APPENDIX T

Socioeconomics Methods and Tables

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Acronyms and Abbreviations

Board	Surface Transportation Board
IMPLAN	IMpact analysis for PLANning
OEA	Office of Environmental Assessment

Appendix T

Socioeconomics Methods and Tables

This appendix provides information on OEA's assumptions, methods, and calculations for the socioeconomics analysis.[1]

T.1 Defining the Study Area

The Surface Transportation Board's (Board) Office of Environmental Assessment (OEA) defined the study area for socioeconomics as the area where socioeconomic changes would have the broadest impact, including those counties where any of the build alternatives would be located. Socioeconomic impacts could also extend to other counties through links such as local trade and commuter patterns. These links often follow existing transportation routes and tend to diminish with distance. Urban centers often function as providers of services to larger rural areas. OEA considered these factors in defining a sufficiently broad study area for the socioeconomics analysis.

Depending on which build alternative, if any, is approved, the proposed rail line would cross one or more of the following four counties: Custer, Rosebud, Powder River, and Big Horn Counties (the four-county area). OEA considered available data on commuter patterns to identify other counties that could also be affected by expenditures related to build alternatives (Tables T-1 and T-2). Based on the analysis of these data, OEA concluded that the broader socioeconomic impacts could extend to Yellowstone, Treasure, Fallon, and Carter Counties in Montana, and Sheridan County in Wyoming (the study area).

The distributions of residences and jobs in the study area are summarized in Table T-1. Yellowstone County is an important county of residence for workers in three of the four counties (Custer, Rosebud and Big Horn Counties), and Sheridan County, Wyoming is an important county of residence for workers in Big Horn County. Carter and Fallon Counties are important counties of residence for workers in Powder River County. Overall, Custer, Rosebud, Big Horn, and Yellowstone Counties each provide workers to fill more than 5 percent of the jobs in the four-county area.

[1] This appendix provides supporting information for Chapter 15, *Socioeconomics*, of this *Draft Environmental Impact Statement for the Tongue River Railroad*. This information should not be interpreted as stand-alone information and must be read in combination with the associated chapter.

Table T-1. Counties of Residence of Workers in the Four-County Area

	Counties Where Job is Located				
Counties Where Workers Live	**Custer (%)**	**Rosebud (%)**	**Powder River (%)**	**Big Horn (%)**	**Four-County Area (%)**
Custer	71.2	3.2	5.0	1.1	33.5
Rosebud	3.0	47.8	6.5	10.7	17.1
Powder River	2.1	4.8	65.6	0.6	4.3
Big Horn	0.8	7.8	1.0	42.4	13.0
Yellowstone	5.2	8.4	0.0	13.6	8.0
Sheridan (WY)	<0.1	0.8	0.8	11.4	3.1
Treasure	0.1	1.5	0.0	1.2	0.8
Carter	0.5	0.9	7.5	<0.1	0.7
Fallon	1.4	4.3	6.8	0.1	2.0
Other	15.7	20.5	6.8	18.9	17.5
Total	100.0	100.0	100.0	100.0	100.0

Source: U.S. Census Bureau 2011

Table T-2 shows that the four-county area is an important source of jobs for workers residing in all of the counties in the study area, with the exception of Yellowstone and Sheridan Counties.

Table T-2. Jobs in the Four-County Area as a Share of Jobs Held by County Residents

County	**Jobs in the Four-County Area by County of Residence of Worker (a)**	**Jobs in Any County by County of Residence of Worker (b)**	**Jobs in the Four-County Area as a Share of Jobs Held by County Residents (a)/(b) (%)**
Custer	4,489	6,232	72.0
Rosebud	2,297	5,388	42.6
Powder River	580	1,308	44.3
Big Horn	1,748	4,132	42.3
Yellowstone	1075	72,997	1.5
Sheridan	413	13,918	3.0
Carter	96	358	26.8
Fallon	271	1,249	21.7
Treasure	105	432	24.3

Source: U.S. Census Bureau 2011

Billings (population 104,455 in 2010) and Sheridan (population 17,444 in 2010) (U.S. Census Bureau 2010) have the largest population concentrations in the four-county area and are located in Yellowstone (Montana) and Sheridan (Wyoming) Counties. Project-related

demand for services and materials that could not be met in the four-county area would likely be met in these cities.

Based on the above information, OEA included all nine counties in the study area. In addition to the four counties where the proposed rail line could be located, expenditures related to the build alternatives could be made in Yellowstone, Sheridan, Carter, and Fallon Counties through commuter linkages. Yellowstone and Sheridan Counties also provide services to the four-county area. Although Treasure County provides a small number of workers to the four-county area, these jobs represent a large proportion (25 percent) of the total employment for residents of Treasure County. OEA, therefore, also included Treasure County in the study area.

T.2 Estimating Loss of Farming Output

OEA estimated loss of farming output by first calculating the acres of land used for grazing, irrigated farmland, and nonirrigated farmland within the right-of-way of each build alternative. OEA then calculated the value of output lost. OEA also calculated the output associated with irrigated lands in severed parcels that would no longer have access to irrigation systems. OEA assumed that winter wheat is the output of irrigated lands and alfalfa hay is the output of nonirrigated lands, based on the U.S. Department of Agriculture, National Agricultural Statistics Service data (2013) indicating that these are common crops in the study area. OEA did not estimate the loss of output from commercial forested land because the data available on lands intersecting the right-of-way do not distinguish between commercial and noncommercial forested land. However, based on data available for timber harvest, by county (Bureau of Business and Economic Research 2014), OEA expects the loss of forestry output to the right-of-way to be negligible to none.

Table T-3 shows the estimated output associated with lands for grazing in the right-of-way of each build alternative. OEA obtained the estimate by multiplying the acres of land lost by an average ratio of cattle heads per acre, an estimate of pounds of meat produced per head, and the dollar value of meat per pound, using data from the U.S. Department of Agriculture (2007, 2013).

Table T-3. Estimated Loss of Livestock Farming Output by Build Alternative

Build Alternative	Grazing Land in Right-of-Way (acres)	Cattle and Calf Inventory[a] (Heads)	Annual Meat Output (pounds)[b]	$ per pound[c] ($)	Output (2012 $)
Tongue River	3,594	225	92,096	$1.21	$111,436
Tongue River East	3,483	218	89,262	$1.21	$108,007
Colstrip	1,881	118	48,206	$1.21	$58,329
Colstrip East	1,844	115	47,260	$1.21	$57,185
Tongue River Road	3,958	247	101,429	$1.21	$122,729
Tongue River Road East	3,811	238	97,659	$1.21	$118,168
Moon Creek	3,726	233	95,484	$1.21	$115,535
Moon Creek East	3,616	226	92,650	$1.21	$112,106
Decker	2,185	137	55,983	$1.21	$67,739
Decker East	2,018	126	51,706	$1.21	$62,564

Notes:

[a] Assumes 16 acres of grazing land per head, based on 2007 Ag Census ratio of pastureland acres and cattle and calves inventory

[b] Based on annual production of 410 pounds of meat per head of cattle inventory in Montana in 2012

[c] Reflects annual gross income per pound of meat production in Montana in 2012. Gross income includes cash receipts and home consumption

Sources: U.S. Department of Agriculture, National Agricultural Statistics Service 2013; U.S. Department of Agriculture 2007

Table T-4 shows the estimated output associated with irrigated lands in the right-of-way of each build alternative. OEA obtained the estimate by multiplying the acres of land lost by an estimate of output per acre and the dollar value per unit of output. OEA used values for winter wheat because it is the most common crop for irrigated lands in the study area. TableT-4 also shows the loss of output from irrigated lands severed by the right-of-way of each build alternative.

Table T-4. Estimated Loss of Irrigated Winter Wheat Output by Build Alternative

Build Alternative	Irrigated Lands in Right-of-Way (acres)	Irrigated Lands in Severed Parcels (acres)	Annual Output per Acre[a] (bushels)	Annual Output in Right-of-Way (bushels)	Annual Output in Severed Parcels (bushels)	Value per Bushel[b] ($)	Value of Output in Right-of-Way (2012 $)	Total Value of Output (Right-of-Way and Severed Parcels (2012 $)
Tongue River	62.50	151.6	76.70	4,794	11,628	$7.96	$38,158	$130,715
Tongue River East	40.90	16.7	76.70	3,137	1,281	$7.96	$24,971	$35,167
Colstrip	51.60	134.9	76.70	3,958	10,347	$7.96	$31,503	$113,864
Colstrip East	0.00	0.0	76.70	0	0	$7.96	$0	$0
Tongue River Road	142.10	210.3	76.70	10,899	16,130	$7.96	$86,757	$215,151
Tongue River Road East	120.50	75.4	76.70	9,242	5,783	$7.96	$73,569	$119,603
Moon Creek	74.40	151.6	76.70	5,706	11,628	$7.96	$45,424	$137,980
Moon Creek East	52.80	16.7	76.70	4,050	1,281	$7.96	$32,236	$42,432
Decker	5.00	0.0	76.70	384	0	$7.96	$3,053	$3,053
Decker East	5.00	0.0	76.70	384	0	$7.96	$3,053	$3,053

Notes:
[a] Irrigated winter wheat yield for Bighorn County; typical of winter wheat yields for all counties in the four-county area
[b] 2012 Marketing year average for Montana
Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2013

Table T-5 shows the estimated output associated with nonirrigated lands in the right-of-way of each build alternative. As is the case with irrigated lands, OEA estimated the output by multiplying the acres of land lost by output per acre by the dollar value per unit of output, using data from the U.S. Department of Agriculture (2013). OEA used values for alfalfa hay because it is the most common crop for nonirrigated lands in the study area.

Table T-5. Estimated Loss of Nonirrigated Alfalfa Hay Output by Build Alternative

Build Alternative	Non-Irrigated Hay Land in Right-of-Way (acres)	Annual Output (tons per acre)[a]	Annual Output (tons)	$ / ton[b]	Output (2012 $)
Tongue River	78.70	2.20	173	146.00	$25,278
Tongue River East	59.70	2.20	131	146.00	$19,176
Colstrip	52.20	2.20	115	146.00	$16,767
Colstrip East	33.20	2.20	73	146.00	$10,664
Tongue River Road	66.80	2.20	147	146.00	$21,456
Tongue River Road East	47.70	2.20	105	146.00	$15,321
Moon Creek	86.50	2.20	190	146.00	$27,784
Moon Creek East	67.40	2.20	148	146.00	$21,649
Decker	0.10	2.20	0	146.00	$32
Decker East	0.00	2.20	0	146.00	$0

Notes:
[a] Average yield of Custer, Big Horn, Rosebud and Powder River Counties
[b] 2012 Marketing year average for Montana
Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2013

T.3 Estimating Construction Costs and Employment

Construction and operation of the proposed rail line would generate employment directly related to the project, and indirectly because of population growth and increasing demand for general services in the study area. OEA analyzed the impact of the proposed rail line on employment and earnings by modeling construction costs based on the Tongue River Road East Alternative. TRRC estimates this build alternative would have the highest construction costs. OEA estimates this build alternative would employ the most people during the construction period, as shown below. Analyzing the impacts of the build alternative that would employ the most people enabled OEA to identify the range of impacts from all build alternatives.

T.3.1 Construction Costs and Direct Employment

OEA applied the following assumptions and methods to calculate construction costs and direct employment that could result from construction of the proposed rail line.

- Tongue River Railroad Company provided construction cost estimates for each build alternative (Tongue River Railroad Company 2014a). Because almost all baseline monetary data used are in 2012 dollars, OEA deflated the construction costs to 2012 dollars. This allowed OEA to compare the estimated impacts with the characteristics of the affected environment and discuss the relative intensity of impacts. OEA deflated costs using the BLS Consumer Price Index (Bureau of Labor Statistics 2014).[2]
- OEA distributed construction expenditures over the construction period in proportion to the estimated direct employment in each year.
- OEA estimated direct employment by build alternative based on information provided by TRRC (2014b). This information was adjusted for revisions in the construction schedule and construction costs: the information indicated that TRRC plans on the following staff levels.
    - TRRC would hire 25 project managers for the duration of the construction period.
    - TRRC would hire 100 civil/grading contractors for any build alternative for most quarters of the year. This staff would be reduced to 25 in the last few quarters of the year. OEA assumed this reduction would occur in the last three quarters for most build alternatives and in the last two quarters for the Colstrip Alternative (because of its short period of construction).
    - TRRC would hire 50 track, signal, and telecom workers for any build alternative toward the last 2 years of the construction period, and would reduce such staff to 25 in the last few quarters. OEA assumed the reduction would occur in the last four quarters for most build alternatives and in the last two quarters for the Colstrip Alternative (because of its short period of construction).
- OEA analyzed build alternatives under two scenarios. The first scenario assumes construction would occur during 8 months of the year, excluding 4 winter months. In this scenario, OEA assumed workers would work in two shifts of 8 hours each. OEA estimated direct labor for each build alternative under this scenario using the staffing information from TRRC and construction cost estimates. The second scenario assumes construction would occur year-round (during all 12 months). In the second scenario, OEA assumed that workers would work 24 hours, in three shifts of 8 hours, during the 4 months of cold weather, and in two shifts of 8 hours during the remaining months. The construction schedule would be shorter and peak employment would be higher in the 12-month scenario.

[2] OEA deflated costs using annual averages. Inflation between 2012 and 2013 was 1.5 percent.

Tables T-6 and T-7 show the estimates of construction costs during the construction period. Table T-6, for example, shows that construction of the Tongue River Alternative would cost an estimated $602 million in 2012 dollars, with $201 million of the total spent in year 1 of the construction period. Table T-7 shows that, under the compressed 12-month construction scenario, a greater share of the total costs would be spent in year 1 for the Tongue River Alternative: an estimated $359 million in 2012 dollars.

Tables T-8 and T-9 show the estimates of direct labor during the construction period. Table T-8, for example, shows that the Tongue River Alternative would employ an estimated 225 construction workers during the second year of construction. Table T-9 shows that, under the compressed 12-month construction scenario, a greater share of the direct employment (295) would occur in year 1.

Table T-6. Distribution of Construction Costs with 8-Month Construction Schedule (2012 million $)

Build Alternative	Right-of-Way Length (miles)	Construction Costs								
		Total	Per Mile	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Tongue River	84.1	$602	$7.16	$201	$274	$128	-	-	-	-
Tongue River East	86.4	$731	$8.46	$270	$190	$100	$121	$50	-	-
Colstrip	42.3	$388	$9.17	$155	$183	$49	-	-	-	-
Colstrip East	45.1	$520	$11.54	$216	$152	$104	$48	-	-	-
Tongue River Road	84.0	$743	$8.84	$149	$149	$149	$203	$95	-	-
Tongue River Road East	86.0	$874	$10.17	$286	$201	$101	$105	$128	$53	-
Moon Creek	82.4	$724	$8.79	$145	$145	$145	$198	$92	-	-
Moon Creek East	84.7	$853	$10.07	$269	$190	$95	$95	$125	$69	$11
Decker	51.1	$733	$14.35	$122	$122	$122	$122	$167	$78	-
Decker East	49.7	$702	$14.13	$228	$153	$80	$80	$109	$51	-

Source: OEA estimates based on Tongue River Railroad Company 2012a, 2014a, 2014b

Table T-7. Distribution of Construction Costs with 12-Month Construction Schedule (2012 million $)

Build Alternative	Right-of-Way Length (miles)	Construction Costs					
		Total	Per Mile	Y1	Y2	Y3	Y4
Tongue River	84.1	$602	$7.16	$359	$243	-	-
Tongue River East	86.4	$731	$8.46	$289	$289	$153	-
Colstrip	42.3	$388	$9.17	$291	$97	-	-
Colstrip East	45.1	$520	$11.54	$283	$237	-	-
Tongue River Road	84.0	$743	$8.84	$298	$298	$148	-
Tongue River Road East	86.0	$874	$10.17	$290	$290	$294	-
Moon Creek	82.4	$724	$8.79	$294	$294	$135	-
Moon Creek East	84.7	$853	$10.07	$258	$258	$258	$80
Decker	51.1	$733	$14.35	$249	$249	$235	-
Decker East	49.7	$702	$14.13	$238	$238	$226	-

Source: OEA estimates based on Tongue River Railroad Company 2012a, 2014a, 2014b

Table T-8. Direct Employment with 8-Month Construction Schedule

Build Alternative	Jobs							
	Total	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Tongue River	496	165	225	105				
Tongue River East	602	223	157	82	100	41		
Colstrip	320	128	151	41				
Colstrip East	429	178	125	85	40			
Tongue River Road	612	122	122	122	167	78		
Tongue River Road East	720	236	166	83	87	106	43	
Moon Creek	596	119	119	119	163	76		
Moon Creek East	703	222	156	78	78	103	57	9
Decker	604	101	101	101	101	137	64	
Decker East	578	188	126	66	66	90	42	

Notes:

[a] Direct employment estimates are based on information provided by TRRC, adjusted for updated construction schedules

[b] Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column in the table represents the total number of job-years.

Source: OEA estimates based on Tongue River Railroad Company 2014b

Table T-9. Direct Employment with 12-Month Construction Schedule

	Jobs				
Build Alternative	**Total**	**Y1**	**Y2**	**Y3**	**Y4**
Tongue River	496	295	200		
Tongue River East	602	238	238	126	
Colstrip	320	240	80		
Colstrip East	429	233	196		
Tongue River Road	612	245	245	122	
Tongue River Road East	720	239	239	242	
Moon Creek	596	242	242	112	
Moon Creek East	703	212	212	212	66
Decker	604	205	205	193	
Decker East	578	196	196	186	

Notes:
[a] Direct employment estimates are based on information provided by TRRC, adjusted for updated construction schedules
[b] Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column in the table represents the total number of job-years.
Source: OEA estimates based on Tongue River Railroad Company 2014b

T.3.2 Indirect and Induced Employment

OEA applied the following assumptions and methods to calculate the indirect and total employment that would result from the construction of the proposed rail line.

- OEA defined a job as a full-time or part-time position during one year. This definition differs from full-time equivalent employment in that it treats part-time and full-time employment equally. OEA adopted this definition because it is used by the U.S. Department of Commerce, Bureau of Economic Analysis and the regional economic impact model used to analyze job creation (IMPLAN).
- OEA used the regional economic impact model IMPLAN (IMpact analysis for PLANning) to estimate indirect and induced employment associated with the expenditures under each build alternative. IMPLAN is a regional impact model originally developed in the 1970s for the U.S. Forest Service and more recently developed and commercialized by IMPLAN Group, Inc. IMPLAN is used to estimate the output, jobs, earning and value added that is generated in a geographically defined area by an increase in final demand for a specific product or service. IMPLAN results are based on commodity flow data, from producers to intermediate and final consumers, that capture how industrial sectors purchase and sell to each other and how consumers spend their incomes among industrial sectors. IMPLAN estimates the indirect and induced employment in the study area based on expenditures associated with rail construction and operation. OEA used the IMPLAN model as follows.

- OEA used construction costs for each build alternative and the distribution of costs over time during the construction period as defined in Section T.3.1, *Construction Costs and Direct Employment* (Tables T-6 and T-7) as input to the model (the initial increase in local demand that would spur increased jobs and earnings).
- OEA used IMPLAN 2012 data for the study area in the IMPLAN analysis.
- OEA assumed that the study area share of expenditures would be 45 percent. In other words, of the total costs for building the rail line, 45 percent would be spent in the study area. OEA assumed that TRRC would purchase all rail, ties, connectors, heavy equipment, and ballast from outside the state of Montana. OEA assumed that local expenditures would include right-of-way acquisition, diesel expenses, earthwork, and the unloading and installation of rail materials, culverts, fencing and similar tasks. OEA based these assumptions on estimates for comparable projects. In particular, 45 percent represents the share of these tasks in the total costs of rail construction estimated for a hypothetical rail line between Arizona and the Montana Powder River Basin (Surface Transportation Board 2011, Appendix B). Over the entire construction period, this would amount to an estimated $393 million for the Tongue River Road East Alternative, the build alternative with highest overall cost ($874 million, per Table T-6).
- OEA modeled local expenditures as an increase in demand for local services, using values from IMPLAN industry 36 (*construction of other new nonresidential structures*). This industry includes bridges, tunnels, elevated highways, mass transit, and other new construction.
- OEA customized the parameters of the IMPLAN model to adjust for local labor earnings in the construction, rail transport and mining industries based on Bureau of Labor Statistics data (2013a, 2013b).
- OEA used 2012 dollar values.

Tables T-10 through T-13 show estimated direct, indirect, and induced employment that could occur because of construction of the proposed rail line during the construction period. Construction of the Tongue River Road East Alternative would generate an estimated 2,534 jobs in the construction industry over the 6-year construction period (Table T-10). This includes workers employed by TRRC, workers in those firms servicing the rail line and workers in firms demanded from by workers employed by TRRC and its providers. The total includes full-time and part-time jobs. However, peak annual jobs in the construction industry would be highest under the Tongue River Alternative, under the year-round construction schedule. Under the Tongue River Alternative, peak employment in the construction industry could reach 1,039 in year 1 under the year-round construction schedule (Table T-11).

Table T-10. Direct, Indirect, and Induced Employment with 8-Month Construction Schedule, Construction Industry

	Jobs[a]							
Build Alternative	**Total**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**
Tongue River	1,745	582	793	370	-	-	-	-
Tongue River East	2,118	783	552	288	351	144	-	-
Colstrip	1,124	450	531	143	-	-	-	-
Colstrip East	1,508	626	441	301	140	-	-	-
Tongue River Road	2,151	430	430	430	587	274	-	-
Tongue River Road East	2,534	829	584	292	305	371	153	-
Moon Creek	2,099	420	420	420	572	267	-	-
Moon Creek East	2,472	780	549	275	275	362	200	31
Decker	2,124	354	354	354	354	483	225	-
Decker East	2,036	661	444	233	233	317	148	-

Notes:
[a] Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column represents the total number of job-years.
Source: OEA estimates based on Tongue River Railroad Company 2014a, 2014b, and using IMPLAN, as explained in the text

Table T-11. Direct, Indirect, and Induced Employment with 12-Month Construction Schedule, Construction Industry

	Jobs[a]				
Build Alternative	**Total**	**Y1**	**Y2**	**Y3**	**Y4**
Tongue River	1,744	1,039	705	-	-
Tongue River East	2,119	837	837	445	-
Colstrip	1,124	843	281	-	-
Colstrip East	1,508	820	688	0	-
Tongue River Road	2,152	862	862	428	-
Tongue River Road East	2,533	841	841	851	0
Moon Creek	2,098	853	853	392	-
Moon Creek East	2,471	746	746	746	233
Decker	2,125	722	722	681	0
Decker East	2,034	690	690	654	0

Notes:
[a] Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column represents the total number of job-years.
Source: OEA estimates based on Tongue River Railroad Company 2014a, 2014b, and using IMPLAN, as explained in the text

In addition to jobs in the construction industry, local expenditures would generate indirect and induced jobs in other industries, such as architectural and engineering services, food services, real estate, wholesale and retail trade, and other services. Based on IMPLAN modeling, an additional 0.89 job would be supported in these industries for each job supported in the construction industry. The total number of jobs supported in the study area during construction of the Tongue River Alternative, would peak in year 1 at 1,974 jobs (Table T-13), under a year-round construction schedule.

Table T-12. Direct, Indirect, and Induced Employment with 8-Month Construction Schedule, All Industries

	Jobs							
Build Alternative	**Total**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**
Tongue River	3,313	1,104	1,506	703	-	-	-	-
Tongue River East	4,022	1,488	1,047	547	666	274	-	-
Colstrip	2,135	854	1,009	272	-	-	-	-
Colstrip East	2,863	1,189	837	571	266	-	-	-
Tongue River Road	4,086	817	817	817	1,115	520	-	-
Tongue River Road East	4,810	1,574	1,108	554	579	705	290	-
Moon Creek	3,985	797	797	797	1,087	507	-	-
Moon Creek East	4,694	1,482	1,043	522	522	687	379	59
Decker	4,033	672	672	672	672	917	428	-
Decker East	3,865	1,255	843	442	442	602	281	-

Notes:
[a] Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column represents the total number of job-years.
Source: OEA estimates based on Tongue River Railroad Company 2014a, 2014b, and using IMPLAN, as explained in the text.

Table T-13. Direct, Indirect, and Induced Employment with Twelve-Month Construction Schedule, All Industries

	Jobs				
Build Alternative	**Total**	**Y1**	**Y2**	**Y3**	**Y4**
Tongue River	3,313	1,974	1,339	-	-
Tongue River East	4,022	1,589	1,589	844	-
Colstrip	2,135	1,601	534	-	-
Colstrip East	2,863	1,557	1,306	0	-
Tongue River Road	4,086	1,637	1,637	812	-
Tongue River Road East	4,811	1,597	1,597	1,617	0
Moon Creek	3,985	1,620	1,620	745	-
Moon Creek East	4,694	1,417	1,417	1,417	443
Decker	4,035	1,371	1,371	1,293	0
Decker East	3,865	1,311	1,311	1,243	0

Notes:
Jobs correspond to full-time and part-time employment during one year, rather than persons employed. The Total column represents the total number of job-years.
Source: OEA estimates based on Tongue River Railroad Company 2014a, 2014b, and using IMPLAN, as explained in the text

T.3.3 Employment from Rail Operation

OEA estimated total employment impacts of rail operation using the IMPLAN model. OEA based the estimates on the number of direct employees during rail operation (as estimated by TRRC) and total employment multipliers from IMPLAN's industry 333 (*transport by rail*) for the study area. OEA first customized the model to adjust for local labor earnings in the construction, rail transport, and mining industries based on Bureau of Labor Statistics data (2013a, 2013b). OEA estimates that the build alternatives would employ 24 staff members (Chapter 2, *Proposed Action and Alternatives*). Annual direct employment of 24 employees would support additional employment of 54 jobs in the study area based on IMPLAN employment multipliers.

T.4 Estimating Population Increase

Yellowstone, Fallon, Carter, Treasure, and Sheridan (Wyoming) Counties provide a portion of the workers to the four-county area. However, the commute from main population centers in those counties (e.g., Billings and Sheridan) to the project location (e.g., Colstrip, Ashland, Miles City) would typically take more than 2 hours in each direction. Although some construction workers may choose this commute, OEA expects this would be a small portion of the construction workforce. Construction of the proposed rail line would likely bring construction workers to the four-county area.

T.4.1 Population Increase in the Four-County Area

Data on the number of construction workers currently residing in the four-county area are not available. OEA calculated the increase of construction workers in the four-county area for year 1 of construction under the Tongue River Alternative, assuming the 12-month construction scenario. This would be the year, build alternative, and construction scenario that would generate the most employment in the four-county area (295), allowing OEA to establish a range of impacts from the build alternatives. OEA adopted the following assumptions.

- OEA assumed that the proportion of construction workers in the four-county labor force is the same as the proportion of construction jobs in the total number of jobs in the four-county area (4.4 percent of the labor force) (Bureau of Labor Statistics 2012).
- OEA assumed that construction workers account for 4.4 percent of the total employed population. OEA also assumed that construction workers account for 4.4 percent of the unemployed population. In 2012, the total employed population in the four-county area was 15,491 and the total unemployed population was 1,250 (Bureau of Labor Statistics 2012). Therefore, OEA estimated that 682 construction workers were employed in the four-county area in 2012 and 55 construction workers were unemployed in the four-county area in 2012.
- OEA assumed that the labor force will grow at an annual rate of 0.75 percent, the same rate as the projected annual growth of the four-county population (Montana Department of Commerce 2013 and U.S. Census Bureau 2010) and that the unemployment rate will remain the same. Therefore, in year 1 (2015), the year of peak construction employment, 697 construction workers would be employed in the four-county area and 57 would be unemployed.
- OEA assumed that only unemployed construction workers would be available from the four-county population for employment during the construction period. These construction workers would have, or could acquire, the training required to build a rail line.
- OEA assumed that incoming construction workers would not move with their families. This is a reasonable assumption given that peak construction would last 1 year. Nearby urban areas could provide construction workers (e.g., Billings).
- Under the assumptions above, 238 (295 minus 57) construction workers would be expected to move to the four-county area during the peak employment year (2015), under the Tongue River Alternative. For the other build alternatives, the increase in construction workers would be equal to or less than the increase estimated above because peak employment for the other build alternatives would be equal to or less than peak employment for the Tongue River Alternative, under the 12-month construction scenario (Table T-13).

T.4.2 Population Increase in the Study Area

Although total direct, indirect, and induced employment would be, at most, 1.7 percent of the employment in the study area (in year 1 of peak construction under the Tongue River Alternative) (Chapter 15, *Socioeconomics*), some increase in construction workers in the study area could also occur. OEA calculated the move of construction workers to the study area for year 1 of construction under the Tongue River Alternative, assuming the 12-month construction scenario. This would be the year, build alternative, and construction scenario that would generate the most employment in the study area (1,039), allowing OEA to establish a range of impacts from build alternatives. OEA adopted the following assumptions.

- OEA assumed that the proportion of construction workers in the study area labor force is the same as the proportion of construction jobs in the total number of jobs in the study area (6.5 percent of the labor force) (Bureau of Labor Statistics 2012).
- OEA assumed that construction workers account for 6.5 percent of the total employed population in the study area. OEA also assumed that construction workers account for 6.5 percent of the unemployed population. OEA estimated that 7,391 construction workers were employed in the study area in 2012 and 388 construction workers were unemployed in the study area in 2012 (Bureau of Labor Statistics 2012).
- OEA assumed that the labor force will grow at a rate of 1.3 percent, the same as the projected annual growth of the study area population (Montana Department of Commerce 2013 and U.S. Census Bureau 2010) and that the unemployment rate would not change. Therefore, in year 1, the year of peak construction employment, 7,783 construction workers would be employed in the study area and 409 would be unemployed.
- OEA assumed that only unemployed construction workers would be available from the study area population for employment during the construction period. These construction workers would have, or could acquire, the training required to build a rail line.
- OEA assumed that construction workers would not move with their families.
- Under the assumptions above, 630 (1,039 minus 409) construction workers would be expected to move to the study area during the peak employment year (2015). For the other build alternatives, the increase in population would be the same or less, given that peak employment would be the same or less (Table T-14).

Table T-14. Population Increase during Peak Employment Year (2015), 12-Month Construction Schedule

	Four-County Area		Study Area	
Build Alternative	Incoming Construction Workers	Share of Local Population (%)	Incoming Construction Workers	Share of Local Population (%)
Tongue River	238	0.6	630	0.3
Tongue River East	181	0.5	428	0.2
Colstrip	183	0.5	434	0.2
Colstrip East	176	0.5	411	0.2
Tongue River Road	188	0.5	453	0.2
Tongue River Road East	182	0.5	432	0.2
Moon Creek	185	0.5	444	0.2
Moon Creek East	155	0.4	337	0.1
Decker	148	0.4	313	0.1
Decker East	139	0.4	281	0.1

Source: OEA estimates, as explained in the text

T.5 Estimating Demand for Housing and Public Services

T.5.1 Housing in the Four-County Area

OEA calculated the demand for housing and public services in the four-county area based on increased employment and population. OEA used the same build alternative and construction schedule as those used for the analysis of peak employment because these would generate the largest change in demand for housing (the Tongue River Alternative under the 12-month construction schedule). OEA made the following assumptions.

- OEA assumed that each construction worker moving to the four-county area would require a housing unit.
- OEA estimated the number of vacant rental units in 2015 (year 1 of construction) based on the average number of rentals available in the 2008 to 2012 period and assumed that the number of available rentals would increase at the same rate as the population.
- OEA estimated that the demand for 238 housing units (incoming construction workers, Table T-14) would correspond to approximately 57 percent of the average number of housing units projected to be vacant and for rent in 2015 in the four-county area (418) (projected as described above and using data presented in Chapter 15, Section 15.4.2, *Housing and Public Services*). The demand for housing would be the same or less for the

other build alternatives, given that peak employment would be the same or less (Table T-15).

T.5.2 Housing in the Study Area

OEA calculated the demand for housing and social services in the study area based on increased employment and population using the Tongue River Road East Alternative and the following assumptions.

- OEA assumed that each construction worker moving to the study area would require a housing unit.
- OEA estimated the number of vacant rental units in 2015 (year 1 of construction) in the study area based on the average number of rentals available in the 2008 to 2012 period and assumed that the number of available rentals would increase at the same rate as the population.
- OEA estimates that the demand for 630 housing units (incoming construction workers, Table T-14) would correspond to approximately 39 percent of the average number of housing units projected to be vacant and for rent in the study area (1,611). The demand for housing would be the same or less for the other build alternatives, given that peak employment would be the same or less (Table T-15).

Table T-15. Demand for Housing during Peak Employment Year (2015), 12-Month Construction Schedule

	Four-County Area		Study Area	
Build Alternative	Demand for Housing (Housing Units)	Share of Vacant Housing Units for Rent (%)	Demand for Housing (Housing Units)	Share of Vacant Housing Units for Rent (%)
Tongue River	238	57.0	630	39.1
Tongue River East	181	43.3	428	26.6
Colstrip	183	43.7	434	26.9
Colstrip East	176	42.1	411	25.5
Tongue River Road	188	45.0	453	28.1
Tongue River Road East	182	43.5	432	26.8
Moon Creek	185	44.4	444	27.6
Moon Creek East	155	37.1	337	20.9
Decker	148	35.4	313	19.4
Decker East	139	33.3	281	17.5

Source: OEA estimates, as explained in the text

T.5.3 Demand for Public Services

OEA expects that the demand for public services, such as law enforcement and fire protection, would increase in rough proportion to the increase in population. For the build alternatives, OEA estimates that population would increase by up to 0.6 percent relative to the projected local population in the four-county area in 2015, depending on the build alternative and construction schedule (Table T-14). However, the increase in demand for public services may be considerably higher in some communities, depending on the population distribution. Communities that could see an influx of construction workers seeking temporary residence include the Miles City, Forsyth, Colstrip, Broadus, Hardin, and smaller communities along Highway 212, such as Ashland, Lame Deer, Muddy, Busby, and Crow Agency. Because these communities are mostly small, the increase in demand for local housing and public services from the influx of construction workers may be particularly noticeable, depending on the distribution of construction workers. The impacts, however, would be temporary.

In the study area, OEA expects that the demand for public services would increase by 0.3 percent. The increase would be temporary.

Because construction workers were assumed to move within commuting distance of the project area without bringing their families, there would be no increase in demand for public schools during construction. During operation, the increase in demand for public schools would be negligible, given the size of the expected increase in population (Chapter 15, *Socioeconomics*).

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