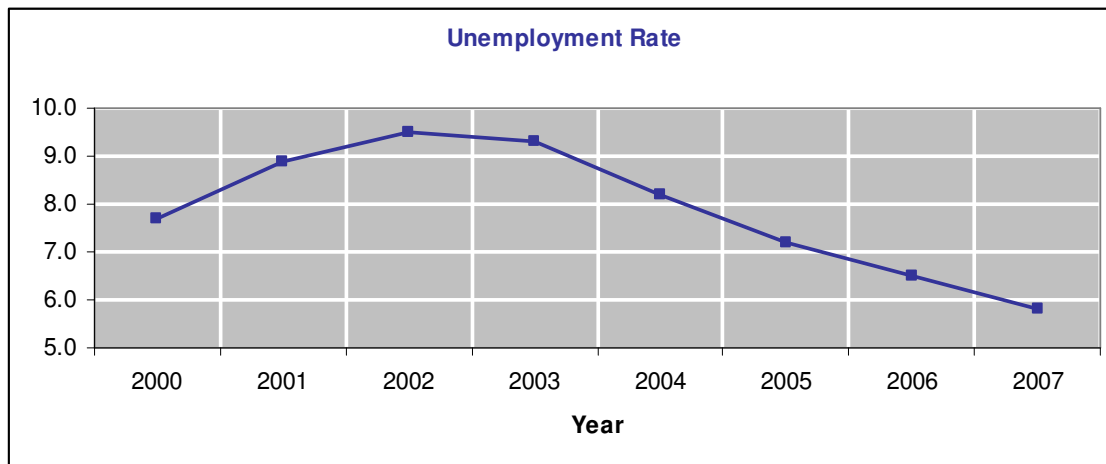
⁴² Washington State Employment Security Department, Labor Market and Economic Analysis. 2006 . *Workforce Explorer*. <http://www.workforceexplorer.com/>. U.S. Census Bureau. 2002. *2002 Economic Census*. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ECN&_submenuId=datasets_4&_lang=en.

⁴³ The Moses Lake Micropolitan Statistical Area is composed of Grant County and is defined by Washington OFM as follows: A micro area contains an urban core of at least 10,000 (but less than 50,000) population. Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core.

⁴⁴ Washington State Employment Security Department. 2008. <http://www.workforceexplorer.com> *Resident Labor Force and Employment in Washington State and Labor Market Areas*. October 21, 2008.

labor force in the City of Moses Lake. Manufacturing was the second leading industry, capturing 18 percent of the labor market. By 2002, manufacturing grew to be the leading industry, employing 23 percent of the workers in the City of Moses Lake (2002 Economic Census).⁴⁵ The same pattern occurs today with the expansion of manufacturers such as REC Silicon and the construction of a 620,000 square-foot facility by Guardian Fiberglass, Inc. (creating 209 total jobs).

Exhibit 4.7
Unemployment Rate for the City of Moses Lake
(Micropolitan Statistical Area)



Manufacturing and educational, health, and social services remain the base of the City of Moses Lake's economic well-being. Also contributing to the economic stability of the area are sectors such as retail trade (12 percent), arts and entertainment (9.1 percent), transportation (6.1 percent), professional services (6 percent), wholesale trade (5.6 percent), and agriculture (5.3 percent). The government employs 17.9 percent of the labor force in the City of Moses Lake.

Income

Personal income statistics are a critical indicator of an area's output and economic stability. Data from the U.S. Census indicate that, from 1990 to 2000, personal income in the City of Moses Lake increased by a total of 51.8 percent, or at an annual rate of 5.2 percent. Per capita income for the City of Moses Lake was \$16,644, compared with \$15,037 for Grant County, in 1999 dollars, according to 2000 U.S. Census data.⁴⁶

⁴⁵ U.S. Census Bureau. 2002. *2002 Economic Census*.
http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ECN&_submenuId=datasets_4&_lang=en.

⁴⁶ U.S. Census Bureau. 2000. <http://www.census.gov>.

Median household income data are based on U.S. Census data for household income and earnings for 1989 and 1999, as reported in 1990 and 2000. Median income in the City of Moses Lake increased by a total of nearly 57 percent, from \$23,258 in 1989 to \$36,467 in 1999. In 2000, the median household income in the City of Moses Lake was comparable to Grant County's median of \$35,276 and 26 percent lower than Washington State's median at \$45,776. By 2006, median income in the City was \$38,200, approximately 37 percent lower than the state's median income of \$52,583.⁴⁷

Are there any Environmental Justice Communities in the area of the proposed project?

Executive Order (EO) 12898,⁴⁸ *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to consider whether their actions would have a disproportionately high and adverse impact on minority or low-income populations.

Along the existing line (Segment 3), Longview neighborhood residences are found as close as 45 feet from the existing line. In Segment 1 and Alternative 1A (Millerville), the closest residence is 210 feet from the proposed line. In Segment 2 and Alternative 2A, no residences are found within 500 feet of the proposed right of way.

Minority Populations

The total minority population comprises approximately 24 percent of the population within the study area⁴⁹ (**Exhibit 4.8**). This compares to roughly 23 percent within the City of Moses Lake and 24 percent in Grant County.

According to the 2000 U.S. Census, approximately 24 percent of the population of the census tracts and block groups within the study area identified themselves as Hispanic (persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); this compares to 25 percent in the City of Moses Lake, and 30 percent in Grant County.⁵⁰ However, when the census data is broken down into block groups, the Longview neighborhood, located south of the existing Segment 3 alignment, contains approximately 65 percent Hispanic persons in the total neighborhood population, and only 2.2 percent other minority composition.

⁴⁷ City Data.com, City of Moses Lake, Washington. Available at <http://www.city-data.com/city/Moses-Lake-Washington.html>

⁴⁸ The STB, as an independent regulatory agency, is not legally bound by Executive Orders; nevertheless, the STB makes every effort to comply with the intent of applicable Executive Orders for projects subject to its authority.

⁴⁹ U.S. Census Bureau, Census Block Group data. 2000. <http://www.census.gov>

⁵⁰ U.S. Census Bureau, Census Block Group data. 2000. <http://www.census.gov>

Exhibit 4.8
Population and Minority Characteristics

Geography	Race	Population	Percent
Project Area	White	6,341	75.8%
	Black or African American	222	2.7%
	American Indian and Alaska Native	121	1.4%
	Asian	127	1.5%
	Native Hawaiian and Other Pacific Islander	4	0.0%
	Other	1,553	18.6%
	Total Population	8,368	100.0%
	Total Non-white Population	2,027	24.2%
	Total Hispanic or Latino	2,026	24.2%
City of Moses Lake	White	11,537	77.2%
	Black or African American	253	1.7%
	American Indian and Alaska Native	152	1.0%
	Asian	214	1.4%
	Native Hawaiian and Other Pacific Islander	10	0.1%
	Other	2,787	18.6%
	Total Population	14,953	100.0%
	Total Non-white Population	3,416	22.8%
	Total Hispanic or Latino	3,800	25.4%
Grant County	White	57,174	76.5%
	Black or African American	742	1.0%
	American Indian and Alaska Native	863	1.2%
	Asian	652	0.9%
	Native Hawaiian and Other Pacific Islander	53	0.1%
	Other	15,214	20.4%
	Total Population	74,698	100.0%
	Total Non-white Population	17,524	23.5%
	Total Hispanic or Latino	22,476	30.1%

Source: 2000 U.S. Census, Block Group data, SF1, Table P7 except for Hispanic or Latino populations, where Table P8 was used.

Note: Total non-white population does not include the Hispanic race alone; therefore, Hispanics are combined with "other." Including the Hispanic or Latino category would be double-counting the population.

The only school located within the study area is Longview Elementary School, which is located approximately 190 feet north of the existing rail line (Segment 3) near RP 5. To the south of the school is the Longview neighborhood, which is within the school district boundary. Accordingly, elementary students from the Longview neighborhood are likely to attend Longview Elementary School.

The Longview neighborhood and Longview Elementary School are separated by the existing rail line, Segment 3. The school population is approximately 40 percent Hispanic and 13.5 percent of the school's students are enrolled in the Migrant Education Program⁵¹ for children of migrant workers. One measurement of minority status in school districts is the number of students served in language assistance programs (e.g., English as a Second Language, High Intensity Language Training, bilingual education). The Moses Lake School District averages 59 students enrolled in the language assistance program per school.⁵² Based on that average, approximately 11 percent of the students at Longview Elementary School are enrolled in the language assistance program.

Census Tract 9808, Block Groups 1 and 2, encompass the western portion of Segment 3 (the existing rail line) and all of Segment 2 and Alternative 2A. Both block groups indicate areas of minority populations above 50 percent. This is significantly higher than the minority population of 24 percent within the overall study area, 23 percent within the City of Moses Lake, and 24 percent in Grant County.

Low-income Populations

Low-income populations are identified based on median household income relative to the poverty threshold for the area. According to the U.S. Department of Health and Human Services, poverty is defined by comparing the total family income with the poverty threshold. The poverty threshold for both the state of Washington (average household size of 2.53) and Grant County (average household size of 2.91) is \$16,600. The 2000 Census indicates that 2,221 people live below the poverty level in the City of Moses Lake, and 1,163 people located in census block groups adjacent to the study area live below the poverty level. **Exhibit 4.9** provides a summary of poverty status in the study area, City of Moses Lake, and Grant County.

⁵¹ A child who qualifies for the Migrant Education Program is any child who has moved across school district lines within the last three years to accompany or join a parent or guardian who has moved to seek or obtain temporary or seasonal work.

⁵² U.S. Department of Education, National Center for Education Statistics. 2007. <http://nces.ed.gov/ccd/districtsearch/index.asp>. Accessed December 19, 2007.

Exhibit 4.9
Poverty Status Summary

Geography	Population	Below Poverty Threshold	Percent Below Poverty Threshold
Project Area	7,001	1,163	16.6%
City of Moses Lake	14,661	2,221	15.1%
Grant County	73,591	12,809	17.4%

Source: 2000 U.S. Census, Block Group, SF3

Block Groups 1 and 2 of Census Tract 9808 encompass the western portion of the existing alignment, Segment 3, and all of the proposed Segment 2 and Alternative 2A. These block groups include roughly 30 percent low-income households. This is significantly higher than the low-income population of 16.6 percent for the study area as a whole, 15 percent for the City, and 17.4 percent for the County. More than half the student population in Longview Elementary School has applied for the National School Lunch Program,⁵³ which offers reduced price and free meals for eligible low-income households.

Are parks, recreational resources, public schools, or emergency medical facilities located in the project area?

There are no designated parks or recreational facilities located within 500 feet of the right of way.

There are no emergency or medical facilities located in the study area. Many of these facilities are located southeast of the study area in the Moses Lake city center, including the following:

- The Samaritan Hospital;
- The Moses Lake Community Health Center;
- The City of Moses Lake Fire Department (2 stations); and
- The City of Moses Lake Police Department.

The study area is also served by the Grant County Fire Department, District No. 5.

The project area is served by the Moses Lake School District, which has more than 7,000 students. The only school located within the study area is Longview Elementary School, serving kindergarten through fifth grade. The

⁵³ The National School Lunch Program includes meals at reduced prices and free meals. As outlined by the U.S. Department of Agriculture guidelines, income eligibility for an average household size of 2.6 (the average household size in the City of Moses Lake) is an annual income of \$25,327 (reduced price meal) and \$17,797 (free meal). Students enrolled in the Migrant Education Program are also eligible.

school had an enrollment of 517 students in 2007.⁵⁴ Longview Elementary School is located approximately 190 feet north of the existing rail line (Segment 3) (**Exhibit 4.6**).

Soils and Geology

How was the geology and soils study area defined?

This section describes existing geological and soil conditions in the project area. For the purposes of this analysis, the geology and soils study area was defined as the area within 100 feet of the centerline of the proposed project corridor.

Information was collected from published sensitive area, soil survey, geologic, and topographic maps; from previous geotechnical and environmental consultant reports; and from recent aerial photographs.

Subsurface information was obtained from WSDOT, the Port of Moses Lake, and the City of Moses Lake. Other information sources included the following:

- *Engineering Report: Process Water Land Application System, Port of Moses Lake, Moses Lake, Washington.*⁵⁵
- Pile driving records for the State Route 17 (SR 17) temporary construction bridge over Parker Horn.
- *Report of Soils Investigation, Proposed Alder Street Bridge, Moses Lake, Washington.*⁵⁶
- *A Preliminary Evaluation of Soils at a Proposed Crossing of Parker Horn, Moses Lake, Grant County, Washington.*⁵⁷
- Various WSDOT soils reports, including reports for the following:
 - SR 171 East Pioneer Way to Moses Lake.
 - SR 171 Moses Lake Vicinity – Alder Street Intersection.
 - SR 17 South Pioneer Drive to Wheeler Road (Road 3 NE).

⁵⁴ U.S. Department of Education, National Center for Education Statistics. 2007. <http://nces.ed.gov/ipeds/datasearch/ipedssearch.asp>.

⁵⁵ Cascade Earth Sciences, Ltd. *Engineering Report, Process Water Land Application System, Port of Moses Lake, Moses Lake, Washington.* Spokane, WA. May 7, 1998.

⁵⁶ Dames and Moore. *Report of Soils Investigation, Proposed Alder Street Bridge, Moses Lake, Washington.* July 8, 1957.

⁵⁷ George Maddox & Associates. *A Preliminary Evaluation of Soils at a Proposed Crossing of Parker Horn, Moses Lake, Grant County, Washington.* November 3, 1978.

- SR 17 Wheeler Road (Road 3 NE) Intersection.
- SR 17 Stratford Road to Larson Air Force Base.
- Field notes related to SR 17 and Broadway to Road 4 NE (Cherokee Road) water main extension by the City of Moses Lake (2001).
- *Superfund Fact Sheet, Moses Lake Wellfield Contamination, Skyline Water System.*⁵⁸

The project team conducted two field visits to the study area on August 15 and September 4, 2007, to assess surface conditions, geologic hazards, and likely subsurface conditions.

What are the general surface conditions of the project area?

Central Washington ground surface topography is characterized by several broad basins and flat, open areas separated by ridges and transected by stream channels and flat-bottomed coulees, which are dry, braided channels formed by glacial drainage. The project area is contained in one such broad basin, the Quincy Basin. The boundaries for the Quincy Basin are the Frenchman Hills on the south, the Columbia River on the west, and uplands on the north and east.

The project area contains several subtle scabland tracts, which are features that have been scoured and modified by glacial meltwater rivers and floods. One such scabland tract is occupied by Crab Creek, which crosses the study area.

The study area is predominantly underlain by sand and gravel except where the project crosses Parker Horn. There the proposed alignment is underlain by relatively fine-grained sand and silt.

Surface water and groundwater in the project area are controlled primarily by soil and bedrock conditions, as well as ground surface topography. The topography across most of the project area is gently rolling, and the soils are coarse-grained and permeable. Rather than flowing overland and forming streams, most precipitation falling in the vicinity of the project area infiltrates directly into the highly pervious soils. Two streams are found within the study area: Crab Creek, which flows into Moses Lake at the north end of Parker Horn; and Stream C, which flows in a roadside ditch within the right of way for SR 17.

⁵⁸ USEPA (U.S. Environmental Protection Agency). *Superfund Fact Sheet, Moses Lake Wellfield Contamination, Skyline Water System*. EPA Region 10. July 2002.

Are geologic hazards present in the project area?

Earthquakes and volcanic activity are known to occur in the project vicinity. The rate of earthquake activity in the study area is moderate to low. The principal source of volcanic activity in the project vicinity is the Cascade Mountain Range, located more than 90 miles from the project area. The nearest active fault is the Frenchman Hills Fault, located approximately seven miles south of the Moses Lake area.⁵⁹

Traffic and Transportation

How was the traffic study area defined?

The study area for the traffic analysis is generally the length of the Build Alternative between the east end of Segment 1 (RP 0) and the north end of Segment 2 and Alternative 2A (RP 11), including the streets that cross the alignment. Where cross streets intersected with SR 17, those intersections were also examined. SR 17 itself was not evaluated in the traffic study.

Relevant roadway traffic volumes in the study area were obtained from the City of Moses Lake and Grant County. The City of Moses Lake provided average daily traffic volumes for 2006. Grant County provided average daily traffic volumes for 2007.

What are traffic conditions in the project area?

The existing rail line (Segment 3) crosses six roads:

Kinder Road NE	Maple Drive NE
Wenatchee Drive NE	Loring Drive
Stratford Road NE	Forbes Road NE

There are existing grade crossing signals and gates located at Stratford Road NE and Loring Drive. There are no signals or gates at Kinder Road NE, Wenatchee Drive NE, Maple Drive NE, and Forbes Road NE; those crossings are marked with crossbuck signs only.

Average daily road traffic volumes range from 960 to 1,700 cars per day on most streets in the study area. Volumes on Stratford Road near SR 17 are higher, with average daily traffic volumes of over 13,000 cars per day. The average daily traffic volumes are summarized in **Exhibit 4.10**.

Many of the streets within the study area are minor roadways, for which traffic counts are not available.

⁵⁹ Lidke, D.J. (compiler). *Fault Number 561s, Frenchman Hills Structures, Frenchman Hills Fault*. In Quaternary Fault and Fold Database of the United States: U.S. Geological Survey website, <http://earthquakes.usgs.gov/regional/qfaults>. 2002. Accessed November 2007.

Exhibit 4.10
Average Daily Traffic Volumes

Location	Year of Count	Average Daily Traffic Volume***
Road L NE	2007	1,560
Wheeler Road (Road 3 NE)*	2006	13,180
Road K NE	N/A	N/A
Kinder Road NE	N/A	N/A
Wenatchee Drive NE	N/A	N/A
Stratford Road NE**	2006	13,180
Maple Drive NE	N/A	N/A
Loring Drive	N/A	N/A
Forbes Road NE	N/A	N/A
Randolph Road (east of 22nd Ave)	2007	1,700
Turner Road NE	N/A	N/A
Graham Road NE	N/A	N/A
Tyndall Road NE	2007	960
Randolph Road (north of Road 7)	2007	1,300

* 300 feet west of SR 17

** 100 feet north of SR 17

***Traffic counts were provided by the City of Moses Lake (2006 data) and Grant County (2007 data). Counts are averaged over road segments.

N/A = not available.

Traffic delays at railroad at-grade crossings were calculated based on the queuing theory equations from *Traffic Flow Fundamentals*.⁶⁰ The hourly delay calculation takes into consideration several parameters including train frequency, train blockage time, hourly traffic volume, and traffic departure capacity. Based on factors including train frequency and road traffic volumes, the hourly delay calculation estimates the delay time that drivers will experience if they are stopped at a railroad crossing. The estimated delay time resulting from a freight train is 70 seconds, starting from the first warning and the lowering of the crossing gate, to the completion of the gate's rise after the train has passed. Due to the seasonal nature and low numbers of freight trains currently using the existing track, trains do not block area roads on a regular basis. Occasionally, in the eastern part of the study area at the eastern end of Segment 1, trains on the existing rail line can cause delays as they move to and from existing track around Wheeler Road (Road 3 NE) and Road 0 NE, but this does not occur on a regular basis.

⁶⁰ May, Adolf D. *Traffic Flow Fundamentals*. 1990.

How will road traffic change in the future?

Future traffic volumes for 2010 and 2030 were predicted by applying a 3 percent annual growth rate to existing traffic volumes, as forecasted by the *Moses Lake Comprehensive Plan (Exhibit 4.11)*.⁶¹ Although growth rates over the last five years have actually been occurring at a lower rate (closer to 1.7 percent based upon actual traffic counts), the project team used the higher growth rate to estimate the greatest future traffic volumes that could reasonably be expected.

Exhibit 4.11
Future Average Daily Traffic Volumes

Location	2010 Average Daily Traffic Volume	2030 Average Daily Traffic Volume***
Road L NE	1,700	2,640
Wheeler Road (Road 3 NE)*	15,160	22,670
Road K NE	N/A	N/A
Kinder Road NE	N/A	N/A
Wenatchee Drive NE	N/A	N/A
Stratford Road NE**	15,160	22,670
Maple Drive NE	N/A	N/A
Loring Drive	N/A	N/A
Forbes Road NE	N/A	N/A
Randolph Road (east of 22nd Ave)	1,850	2,870
Turner Road NE	N/A	N/A
Graham Road NE	N/A	N/A
Tyndall Road NE	1,050	1,620
Randolph Road (north of Road 7)	1,420	2,200

* 300 feet west of SR 17

** 100 feet north of SR 17

*** Future traffic volumes are based on the counts provided by the City of Moses Lake and Grant County, and are averaged over road segments.

N/A = not available

Visual Quality

How was the visual quality study area defined?

Visual resources are the natural and human-made features of a landscape that characterize its form, line, texture, and color. This section describes the existing visual landscape within the project area and vicinity.

⁶¹ City of Moses Lake. 2002. *Moses Lake Comprehensive Plan 2002 Amendment*.

The study area was defined as a corridor the length of the Build Alternative, from RP 0 at the eastern end to approximately RP 11 at the northwestern end. The width of the study area was generally 1,000 feet from the centerline of the proposed right of way, depending on the topography.

The project team identified nine viewpoints in the project area to be studied for visual quality. The viewpoints were selected based on their potential to be an area of impact or because the view was a representative example of a particular landscape type (for example, an industrial or residential area).

The study area included views experienced from Wheeler Road (Road 3 NE) on the east project boundary to the GCIA on the west project boundary. The views from the nine viewpoints spanned the foreground to background area from which the proposed rail line segments could be viewed. The location of the viewpoints is shown on **Exhibit 4.12**.

The visual character and quality of the study area was determined through site visits and review of aerial and on-site photographs. Viewer response and sensitivity was derived from interviews with City of Moses Lake Planning Department staff and comments received at the July 2007 Public Open House. The project team reviewed concept plan sheets and other planning documents to determine what changes to the visual environment would result from the proposed project.

What are the existing visual quality characteristics in the project area?

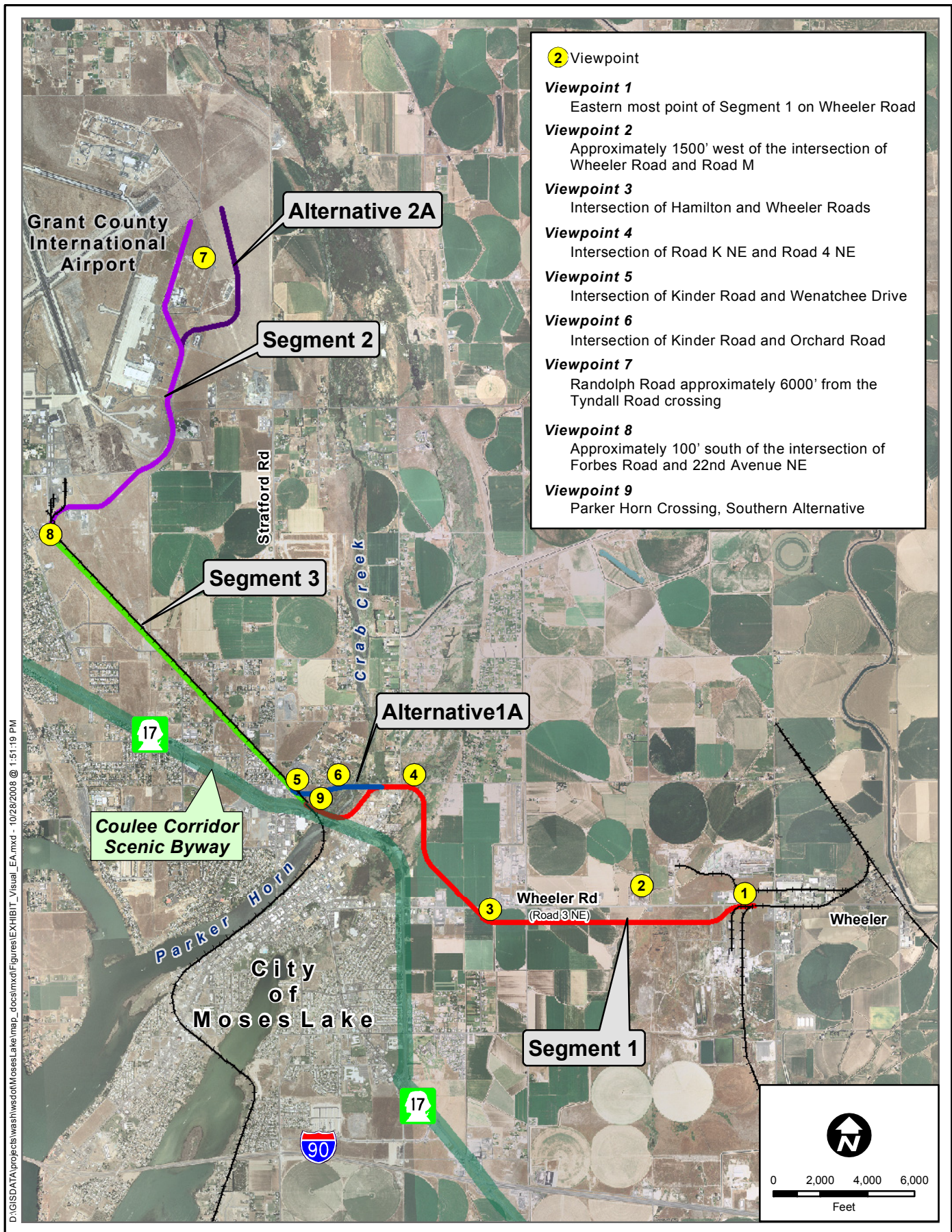
The criteria used to describe the visual quality of the project study area are derived from *Visual Impact Assessment for Highway Projects*,⁶² and consist of vividness, intactness, and unity:

Vividness – The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

Intactness – The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.

Unity – The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

⁶² FHWA (Federal Highway Administration). *Visual Impact Assessment for Highway Projects*. 1981.



Using these criteria, the overall existing visual quality in the study area was rated as moderately low. Dominant visual features include undeveloped or irrigated crop fields and large industrial buildings, with increasing commercial development toward SR 17. Enclaves of low-density residential development occur near the northern arms of Parker Horn.

Each of the nine viewpoints was rated for vividness, intactness, and unity.⁶³ Representative photographs are included for Viewpoint 2 (Wheeler Road), Viewpoint 4 (Road K NE and Road 4 NE), and Viewpoint 9 (Parker Horn), since those are located close to existing residences and have relatively high visual quality when compared with other views in the study area (See **Exhibit 4.13**).

Are there any designated scenic resources in the project vicinity?

SR 17 is part of the Coulee Corridor National Scenic Byway. Scenic byways are roads designated by the U.S. Secretary of Transportation as distinct based on archaeological, cultural, historical, natural, recreational, and scenic qualities. The National Scenic Byways Program was established to help recognize, preserve, and enhance selected roads throughout the U.S. The Coulee Corridor National Scenic Byway traverses central Washington State in

Exhibit 4.13a
Viewpoint 2 (Wheeler Road)



⁶³ For the numeric ratings and calculation sheets, please see the Visual Quality Technical Memorandum, which may be obtained from the WSDOT Rail & Marine Office. Contact information is provided on the back of the title page.

Exhibit 4.13b
Viewpoint 4 (Road K NE and Road 4 NE)



Exhibit 4.13c
Viewpoint 9 (Parker Horn)



a north to south direction and includes portions of three highway routes – SR 155, U.S. Highway 2, and SR 17.

Scenic byways can be selected for their rural character and for the elements that compose the visual landscape along the roadway. In addition, SR 17 is prized for its “geological wonders,” which include canyons, cliffs, lakes, and sand dunes; its archaeological history; and prevalent avian wildlife.

Although included in the Scenic Byway designation, this urbanized segment of SR 17 along the proposed project corridor does not reflect the distinct characteristics that led the highway to be designated as a national scenic byway.

Water Resources

How was the water resources study area defined?

The study area extends approximately 11 miles, from RP 0 to RP 11, and includes the water bodies that cross or run parallel to the proposed rail line segments, or that may receive drainage from these water bodies. The study area also includes aquatic areas 0.5 miles downstream of where Segment 1 and Alternative 1A would cross Parker Horn or Crab Creek. The 0.5-mile limit was determined based on the potential extent of water quality-related impacts resulting from construction and operation of the proposed project.

Information was acquired through a review of basin plans, topographic and resource maps, aerial photographs, water quality studies, and agency websites. A site visit was conducted in August 2007 to assess existing drainage and water quality features.

What water resources are found in the project area?

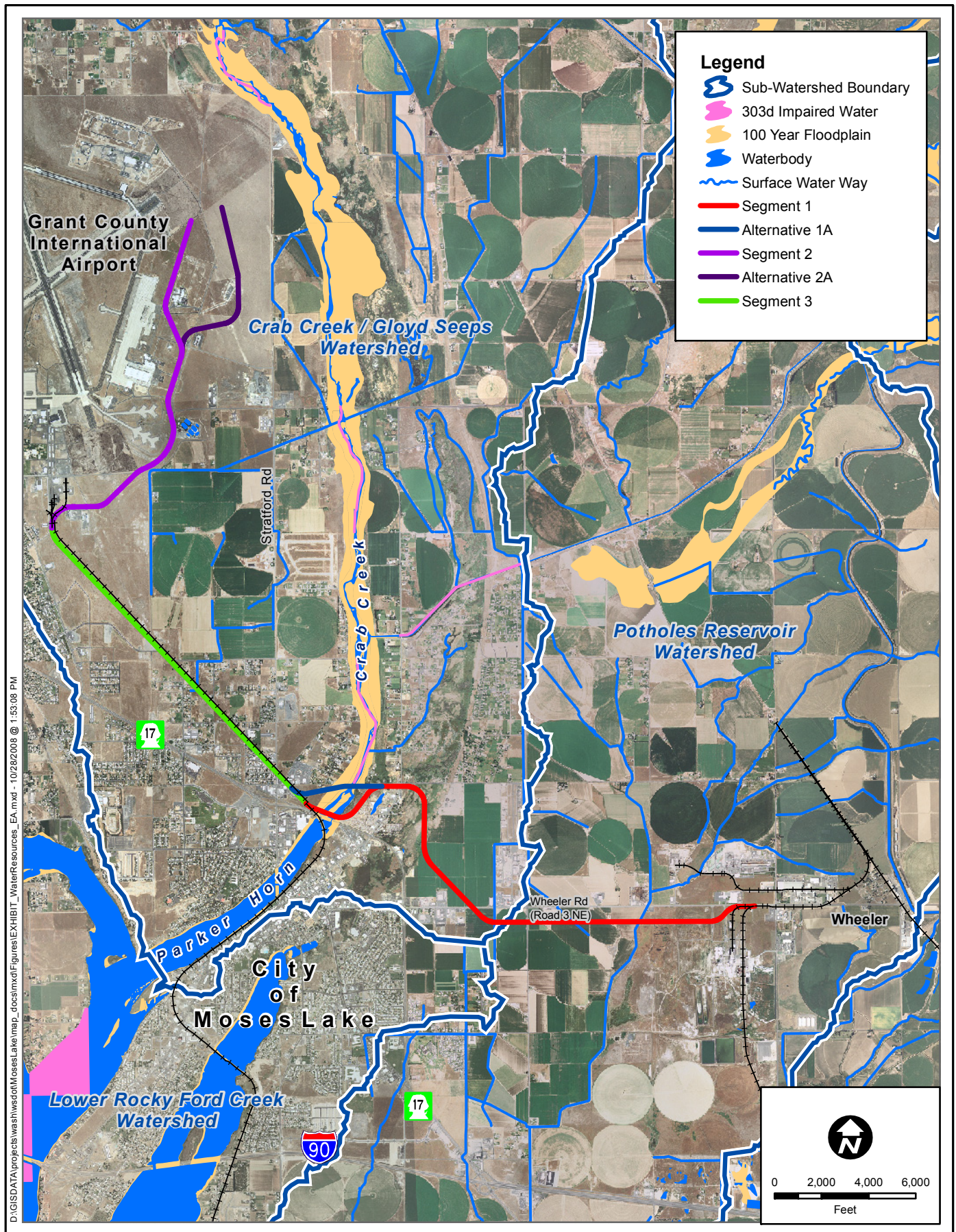
Lower Crab Creek flows southwest from Moses Lake to its confluence with the Columbia River. Upper Crab Creek originates on the northeastern Columbia River Plateau approximately three miles east of Reardan, Washington, flowing into Moses Lake at Parker Horn. The Crab Creek Watershed, which includes the project area, drains an area of approximately 4,840 square miles.

Crab Creek and Stream C are located within the study area. Stream C is a small, channelized roadside drainage ditch that parallels SR 17 to its discharge at Parker Horn, which is an arm of Moses Lake.

The study area also includes six irrigation canals and irrigation wasteways (canals that receive wastewater from the irrigation of nearby fields), as well as two drainage ditches. Most of the irrigation canals and wasteways eventually drain to the Potholes Reservoir, a 28,000-acre water body located approximately 2.5 miles south of the project area, and which drains to the Columbia River. Water resources in the study area are shown on **Exhibit 4.14**.

What are the characteristics of water bodies in the project area?

Ecology monitors water quality in Washington State and has determined that Moses Lake and Crab Creek do not meet one or more water quality standards



(303(d) list).⁶⁴ Moses Lake has been shown to have excessive levels of total phosphorus, high pH,⁶⁵ and toxic parameters measured in fish tissue samples. The principal water quality problem in the lake is excessive levels of algae due to high concentrations of phosphorus. High phosphorus in the lake results primarily from agricultural practices and operations associated with the system of irrigation canals in the watershed. Crab Creek has been shown to have high temperatures, high pH, and fecal coliform bacteria.⁶⁶

Are floodplains present in the project area?

Floodplains in the study area are limited to the Parker Horn / Crab Creek area. There are few impervious surfaces in the study area and soils generally have high infiltration rates. Very little surface water runoff occurs except under infrequent conditions such as extreme thunderstorms or rain following snowstorms. These characteristics reduce the potential for flooding problems.

Wetlands

How was the wetlands study area defined?

Wetlands are biologically diverse and dynamic ecosystems that support diverse populations of fish, wildlife, and plants. Wetlands also help protect water quality by filtering out pollutants, providing natural flood control by absorbing excess water, and buffering coastal areas from erosion.

Wetlands are defined by three characteristics: wetland vegetation, wet soils, and the presence of water. Both the U.S. Army Corps of Engineers and Ecology have regulations that define how wetlands are assessed.

The wetlands study area is a 600-foot-wide corridor, with 300 feet on either side of the proposed track centerline. Prior to visiting the proposed project site, site-specific information was collected and analyzed. This information was obtained from the WDFW PHS database, Moses Lake Shorelines Management Master Plan,⁶⁷ U.S. Fish and Wildlife National Wetlands Inventory (NWI), U.S. Department of Agriculture Natural Resources Conservation Service soil survey, U.S. Geologic Survey quadrangle maps, technical reports previously produced by WSDOT, and aerial photographs.

⁶⁴ Ecology. 2004 *Water Quality Assessment (Final) - Category 5 Listings for WRIA 41*. http://www.ecy.wa.gov/programs/wq/303d/2002/2004_documents/wria_pdfs-5final/kk-active-5-wria41.pdf.

⁶⁵ pH is a measure of how acidic or basic a liquid is. Low pH indicates an acid, whereas high pH indicates a base. As a water body becomes more acidic or basic, it can adversely affect the health of aquatic populations that are not adapted for those conditions.

⁶⁶ The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of humans or animals.

⁶⁷ City of Moses Lake. 1988. *Shorelines Management Master Plan*.

The project team conducted field visits in July 2007 and August 2007. They identified and assessed wetlands and other waters of the U.S. within the study area. Accessible wetlands and other waters located within the proposed project corridor were evaluated for the presence of wetland vegetation, soils, and hydrology as described in the 1987 *Corps of Engineers Wetlands Delineation Manual*⁶⁸ with the 2006 *Arid West Supplement*⁶⁹ and the *Washington State Wetland Identification and Delineation Manual*.⁷⁰ The *Arid West Supplement* was used because the study area is located within the Columbia / Snake River Plateau.

Two types of analysis were performed within the study area:

- **Formal wetland delineations:** All accessible wetlands within 100 feet of either side of the project centerline were delineated and rated. Wetland boundaries were identified using Global Positioning System (GPS) equipment.
- **Wetland reconnaissance:** The approximate boundaries of wetlands located between 100 to 300 feet from the project centerline, or wetlands that were inaccessible due to private property issues, were mapped by a wetland biologist. The boundaries and ratings of these wetlands were estimated using NWI data and then verified by visiting the project area.

Descriptions of wetlands and other waters of the U.S. that could be affected by the proposed project were classified using *The Classification of Wetlands and Deepwater Habitats of the United States*.⁷¹ Hydrologic, water quality, and habitat functions were evaluated using the *Washington State Wetland Rating System for Eastern Washington – Revised*.⁷²

Ditches and canals that convey water to navigable waters with sufficient duration to be jurisdictional⁷³ were identified during the fieldwork. Other features that were determined not to be jurisdictional were investigated in the field based on aerial photo signatures or NWI data.

⁶⁸ Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. U.S. Army Waterways Experiment Station. Vicksburg, MS.

⁶⁹ Environmental Laboratory. 2006 *Arid West Supplement*. 2006

⁷⁰ Ecology (Washington State Department of Ecology). *Washington State Wetland Identification and Delineation Manual*. Publication # 96-94. Olympia, WA. 1997.

⁷¹ Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States*. Fish and Wildlife Service PUBL. FWS/OBS-79/31. 1979.

⁷² Hruby, T. *Washington State Wetland Rating System for Eastern Washington - Revised*. Washington State Department of Ecology Publication #04-06-15. 2004.

⁷³ The term “jurisdictional” applies to wetlands regulated by the U.S. Army Corps of Engineers and for which a permit would be required for any disturbance.

What types of wetlands are found in the project area?

Six wetlands were identified in the study area, as shown on **Exhibit 4.15**. These wetlands are primarily associated with Crab Creek and Parker Horn and are located near the western end of Segment 1 and Alternative 1A. When lake levels are low and Crab Creek is flowing freely through Parker Horn, wetlands along the creek receive occasional flooding and exchange nutrients with the creek. These same wetlands also function as lacustrine (lake fringe) wetlands when water levels in Moses Lake are high, which creates a backwater effect in Crab Creek. During these times of high water, wetlands buffer shorelines and provide habitat for species associated with lake habitats.

Wetlands outside of Parker Horn and Crab Creek are associated with spring flow and groundwater discharge resulting from landscape-wide irrigation practices.

All of the wetlands in the study area were rated as Category III wetlands (moderate functional levels); wetlands are rated by Ecology and range from Category I (unique or rare, relatively undisturbed) to Category IV (low functional level). The wetlands in the project area provide flood attenuation, water quality, habitat functions, and have aesthetic value.

Wetlands in the study area are described in **Exhibit 4.16**. They are mostly emergent,⁷⁴ but also include small, non-native forest and scrub-shrub communities and open water. The open water area (unconsolidated bottom, no emergent vegetation) is located at Parker Horn where the channel is deeper due to water flow from Crab Creek. Many of the plant species occurring in the study area are non-native and equally adapted for both wetlands and uplands.

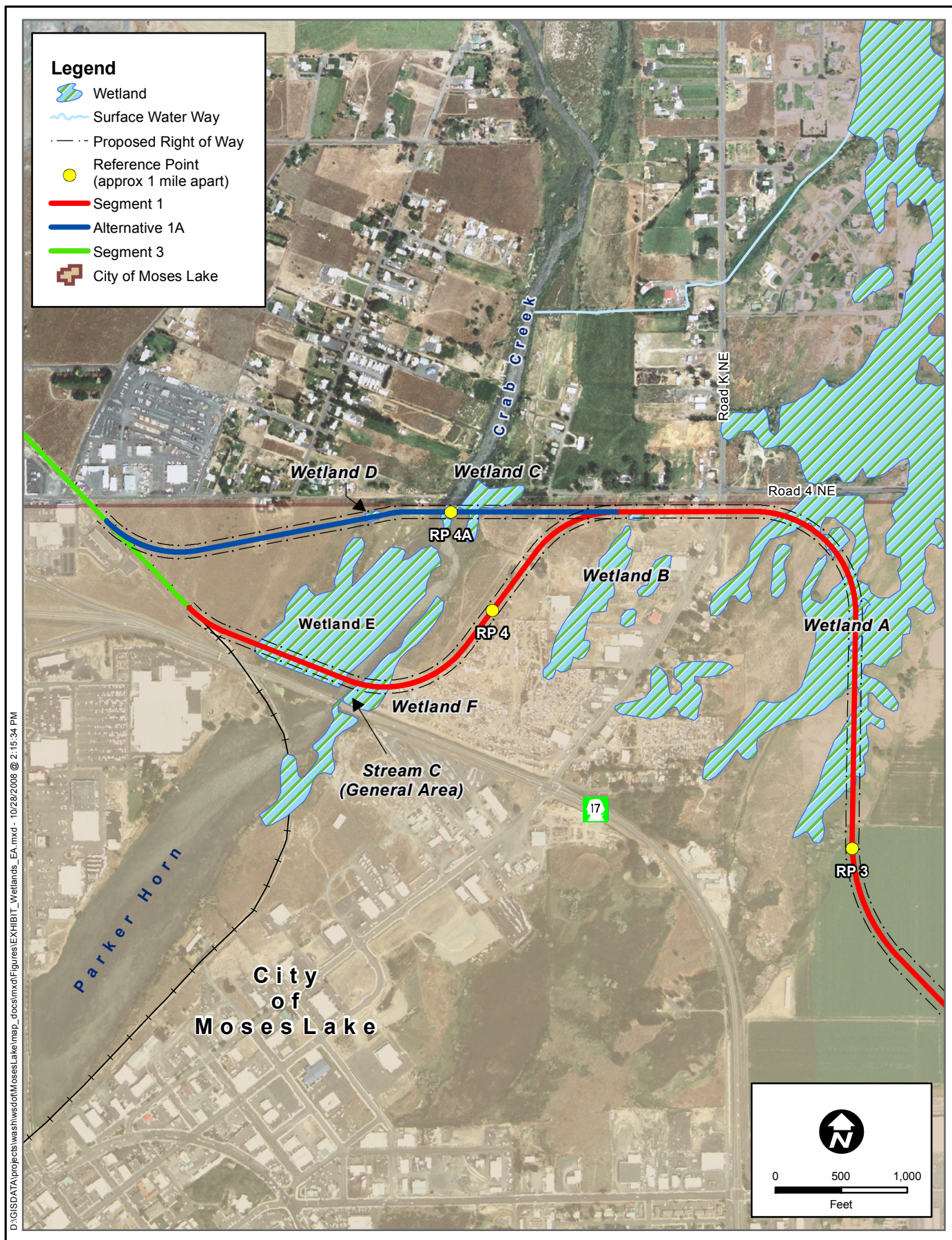
Are there other water resources regulated by the U.S. Army Corps of Engineers in the study area?

In addition to Stream C and Crab Creek, eight ditches and irrigation canals cross the study area. The ditches and canals meet the definition of “waters of the U.S.” because they convey irrigation return flows to the receiving navigable water, the Columbia River.⁷⁵

Stream C is spring-fed, originating from a wetland area located southeast of the study area. During construction of improvements to SR 17, this stream was channelized in a ditch on the north side of the highway, outside the area of disturbance and outside the right of way for the Build Alternative.

⁷⁴ Emergent plants are aquatic plants that have their stem, leaves, etc., extending above the surface of the water.

⁷⁵ There are also several roadside ditches and one area that was mapped by NWI as a wetland but found not to be one in the field. The roadside ditches are not “waters of the U.S.” as defined by the criteria of Ecology and the U.S. Army Corps of Engineers, and are therefore not evaluated in this EA.



Crab Creek is a perennial stream that drains approximately 84 percent of the Moses Lake Watershed, including major irrigation return flows through the Rocky Coulee Wasteway. Crab Creek and the northern portion of Parker Horn contain populations of priority resident fish species such as largemouth bass, rainbow trout, and walleye. The creek flows into Parker Horn in the area of the proposed Segment 1 crossing. At the proposed Segment 1 crossing, the water body is approximately 300 feet wide. Upstream from the Segment 1 crossing, Crab Creek narrows to approximately 170 feet at the proposed crossing for Alternative 1A.

Exhibit 4.16
Wetlands in the Study Area

Wetland	Location	Functional Category	Water Source	Required Buffers	Comments
A	RP 3.1-3.5	III (moderate)	Groundwater and irrigation returns	25 feet	Large on both sides of study area, heavily browsed, ⁷⁶ current livestock use.
B	RP 3.8	Estimated III (moderate)	Groundwater and irrigation returns	Estimated 25 feet	Property owner denied access. Appears large with open water.
C	RP 4.0	Estimated III (moderate)	Crab Creek	Estimated 80 feet in shoreline area; 25 feet outside shoreline area.	Property owner denied access; located on the east bank of Crab Creek, within the Shoreline Management Area.
D	RP 4.1	III (moderate)	Groundwater	25 feet	Small, depressional. ⁷⁷
E	RP 4.3-4.4	III (moderate)	Crab Creek	80 feet	Includes west bank of Crab Creek within the Shoreline Management Area, Crab Creek floodplain, a high-water channel of Crab Creek, and an island that separates the high-flow channel from the primary channel.
F	RP 4.2	Estimated III (moderate)	Fluctuating lake and creek levels	Estimated 80 feet	Property owner denied access. Located on the east bank of Crab Creek. Provides habitat for northern leopard frog, Townsend's big-eared bat, and western grebe.

⁷⁶ To eat, nibble at, or feed on leaves, tender shoots, or other soft vegetation.

⁷⁷ Depressional wetlands are those that occur in an area of lowered elevation, usually supported by groundwater or springs.

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